FACULTY OF LAW
Tiensestraat 41 box 3413
3000 LEUVEN, BELGIUM
thomas.deromph@kuleuven.be

FACULTY OF LAW
Martelarenlaan 42
3500 HASSELT, BELGIUM
thomas.deromph@uhasselt.be

Thomas J. de Römph

THE LEGAL TRANSITION TOWARDS A CIRCULAR ECONOMY
EU ENVIRONMENTAL LAW EXAMINED

June 2018

The legal transition towards a Circular Economy

EU environmental law examined

Thomas J. de Römph

Dissertation submitted with a view to obtaining the degree of Doctor of Law (Ph.D.) at the Faculties of Law of the KU Leuven and Hasselt University

KU Leuven - Faculty of Law
supervisor: Professor Geert Van Calster

Hasselt University - Faculty of Law
supervisor: Professor Bernard Vanheusden

The legal transition towards a Circular Economy

EU environmental law examined

Thomas J. de Römph

Dissertation submitted with a view to obtaining the degree of Doctor of Law (Ph.D.) at the Faculties of Law of the KU Leuven and Hasselt University

KU Leuven - Faculty of Law
supervisor: Professor Geert Van Calster

Hasselt University - Faculty of Law
supervisor: Professor Bernard Vanheusden

June 2018

Doctoral dissertation submitted to the examining committee for consideration

Predefence – Leuven, 9 April 2018

Public defence – Leuven, 23 June 2018

Acknowledgements

There are many I wish to thank for their part in the successful completion of this project. People who have inspired me and made me go the extra mile, who have professionally, financially and morally supported and encouraged me whenever I needed it.

Firstly, I would like to express my sincere gratitude to my supervisors Professor Geert Van Calster (KU Leuven) and Professor Bernard Vanheusden (Hasselt University) for their continuous belief in me, and their commitment and guidance during these past years. I am thankful for everything they have taught me on a professional as well as on a personal level, and for the opportunities they have given me. Working with them has been a real privilege.

In addition, I wish to express my special appreciation and thanks to Professor Jacqueline Cramer (Innovation Studies, Utrecht University) - we spent many hours discussing my dissertation, which helped me to grow as a researcher. I would like to thank the members of my supervisory committee, who besides my supervisors are Professor Karel van Acker (Sustainable Materials Management, KU Leuven) and Professor Geert De Baere (European Law, KU Leuven). Of course, I would also like to extend my thanks to the members of my examining committee for their final commentaries and participation. Besides Van Calster, Vanheusden and Cramer, they are Professor Owen McIntyre (Environmental Law, University College Cork), Professor Chris Backes (Environmental Law, Utrecht University), Elly Van de Velde (Tax Law, Hasselt University) and, as the Chair, Professor Emeritus Jacques Herbots (KU Leuven).

This work would not have been possible without the financial support of the Flemish government via the Policy Research Centre for Sustainable Materials Management. The Centre gave me the opportunity to collaborate with peers and experts at an interdisciplinary level, and I would like to thank my former colleagues at the Centre for teaching me to look beyond the law. Thanks also to Hasselt University for additional funding and to KU Leuven for work-related reimbursement of expenses, and for the access both universities gave me to their facilities to get ahead in my PhD project.

With great joy, I would like to thank the 'Vier Valkeniers', ''t Tweede Verdiep', 'Team Hasselt' and the 'Writing Group', and many more great colleagues and friends for sharing their smiles with me and, indeed, for making my life in Belgium more meaningful on a personal level. Their positive vibes and friendship have been absolutely priceless. As for my close friends who stayed behind in the Netherlands, they have never complained about my absence at special occasions and they have always kept asking about my PhD even though, perhaps, they did not quite get what I was doing in Belgium after all… To all of them: I feel blessed having you in my life.

Words cannot express how grateful I am to my mother for always providing good advice if things did not exactly go as planned or as hoped. She has also financially supported me for a long time. Further I would like to thank my entire family for all their love and encouragement. 'Step by step', is what they told me time and again. Even though I may not have been convinced at the time, I see now at last that it is true.

Last but not least, I am deeply grateful to and sincerely proud of Ron, who has made my pursuits ours. What once started as a one-man show has grown into a shared adventure and future. That this PhD project was ever completed owes to him, for he has always and unconditionally supported me in numerous ways, not least by also moving to Belgium and by just telling me to sit back and relax for a while. I am forever grateful to have him by my side.

Thomas
Ghent, June 2018

Abstract

English

The legal transition towards a Circular Economy – EU environmental law examined
Pressures on natural resources, the environment and human health have increased in the past decades and will continue to rise if no changes will come about in many of our current patterns of resource extraction, manufacturing, product use and waste management.

To this end, the European Union (EU) aims at transforming the Union's economy from a linear system into a so-called Circular Economy, which is an economy based on a life-cycle approach. Establishing the right regulatory regime for a Circular Economy is one of the challenges facing the EU. This doctoral dissertation aims to contribute to a better understanding of the legal conditions that ideally need to be fulfilled in order to enhance the transition towards a Circular Economy in EU environmental law.

The study first analyzes the embedding of the Circular Economy concept in EU primary law and EU environmental policy, whereupon three key laws are identified for the transition. Next, these laws are separately analyzed in three case studies based on a particular starting point derived from the Circular Economy ideology to determine which aspects of the laws obstruct the transition. Additionally, certain improvements to the policy framework for the Circular Economy, i.e. the 2015 Circular Economy Package, are proposed to address the legal obstacles. The case studies concern:

Ecodesign Framework Directive (EFD), on the possibility to broaden the law's scope to non-energy-related products such as wooden products. The analysis shows that a greater emphasis on material-related aspects can already be legally founded. However, there are certain additional features that must be taken into account as well. For example, several principles of environmental law become more relevant. In addition, the consistent use of terminology is essential; this generally concerns the definitions and concepts laid down in other framework laws. Finally, additional information flows on material use need to be generated with the support of specific policy instruments outside the realm of the EFD. All in all, these issues are likely to further enhance the consistency and coherence of the regulatory framework for wooden products.

Waste Framework Directive (WFD), on the opportunities to encourage qualitative recycling, which includes a closer examination of the use of harmonized European standardization. The study reveals that the WFD does not provide any guidance in specifying the legal meaning of 'qualitative recycling'. The only instrument that is material-specific and can therefore potentially grasp 'high quality' is the End-of-Waste (EoW) instrument. A shortcoming of EU EoW criteria is, however, that they only set minimum quality thresholds, which was also the case for the criteria for glass wastes. Based on similar shortcomings, the alternative of harmonized European standardization is not indisputably appropriate either. Therefore, additional means for promoting qualitative recycling need to be explored, such as other legal acts, soft-law and/or private-party instruments.

REACH, on the differences in compliance between virgin and recycled materials. This analysis shows that plastics recyclers encounter several compliance problems under REACH. Generally speaking, it is more challenging for recyclers than for primary manufacturers to collect the information required under the (exemption of the) registration rules. The information gap also affects the possibility to meet the requirements on the authorization or restriction of certain risky substances or mixtures. Amongst others, therefore, REACH should create more room for uncertainty and innovation, and should be better attuned to the Ecodesign framework, triggering producers to share the responsibility for the quality of (waste) materials.

Besides these more specific recommendations for each individual law, some overarching recommendations to change the EU regulatory regime for the Circular Economy are made as well. This includes the recognition of 'life-cycle thinking' as a new environmental legal principle and

‘EU materials law’ as a branch of EU environmental law that regulates the materials system ideally pursuant to the Circular Economy concept.

Dutch

De juridische transitie naar een circulaire economie – EU milieurecht onderzocht

De druk op natuurlijke hulpbronnen, het milieu en onze gezondheid is in de afgelopen decennia opgelopen. Deze ontwikkeling zal nog verder doorzetten als er geen veranderingen plaatsvinden ten aanzien van de manier waarop we grondstoffen winnen, producten vervaardigen, producten gebruiken en afval beheren.

Daartoe beoogt de Europese Unie (EU) haar economie van een lineair systeem te transformeren naar een zogenaamde circulaire economie die gestoeld is op een levenscyclusbenadering. De realisatie van het juiste wettelijk kader voor de circulaire economie is een van de uitdagingen waarvoor de EU staat. Het doel van dit proefschrift is om een bijdrage te leveren aan het beter inzichtelijk maken van de juridische voorwaarden om de transitie naar een circulaire economie in Europees milieurecht te bevorderen.

Allereerst wordt er gekeken naar de verankering van de circulaire economie in de primaire wetgeving van de EU en in het Europees milieubeleid. Daarnaast worden er drie wetten globaal besproken die een essentiële plek innemen in de transitie. Deze wetten worden vervolgens in drie afzonderlijke casestudy’s geanalyseerd op grond van een bepaald uitgangspunt dat ontleend is aan het gedachtegoed van de circulaire economie om te bepalen welke aspecten van die wetten belemmerend werken. Er wordt daarbij eveneens besproken welke verbeteringen aangebracht kunnen worden in het Europees beleidskader voor de circulaire economie, te weten het Pakket Circulaire Economie uit 2015, om zo de juridische barrières te slechten. De casestudy’s zijn:

Kaderrichtlijn ecodesign (EFD), over de mogelijkheid om het toepassingsgebied van de richtlijn uit te breiden naar niet-energiegerelateerde producten, zoals houten producten. De uitkomst van de analyse is dat het momenteel al mogelijk is om materiaalgerelateerde aspecten in productontwerp beter te benadrukken. Er dient echter ook rekening te worden gehouden met andere aspecten. Verschillende milieurechtsbeginselen zullen bijvoorbeeld relevanter worden. Daarnaast zal het consistente gebruik van terminologie belangrijk zijn; dit betreft veelal de definities en concepten zoals vastgelegd in andere kaderwetten. Ten slotte zullen bepaalde beleidsinstrumenten die buiten de directe invloedssfeer van de EFD liggen moeten worden aangeboord om zo in de aanvullende informatiestromen over materiaalgebruik te voorzien. Al met al zouden deze punten de consistentie en samenhang van het juridisch raamwerk voor houten producten waarschijnlijk verbeteren.

Kaderrichtlijn afvalstoffen (WFD), over de mogelijkheden om kwalitatieve recyclage aan te moedigen, wat tevens een nader onderzoek vergt naar het gebruik van geharmoniseerde Europese normen. De studie toont aan dat de WFD geen hulp biedt bij het uitklaren van ‘kwalitatieve recyclage’. Het enige instrument dat materiaalspecifiek is en dat daarom de potentie heeft om ‘goede kwaliteit’ te vatten is het einde-afvalinstrument. Een tekortkoming daarvan is dat het enkel minimum grenswaarden stelt, zoals ook het geval is bij de criteria voor afvalstoffen van glas. Dezelfde soort tekortkomingen maken dat het alternatief, namelijk het gebruik van Europees geharmoniseerde normalisatie, óók niet het juiste middel is. Hierdoor zullen er andere manieren moeten worden gezocht om kwalitatieve recyclage te bevorderen, zoals via andere rechtshandelingen, soft law-instrumenten en/of privaatrechtelijke instrumenten.

REACH-verordening, over de verschillen tussen primaire en gerecycleerde materialen in de naleving van de verordening. Het blijkt dat de recyclagebedrijven die plastics verwerken verschillende problemen ondervinden met de naleving van REACH. Het is over het algemeen moeilijker voor recycleurs om aan de informatie te geraken die nodig is om aan de wettelijke registratie-eisen (of de vrijstelling daarvan) te voldoen. Het informatietekort tast ook de mogelijkheid aan om aan de autorisatie- en restrictievereisten te voldoen. Er zou daarom onder andere meer ruimte moeten komen voor onzekerheid en innovatie. Ook zou REACH beter moeten

worden afgestemd met het ecodesignbeleidskader, om zo de verantwoordelijkheid voor kwalitatieve (afval-)materialen te delen met de producenten.

Naast deze specifieke aanbevelingen, worden er ook overstijgende aanbevelingen gedaan om het Europees wettelijk kader voor de circulaire economie aan te passen. Hieronder valt de erkenning van ‘levenscyclusdenken’ als een nieuw milieurechtsbeginsel en van ‘Europees materialenrecht’ als een rechtstak van het Europees milieurecht dat het materialen systeem idealiter volgens het denkbeeld van de circulaire economie reguleert.

List of acronyms and abbreviations

2014 CE Communication	COM(2014) 398 *(part of the 2014 CE Package)*
2014 CE Package	Circular Economy Package *(published in 2014, but withdrawn)*
2015 CE Package	Circular Economy Package *(published in 2015, generally referred to as 'CE Package')*
2018 CE Package	CE Package *(published in 2018)*
BAT	Best Available Technique
BPD	Biocidal Products Directive
BPR	Biocidal Products Regulation *(not to be confused with 'BRP')*
BREF	Best Available Techniques Reference Documents
BRP	Better Regulation Programme *(not to be confused with 'BPR')*
CBA	cost-benefit analyses
CE	Circular Economy
CE Action Plan	Action Plan for a Circular Economy
CE benchmark	Circular Economy benchmark
CE marking	'Conformité Européene' *(not 'Circular Economy')* marking
CEN	Comité Européen de Normalisation
CENELEC	Comité Européen de Normalisation Électrotechnique
CE Package	Circular Economy Package *(published in 2015, same as '2015 CE Package)*
CJEU	Court of Justice of the European Union
CLP Regulation	Classification, Labelling and Packaging Regulation
CMR	carcinogenic, mutagenic or toxic for reproduction (substance)
Commission	European Commission
Council	European Council
CPD	Construction Products Directive
CPR	Construction Products Regulation
CSA	Chemical Safety Assessment
CSR	Chemical Safety Report
C&D	Construction and demolition
Decision 2016/1332	EU Ecolabel criteria for furniture
Decision 2017/176	EU Ecolabel criteria for wooden floor coverings
DG	Directorate-General of the European Commission
DG CLIMA	DG for Climate Action
DG ENER	DG for the Energy Union, Energy and Climate Action
DG ENV	DG for the Environment
DG GROW	DG for the Internal Market and Industry
DoP	Declaration of Performance
DDS	due diligence system
EAP	Environment Action Programme
EC	European Community
Ecolabel Regulation	Regulation on the EU Ecolabel
EC Treaty	Treaty establishing the European Community
EEA	European Environment Agency
EEE	electrical and electronic equipment
EFD	Ecodesign Framework Directive
ELV Directive	End-of-Life Vehicles Directive
EMAS	Eco-Management and Audit Scheme
EoW	End-of-Waste
EP	European Parliament
EPR	Extended Producer Responsibility

ErP	energy-related product
ESO	European Standardization Organization
ESR	European Standardization Regulation
ESS	European Standardization System
ETSI	European Telecommunications Standards Institute
EU	European Union
EU EoW criteria	EU End-of-Waste criteria
EU GPP	EU Green Public Procurement
EuP	energy-using product
EU SDS	EU Sustainable Development Strategy *(not to be confused with 'SDS')*
EUTR	EU Timber Regulation
EU Treaties	TEU and TFEU
FLEGT	Forest Law Enforcement, Governance and Trade Action Plan
FSC	Forest Stewardship Council
GPP	Green Public Procurement
IPP	Integrated Product Policy
ISO	International Organization for Standardization
JMRM	Joint Monitoring and Review Mechanism
JRC	Joint Research Centre
LCA	life-cycle assessment
LFD	Landfill Directive
LM	landfill mining
MLP	multi-level perspective
MO	Monitoring Organizations
New Approach	Resolution on a technical harmonization and standards
NGO	non-governmental organization
NSO	national standardization organization
OECD	Organisation for Economic Co-operation and Development
Packaging Directive	Packaging and Packaging Waste Directive
PBT	persistent, bioaccumulative and toxic (substance)
PEFC	Programme for the Endorsement of Forest Certification
POPs	persistent organic pollutants (substances)
PPD	Public Procurement Directive
PSS	Product Service Systems
PWD	Product Warrantee Directive
REACH	Regulation on the Registration, Evaluation, Authorisation and Restriction of Chemicals
REFIT	Regulatory Fitness and Performance Programme
RMOA	risk management options analysis
RoHS2	Regulation on the restriction of hazardous substances in EEE
R&D	research and development
SCP Action Plan	Action Plan for Sustainable Consumption and Production
SDS	Safety Data Sheet *(not to be confused with 'EU SDS')*
SFM	Sustainable Forest Management
SME	small and medium-sized enterprise
SVHC	substance of very high concern
SWD(2016) 180	EU GPP criteria for office buildings
SWD(2017) 283	EU GPP criteria for furniture
TEU	Treaty on European Union
TFEU	Treaty on the Functioning of the European Union
t/y	tonne(s) per year

UN	United Nations
UNEP	United Nations Environment Programme
Union	European Union
VA	voluntary agreement
VPA	FLEGT Voluntary Partnership Agreement
vPvB	very persistent and very bioaccumulative (substance)
WEEE	waste electrical and electronic equipment
WFD	Waste Framework Directive
WSR	Waste Shipments Regulation
WTO	World Trade Organization
w/w	weight by weight

List of charts and graphics

Condensed table of contents

Table of contents

PART I – INTRODUCTION

1. The transition towards a Circular Economy

The call for using materials more sustainably is placed high on the political agenda due to numerous interlinked challenges that relate to resource extraction and processing, the manufacturing and use of products, and the way waste is treated.

The European Union (EU) has responded to these challenges by developing and promoting a new concept: the 'Circular Economy'. The concept concerns the materials system, which contains all materials in whatever form (as a resource, a substance, a product or waste) and all activities related to materials. At its core, a Circular Economy is an economy in which materials are used sustainably. The Circular Economy approach therefore not only aims at conserving resources, it also tries to manage waste properly and to minimize and control the environmental and health impacts of the materials we use. The European Commission (Commission) gives substance to the Circular Economy concept by the adoption of the so-called 'Circular Economy Package' (CE Package).[1] The CE Package is a set of policy documents and legislative proposals on waste that aims at stimulating the transition towards a Circular Economy in the EU.

This research is about that transition. More precisely, it is about the legal transition towards a Circular Economy in EU environmental law. Before providing the research questions that should define which aspects of the Circular Economy transition are addressed in this dissertation, however, I will first clarify the challenges in more detail. Next, the goal of the EU to transform its economy into a Circular Economy is further clarified. This includes an explanation of how the EU interprets the concept and a broad outline of the content of the CE Package. One of the main objectives of the CE Package is to ensure that the right regulatory regime is in place for the Circular Economy to flourish. This is also the starting point for this dissertation, which will be further clarified in the final section of this Chapter.

1.1 Challenges related to the materials system

Starting from the Industrial Revolution, in the mid-18th century, there has been an increase of human activities that pushed the planet outside the Holocene into an era where humans constitute the dominant driver of change to the Earth System.[2] Although often challenged by politicians, many academics believe we are now in the so-called 'Anthropocene'.[3] Human-induced challenges related to the earth's system. They affect virtually all States and regions around the world, resulting in a shared responsibility to address them. This also applies to the challenges relating to the materials system.

---

[1] The CE Package consists of an Action Plan Communication and an Annex, and four legislative proposals to change a variety of EU waste Directives, including Annexes, and two Commission Staff Working Documents: European Commission, *Closing the loop – An EU action plan for the Circular Economy*, COM(2015) 614 (CE Action Plan); European Commission, *Annex to the Communication Closing the loop – An EU action plan for the Circular Economy*, COM(2015) 614/2; European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595; European Commission, *Proposal for a Directive amending Directive 94/62/EC on packaging and packaging waste*, COM(2015) 596; and European Commission, *Proposal for a Directive amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment*, COM(2015) 593; European Commission, *Additional analysis to complement the impact assessment SWD (2014) 208 supporting the review of EU waste management targets*, SWD(2015) 259; and European Commission, *Implementation Plan*, SWD(2015) 260, respectively.

[2] The Earth System is by Rockström *et al.* defined as the *'integrated biophysical and socioeconomic processes and interactions* […] *among the atmosphere, hydrosphere, cryosphere, biosphere, geosphere, and anthroposphere (human enterprise) in both spatial—from local to global—and temporal scales, which determine the environmental state of the planet within its current position in the universe. Thus, humans and their activities are fully part of the Earth System, interacting with other components.'* J. Rockström *et al.*, 'Planetary Boundaries: Exploring the Safe Operating Space for Humanity' (*Ecology and Society*, 14:2, 2009) footnote i.

[3] Ibid., p. 2.

Regarding the type of challenges related to the materials system, one can distinguish between trends (e.g. globalization and unsustainable production and use patterns) and pressures (e.g. chemical pollution and the supposed resource scarcity). However, since they are interrelated, they will be explained together below.

Overarching trends and pressures

In many ways, materials underpin the quality of life, support societies and are driving forces of economies, because they provide essential inputs to production processes. Yet, the use of natural resources and the subsequent manufacturing of products, product use and waste treatment practices generate many environmental and human health pressures. Other pressures relate to the preservation of raw materials, international trade and the market prices of raw materials and other goods, and the productivity and the competitiveness of the economy.[4] These consequences can have an impact on different stages of the life-cycle of a material and may depend on issues such as type of material, amount of material, the technology used, and the location and time of use.

There are several major trends aggravating many of the pressures. First, the world population is expected to increase massively: from 7 billion in 2012 to over 9 billion people in 2050.[5] This growth has and will have immense impacts on resources extraction, product use and waste generation rates. Second, due to the high living standard and consumption levels in developed States, such as the Member States of the EU, and the desire to attain equal income and welfare in an increasing number of developing States, pressures on natural resources, the environment and human health have increased phenomenally and will continue to rise.[6] Demand-side processes are unmistakably significant as well. Finally, globalization could trigger environmental, social and economic pressures. The international integration of economies and trade has been deepened, accelerated by the rapid industrialization of emerging economies. This development has enlarged the size of (multinational) enterprises and markets, which has led to an overall increase in international flows in resources, products and wastes. In addition to that, unexpected economic shocks such as the 2008 financial crisis are short-term deviations from the long-term trends.[7] Economic shocks and environmental pressures are linked to each other in a complex manner: environmental pressures are influenced by the economy and therefore also by these intermezzos.[8]

Raw materials extraction

There is no general agreement on whether there is a real problem with regard to the quantity of available resources that can still be extracted from the environment. It is a highly controversial topic. Some say there is a scarcity of natural (non-renewable) resources, whereas others say that there is always a possibility to extract more, from a geological perspective, depending on how many efforts (e.g. investments, time, human resources…) one puts into these extractions and how easy it is to access the resources.[9] According to the OECD, the problem is not so much the

[4] Organisation for Economic Co-operation and Development, *Material Resources, Productivity and the Environment* (OECD Publishing, 2015), p. 22.

[5] Organisation for Economic Co-operation and Development, *Environmental Outlook to 2050. The Consequences of Inaction* (OECD Publishing, 2012), p. 20. There are however significant regional and State differences in the demographic predictions. Population growth (or even decline in some cases) rates are assumed to be relatively low in most members of the Organisation for Economic Co-operation and Development (OECD), such as in the EU Member States (p. 49).

[6] European Commission, *Roadmap to a Resource Efficient Europe*, COM(2011) 571, p. 2.

[7] Supra note 5, p. 53.

[8] On the other hand, while the use of resources and the amount of environmental impacts might have dropped since the crisis, less economic growth could also delay progress in resource-efficiency and technology innovation. Ibid., pp. 54-55

[9] The Commission takes the view that generally there is no indication of a global 'imminent physical shortage' of the majority of raw materials, which does not say anything on the actual accessibility of these resources. European Commission, *The raw materials initiative — meeting our critical needs for growth and jobs in Europe*, COM(2008) 699, pp. 4-5. For some minerals, however, there is global consensus of exhaustion, for example for phosphate.

depletion of non-renewable resources (e.g. minerals and fossil fuels), but rather of over-exploitation of renewable resources (e.g. fresh water and forests) and the life-cycle impacts of externalities associated with resource extraction, transport, utilization and waste treatment.[10] Regarding non-renewable resources, a key issue is whether the rate of discovery of new resources will match the rate of future demand. This also relates to the question as to what extent technological innovation will help develop alternative substitute materials.[11]

What we *do* know, however, is that the total volume of materials extracted and harvested worldwide reached nearly 60 billion metric tons per year in 2007, which represents a 65% increase from 1980 and an estimated 8 fold increase over the last century.[12] Raising concerns about access to resources have gained importance on the political agenda over the last years is amongst others the result of rising prices for many resources and of the fact that several extracting States have restricted the export of particular resources.[13] The access to resources can further be frustrated by political, institutional and regulatory factors, for example in the case of their geographical distribution in conflict zones.[14] Globalization is of major importance in that regard.

Product manufacturing and use

A specific challenge for the environment and human health is the use of chemicals in a wide array of materials and products.[15] The production and use of chemicals can have negative impacts on the environment and on humans. While, of course, not all chemicals are hazardous, impacts on human health have for example been documented in the case of persistent, bio-accumulative and endocrine disrupting chemicals. The exact impacts on the environment and human health are, however, often not well understood.

Not only has the use of chemicals increased severely over the past years, potentially posing threats to the environment and human health, other trends in the materials system have further contribute to environmental and human health pressures, some of which also have major impacts on the options for waste treatment. For example, products, substances and materials tend to be smaller than before. In addition, their variety and complexity has increased tremendously. Products may include new materials (e.g. rare earths or synthetic materials) and/or a multitude of materials, often performing a variety of functions simultaneously. High-tech and high-performing materials and products (e.g. electronic devices) have become part of modern-day life. For instance, nanomaterials and 'smart' materials/products come along with a lot of challenges (e.g. minor element concentrations, unknown risks). In addition to these trends, complaints are sometimes heard that products have a shorter life-span than before.

Having said that, the rapid developments in technology may also have major positive impacts on the environment and human health. For example, chemicals, novel materials and (other) 'smart' materials make a significant contribution to the global economy as well as to the environment and people's health and wellbeing across the world (e.g. pharmaceuticals, agrochemicals and insulation materials). Additionally, the trend that products and materials

[10] These externalities include issues such as climate change, degradation of air, land and wildlife habitats, as well as the exhaustion of natural resources including fresh water, biomass and topsoil. Organisation for Economic Co-operation and Development, *Sustainable Materials Management. Making Better Use of Resources* (OECD Publishing, 2012), p. 3. The OECD cited in this regard: J. Fiksel, 'A Framework for Sustainable Materials Management' (*Journal of Materials*, 2006), p. 15.

[11] Organisation for Economic Co-operation and Development, *Material Resources, Productivity and the Environment* (OECD Publishing, 2015), p. 46.

[12] Organisation for Economic Co-operation and Development, *Sustainable Materials Management. Making Better Use of Resources* (OECD Publishing, 2012), pp. 3 and 14. See also: Organisation for Economic Co-operation and Development, *Resource Productivity in the G8 and the OECD. A Report in the Framework of the Kobe 3R Action Plan* (OECD, 2011), p. 10.

[13] Ibid., *Sustainable Materials Management. Making Better Use of Resources*, p.18.

[14] Supra note 4, p. 24.

[15] The global chemicals industry has grown impressively over the past 50 years: annual global sales of products from the chemicals sector doubled between 2000 and 2009. The OECD expects the world chemical industry to grow by approximately 3% annually to 2050 in terms of sales. Ibid., pp. 304-305, 310-311 and 315.

become smaller could indeed also be considered positive in the sense that fewer materials are required for products and that certain materials perform differently and better once they are smaller. Many of these technologies are now pre-commercial, meaning that they still have some technology cycles to go to overcome practicable and manageable challenges, such as scale and other commercialisation issues. Some believe we are now at the beginning of a sixth wave of 'technological revolution', if redirected carefully.[16] Such a revolution could bring prosperity for the materials system if it were to be a sustainable one. In the long run, it may address some of the challenges.

Waste treatment

There are plenty of potential pressures on human health and the environment once products, substances or materials have become waste. Just as for the environmental pressures, the pressures on human health are still open for debate, amongst others because their causality is often not yet fully proven.[17] Pressures that can be linked to (improper) waste (management) related, for example, to: cancer, central nervous system disorder, morbidity and mortality, and birth defects and reproductive disorders. The impacts most obvious pressures occur in situations where waste collection and treatment is insufficient or even absent.[18] Proper waste management is required, as this could lower and/or control the potential pressures.

Some of the products, substances or materials that have become waste are prepared for reused or recovered, re-entering the economy again, whereas others are permanently disposed of or used for something else such as energy generation. The impact and the choice of waste treatment are influenced by many things, such as the costs of treatment, the amount of waste and the composition of the waste (e.g. complexity, hazardousness…).[19] Let it be clear that the other trends discussed in the previous parts, such as the growing world population and the increase of complex products and materials, impact the waste stage of the material life-cycle as well.[20]

1.2 A Circular Economy in the European Union: the Circular Economy Package

There are various concepts globally developed that aim to address materials in a more sustainable way. Individual States and international (and regional) organizations as well as academics have all been contributing to these concepts and related policies. Environmental concerns lay at their origin whatever their nuances.[21] The EU has neither been idle since the global trends and pressures have deepened. To address these challenges, the Union is trying to transform its linear ('take-make-dispose') economy into a Circular Economy. In 2015, the European Commission presented an extensive policy framework specifically designed to stimulate this transition: the CE Package.

---

[16] E.g. according to J. Sachs, who gave a speech at the 2014 Green Week, organized by the European Commission. See the news item 'Jeffrey Sachs: We need a sixth wave of sustainable and green technologies' of 12 June 2014 on http://cordis.europa.eu/news/rcn/36601_en.html (consulted on 25 October 2017).

[17] World Health Organization Europe, *Population health and waste management: scientific data and policy options* (World Health Organization Regional Office for Europe, 2007); and L. Rushton, 'Health hazards and waste management' (*British Medical Bulletin*, 68, 2003), pp. 183-197.

[18] United National Environment Programme, 'Waste. Investing in energy and resource efficiency'. in: *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication* (UNEP, 2011), p. 301.

[19] Other factors are: duration; infrastructure (e.g. for collection); technology developments (e.g. recycling technologies available); social understanding and acceptance (e.g. 'Not In My Back Yard syndrome'); political and constitutional situations; exposure level; and the type of products (e.g. health care products or construction products).

[20] See e.g.: supra note 4, p. 41.

[21] Policy Research Centre for Sustainable Materials Management: S. Happaerts, *International discourses and practices of Sustainable Materials Management* (SuMMa, 2014), p. 2.

1.2.1 An introduction to the Circular Economy and to the Circular Economy Package

As becomes clear from many EU policies that have been introduced in the past ten to fifteen years, the Circular Economy concept and the CE Package did not come out of the blue. These environmental policies were, however, not *initially* developed to support the Circular Economy. Their origins can be traced back to different constituent aspects of the Circular Economy concept and they were based on various but interlinked grounds, targeting a variety of actors and covering a different mixture of policy areas. Combined, these EU policy tracks underpin the Circular Economy concept.[22]

Intimately related concepts and policies developed by internationally operating organizations are also important sources for the concept's development. The most prominent examples that have been initiated and developed in the past two decades, and which interact and run parallel with the EU policy framework for the Circular Economy, are the ones launched by the United Nations Environment Programme (UNEP) and the OECD.[23] These examples show that there are global, historical and organizational nuances as regards the interpretation of the Circular Economy.[24] Generally speaking, over the years, these policies have been quite successful in building a foundation for a more sustainable approach to the materials system, already influencing a whole host of legal measures, both at international, EU and EU Member State level.

However, only in 2013 the ambition of establishing a Circular Economy in the EU by 2050 was expressly stated as one of the primary goals in the 7th Environment Action Programme (EAP), to which the EU Institutions as a whole engaged themselves.[25] Nevertheless, the 7th EAP does not provide for a clear definition of the concept, let alone any details about how the EU would want to give shape to that 2050 vision.[26] As a first step in this clarification process, the 2015 CE Package fills in some of the blanks. Besides a variety of policy actions that are brought together in the Action Plan for a Circular Economy (CE Action Plan), it includes several proposals for changing EU waste legislation.

Significantly, the Commission explains in the CE Action Plan that:

> *the transition to a more circular economy, where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised, is an essential contribution to the EU's efforts to develop a sustainable, low carbon, resource efficient and competitive economy. Such transition is the opportunity to transform* [the] *economy and generate new and sustainable competitive advantages for Europe*.[27]

The Commission has also posted a brief explanation of the Circular Economy on its website. The most significant part reads:

> [a more Circular Economy] *means re-using, repairing, refurbishing and recycling existing materials and products. What used to be regarded as 'waste' can be turned into a resource. The aim is to look beyond waste and to close the loop of the circular economy. All resources need to be managed more efficiently throughout their life cycle.*

---

[22] The EU policies most significant to the Circular Economy movement are discussed in Chapter 2.2 on the building blocks of the Circular Economy transition.

[23] For example, the OECD policy framework that targets the trends and pressures is called 'Sustainable Materials Management'. Even though these two entities have a great global influence, this mapping exercise is of course by no means exhaustive.

[24] For a general overview of the approaches, including their similarities/differences, see Policy Research Centre for Sustainable Materials Management: supra note 21, p. 2. Note that the Circular Economy concept was not yet adopted by the European Commission at the time this report was published.

[25] Paragraph 1 Annex of Decision 1386/2013 of 20 November 2013 on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet', [2013] OJ L 354/171.

[26] See Chapter 2.2.2 on the role the EAPs play in the consolidation of the Circular Economy concept in EU policy.

[27] CE Action Plan, p. 2. Note that Commission Communications are policy documents with no mandatory authority. In simple terms, the Commission takes the initiative of issuing a Communication when it wants to give notice of its *own opinion* of a certain matter. A Communication has therefore no legal effect.

> *Using resources more efficiently will also bring new growth and job opportunities. Better eco-design, waste prevention and reuse can bring net savings for EU businesses of up to EUR 600 billion, while also reducing total annual greenhouse gas emissions...*[28]

In addition to these two relatively recent descriptions of the Circular Economy transition, the Commission published a highly similar interpretation in the former CE Package in 2014.[29]

> *Circular economy systems keep the added value in products for as long as possible and eliminate waste. They keep resources within the economy when a product has reached the end of its life, so that they can be productively used again and again and hence create further value. Transition to a more circular economy requires changes throughout value chains, from product design to new business and market models, from new ways of turning waste into a resource to new modes of consumer behaviour. This implies full systemic change, and innovation not only in technologies, but also in organisation, society, finance methods and policies. Even in a highly circular economy there will remain some element of linearity as virgin resources are required and residual waste is disposed of.*[30]

Indeed, the trends and pressures that were put forward in Chapter 1.1 are addressed in all three descriptions of the transition towards a Circular Economy: a sustainable, competitive and circular economy is aimed for by pursing a clear life-cycle approach. However, this broad description alone does not have any teeth if there are no concrete actions that come along with it. These actions are provided in the Commission's CE Package.

1.2.2 A first impression of the Circular Economy Package

Based on the CE Package, the transition towards a Circular Economy concerns the quest to address the trends and pressures relating to material use, and therefore to create an economy – or rather a society as a whole – where materials are used sustainably. Creating a Circular Economy is however utterly comprehensive and complex, and there is not a blueprint on how to approach it. After all, the 'Circular Economy' is not a clear-cut concept either; it is a very broad concept, which cannot be easily expressed and applied in one single way. This extensive range is also reflected in the CE Package: it is a wide-ranging policy framework, emphasizing different aspects of the Circular Economy. This demonstrates that today's regulatory regime for the Circular Economy is comprehensive and complex, too, and that it requires many changes on a whole range of issues to enhance the Circular Economy transition.

To operationalize the Circular Economy logic and thus to tackle the obstacles to the Circular Economy transition that are most prominent according to the European Commission, the CE Package includes both an extensive Action Plan that lists both policy actions and legal actions, most of which are short-term measures, and several legislative proposals for prominent EU waste Directives.[31] Some of the actions are concrete (e.g. the legislative proposals), but most of them are expressed as a 'to-do list'. The CE Action Plan is divided in three parts: life-cycle stages, priority areas and horizontal enabling framework. For each part there are actions in the pipeline.

---

[28] This description on the Commission's website is basically a very brief summary of: European Commission, *Proposal for a Directive amending Directives 2008/98/EC on waste, 94/62/EC on packaging and packaging waste, 1999/31/EC on the landfill of waste, 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment*, COM(2014) 397, http://ec.europa.eu/environment/circular-economy/index_en.htm (consulted on 22 December 2017) . It includes all the key issues.

[29] The link between the 2014 and the 2015 versions of the CE Package are explained in Chapter 2.3-A.

[30] European Commission, *Towards a circular economy: A zero waste programme for Europe*, COM(2014) 398, p. 2 (2014 CE Communication).

[31] Note, however, that the distinction between policy actions and legal actions is somewhat artificial: some policy actions may of course eventually lead to legal actions and others are just not (yet) expressly linked to legal action even though the Commission intends to do so. Moreover, many policy actions can also be put *in* legislation.

Life-cycle stages

Just as the Circular Economy concept, the CE Action Plan follows a clear life-cycle approach: for each life-cycle stage a variety of actions are scheduled.[32] The Commission underscores the need to improve product design while preserving the internal market and enabling innovation. To this end, it is announced that the Ecodesign Framework Directive (EFD)[33] will be evaluated as from 2016 to see whether and how aspects of the Circular Economy can be better implemented in future product requirements (there is no fixed end date for this study). More broadly speaking, the Commission looks into the options for a more coherent framework for product policy in 2018.[34] As regards the purchase and use of products, the Commission stresses that the purchase choices are shaped by possibly wrong, incomplete, overwhelming or vague information and product prices. The Commission is working with stakeholders to make claims on sustainability trustworthy.[35] Concerning the use stage of a product's life-cycle, the CE Action Plan highlights the need to extend the life-time of a product through reuse and repair, and hence to avoid wastage. To address these issues, the Commission stresses again the importance of better product design and information supply. Amongst others, it will analyze the possibility to propose horizontal requirements on repair information provision in the Ecodesign framework in 2018.[36]

Regarding the waste stage in the material life-cycle, the Commission underlines that the rates for waste prevention, recycling and other forms of material recovery should be raised, pursuant to the waste hierarchy,[37] as this would stimulate valuable materials finding their way back into the economy without (too many) harmful environmental pressures and significant economic losses. Against this background, the CE Package includes four legislative proposals to adjust six EU waste Directives, amongst which the Waste Framework Directive (WFD), the Landfill Directive (LFD) and the Electrical and Electronic Equipment Waste Directive (WEEE Directive).[38] Overall, the adjustments should have the effect of greater harmonization and coherence, the simplification and better implementation of EU waste legislation. Even though some of the proposed changes apply to only one Directive, their implementation generally has a much broader scope, affecting all six Directives. These shared features are:

1) the introduction of new or improved definitions and the alignment of definitions throughout EU waste legislation;
2) the extra focus on measures to promote waste prevention;
3) the further clarification of the definition of waste;
4) the introduction of new recovery targets and the strengthening of the old ones;
5) the introduction of early warning systems for monitoring compliance with the targets and the improvement of existing reporting obligations; and
6) the alignment to Articles 290 and 291 TFEU on delegated and implementing acts.

---

[32] CE Action Plan, pp. 3-13.
In spite of receiving quite some criticism for not being ambitious enough, this emphasizes the Commission's greater loyalty to the life-cycle approach in the 2015 CE Package than in the 2014 version. See Chapter 2.2.3.

[33] Directive 2009/125 of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products, [2010] OJ L 285/10.

[34] European Commission, *Annex to the Communication Closing the loop – An EU action plan for the Circular Economy*, COM(2015) 614/2, p. 2.

[35] Ibid.

[36] Other measures in the field of consumer/user legislation concerns, firstly, the better enforcement of existing guarantees on tangible products, accompanied by a reflection on potential improvements, which is proposed for 2015-2017, and secondly the evaluation whether the Ecolabel is fit for purpose in 2016.

[37] The waste hierarchy will be explained in Chapter 3.2.3. Moreover, Chapter 6 is largely dedicated to this legal instrument.

[38] European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595; European Commission, *Proposal for a Directive amending Directive 94/62/EC on packaging and packaging waste*, COM(2015) 596; and European Commission, *Proposal for a Directive amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment*, COM(2015) 593.

The CE Action Plan also addresses the 'conversional stage' of the material life-cycle.[39] This stage is extremely important for the Circular Economy, as it converts waste into new resources and materials. This increases the security of resource supply in the EU and lowers the environmental and social impacts which are typical for primary resource extraction. The Commission argues that the development of sufficient demand is a key factor in creating a dynamic level-playing field for recovered materials in the internal market, and that the role of the private sector in this is essential. Actions to improve waste management are crucial, too, as proper waste practices have a direct impact on both the quality and quantity of the recovered materials. The high-quality and low-risk of chemicals is particularly highlighted in that regard. The Commission would have had analyzed the policy options for addressing the interface between chemicals, products and waste legislation in 2017, if it had not been rescheduled for 2018.

Priority areas

To ensure that the interactions between the various life-cycle stages are fully taken into account along the whole chain of a particular resource, material, product or waste stream, the Commission addresses five priority areas.[40] 'Plastics' is one of them. The CE Action Plan highlights that, on the one hand, hazardous chemical additives in plastics can pose technical and risk-related difficulties and the emergence of innovative types of plastics raises new questions (e.g. on biodegradability and nanomaterials), but on the other hand points out that innovations in plastics can also solve certain issues (e.g. the amount of materials used in products and the preservation food). To address these and other issues, the Commission proposes to prepare a new policy strategy targeting plastics.[41] 'Construction and demolition' (C&D) is another priority area. Because C&D wastes are among the biggest sources of waste generated in the EU, the Commission announces it will ensure the recovery of C&D waste and facilitate assessment of the environmental performance of buildings. These generally undefined actions will in any case include best practices guidelines for demolition sites.[42]

Horizontal measures

The CE Action Plan also throws light on the facilitating role horizontal measures play in the Circular Economy transition.[43] It expressly states that creating the 'right conditions' is essential for a *systemic change* of the economy. Many topics are addressed in that regard.[44] An example of a policy action is the mobilization of money flows and stakeholders, including small and medium-sized enterprises (SMEs).[45] The Commission also stresses the importance of a set of reliable

[39] CE Action Plan, pp. 11-13.

[40] CE Action Plan, pp. 13-18. The areas of interest have been selected based on the specificities of their products or value-chains, their environmental footprint or dependency on material from outside the EU. There are no specific legal actions scheduled for any of the priority areas.

[41] According to the Annex of the CE Action Plan, this strategy would have been delivered in 2017. European Commission, *Annex to the Communication Closing the loop – An EU action plan for the Circular Economy*, COM(2015) 614/2, p. 3. However, it was rescheduled for the first quarter of 2018.

[42] The other priority areas are: critical raw materials, food waste, and biomass and bio-based products.

[43] CE Action Plan, pp. 18-21.

[44] Examples are: social dialogue and employment opportunities; stakeholder commitment and cooperation; a global orientation (e.g. on sustainable sourcing); and research and innovations (e.g. fields of technologies, processes, services and business models).

[45] For example through the Horizon 2020 Work Programme 2016-2017. The Work Programme includes an internal market initiative called 'Industry 2020 in the Circular Economy'. This initiative adds to a wide range of existing Horizon 2020 programmes supporting projects highly relevant to the Circular Economy (e.g. in waste management; innovation in SMEs; science with and for society; future and emerging technologies; and food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy). See: Decision, *Horizon 2020 Work Programme 2016-2017*, C(2016)4614, p. 11; and in particular ibid Part 17 for the specific projects. Funding opportunities are also available under other initiatives, e.g. the

indicators that can be used to monitor any progress towards a more Circular Economy.[46] Without being specific, it states that action will be taken to improve the quality of existing data where necessary.

Significantly, the CE Action Plan mentions another conditional policy measure for the Circular Economy: creating the right regulatory regime. This is a clear challenge which the EU faces. Altogether, law plays a significant role in each of the three sections of the CE Action Plan. The bulk of the legal actions is however still imminent. As stated above, most actions proposed are not specific enough, as they only provide for initiatives that will be further developed by the Commission in the next few years. Only the legislative proposals for altering EU waste legislation are in an advanced, thought-out stage and are in principle ready for implementation.

Overall, the CE Package identifies where there are obstructions to the Circular Economy transition and how they will be addressed if it were up to the European Commission. As a first impression, no revisions of the regulatory regime were suggested that would drastically change its direction. Rather, the picture that emerges from the CE Package is that the Commission primarily focusses on small incremental changes with a view to fine-tune the current regime, although there are still plenty of ideas in the pipeline that may possibly evolve differently than it might first appear. In any event, the CE Package is the first policy framework that takes the Circular Economy reasoning as the starting point for changing legislation, however broad the concept may be. It is also the start of a series of 'CE Packages'. In January 2018, the follow-up of the 2015 CE Package was adopted by the Commission (i.e. the 2018 CE Package), which further developed some of the actions proposed in the 2015 CE Package.[47]

1.3 Research questions and overall research perspective

This research reviews the legal fundamentals of the Circular Economy in the EU, thus contributing to the legal enhancement of the transition towards a Circular Economy in EU environmental law. Two questions arose in the process of translating this aim into practice. They will be answered in this dissertation. The questions are:

1. **What are the main building blocks and the key laws of the Circular Economy Package?**
2. **Which aspects of the key legislation obstruct the transition towards a Circular Economy, either because they are present or absent, and which improvements can be made to the Circular Economy Package to encourage the transition?**

Asking these questions is justified for the following reasons.

By identifying and explaining the building blocks of the CE Package in the first research question, the transition towards the Circular Economy in EU environmental law can be further solidified, as it would identify the progress that has already been made over the years in moving towards a Circular Economy. As a consequence, it would also explain the strategy chosen by the European Commission in the CE Package. Clarifying the building blocks allows the creation of a rudimentary knowledge base of the CE Package and the Circular Economy transition in general. Such knowledge is furthermore useful for the selection of key legislation in the transition and the CE Package. Highlighting these significant laws as part of the first research question is justifiable,

---

Cohesion Fund, and are further assessed and developed by the Commission. Depending on the circumstances, the Commission will cooperate with other institutions, e.g. the European Investment Bank and national banks.

[46] The Commission underscores the work which is already ongoing, e.g. the data collection by Eurostat, and commits itself to work closely with the European Environment Agency (EEA) and in consultation with Member States to propose a simple and effective monitoring framework that capture the main elements of the Circular Economy.

[47] The 2018 CE Package consists of several policy documents, including: European Commission, *Communication on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation*, COM(2018) 32; and European Commission, *A European Strategy for Plastics in a Circular Economy*, COM(2018) 28.

too, because, first of all, by doing so the scope of this dissertation is narrowed down. After all, the Commission plans numerous actions in the CE Package for changing a whole host of laws, which ought to be executed the next few years. This bears the risk of making the research too comprehensive and too time-consuming. Secondly, the key laws can be regarded as core elements of the legal transition towards the Circular Economy, as these influential Directives and Regulations institutionalize and give substance to the building blocks identified earlier – they represent the current regulatory regime. Because of the nature of both aspects of the first research question (i.e. the building blocks and the key laws), the answer to this question is essentially descriptive.

Establishing a new regulatory regime for the materials system is one of the main challenges faced by the EU. The second research question of this dissertation is raised in view of contributing to this challenge on a more substantive level, building on the key legislation. This requires a different approach than the broad, descriptive approach previously adopted. The key laws will be examined based on a case study approach to identify which aspects obstruct the Circular Economy. The main reason for using case studies is the complexity and comprehensiveness of the legal transition towards a Circular Economy. One cannot but zoom in on certain issues. Therefore, for each law I selected a pressing issue based on life-cycle thinking and translated it into an objective for the case study in question. In essence, I take the policy paradigm of the Circular Economy as the starting point and then review how this is anchored in three representative case studies. It must be stressed that because each key law is unique and so are the corresponding objectives, tailored research designs are required for each case study.[48] A normative approach will also be appropriate to answer the second research question, because by elaborating upon the obstructions in the key legislation, one automatically sheds light on the improvements that can be made to the CE Package in order to move forwards in the Circular Economy transition in general.

Whilst the first research question does not require further elaboration on how it will be answered due to the descriptive nature of the question, it is much more difficult to grasp for the second research question. For this reason, after having answered the first research question in Part II 'Building blocks and key legislation' (Chapters 2-3), Part III 'Obstacles to the Circular Economy' first sets out the research perspective for the second research question in Chapter 4. This includes an explanation of how to interpret the legal transition towards a Circular Economy and the research designs for the individual case studies. The actual case studies, which form the body of the second research question, are executed in the rest of Part III (Chapters 5-7).[49] Finally, Part IV 'Closing' contains the overall conclusions of the dissertation (Chapter 8).

There are thee final, retrospective points I wish to make. First, I have included sources until February 2018. This includes, but is not restricted to, the jurisprudence of the Court of Justice of the European Union (CJEU), EU legislation and policies, and both academic and professional literature. Second, I have conducted several interviews with officials of the European Commission to verify a number of the legal obstacles and recommendations that are put forward in this dissertation. The purpose of these interviews was to contribute to my own reasoning. The interviewees are for that reason not referred to in the text and bibliography. Third, the approach and content of this dissertation has to a certain extend been influenced by the research work of the Flemish Policy Research Centre for Sustainable Materials Management, in which I participated for three years (November 2012 – December 2016). First and foremost, it has affected my choice of case studies.[50]

---

[48] See for these research designs in particular Chapter 4.3.

[49] See Chapter 4.4 for an overview of the research design of the dissertation.

[50] The objective of the Policy Research Centre studies Sustainable Materials Management, which consisted of a consortium of Flemish research institutions, was to do interdisciplinary research on certain issues relating to the Circular Economy transition in Flanders (region of Belgium). These insights could then be used to justify existing or new governmental policies. In addition, the aim was to create a knowledge platform for interdisciplinary collaboration between stakeholders and to provide scientific support to civil society, industry and others. Together with my two PhD supervisors, i.e. Professor Geert Van Calster (KU Leuven) and Professor Bernard Vanheusden (Hasselt University), I conducted research on the legal aspects.

PART II – BUILDING BLOCKS AND KEY LEGISLATION

2. Building blocks of a Circular Economy

In answer to the first research question, this Chapter addresses the main building blocks of the CE Package. Two building blocks can be identified in that respect.

The foundation for action on the Circular Economy by the EU Institutions is explained first (Chapter 2.1). EU primary law mainly consists of the Treaties of the European Union (EU Treaties), i.e. the Treaty on European Union (TEU) and the Treaty on the Functioning of the European Union (TFEU). The EU Treaties contain formal as well as substantive provisions. The latter set of rules largely defines the scope of the EU policies and EU secondary legislation (e.g. Regulations, Directives…) addressed in the CE Package.

The policy roots of the CE Package are clarified next (Chapter 2.2), as they build on the legal foundation for EU action relating to the Circular Economy. This part provides for a historic overview of significant policies and concepts developed in the past ten to fifteen years that underpin the CE Package.

2.1 Foundations in EU environmental law

This section is for most part dedicated to the provisions in the EU Treaties. It explains in this order: the primary objectives of the EU, the legal basis in the TFEU for EU secondary legislation, and the distribution of competences in the EU. It also sheds light on the choice of legal measures in EU secondary law.

2.1.1 Primary objectives of the European Union

As from the 2007 Lisbon Treaty,[51] Article 3(3) Treaty on European Union (TEU) is the primary provision in the TEU when it comes to the Circular Economy.[52] Besides aiming at sustainable development at large, it expresses the objective of a high level of protection and improvement of the quality of the environment. It further stresses the need for the establishment of an internal market and the promotion of scientific and technological advance for the EU. Innovation is thereby also one of the prime objectives of the Union. In addition, it endorses solidarity between generations and solidarity among Member States. All in all, these objectives are important ingredients for a Circular Economy.

What the exact level of protection and the level of environmental quality should be has not been determined in Article 3(3) TEU. Indicators of determining 'high protection levels' are for instance: the environmental standards in frontrunner and good performing Member States; policy declarations and targets, particularly in cases when no national or international standards have been established; and where scientific uncertainty is great.[53] If both objectives (a high protection level and the improvement of the quality) are combined, one can assume that any measure aiming at a high level of protection must simultaneously aim at improving the existing situation. In other words, they aim at a *higher* level of protection (not the *highest*)[54], which is to be achieved by the EU as a whole. This is in line with the Circular Economy transition, because the entire regulatory regime would only need to be changed in the long run – in a step-by-step process, always aiming at making the Circular Economy more complete.

---

[51] Treaty of Lisbon amending the Treaty on European Union and the Treaty establishing the European Community [2007] OJ C306/1. Neither the Treaty of Nice nor the Lisbon Treaty significantly changed the provisions on the environment. For the Treaty of Nice see: Treaty of Nice of 10 March 2001 amending the Treaty on European Union, the Treaties establishing the European Communities and certain related acts, [2001] OJ C 80/01.

[52] The first paragraph of Article 3(3) TEU is as follows: *'The Union shall establish an internal market. It shall work for the sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment. It shall promote scientific and technological advance.'* See also the Preamble of the TEU.

[53] L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), p. 12.

[54] See on consumer protection: Judgement of 13 May 1997, *Germany v Parliament and Council*, C-233/94, EU:C:1997:231, para. 48.

2.1.2 Legal basis for EU secondary legislation

Article 191 et seq TFEU on the environment

The objectives set out in Article 3(3) TEU are neither exhaustive nor specified enough. The provision is therefore complemented by particular environmental objectives laid down in Article 191 TFEU.[55] The first paragraph of the Article prescribes that EU environmental policy and legislation shall contribute to pursuit of the following, equally important objectives:

> *— preserving, protecting and improving the quality of the environment,*
> *— protecting human health,*
> *— prudent and rational utilisation of natural resources,*
> *— promoting measures at international level to deal with regional or worldwide environmental problems, and in particular combating climate change*

All four objectives undoubtedly highlight aspects of the Circular Economy. The word 'environment' mentioned in the first objective is not merely the state of nature: it also includes us, people, and a great deal of what we do with it. The term 'environment' takes account of the factors affecting human health (second objective) and the quality of life, and all areas and structures transformed or built by humans.[56] It follows that the environment also includes soil, water and land use, and can somehow be regulated. The way how humans use and manage natural resources, waste and other materials therefore also fall under the definition of environment. Particularly the third objective is therefore important for the Circular Economy transition, as 'natural resources' cover the management of *all* resources found in the environment. Consequently, the prudent and rational utilization of those resources also includes the safe treatment of waste.[57] On the whole, the environment should thus be interpreted broadly.[58] This is

---

[55] Title XX 'Environment' TFEU. In point of fact, the original EC Treaty (i.e. the Treaty of Rome: Treaty establishing the European Economic Community [1957]: after Lisbon, the Treaty of Rome of 25 March 1957 establishing the European Economic Community, [1957] was renamed into TFEU) did not contain an explicit competence provision for the EU Institutions to take action on environmental issues. This resulted in Member States taking the lead by cross-border and joined cooperation. In 1975, the first legally binding instruments on Union level were adopted on the basis of Articles 94 and/or 308 EC (now Articles 115 and 352 TFEU), which avoided overlaps with the Commission's responsibility of the internal market or agricultural service, especially in the case of water and waste (L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), pp. 4-5. The Single European Act of 17 February 1986 and 28 February 1986, [1986] OJ L 169/1 introduced for the first time stand-alone Articles on the environment: Articles 174 to 176 EC (now Articles 191-193 TFEU). These Articles required the environmental measures to be adopted *unanimously*. The discussion on the proper legal basis heated every now and then (see above, Krämer, p. 5), because Article 95 (now Article 114 TFEU – see below), which was newly introduced as well in 1987, included a *majority* voting for internal market measures. Even after the adoption of the Maastricht Treaty in 1992 (Treaty on European Union, [1992] OJ C 191: after the Lisbon Treaty called the TEU), which introduced *majority* decisions in environmental matters, unanimous decisions were not banned out completely. The Amsterdam Treaty (Treaty of Amsterdam amending the Treaty of the European Union, the Treaties establishing the European Communities and certain related acts [1997] OJ C340/1) therefore aligned the decision procedure with the one in Article 95 EC by introducing co-decision or 'ordinary legislative procedure', as it is known with the entry into force of the Lisbon Treaty in 2009 (Article 294 TFEU).

[56] *The environment, then, is all around us and humanity is part of it. If we consider how human impacts on the environment are regulated we should not lose sight of the fact that human impacts are themselves part of the environment. However, discussion of regulating human impacts on the environment is not circular because it simply focuses on regulating that part of the environment that can be controlled.* C. McGrath, *Does environmental law work. How to evaluate the effectiveness of an environmental legal system* (Lambert Academic Publishing AG & CO, 2010), p. 10.

[57] Supra note 53, pp. 13-14.

[58] The 1990 Declaration on the Environment, as a warming-up exercise for the 1992 Maastricht Treaty on the European Union, contributed to this all-embracing interpretation of the term 'environment', because it lists a whole range of matters that fall under the definition. The term 'working environment', which is used in Articles 114 and 153 TFEU, is generally *not* regarded the same as 'environment', because the term only relates to the conditions of the workplace. Ibid., p. 2.

also the case in geographical sense: Article 191(1) TFEU is in principle not limited to the EU (fourth objective).[59]

Based on the above, 'environmental law' means the body of law that regulates human impacts on the environment. In other words, it is *'the totality of the legal measures which try to prevent, protect and improve parts or all of the environment.*'[60] This broad interpretation makes EU environmental law a suitable legal field for the Circular Economy transition, given its extensive scope.

The primary sources of EU environmental law should be transposed and operationalized in secondary legislation, because Articles 191 and 192 TFEU do not contain any precise prohibitions or obligations to effectuate the environmental objectives, nor do they lead to other concrete requirements for legislative action. The environmental legal principles in Article 191(2) TFEU (i.e. the precautionary and preventive principles, the source principle and the polluter pays principle)[61] function as guidance for further policy and legislation. The principles are to allow the taking of specific measures in favour of the environment, but do not oblige EU Institutions to actually take such measures per se.[62] Generally, they help to justify certain measures. As a matter of fact, some principles may even conflict with one another in certain situations or can be clarified in opposite directions.[63]

At the end of the day, the EU Institutions are granted a wide discretion, because the exact meaning and application of the environmental principles are rather vague. Some argue that only a systematic and severe disregard of the principles can constitute a successful case at the CJEU,[64] meaning that the principles may constitute a self-standing ground of review of legality of EU environmental legislation (and arguably through the integration principle as laid down in Article 11 TFEU also in other legal fields). However, others argue that despite their trumpeted value as 'principles', individual citizens or companies first need transposition of said principles in secondary law to argue that such secondary law has infringed the principles.[65] Even so, the principles' guiding and justification functions in law-making remain significant nonetheless.[66]

Article 114 TFEU on the internal market

Although it is not obligatory, the bulk of environmental legislation is currently based on the explicit environmental provision in the TFEU – the Article does not leave much outside the competence of the EU.[67] Yet, Articles 191 et seq TFEU are not the only provisions that constitute EU environmental law. The legal basis for environmental legislation is not carved in various stones. The competence to protect the environment is laid down throughout the TFEU. For example, the TFEU includes Articles on animal welfare, and the prohibition of quantitative restrictions on imports and the exception to that prohibition in relation to the protection of health and life of humans, animals and plants (Articles 13, 34 and 36 TFEU, respectively). Additionally, besides Article 192 TFEU, Article 114 TFEU on the completion of the internal market (one of the

[59] Over-simplified, the EU is allowed to adopt measures to protect the environment outside its territory provided that the sovereignty and the jurisdictions of non-EU Member States are respected.
[60] L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), p. 4.
[61] There principles are explained in the course of the dissertation, see Chapters 5-7.
[62] See e.g.: supra note 60, p. 13-15.
[63] Article 191(2) TFEU thus *'does no more than define the general environmental objectives of the European Union, since Article 192 TFEU confers on the European Parliament and the Council of the European Union* […] *responsibility for deciding what action is to be taken in order to attain those objectives.*' In: Judgement of 4 March 2015, *Fipa Group and Others*, C-534/13, EU:C:2015:140, paras. 39-42. See also: e.g.: Judgement of 9 March 2010, *ERG and Others v Ministerio dello Sviluppo económico*, C-378/08, EU:C:2010:126, para. 45.
[64] See e.g.: supra note 60, p. 14; and S. Kingston, V. Heyvaert and A. Cavoski, *European Environmental Law* (Cambridge University Press, 2017), pp. 92-93.
[65] See e.g.: G. Van Calster and L. Reins, *EU Environmental Law* (Edward Elgar Publishing, 2017), pp. 17-18.
[66] Arguably, since the EAPs are nowadays adopted under Article 192(3) TFEU as a Decision, the legal importance of the principles may have increased in recent years. The 7th EAP underscores the environmental principles in Recital (20) and Article 2(2).
[67] Supra note 60, p. 5.

principle tasks of the Union [Article 3(3) TEU] and defined in Article 26(2) TFEU) is the most fundamental legal basis for EU legal acts that are part of EU environmental law. Article 114(1) TFEU reads as follows:

> *Save where otherwise provided in the Treaties, the following provisions shall apply for the achievement of the objectives set out in Article 26. The European Parliament and the Council shall, acting in accordance with the ordinary legislative procedure* […] *adopt the measures for the approximation of the provisions laid down by law, regulation or administrative action in Member States which have as their object the establishment and functioning of the internal market.*

The importance of the Article on the internal market is particularly eminent in the case of products and is therefore highly relevant for the Circular Economy transition.[68] Products require uniform rules not to hinder the free movement of goods *while* pursuing a high level of environmental protection, and, in view of that, taking account of any new scientific developments. Article 114 TFEU basically substantiates the objectives set out in Article 26 TFEU, which establishes an area without internal frontiers where the free movement of goods (Articles 28 and 29 TFEU), persons, services and capital is ensured. A vast amount of product-related measures are therefore based on Article 114 TFEU.[69] To prevent a race to the bottom, it could be argued that the EU has historically been using the internal market to raise environmental protection throughout the Union. After all, if national authorities were given full competence to enact product and production standards, it would have given Member States *carte blanche* for attracting environmentally unfriendly industry by watering down their environmental legislation (if existing at all).[70] Article 114(3) TFEU therefore states that the Commission takes environmental protection and human health into account while seeking to achieve the objective of Article 114 TFEU.

Choice between Articles 192 and 114 TFEU

As a general rule, measures reflecting the environmental objectives in Article 191 are based on Article 192 TFEU and measures concerning the harmonization of laws are based on Article 114 TFEU.[71] However, finding the correct legal basis for measures is not self-evident, for example in the case of a measure affecting products while aiming for environmental protection at the same time, or vice versa. This is because the TFEU does not make a clear distinction between when to use which Article. The question as to which Article is the right legal basis is particularly important considering that for each basis there are different rules regarding derogation for Member States that wish to establish more stringent national rules then a fully harmonized EU

[68] As are some other provisions, e.g. Articles 43 (agricultural and fisheries), 91 (transport), 182 (research and development) and 207 (external trade) TFEU. These are not discussed in this dissertation.

[69] Except those on agricultural products (Article 38(2) TFEU) and for international product-related measures (Article 207 TFEU). See on the approximation of laws Chapter 3 TFEU.

[70] N. de Sadeleer, *EU Environmental Law and the Internal Market* (Oxford University Press, 1 edn, 2014), p. 157.

[71] With respect to waste, in contrast, Article 192 TFEU is typically the rightful legal basis, notwithstanding that waste is regarded as a product (i.e. a good) featuring special characteristics (Judgement of 9 July 1992, *Commission v Belgium*, C-2/90, EU:C:1992:310, paras. 28-30). See for example: Judgement of 17 March 1993, *Commission v Council*, C-155/91, EU:C:1993:98; and Judgement of 28 June 1994, *European Parliament v Council*, C-187/93, EU:C:1994:265. In both Cases, the CJEU judged that the primary objectives of the Directive 91/156 of 18 March 1991 amending Directive 75/442/EEC on waste, [1991] OJ L 78/32 (one of the previous version of the 2008 Waste Framework Directive) and Regulation 259/93 of 1 February 1993 on the supervision and control of shipments of waste within, into and out of the European Community, OJ L 30/1 (the previous version of the 2006 Waste Shipment Regulation), respectively, were environmental protection and that, as a result, Article 192 TFEU had been the correct legal basis for both measures. Nonetheless, Directive 94/62 of 20 December 1994 on packaging and waste packaging, [1994] OJ L 365/10 (Packaging Directive) is based on the provision on the internal market, which shows that both Articles (114 and 192 TFEU) could in principle be used as a basis for waste-related measures. L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), p. 78.

legislation (also called 'gold-plating')[72] (see below). This is particularly important in the case of the Circular Economy because these frontrunners may want to be given space to adopt stricter (product) requirements than set at EU level if they are of the opinion that the harmonized environmental standards are unacceptably low to accelerate the transition. Therefore, one could argue that in the light of the Circular Economy transition they should not be regarded as something negative per se. New beliefs, new evidence or new methods which are matured in the Member States could reach the European Commission and the other law-making EU institutions in this way. It can even be argued that EU environmental law is essentially founded on the very notion of derogation, particularly when considering that environmental measures do not have to be based on the *highest* level of environmental protection technically possible, according to EU primary law.[73] Member States are thus *in essence* allowed (or even stimulated) to set higher environmental standards. For these reasons, anyone arguing that gold-plating does not contribute to EU environmental law appears to be at odds with such views.[74]

The Commission cannot arbitrarily choose between the legal bases: the 'choice' does not depend on the discretion of the Union legislature but must rather be based on objective elements, which are under scrutiny of judicial control.[75] The theory that premises the identification of the 'centre of gravity' of a certain measure is helpful in this respect. The doctrine is based on settled case law from the 1990s and emphasizes the *main objective* and the *content* of the measure (rather than its effects or particular subject).[76] However, the predominant objective of a measure is sometimes hard to identify.[77] This is especially the case when one considers that the environmental objectives in Article 191 TFEU are broadly defined and that there may be more than just one objective pursued by the measure. This may particularly be apparent in the case of the Circular Economy, because of the fact that the Circular Economy concept is so comprehensive.

Indeed, there is a possibility that there are two or more objectives which are *inextricably linked*, making the gravity test difficult to apply. In these cases, the CJEU exceptionally accepts that the measure must be based on the corresponding legal bases (dual or multiple), provided that the procedures are 'compatible'.[78] As from the entry into force of the Lisbon Treaty in 2009, the

---

[72] See for a comparison between 'more stringent measure' and 'gold-plating' from a conceptual perspective: L. Squintani, *Gold-Plating of European Environmental* (PhD dissertation, Law, University of Groningen, 2013), pp. 33-38.

[73] Judgement of 14 July 1998, *Safety Hi-Tech Srl v S. & T. Sri*, C-284/95, EU:C:1998:352, para. 49. See also e.g.: ibid., p. 211.

[74] H. Tegner Anker, K. de Graaf, R. Purdy and L.Squintani, 'Coping with EU Environmental Legislation - Transposition Principles and Practices' (*Journal of Environmental Law*, 27, 2015), p. 21. On the particular issue of the general acceptance of using the idea of 'no gold-plating' by Member States, see: J. Jans and L. Squintani, with Aragão, Macrory and Wegener, ''Gold plating' of European Environmental Measures? (*Journal for European Environmental and Planning Law*, 6:4, 2009), pp. 417-435.

[75] E.g. in: Judgement of 26 March 1987, *Commission v Council*, C-45/86, EU:C:1987:163, para. 11; and Judgement of 10 December 2002, *Ex p. BAT*, C-491/01, EU:C:2002:741, para. 93.

[76] See e.g.: Judgement of 11 June 1991, *Commission v Council*, C-300/89, EU:C:1991:244, para. 10; Judgement of 17 March 1993, *Commission v Council*, C-155/91, EU:C:1993:98; Judgement of 28 June 1994, *European Parliament v Council*, C-187/93, EU:C:1994:265; and Judgement of 25 February 1999, *European Parliament v Council*, Joined C-164/97 and C-165/97, EU:C:1999:99, para. 36. With regard to the choice of a single legal base, also see e.g.: Judgement of 11 May 1990, *Parliament* v *Council*, C-70/88, EU:C:1990:217, para. 17; and Judgement of 26 March 1996, *Parliament* v *Council*, C-271/94, EU:C:1996:133, paras. 32 and 33. See also: e.g.: Judgement of 10 December 2002, *Ex p. BAT*, C-491/01, EU:C:2002:741, para. 94; and Judgement of 20 May 2008, *Commission v Council*, C-91/05, EU:C:2008:288, para. 106. See also: G. Van Calster and L. Reins, *EU Environmental Law* (Edward Elgar Publishing, 2017), pp. 55-57.

[77] L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), pp. 74-75; and N. de Sadeleer, *EU Environmental Law and the Internal Market* (Oxford University Press, 1 edn, 2014), p. 148.

[78] E.g.: Judgement of 11 June 1991, *Commission v Council*, C-300/89, EU:C:1991:244, paras. 13 and 17-21; Judgement of 19 September 2002, *Austria v Martin Huber*, C-336/00, EU:C:2002:509, para. 31; and Judgement of 6 November 2008, *Parliament v Council*, C-155/07, EU:C:2008:605, para. 37. According to Krämer, however, if a measure should pursue both objectives (i.e. environmental protection and the completion of the

adoption of environmental legislation based on Article 192(1) TFEU follows, like the measures based on Article 114(1) TFEU, the ordinary legislative procedure.[79] Hence, as regards the procedure, no considerable difficulties should come about when basing the legal act on both Articles.[80] Another relatively new regulatory mechanism is to draw a distinction between provisions *within* an EU measure: some of the provisions are based on Article 192 TFEU while others are based on Article 114 TFEU.[81] However, as a general rule, the dividing line between Articles 114 and 192 TFEU must be respected.

Derogation possibilities Articles 193 and 114(4)-(5) TFEU

As flagged above, different rules apply to the Member States if they wish to derogate from EU fully harmonized rules,[82] depending on the legal basis of the measure.

For measures based on Article 192 TFEU, Member States may in principle always take more stringent measures to protect the environment under certain conditions.[83] Article 193 TFEU lays down the right to derogate from any environmental measure to maintain or introduce *more stringent* measures. It implies that national measures may only be additional (not different) than those established at EU level to pursue a greater level of protection.[84] If Member States wish to invoke Article 193 TFEU, they need to take account of two limitations. First, the relevant national

---

internal market) it is suggested to opt for Article 114 TFEU, because the Article on integration (11 TFEU) already provides for environmental concerns to be taken into account. Ibid., *EU Environmental Law*, p. 75.

[79] By way of derogation for the ordinary legislative procedure, Article 192(2) TFEU states that the Council shall act in accordance with the special legislative procedure in particular cases, i.e.: '*(a) provisions primarily of a fiscal nature; (b) measures affecting: — town and country planning, — quantitative management of water resources or affecting, directly or indirectly, the availability of those resources, — land use, with the exception of waste management; (c) measures significantly affecting a Member State's choice between different energy sources and the general structure of its energy supply.'* (The Council may also decide to apply the ordinary legislative procedure in those cases). Although there are links between these cases and the Circular Economy (e.g. land-use planning and energy), this Chapter will refrain from commenting on legislation based on Article 192(2) TFEU. As a result, the Article will not be further explained.

[80] Also after the Lisbon Treaty the *Titanium Dioxide* Case remains valid, as had been underscored in: Judgement of 19 July 2012, *Parliament v Council*, C-130/10, EU:C:2012:472, paras. 42-46 (with emphasis on para. 46).

[81] An example is the Batteries Directive: Directive 2006/66 of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC, [2006] OJ L 266/1.

[82] There are two categories of 'harmonization' in EU law: minimum harmonization and maximum harmonization. This is significant to know, because the level of harmonization has an impact on the extent EU rules replace national rules in the Member States. In principle, Articles 192 TFEU as well as Article 114 TFEU can constitute either type of harmonization. In the end, it is the *content* of the measure in question that determines the level of harmonization. See for a discussion of the criteria: J.H. Jans and H.H.B. Vedder, *European Environmental Law* (Europa Law Publishing, 4 edn, 2012), pp. 93 and 98-104. On the one hand, minimum harmonization means that the EU has set a baseline, which is exhaustively harmonized, under which Member States cannot go. Member States can pose stricter (environmental) measures in their domestic laws, on condition that they are compatible with the EU Treaties. As a result, minimum harmonization does not eliminate the diversity between the Member States completely, but rather restricts the width and may therefore still create an obstacle to the functioning of the internal market to a certain extent. On the other hand, maximum harmonization means that the EU measure specifies a level of regulation from which Member States in principle cannot deviate. A higher level of environmental protection by any Member States is not tolerated (see on the shipment of hazardous waste in view of its disposal for example: Judgement of 9 July 1992, *Commission v Belgium*, C-2/90, EU:C:1992:310, para. 20). However, even if the area regulated by the EU measure is deemed to be fully harmonized, it is still (and *only*) possible to derogate from when the EU measure itself provides for this option.

[83] Hence, the use of Article 193 cannot be restricted in the EU measure itself. J.H. Jans and H.H.B. Vedder, *European Environmental Law* (Europa Law Publishing, 4 edn, 2012), pp. 118-121.

[84] This, therefore, does not preclude Member States from transposing the relevant Directive. See e.g.: Judgement of 11 November 1999, *Commission v Germany*, C-184/97, EU:C:1999:546, para. 61.

measure respects the secondary law where it establishes maximum harmonization.[85] Second, the relevant national measure must be compatible with the EU Treaties.[86]

Article 114 TFEU does not provide for identical derogation options as Article 193 TFEU. Common rules on the internal market prescribe that once there is maximum harmonization, Member States are in principle *not* allowed to maintain or adopt any domestic legislation or any other measure that is inconsistent with that particular harmonized measure.[87] However, Member States can under certain conditions *add* rules or – and this is different than in Article 193 TFEU – establish *different* rules. There are two possibilities. First, exceptions to Article 114(1) TFEU can be based on allowance (explicitly or implicitly) provided *within* the EU legal act.[88] Second, derogations to the harmonized rules can also be justified on account of Article 114(4)-(5) TFEU. Derogations are allowed when Member States either wish to *maintain existing* national legislation (Article 114(4) TFEU)[89] or wish to *introduce new* national legislation (Article 114(5) TFEU)[90],

[85] This limitation is not very obvious in practice, because most measures based on Article 192 TFEU do not result in full harmonization. Judgement of 14 April 2005, *Deponiezweckverband Eiterköpfe v Land Rheinland-Pfalz*, C-6/03, EU:C:2005:222, para. 27. Besides for environmental protection, gold-plating through Article 193 TFEU is also reasoned by the fulfillment of a coherent national legal framework, for example in the case of issuing permits (L. Squintani, *Gold-Plating of European Environmental* [PhD dissertation, Law, University of Groningen, 2013], pp. 131-132). Evidently, national measures must not undermine the coherence of the EU secondary law. This may be the case if the national measure is disproportionate to the proper functioning of the regime. See: Judgement of 17 December 1998, *Società Italiana Petroli SpA (IP) v Borsana Srl*, C-2/97, EU:C:1998:613, paras. 37 and 48.

[86] The compatibility with Article 34-36 TFEU will therefore have to be examined. If they are not frustrated, the CJEU concluded that the proportionality principle is not applicable '*so far as* [it] *concerns more stringent protective measures of domestic law adopted by virtue of Article* [193 TFEU] *and going beyond the minimum requirements laid down by the* [relevant] *Directive*,' because the application of Article 193 TFEU *'falls to the Member States to define the extent of protection to be achieved'* (Judgement of 14 April 2005, *Deponiezweckverband Eiterköpfe v Land Rheinland-Pfalz*, C-6/03, EU:C:2005:222, para. 63 [see also: para. 64] and para. 61, respectively). Evidently, the more stringent measures must *'follow the same policy of protection the environment as the Directive does*' (para. 41). In cases where the more protective national measure is likely to affect the free movement of goods, the necessity and proportionality tests should be applied. The CJEU has fleshed out how the proportionality principle is applied in several cases (see some older cases in particular, e.g.: Judgement of 25 June 1998, *Chemische Afvalstoffen Dusseldorp BV and Others v Minister van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer*, C-203/96, EU:C:1998:316, para. 49; and Judgement of 13 December 2001, *DaimlerChrysler AG v Land baden Württemberg*, C-324/99, EU:C:2001:682, para. 56). In essence, De Sadeleer points out that when Member States aim for a higher level of protection than imposed under EU law based on Article 192 TFEU, the national measures should be viewed *'in a favourable light'*, which means that the national measures should only be stopped if they have *significantly disproportionate* effect on the free movement of goods. N. de Sadeleer, *EU Environmental Law and the Internal Market* (Oxford University Press, 1 edn, 2014), p. 357.

[87] E.g. in: Judgement of 12 July 1988, *Commission v United Kingdom*, C-60/86, EU:C:1988:382 (*Dim-dip Lighting* Case). See also: Judgment of the Court of 19 March 1998, *The Queen v Minister of Agriculture, Fisheries and Food, ex parte Compassion in World Farming Ltd*, C-1/96, EU:C:1998:113 (*World Farming* Case), paras. 57-60.

[88] Strictly speaking, this is therefore no real derogation. J.H. Jans and H.H.B. Vedder, *European Environmental Law* (Europa Law Publishing, 3 edn, 2008), p. 112. The CJEU held that the margin of discretion for Member States is *'entirely determined by the directive itself and must be inferred from its wording, purpose and structure*.' In: Judgement of 25 April 2002, *Commission v France*, C-52/00, EU:C:2002:252, para. 16 (see paras. 13-27). See also: e.g.: Judgement of 25 April 2002, *Commission v Greece*, C-154/00, EU:C:2002:254, paras. 12-20; and Judgement of 25 April 2002, *Maria Victoria González Sanchez v Medicina Asturiana SA*, C-183/00, EU:C:2002:255, paras 25-34.

[89] Maintaining national measures could be aimed for by Member States whenever the new EU measure is considered less Circular Economy-friendly. De Sadeleer argues that a significant factor in reviewing the proportionality of national derogation is the substitution principle. See: N. de Sadeleer, *EU Environmental Law and the Internal Market* (Oxford University Press, 1 edn, 2014), p. 363 (see also: N. de Sadeleer, *Environmental Principle, From Political Slogans to Legal Rules* [Oxford University Press, 2002], p. 118; and V. Heyvaert, 'Balancing Trade and Environment in the European Union: Proportionality Substituted?' [*Oxford University Press*, 13:3, 2001], p. 405). He bases this argument on the *Toolex* Case: Judgement of 11 July 2000,

even if the relevant measure does not expressly recognize that right.[91] Naturally, in both cases the Member States must justify their choice.[92] In general, Member States have to prove that their derogation is *necessary* and *proportionate* to attain a higher level of protection in that way.[93]

2.1.3 Shared competence between the EU and its Member States

The challenges that exist relating to the legal basis contrast with the clear distribution of responsibilities between the Union and the Member States when it concerns the environment: they have a shared competence in regulating the environment in the EU (Article 4 TFEU), as meant in Article 191 TFEU. Article 4(2)-(4) TFEU further indicates that areas such as the internal market, consumer protection, energy, common safety concerns in public health matters (limited to the aspects defined in the TFEU), transportation, development cooperation, and research and technological development are shared competences as well. This means that the EU and Member States alike are authorized to adopt binding legal acts in those fields. Yet, Member States are only allowed to exercise their competence on condition that the Union has not already exercised its competence or has explicitly ceased to do so. Notably, the political reality appears to be different: Member States rely heavily on the EU for environmental measures, not least because many national environmental laws are just equivalents of the European laws.[94]

As opposed to environmental issues, pursuant to Article 6 TFEU the Union shall have competence to carry out actions to support, coordinate or supplement the actions of the Member States in the field of industry and the protection and improvement of human health (Article 3(1) TFEU). Exclusive competence has furthermore been given to the Union in the areas of trade which comes under the umbrella of 'common commercial policy' and of the establishing of competition rules necessary for the functioning of the internal market while excluding 'the internal market' as such (because the internal market is a shared competence, as mentioned above). These areas, too, are important in the Circular Economy.

2.1.4 Type of legal measure in EU secondary law

Since the 1970s, environmental concerns have been gaining ground in environmental policy and legislation, both at State level and at European level.[95] The first legal actions were generally a reaction to large-scale accidents that had a great impact on the environment. Over the last decades, environmental law-making has been changing from using a reaction-based or ad-hoc approach to environmental accidents and other novel human-induced environmental concerns, to a

---

Kemikalieinspektionen and Toolex Alpha AB, C-473/98, EU:C:2000:379, paras. 46-47. So far, the substitution principle has predominantly been used in view of chemicals. The question is therefore whether the substitution principle may also be a justification outside the realm of chemical law.

[90] Justifications for invoking 114(5) TFEU seems to be less numerous than for the one in Article 114(4) TFEU (see e.g.: Judgement of 20 March 2003, *Denmark v Commission*, C-3/00, EU:C:2003:167, paras. 64-65. The difference between Article 114(4) and (5) TFEU is *inter alia* explained by the CJEU in the same case (paras. 57-62, particularly 58) and in Judgement of 21 January 2003, *Germany v Commission*, C-512/99, EU:C:2003:40, para. 41), mainly because new national measures are more likely to jeopardize the functioning of the internal market. For this reason, the provision includes three cumulative conditions. The national measure can be justified by 1) *new scientific evidence* on grounds of a 2) *problem specific* to that Member State 3) *arising after the adoption* of the Implementing Measure. See: Judgement of 13 September 2007, *Land Oberösterreich and Austria v Commission*, Joined C-439/05 and C-454/05P, EU:C:2007:510, paras. 57-71, in particular para. 65. See also, e.g.: Judgement of 20 March 2003, *Denmark v Commission*, C-3/00, EU:C:2003:167, para. 63.

[91] Paras. (4) and (5) are only occasionally invoked. (J. Jans and L. Squintani, with Aragão, Macrory and Wegener, ''Gold plating' of European Environmental Measures?'[*Journal for European Environmental and Planning Law*, 6:4, 2009], pp. 417-435).

[92] An important difference between paragraphs (4) and (5) is that the reason to derogate does *not* need to be Member State-specific to *maintain* the national ecodesign requirement based on Article 114(4) TFEU. Judgement of 20 March 2003, *Denmark v Commission*, C-3/00, EU:C:2003:167, para. 59.

[93] Ibid., para. 64.

[94] L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), p. 440.

[95] One of the kick-off documents was in 1971: European Commission, *First communication of the Commission about the Community's policy on the environment*, SEC (71) 2616.

more strategic approach. This development has triggered the rise of more comprehensive and systemic laws, which suits the Circular Economy considering the comprehensiveness of the life-cycle perspective.

Regarding the choice of legal measures, there are two which are most important for EU environmental law: Regulations and Directives.[96] These instruments can only be adopted by the EP and the Council jointly, by the Council alone or by the Commission, depending on the situation. The Commission further holds the monopoly of proposing legislative measures in all such cases.[97]

Regulations are less frequently used to regulate environmental matters, because they have general application and are binding in their entirety and directly applicable in all Member States.[98] In general, Regulations are used when uniform rules are required and indeed possible. International conventions are generally transposed to EU law through Regulations, examples relate to the shipment of waste (the Basel Convention has been redesigned into the Waste Shipment Regulation) and to chemicals (the Rotterdam Convention has been redesigned into the Regulation for export and import of dangerous chemicals). In fact, the areas of waste and chemicals generally show a slow increase of uniform provisions.[99] Even so, some provisions in Regulations do not have direct effect, for they only oblige unspecified action by Member States.

The EU generally chooses to adopt Directives in environmental policy, because a Directive is binding as to the result to be achieved, upon each Member State to which it is addressed, but leaves the choice of form and methods to the national authorities.[100] Environmental Directives therefore often contain general and framework provisions, and elementary requirements which have to be transposed into national law. Legally speaking, there is no difference between a 'normal' Directive and a 'framework' or 'umbrella' Directive, such as the WFD. Despite the outcome-driven description of a Directive, as expressed in Article 288 TFEU, some Directives are in fact rather detailed, particularly in the context of products and substances; there can be plenty provisions in Directives that contain issues such as measuring methods, emission limit values, quality standards and targets, and quantitative restrictions. In addition, these specific rules may often be revised by the Commission in view of technical or scientific progress. Considering these detailed, demanding and often numerical provisions, some Directives show in fact features of a Regulation.

2.2 EU policy roots

This section clarifies the policy roots of the CE Package. Three authoritative policy frameworks are individually set forth in chronological order, including the CE Package, to show the Union's historically grown engagement to transform its economy into a circular one. When discussing the

[96] Decisions (Article 288 TFEU) are important, too, for they are numerous in environmental law. They are particularly significant in cases where they operationalize and flesh out Regulations or Directives. In addition, decisions have binding force, whereas Recommendations (also in Article 288 TFEU) and communications (not expressly provided in the EU Treaties but which expose the Commission's view ion a certain issue and are send to the other EU Institutions) have not. The latter two instruments have therefore more relevance for policy. On the other hand, Communications are sometimes accompanied by drafts for Regulations or Directives, which gives the instrument (whatever name it bears, e.g. Report, Green Paper, Communication, Strategy …) some extra weight, also for the regulatory framework. Moreover, the Commission increasingly uses Communications. Evidently, a prime example is the CE Action Plan of 2015.

[97] As for the joint adoption of environmental Regulations and Directives, see Articles 192(1) (environment) and 144 (internal market) TFEU. As for the adoption by the Council alone (only in specific cases), see Articles 192(2), 43(3), 113 and 207(3) TFEU. As for the adoption by the Commission alone (only when expressly authorized in the Treaty or secondary legislation), see Articles 290 and 291 TFEU.

[98] Article 288 TFEU.

[99] The reasons for this development may lie in the position of the EU in the international state or trade community, and in its wish to establish a well-functioning internal market. L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), p. 50.

[100] Article 288 TFEU.

CE Package in more detail, several concepts and related EU policies important for the Circular Economy transition are explained as well.[101]

2.2.1 Sustainable Development Strategies

In 2001, the European Council adopted the first EU Sustainable Development Strategy (EU SDS),[102] followed by a Commission Declaration on the guiding principles for Sustainable Development in 2005.[103] According to the Declaration, Sustainable Development aims at the

> *continuous improvement of the quality of life on earth of both current and future generations. It is about safeguarding the earth's capacity to support life in all its diversity.*[104]

A clear generational approach is thus advocated in the EU SDS in order to protect and improve the quality of life. The environmental boundaries of the Earth System are seen as the edges not to cross. In addition to this objective, the Declaration enumerates various principles that should give guidance in policy-making, particularly on policy coherence, integration and governance.[105]

One year later, in 2006, the European Council builds upon the Commission's Declaration by adopting the second and extended EU SDS,[106] which further establishes the commitment of the EU to Sustainable Development. It sums up major challenges and follow-up action, which are however not legally binding per se. Amongst others, the EU SDS addresses unsustainable consumption and production patterns, public health and the management of natural resources, including the avoidance of waste generation and the enhancement of the efficient use of natural resources by applying the concept of 'life-cycle thinking' (which is another ways of saying 'life-cycle perspective' or 'life-cycle approach' in EU policy and legislation)[107] and by promoting reuse and recycling.[108]

In the 2009 follow-up of the EU SDS, the Commission underlined that while the EU had mainstreamed the Sustainable Development objectives into a broad range of its policies in the foregoing years, such as the policy for combating climate change and the one for promoting a low-carbon and resource-efficient economy,[109] unsustainable trends and negative pressures persist in many areas. For example, it acknowledges that the fast growing demand on natural resources will exceed what the Earth can sustain.[110]

Considering all EU SDSs, it seems that the EU increasingly more evidently expresses the urge to address the trends and pressures by managing materials sustainably and that this development can initially be embedded in the (much) broader aim of Sustainable Development.[111]

---

[101] There are many resemblances between Chapter 2.2 and parts of one of my publications: T. de Römph, 'WtE and the Circular Economy: Environment and Energy', In: Post, H. (eds.), *From waste to energy: technology, the environment and the implications under EU law* (Eleven International Publishing, 2018).

[102] The EU SDS was first proposed by the Commission (European Commission, *A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development*, COM(2001) 264), whereupon it was endorsed by the Council in the Presidency conclusions Göteborg 15-16 June 2001. The EU SDS is a direct result of the famous Rio Declaration on Environment and Development, which was adopted by the General Assembly of the United Nations in 1992.

[103] European Commission, *Draft Declaration on Guiding Principles for Sustainable Development*, COM(2005) 218. See also: European Commission, *On the review of the Sustainable Development Strategy - A platform for action*, COM(2005) 658.

[104] Ibid., *Draft Declaration on Guiding Principles for Sustainable Development*, p. 2.

[105] Ibid., pp. 5 and 6.

[106] European Council, *Review of the EU Sustainable Development Strategy (EU SDS) - Renewed Strategy*, 10917/06.

[107] 'Life-cycle thinking' is explained in Chapter 2.2.3-B.II.

[108] European Council, *Review of the EU Sustainable Development Strategy (EU SDS) - Renewed Strategy*, 10917/06, pp. 12-16.

[109] 'Resource-efficiency' is explained in Chapter 2.2.3-B.I.

[110] European Commission, *Mainstreaming sustainable development into EU policies: 2009 Review of the European Union Strategy for Sustainable Development*, COM(2009) 400, p. 2.

[111] See in this regard particularly: Ibid., pp.6-9.

The EU SDSs have probably contributed to putting Circular Economy aspects at an early stage on the agenda without expressly mentioning the goal to establish a Circular Economy as such.[112]

2.2.2 Environment Action Programmes

The EU sets out priority objectives to be attained in EAPs. These EAPs have been adopted as legally binding decisions since the 6th EAP,[113] based on Article 192(3) TFEU, which makes their content official sources of Union law. The most recent Programme, the 7th EAP, was adopted under the name *'Living well, within the limits of our planet*' in 2013. It explicitly builds upon other EU policy initiatives, such as the EU Sustainable Development Strategy (discussed above).[114]

For obvious reasons, the 7th EAP also refers back to the 6th EAP. It highlights in Recital (4) the final assessment of the 6th EAP where it was concluded that despite the achievements of the Programme, unsustainable trends still continued in the four priority areas identified. For example regarding the environment and human health,[115] the objective was to achieve a quality of the environment where the levels of man-made contaminants do not give rise to significant impacts on or risks to human health. The identification of risks to health and the development a new system for the evaluation and the risk management of chemicals were, amongst others, two key proposals. Regarding the sustainable management of resources and wastes,[116] the objective was to ensure the consumption of renewable and non-renewable resources not to exceed the carrying capacity of the environment. A decoupling of resource use from economic growth was pursued through improved resource-efficiency, dematerialization of the economy and waste prevention. Notably, the 2002 6th EAP was the first EAP that explicitly linked waste management to the sustainable use of resources. Despite making that connection, it envisaged the adoption of two different strategies based on theme: one on resources and one on waste.[117] Be that as it may, the 6th EAP emphasized the link between wastes and resources. Besides that, it also expressed the ambition to integrate considerations on resource use and waste management into product policy, making one of the first steps to a full life-cycle approach.

Of course, besides recalling these 6th EAP objectives and trying to address the shortcomings in their implementation, the 7th EAP puts forward the renewed vision of the EU for environmental policy. The main ambition of the EU according to the 7th EAP reads as follows:

> *In 2050, we live well, within the planet's ecological limits. Our prosperity and healthy environment stem from an innovative, circular economy where nothing is wasted and where natural resources are managed sustainably, and biodiversity is protected, valued and restored in ways that enhance our*

[112] The latest edition to the global Sustainable Development agenda is the set of 17 Sustainable Development Goals, which were adopted in Johannesburg (South Africa) in 2015, as part of a new Sustainable Development Agenda (Resolution adopted by the General Assembly on 25 September 2015). The 17 goals include many topics which are also addressed in the CE Package, such as innovation and responsible consumption and production.

[113] Decision 1600/2002 of 22 July 2002 laying down the Sixth Community Environment Action Programme, [2002] OJ L 242/1. See also: European Commission, *Environment 2010: Our future, Our choice*, COM(2001) 31. Note that the 6th EAP was adopted one year later than the first EU Sustainable Development Strategy.

[114] Recital (32) and (8) 7th Environment Action Programme, respectively.

[115] This is the third priority area of the 6th EAP.

[116] This is the fourth priority area of the 6th EAP.

[117] European Commission, *Thematic Strategy on the sustainable use of natural resources*, COM(2005) 670; and European Commission, *Taking sustainable use of resources forward: A Thematic Strategy on the prevention and recycling of waste*, COM(2005) 666, respectively. On the other hand, this division between resource and waste is not that strongly respected *within* the strategies. Particularly the latter strategy on waste departs from the notion of an interconnected policy field of both resources and waste. Preventing waste generation and promoting waste recovery would contribute to maintaining the resource base, which, according to the Commission, is essential for sustained economic growth (COM(2005) 666, p. 6).

> *society's resilience. Our low-carbon growth has long been decoupled from resource use, setting the pace for a safe and sustainable global society*.[118] (emphasis added)

What makes the 7th EAP a landmark document is that it coins the concept 'Circular Economy' for the first time in a legally binding source of EU legislation.[119] Notably, it envisages the Circular Economy for 2050, which is also the first time that such a long-term horizon has been mentioned.[120] The 7th EAP does not, however, explain the concept's meaning explicitly. Nevertheless, a series of features may be understood from the priority objectives that are provided in Article 2 of the 7th EAP and which are further clarified in the Annex. The first three priority objectives are most important in that respect.[121]

'Protecting, conserving and enhancing the Union's natural capital' is the first priority objective. Its link to the Circular Economy is the least straightforward compared to the other two priority objectives, because the array of topics included in the goal is very broad. Paragraph 17 of the Annex of the 7th EAP highlights that the economic prosperity and well-being of the EU is underpinned by its natural capital. This includes the essential goods and services provided by ecosystems – *'from fertile soil and multi-functional forests to productive land and seas, from good quality fresh water and clean air to pollination and climate regulation and protection against natural disasters*.' This first priority objective thus boils down to the reduction of the most significant man-made environmental pressures on the Earth's system, which is also pursued within a Circular Economy.

'Turning the Union into a resource-efficient, green and competitive low-carbon economy' is the second priority objective. According to paragraph 29 Annex 7th EAP, the EU needs to stimulate growth by deploying a more competitive economy that uses resources sustainably over their entire life-cycle. It would do so, if GHG emissions are reduced, competitiveness is enhanced through efficiency and eco-innovation, and energy and resources are secured. Moreover, it would particularly help if economic growth is decoupled from energy use ('energy decoupling'), environmental impacts ('impact decoupling') and resources ('resource decoupling'). It is important to understand that resource decoupling is only aimed after for *virgin* resources, because paragraph 40 clearly indicates that waste should be turned back into the economy as a resource. Notably, the paragraph explicitly mentions the term 'Circular Economy'. In the light of this aim, additional efforts are required amongst others to reduce waste generation, to limit energy recovery from waste to non-recyclable materials, to phase out landfilling of recoverable waste, to ensure high-quality recycling, and to develop markets for these recycled materials. Besides the call for 'circular' waste management, the 7th EAP also stresses the need for more environmentally sustainable production, consumption and use of products.[122] Here again, the paragraph explicitly mentions the Circular Economy. Paragraph 36 adds that although the environmental performance of goods and services on the Union market over their whole life-cycle is required, including a significant shift in user demand, stimulating better product design is crucial to tackle most environmental impacts of a product.

---

[118] It is formulated in the first paragraph of the Annex of the 7th EAP.

[119] Not only in the main objective is the concept mentioned; also in the priority objectives 'Circular Economy' is referred to, as will be explained below. The first time the ambition to establish a Circular Economy in the EU was coined in EU *policy*, had been in de 2011 Flagship Initiative for a Resource-Efficient Europe. See Chapter 2.3.2-A.

[120] The 7th EAP further highlights that the achievements of the Programme's objectives for 2020 should be in line with the Circular Economy vision for 2050, as it would provide a stable environment for sustainable growth (see Recital (8) 7th Environment Action Programme). It thereby foresees that several incremental steps need to be taken in order for the existing economy to become a Circular Economy.

[121] Article 2(1)(a)-(c) 7th EAP. These three objectives are the only ones falling under the heading 'Thematic priorities', as opposed to 'The enabling framework' and 'Meeting local, regional and global challenges'.

[122] Paragraph 35 Annex 7th EAP.

'Safeguarding the Union's citizens from environment-related pressures and risks to health and well-being' is the third priority objective.[123] According to paragraph 44 Annex 7th EAP, this priority objective targets amongst others the use of chemicals. Paragraph 50 points out that while the EU has already set baseline protection for human health and the environment, which also ensures stability and predictability for economic operators, there is still a lot of uncertainty about the full impacts of the use of certain (combinations of) substances. In line with international agreements, the overall goal of the EU is therefore to ensure the minimization of (possible) significant adverse effects of chemicals on humans and the environment by 2020, and to respond to new and emerging issues, such as the use of nanomaterials and combined effects, in *'an effective, efficient, coherent and coordinated manner.*' Amongst other specific approaches to achieve this goal, the EU highlights the usefulness of risk assessment and management, information and monitoring.

In conclusion, the 7th EAP is a milestone in the rise of the Circular Economy movement, because it explicitly refers to the concept for the first time in EU legislation; it is even included in the main ambition for the environmental policy of the EU. Even though the EAP does not include a clear-cut definition of the Circular Economy, it provides for numerous aspects that are covered by the concept's explanation and accompanying actions proposed in the CE Package.[124] While the three thematic objectives laid down in the 7th EAP fall within the traditional environmental sphere, there are many related topics included as well – issues that are also part of the Circular Economy rationale. Examples are competition, innovation and – more fundamentally – how an economic system should be remodeled. Moreover, besides the challenges related to resources, chemicals, products and waste (i.e. the material system), issues such as climate control, energy use, food supply and land use are also addressed by the EAP. Similar to the CE Package, this shows that the vision adopted in the EAP on the Circular Economy is highly interconnected to these 'other' challenges and that they should be pursued in parallel. The formulation of the 7th EAP therefore underlines that almost all pieces of EU environmental policy are to a great extent intertwined and that the aim of establishing a Circular Economy in the EU is far from a stand-alone exercise. It is nonetheless clear that the 7th EAP is *the* formal stepping stone towards the CE Package. It coins the term 'Circular Economy' for the first time in EU law.

2.2.3 Circular Economy Package

With the explanation of the Circular Economy concept and the bigger picture of the CE Package already put forward in Chapter 1.2, this Chapter refrains from simply repeating these matters. It does, however, provide the background on the realization of the CE Package: firstly by discussing the politically bumpy road towards its adoption in 2015 (Chapter 2.2.3-A) and secondly by chronologically explaining the policies that have helped in developing certain concepts which are significant for the CE Package (Chapter 2.2.3-B). In that capacity, these policies can be seen as the backbone of the Circular Economy concept and policy.

A. Adoption of the Circular Economy Package(s)

Barroso's second College of Commissioners filled the terminological gap left by the 7th EAP to some extent by launching a completely new and comprehensive policy programme in July 2014 in order to install a *'common and coherent EU framework for promoting the circular economy'*.[125] Just as the CE Package from 2015, this policy framework was known as the CE Package.[126] The 2014 CE Package included a Communication and one legislative proposal that would have

[123] It is also expressed in Article 2(3) 7th EAP.
[124] See Chapter 1.2.
[125] 2014 CE Communication, p. 5.
[126] From now on, when reference is being made to the CE Package of 2014, '2014' will be added if necessary. This is sometimes also done with respect to the 2015 version if the difference between the two Packages is unclear.

amended several waste Directives all at once.[127] Both documents are based on several studies and assessments.[128] Taking into account the many references to other policies in the text of the 2014 CE Package, it was really meant to be the apotheosis of all the previous initiatives (the EU SDS and the 7th EAP being two of them).[129] It reveals the relatively short period in which Circular Economy-related policies have merged into one common policy at EU level. All in all, the launch of the 2014 CE Package received a great deal of attention.[130]

Not before long, however, the newly appointed European Commission, led by the Commission's president Juncker, officially withdrew the CE Package in December 2014 after just having been in office for less than two months.[131] The CE Package's withdrawal shows the political vulnerability of such initiatives. While the 2014 CE Package had been proposed in times of economic crisis, which could have restrained the Package's preparation in the first place based on prevailing economic and trade considerations, it was eventually withdrawn due to a wind of change that blew through EU politics. The Juncker Work Programme 2015 is officially called 'A New Start' for a reason.[132] The practice of withdrawing policies and legislative proposals at the beginning of a new College of Commissioners is generally assumed to be in compliance with EU law, often based on the principle of political discontinuity.[133] This time, however, there was a broad-based engagement for the 2014 CE Package by the Member States, the EP, civil society and industries alike, for they already invested quite some time, effort and money in 'greening' their policies and activities over the past few years, no least on account of influential policies and legislation. Generally speaking, non-governmental organizations (NGOs) also embraced the CE Package.

These findings are important in the context of the CE Package, because the Juncker Commission simply stated that the legislative proposal of 2014 CE Package was under scrutiny to cut red tape, under the Better Regulation Programme,[134] without giving much further detail on the reasons for withdrawal.[135] Initially, a leaked version of the 2015 Work Programme – to which most media referred to when the official Work Programme was not published yet – stated that the CE Package would be withdrawn by reason of 'no foreseeable agreement' between the Member States and the EP.[136] In the final Work Programme, however, this statement had been changed into another explanation: the Commission wanted to propose a *'new, more ambitious proposal by*

[127] 2014 CE Communication,; and European Commission, *Proposal for a Directive amending Directives 2008/98/EC on waste, 94/62/EC on packaging and packaging waste, 1999/31/EC on the landfill of waste, 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment*, COM(2014) 397, respectively.
[128] These studies include a progress report on the Roadmap to a Resource Efficient Europe (Chapter 2.2.3-B.I) and an ex-post evaluation (fitness check) of five waste directives, which can be found on the website of the European Commission, DG ENV. As will be clarified in, the Better Regulation Programme of the EU shapes these studies and assessments. See for this Chapter 4.2.2.
[129] Others are discussed below in Chapter 2.2.3-B.
[130] For example, the 2014 edition of the Green Week, which is an annual event organized by the EU to debate and discuss European environment policy, was dedicated to the Circular Economy.
[131] Annex to European Commission. *Commission Work Programme 2015: A New Start*, COM(2014) 910.
[132] European Commission. *Commission Work Programme 2015: A New Start*, COM(2014) 910.
[133] Advocate General Jääskinen states in one of his opinions on a dispute between the European Council and the European Commission that the expression 'power of withdrawal' should prevail over 'right of withdrawal' (, because *'the exercise of that power affects the legal position of the co-legislator only in that it precludes the latter from pursuing the legislative procedure'* (para 1). Opinion of Advocate General Jääskinen on 18 December 2014, *Council v Commission*, C-409/13, EU:C:2014:2470. This opinion is shared by the Grand Chamber, see paras 74-75 of the final judgement.
[134] The fact that the withdrawal of the 2014 CE Package was backed up by the goal of making better regulation (i.e. through the Better Regulation Programme) is dubious, because the 2014 CE Package had in fact been the *result* of the Better Regulation Programme. See Chapter 4.2.2 for an explanation of the Better Regulation Programme.
[135] Supra note 132, pp. 5-6.
[136] Note that the authenticity of the leaked version of the Work Programme cannot be verified, nor is it an official legal source. Relying on the document should therefore be toned down.

end 2015 to promote circular economy.' Even though the Commission assured to come up with a more ambitious CE Package before the end of 2015, it should be stressed that this was by no means legally binding, which left a lot of wiggle room for the Commission in terms of time, content and type of legal measure(s).

In the end, the European Commission kept its promise in the sense that it launched its 'Circular Economy Package 2.0' in December 2015. As pointed out in Chapter 1.2, the CE Package now includes a Communication in the form of an Action Plan and several separate legislative proposals, each amending one particular EU waste Directives. Note that these measures are the same ones that would have been changed by the legislative proposal of 2014.

B. Concepts and correlated policies significant for the Circular Economy Package

The concepts and correlated policies explained in this Chapter are organized in accordance with the two words that when combined constitute the term Circular Economy: 'circular' and 'economy'. Below, the transformation of the *economy* is explained first, whereupon the *circularity* of the economy is considered. When discussing these matters, a connection is made to the 2015 CE Package (and to its differences with the 2014 version, if required).

B.I Economy: resource-efficiency, competitiveness and eco-innovation

Despite the fact that environmental concerns lay at the origin of the Circular Economy movement, economic motives play a fundamental role in it as well. Both the EU Sustainable Development Strategy and the Environment Action Programme confirm this aim to tackle environmental challenges while achieving a long-term sustainable, resource-efficient and competitive economy.[137] The CE Action Plan, too, puts strong emphasis on sustainable economic growth. For example, it highlights the creation of new jobs, opportunities for new business, innovations and investments, and the stimulation of competitiveness and resource-efficiency, which includes resources used for energy.[138] Moreover, the Commission draws attention to the important role the private sector plays in the transition to a Circular Economy, such as businesses and final product users, including governments and other administrations.[139] This comprehensive approach can amongst others be explained by the strong believe that environmental considerations should be embedded in other policy fields and thus the need to optimize synergies and to address the trade-offs between these different policy fields.[140] In addition, it can be explained by the strategy chosen by the Directorate-General (DG) for the Environment (DG ENV), which launched the CE Package(s). Indeed, DG ENV allied with different departments to gather support for both the 2014 and the 2015 CE Package, e.g. DG GROW, which includes the divisions Internal Market and Industry.[141] In point of fact, DG GROW is even the other half of the lead DGs for the Circular Economy. In addition to the Circular Economy goal of policy integration, which derives amongst others from the life-cycle approach, working together with other DGs was politically speaking the

[137] See e.g.: Recital (7) and Article 2(1)(b)-(c) 7th EAP.

[138] Besides the clearly visible economic-driven objectives, the Action Plan also points at the *wider* environmental benefits of a Circular Economy. It is raised that a Circular Economy would save energy and help avoid the irreversible damages caused by resource use in terms of climate and biodiversity, air, soil and water pollution. In other words: benefits that fall *outside the direct scope of the materials system*. CE Action Plan, p. 2.

[139] See e.g.: CE Action Plan, pp. 2 and 13.

[140] Another reason could be the origin of the EU: economic considerations lie at the foundation of the creation of European Coal and Steel Community and the European Economic Community in the 1950s. Only over the following 65 years, an increasingly dense network of environmental policy and legislation has been created. The vast majority of these environmental policies are never completely devoid of economic reasoning, however.

[141] The DG for Employment, Social Affairs and Inclusion was also taken on board. When the 2014 CE Package was launched by DG ENV, DG Employment simultaneously presented a new initiative, called the Green Employment Initiative. European Commission, *Green Employment Initiative: Tapping into the job creation potential of the green economy*, COM(2014) 446. Note, however, that DG ENV did *not* work together publicly with the DG responsible for the Energy Union, Energy and Climate Action (DG ENER).

best option, because DG ENV alone would possibly not had been able to get enough support for the CE Package.[142]

The division of power and responsibilities between the DGs is a recurrent issue in environmental policy, particularly concerning the policies that have helped in the creation of the 2015 CE Package; generally, they have a strong relationship with economic reasoning. The Communication on the Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan (SCP Action Plan) of 2008, for example, highlights the challenge to integrate sustainability into the measures that stimulate the overall economic growth of the EU and, in view of that, to move towards more sustainable patterns of consumption and production. The SCP Action Plan is an initiative of DG ENV.[143]

One policy is particularly interesting for the transition towards a Circular Economy considering the economic angle to the Circular Economy concept: the Flagship Initiative for a Resource-Efficient Europe (2011).[144] The Flagship Initiative is a policy framework that has been created under the broader Europe 2020 Strategy.[145] The policy's implementation is the responsibility of DG ENV.[146] A transitional vision is adopted by the Commission in the sense that

---

[142] Arguably, the close liaison between both DGs may have contributed in the choice not to call it the 'Circular Society', even though that term would have been adequate considering the society-wide scope of the concept.

[143] European Commission, *Communication on the Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan*, COM(2008) 397. Many more policies that are not discussed in this dissertation make direct links to sustainable growth of the economy and an environmentally friendly industry in the EU. The DG responsible for the particular policy depends on the dominant objective. For example, sustainable economic growth is a key objective of the Industrial Renaissance Initiative: European Commission, *For a European Industrial Renaissance*, COM(2014) 14. This policy has been initiated by DG GROW. See also: e.g.: European *Commission, Helping Firms Grow - European Competitiveness Report 2014*, SWD(2014)277.

[144] European Commission, *A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy*, COM(2011) 21; and European Commission, *Roadmap to a Resource Efficient Europe*, COM(2011) 571. An important aspect of the Flagship Initiative is the recognition that making the EU more resource-efficient requires a transitional approach. This is most evident in the Roadmap to a Resource Efficient Europe where it states that the transformation needs *'a policy framework that creates a playing field, where innovation and resource efficiency are rewarded, creating economic opportunities and improved security of supply through product redesign, sustainable management of environmental resources, greater reuse, recycling and substitution of materials and resource savings*' (*Roadmap to a Resource Efficient Europe*, p. 2). This quotation shows that the EU approach to SMM, like the OECD's, also aims at a long-term framework in which policy and regulation can navigate the transformation, e.g. by seizing opportunities and 'managing' resources. In this respect, the Roadmap dedicates an entire chapter to governance and monitoring (pp. 19-23). For example, it is suggested to engage actors and to bring them together to overcome barriers.

[145] In 2010, the Commission set up a broad initiative, the ten-year growth strategy 'Europe 2020', to emerge stronger from the economic and financial crisis. Not surprisingly, it wanted to become a smart, sustainable and inclusive economy. It therefore integrates the relevant elements of the EU SDS in order to ensure overall coherence. Europe 2020 aims at short-term goals (i.e. exit from the economic crisis) and future-orientated goal of sustainability. The Commission proposed targets for five policy fields that should steer that process until 2020: employment; research and innovation; education; poverty; climate change and energy. Notably, to achieve these priority objectives, the Commission aims at policy cohesion and initiated seven Flagship Initiatives to give further substance to Europe 2020. One of which is the Resource-Efficient Europe Initiative. Another Flagship Initiative concerns the 'Innovation Union', which tries to improve the framework conditions and access to finance for research and innovation. See European Commission, *Europe 2020 Flagship Initiative Innovation Union*, COM(2010) 546. For example, it urges to achieve partnerships, e.g. to ensure *'a secure supply chain and* [to] *achieve efficient and sustainable management and use of non-energy raw materials along the entire value chain*' (p. 25). See also: European Commission, *Research and innovation as sources of renewed growth*, COM(2014) 339. Another Flagship Initiative is the 'An Agenda for new skills and jobs' initiative: European Commission, *An Agenda for new skills and jobs: A European contribution towards full employment*, COM(2010) 682.

[146] Note in this regard that this was *neither* the former DG ENER *nor* the DG for Climate Action (CLIMA, there were to separate DGs for Climate Action and for Energy in 2011), which could also have been suitable DGs for action on this matter. Arguably, the fact that DG ENV took the responsibility for the implementation of the Flagship Initiative for a Resource-Efficient Europe can be explained by the reshuffling of the responsibilities of the DGs when the second Barroso Commission took office in 2010. Before 2010, DG ENER used to have the

it foresees that the completion of the Resource-Efficiency Initiative is achieved in 2050, while incremental 'milestone steps' should also be reached by 2020 to speed up the transformation. Note that these benchmark dates run parallel with the ones in the CE Package. Just as has been argued in the CE Package, this vision can provide a clear path and ensure long-term predictability for businesses and investors to boost the competitiveness of the EU.

At the most basic conceptual level, resource-efficiency means at 'doing more with less resources'. The Initiative is not limited to the Circular Economy transition, however: it also aims at other issues, such as stimulating clean and efficient energy, combating climate change, sustainable fisheries, regional development and the protection of biodiversity. 'Resources' should therefore be interpreted broadly in the context of Europe 2020; it is not restricted to the materials system. This interpretation can also be acquired from the more extensive definition of 'resource-efficiency', which is:

> *to help decouple economic growth from the use of resources, support the shift towards a low carbon economy, increase the use of renewable energy sources, modernise our transport sector and promote energy efficiency.*[147] (emphasis added)

Even so, because the decoupling of economic growth from resource use is used distinctively from, for example, the energy system (e.g. through energy-efficiency), there are reasonable grounds to believe that 'resource decoupling' only relates to the materials system. This viewpoint is strengthened by the EAPs, as pointed out in Chapter 2.2.2, according to which 'energy decoupling', (environmental) 'impact decoupling' and 'resource decoupling' are distinguishing goals. Besides, the Resource-Efficient Europe Initiative, too, distinctively aims at impact decoupling from growth through the determination of medium and long-term objectives and actions.[148] Amongst the list of actions, the Initiative mentions the launch of

> [a] *strategy to make the EU a 'circular economy', based on a recycling society with the aim of reducing waste generation and using waste as a resource.*[149] (emphasis added)

Hence, even before the 7th EAP was published in 2013, the Resource-Efficient Europe Initiative mentioned the goal to become a Circular Economy. It is the first EU policy that coins the term.

All in all, one should understand that there will probably always be some impact on the environment and there will always be a need to extract some resources to safeguard economic growth. This cannot be avoided completely. In addition, resource decoupling is only aimed after for virgin resources in the 7th EAP. Although the Resource-Efficient Europe Initiative does not explicitly mention this virgin v non-virgin division, it emphasizes the need to recycle better and more, and to stimulate the markets and demand for these recyclates through economic incentives.[150] This might indicate that the Resource-Efficiency policy (just as the 7th EAP) does not target recycled resources in the context of resource decoupling.

To be more specific on the relation between resource-efficiency and the Circular Economy: besides mentioning 'resource-efficiency' as one of the main elements in a Circular Economy, the European Commission more specifically stresses that Circular Economy models keep the added value in products for as long as possible and rejects the idea of waste being a problem per se,

---

responsibility for energy and DG ENV for the environment including climate change. But as climate change moved to a DG expressly created to control harmful emissions at EU and international level, DG ENV had to search for other emblematic topics to take up its mandate: by means of resource-efficiency.

[147] European Commission, *Europe 2020 A strategy for smart, sustainable and inclusive growth*, COM(2010) 2020, p. 6. Other objectives put forward in the Resource-Efficient Europe Initiative are amongst others stimulating technological improvements and changing the behaviour of producers and final users. European Commission, *A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy*, COM(2011) 21, p. 3. Indeed, the latter goal refers to the SCP Action Plan

[148] Ibid., *A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy*, p. 5.

[149] Ibid., p. 6.

[150] See the quote where the Circular Economy is coined, above. See also: e.g.: Ibid., p. 8.

because waste can serve as a resource in the production process if properly management. Actually, even *more* value can sometimes be created than in the previous life-cycle of a material. In other words, the Commission tries to pump these valuable resources back into the economy, which would reduce the raw materials dependency of the EU on externalities. In view of this, resource decoupling is together with environmental impact decoupling a key consideration in the 2014 CE Package.[151] Remarkably, no explicit reference is being made to either resource decoupling or impact decoupling from economic growth in the 2015 CE Action Plan. Nonetheless, it can be assumed that these two types of 'decoupling objectives' are being pursued, because they have also been clearly acknowledged in the legally binding 7th EAP.

Apart from impact and resource decoupling, the Resource-Efficient Europe Initiative stresses the importance of enhancing competition, both within its borders and globally.[152] This goal is of course closely related to resource-efficiency, as, generally speaking, the less input materials is used in the industry, the less production costs and the more competitive it is. The Initiative therefore emphasizes the need to develop new products and services, and to find new ways to reduce these inputs. In addition to that, it stresses a bunch of Circular Economy-related issues, such as the necessity to optimize production processes, minimize waste generation, improve management of resource stocks, change use patterns, develop new management and business methods, and improve logistics. It would improve the Union's security of raw materials supply and make the EU's economy more resilient to future increases in commodity prices.[153] It is also believed that it will boost job growth in the 'green technology sector', sustain EU trade amongst others by opening up new export markets, benefit consumers through more sustainable products, and help stimulating technological (eco-)innovation.[154]

The Europe 2020 Strategy provides for another policy framework significant for the Circular Economy: the Eco-innovation Action Plan,[155] which had been rolled out in 2011.[156] The Action Plan identifies measures for the deployment of key environmental technologies and generates awareness of the potential of these new technologies. In other words, it aims at boosting eco-innovation, which, according to the Commission, means:

> *any form of innovation resulting in or aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment, enhancing resilience to environmental pressures, or achieving a more efficient and responsible use of natural resources*.[157]

Eco-innovation is stimulated through its integration into the entire panoply of environmental policy and legislation.

In conclusion, the fact that the Commission addresses resource-efficiency and competitiveness in the 2015 CE Package does not come as a surprise. Existing policies already

---

[151] The 2014 Communication states that moving towards a Circular Economy provides *'a much brighter future for the European economy'* as it would *'allow Europe to rise to the current and future challenges of global pressure on resources and rising insecurity of supply*.' 2014 CE Communication, p. 3.

[152] Competitiveness is also one of the main drivers in the other Flagship Initiatives, for example the ones concerning the Innovation Union and Employment. See European Commission, *Europe 2020 Flagship Initiative Innovation Union*, COM(2010) 546, pp. 2 and 6; European Commission, *An Agenda for new skills and jobs: A European contribution towards full employment*, COM(2010) 682, p. 2, respectively.

[153] European Commission, *A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy*, COM(2011) 21, p. 2.

[154] Ibid.

[155] European Commission, *Innovation for a sustainable Future - The Eco-innovation Action Plan (Eco-AP)*, COM(2011) 899.

[156] In fact, the term 'eco-innovation' already existed at that time. With regard to a 'leaner production' of products, for example, the SCP Action Plan sums up three target areas: resource-efficiency, environmental potential for industries and *eco-innovation*. One could say, therefore, that the Eco-innovation Action Plan developed the concept further.

[157] Supra note 155, p. 2.

provide a basis for this, such as the Resource-Efficient Europe policy framework and the Eco-innovation Action Plan.

B.II Circularity: life-cycle thinking

The transformation from the current linear economy to a *Circular* Economy raises the question of what is meant by the word 'circular'. The term 'circularity' is not explicitly explained in either of the CE Packages. What can be understood from the descriptions of the Circular Economy provided in Chapter 1.2, however, is that waste should not be seen as a problem but rather as an opportunity: waste can be turned back into useable resources. Circularity thus means first of all the closing of one material life-cycle and beginning a new one. The best known waste treatment for this conversional process is recycling.

A significant policy in this field stems from 2005 in which the Commission published the Thematic Strategy on waste prevention and recycling.[158] The full title of the Communication is: *'Taking sustainable use of resources forward: A Thematic Strategy on the prevention and recycling of waste'*. The Commission is truly committed to transform the EU into a 'recycling society' by providing a number of measures that should stimulate recycling.[159] Although the Commission clearly links waste management to resources use, apparently it deliberately separates the Communication from another Communication on the general sustainable use of natural resources,[160] as both documents were released at the same date. This division can be explained by the fact that, at the time the Communications were drafted, waste had been at the centre of EU environment policy in the last 30 years.[161] Despite the tendency to perceive waste more and more as a valuable resource for industry in 2005,[162] the two Communications represent the previously ingrained perspectives on waste; that is waste being a problem rather than an opportunity. It seems that the Thematic Strategy on waste prevention and recycling nonetheless really tried to change this rhetoric by focusing on recycling and other recovery treatments. The Thematic Strategy on sustainable resource use carried out the same message as its twin policy on waste prevention and recycling: a systematic, coordinated and integrated application of the life-cycle perspective was pursued.[163]

Key to that paradigm shift was the introduction of life-cycle thinking to waste policy; that is to take into account *all* other stages of a material's life-cycle in waste management and not only the 'traditional' waste stage.[164]

While the rational of life-cycle thinking has slowly but surely been introduced to the policies for waste and resources, the terminology originates from the attempts of making *products* more sustainable. Decisions made in the period in which a product is conceptualized and manufactured are extremely important if products are to become more sustainable. The rise of reflecting a life-cycle perspective in EU policy starts in 2001.

The first Communication on the Integrated Product Policy (IPP) was the very first EU policy document to conceptualize the idea of life-cycle thinking.[165] Back in 2001, the Commission

---

[158] European Commission, *Taking sustainable use of resources forward: A Thematic Strategy on the prevention and recycling of waste*, COM(2005) 666.
[159] Ibid., pp. 17-20.
[160] European Commission, *Thematic Strategy on the sustainable use of natural resources*, COM(2005) 670.
[161] Note in this regard that the Flagship Initiative for a Resource-Efficient Europe was adopted only in 2011.
[162] Supra note 158, p. 3.
[163] Supra note 160, pp. 6-7.
[164] Supra note 158, p. 7. The Review of the Thematic Strategy on the prevention and recycling of waste, also adopted in 2011, demonstrated, on the one hand, significant progress in the establishment and diffusion of the life-cycle perspective in EU waste policy and law. On the other hand, it also signaled significant implementation differences between Member States of the binding minimum targets, which had been fixed in view of the life-cycle approach under the 2005 Thematic Strategy, and made it quite clear that without further and complementary initiatives, opportunities will be missed to change the trends and pressures expressed in Chapter 1.1. European Commission, *Report on the Thematic Strategy on the Prevention and Recycling of Waste*, COM(2011) 13, pp. 6, 8-9.
[165] European Commission, *Green paper on integrated product policy*, COM(2001) 68.

started to rethink policies relating to the *overall environmental impacts* of products.[166] IPP can be described as:

> *… an approach which seeks to reduce the life cycle environmental impacts of products from the mining of raw materials to production, distribution, use, and waste management. The driving idea is that integration of environmental impacts at each stage of the life cycle of the product is essential and should be reflected in decisions of stakeholders. IPP focuses on those decision points which strongly influence the life cycle environmental impacts of products and which offer potential for improvement, notably eco-design of products, informed consumer choice, the polluter pays principle in product prices. It also promotes instruments and tools which target the whole life cycle of products*.[167] (emphasis added)

This definition is important, because it lays the foundation for integrating environmental aspects into EU product policy and legislation. The 2001 IPP Communication lists plentiful concise guidelines for product design, including on the conservation of resources, the reduction of hazards and risks, and design for durability and recycling.[168] In addition, suggestions were made on the generation of product information, labelling, Green Public Procurement (GPP) and standardization.[169] Overall, the Commission adopted a clear life-cycle approach without really defining it.

The subtitle of the sequel Communication on IPP (2003) was therefore no surprise: *'Building on Environmental Life-Cycle Thinking'*.[170] The Commission considers life-cycle thinking as a highly important 'policy principle' in the 2003 IPP. It describes it as an approach that:

> *… considers a product's life-cycle and aims for a reduction of its cumulative environmental impacts - from the "cradle to the grave". In so doing it also aims to prevent individual parts of the life-cycle from being addressed in a way that just results in the environmental burden being shifted to another part. By looking at the whole of a product's life-cycle in an integrated way, IPP also promotes policy coherence. It encourages measures to reduce environmental impacts at the point in the life-cycle where they are likely to be most effective in reducing environmental impact and saving costs for business and society*.[171] (emphasis added)

Along with the explicitly mentioned issues (such as policy coherence, cost savings and a reduction of the cumulative environmental impacts caused by material use) many other aspects can be derived from this explanation of the life-cycle perspective. Examples of these aspects are: the 'life-cycle of materials' covers besides the actual materials also all the activities related to those materials (e.g. extraction, transportation, production, use, collection and waste treatment) in the generally complex value chains; the need to mobilize and engage the broad array of (economic, governmental, sectoral and individual) actors involved (e.g. mine corporations, manufacturers, importers, private users, and recycling and landfill operators); the need to use of the full range of policy instruments, if required; the need to coordinate between policy areas (not only between the policies related to the materials system, but also between those and the ones for other systems); and the requirement of considering the intergenerational and geographical scope of a material's life-cycle.[172] In addition, in order to anticipate in accordance with the life-cycle of

[166] While in some policy and legislation environmental impacts and human health impacts are separated, the environmental impacts include those on human health under the IPP approach. Ibid., p. 2. Interestingly, the Communication did not include many economic or social considerations, even though the Commission stated that IPP plays an important role in contributing to Sustainable Development. According to the next IPP Communication, IPP is an integral part of the SDS. European Commission, *Integrated Product Policy - Building on Environmental Life-Cycle Thinking*, COM(2003) 302, pp. 2, 3 and 6.
[167] Supra note 165, p. 5.
[168] Ibid., pp. 19-20.
[169] Ibid., pp. 12-13 and 15-21.
[170] European Commission, *Integrated Product Policy - Building on Environmental Life-Cycle Thinking*, COM(2003) 302.
[171] Ibid., pp. 4 and 9.
[172] Regarding the geographical angle to the life-cycle perspective: the importance of pollution from materials use (e.g. production processes) outside the EU can be interpreted as a landscape level (in transition terminology),

a material, one needs to have reliable and detailed data to avoid unintended effects in the course of the cycle. Information is required about the type and magnitude of environmental impacts.

Even without official policy follow-ups, the idea of taking the full life-cycle of products into account to enhance environmentally-friendly product policy and – importantly – corresponding policy coherence clearly entered the EU industrial policy framework through the IPP Communications. The application of life-cycle thinking has developed since then via the 2008 SCP Action Plan[173] to the CE Packages. Whilst the life-cycle perspective under the 2001 IPP policy presumed a cradle-to-grave approach, under the Circular Economy policy it has been developed into a cradle-to-*cradle* approach. In other words, the life-cycle perspective has evolved from a singular life-cycle perspective in 2001 to a life-*cycles* perspective in 2014/2015.[174]

There are nevertheless also differences between the 2014 and 2015 CE Packages. Although the 2014 CE Communication features life-cycle thinking to some degree, it is not very explicit: e.g. the layout is not in 'life-cycle order' and relatively too much attention is being paid to the waste stage compared to other stages. Moreover, the legislative proposal accompanying the Communication also adjusts six EU waste Directives. The 2014 CE Package as a whole totally missed out the opportunity to address the full life-cycle of materials by not including the resource and product stages sufficiently. In contrast, a number of life-cycle stages are individually addressed in the 2015 CE Action Plan and they are even organized in congruence with the material life-cycle to take the reader by the hand. In the 2015 version, there are strategic approaches proposed for four life-cycle stages which all have equal importance. Moreover, even though the 2015 legislative proposals amend the same six EU waste Directives as the legislative proposal of 2014, the 2015 Circular Economy Action Plan has scheduled the examination and possibly modification of a number of EU measures for the next few years. In future, not only EU waste law will be modernized considering the Circular Economy rationale, but, for example, also the frameworks regulating products design and chemicals. In spite of receiving quite some criticism for not being ambitious enough, these examples of differences between the 2014 and the 2015 CE Packages therefore show the Commission's greater loyalty to applying the life-cycle approach in the 2015 version than in the one published in 2014.

In conclusion, closing the life-cycle and starting a new one through waste treatment practices such as recycling is not the only component of 'circularity' that the Commission emphasizes in the CE Package of 2015 – albeit a very important one. Above all, the Commission stresses that the environmental impacts of the *entire* material life-cycle should be considered in an integrated

---

because amongst other reasons the macro-political developments and structures are difficult to alter. In addition, the natural circumstances are just as they are (for example the fact that the earth's crust within the EU borders does not contain much raw materials if one compares it with other regions.

[173] The SCP Action plan builds on the IPP's interpretation of life-cycle thinking by aiming at a dynamic and integrated framework to improve the environmental (this time including energy) performances of products and to foster their uptake by users. In view of that, three priority areas are stressed which are also significant in the life-cycle perspective: resource-efficiency, environmental potential for industries and eco-innovation. The first policy field is addressed in the Resource-Efficient Europe Initiative and discussed in Chapter 2.2.3-B.I. The latter two policy fields are fleshed out in Eco-innovation Action Plan, which had been rolled out in 2011: European Commission, *Innovation for a sustainable Future - The Eco-innovation Action Plan (Eco-AP)*, COM(2011) 899. The Eco-innovation Action Plan also complements the Horizon 2020 (European Commission, *Europe 2020 Flagship Initiative: Innovation Union*, COM(2010) 546). It identifies measures for the deployment of key environmental technologies and generates awareness of the potential of these new technologies. In other words, it aims at boosting eco-innovation, amongst others by integrating eco-innovation into the entire panoply of environmental policy and legislation. Eco-innovation means '*any form of innovation resulting in or aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment, enhancing resilience to environmental pressures, or achieving a more efficient and responsible use of natural resources*' (*Innovation for a sustainable Future - The Eco-innovation Action Plan (Eco-AP)*, p. 2). Eco-innovation thus clearly follows the transitional approach: i.e. the stimulation of niche developments. See for an explanation of transitions Chapters 4.1 and 4.2.

[174] In the course of the thesis, therefore, when referring to life-cycle thinking or comparable terms, it actually means the Circular Economy interpretation of the concept, i.e. the life-*cycles* perspective.

way. Life-cycle thinking – for which there is still no formal definition, making its application open for interpretation depending on the situation – is based on the idea that the use of materials causes a series of positive as well as negative environmental impacts during their life-cycles, and that, in view of that, it is important to search for opportunities to improve these effects in the life-cycle stage(s) where it is best addressed. This also implies that there should be an integrated and coherent 'life-cycle' policy framework. Life-cycle thinking has become a guiding norm in sharpening policy and legislation on products and has along the way also been included in EU resource and waste policy. The EU policy measures that contributed to the development of the life-cycle perspective are important steps for the creation of a *Circular* Economy in the EU.

2.3 Interim conclusion

The first element of the first research question concerns the building blocks of the CE Package and therefore also of the Circular Economy transition in EU law. Two matters were addressed: first the legal foundation for action on the Circular Economy by the EU and second the policy roots of the CE Package.

There is a strong foundation in EU primary law for the Circular Economy transition. The environmental provisions laid down in the EU Treaties require policy and legislation to be continuously improved, aiming at an increasingly higher level of environmental protection in its broadest sense. This includes the prudent and rational utilization of natural resources. The CE Package fits well into this context, as it sends out strong messages to transform the economy into a more sustainable one. This goal is also set out in other policies, albeit not always in the light of the materials system. Significant examples are the EU SDS, the Resource-Efficient Initiative and the EAPs. Member States that are ahead of other Member States or the EU in adapting the legislation to the Circular Economy objectives seemingly play a role in setting the bar higher and higher of what is to be achieved in the Union as a whole. Setting higher standards in EU environmental law in light of the Circular Economy basically means that EU secondary legislation, such as Regulations and Directives, should be changed continuously. Environmental legal principles and new concepts and ideas could help steering and justifying these developments.

The 'Circular Economy' is comprehensive and complex, and is for that reason not a clear-cut concept; it is a collection of objectives and principles, which are generally based on and/or shared with other, already existing concepts and policies. Several EU policies have been launched in the past ten to fifteen years that address particular aspects of the Circular Economy. CE Package can be seen as the culmination of all these different EU policies merged into one policy framework, which is furthermore updated and complemented by new insights deriving from the Circular Economy rationale. Legal measures have, of course, always been adopted and adapted in view of new policies and developments in the course of their existence. As a matter of fact, life-cycle thinking, which is at the core of the Circular Economy concept, has already influenced legislation since its emerge in EU policy. Life-cycle thinking originates from product policy and has since then also been integrated in policies addressing other life-cycle stages. The application of the concept gets yet another boost under the CE Package, resulting in more emphasis on the coherence and consistency of the overall regulatory regime for the materials system. The fact that the CE Package encourages coherency through a life-cycle perspective is a clearing signal that the older environmental policies (including the ones that helped developing life-cycle thinking) and the legislation addressing only certain aspects of the Circular Economy are not yet completely connected.

Just as that there are many contexts for the policies laying the foundation for the CE Package, there are also different contexts for the EU legal acts regulating (aspects of) the Circular Economy. The TFEU offers several legal bases for secondary EU legislation. Some of the measures are based on the explicit environmental Article in the TFEU (Article 192 TFEU), generally in the form of Directives. Others, mostly product-related measures are based on the Article on the internal market (Article 114 TFEU). These regulations are more frequently given

shape as (implementing) Regulations. The EU has together with the Member States a shared competence for matters on the environment and on the internal market. The same is true for other topics relevant for the Circular Economy, such as research and technological development. Moreover, whether the measure is adopted either as a Regulation or a Directive, and either on Article 114 TFEU or on Article 192 TFEU has particular consequences. For example on what way those measures are applicable in the Member States and whether these States can deviate from certain EU rules. As noted above, these different regulatory approaches may be important for upgrading the environmental protection levels at EU level. Another significant consequence *(or result)* is that there are different DGs of the Commission responsible. Note in that respect that the CE Package is the shared responsibility of both DG ENV and DG GROW. This is the most logical option given the Circular Economy objectives and the legal bases available for the EU measures regulating certain aspects relevant for the Circular Economy.

All things considered, there are many strong building blocks that underscore and nurture the Circular Economy logic. Yet, they are not the only aspects that are important to the CE Package and the legal transition towards a Circular Economy in general. Another highly significant aspect is the *outcome* of the EU Treaties and the policies: EU secondary law. At the end of the day, these Regulations, Directives and Decisions reflect the objectives that are laid down in primary law and that have further been developed in the policies prior to the CE Package. This means that now these objectives are interpreted in the light of the Circular Economy transition, EU secondary legislation may need to be adjusted.

3. Selection of key legislation in view of life-cycle thinking

This Chapter addresses the legal acts regulating specific aspects of the Circular Economy, conforming to the second element of the first research question. These secondary sources of EU law are highly significant for the Circular Economy transition, because, by altering them, the European Commission could make progress in ensuring that the *'right regulatory framework'* is in place at a more practical level and

> *to give clear signals to economic operators and society at large on the way forward with long term waste targets as well as a concrete, broad and ambitious set of actions, to be carried out before 2020. Action at EU level will drive investments and create a level playing field, remove obstacles stemming from European legislation...* [175]

The selection of the key legislation depends on two interrelated aspects. First, the CE Package itself: the Commission already highlights which legal acts are considered significant to the Circular Economy transition. The CE Package identifies several obstacles to the Circular Economy transition and solutions to those problems. Second, the level of impact the laws have on (parts of) the material life-cycle. This explains why the Commission has addressed them in the first place.

Below, three key laws have been selected, i.e.: the Ecodesign Framework Directive, the Waste Framework Directive and REACH. Their explanation includes the reasons why they are so important for the transition towards a Circular Economy according to the CE Package. The aim and scope of the laws and their main instruments are also introduced.

3.1 Ecodesign Framework Directive

3.1.1 Circular Economy Package

Decisions made in the period when a product is conceptualized and manufactured by industry and is eventually used by users are extremely important for a Circular Economy. It is often claimed that, generally speaking, more than 80% of all product-related environmental impacts throughout the product's life-cycle are determined at the design stage.[176] These decisions have great impact on earlier and later life-cycle stages (e.g. concerning resource extraction, product use and waste management). On the one hand, some might argue that attempts by the EU to minimize the impacts of products on the environment and human health are still at an early stage and are not systematic, *inter alia* due to the fact that products are subject to (free) trade.[177] On the other hand, one cannot but agree that the Union is already working on this issue for some decades now. For example, progress has been made in well-considered 'green' product design through informed user choices and the establishment of product standards.[178] However, this does not mean that these two viewpoints are necessarily contradicting. Arguably, while the EU is still at an early stage of integrating environmental considerations in product design, considerable progress has already been made in the past few years.

---

[175] CE Action Plan, p. 2.

[176] See e.g.: Paragraph 36 7th EAP; European Commission, *Ecodesign Your Future, How Ecodesign can help the environment by making products smarter*, brochure 2012; and BIO by Deloitte, Oeko-Institut and ERA Technology, *Preparatory Study to establish the Ecodesign Working Plan 2015-2017 implementing Directive 2009/125/EC – Task 1 Draft Final Report* (Deloitte, 2014), p. 5.

[177] See e.g.: L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), p. 210.

[178] For example, the EU Ecolabel Regulation provides users information on the impact particular products have on the environment (Regulation 66/2010 of 25 November 2009 on the EU Ecolabel, OJ L 27/1) and the Construction Products Regulation provides for an obligation to comply with CE marking for all construction products on the market for which harmonized standards are in place (Regulation 305/2011 of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC, [2011] OJ L 88/5).

The CE Package underscores the need to address product design. It states that better design *'can make products more durable or easier to repair, upgrade or remanufacture. It can help recyclers to disassemble products in order to recover valuable materials and components. Overall, it can help to save precious resources*.'[179] 'Better product design' as it is meant in the CE Package is also loosely called 'ecodesign'. According to the CE Package, current market signals appear insufficient to make this happen, in particular because the interests of producers, users and recyclers are not aligned. It is therefore essential to provide incentives for improved product design, while enabling innovation and preserving the internal market and competition.[180] Electrical and electronic equipment (EEE) are said to be particularly significant in this context.[181]

Against this background, the European Commission will emphasize aspects of the Circular Economy in future ecodesign requirements under the EFD. According to the Commission, these requirements have so far mainly targeted energy-efficiency – *not* material-related issues.[182] The Commission will therefore analyze these new issues on a product-by-product basis in new Working Plans and reviews, taking into account the specificities and challenges of different products and in close cooperation with relevant stakeholders. As a first step, the Commission will propose to the Member States mandatory product design and marking requirements under the framework of the EFD to make it easier and safer to dismantle, reuse and recycle electronic displays.[183]

3.1.2 Aim and scope

The first law key to the CE Package and for the Circular Economy transition is the Ecodesign Framework Directive: Directive 2009/125 of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products.

The current EFD was adopted on 21 October 2009 and is one of the corner stones of the industrial regulatory regime of the EU. During the draft stage of the first version of the EFD in 2004 (to adopt the 2005 EFD), there were calls within the Committee on Legal Affairs and the Internal Market, which was asked to verify the choice of the appropriate legal basis for the measure proposed by the Commission, to base the Directive on Article 192 TFEU (ex. Article 175 EC).[184] It was however decided that Article 114 TFEU is the appropriate single legal basis: the Recitals of the proposed 2005 EFD therefore pointed towards the free movement of the targeted products within a good functioning internal market.[185] The legislative proposal for the 2005 EFD basically states that Article 114(1) TFEU suits the Directive's objectives. To support its choice, the Commission made a comparison between the proposed 2005 EFD and other legislation based on Article 114(1) TFEU as they also pursue environmental objectives next to the good functioning of the internal market.[186] Hence, although the 2009 EFD pursues both economic and environmental protection objectives, the main focus remains on the internal market.[187] According

[179] CE Action Plan, p. 3. The 2014 CE Package basically says the same. See 2014 CE Communication, p. 4.
[180] CE Action Plan, p. 3.
[181] Amongst others because their reparability can be important to their users and EEEs can contain valuable materials (e.g. rare earth elements). Ibid., pp. 3-4.
[182] Ibid.
[183] Ibid., p. 4. See also: European Commission, *Annex to the Communication Closing the loop – An EU action plan for the Circular Economy*, COM(2015) 614/2, p. 2.
[184] European Parliament, *Report of 17 March 2004 on the proposal for a directive on establishing a framework for the setting of Eco-design requirements for Energy-Using Products and amending Council Directive 92/42/EEC (COM(2003) 453 – C5-0369/2003 – 2003/0172(COD)), Opinion of the Committee on Legal Affairs and the Internal Market on the legal basis*, PE 337.058, A5-0171/2004.
[185] Ibid.
[186] European Commission, *Proposal for a Directive on establishing a framework for the setting of Eco-design requirements for Energy-Using Products and amending Council Directive 92/42/EEC*, COM(2003) 453, pp. 12-13.
[187] Recital (2) EFD highlights this as follows: '*The disparities between the laws or administrative measures adopted by the Member States in relation to the ecodesign of energy-related products can create barriers to trade and distort competition in the Community and may thus have a direct impact on the establishment and*

to the Committee that counseled the Commission, a dual basis of both Article 114(1) and Article 192 TFEU was not appropriate, because the objectives (internal market and environmental protection) were not equally essential.[188]

The EFD's main objective provided in Article 1(1) EFD has not much changed since the adoption of the 2005 EFD. It now reads:

> *This Directive establishes a framework for the setting of Community ecodesign requirements for* […] *products with the aim of ensuring the free movement of such products within the internal market.*

Article 1(2) EFD adds that the Directive provides for the setting of requirements which the selected products covered by so-called Implementing Measures must fulfil in order to be placed on the market and/or put into service.[189] The provision also states that the EFD contributes to sustainable development by increasing energy-efficiency, the level of protection of the environment and the security of the energy supply.

There are three definitions in the EFD, which, when read together, prove that ecodesign differs from conventional product design in the sense that it systematically integrates environmental aspects through the entire product life-cycle at the earliest stage of a product: the design stage.[190] These definitions are:

> *10. 'Product design' mean the set of processes that transform legal, technical, safety, functional, market or other requirements to be met by a product into the technical specification for that product';…*
> *13. 'Life-cycle' means the consecutive and interlinked stages of a product from raw material use to final disposal*; …
> *23. 'Ecodesign'* [which an abbreviation of 'ecological product design'] *means the integration of environmental aspects into product design with the aim of improving the environmental performance of the product throughout its whole life cycle* [191]

The life-cycle approach adopted in the process of ecodesigning products is thus intended to optimize the environmental performance of products on the one hand while maintaining their functional qualities throughout their whole life-cycle on the other hand.

The responsibility for ecodesigning products can be traced through the value chain as from the manufacturer. Product manufacturers are in principle required to ensure their products comply with the applicable Implementing Measure. When they are not established in the EU and when they do not have any authorized representative in the Union, the importer is obliged to ensure that the products comply. When there is neither a manufacturer nor an importer, the responsible

---

functioning of the internal market. The harmonisation of national laws is the only means to prevent such barriers to trade and unfair competition.'

[188] Supra note 184.

[189] Previously, the decisive terminology 'be placed on the market and/or put into service' has led to different interpretations in other cases than the EFD. One could have understood the phrase in a way that there are two cumulative aspects: 1) placed on the market, and 2) put into service. This is however not the case, as the two components refer to two different moments in the process of bringing a product to the market. Compliance for the market entry is only required either on the moment when the product is placed on the market *or* on the moment when the product is put into service. Only where a product is *not* placed on the market in the literal meaning of the phrase, the moment of compliance is the product's putting into service. Hence, the requirements do not apply to, for example, (imported) products that do not enter the EU market but are to be exported to a non-EU Member State. See European Commission, *Frequently Asked Questions (FAQ) on the Ecodesign Directive 2009/125/EC establishing a framework or the setting of ecodesign requirements for energy-related products and its Implementation Regulations*, p. 3, website of the former Commission administration, last updated December 2014 (not available anymore).

[190] In fact, the legislative proposal for the 2005 EFD expressly mentions that the IPP lays at the foundation of the Directive and that the IPP, in turn, is amongst others based on life-cycle thinking. Supra note 186, pp. 4-5.

[191] Article 2(10),(13) and (23) EFD. It turns out that the Ecodesign Directive takes a different point of departure than I do this dissertation, for it bases its life-cycle perspective on products whereas this dissertation bases its life-cycle perspective on materials. It would not make any difference, though.

(natural or legal) person is the one placing the products on the market and/or puts them into service in the EU, as he/she shall be considered a manufacturer.[192]

Not all product manufacturers are legally responsible to ecodesign their products: this depends on the type of product groups they manufacture. Initially, the 2005 version of the EFD established a framework for the setting of ecodesign requirements for *energy-using products* (EuPs).[193] An energy-using product was defined in Article 2(1) 2005 EFD as:

> *a product which, once placed on the market and/or put into service, is dependent on energy input (electricity, fossil fuels and renewable energy sources) to work as intended, or a product for the generation, transfer and measurement of such energy, including parts dependent on energy input and intended to be incorporated into an EuP covered by this Directive which are placed on the market and/or put into service as individual parts for end-users and of which the environmental performance can be assessed independently.*

Not surprisingly, a significant impact on manufacturers or imports of EEEs was foreseen, as the Directive provided only energy-related requirements for EuPs covered by Implementing Measures (see for an explanation of these regulatory instruments below). These requirements were to be fulfilled before placing them on the market and/or put into service.[194] The explanation given regarding the scope of the 2005 EFD was said to be in principle very extensive. At the same time, however, using the criteria to select suitable product groups (now in Article 15 EFD, which will be discussed below as well), the Commission did not plan to produce a large number of Implementing Measures but rather a limited number for well justified cases.[195] The initial intention of the Commission was in any case *not* to enlarge its scope to energy-related products or to more product groups or all products in the long run. The legislative proposal for the 2005 EFD states that the experiences gained with its implementation would have been used to judge the appropriateness of establishing *similar parallel framework* Directives for products, or *general obligations on producers* to undertake ecodesign.[196]

The 2005 EFD was revised in 2009 – already after four years. On the whole, not a lot of provisions had been significantly changed in content. All details of the provisions are kept the same; even the numbering is almost identical, including for the Annexes. Nevertheless, the recast changed one crucial aspect that broadened the EFD's scope tremendously: the term 'energy-using product' had been replaced by *'energy-related products'* (ErPs). Article 2(1) EFD defines an ErP as follows:

> *any good that has an impact on energy consumption during use which is placed on the market and/or put into service, and includes parts intended to be incorporated into energy-related products covered by this Directive which are placed on the market and/or put into service as individual parts for end-users and of which the environmental performance can be assessed independently.*

Hence, not only does this new focus include products which use, generate, transfer or measure energy, it further triggers implementing measures on products used in buildings, such as windows (including wooden frames), insulation materials (e.g. wood panels and glass wool) or water-using products (e.g. shower heads or taps that contribute to significant energy savings during use).[197] In

[192] Articles 2(6)-(8) and 4 EFD.
[193] Directive 2005/32 of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council, [2005] OJ L 191/29.
[194] 'Putting into service' means the *'first use of a product for its intended purpose by an end-user in the Community'* (Article 2(5) EFD). The Directive thereby also covers products that are physically never placed on the market, but installed directly at the end-user's place. Examples are lifts, machinery and measuring instruments.
[195] European Commission, *Proposal for a Directive on establishing a framework for the setting of Eco-design requirements for Energy-Using Products and amending Council Directive 92/42/EEC*, COM(2003) 453, p. 3.
[196] Ibid., p. 4.
[197] Recital (4) EFD.

other words, ErPs do not necessarily *use* energy but they can have an indirect impact on energy *consumption* in any stage of their life-cycle. Air conditioners and comfort fans, household dishwashers and water pumps are just three examples of product groups that need to fulfill product-specific ecodesign requirements.[198]

The reason for such a far-reaching extension in scope is that ErPs account for a much larger proportion of the consumption of natural resources and energy in the Union than only EuPs. The 'restriction' of the scope to EuPs was considered to be hampering the full potential of the IPP,[199] which is one of the policies underpinning the EFD together with the 6th EAP.[200] A more comprehensive framework was therefore considered necessary. The Commission considered the extension of the product scope an *'essential building block'* for an integrated sustainable environmental product policy.[201] It was a direct consequence of the SCP Action Plan,[202] in which the Commission clarifies that it would establish a single framework at EU level for the setting of ecodesign requirements and ensure the efficiency and consistency of legislation by using a common approach.[203] Internal market considerations thus lie at the foundation of the extension together with the mind shift initiated by the IPP. According to Recital 4 EFD, many ErPs have in fact a significant potential for environmental improvement and energy saving through different design, which, moreover, also leads to economic savings for businesses and end-users. As a result of the Directive's enlargement in scope, other ecodesign aspects are gaining greater importance than under the old regime: material-related aspects. This is exactly what the CE Package encourages to be developed further.

3.1.3 Main instruments

In order to provide consistent EU-wide rules for improving the environmental performance of products, the EFD sets out minimum ecodesign requirements for ErPs, which are mandatory for all products put on the EU market. According to Article 2(24) EFD, an ecodesign requirement means:

> *any requirement in relation to a product, or the design of a product, intended to improve its environmental performance, or any requirement for the supply of information with regard to the environmental aspects of a product*.

Ecodesign requirements are laid down in the most important instrument of the EFD: the product group-specific Implementing Measures, also called Ecodesign Regulations.[204] There are currently 23 of these Implementing Measures.[205]

---

[198] Regulation 206/2012 of 6 March 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for air conditioners and comfort fans, [2012] OJ L 72/7; Regulation 1016/2010 of 10 November 2010 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for household dishwashers, [2010] OJ L 293/31; and Regulation 547/2012 of 25 June 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for water pumps, [2012] OJ L 165/28, respectively.
[199] European Commission, *Proposal for a Directive establishing a framework for the setting of ecodesign requirements for energy related products*, COM(2008) 399, p. 5.
[200] See Recitals (5)-(6) EFD.
[201] Supra note 199, p. 2.
[202] Ibid., p. 4.
[203] European Commission, *Communication on the Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan*, COM(2008) 397, pp. 4-5.
[204] Both terms are used in this dissertation.
[205] See the overview of legislation within the Ecodesign framework as provided by the Commission (2 September 2015): https://ec.europa.eu/energy/sites/ener/files/documents/list_of_ecodesign_measures.pdf (consulted on 22 December 2017).

Implementing Measures

Article 15(2) EFD lists several criteria that trigger – *when met by an ErP* – the adoption of an Implementing Measure or, as a prioritized alternative, a self-regulation measure (e.g. a voluntary agreement (VA)[206]). An Implementing Measure may accordingly only be adopted when a preparatory study and an impact assessment proved that the criteria are met. The criteria are:

> *a) the EuP shall represent a significant volume of sales and trade, indicatively more than 200 000 units a year within the Community according to most recently available figures;*
> *(b) the EuP shall, considering the quantities placed on the market and/or put into service, have a significant environmental impact within the Community, as specified in Community strategic priorities as set out in Decision No 1600/2002/EC*; [207]
> *(c) the EuP shall present significant potential for improvement in terms of its environmental impact without entailing excessive costs, taking into account in particular:*
> *- the absence of other relevant Community legislation or failure of market forces to address the issue properly;*
> *- a wide disparity in the environmental performance of EuPs available on the market with equivalent functionality.*

The decision on whether or not the criteria are fulfilled is based on several sources. Article 15(3) EFD states that, in preparing a draft Implementing Measure, the Commission shall amongst others take into account relevant self-regulation and relevant other EU legislation, and any views expressed by the Committee referred to in Article 19(1) EFD. Recital (25) EFD adds that it should take due account of existing national environmental legislation that Member States have indicated should be preserved (in particular regulating toxic substances), without reducing the existing levels of protection in the Member States. This shows that there should be an interchange between the Commission and the Member States.

As indicated, the Commission is assisted by a Comitology Committee via the Committee procedure.[208] This is because the Implementing Measures are considered to add 'non-essential elements' to the EFD. Broadly speaking, the examination procedure in Article 5 of the Comitology Regulation offers three situations:

> 1) qualified majority in favour of the proposal: the Commission must adopt the Implementing Measure;
> 2) qualified majority against: the Commission shall not adopt it; or

---

[206] In accordance with paragraph Article 15(3)(b) in conjunction with Article 17 and the non-exhaustive list of indicative criteria provided in Annex VIII Ecodesign Directive.
These self-regulation measures are clearly deemed more important than legislation by the Commission. Annex VIII Ecodesign Directive lists several indicative criteria that may be used to evaluate the admissibility of self-regulatory initiatives as a suitable alternative to an Implementing Measure. In point 8, it stresses the need for such initiatives to respond to the policy objectives of the Directive, which means that any initiative must aim at the protection of the environment and human health, as well as the protection of the interests of consumers, quality of life and economic interests. Overall, an integrated approach must be enshrined. In addition, point 9 highlights that policy consistency is essential to sustain an effective self-regulatory initiative. Therefore, when assessing an initiative one should take into account other factors and incentives, e.g. market pressure, taxes, legislation at national level, *et cetera*.

[207] The priorities of the Sixth Community Environment Action Programme are: climate change; nature and biodiversity; environment and health and quality of life; and natural resources and wastes (Article 1(4) 6th EAP).

[208] Article 15(1) and Article 19(3) EFD in conjunction with Article 5(a)(1)-(4) and Article 7 Decision 1999/468 and having regard to Article 8 thereof. See Decision 1999/468 of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission, [1999] OJ L 184/1. This Decision is repealed by the Comitology Regulation in 2011 (Regulation 182/2011 of 16 February 2011 laying down the rules and general principles concerning mechanisms for control by Member States of the Commission's exercise of implementing powers, [2011] OJ L 55/13). New Implementing Measures shall therefore rely on Article 5(1)-(4) and 10, respectively.

3) no qualified majority for or against: the Commission *may* adopt the draft implementing act, except in some cases provided, for example when the Implementing Measure concerns the protection of the health or safety of humans, animals or plants, or definitive multilateral safeguard measures.[209]

Member States thus retain some influence over the adoption of Ecodesign Implementing Measures. This is further enhanced by some common rules in Article 3 of the Regulation. There, paragraph (4) foresees in a process of dialogue on the actual content of the proposed measure by giving the Member States (i.e. the Committee members) the opportunity to make suggestions to the text until the Committee delivers its opinion, most likely based on national policy and legislation applicable to the particular ErP.

Ecodesign requirements

When all criteria of Article 15(2) EFD are fulfilled, the questions are how the Ecodesign Regulation should look like and how to determine the ecodesign requirements? Pursuant to Article 15(5) EFD, an Implementing Measure must meet all following criteria:

(a) there shall be no significant negative impact on the functionality of the product, from the perspective of the user;
(b) health, safety and the environment shall not be adversely affected;
(c) there shall be no significant negative impact on consumers in particular as regards the affordability and the life cycle cost of the product;
(d) there shall be no significant negative impact on industry's competitiveness;
(e) in principle, the setting of an ecodesign requirement shall not have the consequence of imposing proprietary technology on manufacturers; and
(f) no excessive administrative burden shall be imposed on manufacturers.

According to Article 15(6) EFD, Implementing Measures lay down generic ecodesign requirements and specific ecodesign requirements.[210] Specific requirements are quantified and measurable requirements that relate to a particular environmental aspect of a product, e.g. energy consumption during use, whereas generic requirements have a more general nature. They are based on the product's ecological profile as a whole with a set of limit values for particular environmental aspects. Annex I on the generic ecodesign requirements, on the other hand, aim at improving the environmental performance of ErPs focusing on significant environmental aspects *without* setting limit values. The Annex consists of three parts:

- Part 1 ecodesign parameters for products[211]
- Part 2 requirements relating to the supply of information
- Part 3 requirements for the product manufacturer

Part 1 is divided in three constructive sections. The first section lists all important life-cycle stages of a product to which significant environmental aspects must be identified – from the sourcing of materials to the waste management stage. The second section determines that, where relevant, for each of these stages the following environmental aspects must be assessed:

(a) predicted consumption of materials, of energy and of other resources such as fresh water;
(b) anticipated emissions to air, water or soil;
(c) anticipated pollution through physical effects such as noise, vibration, radiation, electromagnetic fields;

[209] Article 5(4)(a) Comitology Regulation. In general, a Committee is competent to examine proposals that have a potential impact on the these issues, including the environment (Article 2(2)(b)(iii) Comitology Regulation).
[210] Article 2(25) in conjunction with Annex I EFD and Article 2(26) in conjunction with Annex II EFD, respectively.
[211] There is also a possibility that no ecodesign requirement at all are necessary for certain parameters referred to in Annex I, Part 1.

(d) expected generation of waste material; and
(e) possibilities for reuse, recycling and other forms of material recovery and/or energy recovery.

The third section contains a list of parameters that must be used for evaluating the potential for improving the environmental aspects referred to in the second section (only when appropriate and where necessary supplemented by others). These parameters contain aspects such as: the weight and volume of the ErP; the use of materials issued from recycling activities; the incorporation of used components; the consumption of energy, water and other resources throughout the life cycle; the extension of lifetime (minimum guaranteed lifetime, minimum time for availability of spare parts, modularity, upgradeability, reparability); the use of substances classified as hazardous to human health and/or the environment; and the amounts of waste generated and amounts of hazardous waste generated. It also tries to facilitate reuse and recycling as expressed through the:

number of materials and components used, use of standard components, time necessary for disassembly, complexity of tools necessary for disassembly, use of component and material coding standards for the identification of components and materials suitable for reuse and recycling (including marking of plastic parts in accordance with ISO standards), use of easily recyclable materials, easy access to valuable and other recyclable components and materials; easy access to components and materials containing hazardous substances.

Taking everything into account, Part 1 clearly makes an all-out effort to embolden circularity in the design and production of a product. It is however utopian to believe that all parameters are fully endorsed, as a lot of research and documentation is required.

Part 2 requires Implementing Measures to include requirements that oblige manufactures to supply certain information which could influence the manner of use or recycling by actors along the chain, e.g. private users and waste treatments facilities. Information could for example be provided on: significant environmental characteristics and performance of the ErP; how to install, use and maintain the ErP; how to return the product at end-of-life; the period of availability of spare parts and the possibilities of upgrading products; and disassembly, recycling, or disposal possibilities. Part 2 contains a non-exhaustive list.

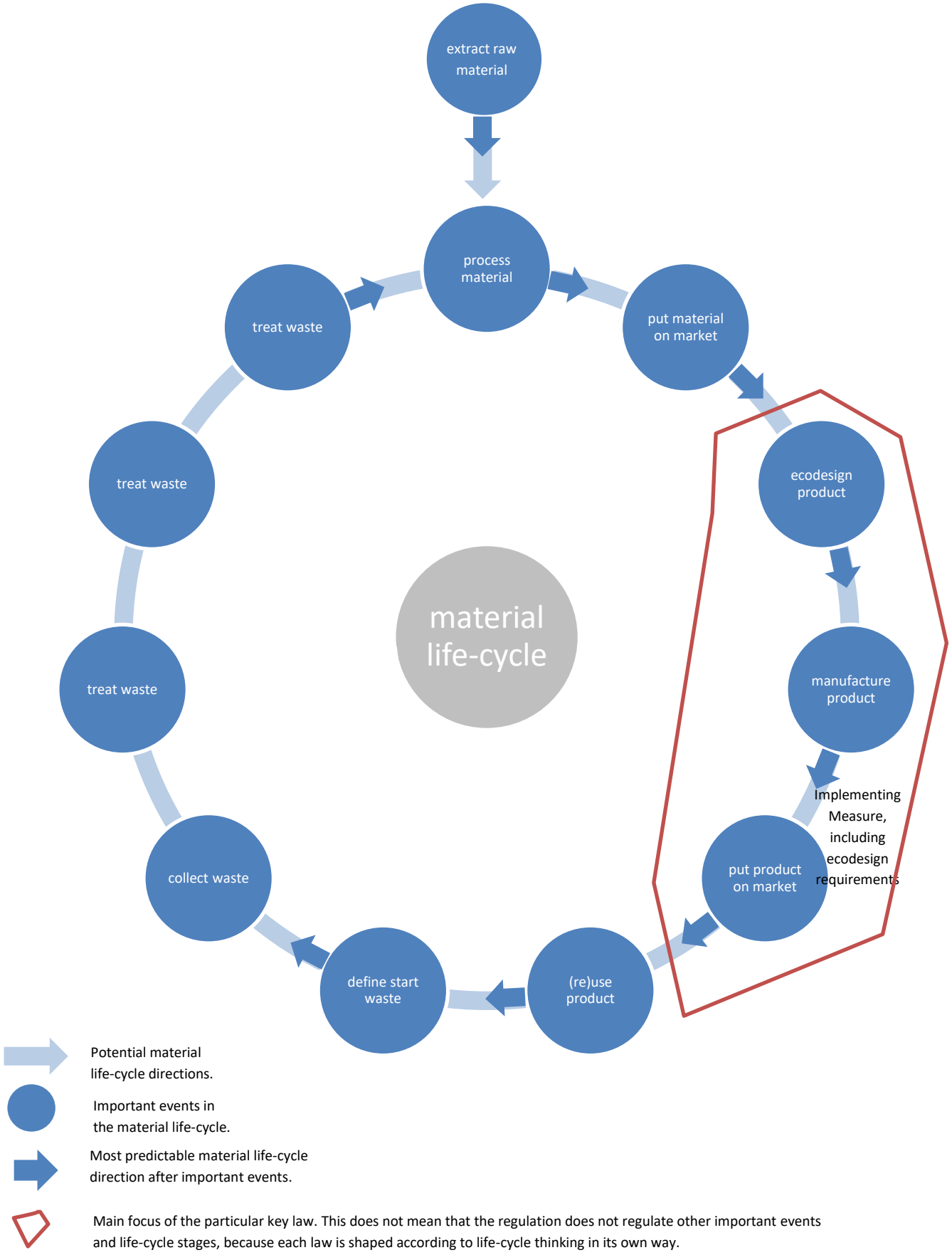
Part 3 lays down requirements for the manufacture. They must for example perform an assessment of the product model throughout its life-cycle. Notably, these assessments should be based on *realistic assumptions* about *normal conditions and purposes* of use, which matches the general rule in EU product law that manufacturers have to match the level of protection of the user with the product's intended use.[212] It further states that other environmental aspects than the ones identified in the implementing measure may be examined on a voluntary basis. The results should be put together in the product's 'ecological profile'. By using the assessment, manufacturers must evaluate alternative designs and the product's achieved environmental performance against benchmarks (which are identified in the Implementing Measure based on information gathered during the preparation of the Measure). In the end, the choice of a particular design should reflect *'a reasonable balance between the environmental aspects and other relevant considerations, e.g. safety and health, technical requirements for functionality, quality, and performance, and economic aspects.'*

3.1.4 Summarizing flowchart

Below, the EFD is summarized in *Flowchart 1*, which reflects a simplified version of the life-cycle of a material. The main purpose of the chart is to specify the main focus of the EFD and where the main instruments have an impact on the life-cycle.

[212] The intended use means either the use for which a product is intended in accordance with the information provided when placed on the market, or the ordinary use as determined by design and construction of the product. Consequently, this also means that not all risks can be prevented by product design. European Commission, *The 'Blue Guide' on the implementation of EU product rules*, Version 1.1 – 15/07/2015, p. 23.

Flowchart 1: main focus Ecodesign Framework Directive [213]



[213] The flowchart is authentic, designed especially for this research.

3.2 Waste Framework Directive

3.2.1 Circular Economy Package

Not only can the decisions made in the design and production stage of a product have a huge impact on the material life-cycle, waste practices are crucial as well. Proper waste management decreases the pressures on the environment and human health and has a direct impact on the quantity and quality of the materials that are returned to the economy after the waste stage, for example as recovered raw materials or products. It is therefore essential to improve waste operations. This calls into question what is meant by 'environmentally sounds waste management'. The bottom line of current EU waste law, which ranks historically among the earlier pieces of EU environmental law and has since then expanded considerably, is to combine a healthy business interest in the waste sector while ensuring a high level of environmental protection. The EU is of the view that if business loses interest in waste management, local authorities in particular would be overwhelmed by the logistic and financial strains involved.[214] Economic operators have been gradually involved more and more in the sector, whilst most Member States have slowly but surely moved away from a first-tier role in some waste management activities, such as the processing of waste.[215] Waste management in the EU therefore has an important impact on both businesses and Member States authorities. The EU is constantly trying to improve the rules about waste management with the aim of finding the right environmentally sounds waste management system.

According to the CE Action Plan, only around 40% of the waste generated by EU households is currently recycled. This average, nevertheless, masks large differences amongst its Member States and regions. In some areas, rates are documented as high as 80% while in others lower than 5%.[216] Moreover, these percentages do not say much about the quality of the recyclates. Zooming out to all waste streams, it is calculated that in 2013 total waste generation in the EU amounted to approximately 2.5 billion tons of which 1.6 billion tons were not reused or recycled.[217] The EU misses out on significant opportunities to utilize the potential secondary raw materials which are found in waste streams, as it is estimated that an additional 600 million tons could be reused or recycled.[218] The Commission states that higher recycling rates are often limited by administrative capacity, a lack of investment in separate collection and recycling infrastructure and insufficient use of economic instruments.[219] Another barrier to higher recycling rates is said to be the illegal transport of waste, both within the EU and to non-EU Member States, which regularly results in economically sub-optimal non-environmentally friendly treatment.[220] Overall, the market for recyclates is still underdeveloped, amongst others due to the uncertainty as to the quality of secondary raw materials.[221] In addition, the creation of overcapacities in infrastructure to treat residual waste from recycling processes also poses major challenges.[222]

The European Commission proposes many actions and concrete detailed rules in the CE Package to resolve these problems, some of which have already been addressed in Chapter 1.2 and will for that reason not be repeated here. What has not been stressed enough so far, however, is that also according to the Commission waste management plays a central role in the Circular

[214] G. Van Calster, *EU Waste Law* (Oxford University Press, 2 edn, 2015), p. xxv.
[215] Ibid.
[216] CE Action Plan, pp. 8-9. These percentages are probably based on 2014, because the Commission's website on waste statistics (using the statistics fom Eurostat) is based on that year. An update of the website is only plannend for October 2018. See: http://ec.europa.eu/eurostat/statistics-explained/index.php/Waste_statistics (consulted on 17 December 2017).
[217] See e.g.: European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595, p. 2.
[218] Ibid., p. 2.
[219] CE Action Plan, p. 9.
[220] CE Action Plan, p. 10.
[221] CE Action Plan, p. 11.
[222] CE Action Plan, p. 9.

Economy, because it determines how the waste hierarchy is put into practice.[223] The waste hierarchy is set forth in the WFD (an explanation of the hierarchy is provided below). There are many references throughout the text of the CE Action Plan to the hierarchy's implementation in national policy and legislation and its proper application, particularly in view of reducing the environmental pollution caused by waste and the amount of waste generated, and of fostering recycling in the EU. Regarding the latter aim, both quantity and quality are very much emphasized, while only the objective to stimulate the amount of waste getting treated is put into real actions, such as through the increase of the preparing for reuse and recycling targets. The waste hierarchy cannot be seen separately from the definitions which are also provided in the WFD, because they demarcate the steps of the hierarchy. It is for this reason that the CE Package aims at the simplification and harmonization of the definitions and calculation methods in the entire regulatory framework for waste.[224] Amongst others, the legislative proposals therefore provide for new or adjusted definitions or guidelines for particular waste management treatments.

3.2.2 Aim and scope

Based on the above, the second law key to the CE Package and to the Circular Economy transition at large is the WFD: Directive 2008/98 of 19 November 2008 on waste and repealing certain Directives.[225] The Directive was adopted on 19 November 2008 and has repealed Directive 2006/12[226] (which replaced the original Waste Directive of 1975)[227], Directive 91/689[228] on hazardous waste and Directive 75/439[229] on waste oils. Given the status of the measure as a *framework* Directive, it sets the basic principles, concepts and definitions related to waste management. The Directive's framework status was acquired upon its first serious amendment in 1991.[230] The very first version (Directive 75/442) was amended by Directive 91/156, which was adopted in 1991. Since then, the WFD truly has become the *lex generalis* of EU waste legislation: it really is the heart of the European waste acquis.[231] The Directive's subject matter and scope is put forward in Article 1:

> *This Directive lays down measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use.*

While this environmental protection objective has only explicitly occurred in the 2008 version of the WFD, environmental protection had always been advocated in the Recitals of the previous Directives right from the beginning. The environmental protection goals of Article 13 WFD,[232] which give further substance to the more general objective of Article 1 WFD, have however always been included in previous versions of the Directive.[233] It should not come as a surprise that the legal basis of the WFD is therefore Article 192 TFEU – the environmental provision.

---

[223] CE Action Plan, p. 8.
[224] See e.g.: CE Action Plan, pp. 5-6 and 10-11; and European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595, pp. 4.
[225] Directive 2008/98 of 19 November 2008 on waste and repealing certain Directives, [2008] OJ L312/3.
[226] Directive 2006/12 of 5 April 2006 on waste, [2006] OJ L 114/9.
[227] Directive 75/442 of 15 July 1975 on waste, [1975] OJ L 194/39.
[228] Directive 91/689 of 12 December 1991 on hazardous waste, [1991] OJ L 377/20.
[229] Directive 75/439 of 16 June 1975 on the disposal of waste oils, [1975] OJ L 194/23.
[230] Directive of 18 March 1991 amending Directive 75/442/EEC on waste, [1991] OJ L 78/32.
[231] G. Van Calster, *EU Waste Law* (Oxford University Press, 2 edn, 2015), p. 2. For example, the Packaging and Packaging Waste Directive could be regarded as *lex specialis* to the WFD.
[232] The provision states that Member States shall take the necessary measures to ensure that waste management is carried out without endangering human health, without harming the environment and, in particular: without risk to water, air, soil, plants or animals; without causing a nuisance through noise or odours; and without adversely affecting the countryside or places of special interest.
[233] See Article 4 1975 Waste Directive.

Concerning the types of waste covered by the Directive, Article 2 WFD excludes several waste streams from its scope, some of which only to the extent that they are covered by other Union laws. Examples are: gaseous effluents emitted into the atmosphere; contaminated and uncontaminated soil; radioactive waste; waste waters; carcasses of animals that have died other than by being slaughtered; and waste resulting from prospecting, extraction, treatment and storage of mineral resources and the working of quarries.[234]

Besides these and several more waste streams, the WFD applies to all wastes. The definition of 'waste' is therefore extremely important, as it lays the foundation for almost the entire regulatory framework for waste. Article 3(1) defines waste as:

> *any substance or object which the holder discards or intends or is required to discard*

Over time, the waste definition has not changed considerably; the core concept of 'to discard' has remained untouched by the WFD since its introduction in the 1991 amendments.[235] While the definition has been increasingly clarified along the development of the WFD, not least by the many cases brought to the national Courts of the Member States and the CJEU which challenged the application of the definition,[236] it remains the elephant in the room; it remains the root cause of many problems for market players and national authorities.

3.2.3 Main instruments

To provide guidance for policy-makers and legislators in what is regarded as 'environmentally sounds waste management', Article 4(1) WFD offers a tool which is based on a life-cycle approach: the waste hierarchy.

Waste hierarchy

The waste hierarchy establishes a priority order of management options for policy-makers and legislators: from the prevention of waste to preparing for reuse, recycling and other recovery forms, through to the disposal of waste as a last resort. Article 4(1) WFD is as follows:

> *The following waste hierarchy shall apply as a priority order in waste prevention and management legislation and policy:*
> *(a) prevention;*
> *(b) preparing for re-use;*
> *(c) recycling;*
> *(d) other recovery, e.g. energy recovery; and*
> *(e) disposal*

The waste hierarchy aims to encourage the options that deliver the best overall environmental outcome.[237] It is one of the most famous and influential policy instruments that reflect life-cycle thinking. The waste hierarchy has a long non-legal history during which the mechanism has been progressively clarified. In 1979, the so-called 'Ladder of Lansink' was developed to discourage the landfilling of waste and to use resources contained in waste in an environmentally-friendly

---

[234] See Article 2(1)(a)-(d) and (2)(a) and (c)-(d) WFD, respectively, for the exact wording. See Article 2 WFD for the entire list of waste streams that are excluded and under what conditions.

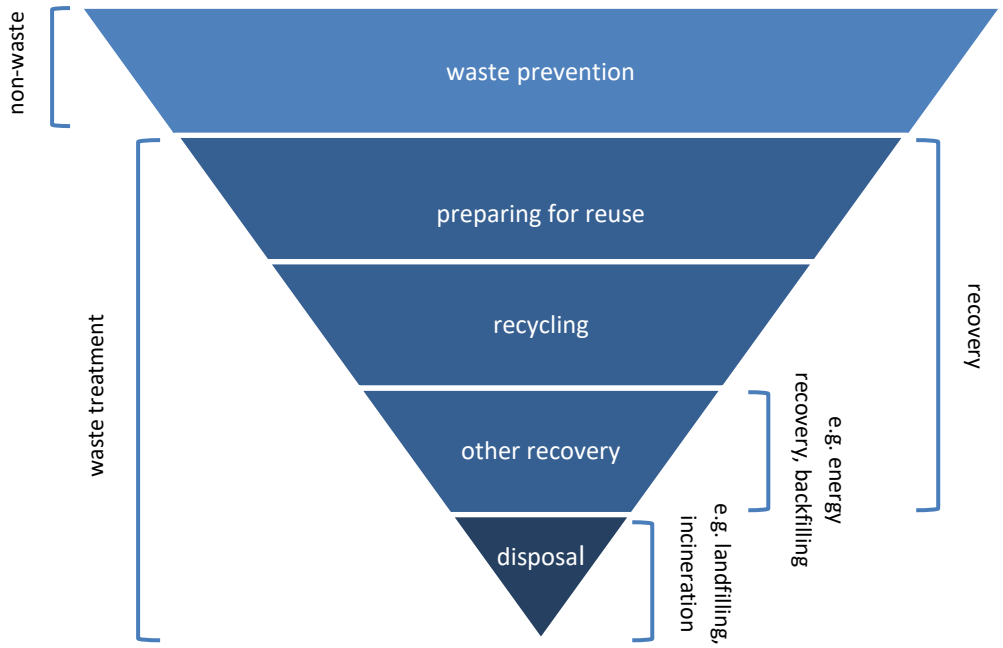
[235] According to Article 1 1975 WFD, waste means *'any substance or object which the holder disposes of or is required to dispose of pursuant to the provisions of national law in force'*, whereas in the 1991 amendments to the WFD it was modernized by means of Article 1 into the definition *'any substance or object in the categories set out in Annex I which the holder discards or intends or is required to discard'*, which is similar to the definition used today. The current definition no longer refers to an Annex of waste categories.

[236] See first and foremost Chapter 6.1.

[237] Comparable to older version, two other steps have been added that links the hierarchy with the least environmental impact and the saving of resources. S. Van Ewijk and J.A. Stegemann, 'Limitations of the waste hierarchy for achieving absolute reductions in material throughput' (*Journal of Cleaner Production*, 3, 2014).

way.[238] The hierarchy has been a guiding principle from the start; as a pioneering concept, it shaped the current waste hierarchy greatly. Explicit references to life-cycle thinking and to 'waste hierarchy' were only made in the 2008 revision of the WFD, although the foundation of the hierarchy had already been made in previous versions. Indeed, since it has also been incorporated in EU waste legislation, it is nowadays also a *legal* mechanism.[239] The hierarchy is the corner stone of modern EU and national waste law. Put in a graphic, it looks as follows:

Graphic 1: waste hierarchy



There is more than just this visualized priority order. The EP insisted in the second reading of the ordinary legislative procedure for the adoption of the 2008 WFD that 'life-cycle thinking' would be added to Article 4 WFD as the only way to justify any deviation from the hierarchy.[240]

In previous preparatory documents 'life-cycle assessments' (LCAs) and 'cost-benefit analyses' (CBAs) were mentioned as justifications for case-by-case derogation if they indicate *'clearly that an alternative treatment option shows a better record for a specific waste stream… These* [methods] *shall be made public and be reviewed by independent scientific bodies. Consultation shall be undertaken and ensure a full and transparent process, including stakeholder and citizen involvement*.'[241] The current wording of Article 4(2) WFD is:

[238] The Ladder of Lansink is as follows: 1) prevention; 2) reuse; 3) recycling; 4) energy; 5) incineration; and 6) landfilling. The priority order gets its name from its developer: Mr. A. Lansink was a former Dutch politician and researcher, and worked on a multitude of topics such as environment, energy and public health.
[239] The hierarchy's order could either be seen as a mere policy orientation, which makes it very difficult to 'breach' by Member States (see e.g.: L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), pp. 335-336) or as a more mandatory obligation, despite being policy influenced (see e.g.: E. Fisher, B. Lange and E. Scotford, *Environmental Law. Text, Cases and Materials* (Oxford University Press, 2013), pp. 702-704).
[240] European Parliament, Recommendation of 18 April 2008 for second reading on the Council common position for adopting a directive of the European Parliament and of the Council on waste and repealing certain Directives (11406/4/2007 – C6-0056/2008 – 2005/0281(COD)), A6-0162/2008, pp. 25-26.
[241] European Parliament, Report of 15 December 2006 on the proposal for a directive of the European parliament and of the Council on waste (COM(2005)0667 – C6-0009/2006 – 2005/0281(COD)), A6-0466/2006, p. 14.

> *When applying the waste hierarchy referred to in paragraph 1, Member States shall take measures to encourage the options that deliver the best overall environmental outcome. This may require specific waste streams departing from the hierarchy where this is justified by life-cycle thinking on the overall impacts of the generation and management of such waste.*
>
> *Member States shall ensure that the development of waste legislation and policy is a fully transparent process, observing existing national rules about the consultation and involvement of citizens and stakeholders.*
>
> *Member States shall take into account the general environmental protection principles of precaution and sustainability, technical feasibility and economic viability, protection of resources as well as the overall environmental, human health, economic and social impacts, in accordance with Articles 1 and 13* [which set out the Directive's objectives].

Because the waste hierarchy is based on generalization, the order can be customized for a *specific* waste stream but only if this is justified by life-cycle thinking on the overall impacts of the generation and management of such waste. This opportunity to deviate rests on the idea that the hierarchy cannot *always* provide good guidance. Accordingly, as long as national authorities follow the waste hierarchy in their policy and legislation, a proper application of life-cycle thinking is in principle assumed.[242] While the principles of good governance (e.g. public consultation, transparency…) were upheld in the final version of Article 4 WFD, the concept of life-cycle thinking prevailed over other concepts that give shape to the life-cycle perspective. Concepts such as LCAs and CBAs are not decisive: they are non-binding methods that may be used to *support* any deviations based on life-cycle thinking.[243] Because the concept of life-cycle thinking is not further specified in the WFD, the interpretation and application of the waste hierarchy and life-cycle thinking by the Member States is quite flexible on condition that the choices made are explained thoroughly.[244] Next to the EU policies on life-cycle thinking which

[242] European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, 2012, p. 49, http://ec.europa.eu/environment/waste/framework/pdf/guidance_doc.pdf (consulted 15 November 2016). It is however questionable how the EU could sanction Member States not willing to follow the waste hierarchy. This issue was raised in the drafting process of the German federal Closed Substance and Cycle and Waste Management Act (see the 'Gesetz zur Neuordnung des Kreislaufwirtschafts- und Abfallrechts - Kreislaufwirtschaftsgesetz, KrWG', Federal Law Gazette ['Bundesgesetzblatt'], published 29 February 2012). Article 8(3) of the proposed Act ranked energy recovery and preparing for reuse, recycling and other recovery options other than energy recovery equally, provided that the waste stream had a calorific value of at least 11,000 kilojoules per kilogram. The European Commission raised its concern that the deviation from the waste hierarchy was not limited to a *specific* waste stream but, instead, was generalized to all waste streams. It stated that the Act *'could therefore lead to a weakening of the priority given for preparation for re-use and recycling which is not in line with the waste hierarchy and the objectives of Directive 2008/98/EC and has therefore invited the German authorities to revise Article 8 of the notified draft act in order to better reflect the concept of waste hierarchy*' (Commissioner Potočnik provided a statement on behalf of the Commission and on request from a member of the EP, where he expressed concerns about the draft Act. See: Parliamentary questions of 4 August 2011, www.europarl.europa.eu/sides/getAllAnswers.do?reference=E-2011-005520&language=SV (consulted on 13 November 2016). Either way, Germany did *not* change the wording of Article 8(3) in the final text of the Closed Substance and Cycle and Waste Management Act. To my knowledge, the Commission did not take any further action. See for a broader discussion on this issue: C. Dalhammar, 'The application of 'life cycle thinking' in European Environmental law: theory and practice' (*Journal for European Environmental & Planning Law*, 2015, pp. 116-118.

[243] European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, 2012, p. 51.

[244] See e.g.: J. Wante, 'A European Legal Framework for Enhanced Waste Management' (*1st Int. Symposium on Enhanced Landfill Mining*, 2010), p. 5; and C. Dalhammar, 'The application of 'life cycle thinking' in European Environmental law: theory and practice', (*Journal for European Environmental & Planning Law*, 12, 2015), pp. 106 and 114-118. See also: for the particular application of life-cycle thinking in the waste hierarchy, for example through LCAs, and for the challenges that go along with basing national polices and legislations on these LCAs and other assessments and life-cycle thinking in general: D. Lazarevic, N. Buclet and N. Brandt,

were already publicized back then,[245] the concept has been explained for the particular context of the WFD by the European Commission as:

> *a conceptual approach that considers upstream and downstream benefits and trade-offs associated with goods and services. LCT* [life-cycle thinking] *takes into account the entire life cycle, starting with the extraction of natural resources and including material processing, manufacturing, marketing, distribution, use, and the treatment of waste.*[246]

Another novelty in Article 4(2) WFD is the explicit reference to the environmental principles of precaution and sustainability, technical feasibility and economic viability, protection of resources as well as the overall environmental, human health, economic and social impacts. These principles and concepts should be taken into account when applying the waste hierarchy, including when a Member State wants to derogate from the five-step order. It is the first time these environmental principles are expressly referred to at all in the WFD.[247]

Note moreover that the preventive principle is not mentioned in relation to the waste hierarchy, whereas it is a guiding principle for the Directive as a whole – not only by means of Article 191(2) TFEU, but also through Recital (30) WFD. A final environmental principle relevant for the whole WFD is the polluter pays principle: Article 14(1) WFD states that the costs of waste management shall in principle be borne by the original waste producer or by the current or previous waste holders.[248] The source principle, which is like the other three environmental principles also put forward in Article 191(2), has neither been mentioned in Article 4 nor in any Recitals of the WFD. A concept which is not an environmental principle but which has really influenced the 2008 WFD and waste policy in general is the concept of 'extended producer responsibility' (see Article 8 WFD). Last but not least, the principles of self-sufficiency and proximity form also part of the regulatory framework for waste (see Article 16 WFD).[249]

Definitions

The definitions laid down in Article 3 WFD are crucial to the implementation and application of the waste hierarchy. The most important ones to understand the hierarchy are:

> *12. 'prevention' means measures taken before a substance, material or product has become waste, that reduce:*
>
> *(a) the quantity of waste, including through the re-use of products or the extension of the life span of products;*
>
> *(b) the adverse impacts of the generated waste on the environment and human health; or*
>
> *(c) the content of harmful substances in materials and products*
>
> *13.'re-use' means any operation by which products or components that are not waste are used again for the same purpose for which they were conceived*
>
> *14.'treatment' means recovery or disposal operations, including preparation prior to recovery or disposal;*
>
> *15.'recovery' means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II sets out a non-exhaustive list of recovery operations;*
>
> *16.'preparing for re-use' means checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing;*

'The application of life cycle thinking in the context of European waste policy' (*Journal of Cleaner Production*, 29-30, 2012), pp. 199-207.

[245] Such as the IPP and the Thematic Strategy on waste prevention and recycling. See Chapter 2.2.3-B.II.

[246] Supra note 243, p. 49.

[247] See also: for the precautionary principle Recital (30) WFD.

[248] See also: Recitals (1) and (26) WFD. The polluter pays principle is the only environmental principle which the 1975 Waste Directive already mentioned in its Preamble and Article 11.

[249] The meaning of this concept and these environmental (waste) principles, which are typical to waste legislation, will be explained in more detail in the course of this dissertation whenever it is required.

17.'recycling' means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations;…
19.'disposal' means any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I sets out a non-exhaustive list of disposal operations;[250]

What can be concluded from these definitions is that waste prevention happens *before* a substance or object become waste and , because of that, the WFD in fact a much larger scope that previously said in Chapter 3.2.2 above; apparently also non-waste falls within its scope.[251] The next four tiers are on the other hand real options for *waste* treatment: the substances or objects need fulfill the definition of waste. In turn, the first three treatments following waste prevention are successive categories of waste recovery. The two most important elements of the definition for recovery is that the *principal result* of the operation is that the waste must serve a *useful purpose* by replacing other materials or waste which would otherwise have been used to fulfil a particular function. By way of guidance, Annex II WFD contains a non-exhaustive list of recovery operations.

Regarding the first recovery category, preparing for reuse basically means that waste products are returned to the use stage of the product after they have been minimally treated (e.g. cleaned, repaired…). On the contrary, the second recovery category is based on the idea to add another cycle to the terminating life-cycle of a material, which is done by aiming at *new* substances, products or materials. It follows, unsurprisingly, that the definition for recycling explicitly states that recycling *excludes* energy recovery and the production of waste-derived fuels. Together with backfilling, these two recovery activities fall under the final category ('other recovery') for which no explicit definition exists in Article 3 WFD. Accordingly, one has to look at the general meaning of recovery, as quoted above, minus the two recovery categories which are higher ranked in the hierarchy. It should be noted, moreover, that the operations falling within this residual 'other recovery' category are on equal footing: there is in principle no hierarchy between these recovery practices on condition that the relevant waste stream is unfit for the preparation for reuse and recycling.[252]

Just like 'other recovery' is a residual category of 'recovery', 'disposal' is a residual category of 'waste treatment'. According to Article 3(19) WFD, disposal means any operation which is *not* recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Again, by way of guidance, the WFD contains an Annex which includes a non-exhaustive list of disposal operations: Annex I.

Besides the requirement for Member States to draft a waste prevention programme and a national waste management plan to actually stimulate the application of the waste hierarchy in a

[250] All will be further clarified in the course of this research.
[251] See also the wording of the Directive's main objective in Article 1 WFD.
[252] I argue, however, that overall the WFD favours activities that bring waste materials back to the materials system (e.g. recycling) over any activities that use waste materials for energy purposes (e.g. energy recovery). This can be based on the underlying policies and guiding principles and on the legal instruments themselves. For the discussion on the triangular relationship between materials, waste and energy see: T. de Römph and L. Reins, 'Waste-to-Energy and the Circular Economy - Connecting the dots' (*Oil, Gas, Energy Law Intelligence*, 14:3, 2016), pp. 1-12; and T. de Römph, 'WtE and the Circular Economy: Environment and Energy' in: H. Post (eds.), *From waste to energy: technology, the environment and the implications under EU law* (Eleven International Publishing, 2018), pp. 135-169. See for related energy policy documents: e.g. European Commission, *Energy Union Package. A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy*, COM(2015) 80; European Commission, *Annex to the Roadmap for the Energy Union*, COM(2015) 80/2; European Commission, *An EU Strategy on Heating and Cooling*, COM(2016) 51; and European Commission, *Exploiting the potential of Waste to Energy under the Energy Union Framework Strategy and the Circular Economy*, ENV-UNIT A2–2016/ENV/086. See for a subsequent policy documents on the link between the Circular Economy and Waste-to-Energy, amongst others: European Commission, *The role of waste-to-energy in the circular economy*, COM(2017) 34.

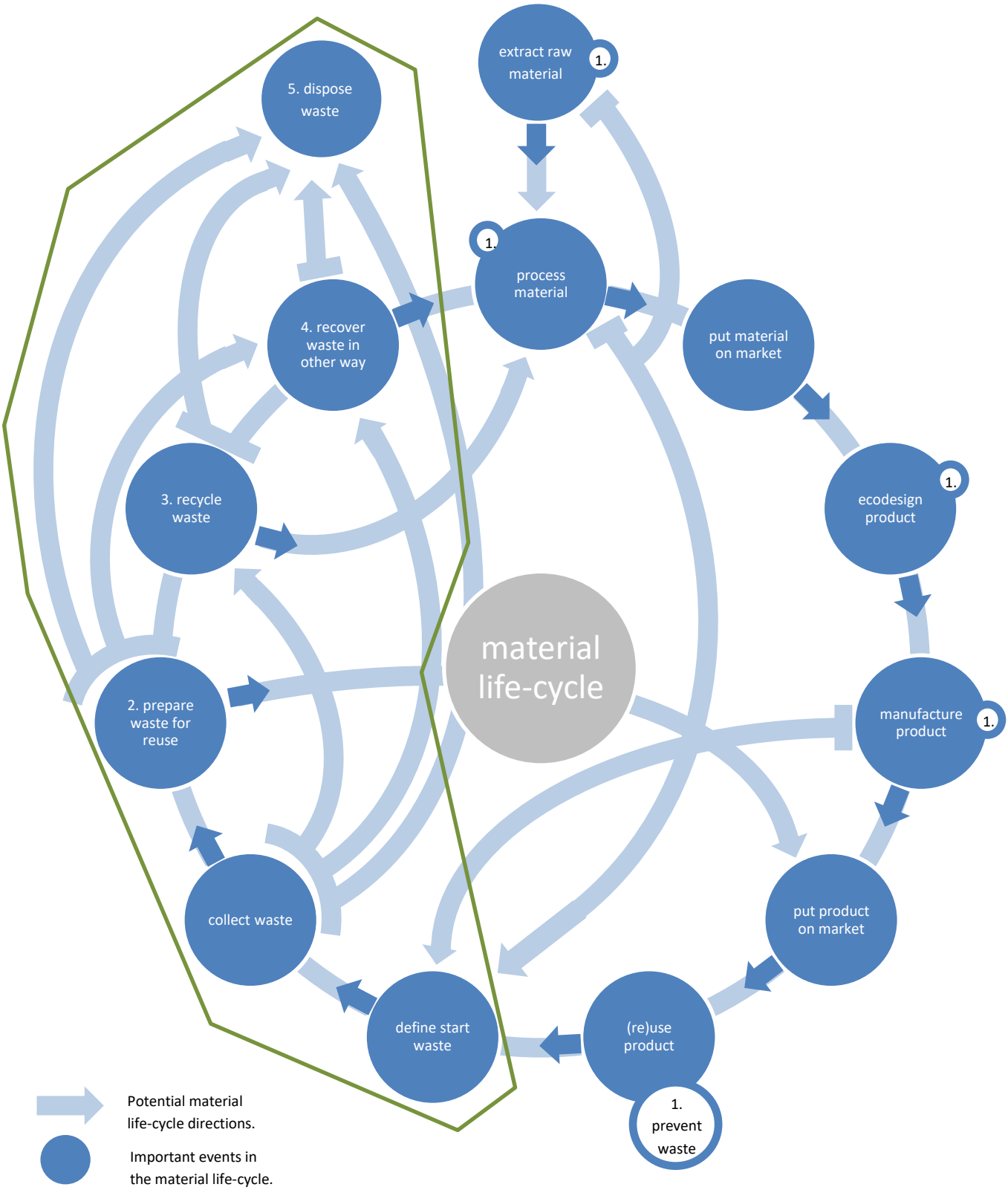
more practical way,[253] the WFD also contains two waste management targets for specific waste streams.[254] Article 11(2) WFD sets targets for waste that must be prepared for reuse and recycled to increase the level of resource-efficiency in the EU. Member States must take the necessary measures to achieve the following targets by 2020: 50 % by weight of household waste (such as at least paper, metal, plastic and glass) and possibly from other origins if the waste material is similar to household waste must be prepared for reuse and recycled; and 70 % by weight of non-hazardous construction and demolition (C&D) waste (excluding naturally occurring material defined in category 17 05 04 in the list of waste) must be prepared for reuse, recycled and recovered in another way for its materials, such as backfilling operations using waste to substitute other materials.

3.2.4 Summarizing flowchart

Below, the WFD is summarized in *Flowchart 2*, which reflects a simplified version of the life-cycle of a material. The main purpose of the chart is to indicate the main focus of the WFD and where the main instruments have an impact on the life-cycle.

Flowchart 2: main focus Waste Framework Directive (on the next page) [255]

[253] Articles 28-30 WFD.
[254] Chapter 1.2 already referred to one of these targets (i.e. the one for municipal waste), because it is proposed in the CE Package to increase this target.
[255] The flowchart is authentic, designed especially for this research.



Potential material life-cycle directions.

Important events in the material life-cycle.

Most predictable material life-cycle direction after important events, amongst others based on the waste hierarchy

1-5

The numbers indicate the waste hierarchy. Accordingly, waste prevention (1.) is placed outside the waste stage, whereas the waste treatments (2-5) are within that stage. For the waste treatments, the corresponding dark blue arrows show the way the waste goes after the specific treatment. The light blue arrows indicate the direction(s) which are also possible. The choice between these light blue arrows is not optional: the arrow should be picked with a sequence number. However, one could also ignore the numbers if this is justified by life-cycle thinking: then the waste treatment most optimal for the environment can be chosen.

Main focus of the particular key law. This does not mean that the regulation does not regulate other important events and life-cycle stages (such as waste prevention [no. 1]), because each law is shaped according to life-cycle thinking in its own way.

3.3 REACH

3.3.1 Circular Economy Package

Chemicals are extremely important in industrial processes as well as in our day-to-day lives due to their many applications. The chemical industry can be divided in several subcategories: petrochemicals, polymers, consumer chemicals, basic inorganics and specialities.[256] As an 'enabling industry', it plays a fundamental role in providing innovative materials and technological solutions to support the industrial competitiveness of the EU.[257] The world chemical sales are still increasing, making the chemical industry a 3,534 billion EUR business in 2015, out of which the EU holds a share of 519 billion EUR.[258] The EU is the world's number three in chemical production.[259] One could say that the EU chemicals industry is under severe global competitive pressure. It moreover faces other challenges, too, related to its energy intensity and rising energy prices, its need for natural resources and rising feedstock prices, and the use of dangerous chemicals and impacts on the environment and human health. All in all issues which are directly linked to the Circular Economy. Due to the relatively long history of chemical production and sales in Europe, the EU also has a long history of regulating the manufacturer, marketing and use of chemical substances. The first legislation on the classification, packaging and labelling of chemicals already dates from 1967.[260] Over time, the chemical sector has been heavily regulated under Union law as regards health, safety and environmental protection, GHG emissions and energy concerns. A predictable but open for innovations, and environmentally-friendly regulatory framework seems to be a key requirement for future competitiveness of the chemical sector in the EU.

The European Commission frequently refers in several contexts to chemicals in the Action Plan for a Circular Economy. While the word 'chemicals' is explicitly mentioned in the introduction, the parts concerning the product stage and the conversional stage, and in two parts concerning a priority area (plastics and biomass), implicit reference is made when the CE Action Plan is linked to other closely-related policies which target chemicals as well. This is the case, for example, in the part concerning the horizontal measures where the text refers to the Eco-innovation Action Plan.[261] The role chemicals play in the Circular Economy is nonetheless particularly stressed in the context of the conversional stage of a material.[262] The Commission points out that the market for secondary chemicals is not yet well-linked with legislation on chemicals. In the words of the Commission:

> *A growing number of chemical substances are identified as being of concern for health or the environment and become subject to restrictions or prohibitions. However, these substances may be present in products sold before the restrictions applied, some of which have a long lifetime, and therefore chemicals of concern can sometimes be found in recycling streams. Such substances can be costly to detect or remove, creating obstacles in particular for small recycling operators.*[263]

To tackle this specific problem, the Commission announces that it will analyze the interface between chemicals, products and waste legislation in the context of the Circular Economy, including on how to reduce the presence and improve the tracking of chemicals of concern in

[256] Cefic, *The European Chemical Industry Facts and Figures Report 2015* (2015), see http://fr.zone-secure.net/13451/186036/#page=4 (consulted at 25 November 2016), p. 8.
[257] See the website of the European Commission: https://ec.europa.eu/growth/sectors/chemicals_en (consulted on 25 November 2016).
[258] Supra note 256, p. 4.
[259] After China (number one by far, but a position once firmly held by EU28) and the area of the North American Free Trade Agreement (number two). Ibid., p. 6.
[260] Directive 67/548 of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances, [1967] OJ L 234.
[261] CE Action Plan, p. 18.
[262] CE Action Plan, p. 12.
[263] CE Action Plan, p. 12.

products.[264] The promotion of a non-toxic materials system while limiting unnecessary burdens for recyclers, particularly for SMEs, and facilitating the cross-border circulation of secondary chemicals (particularly in plastics)[265], is regarded as a main goal. The actions that will be proposed to address this, will also feed into a future 'EU Strategy for a non-toxic environment'.

3.3.2 Aim and scope

The third law which is key to the CE Package and for the Circular Economy transition is REACH: Regulation 1907/2006 of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.[266] REACH is the umbrella regulation laying down management requirements on chemicals and their safe use, which entered into force on 1 June 2007. It is complemented by other chemical/product legislation. The most significant one is Regulation on classification, labelling and packaging of substances and mixtures (CLP Regulation), because it ensures that the hazards presented by chemicals are communicated to workers and consumers/users in the EU through classification and labelling of chemicals.[267] REACH is an abundant, complicated and highly technical framework – the Regulation alone already covers 278 pages, including 141 Articles and many Annexes and Appendixes, and it is supplemented by over twenty non-legally binding guidance documents, which generally easily run to over 100 pages each.[268] Moreover, both REACH and the guidance documents are frequently updated.

The aim of REACH is to ensure a high level of protection of human health and the environment through a better and earlier identification of chemical substances and mixtures, and implement risk management measures, as well as the free circulation of substances on the internal market while enhancing competitiveness and innovation.[269] In fact, REACH emerged as a response to criticisms of chemicals control.[270] The Regulation introduced innovative – and therefore also much contested – tools/strategy at the time of its adoption.[271] REACH effectively and to varying degrees[272] places the burden of proof on industry[273] to identify, assess and manage

[264] CE Action Plan, p. 13; and European Commission, *Annex to the Communication Closing the loop – An EU action plan for the Circular Economy*, COM(2015) 614/2, p. 3. The Commission would have had analyzed the policy options for addressing the interface in 2017, if it had not been rescheduled for the first quarter of 2018.
[265] CE Action Plan, pp. 13-14.
[266] Regulation 1907/2006 of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, [2006] OJ L136/3.
[267] Regulation 1272/2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 [2008] OJ L 353/1. It entered into force in January 2009 and repealed Directives 67/548 and 1999/45 on dangerous substances and mixtures by 1 July 2015.
[268] See for the guidance reports: https://echa.europa.eu/guidance-documents/guidance-on-reach?panel=ident_nam_subst#ident_nam_subst (consulted on 28 November 2016).
[269] Article 1(1) REACH.
[270] See for an extensive historical overview of the establishment of REACH and, importantly, the inevitable controversy on its innovative approaches: Elizabeth Fisher, 'The 'perfect storm' of REACH: charting regulatory controversy in the age of information, sustainable development, and globalization' (*Journal of Risk Research*, 8:4, 2008), pp. 541-563.
[271] Besides the resistance against certain chemical control tools, the debate was largely driven by the level of precaution that should be incorporated in REACH, although they are clearly interrelated. T. Assmuth, M. Hilden and M. Craye, 'Beyond REACH: roadblocks and shortcuts en route to integrated risk assessments and management of chemicals' (*Science of the Total Environment*, 2010), pp. 3955-3956.
[272] B. Hansen, 'Background and structure of REACH', in L. Bergkamp (ed.), *The European Union REACH Regulation for Chemicals – Law and Practice* (Oxford University Press, 2013), p.21 (1.19 ff).

the risks linked to the substances it manufactures and markets (or import into) in the EU. The basic principle underpinning REACH is rather straightforward: 'no data, no market'.[274] The data will be publicly available through the central database held at the European Chemicals Agency (ECHA) and is supposed to help to close the information gap on chemicals.[275] REACH is based on the idea that the efficient functioning of the internal market for chemicals can only be achieved if requirements for substances, which should ensure a high level of human health and environmental protection all the same, do not differ significantly from Member State to Member State. REACH is therefore exclusively based on Article 114 TFEU.

REACH applies in principle to *all chemical substances and mixtures, whether manufactured, imported, used as intermediates or placed on the market either on their own or in articles*. There are however some exemptions to this general rule. For example, REACH does not apply to radioactive substances[276] and non-isolated intermediates.[277] In addition, waste is in essence excluded from the Regulation's scope because it is not a substance, mixture or article within the meaning of Article 3 REACH.[278]

Indeed, the definitions most important to the demarcation of the Regulation's scope are the ones for 'substance', 'mixture' and 'article'. Article 3 REACH explains that:

> *1. substance: means a chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition;*
> *2. mixture: means a mixture or solution composed of two or more substances;*
> *3. article: means an object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition;*

In practice, REACH applies to almost all chemicals as well as to those substances that are used in articles (meaning: 'products')[279], for example in paints, cleaning products, clothes, furniture and EEEs. The Regulation, therefore, really has an impact on nearly all companies operating in the EU.

3.3.3 Main instruments

There is of course a reason for the acronym 'REACH': the most notable instruments deployed in the framework are the registration, evaluation, authorization and restriction of (certain) chemical substances, on their own, in mixtures or in articles. Additionally, the dissemination of information through so-called 'Safety Data Sheets', which exist in synergy with the CLP framework, is highly relevant, too. The basics of these main instruments are explained below.

---

[273] Or rather: REACH internalizes the costs of producing information about chemical safety, i.e. the privatizing of information assessment. E. Fisher, 'The 'perfect storm' of REACH: charting regulatory controversy in the age of information, sustainable development, and globalization' (*Journal of Risk Research*, 8:4, 2008), pp. 548-549.
[274] Article 1(3) REACH.
[275] See Title X REACH.
[276] But only to not to the substances within the scope of Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation, [1996] OJ L 159/1.
[277] Article 2(1)(a) and (c) REACH.
[278] Article 2(2) REACH. Member States may furthermore allow for exemptions from this Regulation where necessary in the interests of defense, but only in specific cases for certain substances, on their own, in mixtures or in an article (Article 2(3) REACH). REACH also provides for exclusions particularly for certain applications and only for specific provisions, for example for applications in food or feeding stuffs, cosmetic products and medical devices (Article 2(5)-(6) REACH). See for all other exemptions Article 2(7) et sec. REACH.
[279] For reasons of legal accuracy, the word 'article' is used in the context of REACH instead of 'product'. The word 'product' is used in all other cases in this dissertation, which corresponds to the generally used terminology in other legislation.

Registration and evaluation

REACH requires manufactures and importers of substances, either on their own or in a mixture, in quantities of one tonne or more per year to register those substances (Article 6(1) REACH). For substances in articles a different rule applies. Article 7(1) REACH explains that:

> *Any producer or importer of articles shall submit a registration to the Agency for any substance contained in those articles, if both the following conditions are met:*
>
> *(a) the substance is present in those articles in quantities totalling over one tonne per producer or importer per year*;[and]
>
> *(b) the substance is intended to be released under normal or reasonably foreseeable conditions of use.*

REACH thereby mobilizes the industry by giving private companies responsibilities, which it different than the traditional command-control approaches used in the past. The main goal of the registration of chemicals, however, is to provide information for the regulators upon which decisions can be based (such as authorization or restriction, see below). Article 5 REACH is clear on this: private actors should first provide data before their products are granted market access (i.e. the 'no data, no market' principle, as explained above). Usually a registration fee is charged.[280]

Registration is based on the idea that each substance only requires one registration, which means that manufacturers and importers of the same substance have to submit their registration jointly.[281] In principle all substances requires registration (unless exempted from the Regulation's scope). There is, however, a special transitional regime for certain substances which were already manufactured or placed on the market before REACH entered into force – the so-called 'phase-in substances'.[282] Simply put: companies benefit from the transitional regime if they pre-registered their (back then already existing) substance by 1 December 2008.[283] The principle is that the higher the tonnage, the earlier the transitional registration deadline. The first deadlines have all passed, but a final one is forthcoming: deadline for registering substances manufactured or imported at 1-100 tonnes a year is 31 May 2018.[284]

The submission for registration shall be communicated by each registrant to the ECHA through a registration dossier.[285] Article 12(1) REACH requires that the technical dossier on a particular substance/mixture, which is part of the registration dossier, includes information pertaining to: the identity, the classification(s), the intended use(s), produced or imported quantities, and all physicochemical, toxicological and eco-toxicological information that is relevant and available to the registrant.[286] It is extremely important that the registrant proofs the safe use of the substances for all their uses, considering all stages of the substance's life-cycles, including the waste stage. In view of this, REACH also requires that the registrant of the registered substances in quantities of 10 tonnes or more per year creates a Chemical Safety Report (CSR), based on a Chemical Safety Assessment (CSA),[287] for either each substance on its own, in

---

[280] See e.g.: Articles 7(1) and 6(4) in conjunction with Article 74 REACH.

[281] Article 11 REACH.

[282] See for the definition of phase-in substances Article 3(20) REACH.

[283] Article 28(2) REACH.

[284] Article 23(3) REACH. It is expected by the ECHA that up to 70.000 final registrations will be prepared for 2018. This would be three times more than previously prepared for any of the previous deadlines. European Chemicals Agency, *ECHA's REACH 2018 Roadmap* (ECHA-15-R-01-EN, 2015).

[285] Article 10 REACH.

[286] See also: Article 10(a) REACH.

[287] The ECHA Guidance on the Information Requirements and the Chemical Safety Assessment clarifies that there are uncertainties at each stage of the CSA process. European Chemicals Agency *Guidance on information requirements and chemical safety assessment. Chapter R.19: Uncertainty analysis* (ECHA, version 1.1, 2012), p. 8. This is a clear reason why REACH is based on the precautionary principle. Annex I of REACH, which sets out the conditions for assessing substances and the preparing of CSRs, including CSAs, further states quite often that the information gaps must be acknowledged in the assessments and reports, as it refers to the need to include 'potential adverse effects'.

a mixture or in an article or a group of substances.[288] According to Article 14(3) REACH, a CSA includes the following steps: (a) human health hazard assessment; (b) physicochemical hazard assessment; (c) environmental hazard assessment; and (d) persistent, bioaccumulative and toxic (PBT) and very persistent and very bioaccumulative (vPvB) assessment. If there is scientific uncertainty – which there often is – these safety assessments should be based on the evidence that gives rise to the highest concern.[289] The CSR is the key source from which the registrant provides information of chemicals through the exposure scenarios to all users along the supply chain. This will eventually results in the characterization of risks and the digression on the appropriate risk management measures to control those risks.[290] Article 14(6) REACH namely suggests that a registrant must identify and apply appropriate measures to adequately control the (uncertain) risks identified in the CSA. All things considered, the registration procedure is to a great extent designed considering a classic risk approach instead of a hazard approach,[291] as these CSAs include a hazard assessment, an exposure assessment and a risk characterization. It is moreover explicitly stated in the Preamble and Article 1(3) of REACH that the framework is underpinned by the precautionary principle.

The provisions on the evaluation provide for the follow-up to registration by allowing for checks on whether registrations (i.e. the registration dossiers) are in compliance with the REACH requirements (in contrast to registration, evaluation therefore concerns a substantive *quality* check of the information provided) and, if deemed necessary, by allowing for generation of more information on the properties of substances. There are two types of evaluation: dossier evaluation *(which may be carried out for all substances, but priority shall be given to substances which have or may have: persistent, bioaccumulative and toxic (PBT); very persistent and very bioaccumulative (vPvB); and carcinogenicity, germ cell mutagenicity, reproductive toxicity (CMR) properties, or substances above 100 tonnes per year with uses resulting in widespread and diffuse exposure, provided they fulfil the criteria for certain hazard classes or categories under the CLP Regulation)* and substance evaluation *(which should be carried out irrespective of volume when initial data raise suspicion on the risks)*.[292] Regarding the latter type, the evaluation may follow from the dossier evaluation but is not restricted to it. The outcome of both evaluations can trigger further risk management measures; they can be used in the authorization and restriction procedures.[293]

Authorization

Over time, the burden of proof in chemical legislation to assess the risks of substances has shifted from the authorities to industry. At the time of adoption, REACH was groundbreaking in that regard. Companies wishing to put their substances on the market should now prove that their goods, regardless of the volume, are safe enough for human health and the environment. A prime example is the authorization procedure for substances of very high concern (SVHCs).[294] SVHCs should be properly controlled because they are substances that may have serious and often irreversible effects on human health and the environment. Summed up, SVHCs are the substances meeting the criteria for classification in the CMR hazard classes (carcinogenic, mutagenic or toxic for reproduction) and the hazard classes that cause adverse effects on sexual function and fertility

[288] See Article 10(b) in conjunction with Article 14(1) REACH.
[289] European Chemicals Agency, *Assessing the Health and Environmental Impacts in the Context of Socio-economic Analysis Under REACH - Part 1: Literature Review and Recommendations* (ECHA, 2011), p. 25.
[290] See Articles 3(37), 14 and 31(7) REACH. See also: European Chemicals Agency, *Chemical Safety Report, An illustrative example, Part 1 - Introductory note & Part 2 - Illustrative CSR* (ECHA, date unknown), pp. 22-25.
[291] L. Bergkamp and M. Penman, 'Conclusions', in: L. Bergkamp (ed.) *The European Union REACH Regulation for Chemicals. Law and Practice* (Oxford University Press, 2013), p. 420.
[292] Articles 40(1) (see also: Article 42) and 44(1) REACH, respectively.
[293] Articles 42(2) and 48 REACH.
[294] See Recital (69) and in particular Title VII REACH on this matter.

or on development in accordance with the CLP Regulation,[295] substances which vPvB and PBT in accordance with REACH, and substances which are not mentioned but for which there is scientific evidence of probable serious effects to human health or the environment which give rise to an equivalent level of concern and which are identified on a case-by-case basis in accordance with a special procedure.[296]

The best known 'substitution list' in EU law having a regulatory basis is the one for SVHCs, also known as the Candidate List, because authorization would eventually lead to the phase out of those substances.[297] The phasing out of these SVHS is an expression of the substitution principle.

The substitution principle is more broadly expressed elsewhere in the authorization process: each application for authorization must have a thorough analysis of the alternatives.[298] To this end, substitution is only required for substances that fall under this authorization procedure, but it is not only the responsibility of the manufactures or importers: also downstream users[299] applying for authorizations must analyze the availability of substitutes and consider their risks, and the technical and economic feasibility of substitution.[300] Moreover, after receipt of an application for substitution by the ECHA, third parties care allowed to submit options for (superior) alternatives.[301] This creates competition, it is argued, because there is a great incentive to submit alternatives: existence of a suitable alternative implies that future applications for authorization are automatically denied.[302]

Restriction

In addition to the authorization procedure for SVHCs, REACH also provides for the opportunity to pose a restriction on the manufacturing, placing on the market or use of a certain substance on its own, in a mixture or in an article, and which is irrespective of any quantitative thresholds.[303] According to Article 68(1) REACH, a restriction can be established when there is an *'unacceptable risk to human health or the environment, arising from the manufacture, use or placing on the market of substances, which needs to be addressed on a Community-wide basis*.' Accordingly, if the Commission considers a restriction is needed due to any risks which are *not adequately controlled*, the procedure to prepare a proposal on a particular restriction is set in

[295] Indeed, the REACH framework is also indirectly based on hazards, as CLP classifications can trigger direct consequences under REACH. Some hazard categories are considered SVHCs purely based on their classification: i.e. the hazard class CMR categories 1A or 1B of Annex I CLP: see Articles 57(a)-(c) and 59(2)-(3) REACH.

[296] Article 57 in conjunction with Annex XIV REACH.

[297] Article 55 REACH. As a side note, substances are first identified in the Candidate List for authorization (Article 57 REACH), which already creates legal obligations to manufacturers, importers or downstream users using the substances. SVHCs will then be included in Annex XIV REACH, after which they cannot be placed on the market or used after a certain date, unless the plastic recycler is granted authorization for the particular use, or when the substance has been exempted from authorization or the substance is present in mixtures below certain concentrations limits,

[298] Article 62(4)(e)-(f) REACH. Furthermore, whenever an authorization is being reviewed, an update of the analysis for alternatives and a substitution plan (if the analysis shows that it can indeed be substituted) is required to submit as well. Regarding the general objective of REACH to substitute substances or technologies of high concern, see Recitals (12), (72)-(73) REACH.

[299] Article 3(13) REACH defines downstream user as: *'any natural or legal person established within the Community, other than the manufacturer or the importer, who uses a substance, either on its own or in a mixture, in the course of his industrial or professional activities. A distributor or a consumer is not a downstream user. A re-importer* […] *shall be regarded as a downstream user.'*

[300] Article 55 REACH.

[301] Article 64(2) REACH.

[302] F. Fleurke and H. Somsen, 'Precautionary regulation of chemical risk: How REACH confronts the regulatory challenges of scale, uncertainty, complexity and innovation' (*Common Market Law Review*, 48, 2011), p. 390; and Scott, 'From Brussels with Love: The translantic travels of European Law and the chemistry of regulatory attraction' (*American Journal of Comparative Law*, 57, 2009), p. 67.

[303] Title VIII in conjunction with Annex XVII REACH in which a list of restriction is included.

motion.[304] Restrictions may limit or ban the manufacture, placing on the market or use of a substance.[305] A restriction (progressively) facilitates the substitution of certain chemicals – evidently, a total ban is the ultimate expression of the substitution principle.

Besides the instrument of registration in itself, the precautionary principle is particularly reflected in the provisions concerning vPvBs. For these substances there can yet no damage be established based on the risk assessment, but they are still restricted in use because of the properties that indicate a plausibility of irreversible adverse effects.

Information supply downstream (e.g. through Safety Data Sheets)

A complementing instrument to the CSR is the Safety Data Sheet (SDS), which is the primary tool for information transfer through the supply chain about the potential risks posed by some chemicals on the environment and human health, which is identified in the CSR through the CSA.[306] SDSs include information about the properties of the substance/mixture, the hazards, exposure control measures and instructions for handling, disposal and transport.[307]

Downstream users or distributors are *inter alia* bound by the obligations set forth in Article 37(5) and (6) REACH, in which is it stated that:

> *5. Any downstream user shall identify, apply and where suitable, recommend, appropriate measures to adequately control risks identified in any of the following:*
>
> *(a) the safety data sheet(s) supplied to him;*
>
> *(b) his own chemical safety assessment;*
>
> *(c) any information on risk management measures supplied to him in accordance with Article 32* [i.e. minimum information supply downstream for situations were SDSs are not required].

> *6. Where a downstream user does not prepare a chemical safety report* […] *he shall consider the use(s) of the substance and identify and apply any appropriate risk management measures needed to ensure that the risks to human health and the environment are adequately controlled. Where necessary, this information shall be included in any safety data sheet prepared by him.*

At the end of the day, risk information informs the actors operating in the supply chain, whereupon they can decide to buy alternative substances or not.

3.3.4 Summarizing flowchart

Below, REACH is summarized in *Flowchart 3*, which reflects a simplified version of the life-cycle of a material. The main purpose of the chart is to indicate the main focus of REACH and where the main instruments have an impact on the life-cycle.

Flowchart 3: main focus REACH (on the next page)[308]

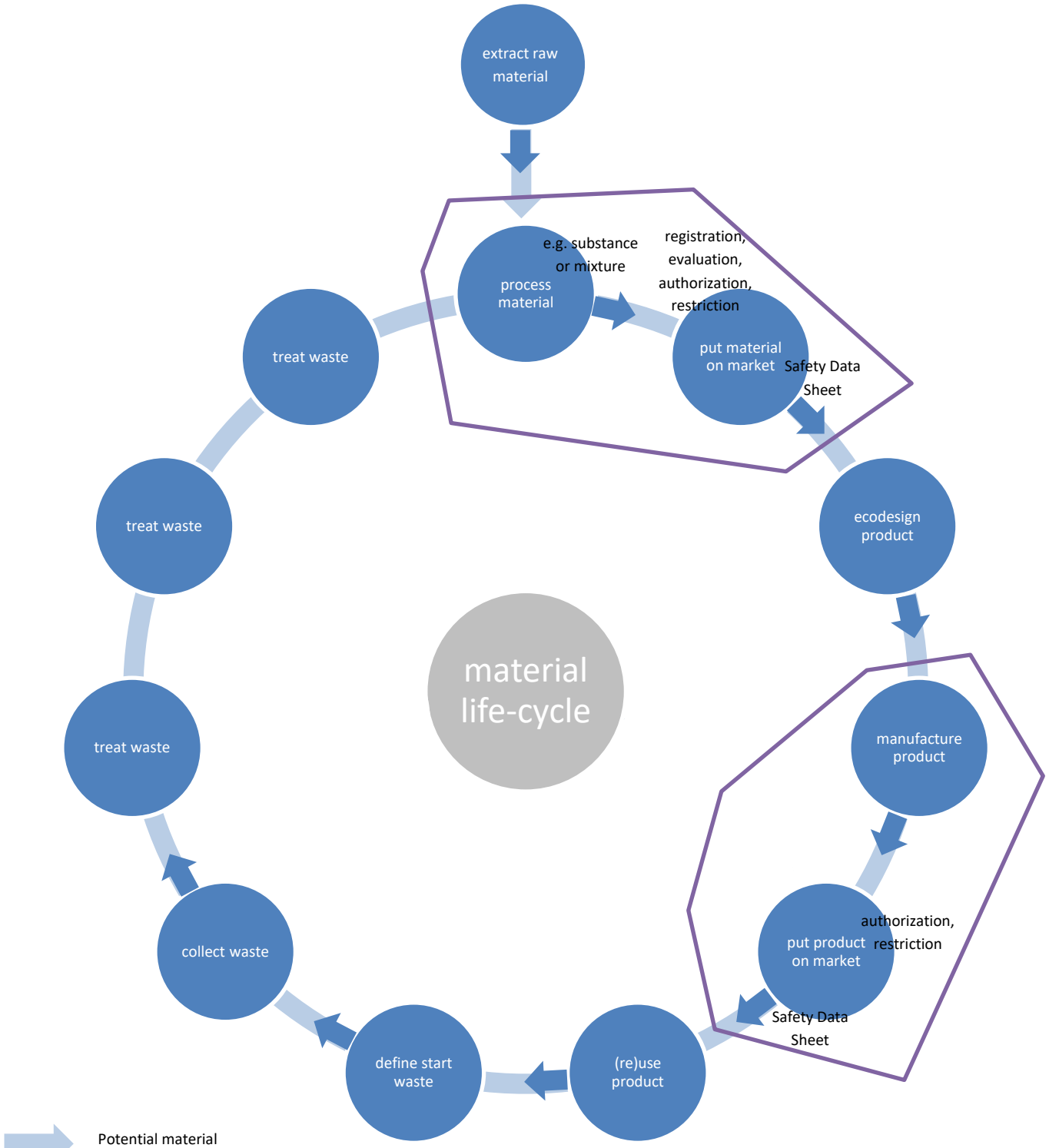
[304] Article 69 REACH.

[305] According to Article 3(31), REACH, restriction means: *'restriction: means any condition for or prohibition of the manufacture, use or placing on the market.'*

[306] The choice of chemicals requiring SDSs is based on the CLP Regulation or on the fact that they are considered to be PBT and PvBv, and/or are submitted to the SVHC Candidate List. See Article 31(1)(a)-(b) REACH. Also some mixtures need to have a SDS despite not falling under these categories (Article 31(3) REACH).

[307] See Annex II REACH.

[308] The flowchart is authentic, designed especially for this research.


extract raw material
process material
e.g. substance or mixture
registration, evaluation, authorization, restriction
put material on market
Safety Data Sheet
ecodesign product
manufacture product
put product on market
authorization, restriction
Safety Data Sheet
(re)use product
define start waste
collect waste
treat waste
treat waste
treat waste
material life-cycle
Potential material life-cycle directions.
Important events in the material life-cycle.
Most predictable material life-cycle direction after important events.
Main focus of the particular key law. This does not mean that the regulation does not regulate other important events and life-cycle stages, because each law is shaped according to life-cycle thinking in its own way.

3.4 Interim conclusion

Both the 2014 and the 2015 CE Package highlights that some EU policies and instruments already provide tools and incentives that are in line with the Circular Economy model. To lend weight to this statement, they specifically mention the waste hierarchy, because the instrument underlies current waste legislation and is progressively leading to the adoption of the preferred options of prevention, preparation for reuse and recycling, and to the discouragement of landfilling. In addition, the policies also mentions the work done regarding the phasing out of toxic substances in chemical policy and the fact that some Ecodesign Implementing Measures already include requirements on durability and to facilitate recycling in the design of energy-related products.[309] Going to the legal roots of these positive developments: the EFD, the WFD and REACH lie at their basis. At the same time, however, both CE Packages stress that the economy is far from circular and that, therefore, things can be better. The Ecodesign framework, waste legislation and chemicals legislation are highlighted again in this respect.

The 2015 CE Package emphasizes that the EFD would need to be improved by emphasizing Circular Economy aspects in future and current Ecodesign requirements to promote a better product design on a product by product basis. A more coherent policy framework for the different strands of work on EU product policy in their contribution to the Circular Economy is pursued by the Commission as a more general aim.

Regarding the WFD, the CE Action Plan underscores that the waste hierarchy would need to be clarified further and would need to be applied better, primarily to promote direct investment and innovation in management options at the top of the waste hierarchy, i.e.: waste prevention, preparing for re-use and recycling. The Commission particularly focusses on high-quality recycling, which is currently not stimulated by EU legislation.

Finally, the Commission highlights the need to examine the interface between chemicals, products and waste legislation. In particular, it underlines the importance of creating a market for secondary chemicals, in particular when they are used in plastics. Clean, non-risky chemical cycles are very important for the Circular Economy, and so the facilitation of the substitution of chemicals of concern and the support for access to innovative technologies by SMEs are important to address. Despite the fact that REACH is not referred to as such in this context, the Regulation is the umbrella law of all legislation on chemicals. It thus makes sense to label REACH as one of the key laws in the CE Package and the Circular Economy transition in general.

The EFD, the WFD and REACH show differences as well as similarities. Contrasts exist in the legal basis chosen for the laws. Both the EFD and REACH are based on the internal market provision, Article 114 TFEU, because these laws regulate first and foremost the placement of products on the internal market (which, indeed, depends on environmental considerations,) while aiming at the protection of the environment and human health as a secondary but still highly relevant goal. This in contrast to the WFD, which is based on the environmental provision (Article 192 TFEU), because the principal objective of waste management is to manage waste in an environmentally-friendly way.[310]

Another significant difference between the measures relates to their form in which they are adopted. REACH is given shape as a Regulation, whereas the WFD and the EFD e are Directives. This means that REACH has direct applicability throughout the Union and entered into force on a predetermined date in all Member States simultaneously. The Directives on waste and ecodesign can be distinguished from REACH because they lay down particular results that must be achieved

[309] See CE Action Plan, pp. 2-3; and 2014 CE Communication, p. 5. There are two more examples, i.e.: the efforts done in the area of energy savings and the reduction of greenhouse gas emissions (see the climate policy at large) and in the area of the so-called 'Bioeconomy' (see the Bioeconomy Strategy). The latter policy field concerns the sustainable and integrated use of biological resources and waste streams for the production of food, energy and bio-based products. European Commission, *Innovating for Sustainable Growth: A Bioeconomy for Europe*, COM(2012) 60.

[310] Note that since all three laws are either based on Article 114 or 192 TFEU, in each case there is a shared competence between the EU and the Member States. This is of course a similarity – not a difference.

while each Member State is – at least in principle – free to decide on how to transpose them into national law. Note however that the Ecodesign Implementing Measures, which finds their legal basis in the EFD, are Regulations, too. This basically means that the Ecodesign framework is a mixture of types of legal act. Note as well that the WFD is complemented by the Waste List, which is adopted as a Decision (which is binding on those to whom it is addressed and is directly applicable).

The differences sketched above simultaneously bring us to the similarities between the laws: all three are umbrella or framework measures, meaning that they are the central piece of legislation for their particular legal field. Their comprehensiveness and influence is exceptional. This is particularly the case for REACH and the WFD, because they are the *lex generalis* of EU chemical law and EU waste law, respectively. The EFD, on the other hand, is less general; there are many more regulations that in some way regulate products in view of environmental and human health protection. Moreover, the Ecodesign framework 'only' targets specific energy-related product groups, whereas REACH and the WFD have a relatively much larger scope (in principle all chemicals and all waste, respectively).

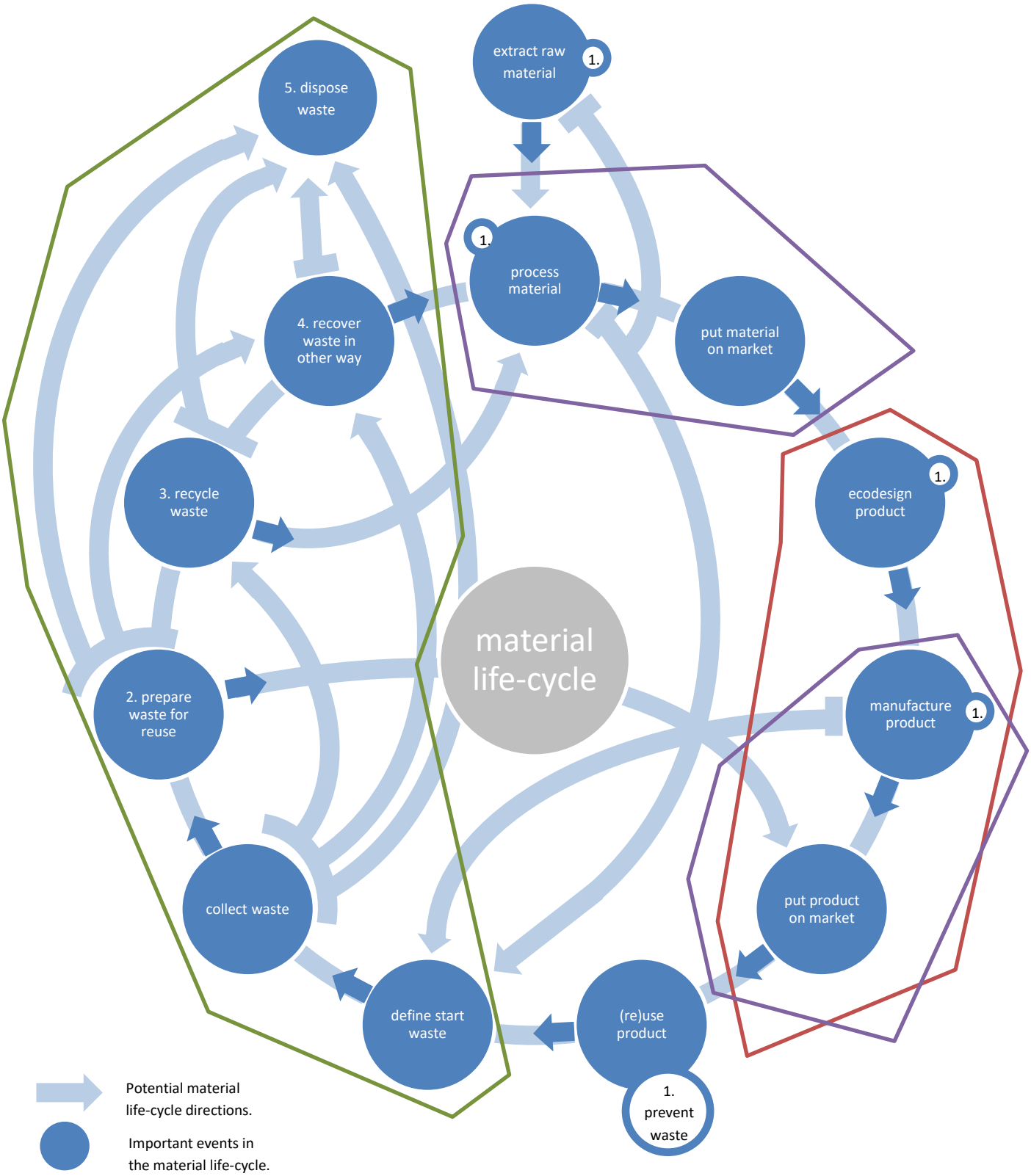
The most significant comparison between the measures is that all three have been influenced by life-cycle thinking to some degree. Apparently, the policies introducing and developing the concept of life-cycle thinking have also led to changes to legislation – notwithstanding challenges which still lie ahead of us regarding the full establishment of a Circular Economy, as pointed out in the CE Package. Main instruments such as the hierarchy and associated definitions (WFD) are obvious reflections of life-cycle thinking. In particular the justification for derogation from the hierarchy and the inclusion of waste prevention (which in principle should fall outside the scope of the Directive) in the hierarchy. The requirements in the Implementing Measures (EFD) must cover the entire life-cycle of the particular energy-related product group, so in principle including the waste stage. This idea of taking into account the waste stage is to a lesser degree implemented in chemical legislation (REACH). There, most attention is being paid to market entry by chemicals through the registration, authorization and restriction of substances: the further away from that moment in the chemical cycle, the fewer requirements apply. The waste stage should sometimes be addressed, nonetheless.

It is right to say, therefore, that each framework (WFD, EFD and REACH) addresses parts of the material life-cycle more and/or differently than the other frameworks. It is also true that the key lawss have an impact on (almost) the entire material life-cycle when they are combined, considering their main focus (not mentioning the *actual* impact they have apart from their main focus: each law is to a great extent based on a life-cycle approach and therefore addresses more than the main focus area). The flowchart below, *Flowchart 4*, which is a combination of the flowcharts for each individual key law,[311] shows this twofold observation.

This dissertation continues by answering the second research question in Part III of this research, taking the three key laws as the starting point. Chapter 4 provides for the research perspective for answering the question.

Flowchart 4: combination flowcharts 1-3 (on the next page)[312]

[311] See Chapters 3.1.4, 3.2.4 and 3.3.4.
[312] The flowchart is authentic, designed especially for this research.



Potential material life-cycle directions.

Important events in the material life-cycle.

Most predictable material life-cycle direction after important events, amongst others based on the waste hierarchy.

1-5

The numbers indicate the waste hierarchy. Accordingly, waste prevention (1.) is placed outside the waste stage, whereas the waste treatments (2-5) are within that stage. For the waste treatments, the corresponding dark blue arrows show the way the waste goes after the specific treatment. The light blue arrows indicate the direction(s) which are also possible. The choice between these light blue arrows is not optional: the arrow should be picked with a sequence number. However, one could also ignore the numbers if this is justified by life-cycle thinking: then the waste treatment most optimal for the environment can be chosen.

Main focus of a particular key legislation (**EFD**, **WFD**, **REACH**). This does not mean that the laws do not regulate other important events and life-cycle stages, because each law is shaped according to life-cycle thinking in its own way.

PART III – OBSTACLES TO THE CIRCULAR ECONOMY

4. Subsequent research perspective: theory, practice and case studies

This Chapter sets forth the research perspective to answer the second research question.[313] To repeat the question:

> **Which aspects of the key legislation obstruct the transition towards a Circular Economy, either because they are present or absent, and which improvements can be made to the Circular Economy Package to encourage the transition?**

To ensure a comprehensible and orderly answer to the second research question, this Chapter is organized as a four-stage rocket where each stage must be read together with the other stages to ensure they are mutually reinforcing. The Chapter first provides a general explanation of sustainability transitions. This allows placing the Circular Economy transition in a broader theoretical perspective on sustainability transitions. The second part of this Chapter discusses how to place the Circular Economy transition in this broader theoretical perspective. More particularly, it explains in what way the EU experiences a *legal* transition towards a Circular Economy, and how the CE Package and a comprehensive EU programme on improving the quality of EU regulation, called the 'Better Regulation Programme', fit into this picture. The third part of this Chapter provides for the research designs for the individual case studies. Because each of the key laws are unique and so are the legal obstructions, customized research designs are required. This part is therefore practically speaking most valuable for the case studies in Chapters 5-7. The final part of this Chapter contains an overview of the overall research design of the dissertation. It also shows a conceptual model of the case studies.

4.1 Theory of sustainability transitions

So far, the word 'transition' has frequently been used in relation to the Circular Economy. Both CE Packages (2014 and 2015) repeatedly speak about *'the transition to a more Circular Economy'* or use comparable phrases.[314] But what does 'a transition' actually mean? What kind of instruments can be used in a transition? Neither the CE Packages nor any other EU policy or legal documents provide for a general explanation of transitions. For that reason, this section relies on the research field of 'sustainability transitions', which has gained ground in the last fifteen years, mostly in EU Member States, to observe, evaluate and govern drastic societal changes and the associated challenges that are the basis for or spring from sustainability transitions.[315]

In general terms, sustainability transitions are situated in numerous symbiotic socio-technical systems (e.g. energy, agro-food, mobility and materials). Socio-technical systems are significant for sustainability transitions because a system perspective is an influential component of the research field. There are many meanings for 'socio-technical systems' – each one is developed in different social research areas. An example of a definition is:

> *a collection of messy, complex, problem-solving components. They are both socially constructed and society shaping. Among the components in technological systems are physical artifacts ... Technological systems also include organizations, such as manufacturing firms, utility companies, and investment banks, and they incorporate components usually labeled scientific, such as books, articles, and university teaching and research programs. Legislative artifacts, such as regulatory laws, can also be part of technological*

[313] As announced in Chapter 1.3 on the aim and the research questions of the dissertation.

[314] See e.g.: CE Action Plan, pp. 2-3, 13, 18-19 and 21; and 2014 CE Communication, pp. 2-3, 7 and 13. Also the OECD's Sustainable Materials Management and the initiatives developed by UNEP are underpinned by a transitional approach.

[315] Several theoretical 'innovation studies' approaches have been developed that derive from the broader concept of 'sustainability transitions' – all of them highlight different dynamics. It is however sufficient to make general statements on transitions in this thesis without getting to the roots of the matter. Understanding the nuances and the repercussions of choosing one of them requires an in-depth stand-alone analysis. It is therefore not the intention to fully commit this thesis either to all theories (i.e. to elaborate upon each of them separately and to pinpoint the parallels and divergences), or to one particular theory alone (i.e. to get to the bottom of it).

> *systems. Because they are socially constructed and adapted in order to function in systems, natural resources, such as coal mines, also qualify as system artifacts. An artifact - either physical or nonphysical - functioning as a component in a system interacts with other artifacts, all of which contribute directly or through other components to the common system goal* [e.g. the support of sustainability]. *If a component is removed from a system or if its characteristics change, the other artifacts in the system will alter characteristics accordingly.*[316]

The challenges associated with these systems are linked with and stimulated by the strong path-dependencies and lock-ins in established sectors.[317] These deeply rooted trajectories show *unsustainable* symptoms. Examples of the causes of such symptoms are: existing policy and legislation, user practices, life-styles, consumption patterns, production technologies and processes, entire value chains, business models, power relations, and organizational and institutional structures.

Clearly, it is extremely difficult to alter a system. In general, a transition therefore requires far-reaching and structural socio-technical changes and involves many actors that interact with one another. In the course of the transition, new products, technologies, services, business models… emerge that partly complement and partly substitute existing ones.[318] The transformational process goes through different stages (predevelopment, take-off, breakthrough, stabilisation). Overall, the process takes a long time: between forty to fifty years or more.[319] On the whole, even though incremental changes to the system are necessary to 'get the transition going', they are insufficient in the long run; fundamental long-term and radical system changes are required.[320]

A concept that is often referred to in transition literature is the multi-level perspective (MLP). This concept is based on the idea that a socio-technical system consists of three functional scale levels with increasing degrees of structuration and that a transition is the consequence of the interaction between those levels. The levels are: *niches* (micro-level), *regime* (meso-level) and *landscape* (macro-level).

More radical conversions happen at the niche level, because technologies, ideas and practices are generally developed by dedicated frontrunners in public and private sectors operating via a bottom-up approach. A niche does not only relate to technologies, science and research, but can also emerge from changing societal values and behaviour (e.g. a less materialistic life-style) and

---

[316] This quote comes from an influential contribution by Hughes to the 'socio-technical system theory' in the late 80's. See: T.P. Hughes, 'The Evolution of Large Technological Systems' in: W.E. Bijker, T.P. Hughes and T.J. Pinch (eds.), *The Social Construction of Technological Systems. New Directions in the Sociology and History of Technology* (The MIT Press, 1989), p. 51 (pp. 51-82 for the full book chapter). There are however much more theories in social science that can somehow be linked to the research field of sustainability transitions. See for more information on this topic, i.a.: F.W. Geels, 'Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective' (*Research Policy*, 39, 2010), pp. 495-510. A somewhat abstract definition of 'socio-technical systems' in sustainability transition literature is: '*… the linkage between elements necessary to fulfil societal functions (e.g. transport, communication, nutrition). As technology is a crucial element in modern societies to fulfil those functions, it makes sense to distinguish the production, distribution and use of technologies as sub-functions. To fulfil these sub-functions, the necessary elements can be characterised as resources.* [Socio-technical systems] *thus consist of artefacts, knowledge, capital, labour, cultural meaning, etc. … The resources and fulfilment of sub-functions are not simply there. Socio-technical systems do not function autonomously, but are the outcome of the activities of human actors*.' In: F.W. Geels, 'From sectoral systems of innovation to socio-technical systems Insights about dynamics and change from sociology and institutional theory' (*Research Policy*, 33, 2004), p. 900. In the light of this dissertation it is sufficient to know that, generally speaking, when socio-technical systems are studied, one looks at the complex nature of the interaction between people and technology (or better: structures and sub-structures) in society.

[317] J. Markard, R. Raven and B. Truffer, 'Sustainability transitions: An emerging field of research and its prospects' (*Research Policy*, 41, 2012), p. 955.

[318] Ibid., p. 956.

[319] Ibid., p. 956; E. Paredis, *A winding road. Transition management, policy change and the search for sustainable development* (PhD dissertation, Political Science Ghent University, 2012-2013), pp. 2, 10, 11 and 17-23. Some authors, however, indicate that it may take less time or may take longer.

[320] Supra note 347, pp. 955-956.

in governance, management and policy. For example, niches may be important in the policy domain ('policy niche') by developing innovative and novel policies, effectuating changes in policy instruments, in the choice of those instruments and in policy paradigm. Additionally, novelties can also emerge in institutions. On the whole, there is a broad spectrum of niches. The search for innovation, solutions and opportunities constitutes new ideas and outcomes for which there are no established markets or practices and the actual applications are relatively expensive up till then. The configuration of niches is moreover not very stable because of the extensive experimentation period and because technologies, legislation and practices are still unchanged or under development. The success rate of niche experiments and whether they really influence the socio-technical system as a whole largely depends on the evolutions at the regime and landscape levels.[321] Generally, niche experiments must be scaled up to embed them in a regime context if they want to be successful.[322]

While changes at the niche level could potentially be ground-breaking, the changes in the regime level are more incremental. Regimes *'leave room for creativity and adaptation to new situations and for improving the dominant design of a system, while leaving the basis design intact. They provide strong steering, but are not deterministic*.'[323] A regime can be described as a semi-coherent set of 'rules'[324] that guides a network of actors and social groups, and which maintains and reproduces the system on a continuous basis.[325] In fact, there is a patchwork of regimes, each departing from a different direction (scientific, political, industrial, markets and user preferences, cultural, technological…) but, together, they have a common basis that makes the socio-technical system function. Importantly, in periods when there are changes in the trajectories of different actor groups, mismatches and tensions between the logics of actors take place. This process leads to disconnections ('cracks', tensions) that may open up 'windows of opportunities' during which a regime may undergo *'profound change'*.[326]

The landscape level refers to the *'technical, physical and material backdrop that sustains society'*.[327] It usually evolves slowly and contains deep cultural patterns, macro-political developments, natural circumstances and material environments. Examples are climate change and infrastructures. Occasionally, shocks may occur that bring about fast changes, such as wars and the economic crisis of 2008 et seq. The landscape is an exogenous dynamic that is supposed to be beyond the direct influence of regime and niche actors. Despite being an important source of pressure on regimes, landscape changes provide simultaneously opportunities for niche developments.[328]

The degree and manner of interaction between the three levels has been the reason for a continuous debate in literature. What is most important to understand, however, is that none of

---

[321] This simplified and idealistic description is based on literature recapitulations made in: E. Paredis, *A winding road. Transition management, policy change and the search for sustainable development* (PhD dissertation, Political Science Ghent University, 2012-2013), p. 21; and R. van der Brugge, *Transition dynamics in social-ecological systems. The case of Dutch water management* (PhD dissertation. Erasmus University Rotterdam, 2009), pp. 94-99. As a consequence, this section may detract from the original sources, a large proportion of which comes from the authors Geels and Schot (see e.g.: below). Nuances are hence not being taken into consideration in this thesis.

[322] Ibid., *A winding road. Transition management, policy change and the search for sustainable development,* p. 32.

[323] Ibid., p. 20.

[324] The term 'rules' should be broadly interpreted – it should not (only) be interpreted as *legal* rules: it consists of all elements that are dominant and make a regime work, e.g. rules, infrastructures, technologies, artefacts, institutions, actor networks and practices. Ibid., pp. 20 and 21. Originally, Schot and Geels did not include all of these elements, but various other authors (as mentioned by Paredis) broadened the scope of the terminology.

[325] Ibid., p. 19.

[326] Ibid., p. 20.

[327] F. Geels and J. Schot, 'Typology of sociotechnical transition pathways' (*Research policy*, 36, 2007), p. 403.

[328] E. Paredis, *A winding road. Transition management, policy change and the search for sustainable development* (PhD dissertation, Political Science Ghent University, 2012-2013), p. 21.

these levels function fully independently: all levels could potentially constrain, enable and help to interpret another.

An obvious follow-up that trails the basic explanation of a 'transition', as provided above, concerns the question of how to influence transitional changes. Again, several approaches have been suggested over the years, but all authors seem to agree that *'transitions cannot* [only] *be steered top-down by a central actor such as a government, nor will transitions spontaneously break through as a result of market forces.*'[329] Top-down, bottom-up and more fluid actions are thus required. For example, besides governmental interventions and market mechanisms, new policy networks in which a plurality of actors, including governmental authorities acting as 'regular' players, interacts to address problems may be a tool to influence transitions. Important to know is that transitional trajectories are full of uncertainties and cannot always be determined in advance. For example, policy goals can be adjusted along the way in function of the transitional approach or technological development goes into a surprising direction.

Transition Management is an established form of transition governance. A set of theoretical principles and practical instruments has been developed in that context, which can be used to direct a transition.[330]

Graphic 2: principles and instruments in transition management

Principles	Instruments
a. Creating space for innovation in niches or arenas: protected spaces are important for experimenting with radical novelties.	Transition arena
b. A focus on frontrunners: since incumbent regime actors will not be willing to fundamentally discuss the system and formulate radical alternatives, frontrunners from niches and regimes are essential to bring renewal.	Transition arena and competence analysis
c. Guided variation and selection: various innovative options are stimulated and kept open; selection only happens on the basis of learning.	Transition experiments and transition pathways
d. Radical change in incremental steps: immediate, radical change will lead to resistance and even backlash. Small, incremental steps give the system time to adapt to new circumstances and build new structures.	Envisioning for sustainable futures
e. Empowering niches: niches are in need of resources (knowledge, finance, competence, lobby mechanisms, exemption of rules, space for experimenting) to grow and compete with the regime.	Competence development
f. Learning-by-doing and doing-by-learning: practical experience informs theory and vice versa. This is to enhance social learning where the perspective of actors is reframed. In particular experiments are deemed useful for that.	Deepening, broadening and scaling up experiments
g. Anticipation and adaption: being attentive to future trends and possible seeds of change is important for the development of long-term strategies. This should be accompanied by adjusting when the structure of the system is changing.	Complex system analysis
h. Multi-level and multi-domain approach: understanding ongoing multi-level and multi-domain dynamics in the system is essential for being able to use them at the advantage of influencing transitions.	Multi-pattern and multi-level analysis

[329] Ibid., p. 24.

[330] The list is based on: D. Loorbach and J. Rotmans, 'Towards a better understanding of transitions and their governance: a systemic and reflexive approach', in: J. Grin, J. Rotmans and J. Schot (eds.), *Transition to Sustainable Development. New Directions in the Study of Long Term Transformative Change* (Routledge, 2010), pp. 144-147, with emphasis on p. 147.

Transition Management is presented as a governance model that provides a long-term orientation for regular policy, but which can only be successful when it is allowed a special position. The regular policy arena must therefore tolerate transition arenas to function in its shadow. In these settings, frontrunners should be able to openly discuss, cooperate, compete and think freely about desired directions.[331] Nevertheless, the transitional approach must not be a totally different sidetrack. Especially in the creative and envisioning phases, Transition Management benefits from some kind of protection in the regular policy. In this respect, the transition arena is basically *'a niche for (policy) innovations to mature and from there diffuse and can be used* [as] *a systemic-instrument to influence (or transitionize) ongoing policies.*'[332]

In conclusion, sustainability transitions deal with paradigm shifts in socio-technical systems. These systems consist of three interactive scale levels (niches, regime and landscape). The coordination between the levels is an important factor to sustain the system. However, when a transition is happening, the structures are loosened and new or better connections are being made. Particularly the interactions between the niche and the regime level are vitally important to transform the regimes in the system.

4.2 The transition towards a Circular Economy

Before explaining what is meant by 'the legal transition towards a Circular Economy' and which role the Better Regulation Programme plays in this transition, one first needs to understand that the road towards a Circular Economy is, indeed, a sustainability transition.

Based on the CE Package and the concepts and policies that are also significant for the Package, the Commission's interpretation of the Circular Economy transition principally relates to the socio-technical system of *materials*. Despite using words such as 'products', 'objects', 'chemicals', 'resources', 'waste' and 'materials' independently, they all lead to the broader term 'materials' in the end.[333] Materials cover both natural and man-made materials, and include substances from both living and non-living organisms.[334]

Note, moreover, that the materials system only concerns the materials which are used in human-made and human-used things. The symptoms associated with the materials system are amongst others the alleged resource scarcity, increasing material use and chemical impacts on the environment and human health. These and more have already been put forward in Chapter 1.1. Current user practices, life-styles, consumption patterns, production technologies and processes, value chains, business models, power relations, organizational and institutional structures, policies and the use of *legal rules* are examples of the causes of such symptoms.

The role of law in the Circular Economy transition is discussed in more detail below. Additionally, because the CE Package is the result of the Better Regulation Programme, which fits the transitional approach as well, an explanation of the BPR programme is provided next.

---

[331] Supra note 328, p. 33.

[332] D. Loorbach, *Transition Management. New mode of governance for sustainable development* (PhD dissertation, Erasmus University Rotterdam, 2007), pp. 85 and 86.

[333] A material can be described as: '… *the substance*[s] *of which a thing is made or composed. This term comprises raw materials (e.g. minerals, biomass) as well as materials processed by humans, by physical or chemical processes. Materials can be distinguished between biotic and abiotic; biotic materials are any materials coming from living organisms: forests, waterborne environment (seas, rivers, lakes), and terrestrial/soil and their products (animals, plants, etc). Abiotic materials, can thus be defined as materials from non-living organisms*' (emphasis added). BIO Intelligence Service, Fraunhofer IZM and Wuppertal Institute, *Material-efficiency Ecodesign Report and Module to the Methodology for the Ecodesign of Energy-related Products (MEErP) - Part 1: Material Efficiency for Ecodesign* (BIO Intelligence Service, 2013), p. 10. There are many more definitions of materials available, also of the other terms used in the 'material sphere'. While some of them are defined in EU policy measures, there is no legally binding definition for 'material' under EU law.

[334] Despite the prime focus on the materials system, other highly interconnected socio-technical systems are touched upon, too, such as the systems for energy, water and food. The Circular Economy transition is therefore by no means a mere 'materials transition'. The fact that the Commission does not ignore or challenge that these other sustainability transitions are in some way interlinked to the Circular Economy transition can, for example, be understood from the special attention which is being paid to food waste and energy generation from wastes.

4.2.1 The legal transition: from one regime to another

Even though law plays an important role in guiding the direction of sustainability transitions, the relationship between transitions and the use of law is generally only briefly touched upon in literature, if mentioned at all. It is not the intention of this research to fill this research gap – that goes beyond the scope of this thesis. This section rather tries two other things. The first goal is to signal a number of connections between on the one hand the transitional approach and, on the other hand, the EU regulatory terminology. This would contribute to a better understanding of the regulatory transformation, which is needed for the establishment of a Circular Economy, or, in other words, of *the legal transition towards a Circular Economy*. The second goal of this section is to frame the CE Package in the legal transition towards a Circular Economy. Below, the MLP approach is used to further discuss both goals. This is done in chorus and in order of the functional scale levels (i.e. the landscape, regime and niche level). Reference is further made to the principles and instruments laid down in *Graphic 2*.[335]

The landscape level in the Circular Economy transition has already been exhaustively described in Chapter 1.1 on the trends and pressures – global market conjuncture and globalization in general being only two of them. From a legal point of view, the landscape level can be described in a different way. Like other international organizations (e.g. the UN and the OECD) and their founding/complementary conventions, and even entire legal frameworks that derive from these organizations, the World Trade Organization operates on a political and economic macro-level and should therefore also be considered a landscape factor that puts pressure on the EU regime. The CE Package highlights that EU action on the Circular Economy, both internally and externally, is essential for the implementation of global commitments taken by de EU and its Member States individually.[336] In EU legal terms, these international conventions are sources of EU supplementary law: the CJEU considers them as well when developing its case law. Furthermore, instable economies, wars and environmental accidents across the globe influence the availability and reachability of certain materials. These 'landscape shocks' may put pressure on EU legislation. The CE Package particularly highlights the impacts of these globally occurring shocks on certain materials ('critical raw materials').[337] In addition to that, slowly emerging global impacts, such as climate change, may also impact EU law. Some of these impacts are addressed through international treaties. In terms of MLP, these landscape factors may stimulate niche developments and can initiate a regime transformation top-down.

The regime level of the Circular Economy transition consists of a patchwork of regimes that interact: one of which is the *EU regulatory regime*. The subject-matter of this dissertation concerns first and foremost this regime.[338] According to the MLP terminology, there are 'rules' between the regimes: i.e. the coordination and structuration of human activities. These rules are sometimes linked to formal rules, such as the rules in the TFEU, the EFD, the WFD and REACH.[339] Clearly, the EU regulatory regime plays a fundamental role at regime level: the EU regulatory regime has a dual meaning in the sense that it not only functions as a stand-alone regime, but it also functions as the law-based links *between* the regimes and *within* the other regimes.

---

[335] See Chapter 4.1.

[336] CE Action Plan, pp. 3 and 20.

[337] Ibid., pp. 15-16.

[338] Another regime which is closely related is the one for policy. Other regimes in the materials system are, amongst others, the ones for socio-cultural activities, industry and economic activity, engineering, innovation and research.

[339] The formal rules are also called the 'regulatory dimension of rules'. This pillar of the three dimensions distinguished refers to *'explicit, formal rules, which constrain behaviour and regulate interactions, e.g. government regulations which structure the economic process. It is about rewards and punishments backed up with sanctions (e.g. police, courts).*' The other two dimensions are the normative and the cognitive rules. See for further deliberation on the different 'dimensions' of rules: F.W. Geels, 'From sectoral systems of innovation to socio-technical systems Insights about dynamics and change from sociology and institutional theory' (*Research Policy*, 33, 2004), pp. 904-905.

The EU has two roles in the legal transition. On the one hand, the government fulfills under the MLP approach an active role in transition management, but not so much as the 'top-down commander' only. Instead, it also facilitates processes, encourages actors to participate, is an intermediary between actors and different policy processes, and creates favourable conditions for transition management processes. Note that the government is also one of the actors participating in these processes and has to make clear its visions and agendas for a particular domain.[340] On the other hand, governments are more than just 'partners', because *they* are the ones that prepare, adopt, implement and enforce legislation and therefore occupy a distinguished position at regime level. The creation of favourable conditions for transition management processes is precisely what the government ought to do, *inter alia* by using law. Following the MLP approach, changes in the trajectories of the actors involved and in the interactions between the different regimes can cause mismatches and tensions. These disconnections might nevertheless sometimes open up windows of opportunity during which the regulatory regime may undergo profound change. Regime change can most certainly also be fired up and sparked off by niche developments.

The regime and niche level have a symbiotic relationship.[341] Creating space for niches development and their eventual empowerment can be safeguarded *in* legislation (points a and e of *Graphic 2*). For example, the CE Package proposes: to create new and use existing (digital) platforms; to identify and share BATs, Best Available Technique Reference Documents (BREFs) and other best practices; and to gather and exchange other kinds of reliable and accurate information and data. Additionally, the Commission attaches considerable importance to the roles of the EU as investment facilitator and provider in (new, niche) businesses in favour of the Circular Economy, amongst others through financing demonstration projects. The existing EU investment policy, which is featured throughout the CE Package as an important lever, ties in with the Commission's great emphasis on research and development (R&D) and innovation, for example in the search for new materials and technologies. On the whole, besides the actual actions proposed, the CE Package repeatedly states that the Commission will investigate the possibility for further action on these issues in the future. Notably, it explicitly states that the Commission will explore *'a pilot approach to help innovators facing regulatory obstacles* [for the empowerment of niches] *(e.g. ambiguous legal provisions), by setting up agreements with stakeholders and public authorities ('innovation deals').*'[342] It should not come as a surprise that many of these (vaguely expressed) plans are put forward in the sections in the CE Package dedicated to the horizontal enabling framework.[343] These sections show the viewpoint of the Commission that the Circular Economy needs a multi-domain approach (point h of *Graphic 2*).

At niche level, a variety of actors are involved in the Circular Economy on a multitude of levels and domains (points b and h of *Graphic 2*). They could bring renewal to the regimes. The Commission stresses right at the beginning of the CE Package that economic actors, such as big companies, SMEs and consumers, are key in driving the transition.[344] Initiatives from amongst others citizens, industry, a particular company, universities, NGOs, a particular person in one of these institutions (e.g. chief executive director, PhD student or a volunteer) … in the area of societal values and behaviour, concept thinking, technological development, business models … are potentially important stimuli for changing EU environmental legislation. These innovators can develop and propose radical changes for certain legal requirements. Developments like these can

[340] E. Paredis, *A winding road. Transition management, policy change and the search for sustainable development* (PhD dissertation, Political Science Ghent University, 2012-2013), p. 28.

[341] The boundaries between the regime and niche level is not always clear-cut. Just two questions that can be raised in that respect: when should a niche initiative (e.g. a proposition to change a particular legal obligation for the industry) be scaled-up to an element of the new regime (e.g. a new provision in a Directive)? And who gets the credits of the spaces *created for* innovation in niches and arenas but initially or partly *facilitated by* regime actors on the transformation of the regime (see e.g.: point a in *Graphic 2*)? It is ambiguous where to draw the line between the regime and niche level, as they are so intertwined with each other.

[342] CE Action Plan, p. 18.

[343] See e.g.: Chapter 1.2.2.

[344] CE Action Plan, pp. 2 and 19.

moreover also be initiated by regime actors themselves. Member States and EU Institutions can be frontrunners, too. The launch of the CE Package(s) by (several DGs of) the European Commission could thus in itself also be seen as some sort of a niche initiative, amongst others because it still needs to be formally adopted by the Council and EP.[345] Pioneers such as – one could argue – the Commission can benefit from their existing roles within the regulatory regime as well as in other regimes.

In line of this, the Circular Economy transition is first and foremost an ongoing development. While this process can indeed be based on the environmental foundations in EU primary law on existing EU environmental policies, one should bear in mind that it is at least equally important that the changes made to EU legislation derive from a political mandate provided to the EU decision-makers. Consequently, the next European Commission regime could stay on the current path or could change its course, just as the current Commission regime did when it adopted the CE Package in 2015. From a transitional perspective, this freedom should be embraced because regulatory regimes should be changeable to respond to new scientific discoveries, technological insights, business models, grass roots movements, conceptual interpretations and policy priorities that come along the way of a transition. Indeed, new windows of opportunities could arise, which could not have been predicted and therefore could not have been anticipated by the regulator.

At first glance, the paradoxical relation between the transitional approach and law can be quite challenging: enabling and embedding niche developments in the EU regulatory regime contrasts with several basic characteristics of law. While the Circular Economy transition aims at replacing (large parts of the) the conventional EU regulatory regime by means of the interactions between regimes and niche developments (in a way, transitions thus thrive on uncertainties), law itself is to facilitate stability and predictability, and thus to create durable trust, amongst others for economic operators. Moreover, the smooth anticipation/adaptation in/of law is not always self-evident (this is nonetheless required in point g of *Graphic 2*). Having said that, the reconciliation of the rhetoric of transition management with law can however be defended by the slow process which is (also) required transform the regime: that is by incrementally changing legislation (point d in *Graphic 2*). For example, on an instrumental level, the CE Package proposes the implementation of progressively increasing recycling targets. On a more general level, for example, this is done through the launch of the CE Package in and of itself: the CE Package can be seen as one of the incremental steps in the Circular Economy transition, as all proposed actions ought to be carried out before 2020.[346] Along its course, the transition therefore requires amongst other initiatives more of this kind of Communications to come to the ultimate goal, a well-working Circular Economy, which is aimed for only in 2050. These incremental strategic levers

[345] Only recently, the CE Package trilogue negotiations between the Commission, the Council and the (representatives of the) EP has resulted in a provisional (political!) agreement on the final version of legislative proposals for the four EU waste laws, which were initially proposed by the Commission in the 2015 CE Package. See: http://www.consilium.europa.eu/en/press/press-releases/2017/12/18/council-and-parliament-reach-provisional-agreement-on-new-eu-waste-rules/ and http://www.consilium.europa.eu/en/press/press-releases/2017/12/18/council-and-parliament-reach-provisional-agreement-on-new-eu-waste-rules/ (consulted on 29 January 2018). The agreement is a compromise. For example, the Council managed to lower the proposed preparing for reuse and recycling target for municipal waste of at least 65% by 2030 to 60% by 2030. This is also lower than the EP's proposal to raise the bar up to 70%. As a compromise, however, the Institutions agreed a new target of 65% for 2035. Additionally, another target will be introduced of 55% by 2025, which would increase the current target of 50% by 2020. This information is extracted from a variety of news websites. It is not yet possible to attain the final text, because it is still to be finalized. Once that is done, the EP's Environment committee must approve the text. The first time the full agreed text will become available to the public is a few days ahead of the Environment committee vote, via the website of the EP. The EP must then vote in plenary. Once that step is completed, the provisional agreement will be put on the agenda of one of the Council meetings. The Council will then vote on the legislative proposals' adoption, which constitutes the final step in the process. After this, the final text will be published.

[346] Several times, however, reference is made to other deadlines, such as the internationally agreed Sustainable Development Goals (SDGs) which are set for 2030.

create some degree of flexibility in legislation while at the same time reflect the final long-term goal: the creation of a Circular Economy.

In the end, the transition towards a Circular Economy is about the interaction between the three levels (landscape, regime and niche). Law plays an enabling role in and between each of them – it is a common denominator that originates from a stand-alone regime: the EU regulatory regime. With regard to the interactions between the levels: this is exactly what is being studied in this dissertation, i.e. the interface between on the one hand the existing EU regulatory regime regulating the materials system that arguably maintains or stimulates the unsustainable use of materials,[347] and on the other hand the long-term goal to achieve a new regulatory regime that reflects the Circular Economy values through the shorter-term actions. The 'legal obstacles' that are the backbone of the second research question are the frictions between the current EU regulatory regime and the one projected for the future. The CE Package acts as a reference point, because there the Commission already identifies certain obstacles and sets out the actions to address them.

4.2.2 An enabling policy for the legal transition: the Better Regulation Programme

The legal transition towards a Circular Economy in the EU not only relies on the CE Package and on the other environmental policies laying the foundation for the Package.[348] While these policy documents are highly significant for knowing the Commission's vision on the bottlenecks in the EU regulatory regime, one does not clearly know from the texts *how* the European Commission has come to these conclusions. If one aims to fully understand this, one has to look how most of the proposed changes came about.

This is done through the so-called 'Better Regulation Programme' (BRP), which is a policy programme for making regulation better. Indeed, this is also the general aim in the Circular Economy transition: moving from one regulatory regime to a better, more circular one. The preparation of both the 2014 and the 2015 CE Package had in fact been based on the BRP. In addition to that, the CE Package itself clearly states that the proposed legal actions '*will* [also] *be taken forward in line with Better Regulation principles, and subject to appropriate consultation and impact assessment*.'[349] Accordingly, the BRP is highly relevant for the Circular Economy transition. What 'better regulation' means and how it exactly affects the legal transition towards a Circular Economy is explained below.

As stated above, the BRP sets out how regulation could be made qualitatively better. Besides the 2015 Communication on better regulation for better results,[350] the Programme includes a Guideline for its staff, the so-called 'Toolbox and the Regulatory Fitness and Performance Programme' (REFIT) and other related documents.[351] The Juncker Commission even has its own

[347] See the trends and pressures put forward in Chapter 1.1.

[348] EU primary law can also be seen as one of the building blocks of the Circular Economy transition. See in that regard Chapter 2.2.

[349] CE Action Plan, p. 3. The 7th EAP, too, refers to these better regulation principles (they were then called 'the principles of smart regulation', which was in accordance with the terminology used in: European Commission, Communication Smart Regulation in the European Union, COM(2010) 543). Article 2(4) states that *all* measures, actions and targets set out in the 7th EAP '*shall be proposed and implemented in accordance with the principles of smart regulation and, where appropriate, subject to a comprehensive impact assessment.'*

[350] European Commission, *Better regulation for better results - An EU agenda*, COM(2015) 215. The EU programme runs parallel to the OECD BRP.

[351] European Commission, *Better Regulation Guidelines*, SWD(2015) 111; European Commission, *Better Regulation Toolbox*, available on the website of the Commissionhttp://ec.europa.eu/smart-regulation/guidelines/docs/br_toolbox_en.pdf (consulted on 22 December 2017); European Commission, *Regulatory Fitness and Performance Programme (REFIT): State of Play and Outlook*, SWD(2015) 110, respectively. For the full array of BRP documents, see the Commission's website https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how_en (consulted 22 December 2017). Most of these policies build upon previous versions adopted, starting by the Prodi Commission. Examples of previous policies regarding the BRP: European Commission, *European Governance – a White Paper* [2001] OJ C287/1; European Commission, *Action plan "Simplifying and improving*

Better Regulation Commissioner, Timmermans, who also serves as the First Vice-president of the Commission. An important position, so it seems, particularly – and probably because of that very reason created in the first place – in the light of the current debate on the balance of power between the EU and its Member States (e.g. regarding the subsidiarity and proportionally principles). The Commission has repeatedly used the catchphrase 'big on big things, small on small things' to capture these concerns. The question is how to interpret this.[352] The BRP guideline document describes 'better regulation' as:

> *designing EU policies and laws so that they achieve their objectives at minimum cost* [and deliver maximum benefits to citizens, businesses and workers while avoiding all unnecessary regulatory burdens. This is key to support growth and job creation – allowing the EU to ensure its competitiveness in the global economy - while maintaining social and environmental sustainability][353]. *Better Regulation is not about regulating or deregulating. It is a way of working to ensure that political decisions are prepared in an open, transparent manner, informed by the best available evidence and backed by the comprehensive involvement of stakeholders. This is necessary to ensure that the Union's interventions respect the overarching principles of subsidiary and proportionality i.e. acting only where necessary and in a way that does not go beyond what is needed to resolve the problem*.[354]

'Better regulation' thus targets the presumed disproportionate legislation in the EU regulatory regime. Examples in that respect are: legal provisions that do not achieve the goals that lay at their foundation in the first place; too many administrative burdens for industry, such as SMEs; and any overrigid conformity to such rules. In addition, legislation can also limit the market entrance or application through certain requirements or restrictions, which forces the companies to continue their business as usual and to stop their initiatives with potential for sustainability issues. Legislation can thus be deemed redundant, ineffective or too bureaucratic, because it deprives innovators of resources and time that would otherwise be devoted to other activities.

The BRP covers the entire policy cycle: policy design and preparation, adoption; implementation (transposition, complementary non-regulatory actions), application (including enforcement), evaluation and revision. Impact assessments[355] and fitness checks[356] are examples

---

the regulatory environment", COM(2002) 278; European Commission, *Better regulation for growth and jobs*, COM(2005) 97; the brochure on Better Regulation EC, *Better Regulation — simply explained*, 2006.

[352] Concerns can be raised on the risk that the use of the BRP is too arbitrarily (a political choice), as the catchphrase does not provide any guidance in selecting *which* topics are being considered 'big' or 'small' in the eyes of the Commission and other EU Institutions. What if environmental protection is considered a small thing in comparison to other objectives, e.g. economic growth, competition and job growth? Plainly, 'the environment' cannot raise its voice in the law-making procedure and in identifying violations in legal compliance, and therefore generally relies on environmental organizations. Moreover, environmental issues are often difficult to put on the political agenda, let alone in times of an economic and financial crisis, or when the balance of powers between the Union and its Member States is put to the test. The discontinuity of environmental legislation and its watering down may potentially be the result of 'better regulation'. In fact, these issues had often been raised by societal actors when the Junker Commission withdrew the 2014 CE Package. The Commission denies these allegations by expressly stating that 'better regulation' is not about the question whether more or less EU legislation is required, nor is it about deregulating per se or deprioritizing certain policy fields. See e.g.: supra note 350, p. 4.

[353] European Commission, *Better Regulation Guidelines*, SWD(2015) 111, p. 4. To avoid misinterpretation, this dissertation sticks to the terminology and the procedures put forward in the Better Regulation Package of 2015 – not to its previous policies.

[354] Ibid., p. 5.

[355] An impact assessment must '*identify and describe the problem to be tackled, establish objectives, formulate policy options and assess the impacts of these options*.' According to the Commission, its impact assessment system follows *'an integrated approach that assesses the environmental, social and economic impacts of a range of policy options thereby mainstreaming sustainability into Union policy making.*' Ibid., p. 9.

[356] A 'fitness check' is a comprehensive evaluation of a policy area. It usually addresses how several related legislative measures have contributed (or not) to the attainment of policy objectives. According to the Guidance, these checks are particularly well-suited to identify overlaps, inconsistencies synergies and the cumulative impacts of regulation. Ibid.,p. 8.

of ways to realize better regulation (or the *best* regulation possible)[357]. Hence, their procedures could either be retrospective or predictive. Additionally, the use of roadmaps, which explain what the European Commission is considering and which was also used for the preparation of the CE Package, is seen as an important tool in the planning process. Public consultation is also key to the procedures, as stakeholders and other actors provide feedback. The Commission is able to spot the potential obstacles of a legal measure easier and right at the beginning, in the course of its drafting or after its implementation. Put differently, it may provide first-hand and relatively cheaply enquired information (e.g. required through niche developments) on how to change exiting legislation (i.e. the contemporary regulatory regime), *inter alia* because the gathered information could potentially put the whole matter in a completely new perspective: the newly adopted and continuously developing Circular Economy perspective. In addition, the formalization of consulting the public (industries, citizens, administrations, NGOs, research institutes…) enhances public engagement to the Circular Economy, including the changes made to legislation in view of the Circular Economy, and their mobilization. These BRP aspects are really important for the Circular Economy transition and have been utilized in the CE Package.[358]

In general but most certainly in the case of currently occurring trends and pressures concerning the material system, legislation must keep pace with evolving political, environmental, economic, societal and technological developments. The European Commission has a key role in this respect, as it is given the right to initiate new legislation and it has the responsibility to ensure the correct application of EU law. The BRP prescribes that EU action must therefore lead to a *simple, clear* and *predictable* regulatory regime for businesses and citizens that is still valuable when *problems evolve, new solutions emerge* and *political priorities change*.[359] This challenging balancing act is precisely what has been signalled as a potential area of concern, i.e. the reconciling of the transitional approach with the very nature of law. Generally speaking, the BRP could therefore be a useful approach in the Circular Economy transition, as, ideally, it takes into account both legal certainty as well as flexibility for niche and regime developments. Moreover, better regulation also aims at a coherent policy framework, which is an essential element in life-cycle thinking

As stated above, the BRP builds on previous policy documents, introduced by previous Colleges of Commissioners. Various EU measures, including environmental laws, have consequently already been scrutinized by some kind of BRP procedure. Examples are the amendments made to the EFD and the adoption of REACH. Ironically, even though the BRP assessments showed the opportunities for business and job growth while protecting the environment and human health if the 2014 CE Package would have been adopted, the Juncker Commission axed the Package in December 2014.[360] The next few years, the Commission will

[357] Ibid., p. 5.

[358] See on this matter also: T. de Römph, 'Pressing Forward – Developments in the Transition Towards Sustainable Materials Management in EU Environmental Law' in: V. Mauerhofer (eds.), *Legal Aspects of Sustainable Development: Horizontal and Sectorial Policy Issues* (Springer International Publishing, 2015), p. 517. Note that this contribution addressed the 2014 CE Package – not the 2015 version.

[359] Supra note 353, p. 4.

[360] Several leading academic environmental lawyers have expressed several arguments that question the use of the BRP as a basis to withraw the 2014 CE Package. They argued in their 'Letter of Concern' that since the Circular Economy is one of the key objectives of the 7th EAP, which is a *legally binding* Decision adopted by the EP and Council, the Commission must take action on this topic (Avosetta Group: A. Aragao, G. Bándi, A. Epiney, O. K. Fauchald, N. H. Fournerau, B. Iwanska, J. Jendroska, R. Knez, L. Krämer, L. Lavrysen, R. Macrory, M. Montini, L. Ofak, N. de Sadeleer, A. García Ureta, H. Veinla and G. Winter, *The true face of Better Regulation regarding environmental policy*, 10 (University of Oslo Faculty of Law Research Paper, 2015), pp. 2-3. However, although the 7th EAP sets out the legally binding policy goals of becoming a Circular Economy, it does not state any specific period. Consequently, if the Commission, under the guise of the BRP, promises to deliver a 'more ambitious' – whatever that may be – CE Package at the end of 2015, it will adhere to the Decision. The same argument can be brought forward regarding the claim that the Better Regulation Agenda cannot 'overrule' the environmental provisions in the Treaties, as they include environmental objectives and principles that occupy a higher place in the hierarchy of EU norms. Hence, according to the Letter of Concern,

apply the better regulation principles to a lot of EU measures to see where there is potential for changing EU legislation in view of the Circular Economy transition. The legislative proposals under the 2015 CE Package are in any case already the result of a long period of drafting roadmaps, performing assessments, consulting, carrying out public consultations[361]… so as to enhance the simplicity, predictability and coherency of EU waste law, and to reduce costs and efforts for all parties in the waste sector while protecting the environment and human health.

In sum, the BRP is perfectly in line with theory of sustainability transitions and is an influential tool in the legal transition towards a Circular Economy. In point of fact, many EU secondary measures were adopted and adapted in the past years after having been scrutinized by the BRP. Most importantly, the 2015 CE Package had also been the result of the BRP and refers to it repeatedly as the chief method for aligning EU secondary legislation with the Circular Economy concept in the next few years. This means, therefore, that the CE Package also heavily relies on the Programme when the selected key laws are examined in the context of answering the second research question. Despite the importance of the BRP for the development of the key laws and for the Circular Economy in general, this research adopts a different approach.

4.3 Regime change at EU level: the potential for the key laws

4.3.1 Justification for the use of case studies

Establishing a new regulatory regime for the materials system is one of the main challenges faced by the EU. The second research question of this dissertation is raised in view of contributing to this challenge on a more substantive level. To address the question, a case study approach is adopted. The main reason for a case study approach is the complexity and comprehensiveness of the legal transition towards a Circular Economy.

A legal study on the regime change is complex and comprehensive for many reasons, not least by the many EU legal acts that are relevant to the Circular Economy. Moreover, their variety is endless. For particular life-cycle stages or parts thereof, there are Regulations, Directives and Decisions. On top of that, they could address particular sectors, particular materials or materials which are only used in particular products. Furthermore, the legal basis and the policy roots of the laws vary as well.[362] With that in mind, it is not sufficient to either address the entire regulatory regime for the Circular Economy or to resort to one legal field or one legal act. In the case of the latter, this would mean that only one particular life-cycle stage, sector, product or material is addressed. This is why each key law identified earlier is addressed separately in a case study: these framework laws represent a life-cycle stage of the material life-cycle. Building on this, the legal obstacles to the transition towards a Circular Economy should be found in the key legislation.

Practically speaking, a study on *all* possible obstacles in place would be too broad. Consequently, one cannot but zoom in on certain issues. For each law, I selected a pressing issue based on life-cycle thinking and translated it into an objective for the case study in question. Subsequently, several obstacles can be identified when implementing the objectives, resulting in the formulation of several improvements that can be made to the CE Package to address the

---

the BRP procedures (which are mainly *administrative* practices) cannot prevail over Treaty law. According to the authors of the Letter, the fact that the 7th EAP is a legally binding Decision is even more apparent when you take into account a democratic point of view: the Commission should not be able to depart so easily and so significantly from the EU legislator's policy goals, as communicated in the EAP (pp. 2-3). The 7th EAP, however, not only refers to a Circular Economy, it also that all measures, actions and targets set out in the 7th EAP shall be proposed and implemented '*in accordance with the principles of smart regulation and, where appropriate, subject to a comprehensive impact assessment'* (Article 2(4)).

[361] European Commission, *Consultation on the Review of the European Waste Management Targets*, which ran from 4 June 2013 to 10 September 2013, see the website of the Commission, http://ec.europa.eu/environment/consultations/waste_targets_en.htm (consulted on 22 December 2017).

[362] See Chapter 2.2.

obstacles.[363] It must moreover be stressed that because each key law is unique and so are the corresponding objectives, tailored research designs are required for each case study (which are provided in the subsequent sections below).

Importantly, since there would still be a risk that the research becomes too broad when the obstacles are analyzed basing oneself on *all* materials, each case study will be restricted to only one material in the sections where the clarity of the case study would benefit from it.[364] Naturally, an important aspect of the selection of materials is the connection between the key law and the objective for the case study. The choice of materials is furthermore largely based on variation. Variety is significant because it would make stronger arguments if the case studies complement each other or, alternatively, if they contradict each other. In this way, different perspectives are provoked. For example, variation could be encouraged by choosing the materials based on their different characteristics, such as the renewability of resources or the recoverability of waste materials.

Of course, the key laws in combination with the selected materials represent by no means a complete coverage of the obstructions the Circular Economy transition in EU environmental law to. There are a lot of other legal issues that are relevant to the legal transition but which will remain unaddressed in this research. Examples are environmental liability, intellectual property rights and the regulation of services. One could indeed argue that even though the case study approach is necessary to conduct a time-framed and delineated study, at the same time it is a limitation to the research, as, ideally, the research's results should be relevant to the entire regulatory regime for the Circular Economy. The use of case studies is therefore particularly meaningful if they will nonetheless generate results that are to some extent generic, and will therefore contribute to the legal CE transition as a whole.

Against this background, the remainder of this Chapter is divided in different sections, each providing for a research design for one particular case study. They are organized in a systematic way, namely in order of the life-cycle of a material (starting with the product stage, which takes the EFD as the reference law, et cetera). Each section contains, firstly, the motives for choosing the case study and, secondly, the methodology that will be used.

4.3.2 Ecodesign Framework Directive: extending the scope + wooden products

The legal field regulating the product stage in the life-cycle of a material, which in this dissertation includes both the manufacturing of products and their use until they become waste,[365] contains many laws that are relevant to the Circular Economy, some more clearly than others. For example, there are laws on the limitation of emissions by large-scale installations, product safety, energy labelling, ecolabelling, green public procurement and consumer protection. A large part of the CE Package concerning the product stage is however dedicated to the EFD.[366] The Commission will study the possibilities for better implementing aspects relating to the Circular Economy into the Ecodesign framework. This is also one of the aims of Chapter 5. What exactly will be studied in Chapter 5 and why is clarified below. The methodology used in the Chapter is explained next.

---

[363] Evaluating the effectiveness of the entire regulatory regime is not an appropriate method in present case, because 'effective' means that something serves it purpose or produces the intended result. In other words, the purpose of measuring the 'effectiveness' of a law (or group of laws) is to see how successful they are in solving the problems *they were designed to address*. In the case of EU legal acts regulating materials, this would not be an appropriate method, because each law has its own objective, which is not necessarily directly linked to the Circular Economy philosophy.

[364] For the sake of clarity it is assumed in the case studies that the products and wastes that are addressed only consist of one type of material. However, products are usually made from more than one material and particularly post-user waste streams contain a variety of materials. The case studies do not therefore properly reflect reality in every situation.

[365] This approach is different from the one adopted in the CE Package.

[366] Its aim, scope and main instruments have already been put forward in Chapters 3.1.2 and 3.1.3. The 2014 CE Package also listed it as one of the three priority laws in the Circular Economy transition.

Motives

So far, the Implementing Measures accompanying the EFD have predominantly been focusing on energy savings during the use-stage.[367] This approach can be clarified by the scope of the current Directive and of its predecessor: the scope has been broadened from energy-using products (EuPs) in the first Ecodesign Directive to energy-related products (ErPs) in the EFD, which is currently in force.[368] Although this framework targets more products than before, it is still largely focused on *energy-efficiency* during *the use* of *electronic devices*, because, amongst others, that is easiest to achieve.[369] Thus far, the Ecodesign framework does not deliver what was initially expected in terms of sustainable material use.[370] While the current focal point can be historically and practically justified, the Circular Economy paradigm requires a different approach: it can be argued that, ultimately, the *non-energy related impacts* occurring throughout the *entire life-cycle* of ErPs should ideally be addressed in product design. This is why the European Commission will study the possibilities of better implementing material-related aspects into future and existing Ecodesign Implementing Measures, as announced in the CE Package.

Echoing the 2015 CE Package, the Third Working Plan stresses that there is an increasing need and political priority to improve the material-related aspects in product design.[371] It sets out how ecodesign contributes better to Circular Economy objectives. The (illustrative) matters identified are:

> *durability (e.g. minimum lifetime of products or critical components), reparability (e.g. availability of spare parts and repair manuals, design for repair), upgradeability, design for disassembly (e.g. easy removal of certain components), information (e.g. marking of plastic parts) and ease of reuse and recycling (e.g. avoiding incompatible plastics)… and to further establish the scientific basis for developing corresponding criteria that meet the requirements of the Ecodesign* [Framework] *Directive.*[372]

To streamline this development, the Commission will develop a 'Circular Economy toolbox', which may provide for concrete examples of how the material-related aspects could be taken up in the Implementing Measures.[373] In view of that, the Working Plan 2016-2019 also highlights that the methodological basis for a more systematic adoption of such requirements needs to be

---

[367] See besides the CE Package also e.g.: Ecofys *et al.*, *Evaluation of the Energy Labelling Directive and specific aspects of the Ecodesign Directive* (Ecofys Netherlands B.V., 2014), p. 30.

[368] After the adoption of the 2009 EFD, the framework has been further refined to attain some of these goals (albeit not directly linked to the Circular Economy). Most of the developments were initiated by so-called Working Plans, which are policy programmes established by the Commission, consistent with Article 16 EFD. The Working Plans 2009-2011 and 2012-2014 both tried to put additional weight on the non-energy-related requirements in the Ecodesign framework (European Commission, *Establishment of the working plan for 2009-2011 under the Ecodesign Directive*, COM(2008) 660; European Commission, *Establishment of the Working Plan 2012-2014 under the Ecodesign Directive*, SWD(2012) 434). Despite these efforts, the Ecodesign framework is still in need of stronger emphasis on non-energy considerations throughout the entire product life-cycle. It is therefore no surprise to find direct references to the 2015 CE Package and to the Circular Economy transition in general in the latest version, 2016-2019 Third Working Plan (European Commission, *Ecodesign Working Plan 2016-2019*, COM(2016) 773, see e.g.: p. 2). The Third Working Plan is largely based the vision set forth in the CE Package.

[369] The Commission states that the Ecodesign framework in combination with the energy labelling framework has been one of the most effective EU policy instruments to promote energy-efficiency. It is estimated that it contributes around half of the energy savings target for 2020. Ibid., *Ecodesign Working Plan 2016-2019*, p. 2. It is however difficult to determine whether the Ecodesign framework has contributed to the stimulation of innovation in the products addressed. This is because the patent statistics do not confirm it and firms do not strongly attribute their innovations to the framework. Nonetheless, it is clear that the Ecodesign Implementing Measures are one of the main drivers for innovation. Supra note 367, p. 187.

[370] See also: e.g. A. Remmen, R.D. Andersen and C. Dalhammer, *Expanding the Scope of the EuP Directive* (Norden, 2011), p. 61. Note that the publication was published in 2011.

[371] See e.g.: one of the preparatory documents to the Working Plan: Ecofys *et al.*, *Evaluation of the Energy Labelling Directive and specific aspects of the Ecodesign Directive* (Ecofys Netherlands B.V., 2014), pp. 31-32.

[372] European Commission, *Ecodesign Working Plan 2016-2019*, COM(2016) 773, pp. 8-9.

[373] Ibid., p. 9.

improved, and that, to this end, a standardization request to the European Standardization Organizations has been adopted.[374]

The European Commission is not the only EU Institution aiming for the inclusion of more and better Circular Economy requirements in the Ecodesign Implementing Measures. Following up on the Commission's CE Package, the Council adopted its conclusions on the CE Action Plan in June 2016. The Council urges the Commission to include appropriate measures to improve Circular Economy aspects in the Implementing Measures, and other legislation as appropriate, before 2020.[375]

Along with the growing desire to put more emphasis on material-related issues in ecodesign, another frail but constructive tendency can be observed in EU policy: the growing concern on the way we use materials further triggered discussion on the justification of yet another enlargement in scope of the EFD. After all, the EFD is a *framework* Directive and concrete and enforceable product requirements are still lacking.[376] It seems like a logical follow-up when one considers the developments in the past few years: from energy-using products to energy-related products… to non-energy-related products? Pushing only a small share of all designers and manufacturers to produce products consuming less energy could be relatively easy accomplished, and could moreover be delivered in a short period of time.[377] At some point, however, the efficiency gains may become exhausted or the potentials may become negligible. Indeed, electronics are highly symbolic for the European Commission and probably raised a lot of awareness to more sustainable product design in the past, but the question is whether it would not make more sense to look *beyond* those ErPs, and to see how the negative environmental impacts of *all* products can be reduced through ecodesign. In fact, it has been estimated that extending the scope of the EFD to cover all product groups could potentially have twice as much environmental impact than is presently the case.[378] Additionally, it has been estimated that more than 80% of the environmental impact of a product is determined at the design stage – so including material-related impacts.[379] While incrementally including more ErPs into the Ecodesign framework is, of course, valuable to the Circular Economy transition, the broadening of the Directive's scope also fits the transitional approach required for the Circular Economy, because it would most likely have a sweeping impact on how products are designed and on the EU product policy framework in general.

Generally speaking, however, there is a lot of skepticism regarding the expansion of scope. Up till 2012, the Commission had not felt the urge to seriously think about it,[380] even though the

---

[374] Ibid. The scope of this request mainly covers: the extension of product life-time; the ability to reuse components or to recycle materials from waste; and the use of reused components and/or recycled materials in products. See for the request: European Commission, *Decision of 17.12.2015 on a standardization request to the European standardisation organisations as regards ecodesign requirements on material efficiency aspects for energy-related products in support of the implementation of Directive 2009/125/EC of the European Parliament and of the Council*, C(2015) 9096.

[375] European Council, *Council conclusions on the EU action plan for the circular economy*, press release 367/16.

[376] The first argument has also been argued in: L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), p. 427. The second observation is made in: Technopolis Group, Wuppertal Institute, thinkstep and Fraunhofer ISI, Technopolis Group, Wuppertal Institute, thinkstep and Fraunhofer ISI, *Regulatory barriers for the Circular Economy - Lessons from ten case studies* (European Commission, 2016), p. 14. This is considered a major regulatory barrier to the Circular Economy transition.

[377] The review of the EFD in 2012 stressed that while it is too early to draw conclusions on the full effect of the Directive, it simultaneously stated that the available data shows energy-efficiency has increased for all ErPs regulated by Implementing Measures. European Commission, *Review of Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (recast) - 2012 Review*, COM(2012) 765, pp. 2-3.

[378] European Commission, *Impact Assessment - Accompanying the document Proposal for a Regulation of the European Parliament and of the Council setting a framework for energy efficiency labelling and repealing Directive 2010/30/EU*, SWD(2015) 139, p. 49.

[379] See e.g.: European Commission, *Ecodesign Your Future, How Ecodesign can help the environment by making products smarter*, brochure 2012.

[380] See supra note 377, pp. 4-5. Three main reasons can be identified. Firstly, the review states that there was insufficient experience with the extension of the scope from EuPs to ErPs and that the previous Working Plans

EP has called on the Commission to do so.[381] Be that as it may, there are currently signs in EU policy that the idea is not entirely abandoned, at least not in the long term. First of all, the 2012 review of the Ecodesign framework concluded that there will be no examination of the potentials '*for the moment'*.[382] While no action on this topic has been expressly mentioned in the CE Package, it includes the plan to *'examine options and actions for a more coherent policy framework of the different strands of work of EU product policy in their contribution to the circular economy'* in 2018.[383] Depending on how the concept and implementation of the Circular Economy in the EU develops, it may well be that the extension in scope of the EFD will be included in the study. In view of this, it must be noted that the Council hinted at the idea by inviting the Commission to evaluate for which product groups, *other than energy-related*, it would be possible to better emphasize the Circular Economy aspects before the end of 2018. Of course, this does not mean that the scope of the EFD should be broadened at any cost: it only states that the evaluation must be built on experiences from the Ecodesign framework, which leaves the initiative to the Commission.[384]

That having said, it is still worth examining – by way of niche development, presumably having a radical impact – whether there are at least prospects for broadening the scope of the EFD. These insights could then be used for further research. By including more material-related requirements and by opening up the framework to non-ErPs, future relevance of the Ecodesign framework will be guaranteed and the EU could potentially take big leaps forward in the transition towards a Circular Economy. After all, there is evidence suggesting that the Ecodesign framework is actually quite effective. Why not expand this success story?[385]

---

had to be executed first. It has however been six years since the Ecodesign Directive had to be transposed (late 2010), so these arguments could be ignored today. Secondly, in the same review, the argument is raised that a different approach is required for non-ErPs, in particular regarding the assessment of products, because significant non-energy environmental impacts occur *before* the use stage of those products (e.g. the extraction of raw materials). Assessing these impacts is complex. In addition, it was already considered quite difficult to establish enforceable ecodesign requirements for ErP groups with the highest savings potential. By contrast, the review also concludes that some product requirements seem feasible for some non-ErPs, such as furniture and toys. The reason why no action would be taken for these product groups nonetheless, is the minor share of the total environmental impacts of non-ErPs. Apparently, Article 15(2)(b) EFD was a decisive factor in the reserved attitude of the Commission. As stated earlier, addressing energy consumption in the use stage has been presented as the most fitting solution in terms of costs and environmental impact minimization (Article 15(2)(b) and (c) EFD). You could argue that it makes sense to target these energy-related products, because energy savings during their use is just easiest to achieve. Addressing other environmental impacts may not always be cost-effective to the users. Finally (this argument has not been raised in the 2012 review, see the source below), it could be argued that environmental impacts are already sufficiently covered by other legislation. It is therefore uncertain that real advantages in developing individual requirements for each product group on a vertical level are even attainable. Moreover, despite the assumption that vertical regulations may include better specified requirements (e.g. different impact levels), in-depth product specific analyses are required for each and every product group, which would be particularly problematic for non-ErPs due to their heterogeneous nature. (See Ecofys *et al.*, *Evaluation of the Energy Labelling Directive and specific aspects of the Ecodesign Directive* (Ecofys Netherlands B.V., 2014), p. 68).

[381] Recital 5 European Parliament, *Resolution of 24 May 2012 on a resource-efficient Europe*, A7-0161/2012. The EP further underlines that any such proposal must be based on comprehensive impact assessments and must be coherent with other relevant regulations. More recently, see also the call to consider scope extension in the review of the EFD: Recital 24 European Parliament, *Resolution of 9 July 2015 on resource efficiency: moving towards a circular economy*, 2014/2208(INI).

[382] European Commission, *Review of Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (recast) - 2012 Review*, COM(2012) 765, p. 4.

[383] European Commission, *Annex to the Communication Closing the loop – An EU action plan for the Circular Economy*, COM(2015) 614, p. 2; and CE Action Plan, p. 4.

[384] Consideration 8 of the Council Conclusions on the EU action plan for the circular economy, press release 367/16.

[385] This question has also been raised in combination with putting more emphasis on material-related issue – as is the case in Chapter 5 – in: C. Backes, *Law for a circular economy* (Inaugural address, Eleven International

Methodology

Chapter 5 examines the Ecodesign framework on its presumed lack of material-related ecodesign requirements and on the opportunities for the framework if the scope of the EFD is broadened to non-ErPs. It is inherent to these two objectives that once the expansion of scope is studied, one will automatically emphasize the material-related aspects in product design, because many of these 'newly added' products are generally not associated with energy savings. In this way, this study kills two birds with one stone. Ultimately, this approach is intended to determine which improvements can be made to the CE Package regarding the EFD.

Given the importance of life-cycle thinking in the Circular Economy and in product design, the concept is also the central guiding principle to shape this study. Like the definition of life-cycle thinking itself, there are many views on which particular life-cycle stages are to be addressed in product design. For example, the currently applicable EFD already adopts a life-cycle perspective: Part 1 (first section) of Annex I EFD makes a distinction between six life-cycle stages. Alternatively, the CE Package trails the product life-cycle in four main stages. Be that as it may, this research uses only three broadly defined life-cycle stages: the resource stage, the products stage and the waste stage.[386] This resource-product-waste distinction is based on the status materials can enjoy throughout their life. Every life-cycle stage is internally also organized pursuant to a life-cycle approach. In terms of product design, a broad variety of topics fall within this broad application of life-cycle thinking. This study is based on six comprehensive topics, distributed across the main life-cycle stages. These topics originate from the 2015 CE Package, the 2016-2019 Ecodesign Working Plan and the 2001 Integrated Product Policy.[387] Discussing all possible material-related aspects relevant to product design would go beyond the scope of this study; the selected topics serve as prime examples to pinpoint the challenges to the scope extension and the additional attention to non-energy-related issues in the Ecodesign framework. The six topics – from now on called 'Circular Economy benchmarks' (CE benchmarks) – are used as yardsticks in this research. (For an overview of the CE benchmarks, see *Flowchart 5* below).

The CE benchmarks are one by one discussed to examine whether Ecodesign requirements on those particular topics would actually have potential for (non-energy-related) products. Each section starts with a review of the opportunities under the Ecodesign framework to create a requirement on the particular CE benchmark (on condition, of course, that the Directive's scope is broadened – but that we must assume). In other words, the legal basis in the EFD to take action is looked into. Next, each section identifies additional features – *on top of* the conditions and criteria already expressed in Article 15 EFD – that should be taken into account when establishing ecodesign requirements for the CE benchmark at stake. Subsequently, other EU legal acts or frameworks are analyzed to see to how and to what extent the CE benchmarks and additional

---

Publishing, 2017), pp. 42-43. However, the author does not go into detail why he does *'not see any arguments which should plead against principally enlarging the focus of the Ecodesign Directive to make it "fit for purpose"to serve broader environmental goals, including the promotion of the circular economy.'* Chapter 5 will therefore contribute to the examination of this statement.

[386] The preparatory study of the Third Working Plan uses more or less a similar division: type of materials (resource stage); durability of components/products (product stage); and recyclability of products/products (waste stage). BIO by Deloitte, Oeko-Institut and ERA Technology, *Preparatory Study to establish the Ecodesign Working Plan 2015-2017 implementing Directive 2009/125/EC – Task 2: Supplementary Report "Identification or resource-relevant product groups and horizontal issues"* (Deloitte, 2014), p. 6. (The report, however, uses the definitions of 'recycling' and 'recovery' incorrectly. What the authors probably mean with 'recycling' is 'recovery aiming at 'waste-to-materials'').

[387] The issues were not, however, necessarily mentioned in the context of product design, amongst others because of the different categorization of life-cycle stages in the CE Package. The selected topics can nonetheless easily be supplemented or expanded by others. For an extensive overview of 'Circular Economy requirements' that could be taken into account in product design, see the old but very relevant list made by Van Weenen: J. van Weenen, *Waste prevention: theory and practice* (PhD dissertation, Chemistry, Technical University Delft, 1990), pp. 200-208. As stated above, this study is restricted to six topics.

features are addressed.[388] This legislation survey is useful because if, for example, the benchmark is already regulated in other measures, establishing an ecodesign requirement might be superfluous and/or might frustrate existing requirements in other legal acts or frameworks. Alternatively, it may also be possible that there is room for an ecodesign requirement, as it would complement the other legal acts or frameworks. In those cases, the analysis of the EU legislation may provide inspiration and could contribute to the development of the imagined ecodesign requirement. After all CE benchmarks have been analyzed, I will reflect upon the results.

The only remaining question is which particular material is used as an example to test the CE benchmarks in the Ecodesign framework. I opted for wood. This means that the case study addresses the opportunities to regulate wooden products through the Ecodesign framework.[389] The justification for wooden products is multiple.[390] Above all, as pointed out at the start of this section about the methodology: by breaking free from the 'usual suspects' of the currently applicable Ecodesign framework, one automatically sheds light on the CE benchmarks. Wood is perfectly suited in that respect, because just about every wooden product falls outside the current scope of the EFD: no existing Implementing Measure covers wooden products and there is little chance that they will do so in the future if the scope is not changed. Secondly, many policy and regulatory initiatives have been deployed over the years that are relevant to wooden products. A quick survey of legislation tells that several CE benchmarks and additional features are already regulated by EU law, which makes a comparison possible. Thirdly, a related reason is that timber is a common material used in construction,[391] for example in roof structure, building framework, floors, wall cladding, doors and window frames, and a construction sector that uses its sustainable materials in a sustainable manner is placed high on the agenda of the Union.[392] The need to address constructions makes particularly sense considering that the construction and use of buildings accounts for about half of all extracted materials in the EU, and that the sector generates about one third of all waste.[393] Finally, wood is a renewable natural resource, which is generally

[388] The legislation studied in the survey being the EU Timber Regulation, REACH, CLP Regulation, Biocidal Products Regulation, Construction Products Regulation, Ecolabel Directive (3 specific Ecolabel criteria), Pubic Procurement Directive (3 specific Green Public Procurement criteria.

[389] In this study, 'wooden products' mean processed and finished products that are predominantly made of wood and can in principle be put on the market. Examples of wooden products are: joinery, window frames, doors, outdoor and indoor furniture, closets, waterworks (e.g. plank and dock piling, bridges) in fresh water or salt water, decking, and professional and 'do it yourself' building materials, such as beams. Similar to any other product made of a particular material, wooden products vary in lots of things, such as: resource origin, quantity, quality (e.g. strength, tree species and composition), processing opportunities, functionality, fashion, end-use, choices of (desired) waste treatment and end-of-waste possibilities.

[390] Emphasis has accordingly been put on the *material* of which the products are made – not on the products themselves, which might have been a more logical approach given the design of the Ecodesign framework. On the one hand, the approach chosen is not too restrictive because it does not exclusively address one particular wooden product group. On the other hand, nor is it too broad because it excludes products made of other materials such as metal or plastic.

[391] BIO Intelligence Service, in association with Arcadis and the Institute for European Environmental Policy: V. Monier, S. Mudgal, M. Hestin, M. Trarieux and S. Mimid, *A project under the Framework contract ENV.G.4/FRA/2008/0112 – Service contract on management of construction and demolition waste – SR1 Final Report Task 2* (BIO Intelligence Service, 2011), p. 85.

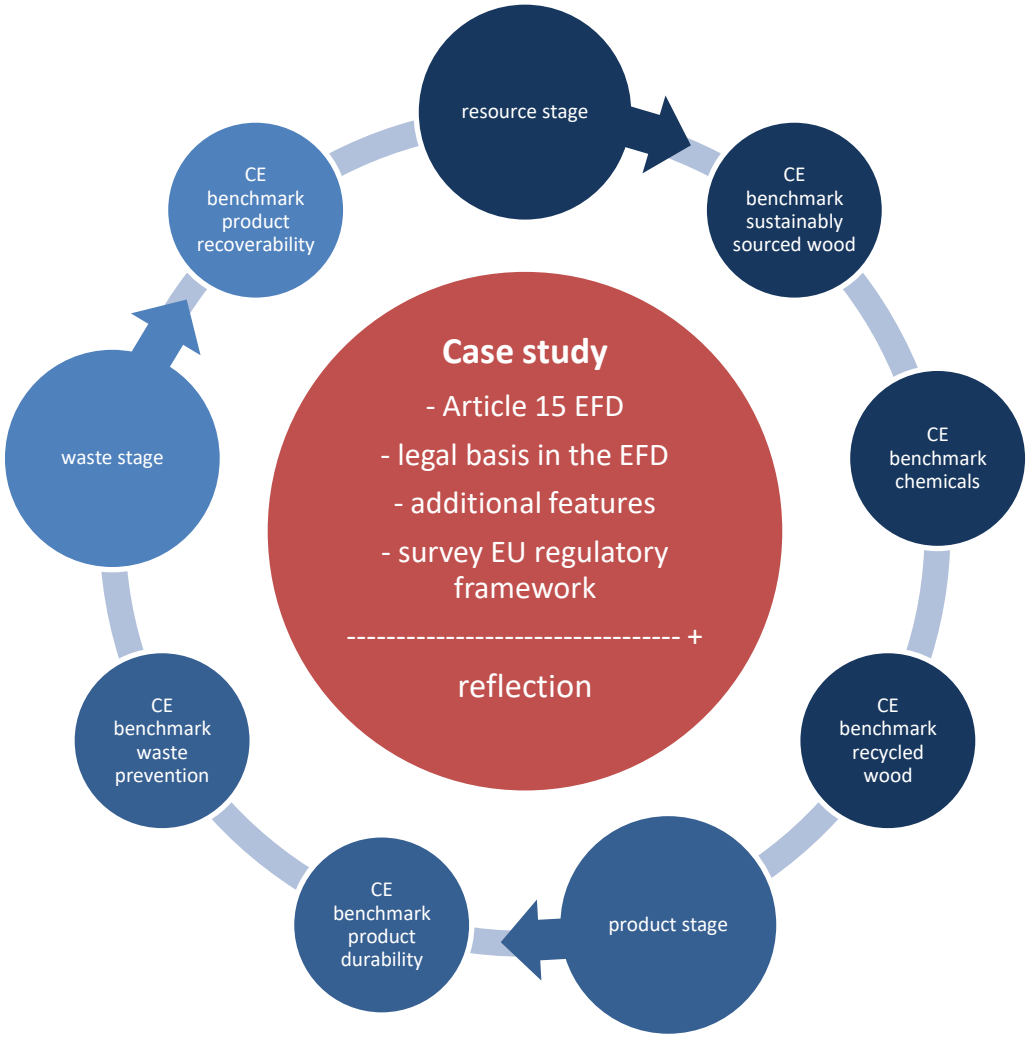
[392] The 2014 Communication on resource efficiency opportunities in the building sector proves it. European Commission, *Communication on resource efficiency opportunities in the building*, COM(2014) 445. See also: European Commission, *Strategy for the sustainable competitiveness of the construction sector and its enterprises*, COM(2012) 433. Although not specifically referring to the Circular Economy vision, the policy heralds the 2015 CE Package in which the construction and demolition sectors are labelled as 'priority sectors'. European Commission, *Annex to the Communication Closing the loop – An EU action plan for the Circular Economy*, COM(2015) 614, pp. 16-17. In both Communications the Commission stresses that design decisions and choices over materials are extremely important.

[393] European Commission, *Communication on resource efficiency opportunities in the building sector*, COM(2014) 445, p. 2. See also: European Commission, *Roadmap to a Resource Efficient Europe*, COM(2011) 571, p. 18; and BIO Intelligence Service, in association with Arcadis and the Institute for European

considered a sustainable material if sourced sustainably.[394] The CE Action Plan underscores the use of bio-based products, as it provides alternatives to fossil-based products.[395] Bio-based materials also present advantages linked to their biodegradability or compostability. Timber can moreover often be produced locally, or at least within the territory of the EU, which, amongst other positive effects, strengthens the independency of the EU of wood supply. These issues offer opportunities for the Circular Economy in the EU. On the other hand, hardwood generally comes from outside the EU. For example, tropical timber needs to be imported. Therefore, choosing wood simultaneously highlights the international dimension to the EU product framework and the Circular Economy in general.

Below, *Flowchart 5* provides for an overview of the life-cycle stages in combination with the CE benchmarks (blue), and the general analysis of Article 15 EFD and the order of issues addressed per CE benchmark (red).

Flowchart 5: design for Chapter 5 [396]



Environmental Policy: V. Monier, S. Mudgal, M. Hestin, M. Trarieux and S. Mimid, *A project under the Framework contract ENV.G.4/FRA/2008/0112 – Service contract on management of construction and demolition waste – SR1 Final Report Task 2* (BIO Intelligence Service, 2011).

[394] Besides the sustainable sourcing of wood, an additional CE benchmark for critical (raw) materials could theoretically also have been included. But since wooden products do not generally contain critical materials, this topic will not be taken into account in Chapter 5.

[395] CE Action Plan, p. 17-18.

[396] The flowchart is authentic, designed especially for this research.

4.3.3 Waste Framework Directive: encouraging qualitative recycling + glass waste

The legal field regulating the waste stage in the life-cycle of a material, which covers the period where any substance or object turns into waste until the moment when it ceases to be waste, contains many laws that are relevant to the Circular Economy. EU waste legislation regulates a variety of issues. There are laws that affect specific waste management activities, such as the measures on the protection of ground water and on the emission control of industrial plants (e.g. waste management installations), and there are laws that specifically address particular waste operations, such as landfills and incinerations installations. And then there are also several laws that target specific waste streams, such as on packaging waste, waste vehicles, waste electrical and electronic equipment, waste batteries and accumulators and waste from the titanium dioxide industry. A large part of the CE Package is, however, dedicated to the 2008 WFD, because, as it is a framework measure, it includes many key definitions and it sets out the rules for crucial legal instruments, such as the waste hierarchy. The impact of the WFD on the entire waste acquis is therefore significant.

What exactly will be studied about the WFD in Chapter 6 and why is clarified below. How this will be done is explained next.

Motives

Like all Commission regimes have tried to improve EU waste legislation in accordance with the emerging views, events and technologies typical of their time, the previous Commission regime (Barroso, 2004-2014) also dedicated much effort to the overall coherence of EU waste legislation, the explanation of the waste definition and the extension and proper application of the waste hierarchy, in particular in view of recycling. After a period of relatively low activity in developing waste framework legislation, the the WFD was revised in 2008. Most changes were initiated given due consideration to the judgements of the CJEU. The meaning and application of the waste definition and the waste hierarchy, including the associated definitions, have always been important to many actors, and have for that reason often been challenged. In fact, industries as well as national governments are still experiencing difficulties in that regard. To address the issues, the European Commission therefore calls in the CE Package for further clarification of the waste definition, a better application of the waste hierarchy, with the focus on the stimulation of recycling, both in quantity and in quality.[397] These topics are also the main focus of Chapter 6,

[397] Evidently, the Commission builds in the CE Package on previous observations. In the context of the Better Regulation Programme, an ex-post evaluation study on the EU waste framework was conducted in 2014. (More specifically on five waste stream Directives: European Commission, Commission Staff Working Document - Ex-post evaluation of Five Waste Stream Directives Accompanying the document Proposal for a Directive of the European Parliament and of the Council reviewing the targets in Directives 2008/98/EC on waste, 94/62/EC on packaging and packaging waste, and 1999/31/EC on the landfill of waste, amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EC on waste electrical and electronic equipment, SWD(2014) 209). While not targeting the WFD explicitly, it stresses amongst others the need to give full effect to the waste hierarchy and the proper application of life-cycle thinking (see e.g.: p. 11). The alignment of definitions in these five Directives with the WFD definitions was also considered highly important (see e.g.: pp. 73 and 75). The European Commission has also received support for the CE Package *after* its adoption. The European Council underlines the importance of the first three steps of the waste hierarchy in its conclusions on the CE Action Plan (European Council, Council conclusions on the EU action plan for the circular economy, press release 367/16). More specifically, there are many indications that the Council prioritizes the Commission's mission to boost recycling, both in quantity as in quality. For example in consideration 12 of the conclusions where the Council stresses the importance of a well-functioning and efficient market for secondary raw materials, which highly depends on the stimulation of the demand for these materials and high-quality recycling. In that respect, it highlights that the importance of the confidence in the quality of secondary raw materials, including the accessibility of information regarding the content of substances which pose problems to recycling. The Council therefore calls upon the Commission to develop uniform EU EoW criteria where appropriate, and to promote the development of EU and international quality standards for secondary raw materials in order to facilitate cross-border movement, while safeguarding the environment and human health. See also: consideration 12.

with particular emphasis on qualitative recycling, and are further explained below. (Even though recycling is an issue that has already been addressed in Chapter 5, *qualitative* recycling has not. For this reason, Chapter 6 will not be repetitive but rather complementary to Chapter 5).

Notwithstanding the long history in both legislation and case law, the waste definition remains the elephant in the room: defining when a substance or object becomes waste is a reemerging problem, as industry keeps on challenging the definition's application in old and new examples of industrial practice.[398] The newly added concepts 'by-product' and 'end-of-waste status' in 2008 did not alleviate this problem – they have remained subject for discussion. The latter status is particularly significant to recycling.

The waste hierarchy is another issue receiving a lot of attention in the CE Package; it is the cornerstone of EU and national waste law. However, lots of Member States are struggling with the circularity of materials through recycling. The challenge is the low amount of waste being recycled in poor-performing ('laggard') Member States and the low quality of recycled materials in well-performing ('frontrunner') Member States.

The CE Package proposes several actions to stimulate quantitative recycling, such as the upgrade of the targets for the preparing for reuse and recycling of the specific waste streams, and the introduction of an Early Warning System for monitoring compliance with these targets. The Commission clings on to a well-trodden path. The opportunity to introduce innovative ideas, concepts or mechanisms is not seized.[399] The excavation of landfills is such a promising but underexposed idea in EU policies, let alone in EU legislation.[400]

The good-performing Member States are ahead of the curve in recognizing the shift from quantitative recycling to qualitative recycling. They acknowledge that there is untapped potential for qualitative recycling. Similar to these frontrunner Member States, the Commission struggles with the low quality of recyclates. Basically, it desires to go beyond the (for some of the Member States relatively easy to meet) legally binding targets. Clearly, stimulating qualitative recycling is a very contemporary challenge. The first steps are yet to be taken. The pressing question facing the Commission is how to achieve better qualitative recycling rates in the EU. Which buttons to push?

Regarding qualitative recycling, the CE Package proposes a few actions, for example the Commission's commitment to promote voluntary certification schemes for treatment facilities for certain key types of waste (e.g. electronic waste, plastics) and the development of EU-wide

---

[398] G. Van Calster, 'Opportunities and Pitfalls for Sustainable Materials Management', in: I.K. Panoussis and H.H.G. Post (eds.), *Waste Management in European Union Law. The Examples of Naples and Campania* (Eleven International Publishing, 2014), pp. 97-98.

[399] This had also been the case in the 2014 CE Package. See: T. de Römph, 'Pressing Forward – Developments in the Transition Towards Sustainable Materials Management in EU Environmental Law' in: V. Mauerhofer (eds.), *Legal Aspects of Sustainable Development: Horizontal and Sectorial Policy Issues* (Springer International Publishing, 2015), p. 525.

[400] In point of fact, many Member States are currentlyfuther developing this concept, amongst others through pilot-projects. Landfills have long been a final 'solution' for waste. Due to a whole host of environmental and social problems, the EU now carries out a policy that severely restrains this type of disposal. Despite that, there are numerous closed and/or operational landfills still in place on the territory of the EU and many problems therefore continue to exist. The idea of mining landfills has been developed to address these issues. Not only that: landfill mining (LM) is above all promising for the recycling rates across the EU because it would provide for a whole new stock of potentially recyclable waste. Thus far, a legal perspective on landfill mining has only been marginally included in the academic debate (let alone in the CE Package or in any other EU waste policy documents), arguably because most LM projects are still pilot-projects and because older LM approaches did not focus so much on waste recovery. Legislation plays an important role in the development of LM, however, because it can enable or hinder the LM initiatives. It is therefore valuable to examine where to place of LM in EU waste law, in particular in the WFD and in the waste hierarchy, as a way to stimulate quantitative recycling. I have done this elsewhere: T. de Römph, 'Terminological Challenges to the Incorporation of Landfill Mining in EU Waste Law in View of the Circular Economy' (*European Energy and Environmental Law Review*, 25:4, 2016), pp. 106-119.

quality standards for recycled materials.[401] What these examples show is that the principal bottleneck is the uncertain market for these materials. The quality of the recycled materials must be guaranteed by the recyclers in order for the producers (if they are different than the recyclers) to be confident enough to use them in the production process as a reliable source of raw materials, replacing virgin raw materials. To expand, solidify and secure the market for recycled materials, it requires, after all, certainty on the quality of the recyclates.

All in all, despite the work done regarding the waste definition and the waste hierarchy in 2008, there are persistent (i.e. the waste definition and quantitative recycling) and prominent (i.e. qualitative recycling) challenges for the EU legal framework for waste. Some of them have (to some extent) been addressed in the CE Package while others have not or only to a limited extend. The section below explains how Chapter 6 addresses the issues, with most emphasis on qualitative recycling.

Methodology

Given the importance of life-cycle thinking in the Circular Economy transition, the concept is the guiding principle for Chapter 6. Because the waste stage begins when a substance or object turns into waste, the case study begins with addressing the waste definition. Several related developments and concepts are discussed simultaneously, such as the End-of-Waste criteria (EoW criteria). Only the case law of the CJEU that has been published after the entry into force of the WFD is used in the main body of the text (2008).

However, the central matter addressed in Chapter 6 is one of the main steps in the waste hierarchy and in life-cycle thinking: the circularity of the material life-cycle through *recycling*. As pointed out above, the main question raised in that respect is how to legally encourage that recyclates are of high-quality. The reason why the case study does not thoroughly address the two options preferred over recycling in the waste hierarchy (which would have made sense considering life-cycle thinking), is firstly because waste prevention and preparing for reuse will already be commented on in Chapter 5 and secondly because these two steps are much less emphasized in the CE Package in comparison to recycling (although that strategy can be disputed).[402]

I will study the issue of qualitative recycling by exploring the existing instruments in the WFD. Some of the issues that will be addressed have been flagged in the CE Package as opportunities for *quantitative* recycling. Because most of the instruments are currently aimed at quantitative recycling, this will be indirectly discussed as well. Moreover, I will also explore the role harmonized European standards play in the search for ways to improve qualitative recycling in the EU, because since the establishment of a reliable market is so important to qualitative recycling, the questions that need to be answered boil down to whether and how the studied instruments guarantee that the recyclates are of high-quality, and whether and how this can be implemented in the WFD. Finally, I will reflect upon the results.

The only question that remains is which material is used as a case study. I have chosen glass. It is important to understand that there are different types of glass waste. Each type has a different impact on the (desired) quality of the recyclate. First of all, the types of glass wastes depend on their application when they were still non-waste products. Examples of glass products are: bottles and jars ('packaging glass', or also referred to as 'hollow glass' or 'container glass'), lead glass artifacts, smartphone displays, drinking glasses and glass applied in the automobile and construction sectors, such as for windows and doors (flat glass or also generally called float glass). Secondly, these different applications require slightly different chemical compositions, reflecting the desired function of the final product. For example, while packaging glass generally

[401] Other examples are the promises to come up with minimum conditions on transparency and cost-efficiency for collection and sorting systems by way of EPR.

[402] Having said that, issues outside the direct scope of recycling are not blind-sided either in Chapter 6; these matters are often also important for the improvement of the quality of recycled materials and are therefore also briefly touched upon. Examples of non-recycling issues are separate collection schemes and EPR schemes.

serves the obvious objectives of protection and conservation of food, flat glass could serve multiple goals next to protection, durability and strength, such as: safety, insulation, fire resistance and solar control. On the other hand, unlike flat glass, which is usually transparent, packaging glass is often produced in several colours. In general, however, three basic natural raw materials are required for making any type of glass or glass product: sand, sodium carbonate and lime. This basic combination makes the material moreover inherently stable. Thirdly, there are two types of glass waste depending on when the glass becomes waste: waste generated during the production process and in other occasions before the final use of the glass product, such as the placement of glass windows which causes cut-offs (pre-user waste);[403] and waste generated after the glass product has been used (post-user waste). There are generally less non-glass particles in pre-user waste than in post-user waste.

There are several reasons why Chapter 6 focusses on glass waste. Firstly because the use of glass is increasing. The EU is currently the largest glass market in the world in terms of production.[404] There are more and more buildings entirely glazed and the use of triple glazing of windows has increased as well. What is more, the duration of flat glass products in society is considerably longer than packaging glass, which means that post-user waste flat glass will also be more abundant in the future. In fact, C&D waste is already the largest waste stream in the EU.[405] Secondly, glass can be cleaned and reused without much difficulty. By choosing glass waste, therefore, the first two steps in the waste hierarchy are not critical for the improvement of waste prevention and preparing for reuse.[406] Thirdly, broadly speaking, the recycling of glass waste has two faces. On the one hand, there is a long history of recycling packaging glass waste. Because glass can *in principle* be recycled infinitely without much quality loss, (post-user waste) packaging glass circulates relatively quickly in the economy. The recycled waste is used as a raw material in the production process of new packaging glass.[407] And because of that, it is a good example of a far-developed circular chain. On the other hand, flat glass recycling and the activities prior to the recycling process are less well-organized. Based on the information which is available,[408] it turns out that post-user waste (flat) glass is commonly not used as a raw material in the production of flat glass (but alternatively in, for example, isolation glass fiber) because of the high optical standards the glass product must comply with.[409] Overall, the risk of contamination and the abundancy of the basic ingredients for glass make it very attractive for flat glass producers to use virgin resources or (internal) pre-user glass. And so, because of the striking difference

[403] Some also make a difference between the waste created during the production process (internal pre-user waste) and the waste created after that process but before the final use (external pre-user waste).
[404] According to the Glass Alliance Europe, the glass production reached a volume of more than 35 million tonnes in 2016 (EU-28). See http://www.glassallianceeurope.eu/en/industries (consulted on 29 October 2017).
[405] See the data (on 2014) provided by Eurostat on http://ec.europa.eu/eurostat/statistics-explained/images/a/a0/Waste_generation_by_economic_activities_and_households%2C_2014-1.png (consulted on 29 October 2017).
[406] This aspect ties in nicely with the choice of not addressing the waste prevention and preparing for reuse in Chapter 6.
[407] For this reason, the CE Package moreover proposes to set a new preparing for reuse and recycling target for waste packaging glass in the Packaging Directive. See European Commission, *Proposal for a Directive amending Directive 94/62/EC on packaging and packaging waste*, COM(2015) 596, p. 11, on the amendment of Article 6 WFD.
[408] There are no EU statistics on matters such as collection and recycling rates.
[409] Both product-related contaminants (e.g. heating wires and foils in car glass, additives to make the glass heat resistance…) and other contaminants (e.g. wood, plastics and metals from window frames…) are challenges in that respect. If a clear culled load appears to be contaminated, it will usually be downgraded into lower-quality glass and thus sold at a lower price, which is then used in 'lower-value' products, such as insulation wool. If the contamination is really severe, the glass waste will sometimes even be send to landfills to be disposed of. Waste & Resources Action Programme, *Collection of flat glass for use in flat glass manufacture. A Good Practice Guide* (WRAP, 2008), p. 3. See also: European Parliamentary Research Service: D. Bourguignon, 'Understanding waste streams Treatment of specific waste' (EU, PE 564.398, Briefing July 2015), p. 5, where it states that flat glass, which accounts for 26% of European glass production, is under-used in recycling (both as a source and as a product of secondary raw material).

between the waste packaging glass and waste flat glass, taking the entire glass waste stream as an example in Chapter 6 could provide for some interesting insights on how to raise the quality of recycled glass. Finally, despite the differences between the two main waste streams, the EU adopted EoW criteria for (all types of) glass waste in 2012.[410] The fact that this Regulation exists further legally frames the case study. (In comparison with the next case study, this is a significant difference)

4.3.4 REACH: regulating recyclates + recycled plastics

The resource stage in the life-cycle of a material is twofold: the materials used in products can be 'virgin' and/or recycled. On the one hand, the EU legal field for the extraction and processing of virgin materials is rather limited, because Member States enjoy a broad discretion for the mining, harvesting and other forms of acquiring these natural resources. Article 191 TFEU only calls for policy and legislation aiming at a prudent and rational utilization of natural resources. Secondary legislation only regulates the actual utilization activity, e.g. through emission standards, environmental impact assessments… In other words, there are no rules on the amount or quality of the resources being exploited. These matters are left to the Member States.

On the other hand, the EU legal field for the processing and use of recycled materials brings us to the conversional stage where the recycling and other forms of recovery take place. This stage is fundamental in a Circular Economy. A substantial part of the CE Package is dedicated to recycling. The case of chemical recycling is particularly emphasized in that respect. Following the CE Package, the European Commission has analyzed the interface between chemicals, product and waste legislation in the context of the Circular Economy in 2018.[411] EU chemical legislation is clearly back on the political agenda of the EU. REACH is therefore the central legislation in Chapter 7.[412] What exactly will be studied and why is clarified below. The methodology for the Chapter is explained next.

Motives

REACH effectively and to varying degrees places the burden of proof on industry to identify, assess and manage the risks linked to the substances it manufactures and markets (or import into) in the EU. REACH was adopted in a time when increasing attention had been paid to recycling and life-cycle thinking (2006).[413]

Nonetheless, the reason why the European Commission announced to study the interface between chemicals, product and waste legislation is that, apparently, there are still shortcomings in the policy area of chemical recycling – a cross point where all legal fields come together. The Commission is not the only EU Institution highlighting this conversial stage: the European Council, too, emphasizes the importance of a well-functioning chemicals framework to support the Circular Economy in consideration 11 of its conclusions on the CE Action Plan.[414] It calls upon the Commission to develop a methodology in collaboration with the Member States to determine whether any of the recovery options or disposal provides the best overall outcome to achieve non-toxic material cycles as well as increased recycling rates. It adds, moreover, that this

[410] Regulation 1179/2012 of 10 December 2012 establishing criteria determining when glass cullet ceases to be waste under Directive 2008/98/EC of the European Parliament and of the Council, [2012] OJ L 337/31.
[411] European Commission, *Communication on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation*, COM(2018) 32.
[412] The aim, scope and main instruments of REACH have already been put forward in Chapters 3.3.2 and 3.3.3.
[413] See Chapter 2.2.3-B.II.
[414] The Council thereby also recalls the various goals put forward in the 7th EAP regarding chemical, such as the increasing efforts to ensure that all relevant substances of very high concern (SVHCs) are placed on the Candidate List by 2020, and the efforts to set out a comprehensive approach to minimizing exposure to hazardous substances, including chemicals in products (paragraph 50 Annex 7th EAP). See also: Recital (16) of the 7th EAP, according to which the EU has agreed to achieve the general objective that chemicals are produced and used in ways that lead to the minimisation of significant adverse impacts on human health and the environment by 2020.

dual goal must be achieved while respecting the existing high-level environmental and human health protection and taking into account the precautionary principle. In addition, the Council underscores the need for adequate information on the presence of SVHCs in materials, products and waste.[415]

Indeed, REACH is right at the center of the debate on the interface between chemicals, product and waste legislation. After all, when waste ceases to be waste through recycling, which is determined by waste legislation such as the WFD and, if available, an EoW Regulation, most recyclates fall within the scope of REACH. As a consequence, recyclers should in principle meet the requirements under REACH regarding registration, evaluation, authorization and restriction if they wish to put their materials on the EU market, just like any other operator using virgin resources.

This could constrain recycling in the sense that the waste is not recycled at all because only virgin resources are used to produce chemicals and products,[416] or in the sense that the quality of the recycled materials is downgraded in comparison to the original materials before they became waste. Indeed, both qualitative recycling and quantitative recycling are part of the debate. These issues are also discussed in Chapter 6 where the WFD is the main law to be studied. In this case study, however, more emphasis is put on the risks to the environment and human health, because this is not so much of a problem for glass recycling. In that respect, Chapter 7 complements Chapter 6.

Methodology

Chapter 7 discusses the role resources play in the Circular Economy. Given the importance of life-cycle thinking in the Circular Economy concept, the Chapter's point of departure is not the use of virgin resources: *recycled materials* dominate the case study, because they can be used again as resources in the economy, for example in the manufacturing industry. By taking chemical recycling as the focal point, the Chapter not only sheds light on how recycled chemicals are regulated under REACH, one automatically compares the regulatory situation for recycled substances with the situation for virgin substances. This comparison is relevant to the Circular Economy because, according to the logic of the concept, recycled materials should in the long term be replaced primary materials to the greatest extent possible. Whether this would indeed be the case pursuant to the current REACH framework is studied in Chapter 7. Three overlapping angles of chemical recycling are relevant in that respect: quantitative recycling, qualitative recycling and risk-free recycling. These aspects of recycling are strong themes all through Chapter 7, some of which are at times more thoroughly discussed than others, depending on the REACH instrument discussed.

The first two instruments addressed are the registration and evaluation of chemicals (either alone or in a mixture, or in articles). The research reflects on the role information plays in these instruments when applying them to recycling and on how this (or the lack thereof) may be a barrier to the Circular Economy. The passing on of information through the chain is also addressed. The second set of instruments discussed in Chapter 7 is the authorization and the restriction of certain, more risky chemicals. These instruments aim to protect human health and the environment from unacceptable risks posed by certain chemicals and, therefore, to control their use. Yet again, the research reflects on how information is relevant for these instruments – this time, however, it mainly concerns information about the (unknown) risks. As a final part of the case study, I will reflect upon the results.

To provide for better focus in Chapter 7, a specific material is selected as a case study: plastic. Plastic is a synthetic material and is made out of several chemical substances. There are many types of plastics, with diverse properties and characteristics. One could modify the plastic's

[415] European Council, Council conclusions on the EU action plan for the circular economy, press release 367/16.
[416] The environmental gains of plastic recycling have been expressed extensively in: European Commission, *Green Paper on a European Strategy on Plastic Waste in the Environment*, COM(2013) 123, p. 8; and IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, October 2014, pp. 1-252.

mechanical, physical or chemical properties, reflecting the end product's intended use. For example, plastic can be softened, hardened, coloured, foamed and made flame retardant. These blends of polymers and additives are used by the plastic industry to produce plastic products. There is an endless list of plastic products available on the market, such as packaging wrapping, medical tubes, television frames, construction panels or chairs.

The justification for plastics is multifaceted. First of all, as opposed to wood and glass, plastic is a material which is actually largely composed of (a blend of) chemicals, so it makes sense to use it in the case study on REACH.[417] It is furthermore used at a large scale and used in applications too many to mention. And because it is so often used it may pose certain risks to humans and to the environment – much more than wooden products and glass products do. Put simply: the stakes are high in the case of plastic recycling.

Secondly and most likely as a result of the first reason just mentioned, great attention is paid to plastics in the CE Package. Significantly, the Commission promised to come up with a strategy on plastics in the Circular Economy in 2017/2018.[418] The CE Package adresses issues such as the presence of hazardous substances of concern in plastics and the recyclability of plastic waste. Regarding the latter example, the link between the opportunities for new business and, aside from the commitments on ecodesign,[419] the development of strategic approaches on plastics and chemicals is explicitly highlighted in the CE Action Plan. Noteworthy in that respect is that plastics are prioritized in the CE Package through several specific actions, such as the increasing of the recyclability of plastics and the creation a sustainable market for recycled plastics. According to the Commission, the plastic recycling rate should be increased because less than 25% of collected plastic waste is recycled (which thus does not even include the uncollected plastic waste) and about 50% goes to landfill in the Union.[420] Encouraging the recycling of plastics is important because a large part of (post-user) plastics waste ends up in energy recovery and landfilling instead of being recycled, even though recycling is higher ranked in the waste hierarchy.[421]

Thirdly, regarding the recycling of plastic wastes into high-quality plastic materials there is still much unregulated from an EU waste perspective in the sense that there are so far no legally binding Union-wide EoW criteria. In fact, the Commission has been working on the development of a Regulation for EoW criteria for plastic waste already for quite some time now; apparently, agreeing on such criteria is causing quite a stir. This absence may be seen as food for thought on how to regulate the transition from plastic waste to resource and the comparison between primary and recycled plastics.

---

[417] The use of chemicals and the application of REACH are therefore only briefly touched on in Chapter 5. Chapter 7 is where the role of REACH in the Circular Economy is more thoroughly discussed.

[418] See: European Commission, *Roadmap to Strategy on Plastics in a Circular Economy*, where it states that the Strategy was originally expected at the end of 2017. This deadline was later rescheduled to the first quarter of 2018, as part of the 2018 CE Package. See: European Commission, *A European Strategy for Plastics in a Circular Economy*, COM(2018) 28.

[419] The recyclability of plastics is explicitly linked to the Ecodesign framework in the CE Package (p. 13). This is, of course, due to the current scope of the EFD (i.e. targeting only particular energy-using product groups, which are frequently made of plastics).

[420] CE Action Plan, pp. 13-14. This is why my contribution on the incorporation of the concept of landfill mining in EU waste law is next to Chapter 6 also significant to Chapter 7 (however, it has not been incorporated in this dissertation). See: T. de Römph, 'Terminological Challenges to the Incorporation of Landfill Mining in EU Waste Law in View of the Circular Economy' (*European Energy and Environmental Law Review*, 25:4, 2016), pp. 106-119. See for further figures on plastics use in the EU and related challenges: European Commission, *A European Strategy for Plastics in a Circular Economy*, COM(2018) 28, p. 2-4.

[421] A weak implementation of the waste hierarchy is considered a major barrier to the Circular Economy considering the plastics chain. In: Technopolis Group, Wuppertal Institute, thinkstep and Fraunhofer ISI, Technopolis Group, Wuppertal Institute, thinkstep and Fraunhofer ISI, *Regulatory barriers for the Circular Economy - Lessons from ten case studies* (European Commission, 2016), pp. 151-152.

4.4 Overview of the overall research design

The dissertation is organized into four parts: the first part (Chapter 1) covered the trends and pressures linked to material use and how the EU has reacted to these problems through the CE Package. Two research questions were raised at the end of this first part:

1. **What are the main building blocks and the key laws of the Circular Economy Package?**
2. **Which aspects of the key legislation obstruct the transition towards a Circular Economy, either because they are present or absent, and which improvements can be made to the Circular Economy Package to encourage the transition?**

The first research question has been addressed in Chapters 2 and 3, and constitutes the second part of the dissertation.

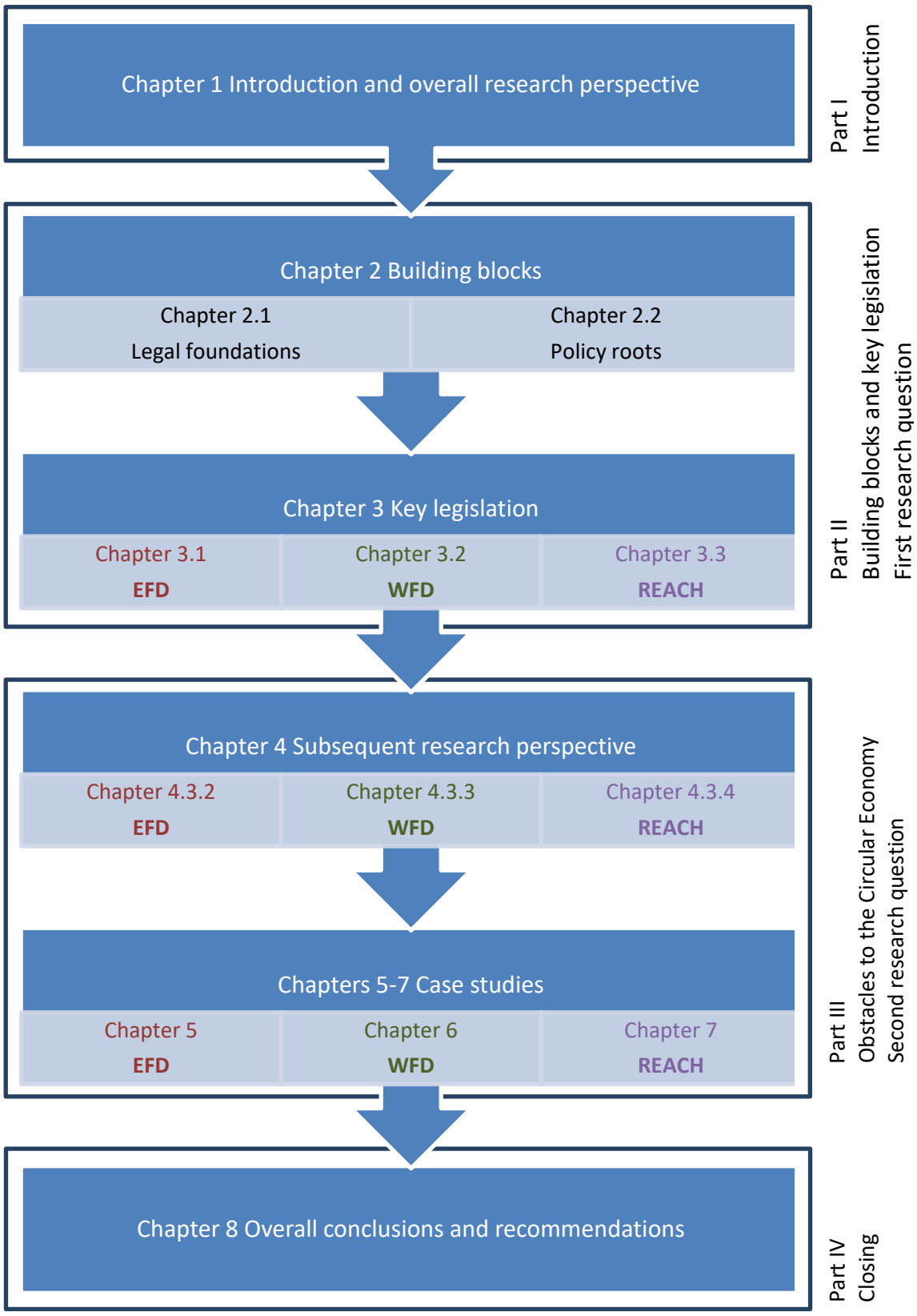
The second research question will be answered in Chapters 5-7 and constitutes the third part of this dissertation together with Chapter 4 on the research designs of Chapters 5-7. In each of those 'case study Chapters', the obstructions to the Circular Economy transition in one particular key law are identified and analyzed. This third part will be the lion's share of the dissertation. At the end of each case study, a number of recommendations are put forward. It is moreover to cross-check these recommendations with the actions proposed by in the CE Package and, if any, the subsequent policy documents of the Commission concerning the Circular Economy.

The fourth part of the dissertation will link the first three parts together and will reflect on the case studies jointly by way of conclusion (Chapter 8). This is to comment on the entire EU regulatory regime for the Circular Economy. What follows are more general recommendations to fine-tune the CE Package. This would complete the answer to the second research question.

Flowchart 6 provides for an overview of the overall design of the dissertation. It makes a distinction between the four parts as explained above, each comprising one or more Chapters. It also indicates the recurrent connections between the Chapters concerning a particular key law in the body of the dissertation (red: EFD; green: WFD; purple: REACH).

Flowchart 6: research design dissertation, Chapters 1-8 (on the next page)[422]

[422] The flowchart is authentic, designed especially for this research.


Chapter 1 Introduction and overall research perspective
Part I
Introduction
Chapter 2 Building blocks
Chapter 2.1
Legal foundations
Chapter 2.2
Policy roots
Chapter 3 Key legislation
Chapter 3.1
EFD
Chapter 3.2
WFD
Chapter 3.3
REACH
Part II
Building blocks and key legislation
First research question
Chapter 4 Subsequent research perspective
Chapter 4.3.2
EFD
Chapter 4.3.3
WFD
Chapter 4.3.4
REACH
Chapters 5-7 Case studies
Chapter 5
EFD
Chapter 6
WFD
Chapter 7
REACH
Part III
Obstacles to the Circular Economy
Second research question
Chapter 8 Overall conclusions and recommendations
Part IV
Closing

The Chapters devoted to the case studies require additional clarification (Chapters 5-7). Several general observations can be made worth pointing out. First, there will be a variety of secondary laws discussed. Both Directives and Regulations are studied.[423] In addition, these measures are either based on Article 192 TFEU (WFD) and Article 114 TFEU (EFD and REACH). It is a highly diverse mixture of laws, representing a large share of the environmental acquis.

Second, not only can the logical continuation of the material life-cycle be underlined (Chapter 5 on the EFD; Chapter 6 on the WFD; and Chapter 7 on REACH; with the latter two frameworks on recycling), it is also worth underscoring that each Chapter in itself is based on life-cycle thinking. Chapter 5 on the EFD covers all life-cycle stages in the quest to alter product design in accordance with the Circular Economy logic. It is moreover the most comprehensive Chapter of the three, because it covers several matters along the material life-cycle that are explained for the first time and that are significant for the subsequent Chapters. Chapter 6 on the WFD is more specific in the sense that it in principal discusses only one stage of the material life-cycle: the waste stage. The Chapter is therefore less extensive than Chapter 5. Chapter 7 on REACH is also more specific, as it zooms in the resource stage through the focus on recyclates. Both Chapter 6 and Chapter 7 are compatible with life-cycle thinking, because recycling is a crucial link between the waste stage and the resource stage. The Chapters however address recycling from a different perspective.

Third, each key law is furthermore discussed considering one particular material (wood and the EFD; glass and the WFD; and plastic and REACH). The selection of materials is quite diverse in several ways. To name a few: wood is a naturally occurring material, whereas glass and plastic are man-made materials; wood and glass are in principle not risky to the environment or human health, whereas some plastics and even some treated wood are potentially risky materials; and wood and recycled plastic are renewable resources, whereas glass and primary plastics are materials that depend on non-renewable resources.

[423] Examples of Directives are: EFD; WFD; other Directives when mapping other Directives and discussing the overlaps, gaps and synergies between the EFD and these measures). Examples of Regulations are: Ecodesign Regulations; REACH; other Directives when mapping other Directives and discussing the overlaps, gaps and synergies between the EFD and these measures.

5. Ecodesign Framework Directive: extending the scope

The Ecodesign Framework Directive (EFD)[424] is the reference law for this Chapter.[425] In the CE Package, it is assumed that the EFD does not yet sufficiently address the aspects in product design that are related to the Circular Economy. In the light of this, I analyze the EFD to see what changes can be made to the Ecodesign framework if the Directive's scope is broadened to non-energy-related products (non-ErPs), in this particular case study to wooden products. This approach simultaneously sheds light on how to better address material-related aspects in product design through the Ecodesign framework, but adds another layer to it by taking a bigger, more radical step forward. The exact motives and methodology for current Chapter have already been explained in Chapter 4.3.2. I will not extensively repeat them.

The first part discusses the requirements on the making and shaping of Ecodesign Implementing Measures under Article 15 EFD. Note that this section does not expressly address the broadening of the scope of the EFD to non-ErPs – the observations have a more general nature. The largest part of this Chapter is, however, dedicated to the examination of whether the Circular Economy benchmarks (CE benchmarks) have the potential to form the basis for corresponding ecodesign requirements in Implementing Measures regulating wooden products (Chapters 5.2-5.4).[426] For each CE benchmark, the existing legal basis to act in an Implementing Measure is highlighted first. Subsequently, I identified some additional features that ought to be considered when the benchmark is indeed addressed in an Implementing Measure. Next, a survey of the other EU legal acts regulating (aspects of) wooden products is provided to see how they already reflect these features and the CE benchmark in general. The closing part of the bulk of the text contains a discussion on the possibility and suitability of acting on the benchmark within the Ecodesign framework is provided. The following part of Chapter 5 consists of a reflection of the findings of this Chapter and discusses these results against the background of the more fundamental question on how to regulate the Circular Economy transition.

5.1 Implementing Measures

Article 15(2) EFD contains criteria that trigger the *preparation and adoption* of an Implementing Measure.[427] Several observations can be made considering the provision. First, the meaning of a *'significant volume of sales and trade*' in Article 15(2)(a) EFD may need to be clarified. The question is why the suggestive benchmark of more than 200.000 units has been fixed in the provision and whether it should not be reduced to enhance the possibility to draft Ecodesign Implementing Measures for more ErP groups in future scenarios – or even for non-ErP groups. The legislative proposal for the 2005 EFD initially did *not* include the indivative 200.000 threshold, nor did it indicate that this threshold is 'indicative' and should represent a 'significant volume'.[428] In the legislative process at the second reading, the EP amended the text as it is today, on certain issues following the Council's position.[429] I could not retrace the reasons of either of the Institutions for formulating the provision in this manner.

---

[424] Directive 2009/125 of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products, [2009] OJ L 285/10.

[425] See Chapter 3.1 for the basic knowledge on the EFD, i.e. the Directive's objective, scope and main instruments, and its links to the CE Package.

[426] See Chapter 4.3.2 for the meaning and the selection of the so-called 'Circular Economy benchmarks'.

[427] See Chapter 3.1.3 for the provision.

[428] See Article 12(1)(a)(i) (now Article 15(2)(a) EFD) of the proposal: European Commission, *Proposal for a Directive on establishing a framework for the setting of Eco-design requirements for Energy-Using Products and amending Council Directive 92/42/EEC*, COM(2003) 453, p. 45. The rest of the content of the Article has remained more or less the same.

[429] See for *'represent a significant…… indicatively...*': European Parliament, Position of the European Parliament adopted at second reading on 13 April 2005 with a view to the adoption of Directive 2005/.../EC of the European Parliament and of the Council establishing a framework for the setting of ecodesign requirements for Energy-Using Products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council, P6_TC2-COD(2003)0172, OJ C 33E/443, p. 455.

The answer to the first question could be that the Directive was created with the intention of regulating only mass-produced goods. This might seem a valid argument in the light of the Circular Economy transition, because mainstreaming the production of products with less environmental and human health impacts would seem to be easier accomplished by targeting mass production. One could argue that the bigger the scale, the easier it gets. On the other hand, one fails to include most other product groups below 200.000 units in this situation, even though these products might be harmful to the environment or human health as well. I argue, therefore, that the volume-based approach may need to be reconsidered in order to provide for the opportunity to adopt Implementing Measures for all other goods. This argument also relates to Article 15(2)(b) EFD.

Second, the criterion under (b) is yet another aspect which is open for discussion, because the paragraph includes the expression *'significant environmental impact'*. It is debatable because the degree of significance which should be attained is unclear. I argue that the level of significance can generally only be decided on a case-by-case basis. Having said that, let us assume that 'significant environmental impact' is an unambiguous concept: by combining paragraphs (a) and (b), Article 15(2) EFD rules out the adoption of Implementing Measures for products that are put on the market in lower units than 200.000 while having a significant environmental impact as well as products that are put on the market in units of 200.000 or above but which do not have a significant environmental impact. In either way, there will be at least *some* environmental impact left untouched. Companies putting those 'residual products' on the market would therefore lack the incentive under the EFD to change their products based the Circular Economy objectives.[430] Be that as it may, paragraph (b) is clear in one thing: the environmental potential must be realized within the borders of the EU. This aspect can also be criticized by arguing that the environmental impacts cross man-made borders.[431] For example, there are generally many environmental challenges regarding the harvesting of tropical timber. Significant environmental gain may therefore also be accomplished *outside* the EU. Conceivably, this rule may have been based on the difficulties to calculate the environmental impacts outside the EU.

Finally, the criteria under (c) that no *'excessive costs'* should come about can be interpreted in many ways. For whom will there be (no) excessive costs? Private users, manufacturers and/or waste management operators? It could be argued that even if an Implementing Measure might not be cost-effective to *individual* end-users, addressing certain environmental impacts in product design would still be beneficial for society as a whole. Not only could the protection of human health and the environment serve as an argument in this regard, but also other Circular Economy issues, such as the reduction of resource-dependency and the further increase of resource-efficiency. Clearly, interpreting the criterion in this way fits the Circular Economy philosophy and the environmental objectives under Article 191 TFEU. However, this argument alone is not very substantial. After all, the principal Treaty provision on which the EFD is based remains Article 114 TFEU – not Article 192. And so, I concur with the additional argument made in a report published in 2014 that *cost-neutrality* for user could often also be realized, which, indeed, backs up the idea that enlarging the influence of non-energy matters in the Ecodesign framework would

---

See for *'200 00 units'*: European Parliament, *Recommendations on 18 March 2005 for second reading on the Council common position for adopting a directive of the European Parliament and of the Council establishing a framework for the setting of eco-design requirements for Energy-Using Products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council (11414/1/2004 – C6-0246/2004 - 2003/0172(COD))*, A6-0057/2005, PE 353.311v02-00, p. 31. This revision of follows the Council's position made known half a year before: European Council, *Position commune arrêtée par le Conseil du 29 novembre 2004 en vue de l'adoption de la directive du Parlement européen et du Conseil établissant un cadre pour la fixation d'exigences en matière d'éco-conception applicables aux produits consommateurs d'énergie et modifiant la directive 92/42/CEE du Conseil et les directives 96/57/CE et 2000/55/CE du Parlement européen et du Conseilm*, CS/2004/11414.

[430] Maybe these products are already regulated by other rules – as will be examined for wooden products in the next few sections.

[431] See Chapter 2.2.3-B.II.

be beneficial for the environment and society at large *and* for individual users.[432] A final point of discussion is the meaning of 'excessive'. While not explicitly stated in the provision, it is likely that this criterion also refers to the benefits *within* the EU.[433]

Overall, Article 15(2) EFD lists several criteria that seem quite difficult to meet by many products (even for ErP groups). It seems that the criteria are above all anchored in an economic vision of product design.[434] At the very least, one could say that they do not preclude any strengthening of Circular Economy considerations in the Ecodesign framework, but guidance on the interpretations of the provisions is still required. In the light of creating Implementing Measures for product groups other than for ErPs, interpreting these criteria in a flexible way may be useful.[435] It can be argued that the threshold of meeting the level of 'significance/excessiveness' should not be set too low, because there will always be *some* impact.

The *content* of an Implementing Measure is another matter regulated by Article 15 EFD: Article 15(5) EFD contains the criteria Implementing Measures are required to meet.[436] Paragraph (a) means that any imposed environmental improvement to a product design must not change the functioning of the product. Intrinsically, a window remains a window and machinery to make windows remain machinery to make windows. It is however debatable to what extent the functionality of a product would need to be impacted in order to become *significantly negative*. What we do know is that the negative impact should be interpreted from the perspective of the user. In Article 15(5)(c) and (d) EFD, 'user' is divided in two categories: both the (competitiveness of the) industry and consumers are safeguarded from significant negative impacts. As regards consumers, paragraph (c) particularly raises the issues of the product's affordability and life-cycle cost. While the paragraphs discussed can be interpreted quite fluidly, paragraph (b) cannot: Article 15(5)(b) is fully compatible with the objective of the EFD to make environmentally better product design.

An overall conclusion of Article 15 EFD is that the clarity of the criteria in both paragraph (2) and (5) leaves much to be desired and that, therefore, more guidance on the interpretation of the provisions would be appropriate. In view of covering more product groups by the Ecodesign system, the criteria ought not to be applied in a restrictive manner.

Now that Article 15 EFD is discussed, the following sections (Chapters 5.2-5.4) will zoom in on the potential to reflect certain CE benchmarks in Implementing Measures targeting wooden products.

---

[432] Ecofys *et al.*, *Evaluation of the Energy Labelling Directive and specific aspects of the Ecodesign Directive* (Ecofys Netherlands B.V., 2014), p. 32.

[433] C. Dalhammar, E. Machacek, A. Bundgaard, K. Overgaard Zacho and A. Remmen, *Addressing resource efficiency through the Ecodesign Directive, A review of opportunities and barriers* (Norden, 2014), p. 179.

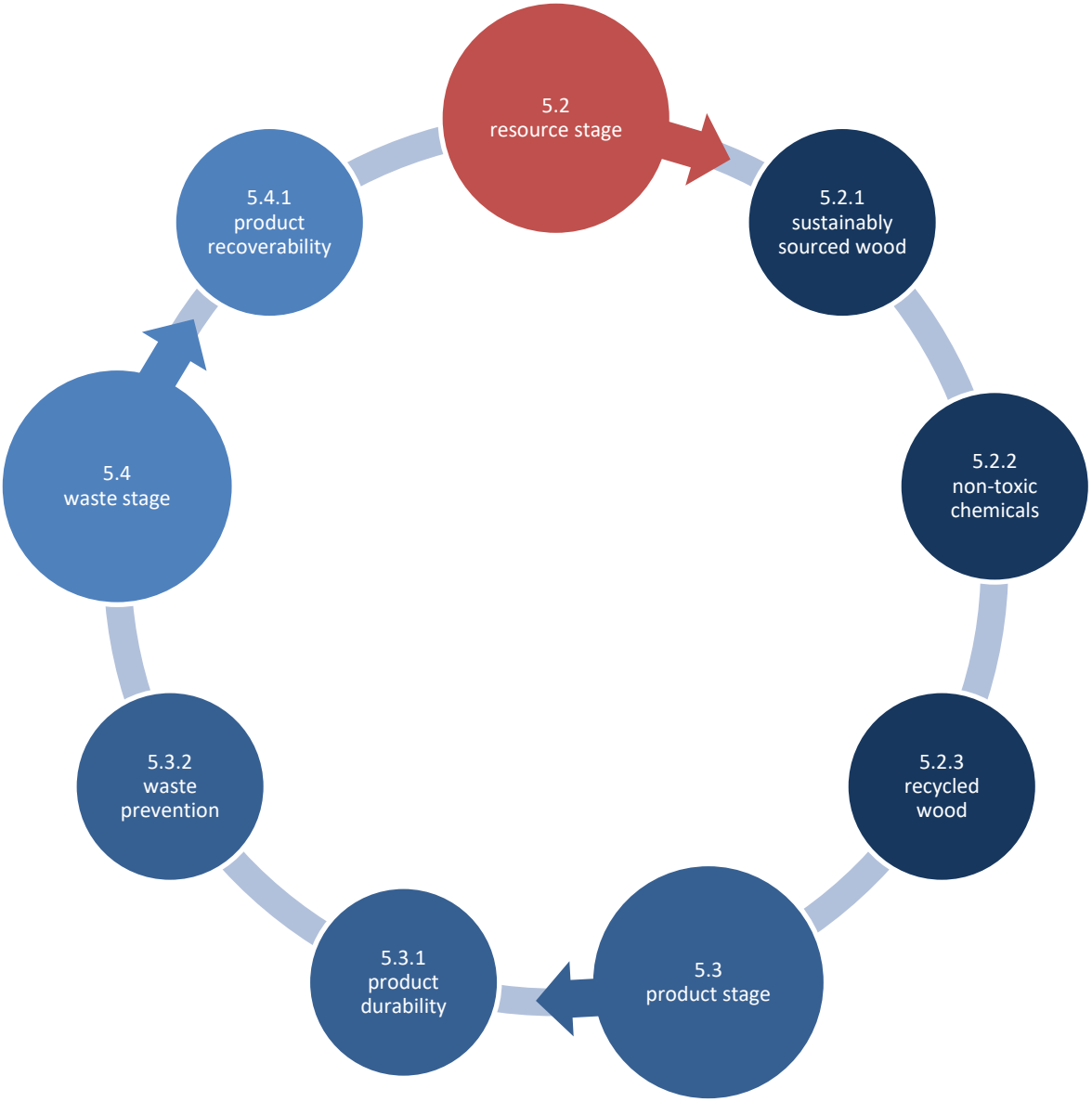
[434] E. Maitre-Ekern, 'Resolving problems of fragmentation of environmental protection in European Union law? An analysis of Life-Cycle Thinking in EU product legislation' (*MILEN 2012 Conference: Advancing the Research and Policy Agendas on Sustainable Energy and the Environment*, 2012), p. 8. It also appears from: European Commission, *Proposal for a Directive on establishing a framework for the setting of Eco-design requirements for Energy-Using Products and amending Council Directive 92/42/EEC*, COM(2003) 453, pp. 23-25.

[435] So far, however, no case law has been provided by the CJEU that clarify any of these criteria, as no formal disputes over the legality of enacted Implementing Measures have arisen. There is no extensive literature available on this issue either.

[436] See Chapter 3.1.3 for the provision.

5.2 Ecodesign requirements for the resource stage

There are three topics highlighted by the CE Action Plan that relate to the resource stage of a material. These CE benchmarks can potentially also be addressed by an ecodesign requirement for wooden products. They are: 1) the use of sustainably sourced raw materials in products, 2) the use of chemicals in products and 3) the use of recycled materials in products. These three benchmarks, which are marked in the darkest shade of blue in the graphic below, are discussed in the next few sections.



5.2.1 Circular Economy benchmark for sustainably sourced wood

This section examines the possibility to establish an ecodesign requirement on the use of sustainably sourcing of wood. The Section A covers the legal basis to act under the Ecodesign framework. Some additional features a potential requirement would need to cover are put forward in Section B. Section C explains which EU legal acts already regulate (aspects of) the sustainable sourcing of wood and whether they cover the features identified earlier and the CE benchmark in general. Note that the explanation of the measures is significant because they will be regularly referred to when the other CE benchmarks are discussed. A final discussion on the CE benchmark is provided in Section D.

A. The legal basis in the Ecodesign Framework Directive to act

Part 1 (section 1) of Annex I EFD establishes ecodesign parameters for products. One of these parameters considers how manufacturers select and use their raw materials. According to paragraph a, manufacturers must assess the predicted consumption of materials, energy and other resources, where relevant. How much and what kind of wood is harvested could therefore be considered.

Part 2 (paragraph a) Annex 1 EFD also states that an Implementing Measure may require information to be supplied by the designer concerning the manufacturing process. The manufacturing process includes the steps through which raw materials are transformed into a final product. It can therefore also cover the selection of sustainably sourced resources and their following transformation. In addition, Part 2 (paragraph b) Annex 1 EFD further explicitly states that an Implementing Measure may include an obligation to provide information for consumers on the *significant environmental characteristics* of a product.[437] The 'significance' of environmental characteristics is not clarified, however. The use of hazardous substances, for example, would arguably quite easily satisfy this criterion, because it poses a direct threat to human health and/or the environment. Moreover, the use of these hazardous chemicals is already largely regulated at EU level, so the significance of the hazard characteristics can be generated from these laws.[438] On the other hand, the sustainable sourcing of wood is relatively new to EU policy and legislation.[439] It is therefore not straightforward whether it is 'significant enough' to provide information on this issue. But if politicians are convinced to address sustainable sourcing, it can. Apart from these two paragraphs in Part 2 Annex I EFD, no other provisions specifically address the sustainable origin of virgin raw materials.[440]

Based on the provisions highlighted above, it is in principle possible to adopt an ecodesign requirement on the use of sustainably produced wood. Implementing Measures containing such requirements would in any case not substantially change the functionality, quality and performance of the wooden products, as required under Article 15 EFD. They would, however, change economic aspects, such as the manufacturing costs and marketability of the products. Whether the criteria laid down in Article 15(5)(c), (d) and (f) EFD are fulfilled is therefore debatable. It is difficult to measure the significance of the negative impacts on end-users and the competitiveness of the industry, and the excessiveness of administrative burdens imposed on manufacturers. Drawing a parallel with existing Implementing Measures is impossible, because there are currently no Implementing Measures addressing this matter.

---

[437] This will accompany the product when it is placed on the market to allow end-users to compare these kinds of aspects of the products sold.
[438] See Chapter 5.2.2.
[439] See Section C below.
[440] The EFD neither addresses the biodegradability nor the renewability of resources, nor are these aspects mentioned by the CE Action Plan. For this reason, they will not be discussed here, in spite of their relevance to wood.

B. Additional features to take into account: Sustainable Forest Management and proof

If one wishes to prepare an ecodesign requirement on the sustainable sourcing of timber, two features additional to the requirements in Article 15 EFD can be considered. They are explained below.

Meaning of Sustainable Forest Management

The first feature relates to the question of how to determine the meaning of 'sustainable sourcing'. Answering this question is complicated, because the answer differs from one resource to another, and even then there are different interpretations possible.

In the case of wood, there is a broad and generally accepted concept that addresses the sustainable management of forests: Sustainable Forest Management (SFM). Many slightly different readings of this concept exist in literature. Fortunately, the EU defined SFM in 1993 as follows:

> [t]*he stewardship and use of forest lands in a way and at a rate that maintains their productivity, biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil now and in the future relevant ecological, economic and social functions at local, national and global levels and that does not cause damage to other ecosystems.*[441]

Despite not providing for any details, such as particular criteria that need to be met, it can be used in an ecodesign requirement on sustainably sourced wood.

Generally speaking, SFM is based on different theories of 'conservation'. It is beyond the scope of this thesis to elaborate on the specifics. It is sufficient to know that SFM aims for the maintenance of forests and the protection of the regeneration and productive capacity, and the protection of the soil, water, biodiversity and forest products (i.e. wood and non-wooden products, such as forage for cattle, nuts and medicinal plants). SFM also addresses the economic benefits to people, the involvement and protection of indigenous and local communities in the forest management, and last but certainly not least to the legality of forest harvesting in the State of origin. Overall, environmental, social and economic considerations are present in the concept.[442]

Proof of the sustainability of the wood

The second feature is inherently linked to the first feature: it relates to the question on how to prove compliance with an ecodesign requirement on SFM. Conformity with the ecodesign requirement on SFM would have to rely on the supply of reliable, clear and transparent information. A preparatory study ordered by the Commission within the Ecodesign framework signposts that the insufficient data on the environmental impacts caused by raw materials extraction will be very challenging when starting to integrate sustainable origin into the Ecodesign framework.[443]

---

[441] Second Ministerial Conference on the Protection of Forests in Europe, *Resolution H1 General Guidelines for the Sustainable Management of Forests in Europe* (FOREST EUROPE, 1993), paragraph D.

[442] For further theoretical explanation of SFM and developments in this field, see e.g.: R. Nasi and P. G. H. Frost. 'Sustainable forest management in the tropics: is everything in order but the patient still dying?' (*Ecology and Society*, 14(2):40, 2009); and D.M. Peters and U. Schraml 'Does background matter? Disciplinary perspectives on sustainable forest management' (*Biodiversity Conservation*, 23, 2014), pp. 3373-3389. See also the website of the International Tropical Timber Organization: http://www.itto.int/sustainable_forest_management/ (consulted on 22 December 2017).

[443] BIO by Deloitte, Oeko-Institut and ERA Technology, *Preparatory Study to establish the Ecodesign Working Plan 2015-2017 implementing Directive 2009/125/EC – Task 2: Supplementary Report "Identification or resource-relevant product groups and horizontal issues"* (Deloitte, 2014), p. 5.

C. Other laws that regulate sustainably sourced wood

Below, the EU Timber Regulation (EUTR)[444], the Regulation on the EU Ecolabel (Ecolabel framework)[445], the Public Procurement Directives[446] and the Construction Product Regulation (CPR)[447] are clarified. The explanations cover a discussion on whether and how these laws address the potential additional features, as identified above, and the CE benchmark in general.

EU Timber Regulation: a moderate but potential role in sustainable sourcing

The EUTR counters the trade in illegally harvested timber and certain timber products derived from such timber by prohibiting their placing on the internal market for the first time.[448] According to Article 2(f) EUTR, 'legally harvested' means *'harvested in accordance with the applicable legislation in the country of harvest'*. 'Illegally harvested' is of course the exact opposite.[449] It does not matter who places the products on the market: both EU-based producers as well as importers need to comply with the EUTR provisions. Outsourcing outside the Union is therefore supposed to be useless.

Notably, the legal basis of the Regulation is Article 192 TFEU.[450] The EUTR explains its rationale more thoroughly in its Recitals (3) and (8), where it states that illegal logging is a major international and urgent problem, because it poses a *significant threat to forests* and it *undermines SFM*.[451] Based on the scope of the EUTR, the framework is however useless in tackling the use of *unsustainably* sourced wood. This observation is nevertheless somewhat misleading. An indirect link to environmental protection can be found in Article 2(h) EUTR, where the relation between 'legal' and 'sustainable' is clarified. The provision explains that the 'applicable legislation' to which the harvesters should comply with in order for their timber to be regarded as legally

---

[444] Regulation 995/2010 of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market, [2010] OJ L 295/23. The Regulation entered into force in March 2013 as a part of Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan. The FLEGT Action Plan was already established in 2003 and aims to reduce illegal logging by strengthening legal and – although this is not very clearly put forward in the Action Plan – sustainable forest management. European Commission, *Forest Law Enforcement, Governance and Trade (FLEGT) – Proposal for an EU Action Plan*, COM (2003) 251. The website on the FLEGT Action Plan, however, puts more emphasis on the sustainability objective of FLEGT. See http://www.euflegt.efi.int/flegt-action-plan (consulted on 22 December 2017).

[445] Regulation 66/2010 of 25 November 2009 on the EU Ecolabel, [2009] OJ L 192/24. The current Regulation stems from earlier versions (1992 and 2000), though without many revisions.

[446] Directive 2014/23 of 26 February 2014 on the award of concession contracts, [2014] OJ L 94/1; Directive 2014/24 of 26 February 2014 on public procurement and repealing Directive 2004/18/EC, [2014] OJ L 94/65 (this is the main Directive and is besides Article 114 also based on Articles 53(1) and 62 TFEU); and Directive 2014/25 of 26 February 2014 on procurement by entities operating in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC, [2014] OJ L 94/243.

[447] Regulation 305/2011 of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC, [2011] OJ L 88/5. The CPR replaced the Construction Products Directive (CPD, Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products, [1989] OJ L 40/12) in 2011 (Article 65 CPR) and is based on Article 114 TFEU. The CPR falls under the responsibility of DG GROW.

[448] Articles 1 and 4 EUTR.

[449] Article 2(g) EUTR.

[450] Combating illegal harvesting in view of environmental protection is deemed to be the main goal; the objective laid down in Article 1 EUTR (on the internal market) is supposedly a secondary goal. When the Commission explained the choice of legal basis, it merely stated in its legislative proposal that the provisions of the Regulation *'relate to the protection of the environment*' (European Commission, Proposal for a Regulation laying down the obligations of operators who place timber and timber products on the market, COM(2008) 644, p. 10). The legal basis is not entirely self-evident, because the Regulation does not include any separate Articles on SFM. A survey of the Guidance on the EUTR reveals, for example, that the document does not even mention 'sustainability' or related terms, showing the lack of 'sustainability objective' of the framework. See European Commission, *Guidance document for the EU Timber Regulation*, http://ec.europa.eu/environment/eutr2013/_static/files/guidance/guidance-document-5-feb-13_en.pdf (consulted on 22 December 2017).

[451] Additionally, combating climate change and biodiversity loss are mentioned as well (Recital 1).

harvested, covers the environmental and forest (management) legislation in the State of origin as well where these laws are *directly* related to timber harvesting. The national law might thus *(but of course do not necessarily have to)* include *(some)* SFM requirements.

According to the EUTR Guidance document, the Regulation takes a rather flexible approach in obtaining and interpreting information indicating compliance with the national legislation, as, of course, different regulatory regimes exist, which do not all require one particular form of documentation or content-wise.[452] The dependence on national environmental and forest legislation is not indisputable, however. Even if there are laws in the State of origin, it does not tell much on their effectiveness per se.[453] Additionally, manufacturing companies producing wooden products can buy (tropical) timber in other States where applicable forest legislation is less strict. To counter these issues, information can be attained from sustainability certificates issued by neutral and transparent third-party verified schemes,[454] such as the Forest Stewardship Council (FSC) or the Programme for the Endorsement of Forest Certification (PEFC) certificate schemes.[455]

The use of certification schemes becomes particularly apparent when discussing the key obligation for producers other than the prohibition of placing illegally harvested timber on the EU market: they must act with due diligence.[456] This means that the operators must undertake a risk management exercise to minimize the risk of placing illegally harvested timber on the market. The EUTR has plainly adopted a reversed burden of proof for them to demonstrate the legality of timber in most occasions (another option is through VPAs, discussed below). Operators can apply due diligence themselves or via Monitoring Organizations (MOs) that assist them.[457] Either way, an appropriate and properly functioning due diligence system (DDS) is mandatory,[458] and enforceable at court, indeed.[459] DDSs will generally involve quizzing suppliers in the State of

[452] European Commission, *Guidance document for the EU Timber Regulation*, p. 10.

[453] Most certainly, one should also look into issues such as compliance, enforcement, corruption, awareness amongst all stakeholders…

[454] Other schemes are: are: official audit reports, environmental permission certificates, approved harvest plans, codes of conducts, ISO certificates, publicly available information and official documents issued by competent authorities.

[455] Independent and transparent forestry certification is a practice under which a third-party audits the performance of forest management to determine whether an operator meets certain SFM criteria and to pass on this information downstream. These forestry certifications have proven their use in stimulating manufacturers and users to buy 'green' wood since the 1990s, and they have attracted investors and have comforted governments since then, too. The FSC was the first globally operating body (a non-profit NGO) promoting third-party assessment of forest operations by FSC accredited independent certification operations, as a response to the growing concerns over deforestation. (See the website of the FSC: https://ic.fsc.org/en [consulted on 22 December 2017]). Notably, the FSC sets its own standards on good forestry and on the chain of custody (but which still need to be interpreted at national level – national FSC standards are therefore not identical). FSC certification could accordingly be seen as a top-down process. A number of competing certification schemes have emerged since the establishment of the FSC, which reflects the growing international recognition that *'centralized control and management of forest resources by weak government forest services had failed to stem escalating deforestation or ensure sustainable forest management.'* (G. Dieterle, 'Sustaining the World's Forests: Managing Competing Demands for a Vital Resource – The Role of the World Bank' in: P. Spathelf (ed.), *Sustainable Forest Management in a Changing World: a European Perspective* (Springer, 2010), p. 18). As from the late 1990s, for example, the PEFC has been operational as well. What is different from the FSC system, is that it is an umbrella organization that 'fosters'/'recognizes' national forest certification standards that meet the PEFC's 'International's Sustainability Benchmark', which primarily address the chain of custody. Put differently, PEFC certification is a bottom up process.

[456] Article 4(2) and (3) in conjunction with Article 6 EUTR.

[457] MOs are accredited by the Commission and are typically trade associations or companies engaged in certification or control services. Oddly, these trade associations often rely on the certification bodies in the monitoring of DDSs compliance.

[458] Article 6(c) EUTR. When the risk assessment of the DDS shows that there is a risk of illegal timber, that risk should be mitigated by requiring additional information and verification from the supplier.

[459] See in this regard two national cases, where the courts held that the EUTR due diligence requirements had not been met by certain importing operators. See Judgement of 5 October 2016, *Almträ Nordic AB* v *Skogsstyrelsen*,

origin and efforts in ensuring that the products are backed with relevant and reliable documentation.[460] Useful material in this respect includes certification that covers the compliance with applicable environmental legislation and information on the complexity of the supply chain.[461] Since basically all SFM-based certification schemes include legality criteria, using these certifications ensures that sustainability considerations have already entered the EUTR system without even having been mandatory.

The EUTR also provides wood exporting non-EU States the opportunity to conclude a bilateral trade agreement with the EU. These agreements are so-called FLEGT Voluntary Partnership Agreements (VPAs).[462] These pacts aim to guarantee the timber exported to the EU is legally harvested. Wood coming from these States can be considered risk-free and should therefore be treated as legally harvested.[463] It is suggested that these VPAs have resulted in significant improvements in the national forest governance, though it is hard to draw strong conclusions on this matter, as the effects of the EU Timber framework is only evolving now.[464] Including SFM guarantees in these VPAs could be an important tool in moving from legality to sustainability, particularly if more and more VPAs are concluded in the future.

On the whole, the wood industry and importers have a huge responsibility under the EUTR. On top of that, any person who sells or buys timber or timber products *already* placed on the market (a trader) is responsible for the traceability of the goods throughout the supply chain.[465]

2095-16 (by the Administrative Court Jönköping of Sweden: 'Förvaltningsrätten Jönköping'); and Judgement of 24 May 2017, *B.V. X v de staatssecretaris van Economische Zaken*, AWB–16_5358, NL:RBNHO:2017:4474 (by the Court of Noord-Holland of the Netherlands: 'Rechtbank Noord-Holland'). See for a discussion on these cases and therefore on the enforceability of the EUTR the blogpost 'Towards a 'due diligence' jurisprudence: The EU Timber Regulation's requirements in courts' of W.Th. Douma, who is a senior researcher at the Asser Institute in the Netherlands, 27 July 2017, http://www.asser.nl/DoingBusinessRight/Blog/post/towards-a-due-diligence-jurisprudence-the-eu-timber-regulation-s-requirements-in-courts-by-wybe-th-douma (consulted on 21 December 2017).

[460] To supplement the EUTR, detailed rules concerning the DDS and the Monitoring Organizations are provided by the EUTR Implementing Regulation to ensure uniform conditions for implementation (required by Article 6(2) EUTR): Implementing Regulation 607/2012 of 6 July 2012 on the detailed rules concerning the due diligence system and the frequency and nature of the checks on monitoring organisations as provided for in Regulation (EU) No 995/2010 of 6 July 2012 laying down the obligations of operators who place timber and timber products on the market, [2012] OJ L 177/16.

[461] Article 6(b) EUTR.

[462] Because they are negotiable and largely depend on the situation in place, there is no 'one size fits all' approach adopted. VPAs assist the EU-partner States in regulating and governing their wood industry, in particular with regard to the definition of legally produced timber (Recital (9) EUTR). Up till now, six States have signed a VPA with the EU (they still need to implement the VPA in order to get a license) and another nine are still in negotiation. The VPA instrument is one of the cornerstone instruments of the FLEGT Action Plan: European Commission, *Forest Law Enforcement, Governance and Trade (FLEGT) – Proposal for an EU Action Plan*, COM (2003) 251.

[463] See Article 5 EUTR in conjunction with: Regulation 2173/2005 of 20 December 2005 on the establishment of a FLEGT licensing scheme for imports of timber into the European Community, [2005] OJ L 347/1; and Regulation of 17 October 2008 laying down detailed measures for the implementation of Council Regulation 2173/2005 on the establishment of a FLEGT licensing scheme for imports of timber into the European Community, [2008] OJ L 277/23. Also, according to Article 5 EUTR, timber of species listed in Annex A, B or C to Regulation 338/97 and which complies with that Regulation (and its implementing provisions) shall be considered to have been legally harvested for the purposes of the EUTR. See Regulation 338/97 of 9 December 1996 on the protection of species of wild fauna and flora by regulating trade therein, [1997] OJ L 61/1 (consolidated version, 2008). The Regulation implements the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

[464] European Forest Institute, *Assessment for the EU Timber Regulation and FLEGT Action Plan –From Science to Policy* (European Forest Institute, 2015), pp. 3-4. However, the study also points out that including socio-economic development objectives into VPAs will make their implementation more successful than when it merely includes requirements on legality (p. 3).

[465] Article 5 EUTR.

Hence, traders also safeguard the information flow until the wood if used in the production of wooden product.

Turning back to the scope of the EUTR, the Regulation excludes certain products from its scope, such as printed papers and *'timber products* […] *manufactured from timber* […] *that have completed their lifecycle and would otherwise be disposed of as waste, as defined in Article 3(1)* [WFD].'[466] Recital (11) EUTR explains that the reason for the exclusion of waste and recovered waste from the scope of the EUTR is that the use of recycled timber should be encouraged, and that including those products in the scope would place a disproportionate burden on operators. Hence, in spite of requiring producers and traders to provide information on the legality of their wooden products, the regime's reach does not go all the way down the chain to the waste stage and to a new life-cycle. A full life-cycle perspective is therefore not aimed at.[467]

Another interesting exception is the category for wooden seats, which includes dining room chairs, office chairs, garden chairs and benches (Annex I EUTR). Unfortunately, any clarification on this exemption is lacking. The choice not to include them seems rather arbitrarily. Excluding them does not make sense, because garden furniture is often made of tropical wood and was the largest product group imported in the EU in 2013 (representing 39% of the total amount).[468] Other wooden products also fall outside of the scope of the EUTR, such as wooden toys, charcoal, printed books, musical instruments and other furniture than a number of customs code labels.[469] Notably, while there is much overlap between the EUTR and the VPAs, products that are covered by the EUTR are not necessarily covered by VPAs, and vice versa. Overall, it has been estimated that no legality control is required for nearly half the wooden products imported to the EU (calculated in EUR between 2008-2013).[470] The exclusion of that many products from the scope of the EUTR shows that it is up till now inadequate to address the legality – *so including the ambiguous links to the sustainability of the harvested wood, as highlighted above* – of *all* wooden products put on the internal market.[471]

In sum, even though the EUTR principally targets the illegality of wood, it also plays a moderate role in addressing the sustainable sourcing of wood. This is a first step towards more sustainably sourced wood being put on the market and, despite its flaws, for a harmonized system to proof it. That system relies on many sources, including SFM certificates, by which sustainability criteria slowly enter the EUTR system.

---

[466] Article 2(a) EUTR.

[467] Then again, it also follows from the EUTR that the EU takes a life-cycle approach to forest harvesting, because the Regulation counters the environmental impacts from these activities happening *outside* the EU borders. Such a viewpoint of the life-cycle perspective on EU market access conditions relates to extraterritorial application of EU law. However, in the case of the EUTR, illegality in the Regulation is partly defined by reference to the national laws of the non-EU States, rather than the EU or its Member States. Thus, in principle, this should limit concerns over jurisdictional overreaching and sovereignty infringements. C. Ryngaert, 'Whither Territoriality? The European Union's Use of Territoriality to Set Norms with Universal Effects', in: C. Ryngaerts, E.J. Molenaar and S.M.H. Nouwen (eds.), *What's Wrong with International Law?* (Brill Nijhoff, Leiden/Boston, 2015), pp. 438-439. This is different from the approach adopted under REACH (see Chapter 6).

[468] CBI, *CBI Trade Statistics: Tropical Timber*, (CBI Market Intelligence, 2015), p. 7.

[469] Being: 9403 30, 9403 40, 9403 50 00, 9403 60 and 9403 90 30. These customs code labels are laid down in Regulation 2658/87 of 23 July 1987 on the tariff and statistical nomenclature and on the Common Customs Tariff, [1987] OJ L 256/1.

[470] ProBos, *Import of secondary timber products by the EU28 - The Netherlands in focus* (Stichting Probos, 2014), pp. 1-81.

[471] This shortcoming has been confirmed by the majority of participants in a consultation study for the review of the functioning and effectiveness of the EUTR, which was carried out pursuant to Article 20(3) EUTR. It included a consultation round, which indicated that, on the one hand, the majority of participants in principle agreed that the EUTR is effective in addressing its objectives, including attaining SFM. On the other hand, it indicated that 64% of the survey participants said the product scope of the EUTR is a (major) challenge for the Regulation's implementation. *Statistics: Survey on the evaluation of the EU Timber Regulation two years after its entry into application*, published on the website of the Commission, p.15: http://ec.europa.eu/environment/forests/pdf/eutr_review/Statistics.pdf (consulted on 22 December 2017).

Ecolabel framework: voluntary and dependence on forestry certificates

Environmental labelling is the most conventional tool to get information across to end-users about the impacts certain products have on the environment. Essentially, labels are to empower these users to move the market towards a more environment-friendly one. Or put differently, by awarding the most environment-friendly products put on the market by labelling them as 'better', labels trigger companies to compete for environmental innovation and performance. Ecolabelling is thus a market-based instrument, as it completely relies on market forces.

The EU also made an attempt to facilitate well-considered choices for product users through labelling: the EU Ecolabel is a voluntary environmental quality label that helps people and companies to identify products (and services) that have a reduced environmental impact throughout their entire life-cycle.[472] In order to be meaningful, the EU Ecolabel must only be awarded to a limited number of products.[473] Like all uses of environmental labels, this should eventually lead to a dynamic 'race to the top'. The establishment and the use of these EU Ecolabels are regulated by the Ecolabel Regulation.

Considering the existence of ecolabels and the introduction of an ecodesign requirement on the use of sustainably sourced wood: the Ecolabel Regulation is quite important in the Ecodesign framework, because according to Article 9(3) EFD products that have been awarded an EU Ecolabel are presumed to comply with the ecodesign requirements of the applicable Implementing Measure – but, of course, only in so far as those ecodesign requirements are met by the EU Ecolabel at issue.[474] Because of the presumption of conformity, Article 6 Ecolabel Regulation lists several general requirements for EU Ecolabel criteria that show great overlap with the criteria in the EFD and the framework's objectives.

Article 6(3) Ecolabel Regulation imposes that ecolabel criteria shall be determined on a scientific basis while adopting a full life-cycle approach. The provision further determines several other aspects that need to be taken into account when establishing the criteria. They include:

> *(a) the most significant environmental impacts, in particular the impact on climate change, the impact on nature and biodiversity, energy and resource consumption, generation of waste, emissions to all environmental media, pollution through physical effects and use and release of hazardous substances;*
> *(b) the substitution of hazardous substances by safer substances, as such or via the use of alternative materials or designs, wherever it is technically feasible;*
> *(c) the potential to reduce environmental impacts due to durability and reusability of products;*
> *(d) the net environmental balance between the environmental benefits and burdens, including health and safety aspects, at the various life stages of the products;*
> *(e) where appropriate, social and ethical aspects* […] (emphasis added)

---

[472] According to the ISO, there are three types of ecolabels: Type I are *'voluntary, multiple-criteria based, third party program*[s] *that awards a license that authorises the use of environmental labels on products indicating overall environmental preferability of a product within a particular product category based on life cycle considerations'*; Type II are '*informative environmental self-declaration claims'*; and Type III are '*voluntary programs that provide quantified environmental data of a product, under pre-set categories of parameters set by a qualified third party and based on life cycle assessment, and verified by that or another qualified third party'.* See: ISO, *Environmental labels and declarations - How ISO standards help* (ISO Central Secretariat, 2012). The Ecolabel is a Type I ecolabel: ISO14024 lists the Guiding Principles for Type 1 labels. A 'quality label' can be described as a label which *'presents the environmental performance or an environmental "good" composition of products and which want to incite buyers and users to make an informed choice and prefer the environmentally "better" product.'* L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), p. 240.

[473] This idea provoked resistance from the industry back in the beginning of the 1990s when the first Ecolabel Regulation came into force. Ibid., p. 240.

[474] Conformity with Ecolabel requirements does not presume any conformity per se with ecodesign requirements more than the CE marking does. European Commission, Frequently Asked Questions (FAQ) on the Ecodesign Directive 2009/125/EC establishing a framework or the setting of ecodesign requirements for energy-related products and its Implementation Regulations, pp. 6-7, website former Commission administration, last updated December 2014 (not available anymore).

Indeed, these general requirements include many objectives that are also enshrined in the EFD and, pursuant to (e), even go a step further by aiming at sustainability at large, which, indeed, better reflects the concept of SFM. An EU Ecolabel provides clear and publicly available information on the sustainability of the manufacturing of a product.[475]

According to Article 6(1) Ecolabel Regulation, the criteria shall be based on the environmental performance of products. It thereby takes into account the '*latest strategic objectives of the Union in the field of the environment*.' Accordingly, the Commission's ambitions to move to a Circular Economy should in principle automatically be taken into account whenever new ecolabels are prepared or old ones are reviewed. The CE Package moreover explicitly expresses the aim to examine how to increase the effectiveness of the EU Ecolabel and its contribution to the Circular Economy.[476] Importantly, developments in the Ecodesign framework should consequently also be taken into consideration, for example when more emphasis is being paid to material-related aspects of ErPs, such as on the sustainable sourcing of raw materials, or when the scope of the EFD is broadened to non-ErPs, such as to wooden products.

So far, a number of EU Ecolabel criteria have been established for particular product groups. Even though manufactures/importers of several ErPs are able to obtain an EU Ecolabel (TVs, PCs…), the instrument is not restricted to ErPs – it can in principle be any product group. This is a clear difference in comparison to the Ecodesign framework and constitutes an advantage in the present legal situation, because wooden products are currently not addressed under the Ecodesign framework. The Ecodesign framework and the Ecolabel framework currently do not reinforce or complement each other in the case of wooden products, because, *up till now*, they cover different products. So far, there are Ecolabels available for: wooden floor coverings; (wooden) furniture; and indoor as well as for outdoor (and a combination of both) paints and varnishes.[477]

Both the EU Ecolabels for wooden floor coverings and (wooden) furniture are illustrations of labels that are only awarded if it is guaranteed that the virgin wood which is used in the targeted products comes from sustainably managed forests. The need to define SFM and how SFM can be proven was already flagged in the previous section on the EUTR and is just as important for the rewarding of the EU Ecolabels. Both EU Ecolabels had been identical on the issue of sustainably sourcing,[478] and have just been recently revised largely in the same way again. They are now more

[475] The Ecolabel framework specifically addresses material-related issues in that respect, unlike, for example, the Energy Labelling Directive.

[476] European Commission, *Annex to the Communication Closing the loop – An EU action plan for the Circular Economy*, COM(2015) 614, p. 6. See the mandate for the fitness check of both the EMAS and the Eco-label Regulations under the BRP, published on the website of the Commission (in particular pp. 3-4): http://ec.europa.eu/environment/ecolabel/documents/final_mandate_fitness_check_emas_ecolabel.pdf (consulted on 22 December 2017). See also the Commission Staff Working Document on the Better Regulation Package: European Commission, *Regulatory Fitness and Performance Programme (REFIT): State of Play and Outlook Accompanying the document Better Regulation for Better Results – An EU Agenda*, SWD(2015) 110, pp. 74-75. According to the latter, the REFIT assessment should have been finalized in 2015. The Commission confirms the role – *even if limited* – the Ecolabel Regulation plays in the Circular Economy transition. European Commission, *Report on the review of implementation of Regulation (EC)No 122/2009 of the European Parliament and of the Council on 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS) and the Regulation (EC) No 66/2010 of the parliament and of the Council of 25 November 2009 on the EU Ecolabel*, COM(2017) 335, pp. 7-8.

[477] According to the online Ecolabel Catalogue. See the Commission's webpage, http://ec.europa.eu/ecat/ (consulted on 26 November 2017). There is a total of five EU Ecolabels applicable to wooden products. Regarding the EU Ecolabel for the indoor and outdoor paints and varnishes, preservation products are excluded from the label. See Decision 2014/312 of 28 May 2014 establishing the ecological criteria for the award of the EU Ecolabel for indoor and outdoor paints and varnishes, [2004] OJ L 164/45, Article 1(3). See also the user manual published online by the Commission, p. 8: http://ec.europa.eu/environment/ecolabel/documents/User_Manual_paints_varnishes.pdf (consulted on 22 December 2017).

[478] For the old EU Ecolabel for wooden floor coverings see: Annex (section 1 and in particular 1.1) European Commission, Decision 2010/18 of 26 November 2009 on establishing the ecological criteria for the award of the Community Ecolabel for wooden floor coverings, [2009] OJ L 8/32. For the old EU Ecolabel for wooden

extensive. First of all in terms of scope: the old label for wooden furniture is now extended to furniture in general.[479] The new edition of the EU Ecolabel contains a special section of wooden furniture,[480] however, which contains the same criteria as the EU Ecolabel for wooden floor coverings.[481] There, it states that all wood shall be covered by *'chain of custody certificates issued by an independent third party certification scheme such as* [FSC], [PEFC] *or equivalent*,' and that all virgin wood shall not *'originate from GMO species and shall be covered by valid sustainable forest management certificates issued by an independent third party certification scheme such as FSC, PEFC or equivalent.*'[482] Moreover, it explains that where a certification scheme allows the mixing of uncertified material with certified and/or recycled materials in a product or production line, a minimum of 70 % of the wood material, as appropriate, shall be SFM-certified virgin material and/or recycled material. Uncertified material shall in any case be covered by a verification system which ensures that it is legally sourced, which is obviously in line with the EUTR and is for that reason redundant, and meets any other requirement of the certification scheme with respect to uncertified material.[483] All in all, the dependence on SFM-certification schemes (was and) is very substantial in the EU Ecolabels for wooden products.

It is however hard to tell whether the Ecolabel instrument *really* helps in getting wooden products SFM-proof through EU Ecolabels. Despite the fact that the Ecolabel framework should be updated according to the latest strategic EU objectives on the environment and on a regular basis,[484] which makes the framework in principle quite a flexible framework, it can be argued that

---

furniture see: Annex (section 3(a)) European Commission, Decision 2009/894 of 30 November 2009 on establishing the ecological criteria for the award of the Community eco-label for wooden furniture, [2009] OJ L 320/23. The first sets of criteria state that producers must have a policy for sustainable wood procurement and a system to trace and verify the origin of wood and tracking it from forest to the first reception point. The criterion further states that the origin of all wood shall be documented and that the producer must ensure that all wood originate from legal sources. The wood shall furthermore not come from protected areas or areas in the official process of designation for protection, old growth forests and high conservation value forests defined in national stakeholder processes unless the purchases are clearly in line with the national conservation regulations. Like in the EUTR framework, national legislation plays an important role. In addition, it states that from 1 January 2013, the wooden floor coverings placed on the market bearing the EU Ecolabel are at least 70 % made from solid wood and 40 % of the wooden materials must originate either from certified sustainably managed forests (by independent third party schemes fulfilling the criteria listed in paragraph 15 of 1998 Council Resolution on forestry) or from recycled materials. The EU Ecolabel also includes special requirements for the certifications on the assessment and verification of SFM produced wood.

[479] Decision 2016/1332 of 28 July 2016 establishing the ecological criteria for the award of the EU Ecolabel for furniture, [2016] OJ L 210/100.

[480] Criterion 3 (Wood, cork, bamboo and rattan) Annex Decision 2016/1332. Applications for the EU Ecolabel (for furniture) falling within the product group 'Criterion 3' submitted before the date of adoption of the new EU Ecolabel remain evaluated in accordance with the conditions laid down the old EU Ecolabel (for wooden furniture). Article 7 Decision 2016/1332.

[481] Criterion 2 (Wood-, cork- and bamboo-based materials) Annex Decision 2017/176 of 25 January 2017 on establishing EU Ecolabel criteria for wood-, cork- and bamboo-based floor coverings, [2017] OJ L 28/44. (This Decision is however not yet into force). According to the Decision's Article 7, applications for the new EU Ecolabel for products falling within the old product group 'wooden floor coverings' may be submitted in accordance with the criteria set out in Decision 2010/18 (Criterion 2 Annex Decision 2017/176) *or* on the criteria set out in this Decision.

[482] As regards the reference to these two specific certification schemes 'or equivalents', the preparative work on the EU Ecolabel for wood furniture explained that FSC and PEFS are explicitly mentioned because they are the dominant certification schemes for SFM. When a national Competent Body is attempting to verify the SFM claim then the verification process is greatly simplified by the fact that final and intermediate products can be FSC or PEFC labelled. If the certificate number on the label is from an approved trader or producer (this can be checked on a publically available database online) then compliance with the EU Ecolabel criteria is essentially confirmed and a starting point for any further enquiries is clearly defined. Any attempts to list SFM principles in the EU Ecolabel would be too complicated. See: Joint Research Centre: S. Donatello, H. Moons and O. Wolf, *Revision of EU Ecolabel criteria for furniture products* (JRC, EUR 28443 EN, 2017), pp. 29-30.

[483] Criterion 3.1 Annex Decision 2016/1332 and Criterion 2 Annex Decision 2017/176.

[484] Articles 6(1) and 7 Ecolabel Regulation.

the instrument is generally not very effective. There are several reasons for this: ecolabels are voluntary; the instrument is still not very well-known (although I have the impression that the public's familiarity with the label gained ground in recent years); there are other well-working competing (national) labelling systems available;[485] and, as pointed out above, only a small number product groups have so far been awarded an EU Ecolabel (36 product groups in 2017).[486] The latter observation is in my view the real problem, for the more products are labelled, the more people know about the EU Ecolabel, and the more people know about it, the more companies may want to see their products labelled (the snow-ball effect).

In sum, while the general impact of EU Ecolabels is doubtful, the existing EU Ecolabels relevant to wooden products at least include a criterion on sustainable sourcing. Third-party certification schemes are used to colour the meaning of SFM and to proof compliance.

Construction Products Regulation: a similar but different approach

The wide array of wooden products used in construction compels us to look at the CPR. The Regulation is applicable to construction products, predominantly intended to be used by professionals (e.g. architects, constructors and civil engineers).[487] The CPR lays down conditions for the placing or making available on the market of the construction products by establishing harmonised rules *'on how to express the performance of construction products in relation to their essential characteristics and on the use of CE marking on those products.*'[488] Hence, creating a single market for these products is the main goal of the CPR by breaking down technical barriers to trade.

To this end, harmonized technical standards are established for each construction product group, either in the form of a harmonized European product standard[489] or, if there is no such standard, of a European Technical Assessment[490].[491] The harmonized technical standards include the technical specifications for a particular construction product, which, in turn, define Union-wide assessment methods (testing, calculation and other means) and define all the essential performance characteristics of the product. In relation to these essential characteristics, extra 'classes of performance' or 'threshold levels' may be developed by the Commission or the standardization bodies, depending on the situation.[492] The characteristics must in any case relate to the seven basic requirements for construction works, as laid down in Annex I CPR.[493] By using

[485] E.g. the Blue Angel or the Green Swan. Both operate in the field of wooden products.

[486] L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), pp. 240-241. See also: European Commission, *Report on the review of implementation of Regulation (EC)No 122/2009 of the European Parliament and of the Council on 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS) and the Regulation (EC) No 66/2010 of the parliament and of the Council of 25 November 2009 on the EU Ecolabel*, COM(2017) 335, pp. 7-8.

[487] Article 2(1) CPR defines a construction product as: *any product or kit which is produced and placed on the market for incorporation in a permanent manner in construction works or parts thereof and the performance of which has an effect on the performance of the construction works with respect to the basic requirements for construction works.*

[488] Article 1 CPR.

[489] Drawn up and published by CEN/CENELEC (European Committee for Standardisation [CEN] and the European Committee for Electrotechnical Standardisation [CENELEC]). See also: Chapter 6.3.4 for a broader explanation of harmonized European standardization and the role of the CEN/CENELEC in EU law-making.

[490] Article 26 in conjunction with Article 2(13) CPR: it is an alternative document for construction products not covered by a harmonized standard, which also provides information on their performance. The European Assessment Documents produced by the European Organisation for Technical Assessment are the basis for issuing European Technical Assessments.

[491] For example, within CEN there are four Technical Committees involved in the development of harmonized European product standards for treated and untreated wood, wood products and preservatives. They are: 7CEN/TC 38 on the durability of wood and wooden products; CEN/TC 112 on wooden panels; CEN/TC 124 on timber structures; and CEN/TC 175 on round and sawn timber.

[492] Articles 27 and 3(3) in conjunction with Article 60 CPR.

[493] Article 3(1) CPR. Hence, these basic requirements should constitute the very basis for the preparation of standardization mandates and the harmonized technical specifications.

the harmonized technical standards, Member States can set their own national performance requirements. The Declaration of Performance (DoP) delivers the information on the product performances in relation to the essential characteristics.[494] By drawing up the DoP, manufacturers assume responsibility for the conformity of the construction product with such declared performance. DoPs should allow designers/architects to make comparisons. Along with a CE marking, a DoP should be affixed to the product in order for it to be put on the EU market.[495] Comparable instruments can also be found in the EFD.[496]

The harmonization of national legislation on product performance as such is however *not* the aim of the CPR – its main focus is the establishment of basic requirements for the technical standards and the establishment of a uniform way for assessment and the supply of information. This is a crucial, because the CPR therefore basically 'reacts' to the requirements set at EU and/or at national level. In this respect, the CPR framework follows a totally different approach than the EFD: a more proactive attitude is pursued in the Ecodesign framework, because the EU legislator sets its own Ecodesign requirements and thresholds. This feature is important for the comparison between the CPR and the EFD, because it indicates that the national legal translation of the harmonized technical standards should be analyzed to see how the CPR framework copes with the sustainable sourcing of wood. The only benchmark *within* the CPR framework is Annex I. The Annex includes the list of seven basic requirements for construction works that should be reflected in the technical standards.

The basic requirements include besides more obvious requirements on issues such as mechanical resistance, stability and safety, also requirements on human health and the environment. According to section 3, construction works should be designed and built in such a way that it will not be a threat to the health and safety of workers, occupants and neighbours, nor have an *exceedingly high impact on the environmental quality over their entire life-cycle*.[497] Presumably, by using the word 'exceedingly', the legislator aims at the high level of environmental protection as laid down by EU primary law.[498] It also covers the entire life-cycle, which means that the harvesting of trees can in principle be addressed.[499] Interestingly, Annex I CPR further stresses that any construction must be designed, built and demolished in such a way that the use of natural resources is sustainable.[500] In this context, particular focus should amongst others be given to the use of '*environmentally compatible raw materials'*.[501] Indeed, the use of wooden products in constructions is affected by this, even though it is not exactly clear to what extent: the CPR does not contain specific obligatory requirements on the extraction of timber, let alone on the desired definition of 'sustainable sourcing' or 'Sustainable Forest Management' to determine what is meant by 'environmentally compatible wood'. Moreover, bear in mind that Annex I does not contain a binding list of requirements that requires manufacturers to act accordingly.

Be that as it may, the essential characteristics (which are based on the list of basic requirements provided in section 3 and 7 of Annex I CPR) largely resemble the Ecodesign parameters provided in Annex I (Part 1) EFD; they are meant to provide the same kind of environmental information of the performance of a product. If the scope of the EFD is extended to non-ErPs, the CPR and the Ecodesign framework may therefore overlap with each other. This might cause problems, as, at least in theory, there will be two different procedural routes/regimes

[494] Article 4 CPR.
[495] If a DoP has not been drawn up, the CE marking should not be affixed (Recital (32) CPR).
[496] E.g. Article 5 EFD: i.e. CE marking and Declaration of Conformity.
[497] The CPD did not contain any reference to the life-cycle approach, nor did it contain the phrase '*exceedingly high impact on the environmental quality*.'
[498] See Chapter 2.1.1.
[499] According to Article 2(28), 'life-cycle' means 'life cycle' means '*the consecutive and interlinked stages of a construction product's life, from raw material acquisition or generation from natural resources to final disposal*.' (emphasis added).
[500] Section 7 Annex I CPR, see also: Recital (55) CPR. The CPD did not contain a comparable section.
[501] Section 7, paragraph c Annex I CPR.

for CE marking: the first would be based on the requirements laid down in the Ecodesign Implementing Measure and the second would be based on the harmonized standards through the CPR framework.[502] Then again, Article 8(3) CPR points out that:

> *For any construction product covered by a harmonised standard, or for which a European Technical Assessment has been issued, the CE marking shall be the only marking which attests conformity of the construction product with the declared performance in relation to the essential characteristics, covered by that harmonised standard or by the European Technical Assessment*. (emphasis added)

The essential characteristics required under the CPR framework (i.e. through the standards) *cannot*, therefore, be declared again by another CE marking pursuant to the Ecodesign framework.[503]

All things considered, the Ecodesign framework's consistency with the CPR framework must be streamlined if the scope of the EFD is extended to non-ErPs. They show quite some resemblances but they are by no means identical. Just as the EFD, the CPR pose *obligatory* rules on companies and could thereby 'push' the market towards a more environmentally-friendly business – market access being the reward. However, the EFD and the CPR interpret the tool of ranting market access quite differently. The EFD adopts a more proactive method, because ecodesign requirements are established by the EU legislator, whereas the CPR heavily relies on harmonized European product standards and national legislation – it thereby 'approves' what is established somewhere else – and is therefore in essence retroactive. Because of this, the CPR does in any case not provide guidance regarding the definition of sustainably sourced wood: national laws could in principle include provisions on the use of sustainably sourced wood, but there is no guarantee. Despite that, based on the fundamental difference between the EFD and the CPR it is probably be best to leave wooden construction products untouched by the Ecodesign framework, in accordance with Article 8(3) CPR.

Green Public Procurement framework: considerable freedom

This section elaborates on the ability of the EU to move public authorities to buy products made of sustainably sourced wood through Green Public Procurement (GPP). This is just as important as moving private users to buy such products, because each year public authorities in the EU spend the equivalent of 19% of the EU Gross Domestic Product on the purchase of goods (e.g. office furniture, building components) and services (e.g. building maintenance, transport services).[504] Construction, renovation and running costs of buildings even represent the stunning share of 50% of annual expenditure. Because of this great share, public procurement to a large extent shapes the production and consumption trends, which as a result, could incentivize eco-innovation and unlock investments.[505] From 2016 onwards, the Commission sets itself the goals to emphasize Circular Economy aspects in new or revised EU GPP criteria (see below) to support

[502] Overall, the connection between the Ecodesign framework and the CPR is vague and might cause inconsistencies and duplication. See e.g.: Risk & Policy Analysts: T. Nwaogu, S. Upson , S. Marshall, Y. Le Crom and H. Vermande, *Analysis of the implementation of the Construction Products Regulation. Executive Summary & Main Report* (European Commission, 2015), pp. 178-179

[503] Van Holsteijn en Kemna BV, ift Rosenheim, VHK and VITO, *LOT 23 / Ecodesign of Window Products. TASK 7 – Policy Options & Scenarios* (VITO, consolidated version 2015), p. 25. It can however be argued on the basis of the doctrine of *lex specialis* that the Ecodesign requirements would prevail over the non-essential characteristics included in a standard, such as the threshold levels of performance (in the Ecodesign framework terminology called 'specific requirements') in the harmonized technical specifications. As a consequence, the standards will need to be adapted.

[504] The GPP brochure: European Commission, *Buying green! A handbook on green public procurement*, (European Commission, 2 edn, 2011), p.4.

[505] European Commission, *Public procurement for a better environment*, COM(2008) 400, p. 2; 2014 CE Communication, pp. 6-7; and CE Action Plan, pp. 7-8.

higher uptake and to play a leading role in GPP.[506] While this ambition is to be welcomed, the current framework should be explored to find out whether there are EU GPP criteria in place that specifically address the sustainable sourcing of wood. Before discussing this matter, however, a general overview of the rules on GPP is provided first. The Commission defines GPP as:

> *a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured.*[507] (emphasis added)

As from 18 April 2016, the European legal basis for public procurement in general can be found in three very lengthy Directives, which are all based on Article 114 TFEU (because Directive 2014/23 [PPD] is the most prominent, it will be the only one discussed in this dissertation).[508] They explicitly allow for the inclusion of environmental considerations in tenders.[509]

At the award stage, authorities can either compare offers on the basis of lowest price or on the 'most economically advantageous tender' (commonly referred to as 'MEAT'), which implies that award criteria can cover a variety of issues, including environmental, qualitative and technical issues.[510] Under the Directives, the importance of the MEAT procedure is reaffirmed.[511] The CE benchmarks discussed in Chapter 5 can therefore in principle all be incorporated in the tenders. In the *Concordia Bus* Case the CJEU ruled that contracting authorities may take these environmental

[506] CE Action Plan, p. 8. The 2008 Communication on GPP already flagged several main obstacles to increase the take-up of GPP by authorities. Two of which were the limited number of environmental criteria established by then and, as a potential cause for the lack thereof, the uncertainty about the legal possibilities to include such criteria in tenders. European Commission, *Public procurement for a better environment*, COM(2008) 400, p. 4.
[507] Ibid., *Public procurement for a better environment*, p. 4. GPP was also recognized by the IPP. Later, many policies followed. Communication COM(2008) 400 is for example officially part of the Action Plan on SCP. More recently, the Europe 2020 Strategy has identified public procurement as one of the key means of attaining 'smart, sustainable and inclusive growth' in the EU, and the CE Package covers GPP too, as already pointed out above.
[508] Directive 2014/23, Directive 2014/24 (this is the main Directive and is besides Article 114 also based on Articles 53(1) and 62 TFEU) and Directive 2014/25. To make the rules simpler and more efficient for public purchasers and companies, they replaced and replenished two older Directives on public procurement: Directives 2004/17 of 31 March 2004 coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors, [2004] OJ L 134/1; and Directive 2004/18 of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts, [2004] OJ L 134/114. The revision of the GPP framework was announced by: European Commission, *Green paper of 27 January 2011 on the modernisation of EU public procurement policy - Towards a more efficient European Procurement Market*, COM(2011) 15.
[509] In contrast with the earlier Directives governing procurement, the 2014 Directives now clearly further strengthen the inclusion of environmental considerations in public procurement. Recital (91) PPD further states that public procurement contributes to the application of the integration principle of Article 11 TFEU. Procurement can therefore be seen as a strategic instrument to implement the environmental objectives into other policy fields. The CJEU had already underscored this approach (see e.g.: Judgement of 17 September 2002, *Concordia Bus Finland Oy Ab v Helsingin kaupunki, HKL-Bussiliikenne*, C-513/99, EU:C:2002:495, para. 57; see also: Opinion of Advocate General Mischo on 13 December 2001, *Concordia Bus Finland Oy Ab v Helsingin kaupunki, HKL-Bussiliikenne*, C-513/99, EU:C:2001:686, paras. 91-93 and 117; and Judgement of 4 December 2003, *EVN AG and Wienstrom GmbH v Austria*, C-448/01, EU:C:2003:651, para. 34). See also: Recital (97) PPD in this regard.
[510] Importantly, for these non-economic award criteria, it is not required to give an *economic* advantage to the authority. In: Judgement of 17 September 2002, *Concordia Bus Finland Oy Ab v Helsingin kaupunki, HKL-Bussiliikenne*, C-513/99, EU:C:2002:495, para. 55. The CJEU firstly recognized in 1988 that there may be non-economic considerations included in a tender: Judgement of 20 September 1988, *Gebroeders Beentjes BV v Netherlands*, C-31/87, EU:C:1988:422, para. 36.
[511] See Article 67(1)-(2) PPD. However, the new Article 67(2) PPD casts doubt as regards the two awarding options: if read closely, one could argue that there might be more options available than the MEAT and the 'lowest price' options. R. Caranta, 'The changes to the public contract directives and the story they tell about how EU law works' (*Common Market Law Review*, 52, 2015), pp. 423-424. These options will however not be discussed in further detail in this dissertation.

matters into consideration when it assesses the MEAT but only on condition that the g criteria fulfill the following four conditions,[512]

a) be linked to the subject-matter of the contract;
b) not give unrestricted freedom of choice on the contracting authority – environmental requirements must be specific and objectively quantifiable; the criteria should be verifiable;[513]
c) be expressly mentioned in the contract; and
d) be in compliance with the general EU Treaty principles.[514]

Over the years, the importance of the first criterion has become more important in the GPP framework.[515] In a nutshell, the EU GPP criteria must not relate to issues outside the scope of the tender.[516] Although the criterion of 'linked to the subject-matter' restricts contracting authorities to some extent, it simultaneously extends their freedom, too, as the CJEU adopted a (increasingly broad) view on the scope of this condition.[517] The CJEU stressed in the *EVN* Case that environmental externalities generated that were being generated during the *production* of the contract good (and therefore *not* being generated during the execution of the contract) were sufficiently linked to the subject-matter.[518] Article 67(3) PPD on the contract award criteria (see below for an explanation) now determines that the criteria

> *shall be considered to be linked to the subject-matter … where they relate to the works, supplies or services to be provided under that contract in any respect and at any stage of their life cycle, including factors involved in:*
> *(a) the specific process of production, provision or trading of those works, supplies or services; or*
> *(b) a specific process for another stage of their life cycle,*
> *even where such factors do not form part of their material substance* (emphasis added)

This reformulation shows that both the CJEU and the EU legislator (predominantly the EP) adopts a strong life-cycle perspective: basically anything that is comprised in the product's life-cycle would be considered linked to the subject-matter.[519] Waste management, packaging, the use of chemicals during the manufacturing, transportation, *resource extraction* … are all life-cycle aspects that could be taken into account.[520] Even though the precise scope of concept of 'like to

[512] Judgement of 17 September 2002, *Concordia Bus Finland Oy Ab v Helsingin kaupunki, HKL-Bussiliikenne*, C-513/99, EU:C:2002:495, para. 58-63. The conditions are were already consolidated in the former Directive on Public Procurement (2004/18).
[513] This particular rule on award criteria had been developed in an old case, also mentioned above: Judgement of 20 September 1988, *Gebroeders Beentjes BV v Netherlands*, C-31/87, EU:C:1988:422, para. 26. Also referred to in the *Concordia Bus* Case.
[514] Such as the free movement of goods and services and the principle of non-discrimination and equal treatment (see also the second condition).
[515] M. Martens and S. de Margerie, 'The Link to the Subject-Matter of the Contract in Green and Social Procurement' (*European Procurement & Public Private Partnership Law Review*, 1, 2013), pp. 8-18.
[516] By way of example, it is not allowed to require tendering companies to have a certain corporate environmental responsibility policy in place (because that is their own business) or to take the larger production or supply capacities of a company into account than required in the bid. See: Judgement of 10 May 2012, *Commission v Netherlands*, C-368/10, EU:C:2012:284 (*Dutch Coffee* Case), paras. 84-92; and Judgement of 4 December 2003, *EVN AG and Wienstrom GmbH v Austria*, C-448/01, EU:C:2003:651, paras. 33 and 66-69.
[517] Attempts by the Commission to encourage for a strict link to the subject-matter of the contract have failed. See for example: Judgement of 17 September 2002, *Concordia Bus Finland Oy Ab v Helsingin kaupunki, HKL-Bussiliikenne*, C-513/99, EU:C:2002:495, para. 52.
[518] In the *EVN* Case it concerned the supply of electricity.
[519] For a discussion on this matter see: M. Martens and S. de Margerie, 'The Link to the Subject-Matter of the Contract in Green and Social Procurement' (*European Procurement & Public Private Partnership Law Review*, 1, 2013), p. 17; and R. Caranta, 'The changes to the public contract directives and the story they tell about how EU law works' (*Common Market Law Review*, 52, 2015), pp. 414-419. Another strong link to the life-cycle approach is moreover the inclusion of the concept of life-cycle costing in the framework (e.g. in Article 68 PPD).
[520] See the newly inserted Article 2(1)(2) PPD for the definition of 'life-cycle'.

the subject-matter' is probably still to be clarified further, the EU GPP policy is a strong tool for the transition towards a Circular Economy. There are however more issues to think about.

Taking all the '*Concordia Bus* conditions' into consideration, the principle of non-discrimination is crucial as well: one should ensure that the contract will not affect access to the tender by other operators with equivalent rights ('access to contract decisions') and one should ensure that the contract will not excessively favour one particular company ('what to buy decisions').[521] It appears that public authorities, who act as participants in the market as buyers rather than regulators, have a significant larger degree of freedom to choose the nature of things they which to buy in 'what to buy decisions'.[522] These decisions are lawful even if they are indirectly discriminatory in the sense that some companies may not be able to attain the high level of environmental performance standards asked in the MEAT.[523] They are, moreover, not regarded as hindering trade between the Member States per se and they are not subject to a proportionality test.[524] To ensure that the principle of non-discrimination is respected, clear objective criteria should be established nonetheless,[525] even when it concerns the identification of the MEATs where criteria are not always expressed in quantitative terms.[526] Generally, therefore, the contracting authority compares costs and evaluates the *quality* of the respondents to the tender, using *predetermined and published criteria*, which often include subcriteria.

GPP tenders include two key mechanisms: the minimum technical specifications that all bids have to comply with and the award criteria.[527] Regarding the technical specifications, if bids do not comply with them they are excluded as 'non-compliant' to the required characteristics of the product and will for that reason no longer be looked at.[528] According to Article 42(1) PPD, those characteristics may refer to a specific process or method of production or to a specific process for another stage of its life-cycle, including the waste stage.[529] Regarding the contract award criteria, bids contain criteria like these on the basis of which the contracting authority compares the offers. Contrary to the technical specifications, bidders that do not satisfy (all) these award criteria are *not* excluded and can participate in the awarding process. There are two kinds of award criteria:

---

[521] See Article 18(1) PPD. In general terms, the principle of equal treatment (which, together with the principle of transparency, forms the basis of the principle of non-discrimination) means that *'comparable situations are not treated differently and that different situations are not treated similarly unless such a difference or similarity in treatment can be justified objectively.*' Judgement of 3 March 2005, *Fabricom SA v Belgium*, Joined C-21/03 and C-34/03, EU:C:2005:127, para. 27. In the *Fabricom* Case, the CJEU had to decide on the exclusion of a tenderer.

[522] P. Kunzlik, 'Green Public Procurement – European Law, Environmental Standards and 'What To Buy' Decisions' (*Journal of Environmental Law,* 25:2, 2013), pp. 188 and 192.

[523] Merely demanding high environmental standards will not easily amount to discrimination, according to the *Concordia* Case: Judgement of 17 September 2002, *Concordia Bus Finland Oy Ab v Helsingin kaupunki, HKL-Bussiliikenne*, C-513/99, EU:C:2002:495, paras. 85-86. See also: Opinion of Advocate General Mischo on 13 December 2001, *Concordia Bus Finland Oy Ab v Helsingin kaupunki, HKL-Bussiliikenne*, C-513/99, EU:C:2001:686, para. 77.

[524] P. Kunzlik, 'Green Public Procurement – European Law, Environmental Standards and 'What To Buy' Decisions' (*Journal of Environmental Law,* 25:2, 2013), e.g. pp. 188-192.

[525] The lack of clarity of the award criteria (see below on what this means) was highlighted in: Judgement of 4 December 2003, *EVN AG and Wienstrom GmbH v Austria*, C-448/01, EU:C:2003:651, paras. 57-58.

[526] See: Judgement of 10 September 2008, *Evropaïki Dynamiki - Proigmena Systimata Tilepikoinonion Pliroforikis kai Tilematikis AE v Commission*, T-59/05, EU:T:2008:326, para. 59. This rule can be interpreted as incorporating the principle of transparency, which is also part of the principle of non-discrimination.

[527] There are four mechanisms: GPP policy also relies on the adoption of selection criteria and contract performance conditions. These will however not be extensively discussed in this section. In a nutshell, selection criteria test the (minimum) ability of the tenderers to perform the contract and performance criteria contract performance constitute additional fixed objective requirements that have no impact on the assessment of tenders (unlike award criteria, see below).

[528] These specifications commonly refer to a performance or functional specification or to a standard, such as one of the EN and ISO standard families, or equivalent (because technical specifications cannot be expressed in such a way that some tenderers are excluded: see below).

[529] Provided, of course, that they are linked to the subject-matter of the contract.

'core criteria', which address the key environmental impacts for the product in question; and 'comprehensive criteria', which encourage extra environmental performance for those procurers wishing to purchase the 'best' products available on the market. The full package is meant to give a comprehensive set of award criteria.[530]

At the end of the day, the award criteria should be weighted to identify how 'green' the competing tenders are. According to Article 67(5) PPD, the contracting authority specifies in the procurement documents the relative weighting which it gives to each of the criteria chosen to determine the MEAT. Hence, it is basically the sum of the freely pre-identified criteria, which should spur competition through eco-innovation.[531] There are several shortcomings to this weighing approach, however. First, economic criteria have generally a much larger share in the weighing.[532] Second, offers of products do not necessarily need to comply with *all* award criteria: some 'incomplete' offers may still turn out to be the 'best' decision, depending on their total score and by making concessions. Third, the PPD does not provide mandatory calculation methods to assess the environmental impacts throughout the life-cycle of a product (e.g. LCAs or life-cycle cost calculation methods)[533]. Because of the variety of measurements available, different results are very likely to come about.[534] There is thus no real guarantee that the winning products are indisputably the 'greenest' or the best in 'sustainable sourcing'.

Nonetheless, the Commission attempts to set a good example on GPP. Since 2008, there have been 21 EU GPP criteria developed to facilitate the in principle voluntary engagement in GPP by the Member States.[535] Although the EU GPP criteria are not legally binding, the criteria used by Member States should at least be *similar* to these common EU GPP criteria. Member States are furthermore invited to formally endorse the EU GPP criteria.[536]

So are there any sets of EU GPP criteria contain criteria on the sustainability of the harvesting of timber? There can be he only three EU GPP criteria that can be linked to wooden products (i.e. on wall panels, on office buildings and on furniture).One may observe that there is a clear difference in approach between the old generation of EU GPP criteria and the new generation.

The 2010 EU GPP criteria for wall panels encourage the purchase of wooden panels that are made of sustainable wooden materials.[537] The criteria for wooden wall panels contain a technical specification on the origin of these panels, namely that virgin wood material shall come from legal sources, and that the demonstration of this legality can be done through the use of a chain-of-

---

[530] As highlighted in: European Commission, *Public procurement for a better environment*, COM(2008) 400, pp. 5-6. The criteria package is to a large extent inspired by a life-cycle perspective, as will be demonstrated in the following sections on the Public Procurement framework. See Chapters 5.2.2-B, 5.2.3-B, 5.3.1-B, 5.3.2-B and 5.4.1-B.

[531] Competition through innovation can also be called 'dynamic competition'. It is aimed for by GPP, because firms seek to create and/or meet demand by producing new products and/or products attaining higher non-economic standards of performance than those of its competitors. Supra note 524, pp. 200-201.

[532] K. Parikka-Alhola and A. Nissinen, 'Environmental impacts and the most economically advantageous tender in public procurement' (*Journal of Public Procurement*, 12:1, 2012), p. 70.

[533] Regarding the cost calculation methods, see e.g.: Article 6 Directive 2009/33 of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles, [2009] OJ L 120/5.

[534] Supra note 532, pp. 43-80. At least Article 68 PPD now includes a list of conditions that must be met by life-cycle costing methodologies. The methodologies are not, however, established for repeated or continuous application, as was aimed by the Commission in the Directive's proposal. European Commission, *Proposal for a Directive on public procurement*, COM(2011) 896, p. 93. Following pressure by the Parliament, Article 68(2)(a) PPD now states that where the methodology has not been established for repeated or continuous application, '*it shall not unduly favour or disadvantage certain economic operators.'*

[535] See the website of the Commission, http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm (consulted on 26 November 2017).

[536] In practice, several Member States have either referenced the EU GPP criteria in their national action plans or adopted national criteria which reflect them quite closely. See FAQs on the website of the Commission: http://ec.europa.eu/environment/gpp/faq_en.htm#AretheEUGPPcriteriamandatory (consulted on 22 December 2017).

[537] European Commission, *Wall Panels – Green Public Procurement Product Sheet* (European Commission, 2010), p. 2.

custody tracing system, such as the voluntary certification schemes (e.g. FSC or PEFC)[538] or equivalent means of proof,[539] or via EUTR VPAs. For all certificates, a DDS must be installed.[540] Regarding the award criteria, it is stated in the EU GPP criteria for wall panels that additional points can be awarded if the wood stems from forests *'verified as being sustainably managed so as to implement the principles and measures aimed at ensuring sustainable forest management, on condition that these criteria characterize and are relevant for the product*.'[541] For the verification of SFM, the same chain-of-custody tracing systems can be used as for proving the legality of timber.

The 2017 EU GPP criteria for furniture have recently been changed and are now subdivided in three main sections: A) refurbishment service for existing used furniture; B) the procurement of new furniture items; or C) the procurement of furniture end-of-life services.[542] Looking at section B, it fully endorses the objective of the EUTR that only legal timber can be used. Unlike the previous EU GPP criteria for furniture, it does *not* include any criteria on the sourcing of wood from sustainable forestry. It explicitly explains why. For public procurement detailing the different elements of the SFM definition would be needed. For the time being, however, such detailed elements are not available on the EU level. Accordingly, several Member States are using their own sets of national criteria and procedure in place to determine whether certification or other third-party-verified schemes provide sufficient assurance of SFM.[543] Harmonizing the criteria was a bridge too far at the time of adoption. Despite this all, the EU GPP criteria recognize that a minimum of 70% sustainable wood should be achievable.[544] Basically the same line of reasoning was used to exclude a criterion in the 2016 EU GPP criteria for office buildings (i.e. legality of the timber pursuant to the EUTR but not sustainably sourced wood).[545]

---

[538] These certification schemes are often based on ISO 9000 and/or ISO 4000 or the EMAS system. The EU Eco-Management and Audit Scheme (EMAS) is an environmental performance management system (Regulation 1221/2009), which is used by organizations (private or public) to improve their overall environmental performance. It also helps to ensure their compliance with environmental legislation. The environmental performance of an entity is based on several aspects, including the efficient use of natural resources, waste prevention, re-use, recycling and GPP. Material-related considerations are therefore well-represented in the framework.

[539] The fact that technical specifications can directly refer to *every* SFM criteria is new: contrary to the former Public Procurement framework and the *Dutch Coffee* Case (Judgement of 10 May 2012, *Commission v Netherlands*, C-368/10, EU:C:2012:284, paras. 74), the 2014 PPD allows for requiring *social* criteria next to environmental criteria of the certifications as long as there is a link to the subject-matter of the contract). According to the *Dutch Coffee* Case, technical specifications apply in principle exclusively to the characteristics of the products (which could concern *environmental* characteristics, see Article 53 Directive 2004/18) – *not* to the conditions under which the supplier acquired them from the manufacturer (such as fair trade and the social aspects of SFM, e.g. the rights of indigenous people).

[540] For *non-certified* virgin wood, bidders shall besides an indication of the species, quantities and origins of the wood, also provide a declaration of their legality. European Commission, *Wall Panels – Green Public Procurement Product Sheet* (European Commission, 2010), pp. 8-9.

[541] Ibid., p. 9. The principles and measures aimed at ensuring SFM must correspond to those of the Pan-European Operational Level Guidelines for Sustainable Forest Management, as endorsed by the Lisbon Ministerial Conference on the Protection of Forests in Europe (2 to 4 June 1998), and outside the EU at least correspond to the UNCED Forest Principles (Rio de Janeiro, June 1992) and, where applicable, to the criteria or guidelines for sustainable forest management as adopted under the respective international and regional initiatives (ITTO, Montreal Process, Tarapoto Process, UNEP/FAO Dry-Zone Africa Initiative).

[542] European Commission, *EU Green Public Procurement criteria for Furniture* (European Commission, SWD(2017) 283). Note that outdoor furniture is currently excluded from the scope of the EUTR, which makes the EU GPP criteria a welcome additional instrument.

[543] For example in the Netherlands, the Timber Procurement Assessment Committee aims to facilitate the Dutch government's commitment to procure 100% sustainable timber and assesses certification schemes to that respect.

[544] Supra note 342, p. 14; and Joint Research Centre: S. Donatello, M. Gama Caldas and O. Wolf, *Revision of the EU Green Public Procurement (GPP) criteria for Furniture* (European Union, EUR 28729 EN, 2017), pp. 111-114.

[545] European Commission, *EU GPP Criteria for Office Buildings Design, Construction and Management* (European Commission, SWD(2016) 180, 2016), p. 30; and Joint Research Centre: N. Dodd, E. Garbarino and

It can be concluded that even though authorities do not have a *carte blanche* in adopting Circular Economy criteria in a tender using the MEAT-track, they have great freedom to choose what and how they wish to procure. The environmental impacts during the entire life-cycle of a product play a larger role under the new PPD than under previous versions. GPP criteria are in principle complementary to the Ecodesign framework, because they can set higher norms on SFM than any possible ecodesign requirement on that matter.[546] It is as if those criteria 'pull' the market even more by giving the adhering companies a market advantage. The EU GPP criteria relevant to wooden products show that this opportunity is not seized in the newest criteria, mainly because the practicalities of SFM is not yet very well captured in EU policy or legislation, and because some frontrunner Member States have already set up their own bodies and system to deal with the issue of SFM certification, making a harmonized approach challenging. Nevertheless, the EU GPP criteria address the legally of wood. In that case, they refer to the EUTR. In addition to the EU approach on GPP, the fact that each Member States may adopt national criteria indicates that the overall GPP framework in the EU is very fragmented.

D. Discussion on the potential for the Ecodesign framework

An initial observation relates the general policy for SFM in the EU. SFM has already been on the policy agenda for a long time now and an ecodesign requirement on this matter would therefore not be inappropriate. It would be in line with the 1998 Council Resolution on forestry, where the Council emphasizes the need to further develop the concept of SFM and to promote the use of wood forest products from sustainably managed forests.[547] The Resolution particularly stresses the importance of *better integration* of forest products in *all sectoral common policies*, such as the policies on the industry and the internal market, with the aim of guaranteeing the required *consistency of a holistic approach towards SFM*.[548] So how could the Ecodesign framework contribute to this ambition?

The use of existing external instruments

The EFD does not prevent any future Implementing Measure for wooden products from including an ecodesign requirement on the use of sustainably produced timber. There are however two additional features to the criteria laid down in Article 15 EFD that should also be considered if an ecodesign requirement on the sustainable sourcing of timber is to be prepared: the meaning of SFM and the methods of guaranteeing SFM harvested wood.

Generally speaking, one could say that there is a uniform approach in the EU regulatory framework for wooden products to handle the two features. It appears that no sustainability criteria have been established in law. Instead, the regulatory framework is largely reliant on 'external' terminology, information and mechanisms: they rely on instruments such as forestry certificates, environmental labels and harmonized standards. All of these 'external' tools are based on a general notion of SFM or address aspects thereof, while still having nuances to the exact meaning of the concept and to the approach on how to achieve and verify it. Generally, the instruments are interconnected. For example, the FSC certification scheme is based on several relevant ISO standards, such ISO 17065 for product certification, ISO 17021 for management system certification and ISO 17011 for accreditation of certification bodies.

Against this background, it would be compatible with the current overall framework to use these existing channels in a future Implementing Measure. While, indeed, one could argue that this facilitates fragmentation due to the variety of available options, it could simultaneously

---

M. Gama Caldas, *Green Public Procurement Criteria for Office Buildings Design, Construction and Management* (European Union, EUR 27916 EN, 2016), pp. 91-92.

[546] Lower norms are undesirable because products having an EU Ecolabel are presumed to comply with the EFD's Implementing Measure.

[547] Paragraph 2(h) of the Council, Resolution 1999/C of 15 December 1998 on a forestry strategy for the European Union, [1999] OJ L 56/1.

[548] Paragraph 2(j) Resolution 1999/C.

considered an incremental way to come to a more harmonized understanding of how to deal with sustainably produced timber at EU level, as these instruments cut-cross policy fields and particular pieces of legislation. Similar to the frameworks currently in place (e.g. the Ecolabel framework and EU GPP framework), the role of certificates would be crucial under the imagined Ecodesign framework. Not only do these certificates provide for a better knowledge on what is meant by SFM-sourced wood, they also offer evidence of what they claim. It can even be argued that the very existence of certifications guaranteeing the sustainable origin of raw materials have even *prevented* setting Ecodesign requirements on this issue so far.[549] In general, any ecodesign requirement on sustainably sourced wood would probably heavily rely on these certification schemes, because national market surveillances do not have the means to control all wooden products that are put on their national market.

The EUTR and the EFD

The EUTR occupies a special place in the EU regulatory framework for wooden products. Not because it directly regulates the sustainable origin of wood, but because it targets the illegality of the timber. This is also significant to the sustainability of logging because the EUTR leaves it up to the persons who place the timber on the market to decide on how they prove the legality of the wood. Proof can amongst other means be provided by the use of SFM certificates for legality is an ordinary criterion in the set of sustainability criteria of the certification schemes.

The EUTR is ideally a better platform than the EFD, Ecolabel Regulation, the CPR or the (EU) GPP framework to address the issue of sustainably sourced wood used in products put on the EU internal market. First and foremost because the EUTR is a horizontal measure. Therefore, if the scope of the EUTR is extend from legally sourced wood to *sustainably* sourced wood, it would make the other EU measures superfluous all at once. The current EUTR requirements on legality can in that sense be regarded a big asset, because the first hurdle has already been taken. Because all SFM-inspired certification schemes include legality criteria, using them ensures that sustainability considerations have already entered the EUTR system without even having been mandatory. Arguably, this suggests that changing the EUTR's scope is not impossibly practically speaking. Additionally, since the current regime is up and running, the existing structure under the EUTR can be used. For example, to attain the desired level of SFM, the provisions on the DDS remain appropriate. This brings us to the terminology used. To use the EUTR in its full potential, the obligations for operators would need to be broadened to *sustainably* harvested timber or timber products derived from such timber (e.g. in Article 4(1) EUTR). A definition of 'sustainably sourced wood' is therefore required, which must be much clearer described than how the SFM concept is currently being used in the other Directives and Regulations for the very reason that the entire regulatory framework for wooden products would be based on it. For example, the EU legislator can further flesh out the generally accepted concept of SFM by using the internationally used third-party certification schemes.

Turning back to the scope of the EUTR, the Regulation currently covers a broad range of imported and internally produced wooden products, including solid wood and plywood products, windows, packaging such as pallets, flooring, (most) furniture, and even pulp and paper (Annex EUTR). The variety of products would definitely outreach the product groups that will be addressed by the Ecodesign framework for a very long time, if the scope of the EFD is extended to all products, making the EUTR the better platform to address sustainably sourced wood between the two framework laws. On the other hand, not all wooden products fall under the reach of the EUTR, indicating that there is still room for improvement. Products such as seats and all other wooden furniture would need to be included as well.

Yet, the transition from legally to sustainably sourced wood in the EUTR may be cumbersome. A revised EUTR would involve significant and expensive administrative and

[549] BIO by Deloitte, Oeko-Institut and ERA Technology, *Preparatory Study to establish the Ecodesign Working Plan 2015-2017 implementing Directive 2009/125/EC – Task 2: Supplementary Report "Identification or resource-relevant product groups and horizontal issues"* (Deloitte, 2014), p. 8.

research burdens. This is a serious counterargument because the alleged costs of legality verification *already* pose a potential threat to SMEs in both importing and exporting States, and to (small) domestic market orientated producers.[550] Establishing an ecodesign requirement on sustainably sourced wood therefore provide EU Member States as well as non-EU States more leeway to adapt to the new legal and practical circumstances (i.e. more sustainably sourced wood is required on the market). In fact, the existence of similar requirements in existing legislation indicates that the EU legislator has already pursued this incremental policy for some time now, albeit principally on a voluntary basis so far (through the EU GPP framework and the Ecolabel framework).

Then again, the use of certification schemes that cover innovative tracking systems (which are currently being developed *because* they should be reliable, relatively cheap and easy to maintain) under the DDSs could to some extent alleviate these concerns. These tracking systems are used to track down the sustainable origin of trees along the chain, filling the gaps of transparency and information supply. This is possible because they make use of a technique that is measurable on the products themselves.[551] There are many tracking systems and technologies currently being developed – often bottom-up, niche initiatives.[552] They are also called 'Sustainable Forest Products'.[553] A broad overview and explanation of the novel tracking technologies is provided in a study by the International Tropical Timber Organization.[554] The possibilities to gather, disseminate and retrace information on the sustainable origin of wood are absolutely crucial for the good functioning of the revised EUTR, because it is difficult to control what is being put on the internal market, particularly whenever the harvesting of the trees occurs outside the territory of the EU.

Despite these promising developments, changing the EUTR would probably take a political courage on many governmental levels (not least by the difficulty in which the EU would find itself when the VPAs under the EUTR framework are to be renegotiated. Changing these bilateral treaties can be done through the provisions provided in the agreements themselves, though this

[550] European Forest Institute, *Assessment for the EU Timber Regulation and FLEGT Action Plan –From Science to Policy* (European Forest Institute, 2015), pp. 4-12. In some producing States, fear exists that combating illegal logging is likely to further restrict local communities' access to forest resources. Although these concerns can be taken into account when, for instance, adopting or adapting VPAs (which is by the way currently done, for example in the case of Indonesia: p. 13. All VPAs have in any case already an article on social safeguard: p. 23), in my view, this is an argument in favour of extending the scope of the EUTR to sustainability objectives. Indeed, socioeconomic considerations play a much larger role in sustainability than in legality.

[551] There are many tracking methods and technologies currently being developed – often bottom-up initiatives – that fill the gaps of transparency and information supply. Examples are in the field of Radio Frequency Identification (RFID) chips (which is a wireless method to transfer data) and DNA or isotope sampling of wood. DNA 'fingerprinting', DNA mapping, electronic barcoding and fiber analysis are possibilities for the latter. They are called 'Sustainable Forest Products'. More (parallel) research on technological solutions to the problems regarding the transparency and gathering of information of timber origin, such as the research done on Timtrace (Wageningen University, NL), has been initiated in recent years. A broad overview and explanation of the novel tracking technologies is provided in a study by ITTO: International Tropical Timber Organization: F. Seidel with E. Fripp, A. Adams and I. Denty, *Tracking Sustainability - Review of Electronic and Semi-Electronic Timber Tracking Technologies* (ITTO, 2012).

[552] Examples are in the field of Radio Frequency Identification (RFID) chips (which is a wireless method to transfer data) and DNA or isotope sampling of wood. DNA 'fingerprinting', DNA mapping, electronic barcoding and fiber analysis are possibilities for the latter. More (parallel) research on technological solutions to trace the origin of timber has been initiated in recent years. An example is 'Timtrace'. See: Wageningen University, project leader Professor P. A. Zuidema: http://www.wur.nl/en/show/Timtrace.htm (consulted on 16 January 2017).

[553] See the website of the World Resources Institute (http://www.wri.org/blog/2016/05/5-technologies-help-thwart-illegal-logging-tracing-woods-origin (consulted on 16 January 2017) and the World Business Council for Sustainable Development).

[554] Supra note 551.

would be a rough ride)[555]. In general, a lack of financial resources and knowledge to achieve SFM in a lot of wood producing States and the long period which is required to certify forests, including the loss of market share to already certified suppliers, are additional practical challenges faced when the scope of the EUTR framework is broadened.[556] Another problematic effect of might be that there would be no sufficient certified wood available at the start of the entry into force, as non-EU States may choose to move away from the EU market to other markets for which no sustainability criterion is required to enter.[557]

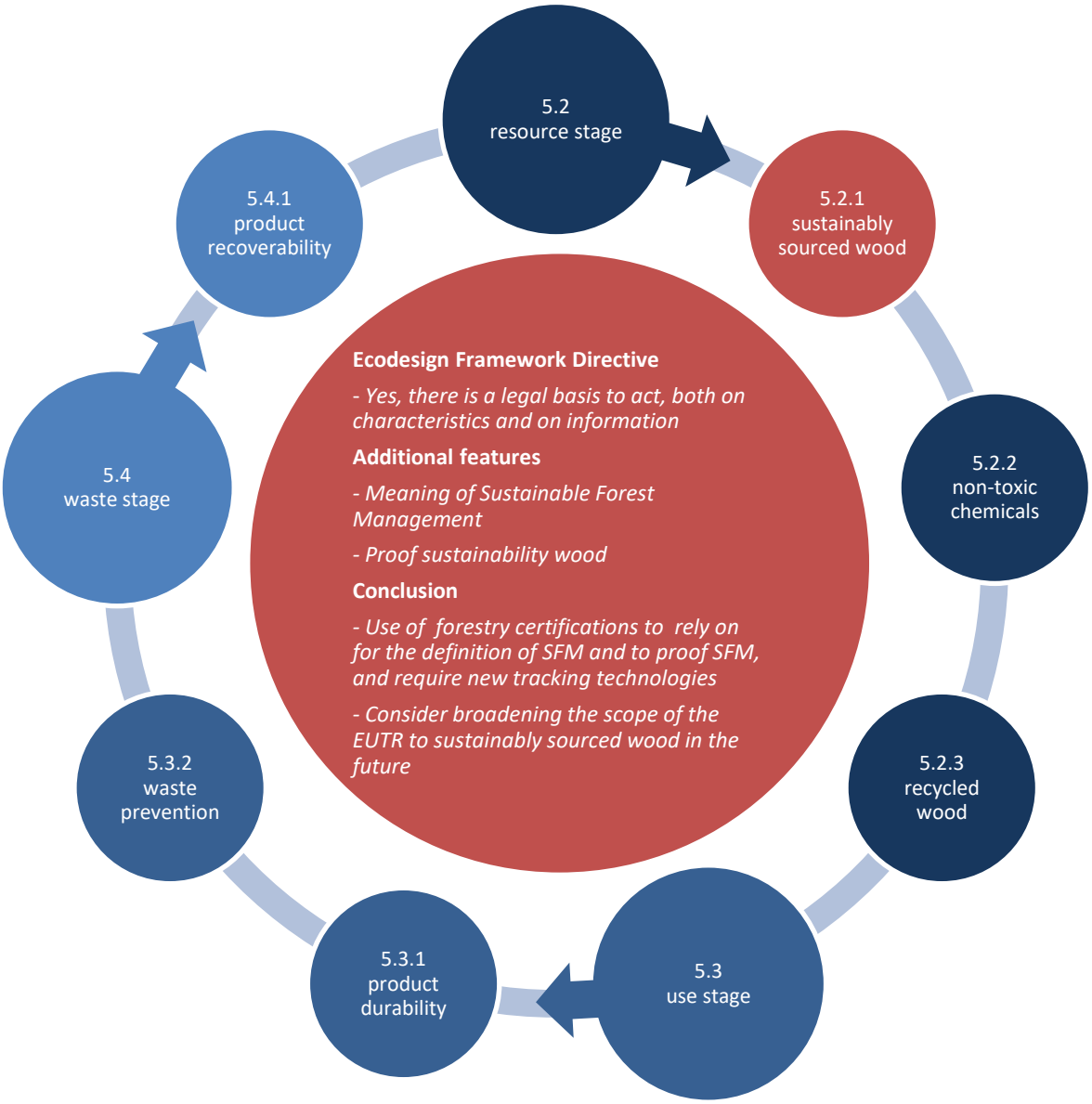
Conclusion

All things considered, although the idea of enlarging the scope of the EUTR to sustainably sourced timber is appealing for a variety of reasons and therefore worthwhile studying further, it is not very likely to fly in the nearby future. Establishing an ecodesign requirement on the sustainable sourcing of wood in Ecodesign Implementing Measures would seem to be more useful on the short term. In principle, the Ecodesign framework can already require timber to be SFM-compatible. In this scenario, the ecodesign requirement does not necessarily have to include a specific definition of SFM (although it could to enhance harmonization in the EU) or any particular ways of SFM verification. Particularly the use of the existing forestry certifications is sufficient, as current practice shows. Nonetheless, new tracing and tracking systems will need to be taken into account in order to justify their use further.

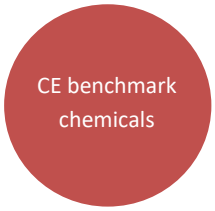
[555] For example in the VPA between the EU and Ghana, there is the possibility to address this issue through the Joint Monitoring and Review Mechanism (JMRM) (Article 19 of VPA of 19 March 2010 between the European Community and the Republic of Ghana on forest law enforcement, governance and trade in timber products into the Community, [2010] OJ L 70/3). The JMRM (composed of Party representatives) shall consider any matter relating to effective implementation of the Agreement through dialogue and exchange of information between the Parties, such as on matters of concern raised by either of the Parties (Article 19 (3)(e)). In addition, the JMRM shall endeavour to settle any disputes (Article 24 – there are procedures for appointing an arbitrator, which has the power to settle the case with a binding decision). Overall, I assume there is little chance of settling the request of the EU to broaden the VPA's scope to sustainably harvested timber through these official channels. Of course, the EU and Ghana can also change the agreement bilaterally under public international law. This has also been provided in the VPA: each party can propose an amendment to the JMRM. But only if consensus is achieved, it shall make a recommendation, which is subject to the approval of each Party (Article 26(1) TFEU).

[556] CBI, *CBI scenario planning Impact of the European Timber Regulation for SME timber exporters in developing countries, 'A strategic future roadmap for BSOs'* (CBI Market Information Database, 2013), pp. 8-9.

[557] Ibid., p. 10.


5.2
resource stage
5.2.1
sustainably
sourced wood
5.2.2
non-toxic
chemicals
5.2.3
recycled
wood
5.3
use stage
5.3.1
product
durability
5.3.2
waste
prevention
5.4
waste stage
5.4.1
product
recoverability
Ecodesign Framework Directive
- Yes, there is a legal basis to act, both on characteristics and on information
Additional features
- Meaning of Sustainable Forest Management
- Proof sustainability wood
Conclusion
- Use of forestry certifications to rely on for the definition of SFM and to proof SFM, and require new tracking technologies
- Consider broadening the scope of the EUTR to sustainably sourced wood in the future

5.2.2 Circular Economy benchmark for chemicals



This section examines the possibility to establish an ecodesign requirement on chemicals used in/on wooden products. Section A explains the legal basis under the EFD to act on this issue. Section B discusses some additional features a potential requirement would need to cover. Section C explains which EU legal acts in some way or another already regulate the use of chemicals and whether and how they cover the features identified earlier and the CE benchmark in general.[558] A final discussion on the CE benchmark is provided in Section D.

A. The legal basis in the Ecodesign Framework Directive to act

One of the potential ecodesign requirements could address the use of chemical substances in/on wooden products. Evidently, any timber used for wooden products is not toxic itself: it is the chemical treatment of the products that could negatively impact human health and the environment. Not only could these chemicals be used in paint or stain,[559] they could also be part of biocides used for preservation. These biocides aim at the protection of wood against attacks by fungi, bacteria or insects, and at the alteration of the characteristics of the wood (e.g. water or heat resistance). The ultimate goals of wood preservation are life-time extension and guaranteeing the safe use of the product at issue. In general, wood preservatives thus perform long-term functions and can therefore be very sustainable.[560] Of course, it is not the purpose of these chemicals to transfer their effects to the environment or to other materials or products.

Whenever (accidental) spills or releases occur, biocides could be harmful to the surrounding environment. Soil and surface and ground water contamination may, for example, be the result. Quite some wood impregnating chemicals are for that reason considered potentially dangerous to the environment, including human health, amongst others because they are not or slowly biodegradable by their very nature. The question is to what extent the EFD can and should regulate the use of these chemicals, and if so how.

There are some references to the controlled use of those preserving chemicals in the current EFD. While Part 1 (section 1.1, paragraph a) of Annex I EFD on 'raw material selection and use' was important for the previously discussed CE benchmark for sustainably sourced materials, it is not so much for the use of non-toxic materials in/on wooden products, because wood preservatives are already processed into final products (which are themselves used in/on other products). There are three life-cycle stages that would be useful to highlight here: the manufacturing stage, the use stage and the waste stage.[561] These stages are important because the Annex specifically provides for the possibility to include a requirement on the assessment of the anticipated emissions to air, water and soil in these stages in Implementing Measures.[562] The assessment of the anticipated pollution through physical effects can also be included, such as noise, vibration, radiation and electromagnetic fields.[563] For evaluating the potential for improving the environmental aspects of the targeted wooden product, several parameters can be highlighted in the non-exhaustive list included in section 1.3 of Annex I EFD. First, paragraph d stresses the direct link to the CLP Regulation and to REACH.[564] Second, yet again, paragraphs k-m refer to

[558] Note that some of these measures are explained for the first time, which means that these explanations are also important whenever some of the other CE benchmarks are addressed in the following Chapters. Others, on the other hand, have already been explained extensively in other Chapters (3.3 and 5.2.1), so these laws are discussed rather briefly.
[559] These treatments are not addressed in Chapter 5.
[560] This Chapter is therefore inextricably linked to Chapter 5.3.1 on product durability of wooden products.
[561] Part 1, section 1.1, paragraphs b, c and f Annex I EFD, respectively. These emissions would most likely cover the adversely affects they have on human health and environment, as referred to in Article 15(5)(b) EFD.
[562] Part 1, section 1.2, paragraph b Annex I EFD.
[563] Part 1, section 1.2, paragraph c Annex I EFD.
[564] The RoHS2 is also mentioned in this paragraph. This Regulation is however not very relevant for wooden products because there are not many electrical or electronic equipment solely made out of wood. Regulation

the emissions to air, water and soil. They particularly emphasize the emissions caused by persistent organic pollutants (POPs) and dangerous substances during the use and waste stages through leakage and spills. The supply of information for users on the significant environmental characteristics and performances of a product can be mandatory (Part 2, paragraph b Annex I EFD).

Based on these provisions and the criteria laid down in Article 15(5) EFD, any new Implementing Measure targeting wooden products can include a requirement on the use of preservatives. In fact, the EFD explicitly makes reference to the CLP Regulation and to the possibility to refer to other legislation in Implementing Measures. It makes sense to at least synchronize any future Implementing Measure with EU chemical law if new ecodesign requirements are established on the use of chemicals in/on wooden products.[565]

B. Additional features to take into account: risks, precaution and substitution

If one wishes to prepare an ecodesign requirement on the use of chemicals in/on wooden products, one may need to consider certain features for the requirement, which would be additional to the requirements set in Article 15 EFD. To be more precise, this section contains a discussion on whether the ecodesign requirement should follow a hazard or a risk approach, and which environmental principles should be taken into account and how this could be done.[566]

A hazard approach or a risk approach

A future Implementing Measure targeting a wooden product group should be specific on the approach adopted and the terminology used, because there are generally two approaches that could be guiding in EU chemical and product law, including the associated terms, that must not be confused.

While the CE Action Plan mentions the 'non-toxicity' of substances,[567] there are other terms, too, that could be used in the Ecodesign framework. Instead of 'toxic', some policies and laws, such as the ones discussed in Section C, contain words such as 'harmful', 'polluting', 'dangerous', 'risky' or 'hazardous' as an adjective to substances or products. Stand-alone, generally overlapping terminology is also being used, such as: POPs; SVHCs; PBTs; vPvBs; and CMRs.[568] Using the correct terminology is part of a more fundamental issue in EU chemical law, namely as to whether product legislation should be based on the evaluation of intrinsic hazards or on risk assessment, or on a combination of both. In other words, should the EU regulate the hazards and/or the risks substances, mixtures or products pose on the environment and human health? Evidently, this question must be answered if one wishes to create an ecodesign requirement on this topic.

The words 'hazard' and 'risk' have different meanings. On the one hand, 'hazard' relates to the intrinsic properties a material can have, such as its heat release, flammability, density, melting point or toxicity.[569] Hazard is the *potential* of chemicals to cause harm. Composing the hazard

---

2011/65 of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, [2011] OJ L 174.

[565] The EU law-maker furthermore specifically addresses the need for the Commission – when it prepares Implementing Measures – to take due account of existing *national* environmental legislation concerning toxic substances that Member States have indicated should be preserved. Importantly, this should be done without reducing the existing and justified levels of protection in the Member States (Recital (25) EFD).

[566] Because of these features that are peculiar to chemical legislation, this part tends to be somewhat extensive. Together with Chapter 3.2 on REACH, it is a reference framework for Chapter 7 where the challenges for the Circular Economy are discussed regarding plastic recycling.

[567] To be precise: '[t]*he promotion of non-toxic material cycles and better tracking of chemicals of concern in products'* and a '*future EU strategy for a non-toxic environment',* as announced in the 7th EAP. In: CE Action Plan, p. 12.

[568] See Chapter 3.3.3 for an explanation of these categories of substances.

[569] These examples can often be subcategorized (for toxicity: e.g. human toxicity and ecotoxicity).

profile of chemicals therefore consists of hazard identification and characterization,[570] and thus depends on a variety of evaluations – not only on the toxicity. On the other hand, determining 'risk' is much harder, as it relates to the actual ability of those hazards to cause harm in the 'real world'. Risk assessment is the *likelihood and level* of exposure[571] of the hazards to humans and the environment in a certain situation. Both hazard and exposure should thus be present: if the hazards are not exposed, there can be no risk.

In general terms, risk assessment can be understood as a four-step scheme which provides an essential set of information. This scheme will ultimately structure the decision-making process (step 5, see below). The four steps are as follows:

1. hazard identification ('does the wood-preservative give rise to an adverse effect to the environment/human health?');
2. dose-response assessment ('how much of the substance causes the adverse impact?');
3. exposure assessment ('what and/or who are exposed, what are the exposure routes, what are the levels of exposure, how long does the exposure take?'); and
4. risk characterization ('what is the likelihood that the exposure will have an impact?').[572]

The decision as to what constitutes an *acceptable* level of risk is more of an ethical and therefore a political decision in the end – it is not purely a scientific one. The question 'how safe is safe enough?' can only be answered by science alone in the most extreme situations.[573] A variety of factors play a role in the decision of what is safe enough, such as institutional, social and economic factors. The subsequent step thus concerns the follow-up of the risk assessment procedure, namely the adding of a normative touch to the issue of regulating risks. This step is called:

5. risk management

Risk management measures determining the level of acceptable risks are made by authorities. The political nature of what is believed to be an 'acceptable risk' is much reflected by the division between risk assessment and risk management: the assessment is the technical process for (scientific) experts and the management is the political process for political institutions, such as the EU regulators.[574] To put it bluntly, risk assessment merely serves as a tool for risk

[570] This means identifying and characterizing the nature and severity of the possible adverse effects. The characterization of chemicals typically involves the determination of the quantity of the chemical to have adverse effects on the environment or human health, because many substances do not have any adverse effects to a certain dose-level. K. Nordlander, Carl-Michael Simon and Hazel Pearson, 'Hazard v. Risk in EU Chemical Regulation' (*European Journal of Risk Regulation*, 3, 2010), p. 240.

[571] The evaluation of exposures is very complex, too: e.g. there are often multiple routes (skin contact, inhalation, through air, ingestion), the conditions are different (e.g. in food, in products, outside, indoor), and the likelihood of occurrence and the potential frequency and duration of the exposures is different. Reaching agreement on these issues is yet another hurdle. Ibid. 241. Another difficulty can be the inclusion of the entire life-cycle of the substance/product.

[572] Based on: N. de Sadeleer, *Environmental Principle, From Political Slogans to Legal Rules* (Oxford University Press, 2002), p. 181. It has furthermore been suggested that if for some reason experts cannot perform the four-step approach (e.g. when information on a substance/technology/product is at the frontier of scientific development and therefore also knowledge), a risk assessment can be reduced to only the performance of a preliminary hazard assessment (p. 197). This type of risk assessment is for example promoted by the 2001 White Paper of the Commission (European Commission, *Strategy for e Future Chemicals Policy*, COM(2001)88), where these simplified assessments are called 'accelerated risk assessments' and 'targeted risk assessments' (p. 20). However, it is debatable whether this can actually be called a risk assessment, because the exposure scenarios are not taken into account.

[573] Supra note 570, pp. 241-242.

[574] M. Lee, *EU Environmental Law, Governance and Decision-making* (Hart Publishing, 2 edn, 2014), pp. 39-40; and European Commission, *Communication on the precautionary principle*, COM(2000)1, p. 12.

management – albeit a very significant one. With that in mind, decision-makers thus enjoy a certain degree of discretion as regards risk assessment in that they should bear a *reasonable relationship* to the relevant scientific findings.[575] The CJEU explained that if the EU law-making institutions disregard the opinion of the experts made in the risk assessment, they must provide *'specific reasons for its findings by comparison with those made in the opinion* [risk assessment] *and its statement of reasons must explain why it is disregarding the latter. The statement of reasons must be of a scientific level at least commensurate with that of the opinion in question.*'[576]

The final step of the risk procedure is the passing on of information about the risk(s) and how to manage them:[577]

6. risk communication

It can be concluded that the toxicity determination is part of the hazard evaluation and the hazard evaluation is, in combination with the evaluation of exposure scenarios, part of the risk assessment. Subsequently, this assessment is turned into deeds – that is the actual management of the risks. Undoubtedly, this explanation is far too simplistic,[578] but it provides some basic understanding of the differences in terminology used in EU chemical law. The EU is generally not very straightforward on which policy it pursues, simply because there is no consensus on whether to follow a hazard-based or a risk-based approach. There is no ready-made solution available that could be applied in all situations. This resulted in a rather fragmented regulatory landscape. Even though hazards form the historical basis from which EU chemical law has developed, the risk approach has been increasingly used in EU chemical legislation since the 1990s.[579] As regards the management of the risks, environmental principles are now used to review and streamline the decision of what is regarded as acceptable risks. The precautionary principle and the substitution principle are explained in more detail below, as they would also shape any future ecodesign requirement on chemicals used in/on wooden products.

Precaution in managing uncertain risks

The precautionary principle is a key principle in EU chemicals law, because it deals with the *uncertainty* about the harm chemicals could pose to the environment and human health. In fact, the very existence of uncertainty even justifies precaution. (The preventive principle, in contrast, derives from scientific certainty. It operates in relation to risks whose scale and impact can be objectively quantified and predicted based on cumulative experience. Article 1921(2) TFEU clearly makes a distinction between the two environmental principles. Even so, both of them depart from a progressive viewpoint instead of a curative viewpoint).[580]

The precautionary principle is only mentioned in Article 191(2) TFEU, which thus obliges the EU Institutions (and Member States)[581] to base environmental policy and pursuant to Article

[575] N. de Sadeleer, *Environmental Principle, From Political Slogans to Legal Rules* (Oxford University Press, 2002), pp. 196-197.
[576] Judgement of 11 September 2002, *Pfizer Animal Health SA v Council*, T-13/99, EU:T:2002:209, para. 199.
[577] See e.g.: European Commission, *Communication on the precautionary principle*, COM(2000)1, p. 2.
[578] For example, as will be clarified in the next section on the precautionary principle: the division between risk assessment and risk management is by no means watertight. See also: N. de Sadeleer, 'The Precautionary Principle in EC Health and Environmental Law' (*European Law Journal*, 12:2, 2006), p. 148.
[579] R.E. Lofstedt, 'Risk versus Hazard – How to Regulate in the 21st Century' (*European Journal of Risk Regulation*, 2, 2011), pp. 149-153.
[580] A discussion on the alleged distinction between the preventive principle and precautionary principle has already been provided elsewhere and will therefore not be repeated here. See e.g.: L. Reins, *The Coherent Regulation of Energy And Environment In The European Union – Using Shale Gas As A Case Study* (PhD dissertation, Law, KU Leuven, 2012-2015), pp. 184-190. For an explanation of the preventive principle see Chapter 5.3.2-B (heading 'Taking preventive action').
[581] De Sadeleer argues that Member States are in any case bound by the precautionary principle if the environmental Directive or Regulation expressly mentions the principle. If this is not the case, the principle may nevertheless apply insofar as Article 10 EC (this Article is repealed and replaced in substance by Article 4(3)

11 TFEU basically all other policies on this principle.[582] Even so, it has not been defined in the EU Treaties, which means that it is open to interpretation.[583]

In plain terms, the precautionary principle allows protective measures to be taken in environmental decision-making when there is no scientific certainty that harm to the environment or human health will occur, in the short run or in the long run. Precautionary action therefore reconciles science and normative decision-making. A more extensive interpretation of the principle was put forward by the Commission in a Communication on the precautionary principle in 2000.[584] The Commission particularly highlights the balancing act of whether or not to invoke the principle:

> [It] *is a decision exercised where scientific information is insufficient, inconclusive, or uncertain and where there are indications that the possible effects on the environment, or human, animal or plant health may be potentially dangerous and inconsistent with the chosen level of protection.*[585] (emphasis added)

It further states that, on the basis of preliminary objective scientific evaluation, there should be reasonable grounds for concern about the potentially dangerous impacts on the environment, and that these impacts may be inconsistent with the high level of protection, as prescribed the environmental objectives of the EU.[586] The CJEU also interpreted the precautionary principle in a number of cases.[587] It reasons that the principle demands a certain level of scientific *plausible*

TEU) imposes on national authorities wide-ranging obligations on environmental protection, prevention and precaution. Hence, there is a binding effect of the precautionary principle as regards Member States' actions. In addition, the precautionary principle is now seen as a general principle. N. de Sadeleer, 'The Precautionary Principle as a Device for Greater Environmental Protection: Lessons from EC Courts' (*Review of European Community and International Environmental Law*, 18:1, 2009), pp. 8-9; and his much cited earlier work: N. de Sadeleer, 'The Precautionary Principle in EC Health and Environmental Law' (*European Law Journal*, 12:2, 2006), pp. 143-144.

[582] The principle was incorporated in the EU Treaties through the adoption of the Maastricht Treaty (then: Article 130r(2)).

[583] On the international level, the best known definition of the precautionary principle can be found in the UN Rio Declaration of 1992. Principle 15 states that '[w]*here there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation,'* which has a narrower scope than the description used in the EU. Since many other international documents and treaties included a reference to the principle, it has been progressively consolidated in international environmental. P. Birnie, A. Boyle and C. Redgwell, *International Law & the Environment* (Oxford University Press, 3 edn, 2009) p. 159. Nevertheless, when it comes to definitional problems, the precautionary principle has often been described as being something similar as *'in a league of its own amongst* [all other] *environmental principles'* in the EU context. In: E. Fisher, B. Lange and E. Scotford, *Environmental law – Text, Cases, and Materials* (Oxford University Press, 2013), p. 412. It could be argued that the vagueness of the principle is, however, inherently linked to the broad spectrum of the principle's application: it needs to be flexible because it operates in a number of different situations (e.g. different administrative levels, different subjects [GMOs, food safety, air quality], both in the past and in the present).

[584] Importantly, the clarifications put forward in Communication are not definitive; rather, the idea of the Commission was to provide input to the debate on the Precautionary Principle. European Commission, *Communication on the precautionary principle*, COM(2000)1, p. 8.

[585] Ibid. The Council tried to formulate a rudimentary definition in the reviewed EU SDS in 2006. According to the document, the principle should be applied *'*[w]*here there is scientific uncertainty implement evaluation procedures and take appropriate preventive action in order to avoid damage to human health or to the environment*.' European Council, *Review of the EU Sustainable Development Strategy (EU SDS) - Renewed Strategy*, 10917/06, 26 June 2006, p. 5. Despite the fact that this interpretation followed the 2000 Communication, it did not provide any more guidance whatsoever.

[586] Supra note 584, p. 3. The General Court, by the way, observed that certain public objectives (e.g. the protection of public health and the environmental) pursued by the regulation may take precedence over economic considerations. E.g. in: Judgement of 11 September 2002, *Pfizer Animal Health SA v Council*, T-13/99, EU:T:2002:209, para. 456; and Judgement of 26 November 2002, *Artegodan GmbH and Other v Commission*, Joined T-74/00, T-76/00, T-83/00 to T-85/00, T-132/00, T-137/00 and T-141/00, EU:T:2002:283, para. 173.

[587] See for the earliest cases, e.g.: Judgement of 13 November 1990, *The Queen v The Minister for Agriculture, Fisheries and Food and the Secretary of State for Health, ex parte: Fedesa and Others*, C-331/88,

risk. The extensive reasoning by the Court of First Instance of the CJEU (now called 'General Court') in the landmark *Pfizer Animal Health SA* Case of 2002 explains that a precautionary measure[588] may only be taken if the risk, *'although the reality and extent thereof have not been "fully" demonstrated by conclusive scientific evidence, appears to be adequately backed up by the scientific data available at the time when the measure was taken.*'[589] Moreover, the Court clearly underlined in *Pfizer* that 'zero risk' does not exist. It rejects any suggestion that a failure to establish proof of 'absolute safety' might justify protective measures.[590]

The Commission points out in the 2000 Communication that the precautionary principle is particularly relevant for risk management, because recourse to the principle presupposes that *'potentially dangerous effects deriving from a phenomenon, product or process have been identified, and that scientific evaluation does not allow the risk to be determined with sufficient certainty*.'[591] In the *Pfizer* Case the CJEU clarifies, however, that a risk assessment is necessary *before* any precautionary measures are taken.[592] Risk assessments play a crucial role in *determining* whether precautionary intervention is justified, as, of course, there must be evidence of plausible harm.[593]

EU:C:1990:391, paras. 9-10 (implicitly acknowledged); Judgement of 5 May 1998, *United Kingdom v. Commission*, C-180/96, EU:C:1998:192 (*BSE disease* Case), para. 93; Judgement of 5 May 1998, *The Queen v National Farmers' Union and Others*, C-157/96, EU:C:1998:191, para. 63; and Judgement of 4 July 2000, *Laboratoires Pharmaceutiques Bergaderm SA and Jean-Jacques Goupil v Commission*, C-352/98 P, EU:C:2000:361, paras. 24 and 52 *et seq*. (which is an appeal against the judgment of the General Court of the CJEU: T-199/96, para. 66). The latter case was in fact the first case ever in which the CJEU explicitly referred to the precautionary principle.

[588] The measures concerned are called 'preventive measures' in the judgement. To avoid confusion with the measures based on the preventive principle, however, the adjustment to 'precautionary measures' would seem to fit better.

[589] Judgement of 11 September 2002, *Pfizer Animal Health SA v Council*, T-13/99, EU:T:2002:209, paras. 136-148, see in particular para. 144 (quote). Just as the Judgement of 11 September 2002, *Alpharma v Council*, T-70/99, EU:T:2002:210, the judgement concerned the use of antibiotics as growth promoters in animal feed. In this particular case, it concerned a Regulation (2821/98) that was explicitly adopted on the basis of the precautionary principle (uncertainty about antibiotic resistance – this basis was eventually judged valid) and that withdrew Community authorisation for virginiamycin (the antibiotic) used as a growth promotor in animals breaded for human consumption. See also: Opinion of Advocate General Mischo on 12 December 2002, *Commission v Denmark*, C-192/01, EU:C:2002:760, paras. 101-102; Judgement of 11 July 2007, *Sweden v Commission*, T-229/04, EU:T:2007:217 (*Paraquat*), paras. 161 and 224; Judgement of 28 January 2010, *Commission v France*, C-333/08, EU:C:2010:44, paras. 91-93; and Judgement of 9 July 2010, *Afton Chemical Ltd v Secretary of State for Transport*, C-343/09, EU:C:2010:419, paras. 61-62.

[590] Judgement of 11 September 2002, *Pfizer Animal Health SA v Council*, T-13/99, EU:T:2002:209, para. 130.

[591] European Commission, *Communication on the precautionary principle*, COM(2000)1, p. 4. See also: pp. 8 and 13; and Judgement of 22 December 2010, *Gowan Comércio Internacional e Serviços Lda v Ministero della Salute*, C-77/09, EU:C:2010:803, para. 68.

[592] Judgement of 11 September 2002, *Pfizer Animal Health SA v Council*, T-13/99, EU:T:2002:209, paras. 155. See also: Judgement of 11 September 2002, *Alpharma v Council*, T-70/99, EU:T:2002:210, para. 168; Judgement of 22 December 2010, *Gowan Comércio Internacional e Serviços Lda v Ministero della Salute,* C-77/09, EU:C:2010:803, para. 75; and Judgement of 28 January 2010, *Commission v France*, C-333/08, EU:C:2010:44, para. 92.

[593] According to Stokes, there is difference between earlier cases and later cases in this regard. Where as in earlier cases the adagio was that some degree of evidence was sufficient to justify the principle, the CJEU requires that there must be concrete scientific evidence of potential harm in later cases. Strokes dedicates this shift to the increasingly popular BRP (as already demonstrated and explained in Chapters 2.2.3-A and 4.2.2, this popularity has not impoverished since the publication of the article in 2008), the 2000 Communication on the precautionary principle and the World Trade Organization (WTO) litigation on precautionary safeguards. In: E. Stokes, 'The EC court's contribution to refining the parameters of precaution' (*Journal of Risk Research,* 11:4, 2008), p. 491-507, see in particular pp. 501-503. Besides the *Pfizer*, *Alpharma*, *Gowan* and *Commission v France* Cases, see: Judgment of the Court of 23 September 2003, *Commission v Denmark*, C-192/01, EU:C:2003:492, para. 61; Judgement of 9 September 2003, *Monsato Agricoltura Italia SpA and Others v Presidenza del Consiglio dei Ministri and Others*, C-236/01, EU:C:2003:431, para. 131; Judgement of 14 December 2004, *Swedish Match AB and Swedish Match UK Ltd v Secretary of State for Health*, C-210/03,

In addition to this, the precautionary principle also *shapes* the risk assessment procedure. For example: it broadens the scope of risk assessment because, according to the principle, *all* relevant risk factors should be taken into account when evaluating *all* uncertainties.[594] Put differently, the principle assigns the scientific experts what to assess. The principle also adds qualitative elements to the quantitative elements of a risk assessment, such as social values to.[595]

Criteria for precautionary measures
The European Commission established several criteria to guide decision-makers on the use of the precautionary principle. The risk management measures that are based on the precautionary principle must, amongst others, be:

1. based on an examination of the benefits and costs of action or lack of action (if possible a cost-benefit analysis);[596]
2. consistent with similar measures already taken in similar circumstances or using similar approaches;
3. subject to review in view of new scientific findings (responding to the dynamics of scientific development);[597]
4. non-discriminatory in the application (comparable/different situations should not be treated differently/the same, unless objective grounds exist);
5. capable of assigning responsibility for producing the scientific evidence (necessary for a more comprehensive risk assessment);[598] and
6. proportionate in the chosen level of protection.[599]

As regards the final criterion,[600] risk reduction implies the redistribution of resources to the disadvantage of certain socio-economic sectors.[601] The decision-maker might thus have to make a

---

EU:C:2004:802, para. 103; and Judgement of 2 December 2004, *Commission v The Netherlands*, C-41/02, EU:C:2004:762, para 59. In the latter, for example, the CJEU states that the Dutch government did not produce '*any scientific studies showing that any intake over the recommended daily allowance of certain nutrients, regardless of by how much, entails a real risk for public health*.'

[594] This is particularly important in light of the complexity of the Circular Economy and other transitional systems.

[595] N. de Sadeleer, *Environmental Principle, From Political Slogans to Legal Rules* (Oxford University Press, 2002), pp. 186-195. See pp. 186, 188 and 191 concerning the three examples provided.

[596] Also explicitly mentioned in Article 191(3) TFEU: in preparing its policy on the environment, the EU must take account of, amongst others, the potential benefits and costs of action or lack of action. Like the criterion of proportionality, this criterion can also been seen in the light of the BRP. M.D. Rogers, 'Risk management and the record of the precautionary principle in EU case law' (*Journal of Risk Research*, 14:4, 2011), pp. 476-477. This criterion was only twice expressly examined by the CJEU in judgements until 2008 and even then it had only an indirect influence on their outcome (the *Pfizer* and the *Alpharma* Cases) (pp. 477-478).

[597] This criterion is really the only criterion that directly relates to the precautionary principle, as it reflects the idea that if scientific uncertainty continuous, the precautionary measure should be maintained as well, and vice versa. See e.g.: Judgement of 21 July 2011, *Etimine SA v Secretary of State for Work and Pensions*, C-15/10, EU:C:2011:504.

[598] According to the 2000 Commission Communication, this criterion means that States *'that impose a prior approval (marketing authorisation) requirement on products that they deem dangerous a priori reverse the burden of proving injury, by treating them as dangerous unless and until businesses do the scientific work necessary to demonstrate that they are safe.'* p. 4.

[599] European Commission, *Communication on the precautionary principle*, COM(2000)1, p. 3. Annex III of the Communication provides further details on the scheme. Because this Communication is endorsed by all EU law-making Institutions, it could be seen as a code of practice.

[600] And additionally the closely related criterion on cost-benefit analysis, because the General Court of the CJEU decided in the *Pfizer* Case that the cost-benefit analysis is actually a particular expression of the proportionality principle in cases involving risk management. Judgement of 11 September 2002, *Pfizer Animal Health SA v Council*, T-13/99, EU:T:2002:209, para. 410.

[601] Supra note 595, p. 167 (see also on cost-benefit analysis pp. 168-172).

choice between reducing the risks that are either based on long-term uncertainties (often related to human health and ecosystems) or on pressing short-term needs (often economic). Be that as it may, proportionality should guide the decision-maker in evaluating the need for and the usefulness of proposed measures by considering how they will affect the interest of the various parties impacted by the decision as well as of society as a whole.[602] In general terms, the proportionality principle requires a necessity test and an appropriateness test.[603]

In the context of the precautionary principle, too, the first test calls for a comparison between the various measures that can be adopted to achieve the desired objective and that causes the least inconveniences. In other words: do not go beyond what is necessary to attain the goal legitimately pursued by the legislation in question.[604] The second test requires the balancing of the pros and cons by weighing the interests. This is to take into account the consequences of the pursued measure. In the light of the precautionary principle, for example, any complete withdrawal of authorization on the use of a substance/product could be regarded as disproportionate in the absence of a serious risk.[605] Another example of disproportionality is the obligation for manufacturers to disclose complete formulas the composition of substances, as it would seriously impact the manufacturers' economic interests in terms of lost benefits in view of research and innovation.[606]

A simple summary would be that the precautionary principle can be applied in cases where there is insufficient data to pinpoint the precise risks. Risk management measures need to take the uncertainty into account.[607] The precautionary principle ultimately boils down to a duty of care and a duty to explain the choices. The EU law-making Institutions must therefore indicate that they actually exercised their discretion, which presupposes the taking into consideration of all the relevant factors and circumstances of the situation the act was intended to regulate.[608] Generally, the Institutions enjoy a large discretion.[609]

Precautionary instruments

So how can the precautionary principle shape secondary legislation such as an Ecodesign Implementing Measure? What are the options for decision-makers to control the uncertain risks related to the use chemicals in/on wooden products?

[602] Ibid., pp. 168 and 173.

[603] See e.g.: Judgement of 21 July 2011, *Etimine SA v Secretary of State for Work and Pensions,* C-15/10, EU:C:2011:504, para. 124. The function of the proportionality principle, which is besides part of the precautionary principle a stand-alone general principle in EU law, is well-understood in theory. That does not mean, however, that it is easy to use by decision-makers. In fact, most of the important cases decided by the CJEU with respect to precaution were brought by claimants claiming that a certain precaution-based regulation was violating the proportionality principle. N. de Sadeleer, 'The Precautionary Principle in EC Health and Environmental Law' (*European Law Journal*, 12:2, 2006), p. 167. See also: M.D. Rogers, 'Risk management and the record of the precautionary principle in EU case law' (*Journal of Risk Research,* 14:4, 2011), pp. 474-475 and 480. Note that the first article was published in 2006 and that the second article included only case law until 2008.

[604] See e.g.: the *Pfizer* and *Alpharma* Cases.

[605] Note that in principle at least human health (and most likely other public objectives) takes precedence over economic considerations (this has already been mentioned above). The precedence and proportionality principles should in turn also be balanced on a case-by-case basis.

[606] Judgement of 6 December 2005, *ABNA Ltd and Others v Ministero delle Politiche Agricole e Forestali and Others*, Joined C-453/03, C-11/04, C-12/04 and C-194/04, EU:C:2005:741, para. 82.

[607] Otherwise, if the measures were taken based on the likelihood of the known risks (i.e. certain risks), it would have been an application of the preventive principle.

[608] Judgement of 9 July 2010, *Afton Chemical Ltd v Secretary of State for Transport,* C-343/09, EU:C:2010:419, para. 34.

[609] Judgement of 7 July 2009, *S.P.C.M. SA, C.H. Erbslöh KG, Lake Chemicals and Minerals Ltd and Hercules Inc. v Secretary of State for the Environment, Food and Rural Affairs*, C-558/07, EU:C:2009:430, para. 42.

Generally speaking, precautionary measures constrain the action of a targeted group. A list of seven regulatory possibilities to address the uncertainties regarding chemicals can be made,[610] which looks as follows:

1. Refrain from doing anything
2. Gather more data
3. Disseminate the information about the possible risk
4. Require authorization of uses (explicit approval: positive list)
5. Establish restrictions, including total bans (explicit disapproval: negative list)
6. Establish voluntary measures
7. Require evaluation

Responding to the scientific uncertainty, however, does not mean that, in practice, precautionary measures are adopted in every situation. Empirical studies have shown that the Commission makes selective use of the scientific evidence provided. It turns out that the principle's invocation depends on which DG is responsible for addressing the risks in question.[611] It should not be surprising that DG ENV tends to be more willing to propose precautionary policies than, let us say, DG GROW.[612] Additionally, the attention a given risk receives from the public (and thus from politicians) also affects the principle's invocation.[613] A final comment relates to the fear in EU politics of false risks ('false positives') and over-regulation based on the precautionary principle.[614]

Be that as it may, the precautionary principle has found expression in a variety of secondary law, primarily in legislation aiming at the protection of public health.[615] Any future Implementing Measures for wooden products would probably also need to take the principle into account.

Substitution of chemicals of concern

Despite its absence from Article 191(2) TFEU, the substitution principle has become one of the building blocks of EU chemical legislation.[616] The goal of the principle's application is to assure fewer risks and to boost innovation.[617] The substitution principle is the newest, stand-alone environmental principle in EU law, but – just like any environmental principle – it is even so inherently linked with other principles; the principle could work in tandem with the precautionary

[610] Milieu Ltd, T.M.C. Asser Instituut and Pace, *Considerations on the application of the Precautionary Principle in the chemicals sector* (Milieu Ltd, 2011), pp. 43-49. The original list contained 6 point. The final point has been added.

[611] J. Tuson, 'How the EU handles uncertain risks: understanding the role of the precautionary principle' (*Journal of European Public Policy*, 20:10, 2013), p. 1521.

[612] Note that this particular information is originally based on an article published in 2006: D. Pesendorfer, 'EU environmental policy under pressure: chemicals policy change between antagonistic goals?' (*Environmental Politics*, 15:1, 2006), p. 101. Possibly, the integration principle has deepened its footprint on EU politics.

[613] Supra note 611, p. 1521.

[614] See for a discussion on this topic: S. Foss Hansen and J.A. Tickner, 'The precautionary principle and false alarms — lessons learned' in: European Environment Agency, *Late lessons from early warnings: science, precaution, innovation* (EEA, 2013), pp. 17-45.

[615] Examples of policy fields where the precautionary principle plays an important role are: biodiversity, GMOs (food safety) and more recently nanotechnology.

[616] See for an early mention of the principle the 2001 White Paper of the Commission, where it takes a prominent place: European Commission, *Strategy for a future Chemicals Policy*, COM(2001) 88, pp. 5, 8 and 20.

[617] Some are however of the opinion that imposed substitution is counterproductive for innovation, as it would remove the benefits from experimenting and learning, for example with the chemicals that need to be substituted by others. See e.g.: S.E. Dudley, 'Comment on Lofstedt's "The substitution principle in chemical regulation: a constructive critique"' (*Journal of Risk regulation*, 17:5, 2014), p. 589.

principle.[618] The principles are closely related in the sense that the risk management measures based on precaution can include requirements on finding and using alternatives for certain chemicals (in particular applications) because of the unknown risks they pose on humans or the environment. Registration, authorization, restriction and evaluation are examples of precautionary measures that reflect the substitution principle.[619] Substituting substances with other, less risky chemicals is a well-known example of a precautionary measure.[620]

Similar to the precautionary principle, there is no clear definition of the substitution principle to date. Some explanations of substitution only cover hazardous chemicals,[621] while others also include products and/or processes.[622] There are even broader interpretations as well, such as:

> *If risks to the environment and human health and safety can be reduced by replacing a chemical substance, mixture or product either by another substance, mixture or product or by some non-chemical technology, then this replacement should be made. All decisions on such substitutions should be based on the best available evidence. This evidence can be sufficient to warrant substitution even if it only consists of hazard information and quantitative risk estimates cannot be made.*[623]

The CJEU had the opportunity to clarify the substitution principle in 2001. In the *Toolex* Case, the CJEU had to answer the question when and to what extent a national measure may impede the free movement of goods based on environmental and human health protection. The case was about the Swedish ban of trichloroethylene, which had been classified as dangerous under the (old) Directive 67/548 and departed from harmonized European standards. The CJEU ruled that despite the uncertainties about the exposure effects of the substance, the ban was necessary for the effective protection of human health and life. When the CJEU checked the proportionality of the measure, it recognized the use of the substitution principle for the first time.[624] Even though the CJEU does not say it explicitly, the judgement suggests that where national measures based on the substitution principle are taken, the proportionality principle is marginally applied, *'not to say superfluous*.'[625] In other words, substitution can in principle take place even if the risks can be controlled by less restrictive measures. It is now possible to refer to this decision in cases where

---

[618] Surprisingly, the 2000 Communication on the precautionary principle however completely ignored this link; it does not mention the importance of assessing alternatives to potentially harmful activities, substances or products at all.

[619] Indeed, these examples were also mentioned in the previous section on the precautionary instruments.

[620] The connection between the precautionary and substitution principles can be explained as follows: *examining and substituting hazardous chemicals with safer alternatives is a key element of precautionary thinking and the availability of feasible safer alternatives or services should be seen as sufficient rationale under precaution to restrict or phase out the use of hazardous chemicals*. S. Foss Hansen, L. Carlsen and J.A. Tickner, 'Chemicals regulation and precaution: does REACH really incorporate the precautionary principle' (*Environmental Science and Policy*, 10:5, 2007), pp. 399-400.

[621] This approach is followed by the Commission: European Commission, *Strategy for a future Chemicals Policy*, COM(2001) 88, p. 8

[622] See e.g.: A. Ahrens, A. Braun, A. vom Gleich, K. Heitmann and L. Lißner, *Hazardous Chemicals in products and Processes. Substitution as an Innovative Process* (Physica-Verlag, 2006), p. 22; and E.M. Vogelezang-Stoute, 'European Community Legislation on the Marketing and Use of Pesticides' (*Review of European Community & International Environmental Law*, 8:2, 1999), p. 147.

[623] S.O. Hansson, L. Molander and C. Rudén 'The Substitution Principle' (*Regulatory Toxicology and Pharmacology*, 59, 2011), p. 456. The authors of this interpretation do no draw a line between hazards and risks. Apparently, the risk assessment can be abandonment in certain situations. That the substitution principle might be based on hazards instead of risks is not a common understanding of the principle, e.g. the UK Royal Society of Chemistry is against this interpretation. See UK Royal Society of Chemistry, *Exploring the Practical Aspects of Chemical Substitution* (Royal Society of Chemistry, 2007), p. 3.

[624] Judgement of 11 July 2000, *Kemikalieinspektionen and Toolex Alpha AB*, C-473/98, EU:C:2000:379 (*Toolex* Case), para. 47.

[625] V. Heyvaert, 'Balancing Trade and Environment in the European Union: Proportionality Substituted?' (*Oxford University Press*, 13:3, 2001), p. 404.

the precedence of human health and environmental protection over economic considerations has been put forward.[626]

The substitution principle has also possible weaknesses. One concern is that it might be uncertain whether there are actually alternatives available. The availability of substitutes is a significant precondition, of course. Moreover, building a bridge between the risk approach and the substitution principle, some authors have flagged the problem of ignoring the possibility of unintended risk-risk trade-offs.[627] These trade-offs can occur when a one risk is being decreased through substitution while another risk will increase due to the substitution. Put differently, substituting one risky but (/and therefore) profoundly studied chemical with another (probably less studied) one might cause other (possibly more severe) risks.[628] In some cases, therefore, the substitution principle could facilitate the shortcoming of the precautionary measure if irresponsibly applied, as the principle actively urges regulators to provide provisions on using alternatives for hazardous substances. The condition that the substitutions must be safe basically boils down to the observation that the application of the substitution principle is *not* automatically risk free, either. It is therefore important that the risk assessment, including the proportionality test, takes into account alternatives and the potential risk trade-offs. Yet, despite the necessity of a thorough substitution comparison,[629] there are several challenges to take account of: comparing is comprehensive, complex, time-consuming, and expensive and may be politically tricky.[630]

Annex – Flowchart 7: hazard-risk-action shows the link between the hazard approach and the risk approach, and displays which steps are taken. It also indicates how the preventive principle, the precautionary principle, the substitution principle and the proportionality principle impact the risk approach.

C. Other laws that regulate chemical use

Below, the CLP Regulation, REACH, the Biocidal Products Regulation (BPR),[631] the Ecolabel framework, the CPR and the PPD framework are clarified in view of establishing an ecodesign requirement on the use of chemicals in/on wooden products. The explanations cover a discussion on whether and how these laws address the potential additional features, which have been identified above, and the Circular Economy in general.

Classification, Labelling and Packaging Regulation: regulating the hazards of substances

The main objective of the CLP Regulation is to determine which properties of substances and mixtures should lead to a classification as hazardous, in order for the *hazards* to be properly

[626] Ibid., p. 405.

[627] See for one of the earliest and often cited work: J.D. Graham and J.B. Wiener, *Risk Vs Risk. Tradeoffs in Protecting Health and the Environment* (Harvard University Press, 1995). The idea of risk-risk trade-off is nowadays widespread in literature – unlike in regulation.

[628] R. Lofstedt, 'The substitution principle in chemical regulation: a constructive critique' (*Journal of Risk Research*, 17:5, 2014), pp. 543-564, with particular focus on pp. 551-552 and 554-555 where examples are provided of cases where it is not clear whether the substitutional substances is safer than the substituted substance.

[629] Supra note 625, p. 406.

[630] For example, it is argued that ignoring the risk-risk trade-offs might be based on political expediency: firstly because science has become more specialized, which affects the ability of regulators to take science-based decisions outside of their specialty area, and secondly because risk-risk trade-offs are – pushed by e.g. media and market-holders – direct products of incomplete and regularly unscientific decision-making. R. Lofstedt, 'The substitution principle in chemical regulation: a constructive critique' (*Journal of Risk Research*, 17:5, 2014), pp. 557-558.

[631] Regulation 528/2012 of 22 May 2012 concerning the making available on the market and use of biocidal products [2012] OJ L 167/1 (consolidated version). It repealed the Biocidal Products Directive (BPD) (Directive 98/8 of 16 February 1998 concerning the placing of biocidal products on the market, [1998] OJ L 123/1).

identified and communicated.[632] Article 3 CLP Regulation specifies that a substance/mixture fulfilling the criteria relating to physical, health or environmental hazards laid down in Parts 2-5 of Annex I CLP is hazardous and shall be classified in relation to the respective hazard classes[633] provided for in Annex I.[634] The entities that enjoy the responsibility to classify substances/mixtures before placing them on the market are: manufacturers, importers and downstream users (the latter group includes the producers of articles).[635]

Even though the CLP Regulation clearly adopts a hazard approach,[636] it also contains certain risk aspects that can be linked to the precautionary principle.[637] First, the Regulation includes provisions on the passing on of information through labelling. Besides hazard statements, the labels include so-called 'precautionary statements' unless exempted.[638] A precautionary statement is a phrase that describes recommended measures to minimize or prevent adverse effects resulting from exposure to a hazardous substance/mixture due to its use or disposal.[639] Second, the (re)classification of hazards is *inter alia* based on the information of the *form* in which a chemical is put on the EU market and in which it can *reasonably be expected to be used*.[640] Furthermore, an opinion is required by the ECHA's Committee for *Risk* Assessment[641] when a proposal for harmonised classification and labelling is submitted.[642] These aspects suggest that at least there are several elements of a risk approach present in the substance classification. Then again, the ECHA strongly rejects this vision, as it states that the classification should not be confused with risk assessment *'which relates a given hazard to the actual exposure* […]. *Nevertheless, the common denominator for both classification and risk assessment is hazard identification and hazard assessment*.'[643] This statement is supported by observations made in practice, such as that the Commission has tended to ignore the criteria on the form and expected use of the substances/mixtures.[644] It is therefore not plain and clear to what extent the CLP framework

[632] Recital (10) in conjunction with Article 1(1)(a) CLP Regulation. This shall be done by identifying and examining the relevant available information (Articles 5 and 6 CLP) or by performing new tests (Article 8 CLP). The CLP Regulation is not only important for the classification of hazardous substances/mixtures: legal entities must notify to the Classification and Labelling (C&L) Inventory (a database) substances which they place on the market, regardless of whether these substances are hazardous or not (Article 1(1)(c)-(e) in conjunction with Articles 39-42 CLP). This Inventory also includes the registered substances under REACH. The ECHA maintains the Inventory. The CLP Regulation incorporates the classification criteria and labelling rules agreed at UN level: i.e. the Globally Harmonised System of Classification and Labelling of Chemicals (GHS).
[633] Article 2(1) CLP: hazard class means '*the nature of the physical, health or environmental hazard.'*
[634] The same Article further states that where hazard classes are differentiated in Annex I on the basis of the route of exposure or the nature of the effects, the substance/mixture shall of course be classified in accordance with such differentiation.
[635] Article 4(1) CLP.
[636] E.g. Recital (48) CLP clearly uses that terms such as 'non-toxic', 'non-harmful', 'non-polluting' or other statements indicating that the substance or mixture is *not hazardous* or any other statements, are inconsistent with its classification should not appear on the label or packaging of any substance or mixture. In the Dangerous Substances Directive (67/548) and the Dangerous Preparations Directive (1999/45) 'dangerous' was the standard term – under the CLP Regulation 'hazardous' is the only proper terminology.
[637] No expression of the substitution principle can be found in the Regulation.
[638] Article 7(1)(g) in conjunction with Article 22 CLP.
[639] Article 2(6) CLP.
[640] See Articles 5(1), 6(1), 8(6) and 9(5) CLP.
[641] Which is set up pursuant to Article 76(1)(c) REACH. As the Committee's name already suggests, it prepares the opinions of ECHA related to the *risks* of substances to human health and the environment.
[642] Article 37(4) CLP. The Competent Authority of a Member State or a manufacturer, importer and downstream user of a substance may submit a proposal to the EHA (Article 37 CLP). For active substances used in biocidal products, however, only the Competent Authorities can submit proposals – not the industry.
[643] European Chemicals Agency, *Introductory Guidance on the CLP Regulation* (ECHA, 2.1, 2015), p. 16.
[644] K. Nordlander, C. Simon and H. Pearson, 'Hazard v. Risk in EU Chemical Regulation' (*European Journal of Risk Regulation*, 3 2010), pp. 242-243. Note that these observations were made when the CLP was not yet in force – the DSD was, however, which contained similar provisions.

follows a risk approach and whether it reflects the precautionary principle. The substitution principle is in any case not reflected in the CLP Regulation.

REACH: risk assessment and risk management

While the CLP Regulation regulates the classification, labelling and packaging of substances/mixtures, its counterpart, REACH, is the chief legislation regulating the use of chemicals. REACH is an umbrella law, laying down management requirements.[645] See Chapters 3.3.2 and 3.3.3 for an explanation of the scope and the main instruments of the Regulation.[646] Generally speaking, one could say that REACH is particularly important for the managing of scientifically uncertain risks surrounding the use of many substances or mixtures, even though it does not define the word 'risk'. In fact, REACH was even *intended* to regulate risks rather than hazards. This caused a major shift in EU chemical law in a relatively short time period.[647] Significantly, the Preamble and in Article 1(3) explicitly states that REACH is underpinned by the precautionary principle. Below, the main instruments of the Regulation are further explained to identify why REACH is indeed based on a risk and precautionary approach.

Registration and evaluation

The registration procedure is generally based on a classic risk approach instead of a hazard approach, as these CSAs include a hazard assessment, an exposure assessment *and* a risk characterization.[648] Article 14(6) REACH suggests that a registrant must identify and apply appropriate measures to adequately control the *risks* identified in the CSA. If there is scientific uncertainty, these CSAs should be based on the evidence that gives rise to the highest concern.[649]

Overall, however, the registration mechanism is not overly significant for wooden products due to the prevalence of the approval procedure in de BPR (see the next section on the BPR below). Where the substance in question is an approved active substance under the BPR, it is considered already registered under REACH. This is to avoid duplication of the dossier already submitted at the ECHA.[650] Having said that, registration is still required for substances *other* than the active substances in the wood preservation product.

As regards the evaluation of substances,[651] the substances that are selected for evaluation are based on criteria made by the ECHA in cooperation with the Member States. The criteria expressly state that this prioritization of substances is based on a risk approach.[652] The outcome of

[645] Article 1 REACH.

[646] REACH is the central law to be discussed in Chapter 7, so this section is also intended as a reference point for that Chapter.

[647] L. Bergkamp and M. Penman, 'Conclusions', in: L. Bergkamp (ed.), *The European Union REACH Regulation for Chemicals. Law and Practice* (Oxford University Press, 2013), p. 420; and G. Schaafsme, E.D. Kroese, E.L.J.P. Tielemans, J.J.M. Van de Sandt and C.J. Van Leeuwen, 'REACH, non-testing approaches and the urgent need for a change in mind set' (*Regulatory Toxicology and Pharmacology*, 53, 2009), p. 70.

[648] As indicated, this does not affect the fact that it also involves hazard assessments and the identification of exposure scenario, because knowing the hazards is part of the risk approach. For example, the technical dossier which ought to be submitted by each registrant should include relevant information about the substance/mixture such as classifications (based on the CLP Regulation, which is hazard-based) and toxicological and eco-toxicological data (i.e. the intrinsic properties of a substance/mixture, which is needed for hazard assessments). Furthermore, CSAs include several assessments, such as a human health hazard assessment and a physicochemical hazard assessment.

[649] ECHA, *Assessing the Health and Environmental Impacts in the Context of Socio-economic Analysis Under REACH - Part 1: Literature Review and Recommendations* (ECHA, 2011), p. 25.

[650] Article 15(2) REACH. Note that this rule only applies for the use in the biocidal product-type for which it is approved. If this is not the case, the substance 'falls back' into the normal registration requirements under REACH.

[651] Contrary to 'dossier evaluation'. See Chapter 3.3.3 (heading 'Registration and evaluation') for an explanation of the two types of evaluation.

[652] Article 44(1) REACH.

the evaluation (as well as of the dossier evaluation) can trigger further risk management measures, such as authorization or restriction.[653]

Authorization and restriction

Both the authorization and restriction of chemicals is based on a risk approach, the precautionary principle and the substitution principle: both instruments are typical ways to manage uncertain risks.[654]

As regards the authorization procedure, the discretion of the authorities to manage risks appears to be rather limited, at first glance. It is very clearly stated in Article 60(1) REACH that an authorization *shall* be granted. On the other hand, the authorities shall grant authorization only if the risks are *adequately controlled*.[655] In that sense, they actually have a broad discretion to frame, choose, interpret and follow the available science,[656] which is in line with the precautionary principle. Some authors argue that this criterion ('adequately controlled' for authorization and registration) and similar criteria expressed in REACH (e.g. 'unacceptable risks' for restrictions, see below) are too vague to be really useful to address risks.[657] As already indicated in Chapter 5.2.2-B, this vagueness of the contours of the relationship between science, uncertainty and the precautionary principle is often criticized: with well over five hundred pages to discuss about, even excluding the far greater amount of paperwork produced by the ECHA as a guidance, REACH's authorization mechanism is of course no exception. It seems to me that the fact that REACH includes those vague criteria is deliberately done to leave some room for politicians to interpret the 'necessary' risk management measures. This really perfectly reflects the dynamic precautionary principle. Moreover, in this particular procedure, if no authorization is granted based on the adequate control criterion, it can still be granted if it can be demonstrated that socio-economic benefits outweigh the risk to human health or the environment and if there are no suitable alternative substances or technologies.[658] This option is in line with the precautionary principle, because it basically incorporates the proportionality test. In fact, this test is required as a general rule for the Commission to apply whenever it assesses the substitution

---

[653] Articles 42(2) and 48 REACH.

[654] This is demonstrated by the 7-point list, which is displayed in Chapter 5.2.2-B (heading 'Precaution in managing uncertain risks'). See points 4 and 5.

[655] Article 60(2) REACH.

[656] For example, the authorities have the discretion to 'read-across', which is an assessment method provided for in Annex XI (section 1 paragraph 5) REACH (also provided for in the CLP Regulation) under which the properties of certain substances may be predicted from existing data relating to '*reference substances which are structurally similar to them. It avoids the need to test every substance for every endpoint and may, consequently, be used where there are no data concerning the substances subject to risk assessment*.' In: Judgement of 21 July 2011, *Etimine SA v Secretary of State for Work and Pensions,* C-15/10, EU:C:2011:504, para. 96, see also: paras. 97-110.

[657] Supra note 647, p. 414; and N. Herbatschek, N. Bergkamp and M. Mihova, 'The REACH Programmes and Procedures', in: L. Bergkamp (ed.), *The European Union REACH Regulation for Chemicals. Law and Practice* (Oxford University Press, 2013), pp. 167-169. Because of the unregulated and sometimes dubious role of science in the REACH framework, the same authors recommended on pp. 169-170 (Herbatschek, Bergkamp and Mihova) to set up an new and preferable legally binding instrument, for example in the form of a code for scientific advice (referred to as a 'science charter'), amongst others to guide the decision-makers, and to some extent also the CJEU, to apply the precautionary principle properly. This charter should set forth both substantive and procedural requirements. Regarding the substantive requirements, they could include that science must be representative for the *'real world'* and be relevant for the specific issues. Clearly, this recommendation would further emphasize and streamline the risk approach in the REACH framework and delineates the role the precautionary plays when there are uncertain risks.

[658] Article 60(4) REACH. This route will always apply to SVHCs that are PBT, vPvB, non-threshold CMRs and non-threshold substances of equivalent concern, because these substances cannot be adequately controlled. Additionally, it also applies to CMRs and substances with equivalent concern with thresholds but for which it is impossible to reduce exposure below those thresholds. G. van Thuyne and F. Goossens, 'Authorisations and Restrictions', in: D. Drohmann and M. Townsend (eds.) *REACH. Best Practice Guide to Regulation (ED) No 1907/2006* (C.H. Beck, Hart Publishing and Nomos, 2013), pp. 456-457.

opportunities.[659] In the case of preservatives used in/on wooden products, the use of *any* substance (active and supplementary substances) in biocidal products is exempted from the authorization and therefore also from the substitution provisions under REACH. Hence, only an authorization under the BPR is required.[660]

As regards restriction, Article 68(1) REACH states that a restriction can be established when there is an *unacceptable risk* to human health or the environment. Accordingly, if the Commission considers a restriction is needed due to a risk that is not adequately controlled, the procedure to prepare a proposal on a particular restriction is triggered.[661] A restriction particularly facilitates the substitution of risky chemicals; a total ban is the ultimate expression of the substitution principle. Importantly, unlike the exemption provided for the REACH authorization requirements, biocidal product manufacturers and importers must comply with these restrictions under the BPR rules. Producers of wooden products can therefore only use wood preservatives that comply with the relevant restriction criteria under REACH.

Distribution of information

REACH requires SDSs to be passed on to producers of wooden products when the substances/mixtures in the wood preservatives are considered hazardous.[662] Essential is that the risk information that is identified in the CSR and the CSA must be communicated downstream to the wooden products producers. These producers are bound by the obligations set forth in Article 37(5) and (6) REACH:

> *5. Any downstream user shall identify, apply and where suitable, recommend, appropriate measures to adequately control risks identified in any of the following:*
>
> *(a) the safety data sheet(s) supplied to him;*
>
> *(b) his own chemical safety assessment;*
>
> *(c) any information on risk management measures supplied to him in accordance with Article 32* [i.e. minimum information supply downstream for situations were SDSs are not required].
>
> *6. Where a downstream user does not prepare a chemical safety report* […] *he shall consider the use(s) of the substance and identify and apply any appropriate risk management measures needed to ensure that the risks to human health and the environment are adequately controlled. Where necessary, this information shall be included in any safety data sheet prepared by him.*

According to these provisions, wooden product producers have the responsibility to follow a risk management approach. Risk information informs the people about the risks and how to manage them. Based on this information, they can also decide to buy alternatives. The substitution principle is in this way also reflected in REACH.

Biocidal Products Regulation: a major impact on wooden products

As repeatedly demonstrated in the previous sections, the BPR is one of the most important legislation when considering the CE benchmark for chemicals. The BPR applies to a range of chemical product groups. Under one of the main groups of Annex V BPR, wood preservation is categorized as a distinct product-type: type 8.[663] The description explains that wood preservations are used:

---

[659] Article 60(5)(b) REACH.

[660] The next section under the heading of 'Biocidal Products Regulation' addresses the BPR authorization procedure.

[661] Article 69 REACH. Although the restriction instrument is largely based on risks, there is a significant link to the CLP Regulation here too. There are a few *hazard* classes that are automatically restricted through Annex XVII REACH (e.g. column 1, entries 3, 28-30).

[662] Hazardous based on the CLP Regulation or being PBT and PvBv, and/or submitted to the SVHC Candidate List. Article 31(1)(a)-(b) REACH. Also some mixtures need to have a SDS even though they do not fall under these categories (Article 31(3) REACH).

[663] Note that the product-types include only products to prevent microbial and algal development unless otherwise stated.

for the preservation of wood, from and including the saw-mill stage, or wood products by the control of wood-destroying or wood-disfiguring organisms, including insects. This product-type includes both preventive and curative products.

Preventive treatments of wood are commonly carried out during the manufacturing process but can also be done when the wooden product is already in its service situation (e.g. in a building or bridge construction).[664] Significantly, the BPR must also be considered in the context of Chapter 5.3.1 on 'product durability', because wood can also be treated during usage (curative treatment). Clearly, the BPR is extremely important for wooden products.

The BPR explicitly states that it is underpinned by the precautionary principle to ensure that the manufacturing and making available on the market of active substances and biocidal products do not result in *harmful* effects on human or animal health or *unacceptable* effects on the environment.[665] The BPR regulates the placing on the market and use of biocidal products which are used to protect humans, animals, materials or articles[666] against harmful organisms, such as pests or bacteria, by the action of the active substances[667] contained in the biocidal product. Above all, the Regulation aims to improve the functioning of the EU market for biocidal products through harmonization. Just as REACH and the CLP Regulation, the BPR is based on Article 114 TFEU. The BPR applies without prejudice to several other EU laws, including the REACH and the CLP Regulation.[668] Where the BPR is a *lex specialis*, REACH and CLP apply to almost all substances placed on the EU market. Manufacturers using wood preservatives should therefore also comply with the requirements set out in those other Regulations whenever the BPR does not derogate from them.

The BPR works as follows. There are three categories regulated and for each category there are different regulatory requirements. The categories are: 1) active substances; 2) biocidal products; and 3) treated articles (such as wooden furniture, which are treated with biocidal products that are composed of several chemicals, including actives substances). The general idea behind the BPR is that all biocidal products require *authorization* before they can be placed on the market (see below), and that the active substances contained in these biocidal products must be previously *approved* for the particular product-types (see below).[669] The list of approved active substances for wood preservation (product-type 8) can be easily accessed on the website of the ECHA.[670] There are also certain provisions exclusively applicable to treated articles that are not

---

[664] European Chemicals Agency, *Transitional Guidance on the Biocidal Products Regulation, Transitional Guidance on Efficacy Assessment of product Type 8 Wood Preservation* (ECHA, 2015), p. 9.

[665] See e.g.: Recital (3) and Article 1(1) BPR. The possibility for Member States to apply the principle is however not expressly mentioned in the BPR.

[666] The BPR uses the same definition(s) as used in the CLP Regulation and REACH. Article 3(2)(c) BPR in conjunction with Article 2(9) CLP and Article 3(3) REACH. According to these provisions, an article is '*an object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition.'*

[667] Article 3(1)(c) BPR: active substance means *'a substance or a micro-organism that has an action on or against harmful organisms.'*

[668] Articles 2(3)(j) and (2)(3)(m) BPR, respectively.

[669] Article 4 BPR. The active substance relative for authorization can be approved for an initial period of 10 or 5 years (Articles 4(1) BRP). Some active substances will in principle not approved (Article 5(1) BPR): carcinogens, mutagens and reprotoxic substances category 1A or 1B according to the CLP Regulation; endocrine disruptors; PBT substances (under REACH); and vPvB substances (under REACH). They can be approved, nonetheless, when the conditions under Article 5(2) BPR are met, i.e. if exposure to them is negligible; they are essential in controlling a serious danger; or where the consequences of not using them are disproportional to the risk avoided.

[670] Currently there are 45 substances approved or under review. See https://echa.europa.eu/nl/information-on-chemicals/biocidal-active-substances, (consulted on 29 November 2017). For more information on the most widely used wood preservatives in the EU, see E. Salminen, R. Valo, M. Korhonen and R. Jernlås, *Wood preservation with chemicals - Best Available Techniques (BAT)* (Norden, 2014), pp. 26-27.

biocidal products themselves.[671] Notably, these articles can only be treated with active substances that are approved for that specific purpose.[672] Hence, every person responsible for the placing on the market of a treated article must ensure that the article carries a label that provides relevant instructions for the use of the biocide, including any precautions to live up to.[673] This information is passed on by the manufacturers of biocidal products, as they should maintain appropriate documentation relevant for the quality and safety of their products.[674] As a minimum, this includes the drafting of SDSs.[675] (Note that these documentation requirements do *not* apply to the manufacturers of treated articles – they only apply to biocidal products. The producers of treated articles are downstream users of those biocidal products).

Approval

The approval (or renewal of approval)[676] of an active substance depends on several things, amongst others the availability of suitable and sufficient alternative substances or technologies,[677] and the hazards based on the classification pursuant to the CLP Regulation and other 'hazardousness' criteria relating to endocrine-disturbing properties and PBT or vPvB under REACH.[678] Unsurprisingly, the bottom line is that these biocidal products must in principle not consist of hazardous substances.[679] The approval is therefore in essence based on a hazard approach.

However, the BPR also provides for the opportunity to deviate from this basic rule: according to Article 5(2) BPR active substances which are believed to cause hazards could still be approved if it is shown that they meet at least one of the following conditions:

---

[671] According to Article 3(1)(l), a treated article means: *'any substance, mixture or article which has been treated with, or intentionally incorporates, one or more biocidal* products.' Hence, whether an article is treated depends on the article's function. Moreover, so-called 'complex articles' (i.e. an article composed by different components possibly made of different materials and substances, e.g. a couch) are regulated by the BPR if at least one component of the article placed on the market contains a biocidal property (e.g. a preservative in the wooden frame of a couch) that may still be beneficial for the complex article in its entirety (e.g. relating to the product's durability). Treated articles that are not biocidal products themselves are for example: antibacterial wipes or insecticide impregnated mosquito nets.

[672] Recital (52) and Article 58(2) BPR. This is a significant change as to the requirements under the Regulation's predecessor, according to which imported articles could have been treated with substances not legally allowed in the EU.

[673] Article 58(3)-(6) BPR. The BPR requires manufacturers and importers of treated articles to label treated articles when: 1) a claim that the treated article has biocidal properties is made; or 2) it is required in the conditions of the approval of the active substance contained in the biocidal product used to treat the article (Article 58(3) BPR). Note that provision does not specify *when* a claim should be made. Therefore, if a 'claim of the use of a biocidal property' is included in the technical specifications of an article, for example, this would trigger the labeling. The information required in the BPR label should be included in the supplemental information allowed for under the CLP Regulation.
The ECHA published a document which provides guidance on labelling wood preservatives, including guidance on the gathering of information claimed on the labels, which is based on the standards EN 599-1 (preventive treatments, even though this standard has been withdrawn as from December 2013) and EN 14128 (curative treatments). European Chemicals Agency, *Transitional Guidance on the Biocidal Products Regulation, Transitional Guidance on Efficacy Assessment of product Type 8 Wood Preservation* (ECHA, 2015), pp. 7-15 (labels) and 16-27 (information). See also: standards EN 335-1 (durability of wood and derived materials – definition of use classes of biological attack Part 1) and EN 351-1 (durability of wood and wooden products – preservative treatment solid wood Part 1).

[674] Article 62(2) BPR.

[675] Article 70 BPR. Indeed, these SDSs are the same sheets as under Article 31 in conjunction with Annex II of REACH and include amongst others information on proper waste management.

[676] See Chapter III and in particular Article 14 BPR.

[677] This reflects the substitution principle, as referred to in Recital (12) and Article 5(2) BPR.

[678] Article 5(1) BPR.

[679] See in particular paragraphs (b)(ii)-(iv) and (c) of Article 5 and Article 20 BPR.

a) *the risk to humans, animals or the environment from exposure to the active substance in a biocidal product, under realistic worst case conditions of use, is negligible, in particular where the product is used in closed systems or under other conditions which aim at excluding contact with humans and release into the environment;*
b) *it is shown by evidence that the active substance is essential to prevent or control* [another] *serious danger to human health, animal health or the environment; or*
c) *not approving the active substance would have a disproportionate negative impact on society when compared with the risk to human health, animal health or the environment arising from the use of the substance.* (emphasis added)

A risk assessment is thus particularly important in the situations provided in a) and c): the hazardous substances will still be permitted in these cases.

A direct link to the substitution principle is made in Article 10 BPR.[680] When preparing an opinion on the approval or renewal of the approval of an active substance, the ECHA examines whether the active substance fulfils any of the conditions according to which an active substance shall be considered a candidate for substitution.[681] Simply put, these conditions are based on the intrinsic hazardous properties in combination with the use and potential exposure.[682] A comparative assessment will be performed in the evaluation for national or Union authorization of a biocidal product that contains the substance candidate for substitution.[683] The aim of this assessment is to see whether alternative products or methods are available for the same use but which brings forth lower risks.[684] So far, the substitution requirements have been quite effective, as many impregnating chemicals that were used in the past (e.g. chromated copper arsenate [CCA], pentachlorophenol and copper naphthenate) are now replaced by less harmful substances.[685]

Authorization

The conditions for granting authorization of biocidal products before putting them on the market are firstly the approval of the active substance (as discussed above) and secondly the evaluation of the submitted dossier for the biocidal products.[686] They all relate to the prohibition of *'unacceptable effects*' to human health and the environment in one way or another. To find out what the 'unacceptable effects' of a biocidal product are, a full risk assessment must performed to determine the appropriate risk management. As expected, the risk assessment covers the four-step scheme: hazard identification, dose- response assessment, exposure assessment and risk characterization.[687] Whether or not to authorize and if so, on what conditions, is therefore a risk management measure. It moreover involves a comparative assessment between biocidal products in view of substituting them,[688] and so the substitution principle is also reflected in the procedure.

In view of keeping the authorization up-to-date with the latest scientific evidence, a *full* evaluation of the application for renewal of authorization is required.[689] Article 47(1) BPR further requires the holder of an authorization to notify the ECHA and the competent authority that granted the authorization[690] of unexpected or adverse effects of the authorized biocidal product or

[680] See also: Recital (38) BPR.
[681] Article 10(1) and (2) BPR.
[682] For example, one criterion is meeting at least one of the exclusion criteria set out in Article 10 BPR.
[683] See below, the final paragraph of this section on the BPR.
[684] Article 23 BPR.
[685] E. Salminen, R. Valo, M. Korhonen and R. Jernlås, *Wood preservation with chemicals - Best Available Techniques (BAT)* (Norden, 2014), p. 25.
[686] Article 19(1)(b) and (2) in conjunction with Annex VI BPR.
[687] See e.g.: paragraph (4) introduction of Annex VI BPR. See the *Annex* to this dissertation for *Flowchart 7*.
[688] Article 23 BPR.
[689] Article 46 BPR.
[690] That is the national authority or the Commission: see the next paragraph.

of the active substance(s) contained in the product that may affect the authorization. As a consequence, it may be decided to amend or cancel the authorization.[691]

There are two ways for authorization: at national level or at EU level. While the approval of active substances (including under which conditions) takes place at EU level by the Commission in collaboration with the ECHA,[692] the authorization of the biocidal products used to takes place at Member State level only under the BPR,[693] which, by the way, could be extended to other Member States through mutual recognition.[694] Since the entry into force of the BPR, however, the Commission can also start an authorization procedure.[695] Going down that road provides a new opportunity for companies to apply for a single authorization across the entire Union right away.

In sum, the BPR is one of the most significant regulations for wooden products considering chemical use, because, as a *lex specialis*, it regulates wood preservatives. The BPR instruments are predominantly based on a risk approach and reflect the precautionary and substitution principles.

Ecolabel framework: dependence on chemical legislation

As pointed out in Chapter 5.2.1-C (heading 'Ecolabel framework'), there are currently only two wooden product groups (for wooden floor coverings and for furniture) that can be awarded with an EU Ecolabel. Both EU Ecolabels include criteria on the use of chemicals. They cover an identical list of different types of hazards that can be organized in three different groups.[696] This is based on the CLP classifications or on their status as SVHC under REACH. For both EU Ecolabels the use of the selected SVHCs is restricted: it is forbidden for the products to contain these SVHCs at concentrations greater than 0,10 % (w/w).[697] For the use of the selected CLP classified substances/mixtures different restriction rules apply.[698] The restriction rules as such as a reflection of the precautionary principle and the substitution principle.[699]

Moreover, significant is that both EU Ecolabels contain special rules about the use of biocidal products such as wood preservatives on wooden products.[700] For floor covering, it is explicitly stated that is not permitted to covering with biocidal products.[701] For wooden furniture, biocidal products are in principle forbidden to use if they are CLP classified, unless their use is specifically derogated. In the case of wood preservatives this actually means that, except for the selected CMRs, all uses are granted pursuant to a few derogation conditions, such as that the active substance contained in the biocidal product is approached under the BPR. In both EU Ecolabels, the applicant shall provide to the competent authority a declaration of compliance or of the non-use of biocidal products.

Overall, it can be concluded that both the voluntary EU Ecolabels on furniture and on wooden floor coverings adopt a hazard approach (through CLP) as well as a risk approach (through REACH and the BPR). The dependence on EU chemical legislation is obvious here.

---

[691] Article 47(2) in conjunction with Article 48 BPR.
[692] Article 9 BPR.
[693] Directive 98/8 of 16 February 1998 concerning the placing of biocidal products on the market, [1998] OJ L 123/1. Now Chapter VI in conjunction with Article 3(1)(m) BPR.
[694] Now Chapter VII BPR.
[695] Chapter VIII in conjunction with Article 3(1)(n) BPR.
[696] See for wooden floor coverings: Criterion 3 (General requirements for hazardous substances and mixtures) Annex Decision 2017/176; and for furniture: Criterion 2 (General requirements for hazardous substances and mixtures) Annex Decision 2016/1332.
[697] Criterion Annex Decision 2016/1332 and criterion 2.1 3.a Annex Decision 2017/176
[698] Criterion 2.2(a) and (b) Annex Decision 2016/1332 and criterion 3.b Annex Decision 2017/176.
[699] Article 6(3)(b) Ecolabel Regulation clearly points out the need to consider the substitution principle.
[700] Criterion 2.2, including Table 2 point (a) Annex Decision 2016/1332 and criterion 4.b Annex Decision 2017/176.
[701] It also lists a few active substances that are neither permitted to use for in-can preservation of water-based mixtures such as adhesives or lacquers.

Construction Products Regulation: dependence on product standards

Meaningful to expound on in this section are the basic requirement under Annex I CPR that lay the foundation for the standardization mandates.[702] Section 3 entitled 'Hygiene, health and the environment' contains a list of potential threats that may occur throughout the entire life-cycle of a construction work and which the standardization bodies must be particularly aware of. It includes environmental threats such as: the emissions of dangerous substances or dangerous particles into indoor or outdoor air; the release of dangerous substances into ground water, marine waters, surface waters or soil; the release of dangerous substances into drinking water; and faulty discharge of waste water, emission of flue gases or faulty disposal of solid or liquid waste. Accordingly, there are many exposure routes emphasized by the Annex.

Recital (25) CPR further stresses that the DoP should be accompanied by information on the content of hazardous substances in the construction product '*in order to improve the possibilities for sustainable construction and to facilitate the development of environment-friendly products*.' The information should be provided without prejudice to the obligations, particularly with regard to labelling, laid down in other instruments of EU law applicable to hazardous substances and should be made available at the same time and in the same form as the DoP, in order to reach all potential users of construction products. The information on hazardous substances should initially be limited to the substances that trigger the drawing up on SDSs and to the substances in articles that trigger the duty to communicate information.[703] Nevertheless, Recital (25) also states that the specific need for information on the content of hazardous substances in construction products should be further investigated *'with a view to completing the range of substances covered so as to ensure a high level of protection of the health and safety of workers using construction products and of users of construction works, including with regard to recycling and/or reuse requirements of parts or materials.*' The same Recital emphasizes that Member States must still obey their rights and obligations pursuant to other instruments of EU law that may apply to hazardous substances, in particular the ones laid down in the CLP Regulation and the BPR.[704]

All things considered, the CPR framework does not explicitly require risk assessments to be carried out. This does not mean that the CPR does not pay any attention at all to the assessment of the risks associated with chemicals used in/on wooden construction products. In accordance with Annex I (section 3) CPR, the European harmonized technical standards developed by the CEN/CENELEC take account of the relevant legislation for wooden products. In this way, the requirements under the CLP Regulation, REACH and the BPR indirectly apply to construction products.[705]

Green Public Procurement framework: a shift from hazards to risks, if addressed at all

Suffice to point out here is that the EU GPP criteria currently applicable to particular wooden product groups include a few criteria on the use of chemicals.[706] All three EU GPP criteria (for furniture, for office buildings and for wall panels) emphasize need to address (toxic) substances in their introduction part where they present the key environmental impacts and areas.[707] However, their approach and content varies.

---

[702] For a more extensive explanation of the contours and particular instruments of the CPR see Chapter 5.2.1-C (heading 'Construction Products Regulation').

[703] See Articles 31 and 33 REACH, respectively. Article 6(5) CPR on the content of the DoP clearly states that DoPs for construction products containing a substances or mixture comes together with a SDS if this is required by Article 31 REACH. For articles that are construction products and contain SVHCs above 0,1%, the information required under Article 33 REACH must be provided together with the DoP.

[704] As well as the EU policies on water and waste.

[705] See CEN/CENELEC, *Work Programme 2016. European standardization and related activities* (CEN/CENELEC, 2015), p. 65.

[706] See Chapter 5.2.1-C (under the heading 'Green Public Procurement framework') for a broader explanation on the PPD.

[707] European Commission, *EU Green Public Procurement criteria for Furniture* (European Commission, SWD(2017) 283), p. 3; European Commission, *EU GPP Criteria for Office Buildings Design, Construction and*

The 2016 EU GPP criteria for office buildings do not contain any criteria on the use of chemicals significant to wood treatment. This might have to do with the fact that the criteria are for buildings rather than for product, although the previous set of criteria did address chemicals.[708]

In the case of furniture,[709] the 2017 EU GPP criteria include in the contract performance clause a criterion saying as a core criteria that the tenderer shall declare the presence of any REACH Candidate List (SVHC) substances that are present at a concentration of greater than 0.1% (w/w) in the product and any component parts/materials thereof. By way of comprehensive criterion, it adds that the product should not contain any SVHC at a concentration of greater than 0.1%.[710]

The 2010 EU GPP for wall panels used to be similar to the older version of the EU GPP criteria for furniture. It primarily refers to certain dangerous substances, CMRs, which are classified pursuant to the CLP Regulation.[711]

An observation would be that the newest generation of EU GPP criteria addresses the use of chemicals much less than the older generation. Additionally, one notices that the EU Ecolabel for furniture refers to REACH, whereas the EU Ecolabel for wall panels refers to the CLP Regulation. This shift from hazard to risk approach is clearly visible.

D. Discussion on the potential for the Ecodesign framework

There are opportunities provided in the EFD to create an ecodesign requirement on the use of preservatives in/on wooden products which are intended to be placed on the EU market. The potential additional features of the future ecodesign requirement relate to the question whether the requirement is supposed to reflect a hazard or a risk approach, and how the precautionary principle and the substitution principle would influence the requirement.

Risk approach

It would be an omission to only look at the intrinsic properties of chemical substances in a full hazard assessment when establishing an ecodesign requirement in an Ecodesign Implementing Measure for wooden products. Although the hazard classification is extremely important, it is just one of the first steps in assessing and managing the *risks* associated with the use of chemicals in/on wooden products. Requiring a full risk assessment is particularly important in the Ecodesign framework, because the evaluation of exposures is different for each product group. For example, outdoor wooden benches have different exposure routes then wooden bed frames even though the same intrinsic (toxic) hazards are classified for a specific wood preservative. It is therefore essential that a risk-based approach would be adopted in the Ecodesign framework, as this helps to 'customize' the level of protection. A newly made ecodesign requirement must be modelled in line with *Flowchart 7*, which is provided in the *Annex* to this research.

In fact, a risk approach would not be so much different from the current practice under the Ecodesign framework. Because an Implementing Measure is only applicable to one product group, the essential but time-consuming and expensive case-by-case approach is already required

---

Management (European Commission, SWD(2016) 180, 2016), p. 8; and European Commission, *Wall Panels – Green Public Procurement Product Sheet* (European Commission, 2010), p. 2.

[708] The previous EU GPP criteria for office buildings contained – without referring to REACH – the general technical specification that SVHCs shall not be used in office buildings. Although the identification of substances as 'SVHC' is by no means purely based on risks, the EU GPP criteria for office buildings showed a shift from a hazard approach (the other older EU GPP sets of criteria use the CLP classifications) towards a risk approach (by referring to SVHCs and thereby to REACH). See: European Commission, *EU GPP Criteria for Office Buildings Design, Construction and Management* (European Commission, SWD(2016) 180, 2016).

[709] The chemical use in the upholstery coverings, coatings and paddings materials and in plastics and foam are not discussed here but are nonetheless addressed in the EU Ecolabel. This section only addressed the chemicals possibly used in wood preservatives.

[710] Ibid., *EU Green Public Procurement criteria for Furniture*, p. 16.

[711] European Commission, *Wall Panels – Green Public Procurement Product Sheet* (European Commission, 2010), p. 11.

under Article 15 EFD. Besides, regulators and the ECHA are still deepening their knowledge of the potential risks due to the registration requirements under REACH, which progressively facilitates the risk assessments.[712] An additional argument in favour of the risk-based approach in the Ecodesign framework is that a mere focus on hazards may lead to stigmatisation and, as a result of that, a loss of incentives to innovate, because the industry would not be keen on doing research on the use of these substances, even though it may be that no unacceptable risks are posed to the environment or human health.[713] This could possibly hamper green chemistry and the creation of opportunities for the Circular Economy. (A counterargument would be that the industry does more research in alternative substances, pursuant to the substitution principle. This could actually enhance the Circular Economy).[714]

Be that as it may, Article 15(5)(b) EFD only states that the Implementing Measures must assure that there will be *'no adverse impacts on human health, safety and the environment'.* Hence, there is no indication that a risk assessment should or should not be carried out. Annex I EFD does not throw light on this matter either. There are two ways to interpret this ambiguity. On the one hand, Annex I lists certain parameters that must be used for evaluating the potential for improving the environmental aspects of a product group. One of which concerns the use of substances classified as hazardous – *not* the use of substances posing (uncertain) *risks*. This is important, given that risk assessments are in principle only obligatory when explicitly required by the secondary law.[715] On the other hand, the list provided in Annex I is non-exhaustive. This means that ecodesign requirements can also be based on other parameters, such as risks. In sun, even though the risk approach is not legally enforceable, it is assumable that an ecodesign requirement on the use of chemicals is based on a risk assessment, which in my opinion is desirable.

Precautionary measures

Since both REACH and the BPR are underpinned by the precautionary principle, it is logical that the Ecodesign framework follows the same approach. Like any other environmental principle, the precautionary principle is not rigid: its intensity and scope may therefore vary from one wooden product group to another. A future ecodesign requirement should, furthermore, be appropriate and necessary (i.e. the requirements of the proportionality principle) to attain the objectives pursued by the EFD. The EU regulator has great discretion in balancing the interests. Only a manifest imbalance is deemed disproportionate.[716] Moreover, if the aim of the particular ecodesign requirement is to phase out the use of certain substances of concern, as can be argued according to the REACH and the BPR, it seems less likely that the CJEU would consider it disproportionate.

Additionally, the Implementing Measure must be non-discriminatory and consistent with other similar Implementing Measures. An Implementing Measure applies in principle to *all* targeted products of a product group, including imported products, so it would probably fulfil the requirement of non-discrimination. Evidently, a comparison of the way how the pursued

[712] K. Nordlander, C. Simon and H. Pearson, 'Hazard v. Risk in EU Chemical Regulation' (*European Journal of Risk Regulation*, 3 2010), pp. 239-250.
[713] Ibid., p. 248.
[714] Chapter 7 on plastic recycling further elaborates on this issue.
[715] N. de Sadeleer, 'The Precautionary Principle in EC Health and Environmental Law' (*European Law Journal*, 12:2, 2006), p. 151.
[716] Judgement of 11 September 2002, *Pfizer Animal Health SA v Council*, T-13/99, EU:T:2002:209, para. 166. See also: Judgement of 21 July 2011, *Etimine SA v Secretary of State for Work and Pensions*, C-15/10, EU:C:2011:504, para. 60 (and para. 125), where the CJEU states that '*where the European Union authorities have a broad discretion, in particular as to the assessment of highly complex scientific and technical facts in order to determine the nature and scope of the measures which they adopt, review by the European Union judicature is limited to verifying whether there has been a manifest error of assessment or a misuse of powers, or whether those authorities have manifestly exceeded the limits of their discretion.*' See also: Judgement of 9 July 2010, *Afton Chemical Ltd v Secretary of State for Transport*, C-343/09, EU:C:2010:419, para. 45; Judgement of 15 October 2009, *Enviro tech (Europe) Ltd v Etat belge*, C-425/08, EU:C:2009:635, para. 47; and Judgement of 18 July 2007, *Industrias Químicas del Vallés, SA v Commission*, C-326/05 P, EU:C:2007:443, paras. 75-77.

Implementing Measures on wooden products and how existing Implementing Measures would be/are dealing with similar uncertain risks is impossible, because the EFD currently does not allow Measures applicable to non-ErPs. We can still learn from other less-related Implementing Measures, nonetheless. For example, the Implementing Measure regulating televisions explicitly states that the use of *hazardous* substances in the manufacturing of the televisions is regulated in RoHS2 and should therefore not be further addressed in the Ecodesign framework.[717] In addition, the Implementing Measure also refers to the voluntary EU Ecolabel for televisions, because the environmental impacts related to the use of *hazardous* substances are already identified in that document.[718] Considering the EU Ecolabel for televisions, it becomes clear that the ecolabel can be awarded if the television fulfills the criteria laid down in the Annex of the Decision. Amongst others, indeed, these criteria aim at the reduction of environmental damage related to the use of *hazardous* substances by reducing the use of such substances.[719] Generally speaking, the EU Ecolabel for televisions and therefore also the Implementing Measure for televisions predominantly follows a hazard approach.[720] An explicit reference to risk assessment is nowhere to be found. It is therefore not entirely clear whether a future Implementing Measure on a wooden product group that includes a requirement on the control of *risks* posed would be 'consistent' with the existing Ecodesign framework.

Now that it is argued that a risk-based approach would suit Implementing Measures best (unless the potential inconsistency with the existing framework), the question is how to shape the ecodesign requirements along the lines of precaution. The EU legislator can choose from several instruments, amongst which an authorisation of the use of risky chemicals and a restriction to limit or ban the manufacture, placing on the market or use of those substances. Despite the legal basis for addressing the chemicals used in/or wooden products through the Ecodesign framework, the EFD overtly refers to existing chemical legislation.

The use of the BPR-REACH-CLP triplet tandem

The EFD explicitly refers to the CLP Regulation and REACH, and provides for the possibility to refer to additional legislation as well, such as the BPR. It follows, therefore, that one should first have a look at these laws before drawing conclusions on how a future ecodesign requirement should look like. This is all the more important, because Article 1(4) EFD states that the Ecodesign framework shall be without prejudice to EU chemicals legislation. As can be understood from the case study, there is very extensive framework for addressing the chemicals used in/on wooden products, which generally consists of a blend of precautionary instruments.

The BPR is the most significant of all, because it includes provisions exclusively applicable to biocidal products such as wood preservatives.[721] The idea that all biocidal products require authorization before they can be put on the market leaves in principle no biocidal products outside the scope of the BPR. In contrast, an Ecodesign Implementing Measure would only apply to one particular product group, leaving many other wooden products untouched. The approval of the

[717] Recital 7 Regulation 642/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for televisions, [2009] OJ L 191/42. Additionally, the currently best available reduced environmental impacts relating to hazardous substances are already identified by (voluntary) Decision 2009/300 of 12 March 2009 establishing the revised ecological criteria for the award of the Community ecolabel to televisions, [2009] OJ L 82/3. According to its Annex, the Ecolabel can be awarded if the television fulfills the criteria laid down in the Annex. Amongst others, these criteria aim at the reduction of environmental damage related to the use of hazardous substances by reducing the use of such substances (see paragraphs 2 and 5).

[718] Decision 2009/300 of 12 March 2009 establishing the revised ecological criteria for the award of the Community ecolabel to televisions, [2009] OJ L 82/3.

[719] See paragraphs 2 and 5 Annex Decision 2009/300

[720] Recital 17. See also: Annex I (paragraph 5(1)(e)) of the Ecodesign Implementing Measure.

[721] Notwithstanding the Regulation's close ties with horizontally applicable REACH and the CLP Regulation, namely on issues such as the classifications and labelling of substances, the drafting and passing on of SDSs, the restrictions on the manufacture, placing on the market or use of certain dangerous substances…

active substance is crucial for the authorization procedure, because the authorization of a biocidal product for a particular purpose can only be triggered if the active substance is approved. The substance approval is also key to the treatment of wooden products, because they can only be treated with (biocidal products that include) approved substances. Even though the approval of active substances is predominantly a 'hazard procedure', exceptions can be made in specific situations based on risk assessments showing negligible risks.[722] And so, even though the authorization rules under REACH are set aside by the rules of the BPR, the precautionary and substitution principles continue to offer guidance on how to protect the environment and human health from (potential) risky substances used in/on wooden products.

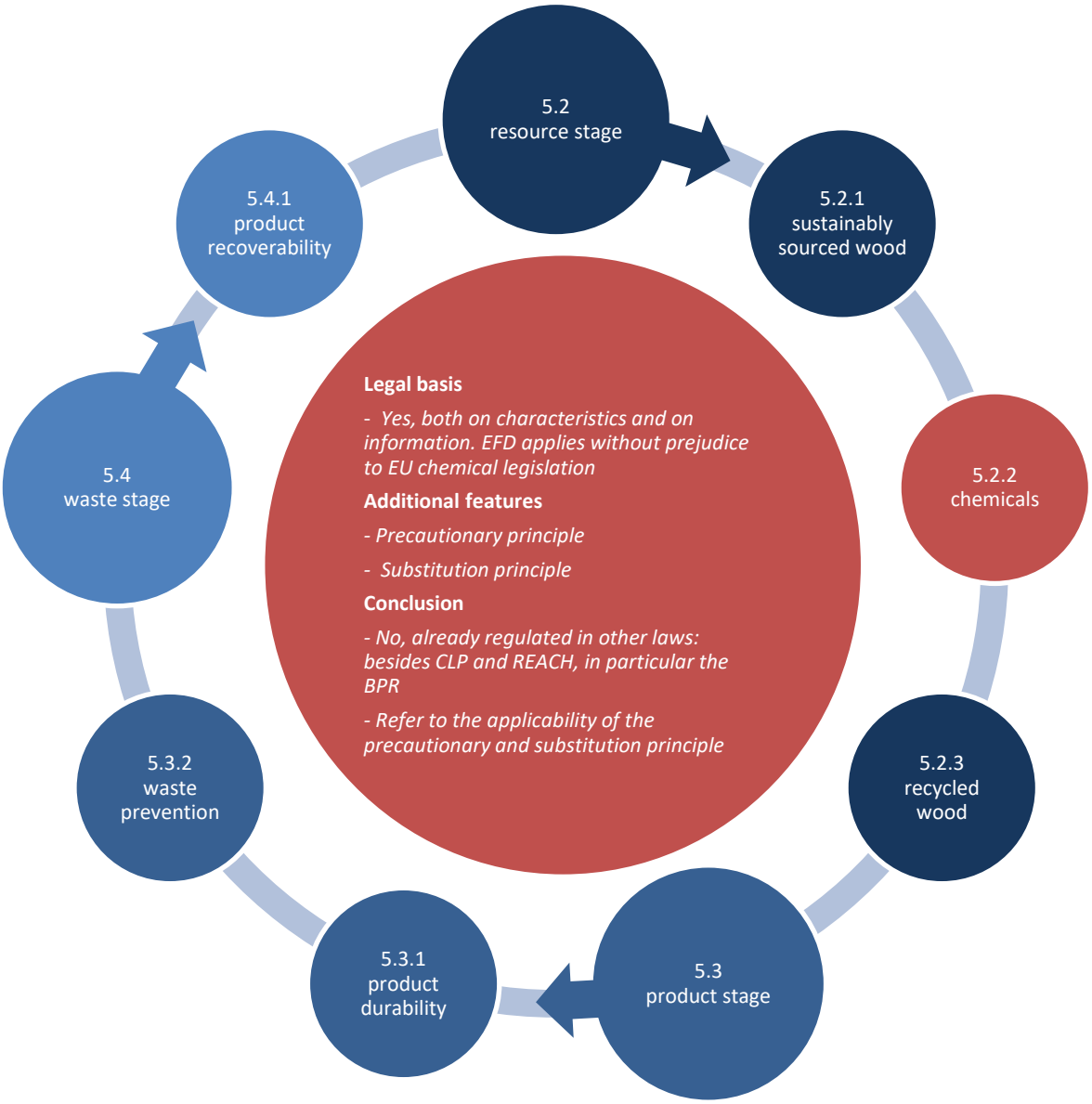
As already flagged above, REACH remains important, too, concerning the restriction on the use of certain substances in/on wood, as the BPR rules do not supersede this. Producers of wooden products can therefore only use wood preservatives that comply with the relevant restriction criteria. REACH's restrictions particularly facilitate the *substitution* of *risky* chemicals, meaning that both the precautionary principle and the substitution principle have an effect on wooden products again via the REACH-track.

On the whole, the EU regulatory framework for wooden products refers repeatedly to the BPR-REACH-CLP triplet tandem. The case study shows that the EU Ecolabel framework generally directly refers to the CLP classifications and the BPR standards. The CPR framework also depends on these principal chemical measures: the harmonized standards for wood and wood-based products on which the CPR framework relies, take full account of both the CPR (which, by the way, directly refers to the CLP Regulation and the BPR) and other regulatory frameworks such as the REACH. The EU GPP framework, too, refers to the CLP Regulation for the classification of substances.

Conclusion

In conclusion, the overall regulatory framework for the use of chemicals in/on wooden products is comprehensive. Particularly the horizontally applicable CLP and REACH and the *lex-specialis* BPR have a great impact on the framework. The interaction between the hazard approach (CLP Regulation) and the risk approach (REACH, BPR) has made the framework strongly intertwined. The other (voluntary) measures discussed in this the case study also largely depend on these three laws. This does not mean, however, that the imagined Ecodesign Implementing Measures should not refer to the rules laid down in EU chemicals legislation and highlight the significant role the precautionary and substitution principles play in these laws and, therefore, also in the Ecodesign framework. Establishing an ecodesign requirement on the use of risky chemicals in/on wooden products would only be useful if a tailored risk assessment for the particular product group shows that setting a low-risk standard for the wooden products is meaningful in addition to what is already regulated in the BPR and REACH particularly. Meanwhile, the shortcomings of these laws would still have to be addressed.

[722] When deciding if such active substances may be approved, the availability of suitable and sufficient alternative substances or technologies should also be taken into account. These reasons for approval are based on the precautionary principle and additionally on the substitution principle. Chapter 5.2.2-C (heading 'Biocidal Products Regulation').


5.2
resource stage
5.2.1
sustainably
sourced wood
5.2.2
chemicals
5.2.3
recycled
wood
5.3
product stage
5.3.1
product
durability
5.3.2
waste
prevention
5.4
waste stage
5.4.1
product
recoverability
Legal basis
- Yes, both on characteristics and on information. EFD applies without prejudice to EU chemical legislation
Additional features
- Precautionary principle
- Substitution principle
Conclusion
- No, already regulated in other laws: besides CLP and REACH, in particular the BPR
- Refer to the applicability of the precautionary and substitution principle

5.2.3 Circular Economy benchmark for recycled wood

This section examines the possibility to establish an ecodesign requirement on the use of recycled wood in wooden products. Section A covers the legal basis to act under the Ecodesign framework and some features a potential requirement would need to reflect are put forward in Section B. Section C explains which EU legal acts already regulate the issue of recycled content, and whether and how they cover the features. A final discussion on the CE benchmark is provided in Section D.

A. Ecodesign Framework Directive

The ratio of 'recycled content' is to require products to be (partly) made of recycled materials, as this would generally lower environmental impacts and would help the recycling industry by realizing a bigger and more certain market share for their goods. 'Recycled content' can in broad terms be described as 'the input of recycled materials in a product'. Using recycled materials is already widely applied in some industries (e.g. packaging, paper and cardboard and vehicles).[723] Examples of wooden products with recycled content are mostly building products, such as particle boards, oriented strand board and parallel strand lumber.

Annex I of the EFD does not provide for clear-cut parameters on the use of recycled materials, but three parameters offer guidance, nonetheless. The first parameter concerns the identification of significant environmental aspects in the life-cycle stage of what is called 'raw material selection and use' in Part 1 (section 1.1, paragraph a) of the Annex. At first glance, it is uncertain whether recycled materials also fall under the scope of '*raw* materials'. Raw materials could for example be interpreted as *'any material, such as oil, cotton, or sugar in its natural condition, before it has been processed for use'*[724] or alternatively as *'the basic material from which a product is made'*[725].[726] The clear adherence to life-cycle thinking in the Ecodesign framework may dispel any doubts: the latter interpretation is probably aimed at. This perception is confirmed by the 7th EAP, where it is stated that ecodesign is used to optimize resource and material-efficiency, amongst other by addressing recycled content.[727] The CE Package also indicates that the concept of 'raw materials' may include recycled materials, because the Commission distinguishes between two types of raw materials in the documents: primary raw materials on the one hand (i.e. virgin materials) and secondary raw materials on the other hand (e.g. recycled materials).[728] Part 1 (section 1.1, paragraph a) of the Annex therefore delivers a useful parameter.

---

[723] BIO Intelligence Service, Fraunhofer IZM and Wuppertal Institute, *Material-efficiency Ecodesign Report and Module to the Methodology for the Ecodesign of Energy-related Products (MEErP) - Part 1: Material Efficiency for Ecodesign* (BIO Intelligence Service, 2013), p. 100.

[724] Source: Cambridge Dictionaries, https://dictionary.cambridge.org/dictionary/english/raw-material (consulted on 22 December 2017).

[725] Source: Oxford Dictionaries, https://en.oxforddictionaries.com/definition/raw_material (consulted on 22 December 2017).

[726] According to the first definition, recycled wood could not be interpreted as raw materials, because recycling *is* the reprocessing of wood waste. It remains of course debatable what the 'natural condition' of wood is. According to the second example, recycled wood could be interpreted as raw materials if it is used as the basic material in a product. Note, moreover, that these definitions are in English, despite the fact that there are 24 official languages in the European Union. For example, according to the renowned Van Dale Dictionary, the Dutch word for 'raw material' used in the Dutch version of the EFD (i.e. 'grondstof') corresponds to the first definition (i.e. translated: 'unprocessed, untreated material'), see http://vandale.nl/gratis-woordenboek/nederlands/betekenis/grondstof#.Wj0DIDciHIV (consulted on 22 December 2017). In the German version the word 'Rohmaterial' is used. According to the Duden Dictionary, this word corresponds to second definition, because its definition refers to *further* modification or processing ('für eine [weitere] Be- oder Verarbeitung bestimmtes Material'), see https://www.duden.de/suchen/dudenonline/Rohmaterial (consulted on 22 December 2017).

[727] 7th EAP, p. 183.

[728] See Chapter 3.2.1.

The second parameter for the evaluation of the potential for improving the environmental aspects of a product design concerns the 'use of materials issued from recycling activities'.[729] It is unclear whether these materials *'issued from'* recycling activities refer to the waste residues from the recycling processes only or to the actual recycled materials as well. If opted for the latter, the parameter can be used to shape Implementing Measures on the issue of recycled content. Based again on the strong influence of the life-cycle perspective on the Ecodesign framework, this option can be assumed.

The final reference in the EFD to the idea of establishing an ecodesign requirement on recycled content relates to the provision of information. Even though Part 2 does not expressly indicate that information on the recycled content of a product must be communicated, it is conceivable. According to Part 2 (paragraphs a and b) Annex I, Implementing Measures may require information from the designer to be supplied by the manufacturer on the manufacturing process. Significant environmental characteristics can also be required when the product is placed on the market, as this would allow the final users to compare it with other products. Applying this to the case of wooden products, the dissemination of information on the recycled content would provide guidance in choosing between products containing (less or) no recycled wood and products containing (more) recycled wood, which, in turn, ought to stimulate manufacturers to produce more products that include (more) recycled materials.

Even though not all legal foundations are that straightforward or well-founded, it seems that the inclusion of a requirement on recycled content in Implementing Measures for wooden products is possible. After all, if one looks at the framework as a whole, 'recycled content' connects the primary life-cycle of a product with a new life-cycle and is therefore completely in line with the idea of life-cycle thinking, which is aimed after by both the Ecodesign framework.

B. Additional features to take into account: categories and proof

If one wishes to prepare an ecodesign requirement on the use of recycled wood in new wooden products, one may need to consider two features, additional to the criteria set out in Article 15 EFD.

Categories for recycled content and setting their minimums

Generally speaking, the degree of difficulty for recycling differs depending on the life-cycle stage where the material becomes waste. An ecodesign requirement on recycled content should therefore include a distinction between recycled materials originating from pre-user waste and from post-user waste,[730] because the latter category is generally much harder to collect and recycle and therefore more costly than pre-user waste so.[731] Particular focus in an ecodesign requirement on post-user waste would therefore be appropriate.[732]

In both cases (pre- and post-user waste) there is a challenge of setting the 'right' minimum content (in %). What are the criteria for calculating and establishing the thresholds? Which measurement unit is best? Should the recycled content be measured of the whole product and/or of its components? How high should a minimum level be set to trigger instead of hinder innovation? Generally speaking, setting these thresholds for recycled content are arbitrary decisions: it is not always clear on what grounds they are adopted. The final decision is generally not only based on ecological and technical assessments, which are for example performed when

[729] Part 1 (section 1.3., paragraph b) Annex I EFD.

[730] The terms 'pre-user waste' and 'post-user waste' are more commonly known as 'pre-consumer waste' and 'post-consumer waste'. The paired terms (e.g. pre-user waste and pre-consumer waste) mean exactly the same. Because this thesis advocates the use of 'user' (or 'final user') instead of 'consumers', this preference has also been adopted in the waste terminology.

[731] Supra note 723, p. 100.

[732] By the way, the pre-user stream excludes the use of by-products within the same or other manufacturing process, because by-products are not regarded as waste and cannot be recycled for that reason. See Article 5 WFD and Chapters 6.1.1-B (heading 'Intends to discard') and 6.1.2-B.

preparing harmonized standards, but also on political and economic considerations.[733] To justify the chosen minimum as objectively as possible, product group-specific life-cycle assessments are required.[734] These assessments are already required by Article 15(4)(b) EFD and should include a comparative analysis of different minimum thresholds.

Technical information is also important to base a minimum threshold on, as this gives an indication as to whether the quality of the recycled wood is 'good enough' for a particular product application. For example, the contamination of unwanted preservatives or coatings and the presence of impurities could influence the quality of the recycled wood. Uncertainty about the quality has been mentioned in the CE Action Plan as one of the barrier faced by operators wishing to use recycled material in their products.[735]

Proof of the recycled content

Another challenge regarding the introduction of an ecodesign requirement on recycled content is that the exact recycled content often cannot be proven by any testing of the material by market surveillance authorities. Providing proof is not always easy.[736] This flaw is essential to address if minimum thresholds are established. Reliable proof on the post-user recycled content can be provided through an administrative 'trace'.[737] If no proof is provided, any manufacturer can claim the recycled content of his products. Wood remains wood, after all.

This brings us to the question of the 'right' terminology. One can only proof 'recycled content' if one knows what can be considered 'recycled'. However, it is not always clear what recycling means, as there are different interpretations and concepts available, which would probably negatively affect the functioning of the Ecodesign framework. An ecodesign requirement should be clear on what constitutes the *recycled* content of a wooden product and how this can be demonstrated.

C. Other laws that regulate recycled wood

Requiring a certain minimum of recycled wood content in products, preferably originated from post-user waste, and providing proof of the recycled content are currently already (partly) addressed in several EU measures. Below, the Ecolabel framework, the CPR, the PPD framework and the Waste Framework Directive (WFD) are discussed to see how they do it.

Ecolabel framework: dependence on forestry certificates

Suffice to point out here once again are the general requirements for setting EU Ecolabel criteria.[738] There is no clear indication in Article 6(3) Ecolabel Regulation that the use of recycled

---

[733] Policy Research Centre for Sustainable Materials Management: R. Hoogmartens, M. Dubois and S. Van Passel, *Recycled content as a policy instrument: International examples in law and further development* ('Recycled content als beleidsinstrument: Internationale wetgevings voorbeelden en verdere ontwikkeling') (SuMMa, 2013), p. 23.

[734] A LCA has for example already been carried out on wooden wardrobes (in Brazil, though): D.R. Iritani, D.A.L. Silva, Y.M.B. Saavedra, P.F.F. Grael and A.R. Ometto, 'Sustainable strategies analysis through Life Cycle Assessment: a case study in a furniture industry' (*Journal of Cleaner Production*, 96, 2015), pp. 308-318.

[735] CE Package, p. 11. Chapter 6 discusses is dedicated to this issue.

[736] This is for example the case when a recyclate is processed in the same facilities where virgin resources are processed, for example in the case of metals. On the other hand, it is not a familiar problem for plastics, because waste and primary plastics generally follow separate management streams until used in production processes. BIO by Deloitte, Oeko-Institut and ERA Technology, *Preparatory Study to establish the Ecodesign Working Plan 2015-2017 implementing Directive 2009/125/EC – Task 2: Supplementary Report "Identification or resource-relevant product groups and horizontal issues"* (Deloitte, 2014), p. 7. Whether this problem also arises in the production of wooden products is not discussed in the study.

[737] This flaw and way to address it have also been flagged in Chapter 5.2.1-B (heading 'Proof of the sustainability of wood') on sustainable sourcing.

[738] See Chapter 5.2.1-C (heading 'Ecolabel framework') for a more detailed explanation of the Ecolabel Regulation.

materials such as wood should be taken account of when EU Ecolabels are prepared. The EU Ecolabels on furniture and on wooden floor coverings address this issue nevertheless.

As has already been mentioned in Chapter 5.2.1-C (heading 'Ecolabel framework') on the CE benchmark for sustainably sourced wood, both the EU Ecolabel for furniture and for wooden floor coverings specify that at least 70% of the wood shall be SFM-certified virgin material *and/or recycled material*. It is therefore up to the manufactures whether they use SFM-certified wood *and/or* SFM-certified recycled wood to fulfil this criterion. The uncertified wood shall meet all requirement of the certification scheme with respect to uncertified material. In general the applicant must provide to the competent body a declaration of compliance supported by a valid, independently certified chain of custody certificate of the manufacturer for *all* wood in the production line.[739] Just as the share of sustainably sourced wood in the piece of furniture, the recycled content should also appear on the EU Ecolabel, if applicable.[740]

The reason why the two sets of relatively new EU Ecolabel criteria can rely on certification schemes is that an increasing number of systems have been developed for a variety of materials.[741] Until recently, however, there had been no reliable schemes that guaranteed recycled wood content.[742] Because of the environmental gains of using recycled wood instead of virgin wood, the FSC developed a particular, additional certificate that recognizes the important role recycled wood plays in protecting forests: the so-called 'FSC Reclaimed Material Standard'.[743] Important is that a difference is being made between the use of pre-user and post-user waste (or mixture). According to the FSC certificate, products carrying the FSC label must be verified as being made of at least 85% post-user reclaimed materials.

However, it is not always clear what recycling means, as there are different interpretations and concepts available. This is something which should be closely followed. For example, besides the fact that there are different definitions of recycling used in EU waste policy and legislation,[744] the FSC Reclaimed Material Standard uses yet a totally different word: 'reclaimed materials'. Evidently, because the FSC operates globally, it is impossible for the Council to develop certificates that adhere to all waste laws world-wide. The certificate does not therefore take the substantial or the subtle semantic differences into account. Manufacturers using this certificate or other certificates should thus look carefully at the definitions used to see whether they are the same as the one(s) used in EU law if it want to place the product on the EU market. The PEFC also provides for the opportunity to include recycled materials in the PEFC system through the

[739] Criterion 3.1 Annex Decision 2016/1332 and Criterion 2 Annex Decision 2017/176.

[740] Criterion 11 Annex Decision 2016/1332. It is striking that the EU Ecolabel criteria for wooden floor coverings does not impose that the % of recycled (or sustainably sourced wood) content appears on the label.

[741] For example, for plastics there are already several ways to declare the recycled content and each of them is based on (other) harmonized standards. An example is the QA-CER (quality assurance certificate) developed by the Belgian Quality Association (which is an audit organization that helps companies with receiving certifications). See the website of QA-CER, https://www.qa-cer.be/what (consulted on 22 December 2017). The certificate is based on the ISO 9001 standard, which sets out the requirements of a quality management system. The certificate aims at the quality assurance of the recycling process *and* the use of recycled plastics (and textiles and composite materials), both with regard to the recycled content as to the quality of the final product. Another bottom-up certification initiative is EuCertPlast, which particularly focuses on the traceability, assessment of conformity and recycled content of recycled plastics. See the website of EuCertPlast, http://www.eucertplast.eu/en/ (consulted on 22 December 2017). The initiative was co-financed by the EU under the Eco-Innovation Programme. Other than QA-CER, it works according to the standard EN 15343:2007, which specifies the procedures needed for the traceability of recycled plastics. In can be concluded that, indeed, these schemes on recycled plastic content can become very important under the *current* framework, for most ErPs are EEEs and are for the greater part made of plastics.

[742] Forest trends, *Meeting Summary: The EU Timber Regulation and the Pulp and Paper Sector* (Forest Trends, 2014), p. 4.

[743] Forest Steward Council, *FSC Standard. Sourcing reclaimed material for use in FSC Product Groups or FSC Certified Projects* (FSC, FSC-STD-40-007 (V2-0) EN, 2011).

[744] See for the definition used in the WFD and a discussion on this definition Section B (under the heading 'Waste Framework Directive').

PEFC Recycled Label. In this case, too, it is not always clear whether attaining the certificate actually proves a part of the content derives from recycling processes, as the certificate claims that the product includes at least 70% PEFC-certified material from recycled sources and wood from controlled sources.[745] Apparently, 'recycled sources' and 'wood from controlled sources' are compatible for the acquirement of the PEFC Recycled Label.

In the case of furniture and wooden floor coverings, ISO 14021 is referred to in both EU Ecolabels to describe the meaning of 'recycled material' and/or 'recycled content',[746] so also the FSC and the PEFC labels should at least adhere to the principles of the standard. For the standard to be used in the EU, however, it should in turn comply with the recycling definition used in EU waste law.[747] One would need to look at ISO 14021/2016 to see whether this is indeed the case. According to secondary literature, recycled content is defined by ISO 14021 as *'the proportion, by mass, of recycled material in a product or packaging*.' [748] It is added that, in general, a reference to recycled content *includes* reused products and materials, and may also include by-products as defined by Article 5 WFD.[749] This is extremely important because, if this is true, the standard does *not* comply with the recycling definition laid down in the WFD (see below under the heading 'Waste Framework Directive').

All things considered, it can be concluded that the EU Ecolabels on furniture and on wooden floor covering heavily rely on certification schemes to proof that a certain share of the product comes from a recycled source *and/or is sustainably sourced wood*. They have a choice in the source they use. If they opt for a recycled content, the use of recycled post-user wood waste may indirectly be stimulated, because some certificates differentiate between pre-user and post-user waste and require that the biggest share is of the latter category. A crucial point is to verify whether the certifications and the standards to which they conform use the right EU terminology.

Construction Products Regulation: secondary materials are at least considered

Relevant for this section is the basic requirement on the use of 'secondary materials' in construction work.[750] However, the meaning of 'secondary materials' is not further explained in the CPR. Note in this respect that the Regulation makes a clear distinction between 'raw materials' and 'secondary materials'.[751] While this distinction is semantically different than the distinction between 'primary raw material' and 'secondary raw material' under the EFD,[752] they probably have similar meanings. Overall, the inclusion of 'secondary material' in Annex I highlights that architects may not turn a blind eye to the concept of recycled content in their design, as it is distinguished as a 'basic requirement' for construction works. Basic requirements constitute the basis for the preparation of standardization mandates.

Green Public Procurement framework: various approaches adopted

Appropriate to point out here is that all available EU GPP criteria relevant to wooden products handle the issue of requiring recycled content differently.[753] According to the award criteria on wooden wall panels, the greater the proportion (%) of *recycled or reused* wood in a panel, the

[745] See the website of the PEFC: https://www.pefc.org/certification-services/logo-use/certified-entities (consulted on 22 December 2017).
[746] Article 2(l) Decision 2016/1332 and Article 2(13) Decision 2017/176. Because the ISO standards are only available to
[747] See below under heading 'Waste Framework Directive'.
[748] Joint Research Centre: Nicholas Dodd, Elena Garbarino and Miguel Gama Caldas, *Green Public Procurement Criteria for Office Buildings Design, Construction and Management* (European Union, EUR 27916 EN, 2016), p. 78. See for an explanation of Article 5 WFD Chapter 6.1.2-B.
[749] Ibid.
[750] Paragraph (c) of section 7 Annex I CPR. See also: Recital (55) CPR. See Chapter 5.2.1-C (heading 'Construction Products Regulation') for a more comprehensive clarification of the CPR.
[751] Paragraph (c) of section 7 Annex I CPR.
[752] As discussed in Chapter 5.2.3-B (heading 'Categories and minimums for recycled content').
[753] Chapter 5.2.1-C (heading 'Green Public Procurement framework') expounds on the PPD.

greater the level of award points offered. In order to prove the percentage, bidders must provide a signed declaration or other appropriate means.[754]

While the EU GPP criteria for furniture underscores that specifying recycled material can help to reduce material impact,[755] it does not contain any criteria that specifically require the use of recycled materials/wood.[756]

Finally, the EU GPP criteria for office buildings, too, recognizes that the use of recycled material can help develop a market for such materials, in line with Circular Economy objectives, and that award criteria for the use of building products or materials could therefore most certainly include requiring recycled and reused content.[757] Despite this, the EU GPP criteria forly set a specific award criterion for the incorporation of recycled content in concrete and masonry.[758] According to this criterion, the procurer shall award points to tenderers that achieve greater than or equal to 15% by value of *recycled content and/or by-products* for the sum of the main building elements.[759]

Two things can be noticed here. First, none of the EU GPP criteria make a distinction between pre-user and post-user waste. Second, the terminology used in the EU GPP criteria differs. For wooden wall panels 'recycling' and 'reuse' are paired, while the criteria for office buildings refer to both 'recycled content' and by-products' (specifically for concrete and masonry – not for wood). Because all of these concepts are waste terminology, it would be appropriate to look at the definitions contained in the WFD (this will be done in the next section on the WFD).

Waste Framework Directive: setting the tone in terms of terminology

Explaining the WFD in view of the CE benchmark for recycled content has a purpose other than for which the other laws have been discussed. The WFD is highly relevant for the discussion on the introduction of an ecodesign requirement on recycled content, because Article 3(17) contains a crucial definition: the one of 'recycling'.[760]

On the whole, this definition is similar to the recycling definition provided in the EFD.[761] Most important is that a 'recycled content' can only be achieved using what once used to be wood *waste* but which had been reprocessed (i.e. recycled) into *non-waste* particles/fibers/flours. The WFD definition adds to the EFD definition that these wooden fractions can besides in energy recovery installations neither be used in waste-based fuels or for backfilling activities – the

[754] European Commission, *Wall Panels – Green Public Procurement Product Sheet* (European Commission, 2010), p. 9.

[755] European Commission, *EU Green Public Procurement criteria for Furniture* (European Commission, SWD(2017) 283), p. 3.

[756] This is different than the previous EU Ecolabel for furniture: it required as a core criteria a certain percentage (based by weight) of recycled content of wooden materials in the final piece of furniture. Similar to the criteria for wall panels, bidders should have provided 'appropriate documentation' where the recycled content percentage/weight is stated. European Commission, *Furniture. Green Public procurement (GPP) Product Sheet* (European Commission, 2008), p. 9. The background JRC report of the currently applicable EU GPP criteria for furniture only dwells on why the criteria do not address the recycled content of plastics. It concludes that although third party 'Environmental Product Declarations' in accordance with ISO 14025 are increasingly used by producers that wish to proof a content of recycled plastics, the topic is considered an area for future research for later EU GPP criteria revisions. Joint Research Centre: S. Donatello, M. Gama Caldas and O. Wolf, *Revision of the EU Green Public Procurement (GPP) criteria for Furniture* (European Union, EUR 28729 EN, 2017), pp. 115-116.

[757] European Commission, *EU GPP Criteria for Office Buildings Design, Construction and Management* (European Commission, SWD(2016) 180, 2016), pp. 6-8.

[758] Criterion B10.2 Annex EU GPP Criteria for Office Buildings Design, Construction and Management, p. 22.

[759] This concerns a core criterion. For the comprehensive criterion, the EU GPP criteria also refer to 'reused content' and raises the total share to a minimum of 30%.

[760] See Chapter 3.2.3 (heading 'Definitions') for the WFD definition of recycling and for recovery. See also: Chapters 5.4.1-C (heading 'Waste Framework Directive') and 6.2.1 for an extensive explanation of the recycling definition under the WFD.

[761] According to Article 2(15) EFD, recycling means: '*the reprocessing in a production process of waste materials for the original purpose or for other purposes but excluding energy recovery*.'

wooden particles can only be used new products.[762] Why the EFD definition for recycling is not linked to the WFD definition is peculiar. Not only because the different terminology may cause for confusion, but also because some other definitions in the EFD (e.g. of recovery, waste and hazardous waste) directly refer to the definitions used in previously applicable waste legislation (which are now covered by the 2008 WFD), indicating that the EFD recycling definition has indeed a different meaning.

The use of the definitions related to waste management other than of recycling will be explained in other parts of this dissertation. Important to stress in this section is that recycling has a totally different meaning than concepts such as reuse' and 'by-products',[763] which it would not be appropriate to merge them together when an ecodesign requirement on the recycled content of a products is established.

D. Discussion on the potential for the Ecodesign framework

EU product legislation lacks major horizontal measures dealing with the issue of recycled content,[764] let alone exclusively on the use of recycled wood in newly manufactured wooden products. The idea of requiring a certain portion of wooden products to be recycled wood has so far neither been given much attention by legal scholars – this has predominantly been done in the field of engineering. It is therefore even more important to analyze the Ecodesign framework and the other measures within the EU regulatory framework for wooden products that actually currently already regulate the recycled content of wooden products in one way or another.

Terminological direction

The evaluation of the Ecodesign framework shows that, while there are indeed parameters in Implementing Measures on the inclusion of ecodesign requirements on recycled content, they might need to be reformulated to better clarify that recycled content is part of the ecodesign toolbox. Clarity is the most important precondition for the two features that have been identified at the beginning of this Chapter, which are the setting of categories and minimums for recycled content and the ways recycled content can be proven. The other EU laws analyzed have proven to be useful in further developing the features.

As already emphasized, using the right terminology is essential for both features. 'Recycled content' sounds great, but what does it actually mean? The case study shows that different interpretations are used for it and that not all of them are used correctly – they are at the least debatable. The meaning of recycled content is not explicitly defined in any of the regulatory frameworks studied, nor is there only one term used. Despite the fact their meanings are legally not interchangeable per se, 'recycled materials', 'reclaimed materials' and 'secondary materials' are examples of concepts used in the overall framework for wooden products (i.e. including harmonized standards, certification schemes…). In the end, however, it all comes down to the

[762] Therefore, defining 'recycling content' as *'the "input" of materials with origin on waste (i.e. secondary material)'*, as is done in a study on material-efficiency in the Ecodesign framework, is incorrect. It is true that the input material originates from waste but that waste needs to be *recycled*. Not all 'secondary materials' live up to this condition. In: BIO Intelligence Service, Fraunhofer IZM and Wuppertal Institute, *Material-efficiency Ecodesign Report and Module to the Methodology for the Ecodesign of Energy-related Products (MEErP) - Part 1: Material Efficiency for Ecodesign* (BIO Intelligence Service, 2013), p. 13.

[763] For the definition of reuse see Chapters 5.3.1-B (heading 'Meaning of durability aspects') and 5.3.1-C (heading 'Waste Framework Directive') and for the definition of by-products see Chapters 6.1.1-B (heading 'Intends to discard') and 6.1.2-B.

[764] An example of a material-specific EU measure addressing recycled content is the Regulation on recycled plastic materials and articles intended to come into contact with foods: Regulation 282/2008 of 27 March 2008 on recycled plastic materials and articles intended to come into contact with foods and amending Regulation (EC) No 2023/2006, [2008] OJ L 86/9). Regulation lays down market access rules which are based on quality assurance to lower the risks for human health. For example, Article 11 states that voluntary self-declaration of the recycled content in recycled plastic materials and articles should follow the rules laid down in standard ISO 14021:2016 (old: ISO 14021:1999) or an equivalent standard. The Regulation has not been address in the case study, because it does not address wooden products.

definition of recycling in the WFD. In fact, all waste terminology in the Ecodesign framework should be in line with the WFD, because, evidently, recycled wood derives from wood waste, which fell under the scope of the Directive whilst having the waste status. A simple reference to the WFD recycling definition in Article 2(15) EFD should therefore be sufficient. Implementing Measures do not have to include a separate definition in that way.

Recycled pre-user waste or post-user waste

Building on this issue of terminology, except for one of the EU Ecolabels, none of the regulatory frameworks makes the fundamental distinction between pre-user and post-user wood waste. Neither does the WFD make the distinction between these two categories. However, in my view, it may seem appropriate to make such a distinction, because the categories are fundamentally different. Firstly because of the quality differences. In addition to the risk of including other materials than wood in the recycling process (e.g. metal screws), the quality of recycled wood largely depends on the presence of (potentially) harmful chemicals in wood waste, possibly caused by the use of wood preservatives in the past. It is worth mentioning in this respect that the two most recent EUN Ecolabels relevant to wooden products (i.e. the ones for furniture and wooden floor coverings) include specific criteria on contaminants in recycled wood used in the products at issue. Secondly, next to the technical differences of the recycled wood, there is a real practical difference between the two categories: they made an entirely different journey to the recycling facility, which differs in difficulty level. Post-use wood is much harder to recycle for many reasons and should therefore be encouraged more than the recycling of pre-user waste. Implementing this distinction in an Ecodesign Implementing Measure would be a relatively new phenomenon in the overall EU framework for wooden products. This idea would also have consequences for the way how the recycled content of wooden products could be guaranteed in combination with the way how this information could be passed on along the chain.

Most of the EU legal acts or frameworks which were discussed in the case study provide for a broad range of relatively new options to proof the recycled content – they do not require one common instrument. Most measures rely on self-declaration (which most likely conform to harmonized standards), labels and certification. The section were the Ecolabel Regulation was discussed shows us that a promising development comes from the globally-operating SFM-certificates. Some of those certification schemes have now a counterpart specifically aimed at securing the chain of custody for recycled wood, and do even differentiate between pre-user waste sources and post-user waste sources. Manufacturers should, however, be cautious when they use these instruments: similar to some of the measures discussed in the case study, the instruments do not necessarily comply with the WFD definition of recycling. The verification methods allowed by an ecodesign requirement (which could be in principle any, because a requirement may not discriminate between the instruments), must therefore be carefully reviewed on their compatibility with the WFD terminology. Nevertheless, despite the fact that the WFD does not make a distinction between the recycling of pre-user waste and post-user waste, the verification instruments would need to reflect this division in order for them to be useful if, as explained above, the difference between the two tracks for recycled wood would indeed be recognized in an ecodesign requirement on the recycled content of wooden products. In any case, the instruments would evidently also be useful for the passing on of information on the two categories of 'recycled content' down the supply chain to the final users of the wooden products.

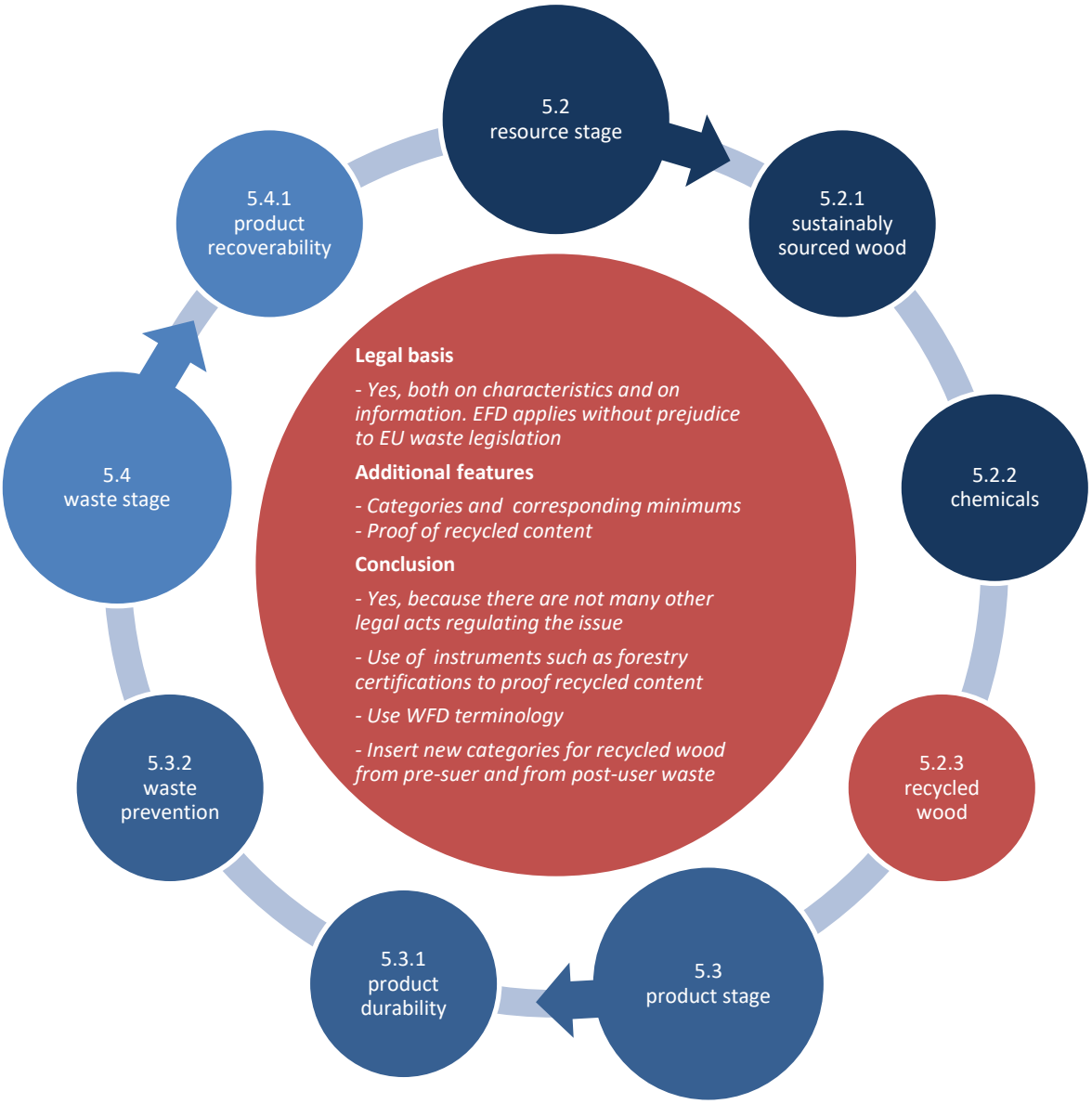
Minimum thresholds

As regards the setting of minimum thresholds (in any case for the recycled content composed of post-user wood waste) the following can be concluded from the legislation survey: while the CPR remains neutral on requiring a certain minimum percentage of recycled content (as this is for national legislators to fill in), the EU GPP framework and the Ecolabel framework are more specific on this issue. If addressed at all, they provide particular minimum thresholds (or alternatively a range in between a specific minimum must be identified) or indicate that national

authorities should need to complete the minimums that are left blank. Moreover, both frameworks show that there is no preferred choice for the measurement unit: if mentioned at all, possibly through the use of harmonized standards, it varies from weight, mass or costs to combinations of those units. A case-by-case approach would seem to be appropriate if proportions are determined in ecodesign requirements. Evidently, this approach is already adopted under the Ecodesign framework because each Implementing Measures regulates one particular product group. It is especially important to look at the final application of the wood. The use of recycled wood is for many wooden products no option. This is in contrast with the first two CE benchmark for sustainably sourced wood and for chemicals: these two issues can be addressed in Implementing Measures independently of the products manufactured.

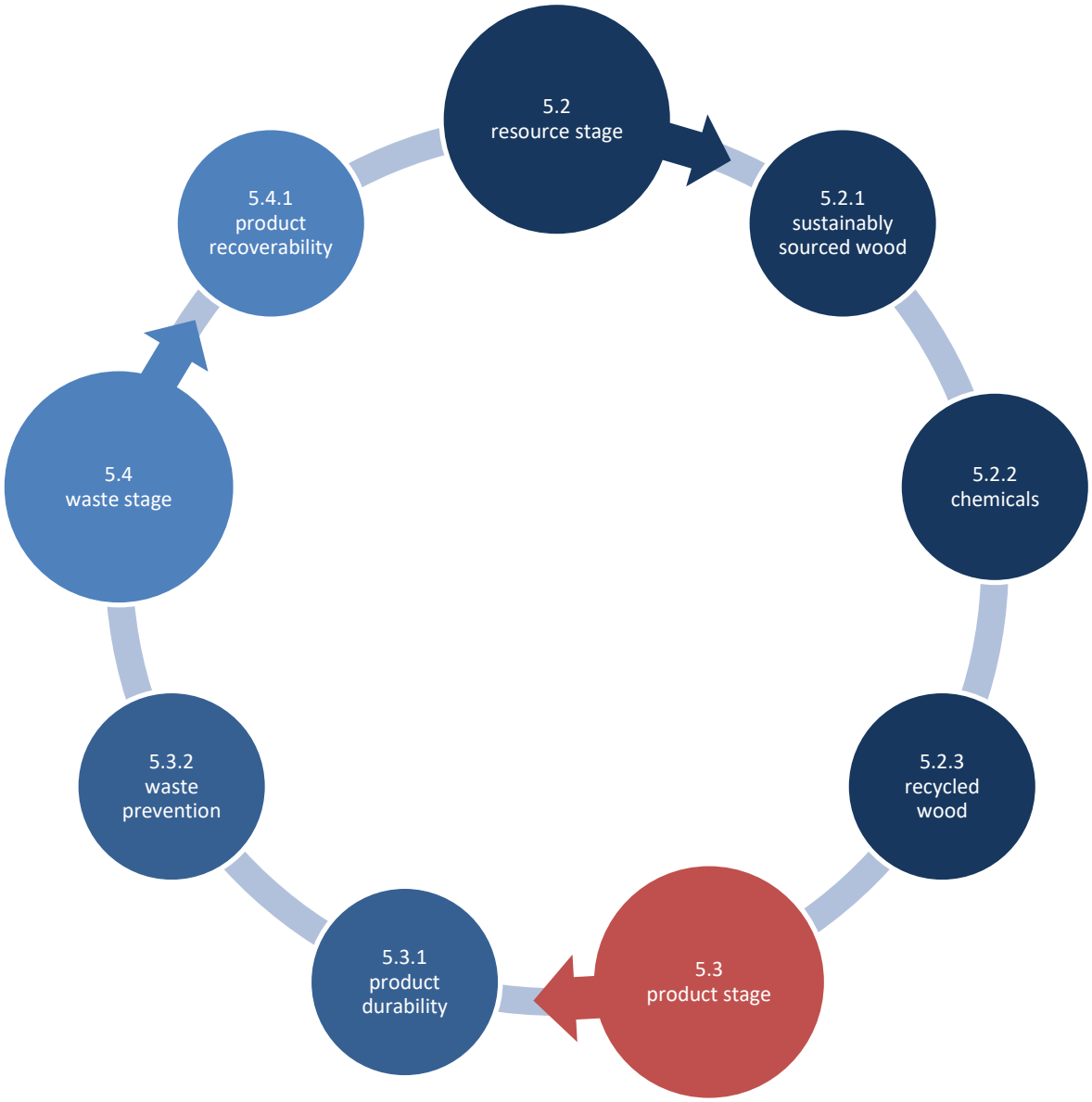
Conclusion

To conclude, it is in all likelihood possible to establish an ecodesign requirement on recycled content. This may even be encouraged, particularly considering the fact that are not yet many EU measures addressing the issue, let alone that they are obligatory. The recycled content would preferably be divided in two categories: one based on pre-user wooden waste and the other based on post-user wooden waste. Forestry certifications, labels and standards are crucial for providing information and proof of the recycled content. Nevertheless, it has to be restated that the limited instruments currently available are still in their infancy. Overall, the currently applicable EU measures, the imagined Ecodesign Implementing Measures and the instruments providing proof of the claimed recycled content should stick to the WFD definition of recycling, in order for the overall regulatory framework to be consistent and coherent.


5.2
resource stage
5.2.1
sustainably
sourced wood
5.2.2
chemicals
5.2.3
recycled
wood
5.3
product stage
5.3.1
product
durability
5.3.2
waste
prevention
5.4
waste stage
5.4.1
product
recoverability
Legal basis
- Yes, both on characteristics and on information. EFD applies without prejudice to EU waste legislation
Additional features
- Categories and corresponding minimums
- Proof of recycled content
Conclusion
- Yes, because there are not many other legal acts regulating the issue
- Use of instruments such as forestry certifications to proof recycled content
- Use WFD terminology
- Insert new categories for recycled wood from pre-suer and from post-user waste

5.3 Ecodesign requirements for the product stage

The CE Action Plan mentions a whole range of strongly interconnected topics that are somehow related to the product stage of a material (i.e. the stage where a manufactured product is put on the market and used).[765] By combining them, their number can be reduced to two CE benchmarks: 1) product durability and 2) the waste prevention. These two benchmarks, which are marked in the intermediary shade of blue in the graphic below, are discussed in the following two sections.



[765] This stage is also sometimes called the 'use stage' or the 'consumption stage'. For example, the CE Action Plan includes a section which is called 'Consumption'. Another option is to refer to this stage as the product's 'life'.

5.3.1 Circular Economy benchmark for product durability

This section examines the possibility to establish an ecodesign requirement on the durability of wooden products. Section A covers the legal basis to act under the Ecodesign framework and Section B puts forward some features a potential requirement would need to cover. Section C explains which EU legal acts already regulate product durability and whether they reflect the features identified earlier. A final discussion on the CE benchmark is provided in Section D.

A. Ecodesign Framework Directive

Before moving to Annex I EFD, two aspects of the Ecodesign framework relevant to the durability of wooden products are highlighted first. First, the EFD applies in addition to newly manufactured products also to imported second-hand products when they enter the EU market for the first time.[766] This is important, because it shows that even some second-hand wooden products may need to comply with the ecodesign requirements. The use of these products can essentially be characterized as durable for the very reason that they 'survived' one or more prior users and are still not discarded as waste. Second, products that have been repaired in the EU *without* changing their original performance, purpose or type are *not* considered new products according to Union law. Hence, these products do not need to comply with the Ecodesign framework. Furthermore, it does not matter whether the original product was placed on the market before or after the relevant Implementing Measure entered into force. As a matter of fact, this general rule even applies to products that have been temporarily exported to a non-EU Member State for repair or maintenance operations.[767]

Having touched upon these general aspects, more specific references to product durability can been found in Annex I EFD. Part 1 (section 1.1) Annex I EFD identifies 'installation and maintenance' and 'use' (paragraphs d and e) as two important life-cycle stages that need to be taken into account when drafting an Implementing Measure. Part 1 (section 1.2) Annex I EFD adds that for each of these stages, amongst others, the possibilities for reuse of the materials should be assed. It further refers to the WEEE Directive, which also addresses to reuse and other durability aspects such as repairability, upgradability and disassembly/dismantling.[768] According to Part 1 (section 1.3) Annex I EFD, particular attention should moreover be paid to a number of parameters. The ones related to product durability are:

> *(e) quantity and nature of consumables needed for proper use and maintenance;*
> *(f) ease for reuse and recycling as expressed through: number of materials and components used, use of standard components, time necessary for disassembly, complexity of tools necessary for disassembly, use of component and material coding standards for the identification of components and materials suitable for reuse and recycling (including marking of plastic parts in accordance with ISO standards), use of easily recyclable materials, easy access to valuable and other recyclable components and materials; easy access to components and materials containing hazardous substances;*
> *(g) incorporation of used components;*
> *(h) avoidance of technical solutions detrimental to reuse and recycling of components and whole appliances;*
> *(i) extension of lifetime as expressed through: minimum guaranteed lifetime, minimum time for availability of spare parts, modularity, upgradeability, reparability;*

---

[766] European Commission, *The 'Blue Guide' on the implementation of EU product rules*, Version 1.1 – 15/07/2015, pp. 17-18. The Energy Label Directive, which is generally seen as the counterpart of the Ecodesign framework, on the contrary, does *not* apply to second-hand products: Article 1(2) and (3) Energy Label Directive.

[767] Ibid., *The 'Blue Guide' on the implementation of EU product rules*, pp. 18-19.

[768] Part 1 (section 1.2, paragraph e) Annex I EFD. The reason why the paragraph refers to the WEEE Directive is because the current EFD mainly regulates EEEs. For the provisions in the WEEE Directive see e.g.: Recitals (12) and (18) and Articles 1 and 4 WEEE Directive.

Durability is clearly well-represented in Annex I EFD. It dedicates most paragraphs to durability in comparison to the other CE benchmarks. It even lists significantly more durability aspects than the ones issued by the CE Action Plan, as it mentions on top of the usual parameters (e.g. repairability and reusability) also issues such as a minimum guaranteed lifetime (i), a minimum time for availability of spare parts (i), the use of standard components (f) and the use of component/material coding standards for the identification of components/materials suitable for reuse (f). Paragraph (e) takes it even a step further by addressing consumables, which are by their very nature not durable as they are intended to be used up and then replaced.[769]

Because the supply of information is generally considered to have a significant impact on how users use their products, it is no surprise that Part 2 of Annex I EFD pays close attention to the product durability. An obvious example is to require information on how to install, use and maintain the product (paragraph c). Moreover, Article 11 EFD emphasizes that Implementing Measures may also include requirements that particularly target components and sub-assemblies that are newly put on the market and/or put into service.[770] According to the provision, manufacturers (or the authorized representatives) of these product parts may be required to provide the manufacturer of an ErP with '*relevant information on the material composition and the consumption of energy, materials and/or resources of the components or sub-assemblies*.'

Overall, an Implementing Measure may most certainly include requirements on durability, related to the characteristics and manufacturing process of a product, and to the supply of information. It is very much encouraged. A wide range of topics can be addressed in that respect.

B. Additional features to take into account: durability aspects, conflicts and proof

If one wishes to prepare an ecodesign requirement on the durability of wooden products, one may need to consider three additional features. They are elaborated upon below.

Meaning of durability aspects

The CE Package includes a number of durability topics that are so strikingly intertwined that they were brought down to one CE benchmark.[771] This 'durability benchmark' therefore includes aspects such as the reusability, repairability, easiness and the level of safety to disassemble or dismantle, upgradability, availability of spare parts and easiness to remanufacture of products (hereafter called 'durability aspects').[772] These durability aspects fall under the scope of product durability, because they all contribute to keeping the products or components in the use stage in their life-cycle for as long as possible. In the end, life-cycle extension is the principal aim of making products more durable. While the CE Action Plan only stresses the take-up of these durability aspects in the Ecodesign framework in relation to EEE products (for the obvious reason that most products currently addressed by the framework *are* EEE products),[773] they could, of course, also be applied to all other products such as to wooden products.

The list of durability aspects is extensive; all of them can in principle be taken into account when drafting ecodesign requirements. For the majority of these aspects the meaning is not explained in great detail in the EFD, however – if explained at all. Be that as it may, the meaning of most of them can be easily guessed and do not need any further clarification for that reason. For example, the repairability of a product may include the modularity of wooden furniture in order to repair only the damaged parts. The ability for maintenance of wooden furniture is no brain teaser either: for example, it can be understood as the easiness of disassembly of

[769] The meaning of 'consumables' is based on: https://en.oxforddictionaries.com/definition/consumable#consumable__5 (consulted on 30 November 2017).
[770] According to Article 2(2) EFD, components and sub-assemblies means '*means parts intended to be incorporated into products which are not placed on the market and/or put into service as individual parts for end-users or the environmental performance of which cannot be assessed independently*.'
[771] See Chapter 4.3.2 (heading 'Methodology').
[772] These durability aspects derive from the Action Plan and where mentioned in the context of both the manufacturing of products, including their ecodesign, and the use of products. CE Action Plan, pp. 3-4 and 7.
[773] CE Action Plan, pp. 3-4.

components and the availability of these items. The upgradability of products further builds on this issue. For wooden products, new preservatives might become available or some paint can keep the product fashionable.

However, the EFD includes one definition of particular interest for product durability: the definition of 'reuse'. According to Article 2(14) EFD, reuse means:

> *any operation by which a product or its components, having reached the end of their first use, are used for the same purpose for which they were conceived, including the continued use of a product which is returned to a collection point, distributor, recycler or manufacturer, as well as reuse of a product following refurbishment* (emphasis added)

The definition clarifies that whenever Annex I EFD or an Implementing Measure uses the word 'reuse' it can refer to the non-waste stage *and/or* to the waste stage of a wooden product. This assumption is based on the fact that the definition expressly states that when a continuously used product is returned to a recycler, it can be called 'reuse' on the condition that the operation fulfils the criteria of 'reached the end of first use' and 'used for the same purpose'. Because recyclers *always* deal with waste materials,[774] reuse can according to this logic also refer to waste materials. Looking at it from another perspective, however, this interpretation is at odds with the assumed meaning of 'product durability', as it undermines the objective to keep the product or component as long as possible in the use *stage* of a product – not the waste stage. Moreover, if the waste products are offered to recyclers, the waste products will be recycled instead of reused.[775] As can be seen from these arguments, the use of the word 'reuse' is not undisputed and must therefore be clarified.

Conflicting angles to product durability

It is generally unknown whether all the durability aspects mentioned in the previous section really contribute to the life-time extension of products and/or their components and whether they actually reduce the environmental impacts, as aimed after by the EFD.

Generally speaking, it is hard to tell whether making wooden products more durable is really helpful, because there is a data gap of the *factual behaviour* of users.[776] The 'factual' behaviour is based on the information provided by each individual Member State: today, this data often relies on estimations.[777] As a result, the factual life-time does not automatically correspond to the technical and 'non-technical' life-time of a product (the non-technical life-time for example relates to the functionality of a product or to its aesthetics). Evidently, changing life-styles and technological innovation have a major impact on what end-users buy and discard. Ecodesign requirements on product durability may therefore have only limited influence on the factual life-time of a product.[778]

Another challenge is that long-lasting products are not better for the environment than short-lasting products in every occasion. Long-life products may cause adverse net-impacts when they cause greater environmental impacts than buying new/other products or services instead. For example, this might be the case when products cause greatest impacts during the use stage instead of the manufacturing stage. Generally speaking, though, the biggest impacts of wooden products occur in the resource stage. Despite this particular situation, the variety of possible scenarios confirms the need to conduct specific LCAs for each material. An additional problem occurs

[774] See Chapters 5.2.3-C (heading 'Waste Framework Directive'), 5.4.1-B (heading 'Different definitions and different categories for recovery'). See also: Chapter 6.2.1.
[775] This argument will be further clarified in Section B under the heading 'Waste Framework Directive' and provides an answer to the question raised in Chapter 5.2.3-C (heading 'Waste Framework Directive') about the difference between recycled content and reused content.
[776] BIO by Deloitte, Oeko-Institut and ERA Technology, *Preparatory Study to establish the Ecodesign Working Plan 2015-2017 implementing Directive 2009/125/EC – Task 2: Supplementary Report "Identification or resource-relevant product groups and horizontal issues"* (Deloitte, 2014), p. 9.
[777] Ibid.
[778] Ibid.

when products are kept too long in the use stage. For example, there may be new evidence available about specific chemicals used in/on wooden products demonstrating certain potential risks. If an ecodesign requirement on durability is effective, these risky products remain in the economy.[779] Particularly considering the substitution of risky chemicals, putting more durable products on the market could slow down the introduction of products with better environmental performances. Generally speaking,

These issues show the overarching dilemma of erecting ecodesign requirements on durability. On the one hand, the Circular Economy philosophy stimulates the manufacturing of more durable products because, amongst others, it would entail fewer products to be manufactured, which requires less input of wood. On the other hand, the Circular Economy also aims at changing life-cycles and technological innovation, which might be frustrated by making products more durable. New Implementing Measures for wooden products may therefore need to strike a balance and include some sort of safety net for situations whenever the two objectives clash.

Providing guidance

The CE benchmarks for the resource stage raised the matter of providing evidence of the use of a particular type of material in the manufacturing of wooden products. Establishing an ecodesign requirement on product durability, however, calls for a different approach: it should address the provision of information, which can be used *after* the product has been put on the market. Since the EFD has little influence on the targeted products from that point onwards, product durability is much harder to regulate through the Ecodesign framework. Providing information to the general public is the primary objective and challenge, as it can at least *help* to change the factual behaviour of the final users – it is, however, no guarantee (as opposed to the paper trace required in the CE benchmarks for the resource stage). It is safe to assume that this is exactly why the Annex to the EFD includes so many requirements in Part 1 (evaluation) and Part 2 (information) dealing with information supply. Implementing Measures for wooden products would be no exception in that regard.

C. Other laws that regulate product durability

In addition to the EFD, five EU measures are discussed in the light of the CE benchmark for product durability and how they deal with the additional features. The measures clarified are: the CPR, the Ecolabel framework, the Product Warranty Directive (PWD)[780], the PPD framework and the WFD.

Construction Products Regulation: new yardsticks to give more guidance

Relevant to mention in this section are the basic requirements under Annex I CPR.[781] Section 7 (paragraphs (a) and (b)) on the sustainable use of natural resources underscores the need to reuse the materials of demolished construction works and the durability of the construction works in general. Unfortunately, the text does not expound on the meaning of 'durability' or 'reuse'.

The 2014 Communication on resource opportunities in the building sector can help to interpret what is meant by 'durability' in the building sector. The Communication stresses that a common framework of core life-cycle indicators should be established, as this would allow comparability and easier access to consistent information while still leaving room for national and commercial schemes,[782] which are key to the CPR framework. In 2017, the Commission launched a voluntary reporting programme under the Circular Economy framework to improve the

[779] This problem has already been flagged in Chapter 5.2.2 where the application of the substitution principle is considered.

[780] Directive 1999/44 of 25 May 1999 on certain aspects of the sale of consumer goods and associated guarantees, [1999] OJ L 171/12.

[781] For a more extensive explanation of the CPR and its relation to the Ecodesign framework see Chapter 5.2.1-C (heading 'Construction Products Regulation').

[782] European Commission, *Communication on resource efficiency opportunities in the building sector*, COM(2014) 445, pp. 4-5.

sustainable performance of buildings, called 'Level(s)'.[783] It is still in the testing phase. For the use stage of a building, it identifies issues such as use, maintenance, repair, replacement and refurbishment. The life planning reporting format includes the expected life-span of a number of main building elements (e.g. internal walls, doors, stairs…) to be filled in by the product's manufacturer. Overall, it is an extensive guidance programme, where little is left untouched. It complements the CPR in the sense that it provides for precise yardsticks to take into account the environmental performance of building, including on the durability of the products used. In the programme, however, only a few definitions are provided for (in any case not of durability or reuse), and the conflicting angles to product durability are not addressed. Moreover, it is voluntary.

Ecolabel framework: durability is not defined but emphasized nonetheless

A preliminary observation concerns the meaning of durability in the Ecolabel Regulation. Article 6(3)(c) Ecolabel Regulation specifically stresses the need to take the 'durability and reusability' of products into account when EU Ecolabel criteria are prepared.[784] Interestingly, the provision apparently considers durability and reusability as two separate concepts. However, their difference is not further clarified. The EU Ecolabels for certain wooden products do not clarify this either.

The 2017 EU Ecolabel criteria for wooden floor coverings are more extensive on product durability than the previous version of the label.[785] It contains criteria for fitness for use, repairability and extended guarantee and information supply.[786] The one for fitness for use refers to a number of standards containing harmonized test. The criterion for repairability and extended guarantee requires that repairability information shall be included in the instructions or the manufacturer's website, and that a minimum of a five year guarantee with no additional cost shall be provided by the applicant, without prejudice to the legal obligations of the manufacturer and seller under national law. The criterion on user information (on the packaging or any other documentation accompanying the product) includes requirements on recommendations for installation, surface treatment, cleaning and maintenance. For all criteria, a declaration of compliance is required.

The 2016 EU Ecolabel criteria for furniture, which expressly excludes second-hand products from its scope, do not contain any durability criteria specifically addressing wooden furniture. It does, however, include similar criteria on fitness for use and one on extended product guarantee, although that guarantee is based on a five year period.[787] The criterion for fitness for use refers to Appendix IV of the label, which covers an extensive list of harmonized 'durability, strength and ergonomic standards' that should be complied with, which should be proven by a declaration of compliance. The EU Ecolabel also contains criteria on the provision of spare parts (they should be available for at least 5 years) and on design for the assembly for furniture consisting of multiple components (they shall be designed for disassembly with a view to facilitating repair and reuse).[788] It is furthermore required to provide information about all these issues with the product.[789]

---

[783] See for the website of the framework: http://ec.europa.eu/environment/eussd/buildings.htm (consulted on 30 November 2017); and e.g. Joint Research Centre: N. Dodd, M. Cordella, M. Traverso and S. Donatello, *Part 3: How to make performance assessments using Level(s)* (European Commission, 2017).

[784] See Chapter 5.2.1-C (heading 'Ecolabel framework') for a more detailed explanation of the Ecolabel Regulation.

[785] The older EU Ecolabel only laid down requirements to pass on *'relevant user information'* to the private users when a product is sold to them. The information provides for recommendations/instructions on the products' proper and technical use as well as their maintenance. Section 7 of the Annex.

[786] Criteria 8-10 Annex Decision 2017/176.

[787] Criteria 9.1-9.2 Annex Decision 2016/1332.

[788] Criteria 9.3-9.4 Annex Decision 2016/1332.

[789] Criteria 10-11 Annex Decision 2016/1332

Considering the two EU Ecolabels, it can be concluded that durability is generally considered an all-inclusive but not defined concept: each label highlights certain durability aspects distinctively without addressing product durability as a stand-alone subconcept. Criteria for several durability aspects are present in each label. For example, the labels require manufactures to guarantee the possibility of acquiring spare part upon request for a certain period. Furthermore, several criteria depend on the use of harmonized standards. In addition, all criteria require a declaration of performance and require that vast amount of durability information is supplied to the users of the products.

Product Warranty Directive: guaranteeing a minimum guarantee of conformity

Building on the idea of requiring a minimum guarantee for a certain period of time,[790] one cannot overlook EU consumer protection law. Despite the fact that this field of law does not qualify as an 'environmental measure', it does provide for some guidance as regards the measure unit used. A little side-track to private law, in this case to the PWD,[791] is therefore justified.

The PWD is particularly important for product durability, because it ensures a uniform minimum level of protection by holding the seller of a product liable to the buyer for any lack of conformity which exists at the time the goods were delivered.[792] If there is a lack of conformity, for example when the products sold are faulty, the seller must free of charge repair or replace them or give the buyer an appropriate price reduction.[793] The seller is always required to provide a solution. Despite not giving reparation precedence over the other options, it safeguards product durability when products are put on the market.

To strengthen the level of protection for the final users of products, Article 5 PWD specifies that buyers always have the right to a minimum two-year guarantee at no cost, thus without the possibility for sellers to shorten the period via a commercial guarantee, and starting as soon as the buyer receives the product (also called 'legal guarantee').[794] What is more is that second-hand products are also covered by the minimum guarantee of two years.[795] Article 5(3) PWD further indicates that, unless proved otherwise, any lack of conformity that becomes apparent within six months of delivery of the products shall be presumed to have existed at the time of delivery (unless this presumption is incompatible with the nature of the goods or the nature of the lack of conformity). Notably, within the first six months after delivery, the seller has to prove that no lack of conformity existed at the time of delivery – thereafter is the burden of proof on the buyer. Arguments can be made, however, that it is very difficult for buyers to proof the defect, and that therefore, practically speaking, the 2-year guarantee is *de facto* reduced to six months.

The CE Action Plan recognizes that problems are still encountered in the implementation of the 2-year limit.[796] The Commission promises that it will address issues such as these in the nearby future.[797] It does not, however, explain how they will be addressed. Questions such as

[790] This is mentioned in Part I (section 1.3, paragraph i) Annex I EFD. See the section above.

[791] Despite the reorganization of EU consumer protection law by the new Directive on Consumers Rights, which has been in force as from 2014 (Directive 2011/83 of 25 October 2011 on consumer rights, amending Council Directive 93/13/EEC and Directive 1999/44/EC of the European Parliament and of the Council and repealing Council Directive 85/577/EEC and Directive 97/7/EC of the European Parliament and of the Council, [2011] OJ L 304/64), the 1999 PWD remains in force.

[792] Articles 1(1) in conjunction with Article 3(1) PWD.

[793] Article 3(2) PWD.

[794] Plus, national legislation may give buyers extra protection. Note that any deviation from EU rules must always be in the users' best interest.

[795] Products bought at public auctions or from private individuals are not covered, however.

[796] This has also been noted by the EP, especially for products reasonably expected to enjoy a longer life: Recital 34 European Parliament, *Resolution of 4 July 2017 on a longer lifetime for products: benefits for consumers and companies*, P8_TA-PROV(2017)0, 287 2016/2272(INI).

[797] For example, it stresses that the legal guarantee periods and the possible reversal of the burden of proof after six months is highly relevant for the product stage of a material. CE Action Plan, pp. 6-7; and European Commission, *Annex to the Communication Closing the loop – An EU action plan for the Circular Economy*, COM(2015) 614, p. 2. This would be in line with the BRP.

whether the reversal of proof will be changed and whether the 2-year period of legal guarantee will be increased, which by the way had been asked by some members of the EP in view of the redrafting of the CE Package mid-2015,[798] are left unanswered.[799] It is safe to say that there is at least merit in extending the guarantee rights for product buyers to encourage manufactures to think more carefully about the durability of the products they sell.

An Implementing Measure for a wooden product group can include a requirement on the obligatory minimum life-time of a product. Surely this is not entirely the same as a legal guarantee under the PWD, but the comparison between the two regulatory frameworks provides an indication as to what period is legally already provided.[800]

Green Public Procurement framework: no one size fits all approach

There are three EU GPP criteria relevant to wooden products.[801] How they address product durability is explained below.

The document on EU GPP criteria for furniture emphasizes the goal to procure durable furniture.[802] The EU GPP criteria dedicated two parts to address this: two of which are significant to product durability, one on refurbishment and one on new furniture.[803] The part on refurbishment is in itself a tribute to product durability. All of the criteria in this part deal with durability. For example, award criterion AC4 sets out that for each additional year of warranty (until 4 or more years) additional points shall be awarded. The part on new furniture includes contract performance clauses on fitness for use and design for disassembly and repair.[804] In this part of the EU GPP label, too, product warrantee is required: as a core criterion the tenderer is required to provide a minimum three-year warranty, which shall cover repair and replacement at no additional costs. The tenderer is also required to guarantee the availability of spare parts for a period of at least three years.[805] The warrantee is durability instrument not seen in other legal acts and frameworks, and could inspire the Ecodesign framework.

A contract performance clause in the EU GPP criteria for wooden wall panels obliges bidders to provide for appropriate user information. The clause describes many things that could help to extend the life-span of the wooden wall panels, such as the handling, installation procedures and surface treatment applications.[806]

---

[798] See the Parliamentary questions of 2 July 2015 on the website of the EP: http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+WQ+E-2015-010665+0+DOC+XML+V0//EN (consulted on 22 December 2017).

[799] Regarding the latter question/opportunity, this was explicitly expressed by some members of the EP in view of the drafting of the CE Package.

[800] Note that the legal guarantee encourages the technical durability of a product – it is not about the *non*-technical durability.

[801] For a more general discussion on the PPD and the GPP framework in the EU see Chapter 5.2.1-C (heading 'Green Public Procurement framework').

[802] European Commission, *EU Green Public Procurement criteria for Furniture* (European Commission, SWD(2017) 283), p. 3.

[803] The Technical report accompanying the EU GPP criteria contains more consideration that may act as guidance for procurers who may wish to request mandatory or optional compliance with certain durability standards. The report explains that the main reason exclude some of these considerations in the EU GPP criteria is a , information gap about the market coverage of products that would meet certain minimum durability requirements and the fact that some aspects will directly impact on user-comfort and user-preferences, which are highly subjective qualities. Joint Research Centre: Shane Donatello, Miguel Gama Caldas and Oliver Wolf, *Revision of the EU Green Public Procurement (GPP) criteria for Furniture* (European Union, EUR 28729 EN, 2017), p. 124.

[804] Criterions TS5/8 and TS6/9 European Commission, *EU Green Public Procurement criteria for Furniture* (European Commission, SWD(2017) 283), respectively. According to criterion TS5/8, the tenderer shall at least provide a declaration of compliance with any relevant EN standards. According to TS6/9, a manual shall be provided by the tenderer.

[805] Criterion TS7 ibid. As a comprehensive criterion, the time frames are increased to five years.

[806] European Commission, *Wall Panels – Green Public Procurement Product Sheet* (European Commission, 2010), p. 10.

None of the durability aspects are individually addressed in the EU GPP criteria for office buildings, which by the way also apply to major renovation works.[807] Probably this is due to the subject-matter: the criteria tend to cover the entire building, without paying too much attention to separate construction materials or products. This does not mean, however, that the construction materials and products do not have to comply with certain requirements on product durability.[808] For the office building as a whole, the performance of the main building elements may require an Environmental Product Declaration in certain situations.[809] This declaration can be based on a LCA to demonstrate the construction has reduced environmental impact. In turn, these LCAs include issues on durability,[810] and in so doing the conflicting angles to product durability are likely to be addressed.

All things considered, the durability aspects that are present in the EU GPP criteria targeting particular wooden products seem to recognize 'durability' as the general concept, but without specifying what this entails. There is no recurring 'one size fits all' list of durability aspects: a different approach is adopted depending on the product group at stake. The Ecodesign framework could in any case draw inspiration from the setting of a 'minimum of X years warranty', which shall cover the repair and replacement at no costs.

Waste Framework Directive: a different meaning of reuse

As announced in Chapter 5.3.1-B (heading 'Meaning of durability aspects') on the clarity of the different components of durability, the CE benchmark for product durability is amongst others reflected in the definition of 'reuse'. The EFD is not the only EU measure that includes a definition of reuse: the WFD includes one as well. Pursuant to Article 3(13) WFD,[811] reuse means:

> *any operation by which products or components that are <u>not waste</u> are <u>used again for the same purpose</u> for which they were conceived* (emphasis added)

According to this definition, the reuse of products/components can only occur when the products/components are non-waste and when they are reused for the same purpose. While the requirement of 'same purpose' can also be found in the EFD, the other requirement of 'non-waste' runs contrary to the EFD definition that suggests that also waste materials can be reused. It is a crucial difference that the WFD makes a distinction between the non-waste stage (i.e. reuse) and the waste stage. For waste products/components that are 'returned' to the use stage of a product, the waste hierarchy in the WFD provides for another concept: preparing for reuse.[812] It is the second option but the first recovery option in the hierarchy. According to Article 3(16) WFD, preparing for reuse means:

> *checking, cleaning or repairing <u>recovery</u> operations, by which products or components of products <u>that have become waste</u> are prepared <u>so that they can be re-used</u> without any other pre-processing* (emphasis added)

Pursuant to this definition in combination with the definition of 'reuse' provided in the WFD, preparing for reuse is a recovery process in the waste stage aiming at the *return* of the waste product to the use stage where it can be used again for the same purpose for which it was

[807] European Commission, *EU GPP Criteria for Office Buildings Design, Construction and Management* (European Commission, SWD(2016) 180, 2016).
[808] See e.g.: the CPR and the voluntary reporting programme Level(s), which is a programme about the measurement of the environmental performance of buildings in Chapter 5.3.1-C (heading 'Construction Products Regulation').
[809] All EPDs shall be in conformance with ISO 14025 or EN 15804.
[810] Criterion 10.1 and Annex 2 EU GPP Criteria for Office Buildings Design, Construction and Management.
[811] See also: Chapter 3.2.3.
[812] See also: Chapter 3.2.3.

conceived.[813] Despite that durability is understood as the life-time extension of a product during the *use stage* (i.e. the extension of the use stage), preparing for reuse would arguably still qualify as a durability aspect, as it can be interpreted as 'reverted durability'.[814] Reverted durability means that products enjoy an extended life-time *even though* they had had a waste status for a certain period of time. To streamline the EFD and the WFD, both frameworks would need to use the same definitions. Because the WFD relies heavily upon the waste hierarchy and the Ecodesign framework applies without prejudice to EU waste management legislation,[815] the strict distinction between 'reuse' and 'preparing for reuse' (i.e. in other words the division of the non-waste status and the waste status) is preferable to be maintained.

When having a closer look at the definitions of reuse in both the EFD and the WFD, the criterion of 'used again for the same purpose' is debatable considering the CE benchmark for product durability. This is because by requiring the same purpose, it excludes products that are used for other purposes even though they are not yet considered waste. The situation where products have another purpose than originally intended is nevertheless very common, for example when someone uses wooden a wall panel as a table top or when wooden pallets are used as a slatted bed base. To legally reject the existence of other, possibly unintended uses is unrealistic and unnecessary if product durability is to be encouraged.

The WFD includes more references to product durability than the definitions of 'reuse' and 'preparing for reuse'. Some of them relate to the durability of wooden products clearer than others. First, the WFD lists the promotion of reuse and repair as appropriate examples of waste prevention measures. (The link between 'product durability' and 'waste prevention' is discussed in Chapter 5.3.2). Second, Article 11(1) WFD obliges Member States to adopt measures that stimulate the reuse of products and preparing for reuse activities, in particular by encouraging the establishment and support of reuse and repair networks, the use of economic instruments, quantitative objectives and procurement criteria.[816] This is a list of possibilities, which means that setting ecodesign requirements could also be aimed for. Third, the Extended Producer Responsibility instrument can amongst others be used to strengthen the reuse of waste.[817] Fourth, the WFD sets a target of 70% (w/w) for the preparation for reuse, recycling and other material recovery of non-hazardous C&D waste by 2020.[818] It is the only target set out in the WFD which is significant for wooden products. The CE Package does not change or upgrade this target as one of the few.

In sum, the WFD contains several instruments to encourage the reuse of products. Most significant for the Ecodesign framework is the WFD terminology. The Commission should harmonize the definitions of reuse and preparing for reuse by referring in the Ecodesign framework to the definitions set out in the WFD. Furthermore, it could be considered to rephrase the definition of reuse to ensure that an operation by which non-waste products are used again for *another* purpose than organically used, is also considered reuse.

[813] See Chapter 5.4 for an explanation of the meaning of 'recovery'. For a critical opinion on the difference between reuse and preparing for reuse, see: M. Gharfalkar, R. Court, C. Campell, Z. Ali and G. Hillier, 'Analysis of waste hierarchy in the European waste directive 2008/98/EC' (*Waste Management*, 39, 2015), p. 309. The authors argue that reuse should logically come after preparing for reuse in the waste hierarchy. However, they overlook that 'reuse' is not considered a waste treatment (it occurs in the use stage of a product, whereas 'reparaing for reuse' is (after this waste treatment, the waste ceases to be waste and returns to the use stage where is it reused.

[814] This is a new interpretation and cannot therefore be underpinned by literature.

[815] Article 1(4) EFD.

[816] The final example has been discussed in the previous section under the heading 'Green Public Procurement framework'.

[817] See for an explanation of Annex IV (paragraph 16) WFD

[818] Article 11(2)(b) WFD.

D. Discussion on the potential for the Ecodesign framework

In essence, product durability is based on a 'product use perspective': the longer the product is used, the better. The main objective is therefore to extend the life-time of a product. The term 'product durability' exists along with other 'durability aspects' as a stand-alone concept in the studied EU measures. For example, durability and reuse often exist next to each other (e.g. in the Ecolabel Regulation). The EFD also contains a number of parameters for product durability. An examination of the terminology used in the entire EU regulatory framework for wooden products shows us that 'durability' is nevertheless the most comprehensive concept of all, as it covers all durability aspects. Product durability can therefore be used as a catch-all concept, as initially planned in the design of the case study.[819] The three additional features identified at the beginning of this section on the CE benchmark for product recoverability relate to this wide nature: the meaning of (some of) the durability aspects may be unclear, there may be conflicting angles to product durability, and information should be provided that can be used after the product has been put on the market. There issues require further evaluation.

Shaping product durability

Although no EU measure includes a definition or an explanation of 'durability', one can tell from the way the concept is used throughout the discussed regulatory frameworks that the concept is generally interpreted as the *technical* life-time extension of a product. This means that things such as materials, components and hinges should be technically suitable to be used for a relatively long time. Yet, the durability aspects do not all highlight the technical angle to product durability – that is just one side of the story: products can also stay in the use stage longer due to their *non-technical* features. More obvious examples of non-technical durability relate to comfort, functionality and changing life-styles. Less obvious examples are the modularity of a product in the sense that users can more easily replace 'old' components with other ones which is more fashionable. In this way, the user does not have to throw away the entire product.

There is a multitude of possibilities to pursue product durability, some of which have been mentioned above. There is nevertheless no EU measure or framework discussed in this Chapter that covers all of the durability aspects – it is generally a mixture of several aspects, depending on which product group is addressed. Examples of aspects are the repairability and the upgradability of wooden products.[820] These examples of durability aspects do not need to have further clarification, because generally speaking their meanings are quite straightforward on the one hand and their applications are very product-specific on the other hand, which means that it is not easy to make general statements about their application. However, there are also some durability aspects that actually require further clarification, not least because of their generic nature. They are already explained by other EU measures, so these explanations have helped to get a better understanding of the aspects and therefore also helped to better formulate a potential ecodesign requirement on product durability. Two significant examples are highlighted below.

The first example concerns the matter of requiring a minimum life-time guarantee on the good functioning of the product. What is an acceptable time-frame? How long is long enough? And could this include the guarantee of the availability of spare parts? Of course, the answers to these questions, too, largely depend on the specific product group, but the PWD already provides for some overarching rules. More particularly, the Directive provides for a legal-guarantee of two years for all goods, which means that if a wooden product turns out to be faulty or does not work (or look) as advertised, the seller must repair/replace them free of charge or offers the buyer a price reduction or a full refund. In light of the Circular Economy, the reparation of the product/component or the replacement of components would be the preferable options; national product warrantee could address this issue. In any case, according to the PWD rules the trader always has to provide a solution. Despite some shortcomings to the PWD, this rule already offers a fixed ground rule for this particular durability aspect. Scale is a major advantage here, because

[819] See Chapter 4.3.2.

[820] More examples are provided in Chapter 5.3.1- B (heading 'Meaning of durability aspects').

the Directive's scope includes all products put on the market, whereas the Implementing Measures under the Ecodesign framework would only apply to certain wooden product groups. Note, moreover, that there is an indicative threshold of 200.000 units put on the market a year to trigger the European Commission preparing an Implementing Measure,[821] whereas the PWD has none. Hence, the PWD would probably be more effective in requiring a minimum life-time guarantee than the Ecodesign framework (but the Commission might need to look at its shortcomings). In addition to the PWD rules, the EU Ecolabel framework shows us that yet another but highly interconnected guarantee can actually be legally required: the possibility of acquiring spare parts from the manufacturer throughout the actual period of their industrial manufacturing and for a period of five years as of the date when production of the relevant range is stopped. Requiring a minimum time for the availability of spare parts was also mentioned as one of the parameters in Part I (section 1.3, paragraph i) Annex I EFD. The rule under the EU Ecolabel framework could therefore be used as a standard format, not least because of the presumption of conformity with the relevant Ecodesign Implementing Measures.

The second example concerns the proper use of waste terminology, namely in the context of 'reusing' wooden products and/or their components. What follows from the analysis of the EU measures, including the EFD, the reuse of a product is not just a matter for the *use* stage of a product's life-cycle, because practically speaking it can also take a little detour via the backdoor (i.e. the waste stage) back to the use stage. I described this possibility as 'reverted durability' because it squares with the concept of product durability (i.e. extending the life-time of a product). Legally speaking there are two ways to interpret the existence of this alternative course. While the EFD does not provide for a separate concept for the sidetrack, the WFD actually does: it is called 'preparation for reuse' in the waste acquis. And hence, according to the WFD the reuse of a product can only occur when the product is used again in the use stage. In contrast, when the product has become waste but is prepared to return to the use stage, this recovery operation is called 'preparation for reuse' and is in fact one of the building blocks in the waste hierarchy. In view of the weight the hierarchy and the concept of 'preparation for reuse' have in EU waste policy, it appropriate to take over the WFD definitions for 'reuse' and 'preparation for reuse' in the Ecodesign framework to avoid confusion. This is irrespective of the fact that the EFD applies without prejudice to the waste legislation.

The importance of information supply and how to deliver

The CE benchmark for product durability also renders some fundamental challenges relating to the overarching dilemma that encouraging the life-time extension of wooden products may not always be the best option for the environment and/or human health. Firstly, it could be argued that the more products are more technically as well as non-technically durable, the less is invested in technological innovation and in the required mentality change of the public and businesses alike. A second challenge relates to the difficulty of obtaining reliable information about the effectiveness of the measures regulating product durability and thus whether the environmental impacts are truly reduced. Measuring durability is problematic because the many products are predominantly used by private final-users and are therefore not kept in a closed environment. Moreover, the factual life-time and the non-technical life-time are more difficult to regulate than the predicted life-time and the technical life-time of a product. This is amongst others because issues such as the level of comfort would require a highly subjective judgement on what is 'acceptable'. A final challenge relates to the dilemma of product durability v proper waste management. A typical example concerns the use of chemicals. If it turns out that certain chemicals which are used in/on wooden products are risky when applied in these specific applications, keeping those products in the use stage also means that the risk posed to the environment and human health remains present. In such situations product durability would not only frustrate the substitution principle reflected under the chemical acquis, e.g. in the BPR and

[821] See Article 15(2)(a) EFD.

REACH,[822] but also the proper management of those products when they become waste. Other than through information supply to the final users, these three fundamental challenges are not expressly addressed by any of the studied EU legal acts and frameworks. In fact, all EU measures rely heavily on information supply. The Ecodesign framework would probably do so too, because there is a clear legal basis to regulate product durability in Annex I EFD, particularly in Part 2 of Annex I EFD, which is dedicated to setting ecodesign requirements on information supply.

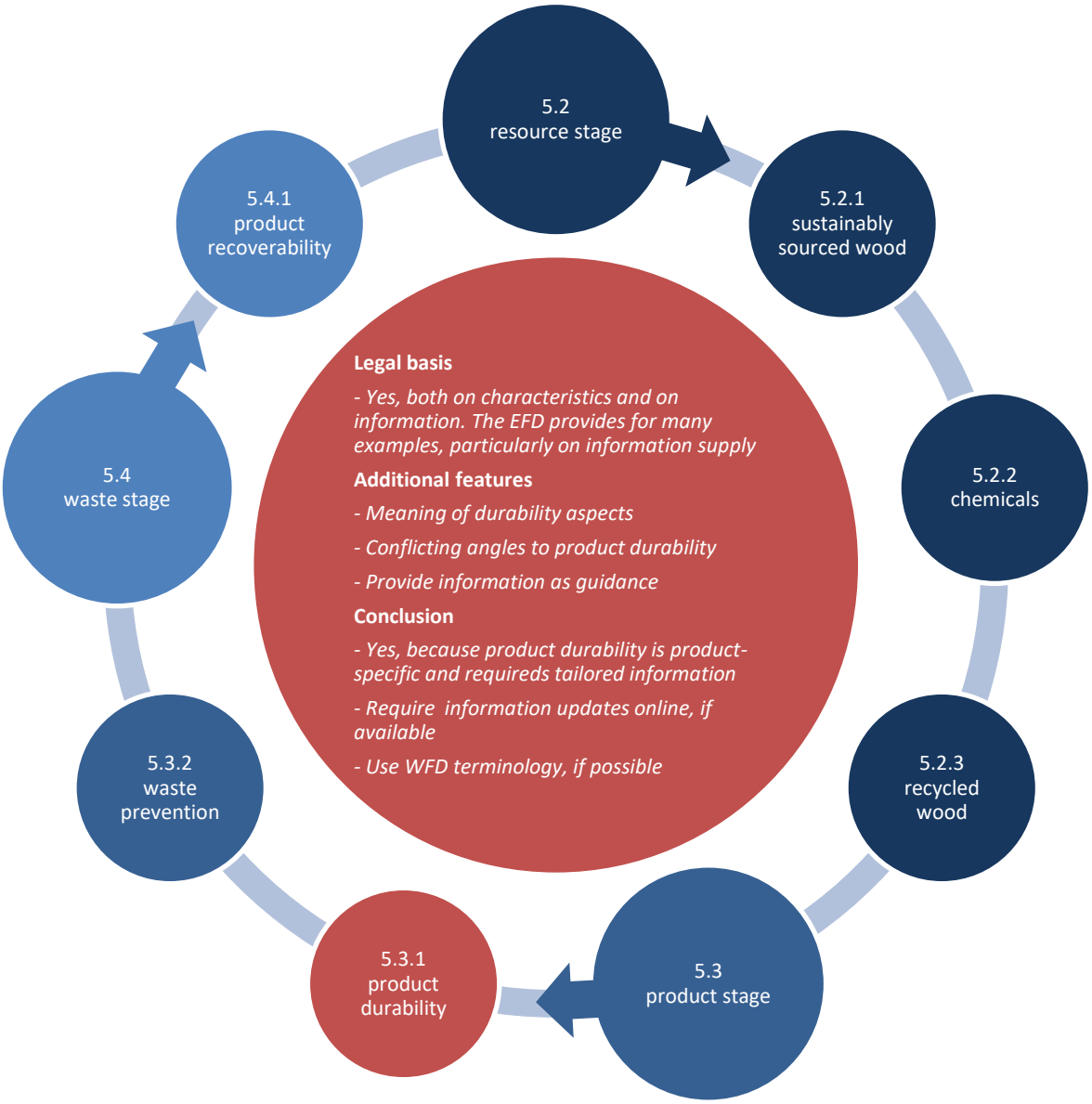
Clearly, the distribution of information on how to extend the life-time of a wooden product is crucial for the CE benchmark for product durability, in particular for steering the product's factual life-time. There are a number of instruments used throughout the overall framework for wooden products that give shape to the need for information supply. There is, however, no clear guidance on *which* instruments are used in *what* situations. Reliance on harmonized standards, certifications and legislation-specific information requirements are examples of commonly required instruments. What most of the EU measures have in common is that they do not specify what kind of information is required. Vague terms such as 'relevant user information' or 'appropriate user information' are used in that regard, probably because the 'relevance' of information depends on many things, such as type of product, the material(s) used in the product are made and who uses the product.

Besides attaching the 'relevant user information' to the product itself, the website of the manufacturer may arguably offer great opportunities for ecodesign requirements. It could serve as a 'safety net': whenever something changes for a particular product already put on the EU market, such as in the case when according to periodic life-cycle assessments it is better for the environment or human health to throw away your old wooden furniture and buy a new one, an explanation and extra guidance must be posted online. These life-cycle assessments can be made periodic (the timing could for example be based on the product's predicted use intensity, following the example of the CPR). This continuous supply of information can be assured in an Implementing Measure. It could offer a potential to respond to the more fundamental challenges highlighted above. However, care must be taken to legally ensure that this rule cannot be abused by companies just wishing to sell newer products, even if there is no real threat to the environment or human health by the product in use. One could envisage the requirement of publishing scientific evidence of what is advised.

Conclusion

Generally speaking, the use stage of a product's life-cycle is difficult to regulate. Annex I EFD however provides for several legal bases to regulate product durability in an ecodesign requirement. Ecodesign requirements on product durability may take varies forms, ranging from product characteristics to a minimum period for stock supply for spare parts. This should be regulated on product-basis. Particularly the passing on of user information is crucial, because educating the public is key to extending the factual and non-technical life-time of a product. For this reason, labels and certifications will be important. Keeping the public up-to-date with the latest life-cycle assessments and techniques may require manufactures to post updates on the durability of their already sold products online. Finally, it is important to stick to the terminology in the WFD.

[822] See Chapter 5.2.2 on this issue.


5.2
resource stage
5.2.1
sustainably
sourced wood
5.2.2
chemicals
5.2.3
recycled
wood
5.3
product stage
5.3.1
product
durability
5.3.2
waste
prevention
5.4
waste stage
5.4.1
product
recoverability
Legal basis
- Yes, both on characteristics and on information. The EFD provides for many examples, particularly on information supply
Additional features
- Meaning of durability aspects
- Conflicting angles to product durability
- Provide information as guidance
Conclusion
- Yes, because product durability is product-specific and requireds tailored information
- Require information updates online, if available
- Use WFD terminology, if possible

5.3.2 Circular Economy benchmark for waste prevention

This section examines the possibility to establish an ecodesign requirement on the prevention of waste derived from wooden products. Part A covers the legal basis under the EFD to act, whereupon some features a potential requirement would need to cover are put forward in Part B. Section C explains which EU legal acts already regulate the prevention of waste derived from wooden products and whether they cover the features identified earlier and the CE benchmark in general. A final discussion on the CE benchmark is provided in Section D.

A. Ecodesign Framework Directive

The fact that waste prevention is discussed here may be somewhat misleading, because the prevention of waste is not restricted to the product stage per se. Undeniably, waste prevention also relates to the resource stage of a material life-cycle, because waste generation can be prevented during the manufacturing of a product and its installation as well as during the product's final use. For this reason, the assessment of the 'expected generation of waste' can be carried out for most of the life-cycle stages summed up in Part 1 Annex I EFD (e.g. manufacturing, maintenance and use).[823]

All the same, for each possibility it occurs that the EFD is unmistakably more focused on waste generation than on waste prevention. A prime example is the Annex to the EFD explicitly mentions waste *generation* as one of the parameters for evaluating the potential for improving the environmental aspects of a product,[824] whereas it is silent on the issue of waste *prevention*. This raises the question as to how 'waste generation' is linked to 'waste prevention'. It can be argued that the information on waste generation (e.g. the type and amount of waste) is an essential building block for establishing an ecodesign requirement on waste prevention.

The clear focus on waste generation does not mean, however, that waste prevention as such is not aimed after: lowering the environmental impacts of products and evaluating the use of resources – which are both objectives of the framework – can also be achieved through waste prevention. As one would expect, the EFD is less generous in providing guidance on adopting ecodesign requirements on waste prevention in comparison to product durability.

B. Additional features to take into account: preventive principle and categories

Despite the lack of clear guidance in the EFD, if the European Commission wishes to prepare an ecodesign requirement on the prevention of waste from wooden products, it may need to consider two features. They are elaborated upon below.

Taking preventive action

Because waste prevention has not been expressly mentioned in the EFD, it first needs to be clarified before it can be turned into an ecodesign requirement. The preventive principle has left a clear mark on EU waste policy: the concept of 'waste prevention' is embedded in the principle.[825] And because waste prevention measures target the period before a wooden product becomes waste, so including the design stage of a product, Ecodesign Implementing Measures, too, should be guided by the preventive principle.

Article 191(2) TFEU states that EU policy on the environment shall aim at a high level of protection and shall *inter alia* be based on the principle *'that preventive action should be taken'*

[823] For the assessment see: Part 1 (paragraph d) Annex I EFD.
[824] Part 3 (paragraph j) Annex I EFD.
[825] The preventive principle has not been extensively discussed in the Chapter on the CE benchmark for chemicals (Chapter 5.2.2). There, the precautionary principle dominated the debate, because there are and will remain many uncertainties about the impacts of the use of chemicals in/on wooden products. It is presumed a different story for the impacts *waste* can have on human health and the environment.

or, in other words, be based on the preventive principle.[826] The environmental objective expressed in Article 191(1) TFEU on the prudent and rational utilization of natural resources is particularly strengthened by the principle.[827] Particularly in the 1990s, the CJEU had to interpret the principle's meaning, as the principle had been included in several EU secondary measures that needed clarification. These cases are still valid today.[828]

Contrary to the polluter-pays principle but similar to the precautionary principle, the preventive principle *anticipates* on environmental problems or prevents them from spreading whenever they have already manifested.[829] Both principles aim at the avoidance of harm. The difference between the precautionary principle and the preventive principle is that the latter principle is triggered by risks which are known to manifest under certain circumstances (it does not presupposes complete knowledge, however), whereas the precautionary principle is triggered by uncertain risks. However, preventive measures cannot always prevent known risks from taking place, nor at any costs.[830]

References to the preventive principle can be found all over EU environmental legislation. For this reason, there are of course nuances to the application of the principle. The principle's main use is in issuing authorization that set out conditions of technical specifications to determine means of operation, quantities and concentrations of pollutants.[831] Requiring product norms, norms for manufacturing processes, environmental impact assessments and BATs are well-known examples in that respect. In fact, these instruments are already applied in the Ecodesign framework, such as in the preparation of Implementing Measures and in the actual wording of ecodesign requirements.

If an ecodesign requirement on waste prevention would be established, one should keep in mind that the preventive principle underpins the measure and that the generation of wood waste from wooden products cannot be prevented completely.

Categories for waste prevention based on quantity and quality

Albeit less obvious than in the case of the CE benchmark for product durability, the concept of waste prevention covers different aspects. In order to define these 'categories', it basically boils down to the question what the aim will be of the ecodesign requirement at issue.

---

[826] The preventive principle firstly appeared in the EU Treaties through the Single European Act of 1986 in Article 130r(2) of the EC Treaty. Even before the principle's formal inclusion in the EU Treaties it played a role in shaping EU environmental policy and law, for example through the adoption of the First, Second and Third EAPs.

[827] Ibid., p. 68.

[828] Note, however, that the precautionary and the preventive principles were particularly in the 1990s sometimes mixed up or used jointly. See for example the judgement on the validity of the Commission Decision on banning the exportation of beef from the United Kingdom, which was based on the uncertain risk of BSE transmission. While para. 63 speaks of 'uncertain risks to human health' (which indicates the use of precautionary measures), the following paragraph refers to preventive action. Judgement of 5 May 1998, *The Queen v National Farmers' Union and Others*, C-157/96, EU:C:1998:191. Another example is the *Bizzaro* Case in which the CJEU explained that by virtue of the precautionary *and* preventive principles, it is for the EU and the Member States to *'prevent, reduce and, in so far as is possible, eliminate from the outset, the sources of pollution or nuisance by adopting measures of a nature such as to eliminate recognised risks* [for human health and the environment].' (emphasis added). Judgement of 5 October 1999, *Paolo Lirussi and Francesca Bizzaro*, Joined C-175/98 and C-177/98, EU:C:1999:486, para. 51. If 'recognized risks' means 'known risks' or 'clear risks', the CJEU should had to refer only to the preventive principle.

[829] N. de Sadeleer, *Environmental Principle, From Political Slogans to Legal Rules* (Oxford University Press, 2002), p. 61.

[830] According to the proportionality principle, which is referred to in Recital (41) EFD, it is not necessary to prevent harm at any price. Both the probability a risk will manifest itself and the extent of damage that might be caused should be considered when adopting preventive measures. De Sadeleer expresses these two aspects as follows: *'A major accident of low probability must be avoided owing to its disastrous implications. By contrast, a very high risk of relatively negligible damage need not be countered in the name of prevention.*' Ibid., pp. 80-81.

[831] Ibid., p. 72.

A distinction can be made between quantitative waste prevention (which aims at the reduction of waste being generated and is also called 'waste minimization' or 'waste reduction') and qualitative waste prevention (which aims at the reduction of the negative impacts waste can have on the environment and human health).[832] Qualitative waste prevention is largely dependent on the type of materials used in product manufacturing and how products are used, so ecodesign would be an appropriate tool to address it.

The Ecodesign framework has however much less room for manoeuvre for quantitative waste prevention. The main reason is that although the Ecodesign framework could in principle aim for the minimization of material input, it is bound by the obvious principle that the product's functionality and quality cannot be affected too much.[833] For example, an Implementing Measure for wooden windows cannot require the replacement of windows by doors or simply by no windows at all. Addressing the amount of material input in products by the slimming down window frames may only be possible in a few situations and to some extent. It is furthermore argued that requiring quantitative waste prevention in the Ecodesign framework has additional shortcomings: it would be poorly enforceable and it is ought to be already addressed by market forces.[834]

In spite of these initial challenges, a distinction between qualitative waste prevention and quantitative waste prevention would be worth analyzing because of their differences and the potential to develop adjusted ecodesign requirements.

C. Other laws that regulate waste prevention

The WFD, the Ecolabel framework and the PPD framework are discussed below to clarify whether and how they address the potential additional features and the CE benchmark in general.

Waste Framework Directive: the relation between waste prevention and product durability

Over the years, waste prevention has become increasingly important in EU waste policy and legislation. In fact, the WFD is largely based on the preventive principle. Recital (3) WFD explains that by virtue of both the precautionary principle and the preventive principle, it is for the EU and its Member States *'to establish a framework to prevent, reduce and, in so far as is possible, eliminate from the outset the sources of pollution or nuisance by adopting measures whereby recognised risks are eliminated*.'[835] It is therefore hardly surprising that despite its prime focus on waste, the WFD actually does not *only* apply to waste. Article 1 WFD points out that it also lays down measures to protect the environment and human health *'by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use.*' Strictly speaking, 'prevention' is not a waste management operation because it concerns substances or objects *before* they become waste.[836] In line with the material life-cycle, waste prevention is therefore at the top of the waste hierarchy.[837] Article 3(12) WFD defines waste prevention as:

> *measures taken before a substance, material or product has become waste, that reduce:*
> *(a) the quantity of waste, including through the re-use of products or the extension of the life span of products;*
> *(b) the adverse impacts of the generated waste on the environment and human health; or*

[832] See e.g.: I. Ferrara and P. Missios 'Household waste management: waste generation, recycling, and waste prevention' in: T.C. Kinnaman and K. Takeuchi (eds.) *Handbook on Waste Management* (Edward Elgar Publishing, 2014), pp. 80-81.
[833] See also: Article 15(5)(a) EFD.
[834] Van Holsteijn en Kemna BV, ift Rosenheim, VHK and VITO, *LOT 23 / Ecodesign of Window Products. TASK 6 – Design Options* (VITO, 2015), p. 10.
[835] This quote is identical to a sentence from the *Bizzaro* Case. In: Judgement of 5 October 1999, *Paolo Lirussi and Francesca Bizzaro*, Joined C-175/98 and C-177/98, EU:C:1999:486, para. 51
[836] Underscored by the Commission in: European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, 2012, p. 30.
[837] Article 4(1) WFD.

(c) the content of harmful substances in materials and products (emphasis added)

Two things can be distinguished from this definition. First, paragraph (a) aims at stimulating quantitative waste prevention, whilst paragraphs (b) and (c) focus on the environmental impacts of waste and thus aim at qualitative waste prevention. There is a clear distinction between the two.[838] Second, even though the CE Package and previous waste policies picture waste as a stand-alone concept, a different approach is expressed in paragraph (a). Waste prevention and product durability are interconnected according to that paragraph, because the reuse of the product and the extension of the life-span of a product are understood as two ways to prevent products from becoming waste.[839] This can be confirmed by Annex IV WFD where examples of waste prevention measures are provided. They include the promotion of the reuse and/or repair of appropriate discarded products or of their components, for example through measures that support or establish accredited repair and reuse-centers and networks.[840] The strict distinction between product durability and waste prevention which is adopted in this Chapter is clearly not confirmed by EU waste legislation: according to the WFD terminology, product durability is part of waste prevention, which simultaneously means that the CE benchmark for waste prevention is inherently linked with the previous CE benchmark for product durability.

Annex IV WFD also provides for another example of waste prevention: *the promotion of ecodesign*.[841] It is unfortunate that the WFD does not further indicate how the Ecodesign framework should address waste prevention, because the EFD is scarce in providing guidance on waste prevention either. All the same, the examples expressed in Annex IV WFD show that the regulator acknowledges that the WFD does not have the 'sole right' to address waste prevention. It builds bridges between the waste framework and other regulatory frameworks that are important for the Circular Economy (see also the next sections).

So far, this section discussed several instruments in the WFD that encourage waste prevention. In addition to these instruments, the European Commission tried to implement another longstanding desire through the 2014 CE Package: binding quantitative waste prevention targets. The 2014 Package included two targets for widely debated 'new' waste streams.[842] Although these targets did not so much affect wooden products, it shows that the (previous) Commission was serious about adopting waste prevention targets. Member States have, however, never embraced the idea of waste prevention targets. For these reasons, perhaps, the 2015 CE Package does not include any particular prevention targets anymore.[843]

To conclude, the preventive principle has left its mark on the WFD, first and foremost by putting waste prevention first in the waste hierarchy. Even though the hierarchy is called the *waste*

[838] This distinction is underlined by Article 29(3) WFD according to which Member States must have determined specific qualitative or quantitative benchmarks for waste prevention measures adopted in the context of their national waste prevention programmes. This is to monitor and assess the progress of these measures. Member States may moreover determine specific qualitative or quantitative targets and indicators other than those adopted by the Commission. See also: European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, 2012, p. 28.

[839] Note that this concerns 'reuse' pursuant to the WFD definition – not under the EFD.

[840] Paragraph 16 Annex IV WFD. Other examples of waste prevention measures provided by Annex IV WFD are: the provision of information on waste prevention techniques with a view to facilitating the implementation of best available techniques (BATs) by industry; the promotion of creditable ecolabels; and the integration of environmental and waste prevention criteria into calls for public and corporate procurement tenders and contracts (e.g. GPP). Paragraphs 5, 13 and 15 Annex IV WFD, respectively.

[841] Paragraph 4 Annex IV WFD.

[842] For food waste, a reductive target was proposed of at least 30% by 2025 and for marine litter a reductive target of 30% by 2020). 2014 CE Communication, p. 12; and European Commission, *Proposal for a Directive amending Directives 2008/98/EC on waste, 94/62/EC on packaging and packaging waste, 1999/31/EC on the landfill of waste, 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment*, COM(2014) 397, p. 9.

[843] See Chapter 6.3.2-A for further discussion on the national waste prevention programmes.

hierarchy, the WFD recognizes that waste prevention occurs before the waste stage of the material life-cycle and that, therefore, other regulatory frameworks should regulate waste prevention, too, such as the Ecodesign framework. This open approach signposts the variety of life-cycle stages involved in in waste prevention. What is more, 'reuse' and 'reparation' are legally speaking considered waste prevention measures. This underlines the fading boundaries between product policy (i.e. product durability) and waste policy (i.e. waste prevention). The CE benchmark for waste prevention and the previous CE benchmark for product durability should therefore be read together.

Ecolabel framework: the focus is on product durability

The Ecolabel Regulation does not explicitly refer to waste prevention.[844] Article 6(3)(a), which lays down the basic considerations that need to be taken into account when drafting Ecolabel criteria, merely mentions that the *generation* of waste must be considered one of the 'most significant environmental impacts'. While this hints at quantitative waste prevention (for one should know the amount of waste that is generated in order to establish measures that minimize waste generation), it is not entirely clear whether this is actually intended. This uncertainty is upheld by the fact that both existing EU Ecolabels applicable to wooden products (i.e. on wooden floor coverings and furniture) do not contain any explicit criteria on waste prevention, which is similar to the Ecodesign framework.

However, this does not affect the fact that the EU Ecolabels address product durability (including the reuse of the products at issue).[845] Additionally, the main goal of using EU Ecolabels in the first place is to encourage the purchase of products, services and works with reduced environmental impacts. The pressures deriving from waste generation are therefore also targeted.

Green Public Procurement framework: waste prevention only marginally addressed

All existing EU GPP criteria related to wooden products (i.e. on wall panels, furniture and office buildings) recognize the need to address waste prevention as.[846] They do not all address it, however.

According to the EU GPP criteria for wall panels, the largest opportunities for an environmental impact reduction are in the areas of waste minimization, recycling options and diversion from landfill.[847] Despite this preliminary statement, there are no criteria established that particularly address quantitative waste prevention.[848] Nor do the EU GPP criteria for furniture include criteria on this matter.[849] The EU GPP criteria for office buildings, on the other hand, only minimally cover the issue of waste prevention, despite the fact it specifically underscores the potential of the design, specification and site management of office buildings to minimize C&D waste.[850] One of the criteria highlights that, in order to minimize waste generation, it is relevant when construction contractor and specialist contractors have experience in successfully implementing demolition and site waste management plans.[851] Another criterion lays down

[844] For a general overview of the Ecolabel Regulation, see Chapter 5.2.1-C (heading 'Ecolabel framework').
[845] As clarified in the Chapter 5.3.1-C (heading 'Ecolabel framework').
[846] See Chapter 5.2.1-C (heading 'Green Public Procurement framework') for an explanation of the EU GPP framework and the PPD.
[847] European Commission, *Wall Panels – Green Public Procurement Product Sheet* (European Commission, 2010), p. 2.
[848] In the explanatory notes it nonetheless explains that the contracting authority may wish to include a contract performance clause to ensure that levels of waste plasterboard (from off-cuts, damaged boards…) are kept to a minimum. Ibid., p. 13.
[849] See European Commission, *EU Green Public Procurement criteria for Furniture* (European Commission, SWD(2017) 283).
[850] European Commission, *EU GPP Criteria for Office Buildings Design, Construction and Management* (European Commission, SWD(2016) 180, 2016), p. 8.
[851] Criterion A3 EU GPP Criteria for Office Buildings Design, Construction and Management.

requirements for the waste management on the construction site, relevant to quantitative waste prevention, amongst others for wood waste. It requires that waste arisings during construction and renovation, but excluding the demolition waste itself, shall be less than or equal to 11 tonnes per 100m2 gross internal office floor area.[852]

All things considered, none of the analyzed EU GPP criteria expressly refers to qualitative waste prevention. However, some of them address quantitative waste prevention, albeit only marginally. This might have to do with the fact that they already address product durability, and the fact the main goal of the EU GPP framework is to encourage the purchase of products, services and works with reduced environmental impacts, so including the impacts deriving from waste generation.

D. Discussion on the potential for the Ecodesign framework

Waste prevention derives from the idea that a product or material must not become waste because there is a risk that, when it becomes waste, it could have a negative impact on human health or the environment. In the context of the Circular Economy, for example, the demand for new products replacing discarded products may require the input of virgin raw materials. The preventive principle lays at the foundation of this viewpoint and is therefore one of the additional features to take into account when preparing an ecodesign requirement on waste prevention. The other additional feature to take into account next to the criteria set in Article 15 EFD is the creation of categories for qualitative waste prevention and quantitative waste prevention.

The interface between product legislation and waste legislation

Unlike *product* durability, *waste* prevention is principally looked at from a waste perspective. The main aim is to prevent the generation of waste, after all. This does not mean, however, that waste prevention is only addressed by legislation principally targeting waste. Interestingly, although waste prevention is primarily addressed through waste policy, it must be achieved *before* a product or material becomes waste. The Ecodesign framework might just as well address waste prevention, despite the lack of a clear legal foundation on this issue. In fact, the WFD even explicitly refers to the ecodesign instrument as a way to prevent waste from being generated.

Similar to 'reuse' (which was addressed in Chapter 5.3.1 on product durability), 'waste prevention' cannot be easily categorized in one particular life-cycle stage. But then again: although waste prevention is a cross-cutting objective, the case study shows that it is less known in policy areas other than the waste area. A coherent approach is hard to find. Some EU product measures are quite vague on their objective to address waste prevention, such as the one for the EU Ecolabel, while others do not even address waste prevention at all. For example, the CPR does not contain any explicit requirements on waste prevention, nor does it contain any basic requirements on waste prevention to be taken into account by the standardization bodies. The EFD does not give much guidance either on which activities fall within the meaning of waste prevention.

The WFD does, however: the WFD definition of waste prevention explains that the concept includes the extension of the life-span of products and the reuse of products. Hence, according to the WFD these two durability aspects fall within the broad spectrum of waste prevention measures. This thereby links the CE benchmark for waste prevention to the one for product durability, merging them into one benchmark and reacting less of a strict legal division between product (product durability) and waste (waste prevention) objectives.

The legal acts or frameworks analyzed shows that only the WFD makes a distinction between qualitative waste prevention and quantitative waste prevention throughout the entire text (but

[852] Criterion D3 EU GPP Criteria for Office Buildings Design, Construction and Management. The comprehensive award criteria lowers the amount to 7 tonnes per 100m. For background information about this criterion on quantitative waste prevention and the share of wood in the targeted waste stream, see: Joint Research Centre: N. Dodd, E. Garbarino and M. Gama Caldas, *Green Public Procurement Criteria for Office Buildings Design, Construction and Management* (European Union, EUR 27916 EN, 2016), pp. 99-102.

without expressly using these terms). In fact, none of the other laws, including the EFD, even clarify what waste prevention actually means. This implies that one can rely on the WFD terminology – and rightly so in the case of the Ecodesign framework, because the EFD and the Implementing Measures shall apply without prejudice to EU waste management legislation.[853]

A hierarchical order in waste prevention

Another issue related to the use of WFD terminology but which has not yet been addressed in this section on the CE benchmark for waste prevention precisely *because* it is not further developed in any of the studied measures, concerns the question as to whether there should be a hierarchy for the proposed waste prevention categories in a future ecodesign requirement on waste prevention. Even though the WFD does not make a hierarchical difference between the two categories, which is by the way just a matter of adjusting the waste hierarchy, it does not mean an Ecodesign Implementing Measure cannot.

I would argue that qualitative waste prevention in principle prevails over quantitative waste prevention, because the quality of wood waste is more important than the amount of waste which is generated from wooden products. This position can be founded on life-cycle thinking: the use of bad quality materials in the manufacturing stage and use stage of a product has logically negative consequences for the waste stage and the conversional stage as well,[854] whereas qualitatively good materials generally stay the same. It might be a bolt statement, but the more good quality materials are used in a *circular* way in the economy, the less should waste be considered a problem, which could for example be when a material has a malicious composition or poses certain risks to the environment or human health. Of course, before introducing such a hierarchical order between qualitative waste prevention and quantitative waste prevention in an ecodesign requirement, however, an LCA should be performed proving or disproving this statement, which is for now only based on the life-cycle thinking *concept* – not on hard data. This information may furthermore eventually be used for the introduction of the waste prevention categories in the waste hierarchy.

A matter for the precautionary principle?

When distinguishing between the waste prevention categories in the waste hierarchy, it becomes apparent that the wording 'qualitative waste prevention' actually does not quite cover the full scope of the concept. According to the definition of waste prevention in Article 3(12) WFD, prevention also includes taking measures that aim at reducing the adverse impacts of waste on the environment and human health and reducing the content of harmful substances in materials and products. What it boils down to is that merely 'prevention' might not be enough as an objective. It seems logical that the precautionary principle should also be enshrined in the first step of the waste hierarchy, considering the unknown risks substances can pose.

This observation is inherently connected with the CE benchmark for chemicals. In that section, it was concluded that because there are so many scientific uncertainties regarding the risks posed on the environment and human health by the use of chemicals in/on products, an ecodesign requirement on the use of biocidal products in/on wooden products would have to be based on the precautionary principle, not least because REACH and the BPR are also primarily founded on it.[855] It makes sense to continue on the same 'precautionary line' in the waste stage, because if the risks were uncertain at the beginning, they cannot all of a sudden be certain in the course of the product's use or when it turns into waste.

---

[853] Article 1(4) EFD.

[854] As regards the waste stage, see the next Chapter on the CE benchmark for recoverability, Chapter 5.4.1, and Chapter 6 on qualitative recycling. Chapter 7 furthermore discusses the conversional stage.

[855] See Chapter 5.2.2. Whether actually establishing such an ecodesign requirement under the Ecodesign framework is desirable, is doubtful by the way, precisely *becaus*e there is already an extensive chemical framework applicable to wooden products.

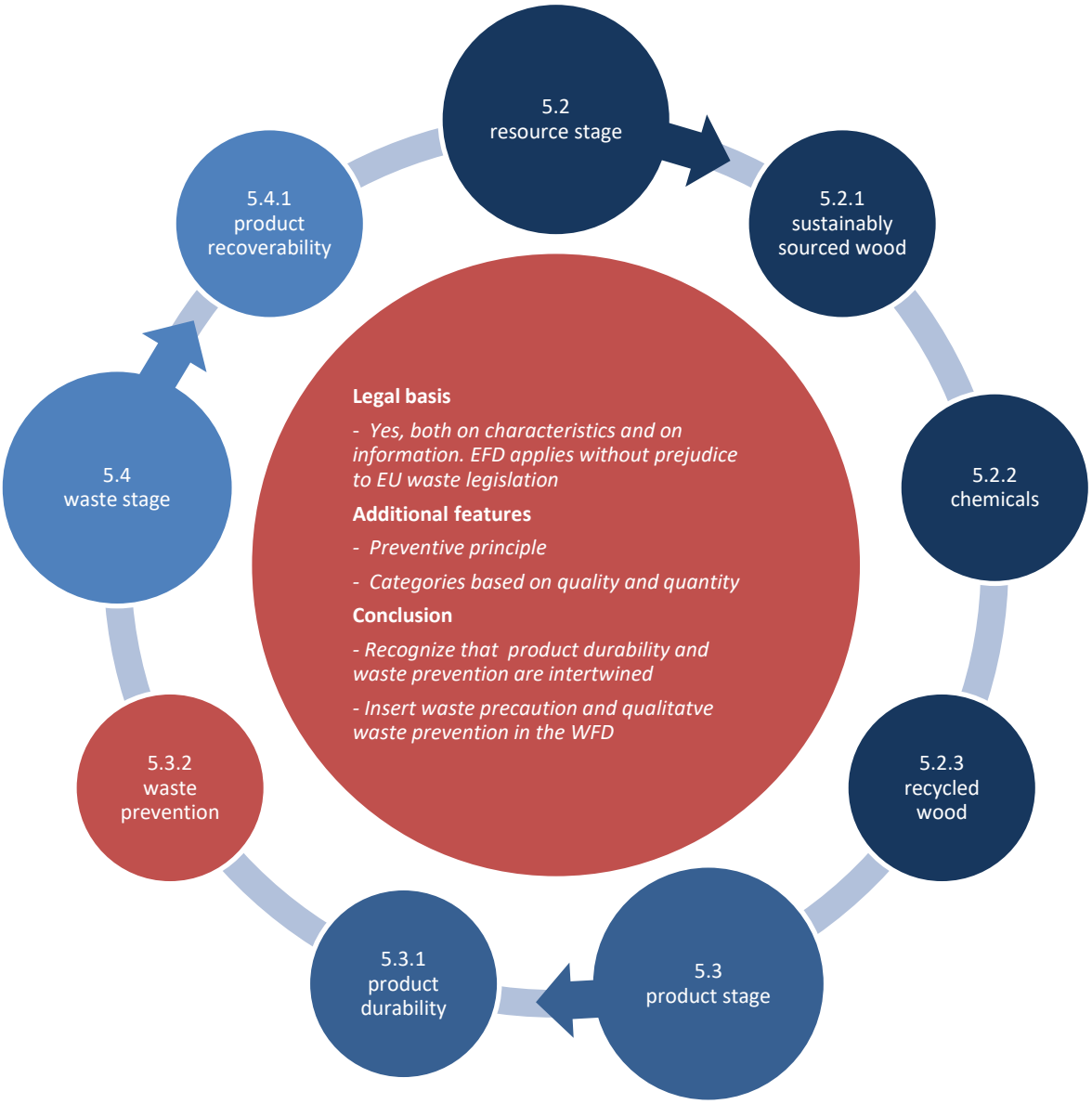
Therefore, the CE benchmark for waste prevention is not only about preparing preventive ecodesign requirements (i.e. on the qualitatively good composition of the product and on the known risks the chemicals used in/on wooden product can pose on the environment and human health), but also about preparing precautionary ecodesign requirements (i.e. on the unknown risks). This line of reasoning suggests that the 'qualitative waste prevention' category, could actually be called 'waste precaution and qualitative waste prevention'. A significant remark in that regard is that precautionary measures cannot be taken twice. And as a matter of fact, there have already been taken precautionary measures in the case of the chemicals, namely pursuant to the BPR and REACH. These laws require amongst others that risk assessments are performed before the substances are put on the market. These laws also require that risk information will be passed on down the supply chain, so the information should in theory reach the final users and should subsequently end up at the waste management facilities. Consequently, in principle no ecodesign requirements would need to be established on waste precaution because precaution has already been taken in chemical legislation. This shall, however, not prejudice the possibility that new risk assessments can be made on the factual life-time of a product,[856] for example whenever new scientific evidence on the risks is published showing additional precaution or whenever unanticipated circumstances occur (e.g. certain products are used for something totally different than originally planned and applied as such in the risk assessments). An Ecodesign Implementing Measure could include a requirement on waste precaution in these kinds of situations, as these risks have not yet been taken care of when the products were put on the market. Of course, the Ecodesign framework also regulates the moment when products are put on the market, so the ecodesign requirement is likely to be design as a

Although developing such as an ecodesign requirement should be encouraged, replacing 'waste prevention' in the waste hierarchy with the two waste prevention categories discussed above (i.e. 'waste precaution and qualitative waste prevention' and 'quantitative waste prevention') can be certainly considered, too, for the same reasons.

Conclusion

In conclusion, for something of such great importance to EU waste policy, the CE benchmark for waste prevention is rather marginally reflected in the EU legal acts and frameworks discussed (except for the WFD). This can be explained by the fact that product durability is already considerably covered under 'product durability', because according to the WFD the CE benchmarks for product durability and waste prevention are intertwined. This does not impact the opportunity to differentiate between two (newly created) categories for waste prevention: one for waste precaution and qualitative waste prevention, and one for quantitative waste prevention. It is recommended to do the same in the WFD and to insert them into the waste hierarchy.

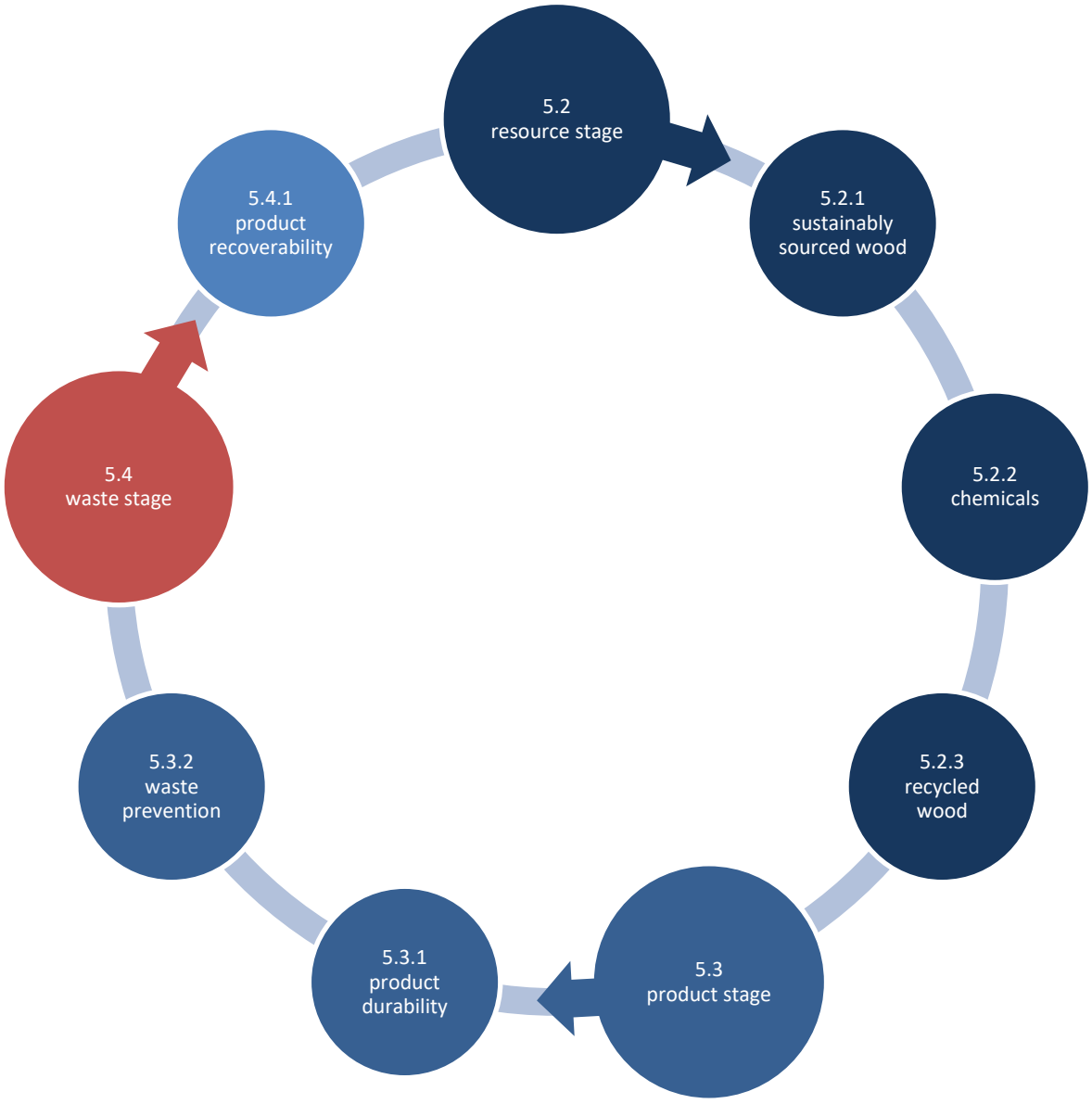
[856] This was one of the challenges in relation to the CE benchmark for product durability. See Chapter 5.3.1-D.


5.2
resource stage
5.2.1
sustainably
sourced wood
5.2.2
chemicals
5.2.3
recycled
wood
5.3
product stage
5.3.1
product
durability
5.3.2
waste
prevention
5.4
waste stage
5.4.1
product
recoverability
Legal basis
- Yes, both on characteristics and on information. EFD applies without prejudice to EU waste legislation
Additional features
- Preventive principle
- Categories based on quality and quantity
Conclusion
- Recognize that product durability and waste prevention are intertwined
- Insert waste precaution and qualitatve waste prevention in the WFD

5.4 Ecodesign requirements for the waste stage

Waste receives much attention in the CE Package. According to the CE Action Plan, waste management plays a central role in the Circular Economy, as it determines how the waste hierarchy is put into practice.[857] Recovery plays in turn a central role in the hierarchy.

The only CE benchmark for the waste stage, the one for product recoverability, is discussed below. The benchmark is marked in the lightest shade of blue in the graphic below.



[857] CE Action Plan, p. 8.

5.4.1 Circular Economy benchmark for product recoverability

This final section on the CE benchmarks examines the possibility to establish an ecodesign requirement on the recoverability of wooden products. The first section, Section A, sheds light on the legal basis under the EFD to act on the CE benchmark for product recoverability. Section B discusses some features the potential requirement would need to cover. Section C explains which EU legal acts somehow already regulate the recoverability of wooden products. A final discussion on the CE benchmark is provided in Section D.

A. Ecodesign Framework Directive

In the preparation of an Implementing Measure, the European Commission is required to analyze the waste stage of the targeted product group, including the *'possibilities for reuse, recycling and recovery of materials and/or energy, taking into account* [the WEEE Directive].'[858] The EFD further states that amongst others the following parameters must be used in particular:[859] the use of materials issued from recycling activities; the use of substances classified as hazardous; avoidance of technical solutions detrimental to reuse and recycling of components/whole appliances; and the ease for reuse and recycling as expressed through:

- number of materials and components used,
- use of standard components,
- time necessary for disassembly,
- complexity of tools necessary for disassembly,
- use of component and material coding standards for the identification of components and materials suitable for reuse and recycling,
- use of easily recyclable materials,
- easy access to valuable and other recyclable components and materials, and
- easy access to components and materials containing hazardous substances

These bullet points provide for practical guidance on how to address recoverability in an Implementing Measure. Moreover, the EFD creates the opportunity to include ecodesign requirements on the provision of information by the manufacturer for waste treatment facilities concerning disassembly, recycling and disposal.[860] It is worth noticing that Annex I predominantly uses the word 'recycling' instead of 'recovery'.

B. Additional features to take into account: categories and information supply

If one wishes to prepare an ecodesign requirement on the recoverability of wooden products, certain features should be considered.

Different definitions and different categories for recovery

Preparing an ecodesign requirement on the recoverability of the targeted wooden product group requires knowledge about what is meant by 'recovery'. According to Article 2(17) EFD, recovery means:

> *any of the applicable operations provided for in Annex II B to Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on waste* [i.e. the previous Waste Directive]

[858] Part 1 (paragraph 1.2, section e) Annex I EFD.
[859] Part 1 (paragraph 1.3, sections b, d, h and f) Annex I EFD.
[860] Part 2 (section d) Annex I EFD.

The 2008 WFD moved away from only relying on the list of examples of recovery operations in Annex II B of the 2006 Waste Directive. The meaning of recovery is now explained by a single definition in combination with an update of the original, non-exhaustive list.[861]

The 2006 Waste Directive did not, however, contain a clear definition of 'recycling'.[862] The EU legislator therefore had to formulate a definition that would only apply to the Ecodesign framework. According to Article 2(15) EFD, recycling means:

> *the reprocessing in a production process of waste materials for the original purpose or for other purposes but excluding energy recovery* (emphasis added)[863]

While the definition of recycling not expressly mentions the link between recycling and recovery, one can deduce from Annex II B of the 2006 Waste Directive that recycling is – just as energy recovery – a category of recovery. The question that arises is why the EFD refers to both 'recovery' and 'recycling' simultaneously without making clear their overlap and the difference between the two concepts.[864] Based on the EFD definitions, it is incorrect to use the terms in that way. Great care must therefore be taken use the terminology correctly if new Implementing Measures are to be established.

Both the CE Package and the EFD predominantly refer to the recycling of products and materials. This can be explained by the aim for circularity within the Circular Economy concept. Nonetheless, recycling is by no means the only recovery option. A future Implementing Measure should therefore address the other recovery options in the waste hierarchy as well.

Traceability and identifiability of materials

It can take a long time from the logging of forests or the recycling of wood waste until the moment when wooden products are discarded, become waste and are treated accordingly. For example, a study on the possibility to address windows (as ErPs) under the current Ecodesign framework points out that an ecodesign requirement on the recyclability would actually address windows that reach the waste stage in 40 years. A requirement will therefore only target the windows placed on the market at the moment of the adoption of the Implementing Measure. Predicting the possibilities for waste treatments over such a long period of time is challenging. For example, technological development could outpace the requirement. Moreover, wooden windows are already problematic, as energy recovery is assumed to be the only viable option for waste treatment. The authors of the study find that ecodesign requirements on recyclability do not seem fit for windows.[865] Regarding C&D waste in general, the study concludes that the proper treatment of C&D waste may be better achieved through waste legislation.[866] Comparable requirements make more sense for EEE products, because they generally have a much shorter life-time.

---

[861] See Article 3(15) WFD and Chapter 3.2.3 (heading 'Definitions'). The EFD also directly refers to other related definitions in the WFD, such as the ones for 'waste' and 'hazardous waste' (Article 2(18) and (19) EFD, respectively).

[862] It was clear nonetheless that recycling is a category of recovery, because Annex II B 2006 Waste Directive contained several references to recycling processes.

[863] The EFD also contains a definition of energy recovery, because there was neither a definition of 'energy recovery' included in the 2006 Waste Directive. Pursuant to Article 2(16) EFD, it means: *the use of combustible waste as a means to generate energy through direct incineration with or without other waste but with recovery of the heat* (emphasis added).

[864] Additionally, the EFD also uses 'recycling' and 'reuse' in such an intertwined manner. This is also at odds with their definitions, because both concepts target a different life-cycle stage: the product stage (reuse) and the waste stage (recycling).

[865] Van Holsteijn en Kemna BV, ift Rosenheim, VHK and VITO, *LOT 23 / Ecodesign of Window Products. TASK 6 – Design Options* (VITO, 2015), p. 9.

[866] Van Holsteijn en Kemna BV, ift Rosenheim, VHK and VITO, *LOT 23 / Ecodesign of Window Products. TASK 7 – Policy Options & Scenarios* (VITO, 2015), p. 14.

The example above clarifies that the supply of information on the recoverability of wooden products could lose its value as time passes. It does not mean, however, that it is entirely useless, because not all wooden products enjoy such a long life and, moreover, even outdated information on the preferable recovery methods can be valuable. The identification of materials present in the waste streams delivered at the recovery plant is crucial to decide on which recovery operation is most appropriate. The traceability of the materials used in/on wooden products is important, too.

The traceability is most important considering the chemicals used in/on the wooden products. Hazardous waste poses greater risks to the environment than non-hazardous wastes and thus requires stricter control in the waste stage. The use of preservatives therefore contributes a lot to the choice of recovery step in the hierarchy and the choice of recovery techniques. The issue of traceability becomes especially apparent considering the use of (partly) substituted chemicals: although a variety of chemicals that have been used in the past are nowadays banned or their use is restricted, it does not mean that there are no wooden products discarded today which do not contain these substances of concern.[867] Information on the so-called 'legacy additives' is important in choosing the proper waste recovery option.

All in all, time is a real challenge for adopting an ecodesign requirement on the recoverability of wooden products. To facilitate product recoverability, it is necessary to address the traceability and identifiability of materials, including the chemicals used in/on the products.

C. Other laws that regulate product recoverability

Four EU measures/frameworks are relevant for establishing an ecodesign requirement on product recoverability in an Implementing Measure targeting wooden products: the WFD, the CPR, the Ecolabel framework and the PPD framework. Below, each of them are discussed to determine whether and how these laws address the potential additional features, as identified above, and the CE benchmark in general.

Waste Framework Directive: setting the scene for recovery practices

The EFD regularly refers for definitions to the 2006 Waste Directive. Where this is not possible because of the very fact that the EFD does not provide for useful terminology, it contains definitions exclusively applicable to the Ecodesign framework. Since the entre into force of the 2008 WFD, however, a lot of new terminology can be used in EU waste policy and therefore potentially also in the Ecodesign framework.[868]

Recovery categories

The definition of 'recovery' lays the foundation for product recoverability. Pursuant to Article 3(15) WFD, recovery means:

> *any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy* (emphasis added)

There are a number of significant components in the term 'recovery'. Firstly, the fact that waste has to serve a *useful purpose* as *a principal result* of the recovery had been introduced to prevent misuse and fake recovery.[869] Secondly, according to Article 3(15) WFD *'these provisions apply not only where a material is actually substituting other materials, but also to processes preparing a waste material in such a way that it no longer involves waste-related risks and is ready to be used as a raw material in other processes*.'[870] Thirdly, the passage 'in the wider economy' refers

[867] This problem has also been touched upon in Chapter 5.2.2. The ways to trail the chemicals used in/on wooden products throughout their life-cycle have also already been discussed in Chapter 5.2.2.
[868] See also: Chapter 3.2.3 for this definition and other significant definitions in the WFD.
[869] See Judgement of 13 February 2003, *Commission v Germany*, C-228/00, EU:C:2003:91, para 43.
[870] European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, 2012, p. 31.

to the fourth step in the waste hierarchy and addresses energy recovery in particular (see below on the meaning of 'other recovery').[871] Fourthly, the list of recovery operation in Annex II WFD is open-ended: there may be more waste treatment operations that fall under the definition of recovery.[872] The examples provided also include preparing for reuse and recycling operations.[873]

Recycling really lies at the heart of current waste policy and is one of the backbones of the CE Package. According to Article 3(17) WFD, recycling means:

> *any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.* (emphasis added)

As is the case for reuse,[874] the definition of recycling is differently in the WFD than in the EFD. The WFD definition is more precise, because it clearly states that recycling is a form of recovery and that it concerns the reprocessing of waste into products, materials or substances. Furthermore, it expressly states that recycling excludes energy recovery, backfilling and the reprocessing into fuels,[875] whereas the EFD definition only mentions the energy recovery in that regard. The significance of backfilling operations for wooden waste products is negligible. However, for the reprocessing of wood waste into fuels or other means to generate energy (e.g. pellets for biofuel production), wood wastes are used from a range of sources.[876] It would therefore be appropriate to address this type of recovery as well in the Ecodesign framework next to energy recovery.

Energy recovery is a common recovery option for wood wastes.[877] Both the demand of wood pellets and energy recovered from wood waste is growing strongly in the EU.[878] Comparable to the 2006 Waste Directive, the current WFD does not include an explicit definition of energy recovery. However, it does provide for guidance in Annex II WFD, which clarifies the distinction between energy recovery and incineration as a disposal operation.[879] A comparison between the reference points to energy recovery in the WFD and the definition of energy recovery in the EFD shows that the EFD definition is outdated: it does not correspond to the energy-efficiency criteria put forward in Annex II WFD, which means that it does not make a clear distinction between recovery and disposal. This is important in the light of the waste hierarchy, which also applies to

---

[871] Ibid.

[872] Annex II WFD is an exact copy of Annex II B of the 2006 Waste Directive to which the EFD refers.

[873] As regards preparing for reuse, this recovery category has already been discussed in Chapter 5.3.1-C (heading 'Waste Framework Directive') on the CE benchmark for product durability.

[874] See Chapter 5.3.1-C (heading 'Waste Framework Directive') for the difference between the WFD and the EFD definition of reuse (Article 2(14) EFD v Article 3(13) WFD).

[875] These excluded waste treatments relate to the fourth step in the waste hierarchy, 'other recovery', which is a residual recovery category and is therefore not explicitly defined in the WFD.

[876] Such as waste from the manufacturing of wooden products (residual waste which cannot be used in the process anymore), from C&D sites and from the packaging industry.

[877] BIO by Deloitte, Oeko-Institut and ERA Technology, *Preparatory Study to establish the Ecodesign Working Plan 2015-2017 implementing Directive 2009/125/EC – Task 2: Supplementary Report "Identification or resource-relevant product groups and horizontal issues"* (Deloitte, 2014), pp. 12 and 16.

[878] SQ Consult, *Competition in wood waste: Inventory of policies and markets* (NL Agency, 2013), p. 48. Energy recovery is amongst others pushed by the renewable energy targets.

[879] Generally speaking, disposal incineration facilities generate low energy volumes, whereas for energy recovery the principal result is the generation of a considerable amount of energy. The difference between energy recovery and incineration depends on whether the processing meets certain crucial energy efficient criteria, set forth in Annex II WFD as R1. Meeting the thresholds of R1 make *municipal solid waste* incinerators classify as energy recovery operators. See the non-legally binding guidance: European Commission, *Guidelines on the interpretation of the R1 energy efficiency formula for incineration facilities dedicated to the processing of MSW*, (European Commission, 2011). See also: Cases, e.g.: Judgement of 15 November 2001, *Abfall Service AG v Bundesminister fur Umwelt, Jugend and Familie*, C-6/00, EU:C:2001:610; and Judgement of 13 February 2003, *Commission v Germany*, C-228/00, EU:C:2003:91.

the Ecodesign Implementing Measures according to Article 1(4) EFD, because recovery operations are preferred to disposal operations, and recycling is preferred to energy recovery.

Extended Producer Responsibility

The WFD provides for another significant instrument to better address the recoverability of wooden products in product design: Extended Producer Responsibility. Recital (27) proclaims that EPR is one of the means to support ecodesign. This statement is further clarified in Article 8(1)-(2) WFD, where it is explained that Member States may take appropriate legislative as well as non-legislative measures to encourage product design of products in order to reduce their environmental impacts and the generation of waste in the course of the production and subsequent use of products, and to ensure that the recovery or disposal of waste products take place in accordance with the waste hierarchy and with the general environmental objectives of the WFD.[880] According to Article 8(3) WFD, when applying EPR, Member States must take into account the technical feasibility and economic viability, and the overall impacts on the environment, human health and society, while respecting proper functioning of the internal market to ensure a level-playing field.[881] EPR does not only aim at a proper product recovery: also product durability, waste prevention and compatible disposal are aimed for.[882] In simple terms, EPR is – as the name already reveals – the responsibility of the producers in the broadest sense of the word. EPR measures may be taken to ensure any person who professionally develops, manufactures, processes, treats, sells or imports products bears the responsibility for various stages of the product's life-cycle, *so including the waste stage*.[883] It is typically understood that this responsibility (financially, administratively or physically)[884] is extended to the post-use stage of a product's life-cycle. The idea of ecodesigning products therefore fits well with EPR, and vice versa.

Notably, pursuant to the BRP goal to create clear and coherent definitions, the Commission suggests introducing minimum operating conditions for EPR in a new extensive Article, Article 8a WFD.[885] It includes the establishment of a reporting procedure aiming at gathering data on products placed on the market and on their collection and treatment once they become waste. On the whole, information collection and supply is repeatedly highlighted in the Article. This is significant for the Ecodesign framework, because the connection between the framework and EPR is precisely the provision of information. Through the use of EPR, manufacturers can be held legally responsible to collect their own products again. This could be beneficial for recycling and

[880] Because Article 8 WFD is addressed to Member States, there are differences in the implementation of EPR schemes. Hence, there is also a varied interpretation of the concept in terms of objectives, scope and definition.

[881] Moreover, according to Article 8(4) WFD, the EPR shall be applied without prejudice to the responsibility for waste management by the original waste producer (Article 15(1) WFD) and without prejudice to existing waste stream specific and product specific legislation.

[882] The reference to disposal is deleted in the legislative proposal to adjust the WFD. See Article 1(7)(b) European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595, p. 15. This shows once again that the CE Package really aims at the circularity of the material cycle.

[883] See also: T. Lindhqvist, 'Extended producer responsibility in cleaner production: Policy principle to promote environmental improvements of product systems' (*IIIEE*, 2000), p. 154. It is a concept which has been developed since the 1990s.

[884] Article 8 WFD explains that EPR measures may include *'an acceptance of returned products and of the waste that remains after those products have been used, as well as the subsequent management of the waste and financial responsibility for such activities* [which may be internalized in the price of the product]. *These measures may include the obligation to provide publicly available information as to the extent to which the product is re-usable and recyclable*.'

[885] European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595, pp. 15-17. The idea to flesh out EPR is not entirely new. The 2014 CE Package included a legislative proposal that even would have had introduced a definition for EPR: '*the producer's operational and/or financial responsibility for a product extended to the post-consumer state of a product's life-cycle*.' It is proposed to include this definition in Article 8 WFD – oddly enough, not in Article 3 WFD where all other definitions are provided.

other recovery practices, because the composition of the materials used in the product and its profile (e.g. the associated risks) is more easily determined whenever the producers deliver 'their' waste at a waste treatment facility. This first-hand information on recoverability can furthermore easier be explained and complemented. This does not only apply to products still available, but also to products put on the market long time ago.

To conclude, the WFD offers a number of instruments relevant to address the CE benchmark for product durability. The EFD definitions that also occur in the WFD should be replaced by the WFD definitions. This would mean that there is a legal distinction between recovery, recycling, energy recovery and incineration. The traceability and identifiability of materials are addressed by the EPR instrument.

Construction Products Regulation: a full life-cycle approach, but recycling

Relevant for this section on the recoverability of wooden products are the basic requirements under Annex I CPR.[886] The Annex stresses repeatedly that the entire life-cycle of a construction should be taken into account. This means that the waste stage should also be considered. This is further emphasized in paragraph (a) of section 7 where it is stated that construction works must be designed, built and demolished in such a way that the use of natural resources is sustainable and ensure amongst others the recyclability of the construction works, their materials and parts after demolition. Notably, the broader meaning of 'recovery' provided under the WFD is not mentioned at all – the CPR only addresses recycling. Therefore, whether the products standards used in this framework cover other forms of recovery is not expressly regulated in the CPR.

Ecolabel framework: all categories of recovery

Product recoverability should in theory be addressed by the EU Ecolabels, because the EU Ecolabel framework adopts a broad life-cycle approach.[887]

Next to a number of criteria on chemical use,[888] the EU Ecolabel criteria for furniture contain a criterion on 'design for disassembly'. However, this criterion is only meant to enable better recycling of furniture consisting of multiple component parts/materials and simply requires the provision of illustrated instructions.[889] This does not take account of the many aspects of product recoverability. More broadly speaking, the EU Ecolabel requires that a detailed description should be provided with the piece of furniture. The description concerns the best ways to manage the product when it becomes waste (i.e. reuse, take-back initiative by the applicant, recycling, energy recovery), ranking them according to their impact on the environment information.[890] Note that this criterion specifically covers other forms of recovery as well, namely energy recovery. The EU Ecolabel criteria for wooden floor coverings contain the similar criteria.[891]

All in all, the supply of information is the only measure that is required to facilitate product recoverability in the EU Ecolabels analyzed. They do, however, recognize the range of recovery

[886] For a more extensive explanation of the CPR see Chapter 5.2.1-C (heading 'Construction products Regulation').

[887] Article 6(3) Ecolabel Regulation. For a more extensive explanation of the Ecolabel Regulation see Chapter 5.2.1-C (heading 'Ecolabel framework').

[888] Some of these criteria have already been put forward in Chapter 5.2.2-C (heading 'Ecolabel framework').

[889] Criterion 9.4 Annex Decision 2016/1332.

[890] Criterion 10 Annex Decision 2016/1332. Note, however, that the terminology used in this section does not correspond to the terminology used in the WFD. For example, 'dispose' should be changed into 'manage'. In addition, reference should not be made to 'reuse' but to 'preparation for reuse' because it concerns waste.

[891] Criteria 9(a) and 10 Annex Decision 2017/176, respectively. There, too, not all terminology is in correspondence with the WFD. It has, however, corrected some terminology in the newest version of the criteria. For example, the previous EU GPP criteria referred to the 'recovery of by-products' whereas according to the WFD definitions this is not possible: only waste can be recovered while by-products should *not* be considered waste. In: criterion 3.2 Annex European Commission, Decision 2010/18 of 26 November 2009 on establishing the ecological criteria for the award of the Community Ecolabel for wooden floor coverings, [2009] OJ L 8/32. See Chapters 6.1.1-B (heading 'Intends to discard') and 6.1.2-B for an explanation of by-products according to EU waste legislation.

options available next to recycling. In the case of wooden products, this would probably mean that information is also provided about the energy recoverability.

Green Public Procurement framework: increasing attention to all recovery options

The recoverability of wooden waste products is not treated in the same way by all sets of EU GPP criteria relevant to wooden products.[892]

The EU GPP criteria for wall panels expressly promote the recyclability of the panels by including a contract performance clause indicating that information on wooden wall panel covering materials, such as paint, must be made available so that any lack of information would not hinder the recycling of the panels.[893] Information supply is therefore covered, but any reference to the broader concept of recovery is lacking.

Conversely, the EU GPP criteria for furniture specifically addresses the recoverability by requiring that furniture or parts thereof that are impossible to (prepare for) reuse (for which by the way tenderers are awarded points if they offer targets for reuse), shall be disassembled into different material streams before being sent to recycling facilities, amongst others at least for wood. Any residual material shall be sent to energy recovery facilities if regionally available. These criteria thus fully reflect the waste hierarchy and recognize the recovery categories other than recycling.[894]

The EU GPP criteria for office buildings is most comprehensive of all and even goes a step further by setting a clear target to be complied with by the tenderers. As a technical specification, the label requires that a minimum of 55% by weight of the non-hazardous waste generated during demolition and strip-out works shall be prepared for reuse, recycling and other forms of material recovery. Excavations and backfilling are explicitly excluded from the recovery options. Timber from the main building structure and doors and floorings are explicitly covered by the 55%-rule.[895] Moreover, tenderers are required to perform a pre-demolition/strip-out audit to determine what can be reused, recycled or in other ways recovered. Amongst others, these audits should comprise of an estimate of the % reuse and recycling potential and of risk assessments that may lead to specialist handling and treatment. Furthermore, the materials, products and elements identified shall be itemized in a so-called 'Demolition Bill of Quantities'.[896]

In conclusion, the approach adopted in the (newest) EU GPP criteria for furniture and office buildings to address product recoverability covers all recovery possibilities while emphasizing (preparing for) reuse and recycling, which is in correspondence with the waste hierarchy. The sets of criteria are most specific on what tenderers should organize prior to the actual recovery.

D. Discussion on the potential for the Ecodesign framework

The CE benchmark for the recoverability of wooden products concerns the way how these products can be designed to optimize their recovery. The distinguishing characteristic that product recoverability concerns *waste* products is important, because it shows that unlike all the other CE benchmarks discussed in the previous sections, this benchmark is the only one exclusively targeting the waste stage of a material's life-cycle. This CE benchmark is therefore the farthest

[892] Chapter 5.2.1-C (heading 'Green Public Procurement framework') explains the EU framework for GPP more clearly.

[893] European Commission, *Wall Panels – Green Public Procurement Product Sheet* (European Commission, 2010), pp. 9-10.

[894] Criteria TS1(a) and AC1European Commission, *EU Green Public Procurement criteria for Furniture* (European Commission, SWD(2017) 283). Furthermore, the planning of waste management is also addressed in criterion TS1(a): the tenderer must provide details of the arrangements for the collection of the furniture, as well as for the (preparing for) reuse and recycling routes to be used.

[895] Criterion C1 European Commission, *EU GPP Criteria for Office Buildings Design, Construction and Management* (European Commission, SWD(2016) 180, 2016). The comprehensive criterion even raises the minimum to 80%, which is 10% more than is currently required for C&D waste as from 2020 under Article 11(2(b) WFD. The minimum of 70% remains the same under the CE Package.

[896] Ibid.

removed from the life-cycle stage to which the EFD is actually applicable to, i.e. the *manufacturing* of the products by making *environmentally-friendly design* obligatory for *putting them on the EU market*.

Exploring the options

What kind of measures can be taken to enhance the recoverability of products through product design? The CE Action Plan does not give much guidance on this particular issue. It merely announces that the Commission will examine the possibility under the Ecodesign framework to address the recyclability of products and the identification of certain materials or substances.[897] As a more general ambition, the Commission will take action on encouraging recovery operations in the EU, amongst others by sending long-term signals to public authorities, businesses and investors and by establishing the right enabling conditions at EU level.[898] This goal has been converted into the upgrade of the preparing for reuse and recycling targets in waste legislation.[899] Much more than these broad statements and the fine-tuning of already well-working existing instruments is not provided in the CE Package. The EFD

In fact, the EFD already contains several reference points allowing for addressing product recoverability. This particularly concerns the recyclability of products. The Annex to the EFD contains a list with aspects that could guide an Implementing Measure on this matter. It includes issues such as improving the technical recoverability of products/materials, the availability of product specific information (for example on dismantling, best recycling practices and materials content) or the ability to dismantle devices (such as through modularity or the use of clip-connections).[900]

Indeed, these examples have also been mentioned outside the context of the CE benchmark for product durability, meaning that they serve more purposes at the same time. There are some differences, however. For example, a difference between the dismantling for repair (product durability) and for recovery is that for the first option one has to make sure no (further) damage is done to the product because the product is still meant to be used. Another example relates to the dismantling time: this is less significant for product durability than for product recoverability,[901] because for waste treatment operators time is crucial when deciding for or against recovery in comparison to disposal.[902]

On top of the list of examples out in the Annex to the EFD, two additional features were identified in the case study that should be considered when preparing an ecodesign requirement on any of these aspects that could encourage product durability. They are: use the available waste-related terminology correctly and consider ways to trace and identify the materials at issue.

The relationship between the EFD and the WFD

Neither the EFD nor the CE Package addresses the *disposability* of products. If they mention it at all it is mainly about the fact that disposal is the last resort in the waste hierarchy and that it should therefore be discouraged. Recovery is undeniably the main goal in the waste stage, so it makes sense for the EFD to focus on recovery as well. It is worth noting in this respect that only recycling is currently expressly addressed by the EFD's Annex. Nevertheless, the examples provided in the Annex are also applicable to the other recovery categories, such as preparing for

[897] CE Action Plan, p. 4.
[898] Ibid., pp. 8, 16-17.
[899] See on this matter Chapter 6.3.3-B.
[900] See also: BIO by Deloitte, Oeko-Institut and ERA Technology, *Preparatory Study to establish the Ecodesign Working Plan 2015-2017 implementing Directive 2009/125/EC – Task 2: Supplementary Report "Identification or resource-relevant product groups and horizontal issues"* (Deloitte, 2014), p. 11.
[901] Notwithstanding the fact that the *easiness* to dismantle the components of the product is highly significant for the final users.
[902] For example, the dismantling time is generally a crucial aspect for operators to decide for or against recovery. Evidently, a big difference between the dismantling for repair (product durability) and for recycling is that for the first option one has to make sure no (further) damage is done to the product. Supra note 900, pp. 11-12, and 15.

reuse and backfilling. The decision on what kind of recovery operation (or disposal operation) should be applied to a particular waste stream is not explained by the EFD or by the 2006 WFD (to which the EFD still refers in certain occasions). The 2008 WFD modernized the 2006 version, *inter alia*, by introducing mechanisms to guide this decision: that is, indeed, through the use of the waste hierarchy and life-cycle thinking. These mechanisms should help public authorities as well as private businesses to base on their policy or (in-house) regulation. Referring to these WFD instruments in the EFD would therefore seem to be appropriate.

There is however an inconsistent and incorrect use of 'recovery terminology' throughout the EU overall regulatory framework for wooden products. This also applies to the EFD and should consequently be solved in future Implementing Measures for wooden products. A prominent example of the wrong use of terminology is the joint use of 'recycling' and 'recovery' without making a clear distinction between the options when the product's waste stage is addressed. To be clear: recycling is always recovery, but recovery does not always have to be recycling. Recycling and recovery are different for the very fact that recycling is a category of recovery operations, which it shares with preparing for reuse and the residual category 'other recovery'. Using the terms recycling and recovery together is therefore wrong. In addition, 'reuse' is sometimes added as a third component. Pursuant to the WFD, however, 'reuse' does not relate to the product's waste stage and is not a recovery category. The concept of 'preparing for reuse' should be used in situations where the recoverability of products is addressed. Note, moreover, that this recovery category can also be understood as an aspect of the CE benchmark for product durability: it could be interpreted as 'reverted durability'.[903] In view of safeguarding the coherence and consistency of the overall regulatory framework it is recommended to use the WFD terminology correctly.[904] This argument is strengthened by Article 1(4) EFD where is says that the EFD applies without prejudice to EU waste legislation.

Having said that, the WFD and the EFD are also complementary to each other. The EPR instrument, which is established under the WFD and according to which ecodesign is one issues that could be addressed by the instrument, complements any future Ecodesign requirements on product recoverability in the sense that Article 8 WFD (and the Article 8a, as proposed in the legislative proposal for the WFD under the CE Package) moves Member States to set up *national* EPR measures. This contrasts with the Ecodesign Implementing Measures, as they are meant to be applied in a *uniform way* throughout the EU.[905] Consequently, ecodesign can be taken into account when preparing national EPR schemes alongside the opportunities provides under the Ecodesign framework. Naturally, this is only allowed when this does not frustrate the harmonized Implementing Measures. The national component of the concept of EPR also means that the European Commission's promise in the CE Action Plan to come up with a proposal that encourages ecodesign in the EU by differentiating the financial contribution paid by producers through EPR schemes seems not feasible using the EFD.[906]

---

[903] See Chapter 5.3.1-C (heading 'Waste Framework Directive').

[904] The aforementioned mistakes have, however, also been made in the CE Package: pursuant to Article 1(3)(a) Proposal for a Directive amending Directive 94/62/EC on packaging and packaging waste, COM(2015) 596, the Commission wishes to change the title of Article 6 Packaging Directive into ''Recovery, re-use and recycling', mixing a non-waste treatment (reuse) with recovery treatments (recovery and recycling), without making a distinction between recovery and recycling. The same applies to Article 1(3)(c), where the text refers to '… for the purposes of preparing for reuse, recycling or recovery' (emphasis added).

[905] Some EU Member States already established national EPR schemes for a variety of (partly) wooden products: e.g. bulky wood, furniture and construction materials. In: BIO Intelligence Service; in collaboration with Arcadis, Ecologic, Institute for European Environmental Policy (IEEP) and Umweltbundesamt (UBA), *Development of Guidance on Extended Producer Responsibility (EPR)* (BIO Intelligence Service by Deloitte, 2014), pp 32 and 135.

[906] See CE Action Plan, p. 4.

Link to other CE benchmarks

The gathering and passing on of information is crucial for recovery operators, for example to decide which recovery option (or disposal) should be applied and to scale up in the waste hierarchy. It is however a challenge to get useful information about the recoverability of the product at issue all the way along the life-cycle to the waste stage.

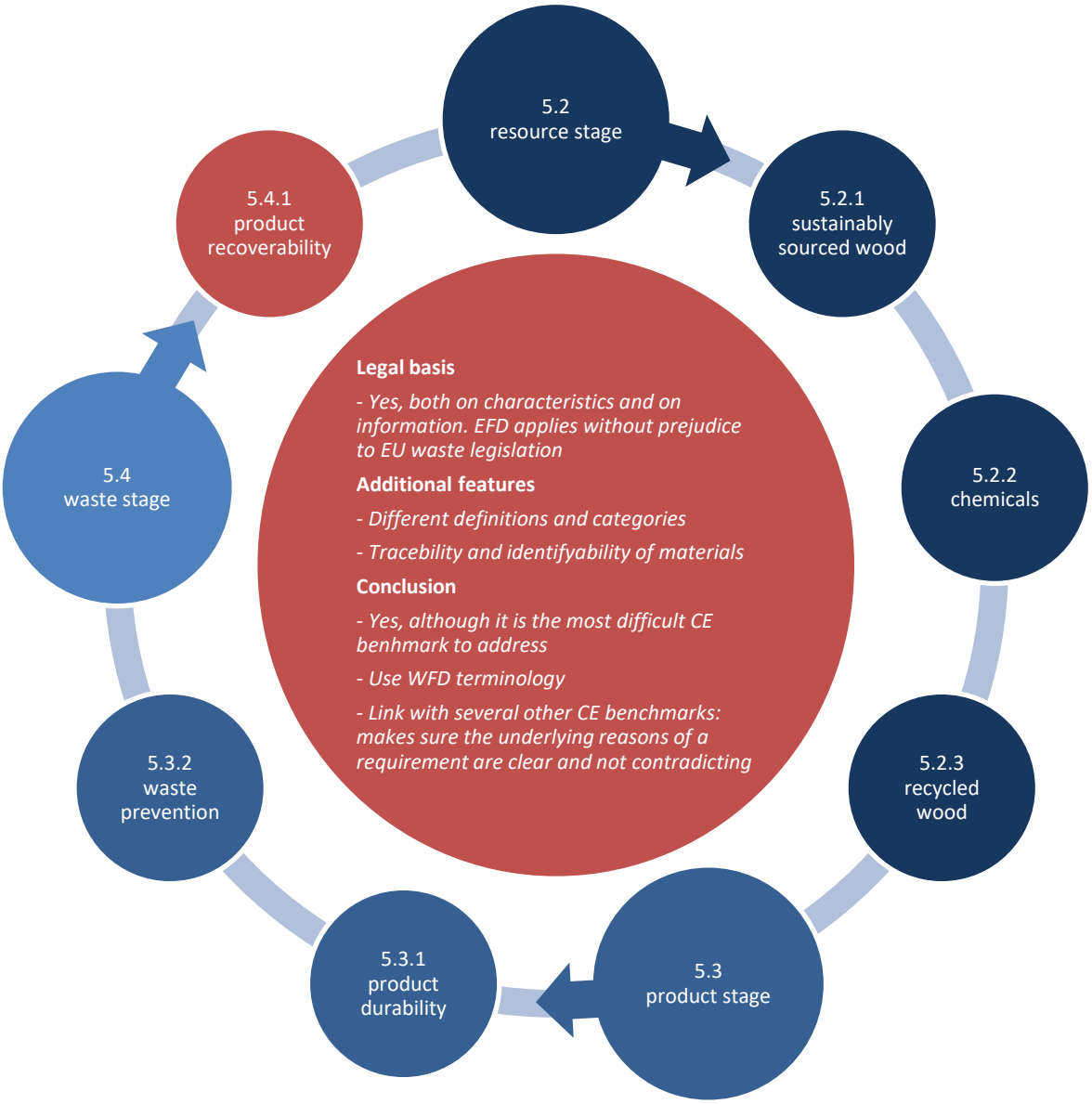
Not many of the EU legal acts and frameworks studied contain specific requirements on this issue. Only the EU GPP framework provides for requirements in this respect, namely the requirement to provide a detailed description of what is supposed to be the best ways to manage the product once it becomes waste. This includes information on waste treatments, meaning all the recovery options and any possible take-back initiatives, such as is promoted under the national EPR schemes.

It must be said that the information on the use of chemicals in/on the products is generally essential for choosing the right recovery category. This matter is already been discussed in Chapter 5.2.2 on the CE benchmark for chemicals. In sum, information on the (uncertain) risks the use of certain chemicals pose on the environment or human health are passed on through the supply chain to the final users by using SDSs, which are based on CSRs and safety assessments. The BPR and REACH are crucial in this respect. The labeling of chemicals is also very significant, which is regulated by the CLP Regulation.

Generally speaking, the further the product is removed from the moment when it is put on the market (and therefore complies with the information requirements), the less is regulated. This has of course also a practical reason in the sense that it is more difficult to regulate the factual life-time of a product. This has already been discussed in Chapter 5.3.1 on the CE benchmark for product durability. Time is even more a challenge for regulating product recoverability in the design stage, because there is an even bigger risk that the information does not reach the recovery facilities. Online information and updates thereof could improve the information supply to the recovery facilities.

Conclusion

To conclude, the EFD offers quite some opportunities to address the recoverability of wooden products. The CE benchmark for product recoverability in fact shares many of these openings with other benchmarks, for examples the ones for chemical use and for product durability. It should nevertheless be clear which purpose(s) a specific requirement has. In addition, it is essential for the sake of clarity that the WFD terminology is used whenever the recoverability of is addressed. The improper use of certain ‘recovery definitions’ should not only be solved in the Ecodesign framework but, in fact, also in the entire EU regulatory framework for wooden products.


5.2
resource stage
5.2.1
sustainably
sourced wood
5.2.2
chemicals
5.2.3
recycled
wood
5.3
product stage
5.3.1
product
durability
5.3.2
waste
prevention
5.4
waste stage
5.4.1
product
recoverability
Legal basis
- Yes, both on characteristics and on information. EFD applies without prejudice to EU waste legislation
Additional features
- Different definitions and categories
- Tracebility and identifyability of materials
Conclusion
- Yes, although it is the most difficult CE benhmark to address
- Use WFD terminology
- Link with several other CE benchmarks: makes sure the underlying reasons of a requirement are clear and not contradicting

5.5 Reflection: addressing a more general challenge

5.5.1 Recap of the case study and the preliminary conclusions

It had been explained in Chapter 4.3.2 on the motives and methodology for this case study that it is presumed that there are insufficient incentives for environmentally-friendly product design under the existing Ecodesign framework to enhance the transition towards a Circular Economy. The European Commission made that very clear in the CE Package, where it states that there is too much focus on energy-efficiency and on the use stage of a product's life in the design process. To address this problem, I examined the EFD based on the far-reaching suggestion to extend the Directive's scope for a second time in its existence: its applicability should shift from ErPs to all products, which would mean that is includes all sorts of wooden products. Exploring this hypothesis automatically provides for an answer to the problem just flagged, because the premise is that the widening of the scope would emphasize more environmental aspects and would result in a more complete application of life-cycle thinking, and, as a result of that, would boost the transition towards a Circular Economy. The case study is restricted to wooden products, amongst others because they are currently not regulated under the Ecodesign framework and because wood is in principle a sustainable material in terms of renewability.

The case study first discussed the Article 15 EFD on the *making and shaping* of Implementing Measures. Subsequently, the study zoomed in on the potential *content* of the future Implementing Measures. To this end, several so-called 'CE benchmarks' had been extracted from the CE Package. Each CE benchmark was the starting point for a four-step analysis. Firstly, I assessed the EFD to see whether it already addresses the particular CE benchmark. Secondly, certain features were identified that would be additional to the existing requirements for the preparation of an Implementing Measure. Thirdly, other EU laws were considered to see if they already address the CE benchmarks and if so, how they cover the additional features. Finally, a discussion on the potential for the Ecodesign framework was provided for each CE benchmark. These parts also included some suggestions for the overall regulatory framework for wooden products.

Two preliminary conclusions can already be drawn from the case study. The first conclusion relates to the foundation of the CE benchmarks in the EFD. The EFD and in particular its Annexes suggest that the Ecodesign framework actually already provides for a comprehensive platform to address non-energy-related aspects of products in product design. Ecodesign requirements could be developed on both the characteristics of the targeted product and on information supply about the product. The fact that there is a legal basis to act for each CE benchmark, of which some are admittedly more clear than others, suggests that the assumption that more attention should be paid to material-related aspects, which is made by the European Commission in the CE Package, is based on practice – not on legal reasons. The legal opportunity to address these issues successfully has just not been seized as initially expected. Unless basing oneself on practice rather than on legal opportunity, neither can the assumption be confirmed that the use stage of a product is predominantly addressed in Implementing Measures, because there is a legal basis for all CE benchmarks.[907] A general conclusion is therefore that the Ecodesign framework already provides for an extensive foundation for addressing material-related issues and all life-cycle stages in the design of wooden products. This does not alter that, despite its shortcoming, Article 15 EFD should be complied with when an Implementing Measure regulating the design of wooden products is prepared and adopted.

A second preliminary conclusion is that the regulatory landscape for wooden products is very fragmented. There are many EU laws somehow relevant to wooden products. Generally speaking, fragmentation can make EU rights and obligations inaccessible and unclear for authorities,

[907] Evidently, these two observations relate to the *current* functioning of the Ecodesign framework and thus on the legal reality that wooden products are not regulated under the Ecodesign framework. Nevertheless, this does not make much difference, because the legal bases in the EFD would, of course, still remain in force if the scope of the EFD is extended to all products.

businesses and individuals over time. The fragmentation is evident in the regulatory framework in many different ways. To name a few examples: some laws or frameworks lay down voluntary rules, while most impose legal obligations; some are based on Article 192 TFEU, while most are based on Article 114 TFEU; and some only regulate one specific CE benchmark or only an aspect thereof, while most others cover more or even all of the benchmarks.

It is no coincidence that many official documents concerning the Circular Economy aim at a more coherent policy framework for products as well as for the Circular Economy as a whole.[908] The most prominent example in this regard is provided in the CE Action Plan where it is stated that '*the Commission will examine options and actions for a more coherent policy framework for the different strands of work on EU product policy*[909] *in their contribution to the circular economy*.'[910] Moreover, the 7th EAP stresses that (environmental integration and) policy coherence is one of the priority objectives of EU environmental policy, and is considered one of the key pillars of the enabling framework.[911] Coherence is furthermore particularly highlighted in the paragraphs on resource use and sustainable production and consumption, *inter alia* in the context of the EFD.[912] Next to regulatory coherence, an interrelated goal is to establish a consistent regulatory framework for the Circular Economy. Although not stressed very often in relation to the legal transition towards a Circular Economy, consistency is particularly important in view of regulatory coherence, because the comprehensibility of law benefits from a consistent framework. Generally speaking, regulatory fragmentation could raise severe obstacles to the coherence and consistency of law. A lack of consistency and coherence can lead to issues such as unnecessary costs, a failure to deliver environmental objectives, a decreasing support for EU legislation and complaints from industry and governments.[913] This legislation survey suggests that there is a risk of not knowing which EU laws must be respected in what way, in which situation and by whom. This is significant to address, because many actors in the life-cycle of wooden products, such as the inspection authorizations and product manufacturers, should and wish know these matters.

Building on these two preliminary conclusions, the question now arising is how to place the EFD in this fragmented landscape if the scope of the EFD is expanded to non-ErPs such as wooden products. Before moving to this deeper analysis, the next section frames the desire to establish a coherent and consistent regulatory framework, and to create coherent and consistent individual legislation and frameworks. This would provide any further deepening of answering

---

[908] See e.g.: the 2014 CE Communication, e.g. pp. 5 and 12.

[909] '*E.g. Ecodesign, Energy Labelling, Ecolabel, Green Public Procurement, and other relevant product legislation'* (original footnote).

[910] CE Action Plan, p. 4. See also: the 2014 CE Package were it is stated that the Commission will *'facilitate the development of more circular models for products and services, including through a more coherent product policy, and further develop the application of the Ecodesign Directive by paying further attention to resource efficiency criteria*' (emphasis added). 2014 CE Communication, p. 6

[911] Article 2(1)(g) and Paragraphs 55 and 85-89 7th EAP.

[912] The 7th EAP expressly states in Paragraph 20 that the EU should tackle problems at source-level, amongst others through better integration of natural capital objectives in the development and implementation of other policies, and ensuring that policies are coherent and deliver mutual benefits. Paragraph 35 adds that existing product legislation, such as the EFD and the Ecolabel Regulation, will be reviewed with a view '*to improving the environmental performance and resource efficiency of products throughout their lifecycle, and addressing existing provisions through a more coherent policy and legislative framework for sustainable production and consumption in the Union*.' It also states that this framework *'should address the fragmentation and scope limitations of the existing … SCP… acquis, and identify, and where necessary fill, gaps in policy, incentives and legislation to ensure minimum requirements are in place with regard to the environmental performance of products and services*.' Paragraph 43(v) further states that in order to turn the EU into a resource-efficient, green and competitive low-carbon economy by 2020, the 7th EAP ensures the establishment of a *'more coherent policy framework for sustainable production and consumption including, where appropriate, the consolidation of existing instruments into a coherent legal framework', inter alia,* by *'reviewing product legislation with a view to improving the environmental performance and resource efficiency of products throughout their lifecycle.'*

[913] Ministry of Infrastructure and Environment of the Netherlands: J. Teekens, 'Better Rules for Better Results, MIW - Make it Work' (*Vereniging voor Milieurecht*, 2016).

the main question for this case study as to whether regulating wooden products via the Ecodesign framework is a promising niche development in the Circular Economy and, if that is indeed the case, whether and how this can be addressed in the CE Package or in any subsequent policy documents of the Commission concerning the Circular Economy.

5.5.2 Framing regulating coherence and consistency

The concepts of coherence and consistency have always occupied a central place in the regulatory field, owing to the systemic nature of law. However, their meaning is not perceived by everyone in the same way,[914] let alone their combination.[915] In general terms, coherence means how well the law is understood (along the lines of: '*each and every one of the norms that are part of the overall system, while performing different functions, can sit comfortable side by side with each other*')[916] and consistency is how well the rules and laws come together (along the lines of: '*the absence of logical contradictions between two statements of law*')[917]. Coherence and consistency are often paired.[918] Combined, one could say in a nutshell that the regulator should aim at a situation where everyone understands their rights and obligations easily and with certainty. In this respect, the principle of legal certainty is what legally unites coherence and consistency.[919]

EU primary law does not make a clear distinction between coherence and consistency either: according to Article 7 TFEU, the EU shall ensure *'consistency between its policies and activities, taking all of its objectives into account and in accordance with the principle of conferral of powers.*' While the English version of the provision refers to 'consistency' and the Dutch version refers to 'samenhang', which has a similar meaning, other language versions use translations of coherence. For example, the German text uses 'Kohärenz', the French text uses 'coherence', the Spanish text 'coherencia'. As all language versions are equally authentic,[920] one can conclude that

[914] Many legal scholars (theorists) have come up with interpretations of the link between coherence and law, and comments on other theories. See for influential, early work for example: J. Rawls, *A Theory of Justice* (Harvard University Press, 1971); N. MacCormick, 'Coherence in legal justification', in: W. Krawietz, H. Schelsky, G. Winkler, A. Schramm (eds.), *Theorie der Normen: Festgabe für Ota Weinberger zum 65 Geburtstag* (Duncker & Humblot, 1984); R. Dworkin, 'On Interpretation and Objectivity', in: R. Dworkin, *A Matter of Principle* (Harvard University Press, 1985); R. Dworkin, *Law's Empire* (Harvard University Press/Fontana, 1986); and N. MacCormick, *Legal Reasoning and Legal Theory* (Oxford University Press, 1987). Many other legal scholars and publications can be added to this list. To discuss the differences and nuances of their theories goes beyond the scope of this case study, however. This section rather sketches a more general understanding of coherence and consistency, as this would function as a steppingstone for the observations from the CE benchmarks just as good.

[915] A. Schiavello, 'On "Coherence" and "Law": An Analysis of Different Models' (*Ratio Juris*, 2001), pp. 233-243, particularly pp. 236-239.

[916] D. Fisher, *Legal Reasoning in Environmental Law. A study of Structure, Form and Language* (Edward Elgar Publishing Limited, 2013), p. 42.

[917] S. Guest, *Ronald Dworkin* (Stanford University Press, 2013), p. 80. (First edition: *Edinburgh University Press*, 1992).

[918] See e.g.: Institute for European Environmental Policy, *Project Make it Work, Towards a roadmap for future EU environmental regulation - Smarter regulation for a more effective and efficient implementation of EU environmental law. Background paper for the Expert workshop, 2-3 April 2014* (IEEP, 2014), p. 5; European Commission, *Regulatory Fitness and Performance Programme (REFIT): State of Play and Outlook*, COM(2014) 368, pp. 13 and 16.

[919] It is settled case law of the CJEU that the principle of legal certainty implies that *'normative provisions imposing duties (burdens) on individuals or granting rights to individuals should be clear and precise so that all implications and applications are foreseeable for those individuals. It relates to clarity and precision of normative content.*' D. Keyaerts, 'Impact of Better Regulation in the Case Law of the European Court of Justice' (*European Journal of Risk Regulation*, 2, 2012), pp. 242-243. In other words, legal certainty is the predictability of rules.

[920] See e.g.: Judgement of 6 October 1982, *Srl CILFIT and Lanificio di Gavardo SpA v Ministry of Health,* C-283/81, EU:C:1982:335, para. 18.

the coherence and the consistency of the regulatory framework should be read together in EU law. EU primary law does not explain the terms.[921]

The constructive role of the concepts in law is evident: regulatory coherence and consistency does not invite any opposition. Who would encourage an incoherent and inconsistent regulatory framework? However, completely coherent and consistent regulatory frameworks and/or laws are very rare. As is almost always the case, it is a matter of degree: there is a very broad and vague range between coherent-consistent and incoherent-inconsistent. As regards coherence, '[t]*he real difficulty … of coherence is that there are no definitive rules to say that one argument is more coherent than another. For example, if many writers write the last chapter of a "chain novel" different readers could make different choices about which conclusion best fits the previous part of the novel.*'[922] For this reason, one could conclude that regulatory coherence and consistency is first and foremost casuistic.

Nonetheless, the European Commission has tried to provide for some guidance on the interpretation of the concepts in the EU context. In 2001, the White Paper on European Governance was published which identifies five principles of good governance: openness, participation, accountability, effectiveness and coherence.[923] The Commission describes coherence as follows:

> *Policies and action must be coherent and easily understood. The need for coherence in the Union is increasing: the range of tasks has grown; enlargement will increase diversity; challenges such as climate and demographic change cross the boundaries of the sectoral policies on which the Union has been built; regional and local authorities are increasingly involved in EU policies. Coherence requires political leadership and a strong responsibility on the part of the Institutions to ensure a consistent approach within a complex system.*[924]

The legal transition towards a Circular Economy fits this description in the sense that the creation of a Circular Economy, which is a long-term goal and must therefore serve as a yardstick for the Commission and the EP and the Council, particularly requires coherence due to the wide-ranging and complex nature of the regime (change). Notably, consistency has not been expressly recognized as a principle of good governance, despite its legal foundation in Article 7 TFEU.

The Better Regulation mantra emanates from these good governance principles. Regarding regulatory coherence, the Commission clarifies in the context of the BRP that the focus on coherence is particularly important in fitness checks, where coherence analysis will look for evidence of synergies or inconsistencies between rules in a related field which are expected to work together, and in the evaluation of rules, which may vary depending on the type of evaluation.[925] It is further stressed in that regard that coherence can amongst others be sought internally as well as within the wider EU framework.[926] Generally speaking, the Commission explains that the evaluation of coherence involves looking at how well different rules work together.[927] This is an interpretation that better reflects the general explanation of consistency provided at the start of this section than the one of coherence. Be that as it may, the identification and elimination of inconsistencies is also expressly mentioned in respect of fitness checks and evaluation.[928] Consistency is generally considered one of several better regulation goals.[929]

---

[921] Besides in Article 7, the Treaty on the Functioning of the European Union further reflects the objectives of coherence and consistency in: Articles 3(3), 21, 11 (integration principle), 121(3), 256(2)-(3), 181(1), 334 and 349(3).
[922] A. Schiavello, 'On "Coherence" and "Law": An Analysis of Different Models' (*Ratio Juris*, 2001), p. 237.
[923] European Commission, *European Governance A White Paper*, COM(2001) 428.
[924] Ibid., p. 8.
[925] European Commission, *Better Regulation Guidelines*, SWD(2015) 111, p. 59.
[926] Ibid., pp. 59-60.
[927] European Commission, *Better Regulation "Toolbox"*, p. 274, which is a guidance document that complements the Better Regulation Guidelines SWD(2015) 111.
[928] Supra note 925, p. 8.

However, consistency has a less central role in the BRP and is seldom used in a joint way with coherence.[930]

All things considered, it can be concluded that the combination of regulatory coherence and consistency is really an umbrella strategy of which the boundaries or instruments to achieve it are not predefined. Despite their unclear relationship, they are actually established conceptual goals in EU law and policy. While, of course, the fragmentation of rules and laws as such does not necessarily lead to incoherent and inconsistent laws, it is a potential risk that should be addressed also in this case study. Therefore, the next section discusses the EFD (on the hypothesis that its scope is broadened to all products, so including wooden products) and its interaction with the EU regulatory framework for wooden products.

5.5.3 Circular Economy benchmarks analyzed: fueling coherence and consistency?

The question addressed in this section is how the additional features identified for each CE benchmark or elements of the features would support or hamper the coherence and consistency between the imagined Ecodesign framework and the overall EU regulatory framework for wooden products.

When assessing the features, it emerges that all features or elements thereof occur more than once in the case study, as shown in *Chart 1*.[931]

Chart 1: additional features and elements thereof

CE benchmark	**Additional features and elements thereof**			
sustainably sourced wood	terminology	proof/information		
chemicals		proof/information		environmental legal principle
recycled content	terminology	proof/information	categories	environmental legal principle
product durability	terminology	proof/information	categories	environmental legal principle
waste prevention			categories	environmental legal principle
product recoverability	terminology	proof/information	categories	environmental legal principle

Building on this observation, each recurring feature or element thereof is discussed in view of its role in the coherence and consistency of the EU regulatory framework for wooden products. This

[929] For example, the Commission calls on the Parliament and the Council in the light of the shared commitment from EU Institutions to commit to better legal drafting so that EU laws are correct, comprehensible, clear and consistent. European Commission, *Better regulation for better results - An EU agenda*, COM(2015) 215, p. 9. See also: e.g. European Commission, *Third strategic review of Better Regulation in the European Union*, COM(2009) 15, p. 3, where consistency is mentioned as one of the things to accomplish in view of moving towards a more integrated approach to simplification of legislation that affects a policy area.

[930] Only sporadically and in specific cases coherence and consistency are paired: see e.g.: ibid., *Better regulation for better results - An EU agenda*, p. 12; and supra note 927, pp. 166-167.

[931] It can be noted that *Chart 1* does not only include the additional features identified in the case study. It also includes some elements of features that are similar to the features but which have not been treated as a separate feature. These 'elements' are significant, nonetheless. An example is the precautionary principle: while this principle has been discussed in the section on the CE benchmark for chemicals, it also plays a role in the CE benchmarks for recycled content and product durability. For this reason, I have referred to the principle's significance for these two CE benchmarks.

may lead to the formulation of improvement to the EFD in view of enlarging its scope to all products. Presumably they also relate to other materials than wood, but that should first be verified in another study.

A. Suitable and correct terminology

Terminology is a recurring feature in most of the CE benchmarks analyzed. It is a matter of using the right definitions, introducing new terminology and providing for clearer clarifications of certain concepts.[932] This is a core element of regulatory coherence and consistency.[933] It is also a significant aspect of the BRP.[934]

An excellent example that has not yet been explicitly brought forward in the case study but which shows the possible ambiguity in interpretation is the definition of 'product'. A product has multiple meanings in EU law. For example, legislation sometimes includes an explicit definition and/or includes a definition of a specific product type.[935] At other times, it includes a definition of a related concept without elaborating on the meaning of 'product' itself in that specific context. This is the case with 'product design' in Article 2(10) EFD. In addition, an EU law may use other terminology than 'product' even though they essentially mean the same. This is the case with 'article' in the BPR and REACH. Probably the best known example of a closely related term to 'product' is the word 'good', for example within the meaning of the Articles on the free movement of goods in the TFEU.[936] Because of the vast diversity of what falls within the definition of 'product' in EU law, the scope of the EFD must be clearly delimited if its scope will indeed be enlarged. Article 2(1) EFD (which) should in any case be changed, because it now refers to ErPs in order to clarify the scope of the EFD. The new provision should provide a description of which products fall within and, more importantly which products fall outside the scope. While the exclusion of certain product groups is of course always debatable (for example, the current EFD does not apply to means of transport for persons or goods, Article 1(3) EFD)[937], it would in any case exclude services (this is for example the case in the product definition under the Product Safety Directive) and raw materials, so that only final products can be regulated as it currently already the case under the EFD.

Given the different interpretations of products that are used throughout EU legislation, there is no such thing as a fully consistent and coherent EU policy on products. The case study shows that in respect of the regulatory framework for wooden products, there are many more examples

---

[932] The lack of definitions has also been identified as a major regulatory barrier to the Circular Economy in other research reports. See for instance: Technopolis Group, Wuppertal Institute, thinkstep and Fraunhofer ISI, Technopolis Group, Wuppertal Institute, thinkstep and Fraunhofer ISI, *Regulatory barriers for the Circular Economy - Lessons from ten case studies* (European Commission, 2016), p. 56.

[933] J. Sanden, 'Coherence in European Environmental Law with particular regard to the Industrial Emissions Directive' (*European Energy and Environmental Law Review*, 2012), p. 230.

[934] It is, of course, no coincidence that the European Commission fully commits to the alignment of terminology and the introduction of further explanations of certain concepts in EU waste legislation in the legislative proposals of the 2015 CE Package.

[935] An explicit definition is for example provided in Article 2(a) Product Safety Directive (2001/95 of 3 December 2001 on general product safety, [2002] OJ L 11/4). A definition for a specific product type is for example provided for 'construction product' in Article 2(1) CPR; and 'by-product' in Article 5 WFD (strictly speaking it is not a definition, as it lists criteria that need to be fulfil by substances or objects to be called a by-product).

[936] Articles 28-37 TFEU: according to Article 28(2) TFEU, the freedom of goods applies both to *'products originating in Member States'* and to *'products coming from third countries which are in free circulation in Member States.*' The CJEU ruled that 'goods' mean: *'products which can be valued in money and which are capable, as such, of forming the subject of commercial transactions'*. Judgement of 10 December 1968, *Commission v Italy*, C-7/68, EU:C:1968:51, p. 428.

[937] This exclusion had also been present in the 2005 Ecodesign Directive. During the drafting of the 2009 version, it was concluded that 'means of transport' were still subject to complex regulation that addresses environmental performance (such as pollutant emissions from cars) and were therefore kept outside the scope of the 2009 Directive. European Commission, *Proposal for a Directive establishing a framework for the setting of ecodesign requirements for energy related products*, COM(2008) 399, p. 5.

of terms that are not used in a coordinated and logic way. The biggest challenge is to align all waste-related definitions and concepts in product legislation with the WFD terminology, as there are currently many differences in interpretation. This also applies to the EFD, despite that the Ecodesign framework applies without prejudice to EU waste legislation. The definitions of recovery, recycling and preparing for reuse are only three examples of definitions that are used incorrectly if the WFD terminology applies.

The introduction of (new) terminological categories has been repeatedly suggested when identifying the additional features for several CE benchmarks. It ties in with the urge to rely on the WFD definitions in the Ecodesign framework, because all the suggestions made are in the area of waste. One of the suggestions relates to the incorporation of categories for recycling. While the WFD already provides for recovery categories that should also be respected by the Ecodesign Implementing Measures in the context of the CE benchmark for product recoverability, there are no categories available for recycling in the context of the CE benchmark for recycled content (i.e. one category for recycled wood derived from pre-user waste and one category for recycled wood derived from post-user waste). Another suggestion relates to waste prevention. The introduction of categories for waste prevention has also been suggested in the context of the CE benchmark for waste prevention (i.e. one category for qualitative waste prevention and one for quantitative waste prevention). In this case, the WFD already provides for a distinction between the categories, but it does not give qualitative waste prevention preference, which was nonetheless suggested. To improve the coherence and consistency, it is recommended to define the categories newly introduced to the Ecodesign framework in parallel with other legislation introducing the same categories or in correspondence with the existing definitions under other legislation.

To conclude, the coherence and consistency of the Ecodesign framework with the other EU laws analyzed can be improved by aligning the waste-related terminology with the existing WFD terminology, as the WFD is the horizontal, framework law which lays the foundation for the entire waste acquis. This can simply be done by referring to the WFD definition. Evidently, this does not only apply to the EFD: it should be a general goal for the entire regulatory framework for wooden products. The introduction of new categories to the Ecodesign framework should come about in coordination with the existing regulatory framework. Moreover, it is recommended to clearly define ‘products’ when changing the EFD’s scope to all products.

B. Information and proof for actors in the life-cycle

Information is a strong element in most CE benchmarks. The gathering, analysis and supply of relevant information is used to provide proof of compliance with a relevant ecodesign requirements. It is also used to provide for instructions for subsequent persons dealing with the (waste) products. Information is therefore closely connected to the application of life-cycle thinking (see Section E), because ideally it must be passed on through the entire life-cycle. This does not only relate to the Ecodesign framework, for it is a common theme throughout the whole regulatory framework for wooden products. The importance of information to the coherence and consistency of law, whether it will be scientific, technical, economic or other information, is that it may act as a bridge between life-cycle stages and between legal acts. Consistent and coherent information mitigates any lack of clarity at the operational level (for businesses, users and public authorities), which is particularly the case in complex regimes such as the regulatory framework for (the life-cycle of) wooden products and the Circular Economy as a whole. The EFD could be regarded as a way for channeling information from *before* the manufacturing of products to the period *after* are put on the market, as some sort of ‘intermediary’.

In fact, the supply of information is already highly significant in the Ecodesign framework. Based on Annex I (Part 2) EFD, ecodesign requirements could oblige manufactures to supply information that could have an impact on the way how the targeted products are used and recovered. The additional features show that the passing on of information however remains a huge challenge, because providing information does not necessarily mean that the information is actually suitable for purpose (the suitability could depend on, for example, the use of proper terminology and of new categories) and/or delivered at the right person (e.g. recovery facilities

often do not receive much information about the post-used waste they receive). The analysis of the regulatory framework for wooden products recognizes this observation, because the 'further' the product gets in the life-cycle as from the moment when it is put on the market, the less accurate the information is that is required to be passed on. For example, although the SDSs, which are obligatory to be attached to the risky substances under both REACH and the BPR and include amongst others information on proper waste management, it is not certain that these SDSs actually reach the recovery operators. Generally speaking, particularly the information on proper waste management specific to the product at issue is based on assumptions and a lot can happen during its use. For example, there could be changing techniques and a changing perception and determination of risk. Therefore, whether the supplied information is really accurate is questionable.

Regarding the delivery of evidence of what is claimed by the suppliers to the product manufacturer (i.e. in the CE benchmarks for sustainably sourced wood, chemicals or recycled content derived from post-consumer wood waste), the EFD provides for less guidance than for the supply of information down the chain. One could draw inspiration from the other laws examined in the case study to further develop this matter under the Ecodesign framework. In practice, it generally means that the paper trail comes from voluntary instruments, which are often developed, coordinated, revisited and interpreted by private entities, with or without legal mandate and operating in the EU only or also outside its territory. Besides in-house information, operators are allowed to use standards, labels and certifications to demonstrate compliance with specific requirements laid down in these laws. For example, SFM certificates are commonly used to proof the sustainable origin of the virgin and recycled wood used in the manufacturing process. Moreover, these instruments can also be found *within* other instruments. For example, an EU Ecolabel should satisfy the criteria laid down in a harmonized standard for environmental labelling and many environmental certifications are based on different standards, such as on ISO 9000 and/or ISO 4000 or EMAS management system. These interconnected ways of ensuring a paper trail would probably play a key role for many CE benchmarks.

As a matter of fact, like many other product legislation based on the internal market, such as the CPR, the Ecodesign framework already relies heavily on in principle voluntary harmonized European product standards.[938] These standards proof compliance with certain requirements of the Implementing Measure.[939] So how do these standards relate to the coherence and consistency of law?[940] Harmonization and standardization are highly interconnected. The practice of using harmonized standards provides for a certain degree of flexibility.[941] A significant aspect in the light of regulatory coherence and consistency is that more EU laws can be created and that, therefore, the gap between EU harmonization and the *volume* of different national technical

[938] These harmonized European product standards are made by external private bodies, namely the three 'European Standardization Organizations (i.e. CEN, CENELEC and ETSI: European Committee for Standardization, the European Committee for Electrotechnical Standardization and the European Telecommunications Standards Institute, respectively).

[939] Before a product can be placed on the market, a CE marking must be affixed to the product and a Declaration of Conformity must be issued. Products bearing the CE marking should be regarded as conforming to the provisions of the applicable Implementing Measure. See Articles 5(1), 6(1)-(2) and 9(1) EFD. These CE markings are therefore *de facto* not voluntary anymore under the Ecodesign system. See Chapter 6.4.3 for a discussion on this issue, i.e. on the legal framing of harmonized European standards.

[940] See for an extensive discussion on harmonized European standardization Chapter 6.4. In general terms, the European Standardization Organizations have a mandate from the European Commission to draw up the technical specifications which satisfy essential requirements (European Commission, *Standardisation mandate to CEN, CENELEC and ETSI under Directive 2009/125/EC relating to harmonised standards in the field of Ecodesign*, 27 July 2011, M/495 EN). Once products are in compliance with these requirements and a CE marking is affixed to it, they can move freely throughout the Union without any verification because they are presumed to be consistent with the essential requirements of the relevant EU measure.

[941] This means that the formal laws only need to contain the essential requirement, and requiring less details means less time and resistance in decision-making.

legislation is reduced.[942] In line with this, the involvement of private parties in EU governance has the advantage of establishing 'shared' standards for a particular sector, material or product, which are applicable throughout the EU. After all, the goal of these standardization bodies is to create common technical standards that could be used in a variety of situations *and laws* – not only in an Ecodesign Implementing Measure.

European standardization is a representative example of the phenomenon of private-party rule-making, which delivers information on the technical quality of a product. This way of 'rule-making' is encouraged under the BRP where the Commission states that the use of regulatory and non- regulatory means should be taken into consideration when searching for the best policy solutions.[943] As already indicated above, the use of certificates and labels as a legal way to proof what is claimed (alone or jointly with other means) shows parallels with the use of harmonized European standards: because they are used in more Member States, the 'sustainability criteria' set in these instruments are transboundary as well. This creates common ground for a variety of EU legislation as well as national legislation for wooden products.[944]

To sum up, the coherence and consistency of the whole regulatory framework for wooden products is only partly safeguarded considering the gathering and supply of information. On the one hand, receiving information is already in a quite advanced stage, as there are several instruments that could be used and are actually already being used, such voluntary SFM certificates and legally obliged mechanisms under the BPR and REACH. The coherence and consistency is encouraged by the use of the same instruments, because they can 'transcend' specific legislation and can address a whole range of different products. On the other hand, despite the use of the same instruments as touched upon above, it remains a challenge to pass on accurate information to the product stage and waste stage in the product's life-cycle. Following the example of the other measures analyzed, the EFD can only require communicating a lot of information on product durability, waste prevention and waste management downstream (which it already does), because the framework has no real power anymore when the product has been put on the market. In accordance with the Ecolabel framework, however, it could require the manufacturer to put the certain useful and if appropriate changing information on its website for a certain period of time. The use of harmonized standards is nonetheless an often used means to at least assure that the products put on the market are of a certain quality level, in the case of the EFD (some of the) the requirements laid down in the Implementing Measure issue.

C. Adherence to old and new categories

A recurring additional feature is the correct use of existing categories for certain legal concepts. In the course of the case study, several suggestions have also been made to change EFD and/or other measures in the EU regulatory framework for wooden products that would introduce new categories of certain concepts. Whether the use of categories of either type are hindering or stimulating the coherence and consistency of the regulatory framework, largely depends on the clarity of the categories' meaning and demarcation. Section A is therefore integrally related to this section.

'Recovery' is a case in point where using the proper WFD definition was unclear or even lacking in many analyzed legal acts and frameworks. There are three categories that fall within the broader meaning of recovery according to the WFD, but this is not always followed. Moreover, the order of the recovery categories pursuant to the waste hierarchy is often not adhered to or recognized. Most measures primarily focus on recycling, even though this is not always the best recovery option in the case of wood. Another recurring mistake is to use 'reuse' in cases where

[942] P. Craig and G. de Búrca, *EU Law, Text, Cases, and Materials* (Oxford University Press, 6 edn, 2015), p. 625.
[943] European Commission, *Better regulation for better results - An EU agenda*, COM(2015) 215, p. 6.
[944] A big difference between harmonized European standards and the labels and certifications is, of course, that market entrance is not guaranteed when using the latter two. For this reason, they cannot be forced upon manufactures to be used; using alternatives should always be an option.

actually only ‘preparing for reuse’ is mentioned, because the latter term is a recovery category and can therefore only be used when the action it at issue deals with waste, whereas the first describes an action dealing with non-waste and may therefore be used in provisions relating to product durability. These issues create an incoherent and inconsistent regulatory framework, so it is advisable to refer directly to the WFD and to use the recovery categories accordingly.

Building on the meaning of one of the recovery categories, it was argued in the section on the CE benchmark for recycled content to introduce two categories of recycled content in the Ecodesign framework and beyond: one composed of recycled materials originating from pre-user waste and the other one composed of recycled materials from post-user waste. The categories are delineated based on waste source. Preference should be given to a recycled content from post-user waste because that is hardest to achieve. The coherence and consistency would be safeguarded if these categories are inserted in the WFD as subcategories for recycling. A potential barrier to the introduction of the categories in view of coherence and consistency would be the supply of information about the origin of the wastes. The definitions of the categories would somehow need to address this issue in one uniform way if they are to be applied in the regulatory framework. One way to do this is to require reliable certificates or labels, which comply with certain harmonized standards. The study shows that this method is already widely used to proof what is claimed, for example when it is claimed that a certain share of a product’s content is from recycled wood.

A final example of suggestions made in the case study to further clarify and introduce categories is the use of ‘quantitative waste prevention’ and ‘qualitative waste prevention’ in the Ecodesign framework, in the WFD and maybe in other legislation as well. This was proposed in the section about the CE benchmark for waste prevention. In this case, the WFD already hints towards this division of the overall concept of waste prevention, but it does so rather vaguely and without giving priority to qualitative waste prevention, as is recommended. It is even recommended to change the WFD in a way that a difference is made between ‘waste precaution and qualitative waste prevention’ and ‘quantitative waste prevention’. In that case, too, if the WFD will be changed the EFD cannot escape from adjusting as well to maximize the coherence and consistency between the two key frameworks.

In sum, the existence and introduction of categories for certain concepts can only be coherent and consistent with the rest of the regulatory framework if the entire framework adjusts as well, or at least the framework law that contains the definition or description of the broader concept at issue. Because all categories considered in the case study are waste-related, this would be the WFD. The use of unequivocal WFD terminology is thus a precondition for using the categories in a way that does not obstruct the coherence and consistency of the regulatory framework. Proof and information (Section B) could also be a key element to the success of the use of categories.

D. Justification and guidance by environmental principles

Besides traditional legal rules in a legal regime, also paralegal rules are significant for coherence and consistency. A case in point is the use of environmental legal principles.[945] The case study shows several of the CE benchmarks are (partly) justified and/or guided by these principles. The environmental principles discussed are the preventive principle (CE benchmark for waste prevention and therefore also significant for the CE benchmark for product durability) and the precautionary and the substitution principles (CE benchmark for chemicals and therefore also significant for the CE benchmark for recycled content). Clearly, they are common denominators in the EU regulatory framework for wooden products. Therefore, referring to and applying these principles in an Ecodesign Implementing Measure would encourage Ecodesign framework’s coherence and consistency with the rest of the framework. In fact, it can even be argued that the EFD *in itself* is a reflection of the preventive principle and the substitution principle.

[945] D. Fisher, *Legal Reasoning in Environmental Law. A study of Structure, Form and Language* (Edward Elgar Publishing Limited, 2013), p. 42.

The preventive principle is directly reflected in the EFD because the framework prevents products from entering the internal market if they do not comply with the ecodesign requirements in a relevant Implementing Measure. The idea is that these non-compliant products are considered not environmentally-friendly enough. In fact, this observation is already pointed out in Recital (5) EFD, where is it said that the *'ecodesign of products is a crucial factor in the … strategy on Integrated Product Policy. As a preventive approach, designed to optimise the environmental performance of products, while maintaining their functional qualities, it provides genuine new opportunities for manufacturers, consumers and society as a whole.*' The precautionary principle is only indirectly applicable to the Ecodesign framework through the BPR and REACH and through the WFD (if it will be adapted to include a new interpretation of waste prevention). The precautionary principle is not directly applicable to the EFD, because only wooden products of which it is known they will cause too much environmental impact would not be addressed by an Implementing Measure in the first place (based on the currently applicable Article 15 EFD) and be allowed to be placed on the market.

In addition, another environmental principle formally acknowledged in Article 192(2) TFEU that could be linked to the EFD, is the rectification at source principle, which was introduced in the Treaty in 1987. The source principle works in tandem with the preventive principle, because both principles are based on the idea that prevention (at source) is better than cure. When aiming for the full rectification of environmental damage, one cannot deny that this is a somewhat idealistic objective.[946] The principle's aim is therefore not to abolish all activities or products that impact the environment or to give absolute priority to non-damaging activities or products. End-of-pipe solutions, i.e. controlling the impacts, could still have value in many situations. Moreover, Member States generally have wide discretion to flesh out the word 'rectification' (regarding e.g. time frame, and choice and content of measures). In general, EU legislation should preferably be based on emission limit values rather than quality standards, when taking into account the rectification at source principle.[947] However, practice shows that, at least in the case of water and air pollution, the EU increasingly opts for quality standards.[948] The principle does therefore not oblige measures to be mainly based on emission limit values.

Even though the EU has never unambiguously applied the rectification at source principle to product legislation,[949] let alone to the EFD, an interpretation respectively would fit the EFD's objective for several reasons. It can be argued that the principle underscores the framework because a lot can be traced back to the design of a product. The fact that the EFD targets the design stage of a product indicates that the EU recognizes that product design generally causes environmental impacts in previous and later life-cycle stages.[950] Corresponding to the source principle, the aim of Circular Economy-friendly design is not to eliminate all these impacts or to give absolute priority to non-impacting products, because that would be unrealistic. Ecodesign is largely up to the industry and market demands on condition that the products comply with the relevant Implementing Measures at the time the products are going to be put on the market. As highlighted above, ecodesign could include ecodesign requirements on the quality of the product as quality benchmarks are increasingly being applied.

In addition to the preventive and the source principles, one could argue that the Ecodesign framework as a whole is shaped and justified by the substitution principle, because the products

[946] Krämer describes the principle as 'a castle of hope'. L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), p. 24.
[947] Ibid., p. 25. See also: J.H. Jans and H.H.B. Vedder, *European Environmental Law* (Europa Law Publishing, 3 edn, 2008), p. 22.
[948] Supra note 946, p 25.
[949] Ibid., p. 212.
[950] According to the Commission, more than 80% of the environmental impact of a product is determined at the design stage. See e.g.: the brochure of the Ecodesign, 'Ecodesign Your Future – How Ecodesign can help the environment by making products smarter' (*European Commission*, 2012), http://www.buildup.eu/en/practices/publications/ecodesign-your-future-how-ecodesign-can-help-environment-making-products (consulted on 3 December 2017).

that do not comply with the ecodesign requirements are not allowed to be put on the market, and are therefore replaced by other products that do comply. In other words, the Ecodesign framework aims at the substitution of the worst-performing ErPs on the market. According to some definitions,[951] however, the principle primarily relates to risk control and is therefore generally associated with chemicals legislation. The part on the CE benchmark for chemicals shows that the BPR and REACH are examples of chemicals legislation that reflect the principle (as a matter of fact, secondary legislation only sporadically directly refers to the principle). It is however argued that incentivizing the substitution of chemicals with less risky replacements has more advantages than merely diminishing the risks posed on the environment and human health, as it also targets other issues such as energy use, safety of the workplace, industrial innovation and competition.[952] A comprehensive search for alternatives may therefore generate valuable knowledge about future, more sustainable options for materials, technologies and manufacturing processes at large. This is an argument against interpreting the substitution principle as a purely 'chemical principle'. Instead, it can also be regarded as an 'ecodesign principle'. The CJEU already hints towards the direction that the substitution principle could also be applicable to substances and products.[953] In so doing, the substitution principle would address concerns on risks as well as on the quality and quantity of products, and would stimulate the quest for cross-cutting alternative solutions, if need be.

Despite this potential for the Ecodesign framework, as it would back up the idea of opening up the scope of the EFD to wooden products, the substitution principle has been largely ignored as one of the underlying principles in the EFD.[954] The CE Package does not in any case recognize recognition of the broader scope of the principle in the 2015 CE Package, whatsoever.[955] Still, the European Commission took note of the opportunity to substitute certain (hazardous *and* difficult to recycle) materials in product design in the 2014 CE Package.[956] This line of reasoning corresponds to the yardsticks put forward in the IPP, because, according to some, IPP should really be based on the substitution principle.[957] If, as recommended, the substitution principle is not only applicable to chemical legislation but also to the Ecodesign framework, one could argue that the principle can also justify the preference of recycled wood over virgin wood and, subsequently, the preference of virgin wood coming from sustainably managed forests over virgin wood coming from forests which are not sustainably managed in an Ecodesign Implementing

[951] For example, the principle can be described as follows: '*dangerous substances should not be used in products where substances are available that are less dangerous for humans or the environment*.' L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), p. 210. The 7th EAP also only makes reference to the substitution principle in the context of chemicals.

[952] F. Fleurke and H. Somsen, 'Precautionary regulation of chemical risk: How REACH confronts the regulatory challenges of scale, uncertainty, complexity and innovation' (*Common Market Law Review*, 48, 2011), p. 388.

[953] The CJEU followed the Advocate General Mischo's Opinion in the 2001 *Toolex* Case in this. See for the judgement: Judgement of 11 July 2000, *Kemikalieinspektionen and Toolex Alpha AB*, C-473/98, EU:C:2000:379 (*Toolex* Case), e.g. para. 47. And see for the Opinion: Opinion Advocate General Mischo on 21 March 2000, *Kemikalieinspektionen and Toolex Alpha AB*, C-473/98, EU:C:2000:147, e.g. paras. 81-82. Krämer described the CJEU's suggestion as a '*strong sympathy for the substitution principle in environmental law.'* L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), pp. 209-2010.

[954] It has neither been mentioned as one of the guiding principles in the policies laying the foundation for (the previous changes to) the EFD, i.e. the IPP and the SCP Action Plan. One can only speculate on the reasons why the Commission did not take that leverage into account and seize the opportunity by putting extra emphasis on the principle in those policies. Remarkably, neither did they mention the precautionary and preventive principles nor any other environmental principle put forward in Article 192 TFEU.

[955] In the CE Package, the substitution principle is only associated with chemicals and the other environmental principles are not expressly referred to either.

[956] 2014 CE Communication, p. 4.

[957] L. Krämer, 'EU Environmental Law' (*Sweet & Maxwell*, 7th edn, 2012), p. 210. Other principles were also mentioned in this regard, i.e. the precautionary principle, the principle of producer responsibility and the minimization principle. However, it should be noted that the European Commission did not dare to explicitly refer to the substitution principle as a legal principle in the 2014 CE Package. Neither did the Commission explicitly refer to any of the legal principles in Article 192 TFEU.

Measure targeting a particular wooden product group. In this respect, the substitution principle could further shape the CE benchmarks for sustainably sourced wood and recycled content, which means that substitution seems particularly important for the choice of material in products.

To conclude, there are several environmental principles that would explicitly as well as implicitly guide and justify certain ecodesign requirements, such as the preventive principle. The substitution and the source principles would also justify the EFD as a whole. To refer to and apply these principles contributes to the coherence and consistency of the Ecodesign framework with the rest of the legal field for wooden products, because it would provide for common foundations.

E. Life-cycle thinking as an underlying concept

This section is different than the previous sections in that it does not address an additional feature identified in the case study, thus resulting in the lack of reference to this section in *Chart 1*, but rather discusses an underlying approach of the Ecodesign framework and – as it turns out – also of the regulatory frameworks discussed: the impact of life-cycle thinking on the coherence and consistency of the EU regulatory framework for wooden products.

Life-cycle thinking is central to the CE benchmarks and the additional features. A fundamental matter is that the EFD does not prevent Implementing Measures from addressing other life-cycle stages than the use stage of a targeted product, as was falsely suggested by the European Commission in the CE Package. On the contrary: the EFD provides for a legal basis to act on *all* the CE benchmarks, both on the characteristics of the targeted product group and on the gathering and supply of information about the products. It thus introduces a full life-cycle approach in product design, as had already been made clear right from the outset of the Directive.[958] Based on the crucial role life-cycle thinking plays in the Circular Economy and the assumption that the majority of environmental impacts can be addressed in the design stage of a product, the Ecodesign framework seems to be a suitable platform to regulate the whole life-cycle of wooden products. Yet, it is noteworthy this respect that the further one gets to the resource stage, the more benchmarks there are and the more specific the regulator can get. This observation could indicate that it is easier to regulate what goes in a product ('which materials are used') than what happens next. As indicated in the discussion on some of the features, this can be explained by the great difficulty to regulate what happens after the putting on the market of the product.

Next to the Ecodesign framework, life-cycle thinking has also started to appear in other legislation since the concept's introduction in EU policy.[959] For example, the framework for EU GPP criteria and the Ecolabels framework cover all CE benchmarks, and the CPR covers all as well except one. The chemical laws discussed (BPR, REACH and CLP) cover in essence also all benchmarks except one, but their role gradually diminishes along the cycle. In any event, the product and waste stages should be taken into account when risk assessments are carried out and risk information is passed on along the chain, theoretically all the way to the waste stage (insofar it would actually reach this stage). For the WFD it is a different story: even though the scope of the Directive is in principle the waste stage, there are concepts and instruments, such as the waste prevention programmes and the EPR, that address the stages prior to the waste stage. In this sense, the EUTR and the PWD are the only measures that focus on one particular (aspect of a) CE benchmark. The fact remains, nevertheless, that most measures discussed in the case study adopt a life-cycle approach. One the one hand, this could foster the coherence and consistency of the EU regulatory framework for wooden products, so including the envisaged Ecodesign framework, because life-cycle thinking is a shared underlying concept, with a similar effect as the environmental principles discussed in Section D. On the other hand, this could potentially raise conflicts within the regulatory framework, because the same stages and CE benchmarks are regulated by different means under different laws.

Regarding the first claim, life-cycle thinking could next to being an underlying principle, which is valuable in itself, for example encourage the coherence and consistency of the EU

[958] Recital (13) and Article 15(4)(a) EFD.
[959] See Chapter 2.2.3-B.II.

regulatory framework when instruments reflecting life-cycle thinking are used in two or more legal acts. Instruments such as certificates and harmonized European standards are already used in different legal acts and frameworks such as the EUTR, the EU GPP framework, the Ecolabel framework, the CPR and the EFD. The use of a specific instrument on one framework can therefore overlap with the use of the same instrument in another framework. Some of the suggestions made in the case study for changing the law are in line with this reasoning as well.

An example that has *not* been addressed so far, however, is the introduction of product passports and an online product registration data base. These instruments look promising for stimulating regulatory coherence and consistency, and for addressing certain other challenges which were highlighted in the case study. This is also most certainly in the interest of the Ecodesign framework. The idea of making a passport for products that are put on the EU market had already been launched under the EU Research-Efficiency policy by the European Resource Efficiency Platform, and has been endorsed several times by the EP.[960] The basic idea is to document the 'identity' of a product in the same way a personal biometric passport contains crucial information. It is a tool to provide clear, easily accessible and publicly available, business-to-business, business-to-user, business-to-market surveillance authority and in many other ways pooled information about all the Circular Economy benchmarks highlighted in this case study (on condition that it does not violate the intellectual property rights of the companies). In other words, it creates the possibility to zoom in on the material full life-cycle, on issues such as: sustainable sourcing such as provided by forestry certifications; risk control measures; the percentage and origin of the recycled wood; how to disassemble the product or how to repair or replace the parts that are most likely to age faster than the rest of the product; and best available recycling techniques. The instruments not only combine the variety of Circular Economy benchmarks and additional features, but also navigate through different legal acts and their instruments. For example, the EU GPP framework and the sets of EU Ecolabel criteria could rely on the passports and data base by highlighting key information on the product characteristics contained in the tools. Other examples of interdependency are the potential for the SDSs, which are required in certain cases by the BPR and REACH, and the DoPs, which are required under the CPR, could be merged into the passport. Other instruments which could still be mentioned and incorporated in the passports and in the data base are, for example, (forestry, recycled wood…) certifications and harmonized standards if they apply to the particular product. All in all, the introduction of product passports and an online product data base, which are based on a life-cycle approach and could be used by actors in whatever life-cycle stage and in whatever legal frameworks they are operating, seems to enhance the coherence and consistency.

Regarding the possible *obstruction* of the coherence and consistency of the EU regulatory framework for wooden products, an example would be the risk of double counting of (possible) environmental impacts in the any of the legal acts and frameworks discussed. This risk is all the greater precisely *because* there are so many laws that adopt a life-cycle approach. Where some environmental impacts have therefore already been targeted by one measure in one particular

[960] See for one of the most recent policy documents: European Commission, *European Resource Efficiency Platform (EREP), Manifesto & Policy Recommendation*, 2014, p. 7. The Platform is a high-level group set up to guide European policymakers on resource efficiency, but has not been actively developed since then. The EP has further signposted the introduction of product passports as one of the potential remedies for the lack of information about the presence of substances of concern in products in 2017. See: European Parliament, *Briefing of October 2017: Chemicals and the circular economy – Dealing with substances of concern*, PE 608.725, p. 7, http://www.europarl.europa.eu/RegData/etudes/BRIE/2017/608725/EPRS_BRI(2017)608725_EN.pdf (consulted on 29 January 2018). Perhaps most significantly in the context of the EFD, the EP already urged the Commission to incorporate a mandatory product passport based on resource-efficiency requirements if it would review the Ecodesign framework and other relevant product legislation. Recital 24 European Parliament, *Resolution of 9 July 2015 on resource efficiency: moving towards a circular economy*, 2014/2208(INI), http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+TA+P8-TA-2015-0266+0+DOC+PDF+V0//EN (consulted on 29 January 2018). So far, both the Council and the Commission have not formally expressed their opinion in the matter.

point in the material life-cycle, it could be that it is superfluous to address the same impacts at another spot in the life-cycle in another measure. In fact, it is argued that the double counting of uncertain risks runs counter to the precautionary principle. If one translations this challenge to the Ecodesign framework: as the discussion on the CE benchmark for chemicals has proven, the chemical rules, such as the ones in the BPR, already reflect the precautionary when the substances are put on the EU market, so this is an argument not to address the same uncertain risks again in an ecodesign requirement on chemical use or on, for example, the recoverability of the targeted products. A final, more broadly applicable example of a challenge for creating a coherence and consistent regulatory framework related to life-cycle thinking, is that there are many ways to give substance to life-cycle thinking. Next to the different possibilities for the substance of a measure, this is actually a real, practical challenge, too. The techniques to provide for life-cycle data are not consistent, because there is no 'right' method: LCAs are only one way to come up with information, as also other comparable means are allowed.[961] None of the laws discussed in this case study prescribe one particular technique.

So far, I have only discussed the external coherence and consistency of the EU regulatory framework for wooden products. A final comment can be made about the internal coherence and consistency of the imagined Ecodesign Implementing Measures. For the internal connection between the CE benchmarks, too, life-cycle thinking can act as a bridge as well as a divider. On the positive side, for example, the inventory of the laws has proven that while originally product durability and waste prevention derived from two different policy perspectives (i.e. product and waste), they are actually completely intertwined and should be dealt with accordingly. The CE benchmarks for chemicals and for product recoverability/waste prevention are connected as well in the sense that the very purpose of using wood preservatives is to extent the product's life-time. In addition, regulating the recycled content relies on the recyclability of wood waste, as you would have thought. There are also occasions where two or more CE benchmarks are contradicting each other. For example, the case study highlights the challenge of situations where new scientific evidence shows that the use of a particular chemical substance in wood preservatives might be more risky than previously considered and should accordingly be substituted pursuant to the ecodesign requirements on chemical use and on waste prevention. However, the wood preservatives have obviously been used on the products to prolong their life-span, which would have been stimulated by an ecodesign requirement on product durability. In these situations, there are three CE benchmarks contradicting each other. Evidently, this challenge does not only relate to the CE benchmarks as set out in the case study: it is less well-delineated than that, because different environmental impacts occur all along the material life-cycle and are most certainly not restricted to the presented CE benchmarks.

To conclude, life-cycle thinking is used throughout the entire EU regulatory framework for wooden products and already plays a major role in the Ecodesign framework. Since there are no clear guidelines for the application of life-cycle thinking in each specific law, let along in the entire regulatory framework, one could conclude that the complexity of life-cycle thinking as an integrated approach to address material use on a case-by-case basis is a challenge as well as an opportunity in view of regulatory coherence and consistency, both externally and internally.

---

[961] This is also confirmed by the Commission in its policy documents concerning the BRP, in: European Commission, *Better Regulation "Toolbox"*, pp. 398-399, which is a guidance document that complements the Better Regulation Guidelines SWD(2015) 111. Here, the Commission states that '[i]*mpacts should be considered far as possible in a holistic*[, systematic] *and integrated manner. This is fundamental to avoid shifting burdens between impacts. … when impacts are associated with production processes and/or to consumption, there is the need to avoid shifting the burden from one part of the product life cycle to another (e.g. from production to consumption).'* (emphasis added). Despite focusing on the LCA technique, it does not make it a mandatory tool or fixes a standard LCA design. It refers however to the European Platform on Life Cycle Assessment, which is an online tool of the JRC to provide for guidance, see http://eplca.jrc.ec.europa.eu/ (consulted on 4 December 2017).

5.6 Conclusions

5.6.1 Conclusion of the case study

The European Commission repeatedly states that more than 80% of the environmental impact of a product is determined at the design stage. Ecodesign is therefore of vital importance in a Circular Economy. The extension of the scope of the EFD in combination with the greater emphasis on material-related issues throughout the entire life-cycle of a product, which are the underlying rationales of the case study, can be legally based on the Directive itself.

The first reason is because there is already quite an extensive suitable set of rules in place under the EFD. Annex I EFD provides for many opportunities to adopt Implementing Measures addressing the CE benchmarks in ecodesign requirements. These CE benchmarks are material-related issues, covering the entire material life-cycle. Apparently, the assumption that more attention should be paid to material-related aspects, which is made in the CE Package, is based on practice rather than on legal reasons. The legal opportunity to address the CE benchmarks has just not been seized as initially expected. Moreover, neither can the assumption be confirmed that the use stage of a product is predominantly addressed in Implementing Measures, because there is a legal basis for all CE benchmarks. The second reason is because there are no legal obstacles in the EFD to replace 'energy-related products' with 'products' in Article 1 EFD, on condition that it is clearly defined which product groups are excluded from the scope. Evidently, if the scope of the EFD is broadened to all products, wooden product groups can in principle also be addressed through the Ecodesign framework.

Despite these confirmatory conclusions, drawing final conclusions on this would be too general to make it work. There are several issues that would otherwise be left untouched. These issues are highlighted below.

First, whether the European Commission would actually prepare Implementing Measures laying down ecodesign requirements for wooden products is questionable, because for many products the conditions listed in Article 15(2) EFD seem quite difficult to meet. Article 15(5) EFD, which establishes conditions on the content of the Implementing Measures that are in preparation, also leaves much to be desired, above all by its unclear wording. These issues may need to be addressed before wooden products and potentially other non-ErPs can be successfully regulated through the Ecodesign framework.

Second, if the Commission wishes to prepare an Implementing Measure for wooden products, it should look beyond the rules that are provided in Annex I and Article 15 EFD, because they do not provide for much guidance on the next steps to be taken. This is where the CE benchmarks come in: several additional features for each of the six CE benchmark were identified in the case study. These features should also be considered if the scope of the EFD is enlarged. (The study did not however provide for detailed ecodesign requirements, because that largely depends on the particular product group, which falls outside the scope of this case study).

Drawing inspiration from the EU legal acts and frameworks other than the EFD, the survey of the EU regulatory framework for wooden products shows that while all of the measures somehow regulate the CE benchmarks, most of them deal with the additional features differently. Sometimes they address the entire material life-cycle, whereas in other cases only specific life-cycle stages are (partly) targeted. There is also a variety of instruments used, which moreover imposes different obligations on a changing number of actors, including the industry, the Member States and the European Commission. For one thing, the mapping exercise demonstrates that the overall framework is fragmented. This situation bears the risk of regulatory incoherence and inconsistency. For obvious legal reasons, the contrary is aimed for: a coherent and consistent regulatory framework.

The case study shows that most of the additional features or elements thereof actually enhance the coherence and consistency. This is another reason why they should be taken into account when preparing or adjusting Ecodesign Implementing Measures. One of the valuable features/elements is the use of the same and correct terminology, preferably laid down in

horizontal (framework) laws. Commonly, this concerns the terminology laid down in the WFD. Furthermore, the use of proper terminology is a precondition for yet another additional feature identified: the use of existing categories of concepts and the introduction of new categories. They can only be coherent and consistent with the overall regulatory framework for wooden products if the categories are properly defined and delineated in appropriate framework laws. Again, in the case of the categories suggested in the case study this would particularly be applicable to the WFD. Another feature/element is the use of information along the life-cycle of the product to track down and proof what is claimed, amongst others through the instruments of other EU legal acts (such as the risk management instruments under the BPR and REACH) or through instruments such as harmonized European standards, labels or certificates (such as SFM-certificates). The existence and use of environmental principles is another matter to take into account. Examples are the preventive and precautionary principles and the substitution principle. In line with this, the existence and use of life-cycle thinking is another matter to consider. Not only because it lies at the heart of the Circular Economy concept, life-cycle thinking is also an approach that has already shaped most of the measures analyzed.

In sum, the broadening of the scope of the EFD and the greater emphasis on material-related throughout the entire life-cycle of a product can be legally founded. However, there are several additional features that should be considered as well. Some of them require changes to the existing legal acts or frameworks. Additionally, continued efforts are required to monitor the coherence and consistency of the Ecodesign framework with the overall regulatory framework for wooden products. It is furthermore recommended to launch a similar study for a different material stream to see if the same results are obtained so as to use the additional features as yardsticks in the Ecodesign framework in the future, and possibly to add them to Article 15 EFD. In that respect, the case study fulfils an explorative function.

5.6.2 Overview of recommendations

This final section is to reflect upon the conclusion of the case study. Most of the plans contained in the CE Package that are relevant to Chapter 5 have already been explained in the case study, scattered throughout the text.[962] This section provides for a recap of those plans (including what the European Commission does *not* suggest) and, if any, the subsequent developments concerning the Commission's policy that have been taking place after the adoption of the CE Package in 2015.[963] There are several recommendations for further actions or research enclosed as well to improve the CE Package or any subsequent policy documents. The recommendations are a useful contribution to the work of the European Commission, as they generally complement the existing policy framework for the Circular Economy.

As a preliminary observation I would like to stress that since the case study took so many legal acts and frameworks into account other than the EFD and since it considered the coherence and consistency of the EU regulatory framework for wooden products, the scope of the EU plans and the recommendations put forward below is wide-ranging as well. Consequently, some of the recommendations may only address the potential of the EFD, while others also suggest changes to other legislation or even have a more general nature.

<u>Extension of scope and emphasis on material-related aspects throughout the life-cycle</u>

- **CE Package:** the CE Package announces that aspects of the Circular Economy are more emphasized in future ecodesign requirements under the Ecodesign framework as from 2016. It also emphasizes the work done in the context of the Ecodesign Working Plan 2015-2017 in that regard (which was rescheduled and renamed, see below) and announces the request to the ESOs to develop generic standards on material-efficiency for setting future ecodesign requirements on the durability, reparability and recyclability of products.

[962] See also: Chapters 1.2, 3.1.1 and 4.3.2.
[963] This includes the Ecodesign Working Plan 2016-2019

The Commission neither comments on any scope extension, nor on any possible changes to the wording of the EFD.

- **Ecodesign Working Plan 2016-2019:**[964] Echoing the CE Package, the Commission stresses that there is an increasing need and political priority to improve the material-related aspects in product design, all throughout the life-cycle of a product. To begin with in the context of electronic displays,[965] but many more new priority products are mentioned. The Commission recognizes that the EFD already covers legal bases to address the material-related aspects (i.e. the CE bechmarks in the case study), but that the focus has so far been on energy issues. Their use will be investigated in future Implementing Measures and in any revisions. To streamline this development, the Commission will develop a 'Circular Economy toolbox', which may provide for concrete examples of how the material-related aspects could be taken up in the Implementing Measures. In view of that, the Working Plan 2016-2019 also highlights that the methodological basis for a more systematic adoption of such requirements needs to be improved, and that, to this end, a standardization request to the European Standardization Organizations has been adopted. The Commission does not comment on the possibility to extend the scope of the EFD or on any other changes to the EFD.
- **Recommendations:** The scope extension of the EFD and more emphasis on material-related aspects of the entire material life-cycle are first and foremost political decisions. Based on the case study, it can be confirmed that any extension in scope would in principle be possible and that the EFD already provides legal bases to emphasize the 'new' aspects (i.e. the CE benchmarks in the case study). However, certain issues must be considered as well. First, clearly define the scope of the EFD if it will indeed be enlarged. In that respect, Article 2(1) EFD should be changed. Second, have a close look at the (generally arbitrary) conditions laid down in Article 15 EFD. More interpretational guidance would be appropriate. It is recommended to interpret them along the lines of the Circular Economy ideology, because, if not, they seem quite difficult to meet by many non-ErPs (as well as ErPs). In particular, the generally quantifiable economic-inspired conditions under Article 15(2) EFD ought to be interpreted in a flexible manner. Consider revision if this would not be sufficient. Third, take the additional features into account when developing ecodesign requirements on corresponding CE benchmarks (the features are identified in the case study. For some of them specific recommendations were proposed – these are put forward below). The Commission could publish a Commission Staff Working Document to address the additional features or even consider adding them to Article 15 EFD. The guidance document could include certain options to support the potential ecodesign requirement, such as on the use of standards, certification, declarations of performance, or when it is best left to other legal frameworks, such as the BPR, REACH or the WFD.[966]

<u>Sustainably sourced wood</u>

- **CE Package:** The Commission highlights that it will promote the sustainable sourcing of raw materials globally. However, the CE Package does not refer to the EUTR whatsoever. In addition, it underlines the opportunities of using bio-based resourced for the Circular Economy, amongst others linked to their renewability. On the other hand, it also stresses that attention is required to their life-cycle environmental impacts and sustainable sourcing. The Commission states it will examine the contribution of its existing

[964] European Commission, *Ecodesign Working Plan 2016-2019*, COM(2016) 773.
[965] See also: European Commission, *Report on the implementation of the Circular Economy Action Plan*, COM(2017) 33, pp. 5-6, where the Commission highlights its first achievements regarding the goals set in the Ecodesign Working Plan 2016-2019.
[966] See for the location and the broader context of the recommendations: Chapters 5.1, 5.5.3-A and 5.6.1.

Bioeconomy Strategy[967] to the circular economy and consider updating in 2016 (the final decision on any revision will be in 2018).[968] From a broader perspective, it also announces tit will further develop the recently launched Raw Materials Information System[969] and support EU-wide research on raw materials flows.

- **Recommendations:** Consider enlarging the scope of the EUTR, as this would make any possible efforts in the Ecodesign framework and in other measures redundant. Even so, considering that this would take a lot of political determination, it is still recommended to address sustainable wood sourcing in the Ecodesign framework, as a preliminary step. The proof of SFM-sourced wood can be done by existing forestry certificates, but additionally requires them to include new tracking technologies.[970]

Chemicals

- **CE Package:** The CE Package does not address the use of chemicals in the content of the EFD, let alone their use in/on wooden products.
- **Recommendations:** Leave regulating the CE benchmark for chemicals used on/in wooden products to the BPR and REACH. This does not mean, however, that the imagined Ecodesign Implementing Measures for wooden products should not refer to the rules laid down in EU chemicals legislation and highlight the significant role the precautionary and substitution principles play in these laws and, therefore, also in the Ecodesign framework.[971]

Recycled wood content

- **CE Package:** The Commission underscores the opportunity to create a dynamic market for recycled materials through the demand side in the private sector. In this respect, it refers to the work done by the sector regarding recycled content and that this market-driven way should be encouraged besides through GPP. In this context, the Commission would launch work (from 2016 onwards) to develop quality standards for recycled materials where they are needed, and is proposing improvements to the EoW rules. Wood is not mentioned in that regard. It also highlights the work done of Eurostat on developing indicators for areas such as the use of recycled materials in products. In cooperation with the EEA and in consultation with the Member States, the Commission will develop a monitoring framework for the Circular Economy, designed to measure progress on the basis of reliable data.
- **Ecodesign Working Plan 2016-2019:** The Commission does not comment on the use of sustainably extracted resources or chemicals. It does, however, mention the use of recycled materials in products. Note that the list of 'things to take into account' is not exhaustive.
- **Recommendations**: To be sure, clarify in the Annex to the EFD that addressing recycled content in an Implementing Measure is indeed one of the possibilities. In addition, review the terminology used in any ecodesign requirement on recycled content: it must be

[967] European Commission, *Innovating for Sustainable Growth: A Bioeconomy for Europe*, COM(2012) 60.
[968] See for the preliminary work: European Commission, *Communication on the Mid-Term Review on the implementation of the Digital Single Market Strategy - A Connected Digital Single Market for All*, SWD(2017) 155. See in particular: European Commission, Review of the 2012 European Bioeconomy Strategy, 2017, brochure: http://ec.europa.eu/research/bioeconomy/pdf/review_of_2012_eu_bes.pdf#view=fit&pagemode=none (consulted on 19 December 2017). This document defines how the Bioeconomy Strategy contributes to the Circular Economy.
[969] The Raw Materials Information System is an online repository of information on policies, activities and data related to the European non-energy related raw materials sector, which aims to tackle the pressure on valuable resources and their more efficient use to the benefit of EU's economies. See: http://rmis.jrc.ec.europa.eu/ (consulted on 19 December 2017).
[970] See for the location and the broader context of the recommendations: Chapter 5.2.1-D.
[971] See for the location and the broader context of the recommendations: Chapter 5.2.2-D.

compatible with the WFD terminology, most importantly with the definition of recycling. A simple reference to the WFD recycling definition in Article 2(15) EFD should be sufficient. Implementing Measures do not have to include a separate definition in that way. Monitoring whether the means that are used to proof recycled materials are used are also compatible with the WFD terminology (e.g. certifications). Finally, insert new categories for recycled wood: one derived from pre-user waste and one derived from post-user waste. This is also recommended to consider for the WFD. [972]

Product durability

- **CE Package:** The CE Package specifically mentions product durability (including repairability, upgradability, planned obsolescence and other durability aspects) in the context of the Ecodesign framework. The Commission states that it will analyze these issues on a product-by-product basis in new Working Plans and reviews. In addition, the Commission stresses the need to address the durability of components of buildings. It will therefore develop indicators to assess environmental performance throughout the life-cycle of a building (it does not indicate when this will be). The Commission also highlights the work done of Eurostat on developing indicators for areas such as the repair and reuse of products. In cooperation with the EEA, the Commission will develop a monitoring framework for the Circular Economy.
- **Ecodesign Working Plan 2016-2019:** The Commission mentions a long list of issues to take into account in product design that conern product durability: extension of product life-time; ability to reuse components; minimum life-time of products or critical components; reparability; availability of spare parts; availability of repair manuals; upgradability; design for disassembly; and ease of reuse. It refers to product durability separately. Note that the list of 'things to take into account' is not exhaustive.
- **Recommendations:** Require updates of product user information on the manufacturers' websites, as it could serve as a safety net whenever something changes for a particular product already put on the EU market. In addition, refer to the terminology used in the WFD. This would clarify the usage of the word 'reuse'.[973]

Waste prevention

- **CE Package:** The work currently done on the exchange of information and best practices is underscored by the Commission in the CE Package. It also highlights the work done of Eurostat on developing indicators for areas such as waste generation. In cooperation with the EEA, the Commission will develop a monitoring framework for the Circular Economy.
- **Ecodesign Working Plan 2016-2019:** The Commission does not explicitly refer to waste prevention.
- **Recommendations:** Insert a hierarchical order for qualitative waste prevention and quantitative waste prevention. Even though the WFD does not make a hierarchical difference between the two categories, which is by the way a matter of adjusting the waste hierarchy and is recommended as well, it does not mean an Ecodesign Implementing Measure cannot. On top of that, rename these two categories of waste prevention into 'waste precaution and qualitative waste prevention' and 'quantitative waste prevention', because the precautionary principle also lays at the foundation of waste 'prevention' measures considering the existence of unknown risks related to waste and waste treatment.

[972] See for the location and the broader context of the recommendations: Chapters 5.2.3-A, 5.2.3-D, 5.5.3-A and 5.5.3-D.
[973] See for the location and the broader context of the recommendations: Chapters 5.3.1-B (heading 'Meaning of durability aspects'), 5.3.1-C (heading 'Waste Framework Directive') and 5.3.1-D.

In addition, consider product durability and waste prevention as one policy field instead of two (i.e. one under product policy and the other under waste policy).[974]

Product recoverability

- **CE Package:** The CE Action Plan does not give much guidance on the recoverability of products through product design. It merely announces that the Commission will examine the possibility under the Ecodesign framework to address the recyclability of products and the identification of certain materials or substances. The Commission also highlights the work done of Eurostat on developing indicators for areas such as waste management. In that respect, the Commission will in cooperation with the EEA develop a monitoring framework for the Circular Economy.
- **Ecodesign Working Plan 2016-2019:** The Commission only mentions the recyclability and reusability of products in the Third Working Plan.
- **Recommendations:** Refer to the terminology used in the WFD, such as the meaning of energy recovery and the definitions of recovery, recycling and preparing for reuse. This simultaneously means that all recovery options should be considered – not only recycling. This is in line with the waste hierarchy.[975]

Coherence and consistency

- **CE Package:** In 2018, the Commission will examine the options and actions for a more coherent policy framework of the different strands of work of its product policy in their contribution to the Circular Economy.
- **Ecodesign Working Plan 2016-2019:** The Commission does not mention the execution of a legislation survey, which is particularly required if more emphasis will be put on material-related aspects in product design. The coherence and consistency of the EU regulatory framework for products is not referred to at all.
- **Recommendations:** Relaunch the initiative to introduce product passports and an online product data base. In addition, stick to the terminology used in other terminology. Evidently, this does not only apply to the EFD: it should be a general goal for the entire regulatory framework for wooden products. As already highlighted in other paragraphs above, there is particularly a lot of ambiguity with regard to the waste terminology, so it is recommended to use the WFD definitions and to simply refer to them. If new terminology is included in the Ecodesign framework, which is recommended several times particularly in cases where categories of existing concepts is concerned, it is recommended to define them in parallel with other legislation. In other words, introduce the same categories in other legal acts and frameworks as well. Finally, from a broader viewpoint it is also recommended to carry out similar case studies, because the research design for this case study is not exhaustive.[976]

Environmental principles

- **CE Package:** The Commission does not explicitly mention the application of any environmental principles to the EU regulatory regime for a Circular Economy, let alone specifically to the EFD. It does, however, refer to several goals that are based on a principle. Facilitating the substitution of chemicals and promoting waste prevention are examples.

[974] See for the location and the broader context of the recommendations: Chapters 5.3.2-C (heading 'Waste Framework Directive'), 5.3.2-D and 5.5.3-A, see also: Chapter 5.2.2-D.
[975] See for the location and the broader context of the recommendations: Chapters 5.4.1-C (heading 'Waste Framework Directive') and 5.4.1-D.
[976] See for the location and the broader context of the recommendations: Chapters 5.2.3-D, 5.3.1-D, 5.3.2-D, 5.4.1-D, 5.5.3-A, 5.5.3-E and 5.6.1.

- **Ecodesign Working Plan 2016-2019:** The Commission does not refer to any environmental principles.
- **Recommendations:** Recognize the role of environmental principles in the Ecodesign framework, because they are common denominators in the Circular Economy and, as the case study shows, in the EU regulatory framework for wooden products. Reference to them in the EFD would stimulate the coherence and consistency with the rest of the framework. Moreover, recognize the underlying role of the substitution principle in the EFD, as this would back up the idea of broadening the scope of the EFD to other products as well and could justify certain hierarchical choices that would be made in the Ecodesign framework (e.g. the preference of recycled wood over virgin wood, and the preference of sustainably sourced virgin wood over unsustainably sourced virgin wood). If, indeed, the substitution principle is not only applicable to chemical legislation but also to the Ecodesign framework, one could argue that the principle can also justify the and, subsequently, the preference of virgin wood coming from sustainably managed forests over virgin wood coming from forests not sustainably managed. In this respect, the substitution principle could further shape the CE benchmarks for sustainably sourced wood and recycled content, which means that substitution seems particularly important for the choice of material in products.[977]

[977] See for the location and the broader context of the recommendations: Chapter 5.5.3-D.

6. Waste Framework Directive: encouraging qualitative recycling

The Waste Framework Directive (WFD)[978] is the reference law for this Chapter. It includes a definition of waste, which, if the particular substance or object meets the definition, triggers the application of most of the Directive's provisions and most of the rest of the EU waste acquis. However, the waste definition means more than just indicating when a substance or object becomes waste. It also indicates when something is *not* waste, either in the case that it has never even become waste or in the case that it ceases to be waste. Needless to say, the waste definition plays a major role in the current legal regime for the Circular Economy. Exactly therein lies the challenge: it is still not always clear when a particular material is waste or not, and therefore which legal framework and their legal instruments apply. Whether something should be considered waste or not thus also impacts the application of the waste hierarchy.[979] The waste definition relates differently to each of these steps.[980]

Despite being third in the waste hierarchy, recycling is the focal point of this Chapter, because it is the first and main step aiming at reinjecting non-waste materials into the economy *after* these materials have turned into waste – a vital aspect of life-cycle thinking.[981] Having undergone a recycling operation is evidence of the non-waste status these materials can get, as will be explained later.[982]

Many Member States struggle with the circularity of materials in the economy. Generally speaking, the amount of waste being recycled in poor-performing Member States and the quality of recycled materials in well-performing Member States are two crucial challenges currently faced in the EU. Established mechanisms, which often originate in and rely on the waste definition and/or the waste hierarchy, have generally proven their value for quantitative recycling. It is the transposition and implementation of those mechanisms in the Member States that generally hamper a recycling increase. In the context of qualitative recycling, this step still has to be taken: the question there arises is how to encourage the quality of the recycled materials at EU level. Which instruments could contribute to quality improvement?

Against this background, I analyse the current rules under the WFD that could boost qualitative recycling. I will also explore the opportunities of harmonized European standardization

[978] Directive 2008/98 of 19 November 2008 on waste and repealing certain Directives, [2008] OJ L 312/3. See Annex II to this dissertation for the legislative proposal under the CE Package to change the WFD. Annex I can be consulted for the CE Action Plan.

[979] The waste hierarchy is a priority order for policy-makers and legislators on which to base their decisions. Each of the steps of the hierarchy plays a different role in the Circular Economy. The hierarchy reads as follows: a) prevention; b) preparing for reuse; c) recycling; d) other recovery, such as energy recovery; and, as a last resort, e) disposal. See Chapter 3.2 for the basic knowledge on the WFD, i.e. the Directive's objective, scope and main instruments, and its links to the CE Package. This section includes a graphic of the waste hierarchy for clarification, *Graphic 1*.

[980] For example, waste prevention measures can only be performed if a subject or object has not yet turned into waste. Another example is that a waste item changes its status from waste to product if it has undergone recycling.

[981] While these two examples are incredibly important to keep products as long as possible and in a good and non-polluting shape in the use stage of the life-cycle of a material, the first two steps of the hierarchy are only marginally addressed in this Chapter, namely only in cases where it serves the explanation of the hierarchy's third step, the recycling of waste. I have already addressed waste prevention and preparing for reuse above. Therefore, if waste prevention and preparing for reuse are touched upon again in this Chapter, it builds on what has already been said on these topics in Chapter 5, e.g. the meaning of the concepts and the differences and similarities with other concepts, in the light of the EFD. See in particular: Chapter 5.3.1-C (heading 'Waste Framework Directive') on product durability; and Chapter 5.3.2-B (heading 'Categories for waste prevention based on quantity and quality') and D (heading 'Discussion on the potential for the Ecodesign framework') on waste precaution and qualitative waste prevention and quantitative waste prevention.

[982] This also applies to prevention and preparing for reuse. Although the final two steps in the waste hierarchy are ranked lower than recycling (i.e. other recovery and disposal), they will be addressed whenever this helps to clarify the challenges related to waste recycling and deal with them.

in that respect. The exact motives and methodology for current Chapter have already been explained in Chapter 4.3.3. I will not extensively repeat them.

Based on the above, the first part of the case study explains the development of the waste definition, as this lays the foundation for the entire waste stage and the EU waste acquis. There are furthermore several aspects of the definition significant for the waste hierarchy, in particular with regard to recycling. The following parts address the waste hierarchy by zooming in on the regulatory opportunities for stimulating qualitative recycling at EU level. This is done by framing 'qualitative recycling', by discussing the legal instruments in the WFD and by exploring the use of harmonized European standards, respectively. The next part of Chapter 6 consists of a reflection of the findings of this case study and discusses these results against the background of the more fundamental question on how to regulate the Circular Economy transition. Glass is taken as an example whenever a more in-depth examination is required.

6.1 Defining waste

The definition of waste had been the elephant in the room even before the EU obtained the competence.[983] The waste definition has remained troublesome since then, but has simultaneously been one of the key aspects of EU waste legislation. This particular field of environmental law has really been developed *around* the waste definition, because, as already highlighted above, its application is generally triggered by it.[984] For example, the provisions regarding waste packaging and waste packaging material (such as from glass food container products) under the Packaging Directive are only applicable if the packaging or packaging material is covered by waste definition under the WFD.[985] The waste definition is also significant outside the scope of EU waste law because non-waste measures refer to it as well, for example the other two key laws for the Circular Economy transition addressed in this dissertation.[986]

The exact meaning of waste is a reemerging problem, as industry keeps on challenging, and the regulator consistently struggles with, the definition's application in old and new examples of industrial practices. Substances or objects that are not considered wastes may have some benefits for its holder. This includes the in principle unrestricted freedom of movement, the absence of environmental waste taxes (notwithstanding the fact that there are also taxes on non-waste goods, of course) and a reduction in environmental administrative costs,[987] for example in view of getting a license. This does not mean, however, that the 'product track' is necessarily easier to follow as opposed to the 'waste track'.[988] The CJEU is repeatedly asked to settle disputes regarding the waste definition. Having a clear definition of waste that is correctly and equally applied across the Union is in the interest of many; businesses, authorities, waste management operators and individuals would attain legal certainty and it would create a level playing field for companies within the borders of the EU. Recyclers are no exception, of course. While these goals could

[983] The European Community lacked clear legal competence to enact environmental (waste) measures when the first WFD was adopted in 1975 (Directive 75/442 of 15 July 1975 on waste, [1975] OJ L 194/39). Thus, when the Community was finally given an express legal basis to act on waste matters (Article 192 TFEU, ex Article 175 EC Treaty [renumbered], *ex Article 130s EC Treaty*), the principal waste measures had a dual basis (ex Article 100 EC Treaty on the common market and ex Article 235 EC Treaty providing a residual legal basis for measures pursuing an EC objective but for which there was no explicit legal competence).

[984] Examples of waste legislation are the EU Waste Shipment Regulation and the Landfill Directive: their application depends on whether a particular substance or object is regarded as waste. Today, however, the WFD is also applicable to non-waste, as had already been stressed in Chapter 5.3 on the CE benchmarks for product durability and waste prevention. There are several definitions and instruments set forth in the Directive that explicitly do expressly *not* apply to waste.

[985] Article 3(2) Packaging Directive.

[986] See Article 2(2) REACH and Article 2(18) EFD.

[987] N. de Sadeleer, 'Scrap Metal intended for Metal Production: The Thin Line Between Waste and Products' (*Journal for European Environmental & Planning Law*, 9:2, 2012), p.152.

[988] Chapter 7 will address this issue.

indeed be linked to the creation of an internal market, they remain secondary to the Directive's main objective to protect the environment.[989]

6.1.1 Historical developments till 2008: setting the scene

A. Laying down the foundations

The first Waste Directive was adopted in 1975. Article 1(a) of the Waste Directive defines waste as:

> *any substance or object which the holder disposes of or is required to dispose of pursuant to the provisions of national law in force.* (emphasis added)

According to the CJEU the legislator envisage a broad scope to the Waste Directive based on the waste definition.[990] This broad interpretation required that the term 'dispose' in the definition had to be changed into 'discard'.[991] This line of reasoning has remained in consonance with the vision of the CJEU on this matter.[992] After the 1991 amendments, for example, the CJEU confirmed that the waste definition does not exclude substances, materials or objects which are capable of economic reutilization, even if the materials in question may be the subject of a transaction or quoted on public or private commercial lists.[993] Put differently, products that still have a positive economic value to someone, including the current holder, can be waste, too. The wide definition has remained ever since.[994]

The 1975 version of the Directive was amended in 1991, after which it fully became a *framework* Directive.[995] The amendments have set the tone for the current approach to general EU waste law.[996] Next to replacement of the term 'dispose' with 'discard' in the waste definition, another example is the deletion of the reference to national law. This was done to stimulate harmonization in waste terminology.[997]

The core of the waste definition remained the same when Directive 2006/12 on waste codified the 1975 version as amended.[998] The 1991/2006 WFD defined waste in Article 1(a)/Article 1(1)(a) as follows:

---

[989] Not only is the Directive's main objective to protect the environment and human health from the adverse impacts of waste (Article 1 WFD, see in conjunction Article 13 WFD), the other environmental objectives of Article 191 TFEU should also be reflected in the Directive, such as the rational and prudent utilization of resources, because the Directive is based on Article 192 TFEU.

[990] See e.g.: Judgement of 12 May 1987, *Ministère public Oscar Van Traen and Others*, Joined C-372 to C-374/85, EU:C:1987:222, para. 7.

[991] G. Van Calster, *EU Waste Law* (Oxford University Press, 2 ed., 2015), p. 8.

[992] Judgement of 10 May 1995, *Commission v Germany*, C-422/92, EU:C:1995:125, para 22; and Judgement of 28 March 1990, *Criminal proceedings against E Zanetti and Others*, C-359/88, EU:C:1990:148, paras. 9 and 12-13. In addition see: Judgement of 28 March 1990, *Criminal proceedings against E Zanetti and Others*, Joined C-206/88 and C-207/88, EU:C:1990:145, para. 8; and Judgement of 9 July 1992, *Commission v Belgium*, C-2/90, EU:C:1992:310, para 13.

[993] See e.g.: Judgement of 25 June 1997, *Criminal proceedings against Euro Tombesi and Others*, Joined C-304/94, C-330/94, C-342/94 and C-224/95, EU:C:1997:314, paras. 47-52; and Judgement of 28 March 1990, *Criminal proceedings against E Zanetti and Others*, Joined C-206/88 and C-207/88, EU:C:1990:145, paras. 12-13.

[994] See e.g.: earlier Cases: ibid. *Euro Tombesi* Case, para. 41; and Judgement of 10 May 1995, *Commission v Germany*, C-422/92, EU:C:1995:125, para. 20. See also: Judgement of 15 June 2000, *ARCO Chemie Nederland Ltd v Minister van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer and Vereniging Dorpsbelang Hees, Stichting Werkgroep Weurt+ and Vereniging Stedelijk Leefmilieu Nijmegen v Directeur van de dienst Milieu en Water van de provincie Gelderland*, Joined C-418/97 and C-419/97, EU:C:2000:318, paras. 39, 40 and 73; Judgement of 24 June 2008, *Commune de Mesquer v Total France SA, Total International Ltd*, C-188/07, EU:C:2008:359, paras. 38-39.

[995] Directive 91/156 of 18 March 1991 amending Directive 75/443/EEC on waste, [1991] OJ L 78/32.

[996] G. Van Calster, *EU Waste Law* (Oxford University Press, 2 ed., 2015), p. 2.

[997] Ibid.

[998] Directive 2006/12 of 5 April 2006 on waste, [2006] OJ L 114/9.

any substance or object in the categories set out in Annex I which the holder discards or intends or is required to discard (emphasis added)

Although Annex I WFD had an impact on the definition's legal understanding and practical application,[999] the waste categories in the Annex were not decisive in this definition: the term 'discard' is key.[1000] Despite refraining from providing any additional definitions or clarifications on what 'to discard' means in either version of the WFD, three alternative interpretations derive from the wording of the definition:

1. the first option is based on the *act* of discarding;
2. the second option is based on the holder's *intention;* and
3. the third option is based on a *legal obligation*.

It did not take long before the first cases were brought to the CJEU to challenge the waste definition in uncertain, new and/or controversial situations. The CJEU plays an important part in how we consider the concept of 'to discard' today. *ARCO Chemie* Case is one of the most significant judgements because it expresses for the first time certain non-exhaustive and non-conclusive positive indications.[1001] These indications are not decisive in themselves but may rather serve as guidance.

Each of the following paragraphs is dedicated to one of the alternatives of 'to discard'. It should be stressed that it is sometimes hard to distinguish the alternatives from one another.[1002] Therefore, the distinction made below is actually quite fluid and the options should accordingly not be seen separately from one another. In line with this remark, it should be born in mind that, based on the non-restrictive interpretation of the waste definition, the CJEU has repeatedly stressed that the analysis of whether a substance, material or object is waste or not, is a case-by-

[999] For example, category Q13 (*'any materials, substances or products whose use has been banned by law'*) enabled Member States to keep a national waste definition, as the text did not specify which legislator was entitled to introduce a ban. In practice, however, Member States were not very reluctant to adopt a different definition. A more significant example is therefore category Q16 which states that '*any materials, substances or products which are not contained in the above categories.*' In practice, therefore, if a material/substance/product did not feature in the Annex, one could assume that is was still regarded as waste on pursuant to this residual category, on condition that one of the 'discard alternatives' applied. See: G. Van Calster, *EU Waste Law* (Oxford University Press, 2 ed., 2015), p. 6.

[1000] As one can see, the term was already included in the 1975 definition.

[1001] At a certain point before the *ARCO Chemie* Case, it can be argued that the CJEU had taken an approach in defining waste other than the 'discard route'. In the *Euro Tombesi* Case of 1997 (Judgement of 25 June 1997, *Criminal proceedings against Euro Tombesi and Others,* Joined C-304/94, C-330/94, C-342/94 and C-224/95, EU:C:1997:314), the CJEU implicitly followed the approach which was suggested by the Advocate General Jacobs in his Opinion (Opinion of Advocate General Jacobs on 24 October 1996, *Criminal proceedings against Euro Tombesi and others,* Joined C-304/94, C-330-94, C-342/94 and C-224/95, EU:C:1996:399, para. 50 et seq). The Advocate General was of the opinion that it was better to turn to the concepts of 'recovery' and 'disposal' instead of looking at the meaning of 'to discard', because the latter term covers both disposal and recovery. One of the downsides of this approach was that these two concepts also required clarification. In the end, however, the CJEU explicitly rejected the '*Euro Tombesi* bypass' in the *ARCO Chemie* Case in 2000 where the Court returned to the core concept of 'to discard'. See: Judgement of 15 June 2000, *ARCO Chemie Nederland Ltd v Minister van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer and Vereniging Dorpsbelang Hees, Stichting Werkgroep Weurt+ and Vereniging Stedelijk Leefmilieu Nijmegen v Directeur van de dienst Milieu en Water van de provincie Gelderland*, Joined C-418/97 and C-419/97, EU:C:2000:318. For a more extensive explanation of the AG's reasons, the other downsides of the approach and in what way the CJEU followed the Opinion in the *Euro Tombesi* Case and in later Cases such as the *Inter-Environment Wallonie* Case (Judgement of 18 December 1997, *Inter-Environment Wallonie ASBL v Région Wallone,* C-129/96, EU:C:1997:628), see G. Van Calster, *EU Waste Law* (Oxford University Press, 2 ed., 2015), pp. 11-14.

[1002] European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste,* 2012, p. 10. This policy document a non-legally binding guidance document launched by the Commission in June 2012 to facilitate the implementation, application and enforcement of the WFD.

case exercise.[1003] In other words, each case has to be assessed on its own merits. The statements made in the sections below are therefore based on specific situations, which do not, therefore, reflect other situations at all times. As noted above, I will use scenarios involving glass waste as much as possible.

B. 'To discard', 'is required to discard' and 'intends to discard'

To discard

'To discard' is in essence action-based. The option 'discards' concerns, for example, situations where a glass bottle is thrown away in a waste container for glass (post-user waste) or where offcuts derived from the production of glass are directly transferred to a glass recycling facility (pre-user waste). Another example is when a holder of glass products flytips (i.e. dumps or abandons them somewhere next to a road).[1004] This is why Article 36(1) WFD requires Member States to take the necessary measures to prohibit the abandonment, dumping or uncontrolled management of *waste*. These examples relate to an intentional action. However, there are also accidental actions that could cause something to become waste.[1005]

The examination of the actions causing waste indicates that, generally speaking, the characteristics of the glass product cannot itself determine whether the product is waste or not. This means that *in essence* it does not matter whether a glass object is broken, out-of-date or contaminated. In practice, however, this is an indication that such products are *likely* to be waste.[1006] There are also situations where a legal rule can determine a waste status.

Is required to discard

The option 'is required to discard' relates to situations where a substance or object should be discarded based on legal rules. The obligation to discard a substance or an object could be imposed by EU law, national law or even by a contract.[1007] This is, of course, largely dependent on the specific substances and materials used in the particular product, and on the product's application itself.

In the case of glass, there are not many legal obligations at EU level for the holders of glass products to discard the items. This may have to do with the fact that glass as such is a relatively clean and solid material, including the surface, which is not very sensitive for external as well as internal impacts. The production of glass and glass objects is generally also harmless given that

---

[1003] See e.g.: Judgement of 15 June 2000, *ARCO Chemie Nederland Ltd v Minister van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer and Vereniging Dorpsbelang Hees, Stichting Werkgroep Weurt+ and Vereniging Stedelijk Leefmilieu Nijmegen v Directeur van de dienst Milieu en Water van de provincie Gelderland*, Joined C-418/97 and C-419/97, EU:C:2000:318, para. 37, 40, 41, see also: 73, 88 and 97; Case C-194/05 *Commission v Italy* [2007] ECR I-11677, para. 52; and Judgement of 18 December 2007, *Commission v Italy*, C-195/05, EU:C:2007:807, para. 51; Judgement of 18 April 2002, *Palin Granit and Vehmassalon kansanterveystyön kuntayhtymän hallitus*, C-9/00, EU:C:2002:232, paras. 23-25; and Judgement of 28 March 1990, *Criminal proceedings against E Zanetti and Others*, Joined C-206/88 and C-207/88, EU:C:1990:145, paras. 12-13.

[1004] Department for Environment, Food and Rural Affairs (UK government), *Guidance in the legal definition of waste and its application*, 2012, published on the website of the government of the United Kingdom, p. 32, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69590/pb13813-waste-legal-def-guide.pdf (consulted 22 December 2017). See also: Judgement of 11 November 2004, *Criminal proceedings against Antonio Niselli*, C-457/02, EU:C:2004:707, paras. 39.

[1005] Case C-1/03 *Paul Van de Walle and Other v Texaco Belgium SA* [2004] ECR I-7632, paras. 49-50. In this case the Court held that the hydrocarbons which were accidentally spilled were waste because it caused soil and groundwater contamination (even though nobody knew about the contamination when it took place). See also: Judgement of 1 March 2007, *KVZ retec GmbH v Austria*, C-176/05, EU:C:2007:123, para. 59

[1006] Department for Environment, Food and Rural Affairs (UK government), *Guidance in the legal definition of waste and its application*, 2012, pp. 19 and 33.

[1007] As regards the latter case, see: Judgement of 15 June 2000, *ARCO Chemie Nederland Ltd v Minister van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer and Vereniging Dorpsbelang Hees, Stichting Werkgroep Weurt+ and Vereniging Stedelijk Leefmilieu Nijmegen v Directeur van de dienst Milieu en Water van de provincie Gelderland*, Joined C-418/97 and C-419/97, EU:C:2000:318, para. 86.

no risky chemicals are used in the production process. However, there are several situations where they might actually be (national) requirements in place, such as when packaging glass is contaminated despite the precautionary measures or when safety requirements require that broken glass products are removed or replaced (e.g. TVs screens in hotels, auto glasses or room dividers in offices).

Moreover, there is an upward trend in the glass industry, which could lead to more situations where glass objects should be legally regarded waste, particularly considering the potential to adversely impact the environment or human health if badly handled or controlled. I am thinking in particular about the development and use of so-called 'smart glasses'. In the emerging technologies that are used for the different types of smart glass, some sort of transparent (ultra-)thin (nano) 'coating' or 'films' (e.g. solar cells) are used on/in the glass or between two or more glass items. An example is glass whose sunlight transmission properties are altered when voltage, light or heat is applied in order to control the heating and light intake in buildings, or alternatively when the sunlight generates energy (also called 'solar glass'). Another example is self-cleaning glass.

If for certain unexpected reasons (e.g. wrong use of materials, accident, new scientific evidence of greater environmental or health impacts…) the risks are deemed too high under EU chemical legislation or EU products legislation concerning electrical and electronic equipment (EEE) to put smart glass objects on the market, i.e. when the maximum concentration values for the use of certain substances or materials are not respected, this can indicate that the glass item has turned into waste.[1008]

Intends to discard

The option 'intends to discard' is the most controversial alternative of the three because it suggests subjectivity. However, it is often acclaimed that this should not be the case. Rather, it is argued – at least by several public authorities – that whether a substance or product is a threat to the environment or human health[1009] requires an objective analysis instead of a subjective one,[1010] because the waste definition would otherwise be too arbitrary. This is in line with the CJEU's general view on the waste definition, namely that analyzing the (waste) holder's intends is a question of considering all factual circumstances and having regard to the aims of the WFD.[1011]

[1008] However, there are currently no EU laws regulating smart glass objects having the potential to indicate when these items should be legally discarded (notwithstanding the possible existence of national rules). For example, the Restriction of Hazardous Substances (RoHS) Directive excludes solar panels (see e.g.: Article 2(4)(i) RoHS Directive). For inverters (i.e. the substances/materials that change something into a different form [e.g. solar to energy]) the following applies: the RoHS Directive is applicable to EEE falling under the WEEE categories 1-7 and 10 plus electric light bulbs and luminaires in households. Accordingly, category 9 (Monitoring and control equipment) is exempted. This means that inverters are not included in the RoHS Directive either. Nevertheless, amendments are possible to the list of restricted substances in Annex II under certain conditions (Article 6 RoHS Directive), so future changes are imaginable, for example in view of controlling the growing volume of this waste stream when these items are 'released' from the use sphere.

[1009] Even though neither the potential to pollute nor the harmlessness of a substance or product is *decisive* in determining the intention of the holder and hence whether it is waste, it could serve as evidence.

[1010] See e.g.: European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, p. 10; and Department for Environment, Food and Rural Affairs (Defra, UK government), *Guidance in the legal definition of waste and its application*, 2012, p. 31. See also: para. 22 of Opinion of Advocate General Jacobs on 13 December 1989, *Criminal proceedings against E Zanetti and Others*, Joined C-206/88 and C-207/88, EU:C:1989:644.

[1011] See e.g.: Judgement of 1 March 2007, *KVZ retec GmbH v Austria*, C-176/05, EU:C:2007:123, para. 63; Judgement of 15 June 2000, *ARCO Chemie Nederland Ltd v Minister van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer and Vereniging Dorpsbelang Hees, Stichting Werkgroep Weurt+ and Vereniging Stedelijk Leefmilieu Nijmegen v Directeur van de dienst Milieu en Water van de provincie Gelderland*, Joined C-418/97 and C-419/97, EU:C:2000:318, paras. 73, 88 and 97; Case C-9/00 *Palin Granit and Vehmassalon kansanterveystyön kuntayhtymän hallitus* [2002] ECR I-3548, para. 24; Judgement of 15 January 2004, *Criminal proceedings against Marco Antonio Saetti and Andrea Frediani*, C-235/02, EU:C:2004:26, para. 40; and Judgement of 18 December 2007, *Commission v Italy*, C-195/05, EU:C:2007:807, para. 41.

The CJEU also explains that since the WFD does not provide '*any single decisive criterion for discerning whether the holder intends to discard a given substance or object, Member States are free, in the absence of Community provisions, to choose the modes of proof of the various matters defined in the directives which they are transposing, provided that the effectiveness of Community law is not thereby undermined.*'[1012] Over the years, however, the CJEU has contributed to the determination of the holder's intends by providing several factors to consider.[1013] Admittedly, these factors are not restricted to this particular alternative of 'to discard', but could also apply the other two alternatives. Whether these factors constitute indeed an 'objective analysis' is open for debate.[1014]

A situation where the 'intention to discard' would in any case be put to the test is when residual glass from the manufacturing process is stored. The CJEU has ruled that if the period of storage of a material is indefinite, it is uncertain whether the material concerned (glass in our example) will be used again in the future. This indicates that the glass should be considered waste.[1015] Similarly, if the glass is stored for a certain period of time with the purpose of bringing it to a recycling facility, it is also regarded waste. On the other hand, if the residual glass is stored for a certain period of time in order for it to be used again in a future production process, it is likely to be considered a 'by-product', which is a *non*-waste product.

By-products attain a special status in EU waste law, different from the regular products the manufacturers actually seeks to produce and different from the waste products and the non-waste products after recovery. By-products result from production processes. They are not in themselves sought for as a primary aim (they are production residues), but the undertaking *seeks to* exploit rather than to discard them anyhow.[1016] According to the CJEU, where the production of a material that is additional to the regular product is the result of a technical *choice*, the material in question cannot be a mere production residue (i.e. waste) and is therefore considered a non-waste product (i.e. the additional by-product).[1017] Moreover, if the manufacturer could have produced the primary product without producing the additional products but *chose not to*, this is also evidence that the material concerned is a regular product and not waste.[1018] Generally speaking, if the holder can guarantee the identification and the actual use of the residual glass for a specific

---

[1012] Case C-194/05 *Commission v Italy* [2007] ECR I-11677, para. 44. See also: Joined Cases C-418/97 and C-419/97 *ARCO Chemie Nederland Ltd v Minister van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer and Vereniging Dorpsbelang Hees, Stichting Werkgroep Weurt+ and Vereniging Stedelijk Leefmilieu Nijmegen v Directeur van de dienst Milieu en Water van de provincie Gelderland* [2000] ECR I-4512, para. 41; and Judgement of 11 November 2004, *Criminal proceedings against Antonio Niselli*, C-457/02, EU:C:2004:707, para. 34.

[1013] Many of which are touched upon in Chapter 6.1. For example, a contract may indicate the holder's intention not to discard. See on this topic Chapter 6.1.2-A.I in particular.

[1014] In general, it is debatable whether the determination of 'intends to discard' could constitute a purely objective analysis. See for the limitation to this viewpoint: G. Van Calster, *EU Waste Law* (Oxford University Press, 2 ed., 2015), pp. 9-10.

[1015] See the *Palin Granit* Case for the indefinite period of time in para. 39 where the CJEU ruled *'the holder of leftover stone resulting from stone quarrying which is stored for an indefinite length of time to await possible use discards or intends to discard that leftover stone, which is accordingly to be classified as waste.'* Judgement of 18 April 2002, *Palin Granit and Vehmassalon kansanterveystyön kuntayhtymän hallitus*, C-9/00, EU:C:2002:232.

[1016] See also: Chapter 6.1.2-B. See e.g.: ibid., para. 32.

[1017] Judgement of 15 January 2004, *Criminal proceedings against Marco Antonio Saetti and Andrea Frediani*, C-235/02, EU:C:2004:26, para. 45. This Case concerned the refining of crude oil to produce fuels. The Court commented that even a substances (petroleum coke) had automatically resulted from the (refining) process, it would still be regarded as a product if it is certain that it will be used for the same purposes and the other products produced in the process. In view of this, it also stated that a modification of the production process in order to give the substance concerned specific technical characteristics could indicate that the production of the material concerned was a technical choice and therefore a regular product. The glass offcuts after the placing of windows by a cabinetmaker, for example, cannot be regarded as by-products. See also: European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, 2012, p. 6.

[1018] Ibid., *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste,* p. 15.

purpose, whether it will be for the same use or another and whether it will be for the same economic operator or another, only then the glass is considered a by-product.[1019] According to the European Commission, other indications of 'certainty for further use' are the existence of contracts between the material producer and the next user, a financial gain for the material producer, a sound supply and demand for this further use in the market, and evidence that the material fulfils the same specifications as other products on the market.[1020] Indications of *un*certain use are, amongst others, the fact that only part of the material will be used while the rest will be disposed of and that the financial gain for the holder is nominal compared to the costs of waste treatment.[1021] The CJEU furthermore highlights that a production residue can only be regarded as a by-product if its further use is certain *without prior processing*.[1022]

Other than by-products, the intention of the holder (not) to discard is also important in the case of secondhand products. A glass item may be unwanted by its current holder, but it is not regarded as waste if it is passed on to a new holder who will use it for its original purpose without needing any processing or treatment.[1023] In other words, the simple transfer of a substance or object from one person to another person does not in itself indicate that they are dealing with waste. These secondhand products have no special legal status: they are just tradable goods, as the intention of the previous as well as the new holder is to continue the item's use.[1024]

C. Completion of 'discard'

Waste *ceases* to be waste when it has undergone a recovery operation (although not all recovery practices necessarily result in non-waste substances, materials or objects – see below). An important concept for determining when wastes ceases to be waste is 'complete recovery', because it indicates the last stage in the recovery process whereupon waste should normally cease to be waste. A complete recovery operation is one *'which has the effect of transforming waste into*

[1019] See e.g.: Judgement of 11 September 2003, *AvestaPolarit Chrome Oy, formerly Outokumpu Chrome Oy*, C-114/01, EU:C:2003:448, para. 39 and 43; and Judgement of 15 January 2004, *Criminal proceedings against Marco Antonio Saetti and Andrea Frediani*, C-235/02, EU:C:2004:26, para. 38.

[1020] European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, 2012, pp. 16-17; and Department for Environment, Food and Rural Affairs (UK government), *Guidance in the legal definition of waste and its application*, 2012, p. 47.

[1021] Ibid., *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, p. 17.

[1022] Case C-194/05 *Commission v Italy* [2007] ECR I-11677, para. 39. The Commission explains that one should have a good look at the processing techniques in that respect: [t]*hose… techniques that address typical waste-related characteristics of the… residue, such as its contamination with components which are hazardous or not useful, would prevent classification as non-waste…* [, as this ensures] *that such operations, which might pose risks to the environment or human health, are monitored under waste management law... On the other hand, treatment which is normal industrial practice, e.g. modification of size or shape by mechanical a treatment, does not prevent the production residue from being regarded as a by-product.*' The 'normal industrial practice' can be interpreted as all the steps '*which a producer would take for a product, such as the material being filtered, washed, or dried; or adding materials necessary for further use; or carrying out quality control*.' Contemporary recovery treatments fall in principle outside this scope. In: European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, 2012, pp. 17-18. See also: Judgement of 15 June 2000, *ARCO Chemie Nederland Ltd v Minister van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer and Vereniging Dorpsbelang Hees, Stichting Werkgroep Weurt+ and Vereniging Stedelijk Leefmilieu Nijmegen v Directeur van de dienst Milieu en Water van de provincie Gelderland*, Joined C-418/97 and C-419/97, EU:C:2000:318, para. 84; Judgement of 18 April 2002, *Palin Granit and Vehmassalon kansanterveystyön kuntayhtymän hallitus*, C-9/00, EU:C:2002:232, paras. 32-37; Judgement of 11 November 2004, *Criminal proceedings against Antonio Niselli*, C-457/02, EU:C:2004:707, para. 42; and Judgement of 15 January 2004, *Criminal proceedings against Marco Antonio Saetti and Andrea Frediani*, C-235/02, EU:C:2004:26, para. 34.

[1023] Department for Environment, Food and Rural Affairs (UK government), *Guidance in the legal definition of waste and its application*, 2012, pp. 19 and 35.

[1024] Indeed, this transfer has already been explained in Chapter 5.3.1-C (heading 'Waste Framework Directive') on waste prevention: this action is called 'reuse' in WFD terminology (Article 3(13) WFD).

a distinct product with characteristics that are the same as or analogous to a raw material, so that it may replace that raw material.'[1025]

As a general rule, the final stage of the recycling process always produces non-waste. The final point of recycling is therefore crucial. The CJEU holds in the *Antonio Niselli* Case that recycled raw materials continued to be classified as waste until they had actually been recycled into products (i.e. secondary raw materials or final products).[1026] In the same Case, the Court clarifies that, despite the general assumption that recycling generates non-waste, there are exceptional cases where recycled substances will remain waste (in accordance with the waste definition), even if it is not possible to distinguish the products derived from a recycling operation from those made from an operation that uses only primary raw materials.[1027] Despite the exemptions, one should always return to the basic principle of the waste definition in the end, i.e. that one must consider the merits of the specific case to determine whether it is waste or not. The CJEU has stressed that having undergone a complete recovery operation is thus not decisive in itself: it is simply a very convincing factor to be taken into account.[1028] Note that the CJEU has not further expounded on possible 'other factors' whatsoever.

Overall, the CJEU has established a rather flexible regime. It recognized several indicative factors to clarify the concept 'to discard' but did not make them final. This gives some room to interpret the waste definition, which, in turn, straddles the product status and the waste status, on a tailored basis. The flexible meaning of waste is necessary: 'waste' should be determined on a case-by-case basis, as it changes according to place, time, people involved and other changing circumstances.[1029] The relativity of waste is also reflected in that a substance or object can remain a product, become waste or cease to be waste at different stages in its life-cycle.[1030]

The landmark Cases of the CJEU on the waste status, by-product status and the completion of the waste status have, not surprisingly, seriously shaped the revision of the Directive in 2008 even before rise of the concept of the Circular Economy. This next epos of the WFD is discussed below.

6.1.2 The 2008 Waste Framework Directive and subsequent developments

The currently applicable version of the WFD repealed the 2006 version in 2008.[1031] Besides extending the waste hierarchy and strengthening of the recovery targets, the 2008 WFD adds certain specific matters concerning the waste definition. As introduced above, these adaptations are predominantly based on the CJEU's interpretation on the waste definition and are, more precisely, on how the definition reflects the environmental objectives of the EU and as laid down in the WFD (rather than on the political, strategical goal to transform Europe's economy into a Circular Economy). It appears that the WFD has already been pushed into a Circular Economy-oriented direction by the CJEU long before the adoption of the CE Package.

[1025] Supra note 1023, p. 51; and Judgement of 11 November 2004, *Criminal proceedings against Antonio Niselli*, C-457/02, EU:C:2004:707, paras. 52-53.

[1026] Ibid., *Criminal proceedings against Antonio Niselli*, para. 36-37.

[1027] Ibid., para. 52. It is exceptional, because complete recovery will have precisely the goal of extracting secondary raw materials from the recovered waste. It would therefore only be the case where it is impossible to sell the recycled materials that their (waste) holder would be likely to discard them. This may involve other recovery methods or recovery categories than initially operated. N. de Sadeleer, 'Scrap Metal intended for Metal Production: The Thin Line Between Waste and Products' (*Journal for European Environmental & Planning Law*, 9:2, 2012), p.152.

[1028] Judgement of 15 June 2000, *ARCO Chemie Nederland Ltd v Minister van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer and Vereniging Dorpsbelang Hees, Stichting Werkgroep Weurt+ and Vereniging Stedelijk Leefmilieu Nijmegen v Directeur van de dienst Milieu en Water van de provincie Gelderland*, Joined C-418/97 and C-419/97, EU:C:2000:318, paras. 94-95.

[1029] N. de Sadeleer, 'Scrap Metal intended for Metal Production: The Thin Line Between Waste and Products' (*Journal for European Environmental & Planning Law*, 9:2, 2012), p.143.

[1030] Ibid.

[1031] It also repealed the Hazardous Waste Directive (91/689) and the Waste Oils Directive (75/439).

The changes made to the WFD explained below relate to the waste status, the by-product status and the EoW status; each of which contributes to the contours of the waste definition and is a direct result of case law. For each of those statuses, the recent developments in that area and the (possible) relevance to the Circular Economy are further clarified.

A. Waste status: Article 3(1) WFD on the waste definition

The core definition of waste that had been used from 1991 to 2008 has remained untouched, leaving a lot of case law on the meaning of 'to discard' unimpaired as well. Article 3(1) 2008 WFD defines waste as:

> *any substance or object which the holder discards or intends or is required to discard*

The reference to the waste categories in Annex I, which was still present in the 2006 WFD, has nevertheless disappeared in the definition. Given the revision of the List of Waste by Decision 2000/532 in 2000,[1032] which replaced Decision 94/3 that introduced the List of Waste pursuant to Article 1(a) of the amended 1975 WFD and which merged this list with the so-called Hazardous Waste List[1033],[1034] the usefulness of the waste categories in the Annex would indeed seem to have reduced considerably.[1035] Under the current Directive, Article 7 establishes the relationship between the waste definition and the List of Waste, i.e. that the inclusion of a substance or object in the List of Waste is merely indicative that it *may* be waste. Paragraph (1) explains that:

> *The list of waste shall be binding as regards determination of the waste which is to be considered hazardous waste. The inclusion of a substance or object in the list shall not mean that it is waste in all circumstances. A substance or object shall be considered to be waste only where the definition in point (1) of Article 3 is met.* (emphasis added)[1036]

What is more striking in the 2008 WFD than the literal reading of the (unchanged) waste definition and the fact that the List of Waste is no longer part of the definition, is the introduction of new concepts to the waste acquis: the by-product status and the End-of-Waste (EoW) status. In truth, they were not entirely 'new' to the framework, as they had been developed according to the interpretation of the waste definition by the CJEU, discussed above. It is therefore preferable to speak of the codification of the concepts. The clarification of the waste definition, which includes trying to make sure that no confusion arises between the various aspects of the waste definition ('by-product v waste' and 'waste v EoW'), was in fact one of the reasons to revise the WFD in the first place.[1037] Although no explicit definition of either concept was included in Article 3 WFD,

---

[1032] Decision 2000/532 of May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste, [2000] OJ L 226/3.

[1033] The Hazardous Waste List is an instrument which was initiated under the Hazardous Waste Directive (which was repealed by the 2008 WFD as it was incorporated in the framework Directive).

[1034] The waste definition under the amended WFD of 1975 included besides the quotation above also: *'The Commission… will draw up… a list of wastes belonging to the categories listed in Annex I. This list will be periodically reviewed and, if necessary, revised by the same procedure.*' The 2006 WFD deleted this additional sentence in the waste definition.

[1035] G. Van Calster, *EU Waste Law* (Oxford University Press, 2 ed., 2015), p. 3.

[1036] The Guidance on the Waste Framework Directive underscores this interrelated but not completely interwoven relationship between the waste definition and the List of Waste. It states that: *'just because a substance or object appears in the List of Waste… does not mean it is waste under all circumstances. It is waste only where the definition 'any substance or object which the holder discards or intends or is required to discard' is met.*' European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, p 14.

[1037] Recitals 8 and 22 WFD. As regards the definitions used in EU waste law, the adoption of the 2008 WFD was generally seen as a complete clarification and simplification exercise. This was in line with the Better Regulation Programme and was, as a matter of fact, predominantly driven by the European Parliament in the end.

two Articles providing legal guidance as to their meanings were added to the WFD. These essential Articles are clarified in the subsequent two sections (sections B and C).

But before going into more detail on those matters, two developments in the interpretation of the definition will be briefly touched upon to illustrate that the interpretation continuously evolves, also without the involvement of the regulator.

A.I Unintentionally blended off-spec products

The first development concerns a recent Case, the *Shell* Case, which was published in December 2013,[1038] where the CJEU decides that unintentionally mixed off-spec products could in certain circumstances be regarded as products instead of waste. The facts were as follows: the oil company Dutch Royal Shell (Shell) loaded 'Ultra Light Sulphur Diesel' (ULSD) onto a ship in the Netherlands and delivered it to a client in Belgium. When the shipment was delivered, it became apparent that the tanks were not entirely empty when the ship was loaded. This resulted in the ULSD being unintentionally mixed with 'methyl tertiary butyl ether' (MTBE). Since the flashpoint of that consignment was too low for it to be resold as fuel for diesel engines, which would have been consistent with its original purpose, and because the client was precluded from storing the mixture on account of its environmental permit, the client returned the consignment to Shell, which shipped it back to the Netherlands. In other words, the ULSD did not satisfy the specifications agreed between the buyer and the vendor and is therefore 'off-spec'[1039] and send back.[1040] The numerous preliminary questions put forward by the District Court of Rotterdam basically come down to the question: is the ULSD-MTBE mixture waste or non-waste?

In the final judgement, which delivers another interpretation of the waste definition than the opinion of the Advocate General,[1041] the CJEU underscores once again that the existence of

---

[1038] Judgement of 12 December 2013, *Shell Nederland Verkoopmaatschappij NV* and *Belgian Shell NV*, Joined C-241/12 and C-242/12, EU:C:2013:821.

[1039] 'Óff-spec' means that something fails meet the prescribed specifications *('a detailed description of how something should be or has been done, made, etc'* [according to the Cambridge Dictionary: https://dictionary.cambridge.org/dictionary/english/spec, consulted on 10 November 2017]) or standards.

[1040] Before the District Court of Rotterdam (i.e. 'Rechtbank'), the prosecutor claimed that the mixture at issue was waste at the time of its shipment from Belgium to the Netherlands and by having failed to adhere to the notification procedure laid down in Article 15 of the former Waste Shipment Regulation (Regulation 259/93), Shell illegally trafficked within the meaning of Article 26(1)(a) of that Regulation. Shell plead that the consignment was not waste. See Judgement of 12 December 2013, *Shell Nederland Verkoopmaatschappij NV* and *Belgian Shell NV*, Joined C-241/12 and C-242/12, EU:C:2013:821, paras. 20-24.

[1041] In brief, the Advocate General Jääskinen concluded that: [a] *consignment consisting of fuel which the vendor takes back and processes through blending with a view to placing it back on the market, because the fuel had been unintentionally mixed with a substance and therefore no longer satisfies safety requirements so that it could not be stored by the buyer pursuant to an environmental permit, must be considered waste… from the moment of unintentional contamination up to its recovery by blending.* (emphasis added). Opinion of Advocate General Jääskinen on 18 June 2013, *Shell Nederland Verkoopmaatschappij NV* and *Belgian Shell NV*, Joined C-241/12 and C-242/12, EU:C:2013:405, para. 43. See also: paras. 37-39. The Advocate General came to this conclusion by focusing on the actions (not) made by Shell. (As we have seen in the previous section, this is indeed a general rule to determining waste. See to that effect: Judgement of 24 June 2008, *Commune de Mesquer v Total France SA, Total International Ltd*, C-188/07, EU:C:2008:359, para. 53; and Judgement of 18 December 2007, *Commission v Italy*, C-263/05, EU:C:2007:808, para. 32). He argues that the heart of the problem lies in the failure of Shell to notify the shipment of the oil product and secure authorization even though it had become unintentionally contaminated (para.18). The Advocate General points out in paragraph 25 that, contrary to submissions made by Shell (see para. 22), the CJEU should not take into account any assumptions that do not correspond with the facts. More specifically, he refers to Shell's assertion that they were aware of the composition of the mixture and the option of it being re-sold without blending before the shipment left Belgium. The fact of the re-blending of the fuel before its resale points towards an *intention to discard* it and the act of re-blending amounts to recovery, he argues. He considers an important aspect that the fact that the fuel mixture was off-spec considering the specifications laid down in the contract between the client and Shell (which is concluded under private law) is irrelevant to determining whether it amounts to waste (which is determined under public law) (para. 26: although he adds in paragraph 40 that the mere failure to fulfil agreed contractual specifications does not as such mean that a substance or product should always be considered waste). Category

'waste' must be determined in the light of all the circumstances, the aim of the Directive and the need to ensure that its effectiveness is not undermined.[1042] Based on the premise that these issues may constitute evidence that the substance or object has been discarded or of an intention or requirement to discard, the CJEU draws attention to the fact that when a substance or object is not or is no longer of any use to its holder, such that it constitutes a burden which the holder might seek to discard, is evidence of a waste status. While in this case the consignment was indeed a burden for the Belgian client whom may have had the intention to discard it, it is apparent that the consignment could be sold on the market, without having been processed, in the condition in which it was when it was returned to Shell.[1043] The CJEU underlines in this respect that it is particularly important that the client returned the contaminated ULSD to Shell so as to obtain a repayment in accordance with sales contract. This indicates in any case that the client did *not* have the intention to discard the fuel.[1044] Moreover, having in mind the main objective of the WFD, the risk that the holder would have discarded the shipment in a way likely to harm the environment is low because of its significant commercial value.[1045] While the fact that the contaminated ULSD still has value is no undisputed evidence of non-waste,[1046] the Court stresses nonetheless that the fact that Shell took back the mixture with the intention of blending it and placing it back on the market is of decisive importance in the present case.[1047] Whether Shell would have had the intention to discard the mixture cannot be imputed to Shell before the time when its contamination was revealed because it was not aware that the substance did not meet the terms of the contract.[1048] After Shell took note of the contamination, it seems that the company was *certain* about its reselling intention – it was not just a mere possibility. This certainty is crucial, according to the Court, and narrows the in essence widely interpreted waste concept to some extent.[1049] Based on these findings the Court ruled that Shell did not deal with waste but with non-waste.[1050]

The *Shell* Case is significant for the waste definition in the sense that it acknowledges that the *certainty of (the intention of)* putting the reversed logistic and off-spec products back on the market, could be evidence of non-waste and could therefore limit the wide interpretation of the waste definition. This is important because off-spec products are routinely sent back to the wholesaler or brought back to the point of sale, and classifying this kind of products in these situations would turn an important daily logistic practice into waste transport operations.[1051] In this light, it is also significant that the Court recognizes that private law (i.e. contracts) may provide *evidence* of the non-waste status of a product. Additionally, contrary to the AG's opinion, the Court rules that the act of re-blending does not necessarily amounts to recovery and is

---

Q2 of Annex I 2006 WFD (which was the version applicable at the time the shipment took place) indicates that off-specification products is one of the waste categories (Q2, Q4, Q7, Q14 and Q16). Jääskinen concludes that while being on the list of Annex I is evidence that the mixture at issue is waste, Annex I is principally open-ended and thus illustrative (para. 20).

[1042] Judgement of 12 December 2013, *Shell Nederland Verkoopmaatschappij NV* and *Belgian Shell NV*, Joined C-241/12 and C-242/12, EU:C:2013:821, paras. 40-41.

[1043] Ibid., para. 43.

[1044] Ibid., para. 46. This point has been stressed as one of the most important aspects of this Case in the blogpost 'Has the ECJ saved reverse logistics from a compliance nightmare judgment in shell' of Professor C. Van Calster (KU Leuven, Belgium), 12 December 2013, https://gavclaw.com/2013/12/12/has-the-ecj-saved-reverse-logistics-from-a-compliance-nightmare-judgment-in-shell/ (consulted on 3 August 2017).

[1045] Ibid., *Shell Nederland Verkoopmaatschappij NV* and *Belgian Shell NV*, paras. 46 and 48.

[1046] As clarified in settled case law, excluding substances and objects which have a commercial value, whether negative or positive, and which are capable of economic reutilization from the waste concept is not correct. See also: ibid., paras. 50-51.

[1047] Ibid., para. 52.

[1048] Ibid., para. 47.

[1049] Ibid., para. 53.

[1050] Ibid., para. 54.

[1051] G. Van Calster, 'Opportunities and Pitfalls for Sustainable Materials Management', in: I.K. Panoussis and H.H.G. Post (eds.), *Waste Management in European Union Law. The Examples of Naples and Campania* (Eleven International Publishing, 2014), p. 99.

therefore no decisive evidence of the product at issue being waste.[1052] These matters, in turn, are important for the Circular Economy, as they provide for more legal certainty for businesses that their accidentally non-compliant products, which are generally of lower quality, could still be sold, re-blended and used without them necessarily being classified as waste. The fundamentally broad interpretation of the waste definition is thus not stretched too far for it to be unworkable for industry and to frustrate commonly applied private law rules, which are, evidently, also important for the creation of a Circular Economy. Moreover, not only does this interpretation save costs for waste management (e.g. for storage, treatment…), it also saves new (virgin) resources from being used in the production of the (off-spec) products. Despite the relevance of the *Shell* Case for the waste definition, it does not have a direct impact on recycling operations, let alone specifically on glass waste recycling operations.

A.II Services instead of products: circumventing the waste definition?

Building on the role private law can play in a Circular Economy, the second development concerns the potential of circumventing the waste status by replacing products with services. This idea is in line with the Circular Economy transition because such business models turn away from well-trodden paths, in this regard the waste definition, and try new things by way of trial-and-error approach.

One of the new business models referred to has been developed by Koninklijke Philips NV (commonly known as Philips)[1053] together with several partners in a project called 'Pay per Lux'. This project aims at delivering lighting services rather than lighting products.[1054] Manufacturers retain greater control over the products they produce through this Product Service System (PSS) or 'performance economy model', because the provider typically has ownership of the product throughout its entire life-cycle, and can thus better manage issues such as (re)placement, the infrastructure, maintenance, optimizing and innovation, and, if required, waste treatment. In other words: the manufacturer bears greater responsibility for all technical and organizational aspects of the products, meaning that they have more control on the efficiency and effectiveness of their products because they can better integrate the design, production, choice of lighting, recycling… issues into the product. In this respect, this business model helps to encourage ecodesign.[1055] The customers of the services benefit in that they only pay for the services they use, which are generally considered having a good quality because providing a high quality standard is of great interest for the manufacturer.[1056] The customer' use of lighting is generally simplified because they outsource it to the manufacturer.

Selling 'light' instead of lighting products potentially raises several interrelated questions concerning the application of the definition of waste and thus also concerning the application of waste legislation in general. These questions do not only relate to the Philips case but also apply to other related products/services models.[1057] Another prominent example is chemical leasing,

---

[1052] This aspect has also been highlighted in the blogpost: 'Has the ECJ saved reverse logistics from a compliance nightmare?: Judgment in Shell' of Professor G. Van Calster (KU Leuven, Belgium), 12 December 2013, https://gavclaw.com/2013/12/12/has-the-ecj-saved-reverse-logistics-from-a-compliance-nightmare-judgment-in-shell/ (consulted on 3 August 2017).

[1053] Royal Philips Electronics: lightning division. Philips is a multinational concern which is a publicly a great supporter of the Circular Economy movement. A testimony of this is the fact that Philips is a leading partner of the Ellen MacArthur Foundation, which is an internationally operating NGO aiming at the acceleration of the Circular Economy transition.

[1054] See the press release: http://www.lighting.philips.nl/bedrijf/newsroom/persberichten/2011/20110207-verlichtingsconcept-pay-per-lux (consulted on 2 November 2017) (in Dutch).

[1055] See for ecodesign Chapter 5. The relation between ecodesign and PSS business models has not been discussed in that Chapter, however.

[1056] See the website of the Ellen MacArthur Foundation: https://www.ellenmacarthurfoundation.org/case-studies/selling-light-as-a-service (consulted on 26 April 2017).

[1057] See for an overview of the differences between the business models according to which products are made available to users in different forms such as leasing, sharing, renting or pay- per-service models, while the

which is based on the same PSS principle, namely that a chemical concern supplies a substance for a specific service/purpose while retaining ownership of the substance, which is generally based on long-term contracts.[1058] By analogy, this business model could also be applied to glass products: a good case would be flat glass windows, particularly if it concerns smart glass. Just as in the Philips case, manufactures of these glass products could offer 'light' (daylight in that case). Additionally, providing light also has an impact on energy savings.[1059] Below, the relationship between the waste definition and the business model of selling services instead of products is explained by taking 'light through windows' as an example.

The prime question is whether the windows offered by the manufacturers would even become waste at the end of their use. The manufacturers could argue that the products they have sold as a service package do not resemble the waste definition. Their primary argument would be that only substances or objects can turn into waste. Therefore, services cannot by definition be considered waste. Another argument could be – which would be superfluous if the aforementioned argument holds true – that the window manufacturer, who is the owner of the window and from the moment when the window is returned to the manufacturer also the holder again, does not discard, intend to or is (probably) obliged to discard the glazing. Objective evidence of this is that the user and the manufacturer contractually agreed on the terms to use the services (*Shell* Case). If for some reason the window does not function anymore the way which was agreed on, for example in the case that the electric conductivity of a film in smart glass does not work properly anymore, general private law rules are applicable (such as consumer protection on services, e.g. on liability issues and standard warrantees) and the glazing would need to be disassembled and sent back to the contractor. (Significantly, the contractor, in turn, has then the responsibility to decide on whether the window classifies as waste, according to the waste definition!).

A more convincing and fundamentally different standpoint would be that the legal arrangement of offering light instead of the window itself, does not change the fact that the service concerns, amongst others, an *object* which the *holder* can discard, should discard or intends to discard – even if this means that the contract is breached, which in that case would trigger the application of national private law.[1060] The waste definition does not, after all, rely on the responsibility of the owner of the object (i.e. the contractor) but of its holder (i.e. the user of the windows). This is an essential difference in that the EU legislator and the CJEU have always stressed the importance of 'use concept' through the holders rather than 'own concept' through the owners. The ownership approach is problematic from an EU point of view because there are no common EU rules to identify who exactly owns certain wastes. The challenge is that neither the WFD nor any other waste-related legal acts includes a definition of 'waste ownership', whereas there is a definition of 'waste holder'.[1061] In practice, this means that the relevant parties have to conclude a contract about the moment when ownership of the waste is transferred. This means that they should rely on national private law of which there are many different regimes in the EU Member States.[1062] It is not surprising that the EU legislator had opted for the use of the

---

ownership over the products remains with the provider: http://circulareconomytoolkit.org/products-as-a-service.html (consulted on 3 May 2017).

[1058] Because chemical leasing has already been around for quite some time now, its development and application is better understood. For this reason, most of the literature used concerns chemical leasing.

[1059] Another possibility for glass would be the selling of isolation (such as through the use of glass wool and/or triple-glazed windows). Food storage (container glass) would not immediately be the most suitable service to offer because of its temporary nature (light and isolation are continuously).

[1060] See for an overview of legal challenges in the Austrian context in respect of chemical leasing: M. Wittmann, 'Chemical leasing – legal questions' in: T. Jakl and P. Schwager (eds.), *Chemical leasing goes global. Selling Services Instead of Barrels: A Win-Win Business Model for Environment and Industry* (*Springer Vienna*, 2008), pp 123–127

[1061] According to Article 3(6) WFD, waste holder means: *'means the waste producer or the natural or legal person who is in possession of the waste'.*

[1062] For a general explanation of the challenges regards the ownership of waste, see: G. Van Calster, 'Opportunities and Pitfalls for Sustainable Materials Management', in: I.K. Panoussis and H.H.G. Post (eds.), *Waste Management in European Union Law. The Examples of Naples and Campania* (Eleven International

holder approach, which suggests that the returned glazing are considered waste even though they could be reprocessed in a production process to make new glass. This means that the WFD and the rest of the waste acquis are applicable to the parties involved.[1063]

In either way, because of the ambiguities concerning the relationship between the waste definition and the service-focused legal arrangements, which lies at the heart of these new business models, it is quite conceivable that challenges will be brought to Court (in the first place to national Courts, of course) in the future that would probably further clarify the role these contracts play in the waste definition. However, this would in all likelihood not drastically change the meaning of waste, as the concept of the holder of the product would not be easily set aside in favour of the product's owner, not least because of the carefully chosen and established wording of the waste definition in the WFD. If this is indeed proven to be the case, there will be no consequences for recycling practices, because the objects they receive are without doubt waste items. A positive aspect of the rise of the PSS business models is in any case that the contractors know the exact composition of their offered products, which is beneficial to the recycling process.

B. By-product status: Article 5 WFD on by-products

As highlighted above when explaining the prior developments in the waste definition,[1064] the by-product status has now been codified in the 2008 WFD. Regarding the concept of by-products,[1065] Article 5 WFD lists several conditions for a substance or object to meet in order for it to be regarded as a by-product. Article 5 WFD is as follows:

> *1. A substance or object, resulting from a production process, the primary aim of which is not the production of that item, may be regarded as not being waste… but as being a by-product only if the following conditions are met:*
>
> *(a) further use of the substance or object is certain;*
>
> *(b) the substance or object can be used directly without any further processing other than normal industrial practice;*
>
> *(c) the substance or object is produced as an integral part of a production process; and*
>
> *(d) further use is lawful, i.e. the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts.*
>
> *2. On the basis of the*[se] *conditions… measures* [, designed to amend non-essential elements of this Directive by supplementing it,] *may be adopted to determine the criteria to be met for specific substances or objects to be regarded as a by-product and not as waste...* (emphasis added)

The essence of these conditions is to give guidance as to when an additional material deriving from a production process is not considered waste but non-waste (called by-product, the same as how the CJEU has called this material stream), which could then be used again in the (same) production process. The purpose of the first condition is that if further use were not certain, there would be a risk of the material being discarded as waste.[1066] The second condition related to the

---

Publishing, 2014), p. 102; and L. Waalkes and R.G.J. Laan, 'Eigendom van afvalstoffen' (Stichting vervoeradres, *Weg en wagen*, 27:70, June 2013). ('Ównership of waste').

[1063] E.g. that the collectors should be considered waste collectors and that the contractor should be considered a waste management operator, and that both entities should have a permit allowing for their activities.

[1064] Chapter 6.1.1-B (heading 'Intends to discard').

[1065] The Commission launched a Communication on by-products in 2007 by way of guidance on the issue of by-products and in preparation for the adoption of the 2008 WFD. It explains the business and environmental context around by-products and interprets the rules as set down in the WFD and as interpreted by the CJEU. European Commission, *Communication on the Interpretative Communication on waste and by-products*, COM(2007) 59. The Communication was part of the Thematic Strategy on the prevention and recycling of waste of 2005, which was touched upon in Chapter 2.2.3-B.II.

[1066] The degree of certainty is assessed based on the aim *'to exclude beyond all reasonable doubt any possibility that, owing to inappropriate treatment, the material which the holder purports to exploit as a by-product will ultimately be treated as waste which the holder discards in an improper manner.'* Opinion of Advocate General Cruz Villalón on 16 May 2013, *Donal Brady v Environmental Protection Agency*, C-113/12, EU:C:2013:324, para. 69.

situation where a production residue has to be treated before it can be used again: this may indicate a waste treatment operation. According to the third condition, a material which is made ready for further use through an integral part of the manufacturing process is evidence of the by-product status.[1067] Amongst others, the fourth condition requires an assessment to confirm that the use of the residual material does not lead to overall adverse environmental impacts, which is in line with the overall objective of the WFD. All in all, whether a material complies with these four conditions is often debatable and should be seen in the context, taking the case law into account. One aspect of the final condition is more straightforward, however: the condition that further use must be lawful requires that at all legislation related to the Circular Economy should be looked at, such as products, chemicals, environmental and health protection legal acts, both at national level as well as EU level. The production residue is a by-product once all conditions in paragraph (1) are met.[1068]

By-products are by definition non-waste – just as the products primarily aimed at. The 2008 WFD has not changed the case law concerning by-products. Member States may introduce specific technical 'by-product criteria' for certain residual materials at national level. Evidently, these criteria should at least comply with the conditions highlighted above. The WFD has moreover explicitly introduced a mandate for the Commission in Article 5(2) WFD to do the same. These EU by-product criteria have precedence over possible national criteria.

Glass residues from glass production are not likely to be considered by-products easily, as glass has the characteristics of being easily reused in the production of new glass without losing any quality and without leading to further adverse environmental or human health impacts. Because of these features, its use in the original products process is reasonably certain.

B.I Circular Economy Package on by-products

While the Commission calls for clearer rules on by-products and greater harmonisation and simplification of the legal framework on by-products,[1069] the legislative proposal amending the WFD only proposes marginal changes to Article 5 WFD. The proposal merely explains more clearly 'who does what' under the current rules – there is actually nothing really *new* about that. Note, therefore, that no *changes* are made to the conditions laid down in Article 5(1) WFD. The proposal stresses more clearly that the first paragraph of Article 5 WFD is addressed to the Member States ('*Member States shall ensure that a substance or object… is considered not to be waste, but to be a by-product if the… conditions are met*') and that the Commission is empowered to adopt the measures referred to in the second paragraph. Building on these two suggestions, an additional paragraph to the Article is proposed that emphasizes that Member States must notify the Commission of national technical regulations.[1070]

C. End-of-Waste status: Article 6 WFD on EoW criteria

While a by-product status can only be attained if a substance or object has not been waste before, the EoW status can only be attained if the substance or object has been waste before and is

[1067] In this respect, if a material leaves the production site where it is produced to undergo further processing, the material may not be a by-product. On the other hand, if it is normal industrial practice that the residual material is treated outside the original production operation, the material could still be considered a by-product pursuant to the second condition. According to the Commission, BREFs can be used to investigate whether a substance or object is produced as an integral part of the production process. European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, 2012, p 18.

[1068] This is not entirely true, however. The CJEU explained in several cases, some of which have already been touched upon earlier (see Chapter 6.1.1-B), that waste must be determined in the light of all circumstances, in view of the aim of the WFD and ensuring that its effectiveness is not undermined. These issues, too, must be taken into account.

[1069] CE Action Plan, p. 5; and European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595, p. 4.

[1070] See for the specific wording of the proposals: ibid., *Proposal for a Directive amending Directive 2008/98/EC on waste*, p. 14.

therefore most important for recycling operations. Their common denominator is, however, that the item concerned stayed/became *non-waste*. For this reason, the WFD sets forth quite similar conditions that must be complied with in order for the substance or object concerned to have the status as non-waste. Both sets of conditions have besides an environmental basis also a clear economic dimension.

Article 6 WFD clarifies when certain waste ceases to be waste by laying down EoW criteria, which ought to provide a high level of environmental protection and an economic benefit. Meeting the relevant EoW criteria is one of the ways to establish that a waste material legally ceases to be waste. This only applies when waste undergoes recovery. The conditions that should be complied with by the EoW criteria specific to a particular waste stream are as follows:

> *1. Certain specified waste shall cease to be waste… when it has undergone a recovery, including recycling, operation and complies with specific criteria to be developed in accordance with the following conditions:*
> *(a) the substance or object is commonly used for specific purposes;*
> *(b) a market or demand exists for such a substance or object;*
> *(c) the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products; and*
> *(d) the use of the substance or object will not lead to overall adverse environmental or human health impacts.*
> *The criteria shall include limit values for pollutants where necessary and shall take into account any possible adverse environmental effects of the substance or object.* (emphasis added)

The essence of these conditions is to provide obligatory guidance for the European Commission for establishing EoW criteria that should indicate when waste stops being waste and turns into non-waste materials or products. The fact that only waste can obtain an EoW status is very different to the by-product status, as the latter can only be obtained by non-waste materials. The completion of a recovery process, including recycling, is therefore closely linked to the EoW status and not to the by-product status: the moment when a material reaches the EoW status is simultaneous with the completion of the recovery process, and *vice versa*. Generally speaking, the completion of a recovery process, which involves many preparation processes prior to the final step in the recovery process, *'may be considered to be the moment where a useful input for further processing, not representing any waste-specific risk to health and the environment, becomes available*.'[1071]

The conditions set out in Article 6(1) WFD are cumulative and fill in that respect the gap of the 'other factors' left by the CJEU.[1072] The first and second 'economic conditions' are related and compliance with the two may be indicated by the existence of firmly established market conditions (supply and demand), a verifiable market price being paid for the material or the existence of trading specifications or standards.[1073] The third condition relates to the lawfulness and the technical quality of the material concerned. Meeting the standards which are set for similar virgin materials for the same purpose can be evidence of meeting this condition. The material should moreover be ready for final use.[1074] The final condition builds on the primary aim of the WFD, namely to protect the environment and human health. Compliance can be indicated by comparing the use of the material under the relevant product legislation with the use of the same material under waste legislation.[1075] Reinjecting recovered materials into the economy should in any case not diminish environmental protection as compared to the situation under EU waste legislation.

[1071] European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste,* 2012, p 25.
[1072] As highlighted in Chapter 6.1.1-C.
[1073] Supra note 1071, p 23.
[1074] Ibid., p 23. Chapter 6.4 of this dissertation discusses the role harmonized standards (could) play in the search for adequate instruments to increase the quality of recycled (EoW) materials. In Chapter 6.5, the relation between EoW criteria and standards is further elaborated on.
[1075] Ibid., *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste,* p 24.

In the cases where these specific EoW criteria have *not* been set at EU level, which are generally set in a Regulation and are for that reason also binding for private users next to the Member States, Member States may decide on a case-by-case basis whether certain waste ceases to be waste taking into account the applicable case law. This is in line with the shared competence between Member States and the EU over environmental matters. The national EoW decisions must even so be notified to the Commission (Article 6(4) WFD). Remarkably, these national EoW criteria are *not* required to meet the conditions set in Article 6(1) WFD.[1076] If Member States do not adopt any national EoW criteria either, it is up for the operators to decide upon whether the waste ceases to be waste – national authorities may of course intervene if they think the materials should still be regarded as waste. Evidently, the waste definition and case law apply in these situations.

Article 6(2) WFD obliges the Commission to consider preparing EoW criteria at EU level, among others, at least for aggregates, paper, metal, tyres, textiles and glass. Recital (22) WFD added construction and demolition waste, some ashes and slags, scrap metals and compost to this list of potential waste streams.[1077] Such EU-wide EoW criteria are binding for Member States and binding on companies and individuals, because they are set in Commission Regulations. So far, three sets of criteria have been adopted, for: iron, steel and aluminium scrap (2011); copper scrap (2013); and *glass cullet* (2012).[1078] Let us look more closely at these latter EoW criteria to see how such Regulations are shaped and how it affects the glass recycling industry.

C.I Exemplary critique: the response to the EU EoW criteria for glass cullet

Scope and content of the EoW criteria

The EoW Regulation for glass cullet was adopted on 10 December 2012. According to Article 2(1) of the Regulation, 'glass cullet' means

> *cullet generated from the recovery of glass waste* (Emphasize added)

In principle, EoW can therefore also be achieved by glass cullet after recovery operations other than recycling. In practice, however, recycling operations are the main focus of the EoW criteria for glass. The Regulation establishes criteria determining when glass cullet destined for the production of glass substances or objects in *re-melting processes* ceases to be waste.[1079] Note that glass cullet sent for use in aggregates would therefore still count as waste.[1080] Using the glass in this type of mixture of materials, made up from either a mix of colors crushed to a small size glass

[1076] According to the Advocate general Kokott in the *Lapin elinkeino* Case, this is indeed the rightful interpretation of Article 6(4) WFD, despite the vision of the Commission that the Member States must observe the criteria of Article 6(1)WFD nonetheless. It further explains that it is unclear why exactly the WFD refers to the case-law and not to the conditions set out in Article 6(1). See Case C-358/11 *Lapin elinkeino-, liikenne- ja ympäristökeskuksen liikenne ja infrastruktuuri –vastuualue v Lapin luonnonsuojelupiiri ry* [2013] ECR I-142; and the opinion of Advocate General Kokott on Case C-358/11 *Lapin elinkeino-, liikenne- ja ympäristökeskuksen liikenne ja infrastruktuuri –vastuualue v Lapin luonnonsuojelupiiri ry* [2012] ECR I-797, paras. 73-75.

[1077] On the basis of Recital (24) WFD, the Commission may adopt guidelines instead of official EU EoW criteria to specify when substances or objects become waste. Just as EoW criteria, these guidelines should promote legal certainty and consistency. There are no conditions that specify for which waste streams guidelines could be developed. The Recital only mentions electrical and electronic equipment and vehicles as potential waste streams.

[1078] Regulation 333/2011of 31 March 2011establishing criteria determining when certain types of scrap metal cease to be waste under Directive 2008/98/EC of the European Parliament and of the Council, [2011] OJ L 94/2; Regulation 715/2013 of 25 July 2013 establishing criteria determining when copper scrap ceases to be waste under Directive 2008/98/EC of the European Parliament and of the Council, [2013] OJ L 201/14; and Regulation 1179/2012 of 10 December 2012 establishing criteria determining when glass cullet ceases to be waste under Directive 2008/98/EC of the European Parliament and of the Council, [2012] OJ L 337/31, respectively.

[1079] Article 1 Regulation on EoW criteria for glass cullet.

[1080] Aggregates are a mixture of waste particulate materials generally derived from construction and demolition sites (sometimes non-waste can be used as well).

or a mix of these glass particles and particles made of other materials such as sand, gravel, slag and/or recycled concrete, is also called a backfilling operation and falls within the residual recovery category 'other recovery'.[1081] The fact that the EoW criteria only apply to glass waste in re-melting processes is to safeguard the quality of the glass cullet. According to the JRC, it is estimated that from all the packaging and flat glass waste that is collected across the EU more than 80% will meet the EoW criteria after proper sorting and recovery treatment.[1082] Importantly, the glass recyclers (or importers) should declare their cullet as 'EoW'. They should issue a statement of conformity for each consignment of glass cullet and install a management system, which is to be verified and monitored by a so-called independent 'conformity assessment body'.[1083]

If one zooms in on Article 6(1)(c) WFD, the JRC and Institute for Prospective Technological Studies, which have been assigned by the mandated Commission to prepare the EoW criteria for glass, have based the quality standards that need to be met, amongst others, on industrial standards and legislation.[1084] As regards the applicable legislation, for example, the Packaging Directive establishes European-wide maximum concentration levels for certain substances (lead, cadmium, mercury, hexavalent chromium…) for container glass.[1085] These levels are relatively strict, because the container glass could come into direct contact with food. REACH is less significant for the setting of concentrations limits for glass, because most types of glass can be exempted from registration considering that registration is deemed inappropriate or unnecessary based on the classification of glass as safe (i.e. not dangerous),[1086] or have already been registered before.[1087] Particularly regarding the quality levels in the EoW criteria, it becomes apparent that the contamination levels set in the EoW criteria are *maximum* levels ('no more than… is allowed').

At the same time – and this is essential to understand – the EU EoW criteria *as such* set a *minimum* quality standard for glass cullet. This is to include as much as possible cullet while still guaranteeing a sufficient level of environmental protection, as the cullet must be suitable for remelting into newly manufactured non-waste products such as bottles, fiberglass or glass wool. Important to note in this regard is that the EoW criteria do *not* fix any final applications or purposes. The goal is rather to produce cullet which can be used as a resource for all sorts of products. The cullet must therefore be devoid of hazardous properties and sufficiently free of non-

---

[1081] Although backfilling is explicitly accepted by Article 11(2)(b) WFD as a recovery operation, the WFD does not provide a definition. Article 2(6) Decision establishing rules and calculation methods for verifying compliance with the targets set in Article 11(2) WFD states that backfilling means *'a recovery operation where suitable waste is used for reclamation purposes in excavated areas or for engineering purposes in landscaping and where the waste is a substitute for non-waste materials.*'

[1082] Joint Research Centre and Institute for Prospective Technological Studies: E. Rodriguez Vieitez, P. Eder, A. Villanueva and H. Saveyn, 'End-of-Waste Criteria for Glass Cullet: Technical Proposals' (*European Union*, EUR 25220 EN-2011, 2011), p. 101.

[1083] Articles 4 in conjunction with Annex II, and 5 Regulation on EoW criteria for glass cullet. These are requirements that are also present in in other two EoW Regulations. The use of control procedures is in line with other environmental regulations and allocates the main responsibility with the industry.

[1084] See supra note 1082, pp. 40-59.

[1085] Article 11 Packaging Directive. Note, however, that these limits are applicable to the final product and not to the cullet itself.

[1086] According to Article 2(7)(b) REACH: this provision refers to Annex V.11 Annex V.11 REACH reads as follows: *'The following substances unless they meet the criteria for classification as dangerous… and provided that they do not contain constituents meeting the criteria as dangerous…, unless conclusive scientific experimental data show that these constituents are not available throughout the lifecycle of the substance and those data have been ascertained to be adequate and reliable: Glass, ceramic frits.'* (emphasis added).

[1087] According to Article 2(7)(d) REACH. The JRC-IPTS preparatory study states that for glass, it is most likely that showing 'sameness' (which is a key requirement under the provision) of the recovered glass by the same IUPAC (a standard body) name is sufficient, *'as due to the nature of glass, impurities in EoW glass are rather limited and, in most cases would not change the hazardous properties to an extent that a "new" substance would have to be defined*.' See supra note 1082, p. 54.

glass components, such as wood and plastics.[1088] This is the reason why only non-hazardous waste from the collection of recoverable container glass, flat glass or lead-free tableware may be used as input.[1089] The fact that the recycled materials must be used by all sorts of industries and for different applications means that quality levels are generally not considered very ambitious, which makes the criteria for many stakeholders requiring (recycled) raw materials of a higher standard inadequate. However, this mediocrity does not prevent standard bodies or businesses from requiring higher qualities of the (virgin as well as recycled) glass cullet. These higher standards would thus exist next to the EU EoW criteria. The quality level of these parallel quality standards depend on the final application of the cullet. For example, the quality for glass insulation wool is lower than for flat glass.[1090]

Response and critique to the EoW criteria

In spite of the flaw put forward above, the Regulation on EU EoW criteria for glass has generally speaking been positively received by the glass recycling industry.[1091] One of the criticisms was, however, that the self-monitoring requirements omit to take account of the differences between pre-user flat glass waste and post-user flat glass waste. It is argued that the first category, which is the greatest majority of the flat glass cullet volume derived from recycling processes, should be exempted from the requirements, because this type of cullet derives from offcuts originating from the glass processors who produce final flat glass products for building, automotive, and industry, and consists of clean flat glass exempt from any other pollutants.[1092] Hence, this means that this stream, which is currently considered waste because the glass *processor* is an independent legal entity different from the flat glass *manufacturer*, can be directly sent back to the furnace without additional treatment.[1093] Before the adoption of the EoW Regulation, the decision on the use of this type of cullet in flat glass furnace was based on a visual inspection only. The self-monitoring requirements in Annex I of the EU EoW criteria for glass (namely for criteria 1.2 and 1.3) make it practically impossible to benefit from the EU EoW criteria and to be directly used in flat glass furnaces.[1094] This argument boils down to the idea that pre-user glass cullet with a highly predictable composition needs less frequent and time-consuming monitoring. It stands to reason that there is a difference between the two waste streams and that a distinction can be made between them. If the requirements would indeed be incorporate, a definition for pre-user cullet must be incorporated in the EU EoW criteria for glass, as this would lower the risk of any abuse of the rule. The preparatory work of the JRC-IPTS provides for a useful definition. It defines pre-user cullet as:

[1088] Annex I Regulation on EoW criteria for glass cullet.

[1089] See Annex I (section 2) Regulation on EU EoW criteria for glass cullet.

[1090] For flat glass the concentration levels in criterion 1.2 is much tighter. Glass for Europe, 'End-of-Waste criteria for waste glass. Glass for Europe comments on the second draft of the background document for the Expert Workshop - (Seville, December 2010)' (*Glass for Europe*, 2011).

[1091] See e.g.: a statement made by Glass for Europe (which is a trade association for Europe's manufacturers of building, automotive, and transport flat glass. It represents 90% of Europe's flat glass production). Ibid.

[1092] The lack of distinction between pre-user waste and post-user waste in the EoW criteria was also noted in the case of the EoW criteria for scrap metal. This absence was nevertheless not recognized as a flaw; it was only observed that the practical distinction implies that the EoW criteria may apply at different stages. N. de Sadeleer, 'Scrap Metal intended for Metal Production: The Thin Line Between Waste and Products' (*Journal for European Environmental & Planning Law*, 9:2, 2012), p.158.

[1093] These arguments were made in: Glass for Europe, 'End-of-Waste criteria for waste glass. Glass for Europe comments on the second draft of the background document for the Expert Workshop - (Seville, December 2010)' (*Glass for Europe*, 2011).

[1094] The document continues by explaining that, '[d]*ue to the dimension of the pieces, it is not possible to make an analysis of the contaminants as is. The cullet should be grinded to allow the analysis foreseen to be performed. Glass processors are mostly SME's and have no equipment to grind the glass and they would have to send the glass, as waste, to a recycler as of today. Thus, the benefit of EoW is lost for the glass processor and pre consumer cullet*.' Ibid. See also e.g.: supra note 1082, p. 93.

glass waste resulting from the manufacturing of products…, and which leaves the specific facility where it was generated, becoming waste but not reaching the consumer market. An example of pre-consumer cullet is the glass cullet constituted by offcuts and pieces from defective manufacturing of e.g. the production of car windows from flat glass, which leave the car window manufacturing facility and are re-melted in the flat glass manufacturing facility.[1095] (emphasis added)

Accordingly, pre-user glass cullet, such as offcuts and pieces from defective manufacturing, is considered waste which leaves the manufacturing site but does not reach the final users, such as house owners who wish to replace the windows.[1096] The level of predictability of the composition of these streams of glass waste is high (on condition that the cullet is collected and transported back to the manufacturing facility separately). It is unclear why the final set of EU EoW criteria for glass cullet does not make a distinction between pre-user and post-user glass cullet.

After the adoption of the 2012 EU EoW criteria for glass cullet and of the subsequent EU EoW criteria for copper scrap in 2013, things became more difficult for the Commission to continue and extend the EoW regime because of protests amongst the paper manufacturers/recyclers during the preparations of the EU EoW criteria for paper. In a nutshell, some of them claimed that the proposal for the EU EoW criteria for paper would have moved the EoW point from the recycling facilities to an earlier stage in the collection. This would have had risked a lower quality of 'recycled' paper, requiring further processing on every occasion, and would have had posed a threat to the high paper recycling rates at that time in the EU, amongst others because the Waste Shipment Regulation would not be applicable anymore once the waste ceases to be waste, risking big volumes of paper material to leave the EU's territory.[1097] Clearly, the prospect of a decline in both the quality and the quantity of recycled paper lies at the basis of their criticism.

All things considered, the main goal of setting EU EoW criteria is to regulate that waste may only cease to be waste whenever human health and the environment are protected in the products stage at least on to the same extent as they had been in the waste stage. In addition, guaranteeing a *minimum* level of the recovered material is also aimed for, as this means that the material will actually be used again in new production processes. Having specific EU EoW criteria does not mean, however, that all producers can use the non-waste material in their processes, because they require different, possibly higher quality levels for different product applications. It is therefore questionable whether the EoW mechanism is a useful instrument for the industry. In fact, since the plan to adopt an EoW Regulation for paper had not come to fruition, the adoption of new EoW Regulation has basically been put on hold. The European Commission tries, however, to revitalize the use of EU EoW criteria through the 2015 CE Package, where it introduces some changes to the mechanism.

C.II Circular Economy Package on EoW criteria

Recital (8) of the legislative proposal to change the WFD stresses once again that, in order to provide operators in markets for recovered raw materials with more certainty about the waste status of substances or objects and to promote a level playing field, it is important to establish

[1095] Ibid., p. 11. The original wording in the report is 'pre-consumer cullet' instead of 'pre-user cullet'.
[1096] Note that this definitions explicitly requires the glass product to have left the production facility, because if this was not the case, this is evidence that the offcuts concerned are *by-products* of the production process. These by-products are usually immediately used again in the production process and do not become waste. Because this practice is easy for glass, due to the characteristics of glass, almost no glass will leave the manufacturing facility as waste. See e.g.: European Parliamentary Research Service: D. Bourguignon, 'Understanding waste streams Treatment of specific waste' (*European Union*, PE 564.398, Briefing July 2015), p. 5.
[1097] See the press release 'End-of-Waste = End of recycling?' of the Confederation of the European Paper Industries of 10 September 2013, see: http://www.cepi.org/topic/recycling/pressrelease/endofwaste (consulted on 4 May 2017).

harmonized conditions for such substances and objects to be recognized as non-waste.[1098] With this in mind, the Commission proposes several minor adjustments to Article 6 WFD.[1099] It is important to know that the conditions for setting EU EoW criteria, as laid down in Article 6(1) WFD, have been left untouched.

That being said, the biggest, clear change to Article 6 has a major impact on the scope of application of the conditions set out in its first paragraph: contrary to the currently applicable rules, the new wording of the Article clarifies that also *national* EoW criteria must comply with Article 6(1) WFD. In this way, the conditions are generalized and made applicable throughout the EU. This is an alternative, much slower way of harmonization than through the setting of EU criteria.

Regarding the setting of *EU* criteria, the European Commission is less clear on the strategy. Based on the text of the CE Package, it is not unambiguously clear that the Commission still has the mandate to adopt EU EoW criteria. Firstly because the introductory phrase of Article 6(1) WFD has unequivocally given the *Member States* the responsibility to ensure that waste having undergone a recovery operation is considered to have ceased to be waste if it complies with the conditions. Secondly, at the same time, the currently applicable Article 6(4) WFD, according to which Member States could only adopt national EoW criteria if no criteria were developed at EU level, has been repealed. Finally, the legislative proposal includes a new Article 6(2) WFD, stating that the Commission would be empowered to adopt delegated acts in order to establish *'detailed criteria on the application of the conditions'* laid down in Article 6(1) WFD to certain waste streams.[1100] Purely based on this wording, it is unclear whether the 'detailed criteria' actually mean the EU EoW criteria as they are presently known and used. Why not just refer to 'the EU EoW criteria'?[1101] Moreover, EU EoW criteria are no criteria *on the application* of the conditions; rather, such criteria must *comply with* the conditions. Based on these three, indeed, semantic arguments it is plausible to think that the Commission would not have the right to prepare new EU EoW criteria anymore.[1102]

After having sought confirmation of the arguments at the European Commission, however, it is safe to state that, despite the ambiguities, the European Commission would nonetheless continue to have the right of initiative to propose and adopt EU EoW criteria for certain waste.[1103] The Commission would not easily propose giving back this mandate to the Member States considering the assumed need to harmonize when waste ceases to be waste across the Union. The

[1098] Noteworthy, therefore, is that EoW criteria are in principle not intended to address decisions concerning strategic waste management options; they are only a tool to help improve and promote recycling by determining when a waste ceases to be a waste, independently from the waste management option chosen. JRC, *End-of-Waste Criteria*, EUR 23990 EN, 2009, p. 7

[1099] See for the changes: European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595, pp. 14-15.

[1100] Ibid., p. 14.

[1101] To compare it with the currently applicable Article 6(2) WFD: there it uses the words 'the criteria set out in paragraph 1' and the 'end-of-waste specific criteria'. These phrasings are much more to the point.

[1102] On top of this, the Commission neither really seems to support the idea of granting itself the opportunity to adopt EU-wide EoW criteria in the 'Questions & Answers' fact sheet, which accompanied the CE Package. There, it states that the legislation will be modified to enable recycled materials to be reclassified as non-waste whenever they meet a set of general conditions, which have become the same across the whole EU, and that the three existing EU EoW criteria (e.g. for glass cullet) will remain in force. See the European Commission's fact sheet: 'Circular Economy Package: Questions & Answers', 2 December 2015, see http://europa.eu/rapid/press-release_MEMO-15-6204_en.htm (consulted on 10 May 2017). By explicitly pointing out that the existing EoW Regulations would in any case be still applicable, it implies that the adoption of new EU-wide EoW criteria has come to an end. Note, moreover, that the proposed Article 6(2) WFD does not oblige the Commission to look into the opportunities to adopt EU EoW criteria for specifically identified waste streams anymore, which is for example currently the case for glass.

[1103] I checked this with DG ENV of the European Commission by an e-mail correspondence between the author of this thesis and one of the employees of Unit B3 - Waste Management & Secondary Materials, which started on 9 May 2017 and ended on 18 May 2017.

'detailed criteria' would therefore mean the actual EU EoW criteria. The fact that Member States are emphasized more in the adjustments can be traced back to the fact that Member States would also need to comply with the conditions as set out in Article 6(1) WFD.

In sum, it is not very surprising that the Commission embraces a conciliatory approach in the CE Package to try to achieve results (again) with respect to the EoW status. This is done through the broadening of the scope of application of the conditions laid down in Article 6(1) WFD to the Member States, so as to create simplicity and public support. On the one hand this development is advantageous for the Circular Economy in the EU, because national EoW criteria will increasingly more resemble each other. In addition, a greater consensus will be regained on the value of the Article. However, on the other hand, it is a much slower-paced approach to the harmonization ambition for creating an EU market for waste and recycled materials than envisaged by the currently applicable rules. Moreover, a EU approach would provide a better platform for the industry operating on an EU scale to discuss the (minimum) quality level desirable.

6.1.3 Interim conclusion and summarizing flowchart

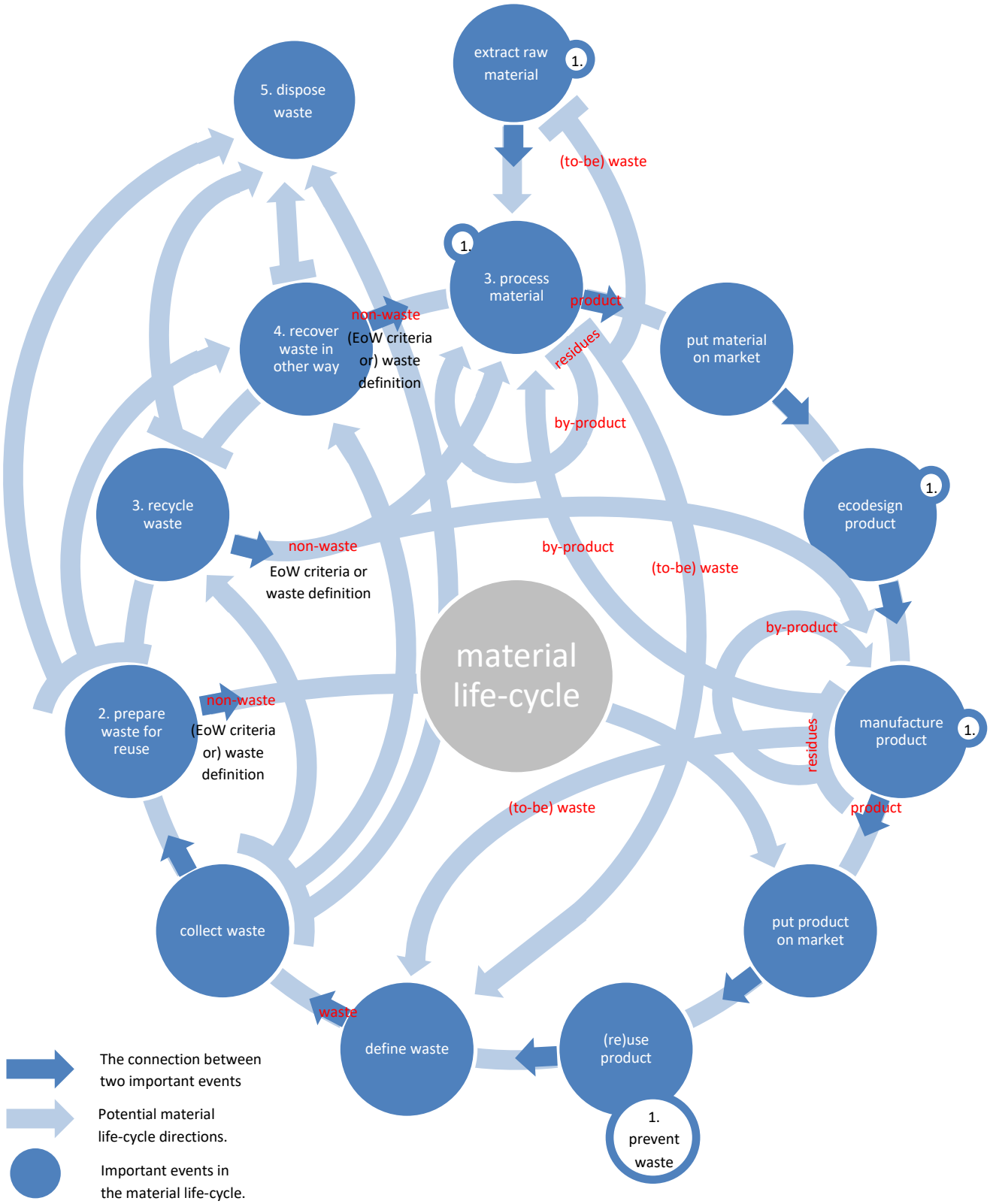
The waste definition has come a long way since its introduction in EU law in the 1970s. The CJEU has (had) a significant impact on its development. The abstract nature of 'to discard' has nevertheless remained intact ever since. Despite the newly added 'by-product status' and 'EoW status' to the WFD in 2008, which are nevertheless based on settled case law, the problem of not knowing the exact meaning and correct application of the waste definition is not entirely alleviated. The waste definition is still regularly being put to the test by new technologies, business models, stakeholders… Emerging business models (such as Product Service Systems, according to which services may be use to circumvent the waste stage) and recent CJEU judgements (such as the *Shell* Case, according to which contracts could be one of the indications that one deals with non-waste instead of waste) all impact the interpretation of the waste definition to some degree. These developments could moreover influence recycling practices in the EU. Even though there is a continuous development in the interpretation of the waste definition, which fuels discussion on its general meaning, the tenor of the waste definition remains that it should be applied on a case-by-case basis, taking all the specific circumstances into account.

Besides the waste definition, the rules on 'by-products' and 'EoW criteria' have also become subject for discussion. Considering recycling, however, Article 5 on the by-product status does not cause many problems. The most significant Article for recycling is Article 6 WFD on the EoW criteria, because it indicates amongst others which conditions must be complied with by the EU to establish EU-wide EoW criteria for particular waste streams. These criteria should in turn indicate when the waste items of the waste stream at issue cease to be waste after the completion of a recovery process – in nearly all cases it concerns recycling processes. If the changes proposed in the CE Package are to be implemented, it would make the conditions also applicable to national EoW criteria, for this is currently not the case. Today, Member States can create EoW criteria if no criteria are established on EU level *without* taking the conditions into account. Thus far, glass is one of the three waste streams for which an EoW Regulation has been developed by the EU. Shortly after its adoption, however, a heated discussion with the industry on the adoption of EU EoW criteria for other waste streams led to less optimism and motivation within the Commission to continue the harmonization approach through EU EoW criteria. The main point of critique is that the mechanism set a minimum quality level, according to which the protection of the environment is sufficiently guaranteed, but which does not raise the quality of the recyclate at issue; the quality level is the result of the pursuit of an overall, mediocre quality of the recycled material. Therefore, EU EoW criteria will not be beneficial for many stakeholders in the supply chain who (might want to) use high(er)-quality recycled materials. In fact, I doubt whether EU EoW criteria are useful to stimulate even most of the stakeholders involved to attain the minimum quality level set out in the criteria, because most of the recyclates already meet the thresholds. Despite this flaw, the CE Package tries to revitalize the EoW instrument nonetheless.

A flowchart is provided below to visualize and thereby clarify the different statuses a material can have in its life (*Flowchart 8*). The 'tracks' are based on the currently applicable rules and are indicated in red. As one can notice, the WFD has a great impact on the material life-cycle. Significantly, only waste materials can be recycled. The waste definition is therefore a conditional element for recycling. Furthermore, the flowchart shows that recycling is one of the recovery operations whereupon waste may cease to be waste (i.e. attaining the EoW status). The material resulting from the recovery operations could then be used again as a raw material in the processing of other, new materials or straightaway in the product manufacturing. In that respect, the waste definition and especially the rules on the EoW status are significant for the recycling track, as they determine the non-waste status of the recycled material.

Flowchart 8: status material in the material life-cycle (on the next page)[1104]

[1104] The flowchart is authentic, designed especially for this research.



1-5 The numbers indicate the waste hierarchy. Accordingly, waste prevention (1.) is placed outside the waste stage, whereas the waste treatments (2-5) are within that stage. For the waste treatments, the corresponding dark blue arrows show the way the waste goes after the specific treatment. The light blue arrows indicate the direction(s) which are also possible. The choice between these light blue arrows is not optional: the arrow should be picked with a sequence number. However, one could also ignore the numbers if this is justified by life-cycle thinking: then the waste treatment most optimal for the environment can be chosen.

abc Different statuses a material can have/different tracks in the life-cycle of a material

6.2 Framing qualitative recycling

The waste definition and the related concepts form the basis of EU waste legislation and are in that capacity important to define the transition from and to EU product legislation. The possibility for waste to attain the EoW status is particularly significant to recycling practices, because recycling aims at reprocessing waste materials into non-waste products, materials or substances.

Nearly all currently applicable waste policy and legislation aim at shifting away from landfilling and incineration (i.e. disposal operations) to recovery operations such as recycling. Already back in 2003, the European Commission noted that there was a need for a generally applicable definition of recycling and that there was a lack of comprehensive approach to recycling.[1105] The 2008 WFD therefore contains several waste management tools, an enhanced waste hierarchy and a general definition of recycling to encourage and to clarify the scope of recycling. When it comes down to waste treatments, recycling became the centerpiece of the waste regime. The EU clearly wants to move to a recycling, circular economy. Bearing in mind the historic evolution of EU waste law, it turns out that the long-term strategy of shifting from disposal to recycling is effective.[1106] The next step now urgently needed is to establish a Circular Economy based on quality. It is for this reason that the CE Package challenges the EU and its Member States to encourage qualitative recycling.

Clearly, the proliferation of the word 'recycling' has increased over time. There are moreover several interpretations of recycling available today. Its plural and changing meaning in law, policy and every-day language are confusing for the industry and the final product users as well as for public authorities, both at EU and at national level. All the more so since more and more vaguely described 'subconcepts' for recycling are being used in non-legal documents to differentiate between recycling systems and/or to refer to the different qualities of recycled materials.

I will explain the legal meaning of recycling and to explore how the (non-legal) subconcepts, including 'qualitative recycling', relate to this general definition. The purpose of this section is thus to map out the points of reference in the WFD to provide for a basic understanding of qualitative recycling and for a starting point for the subsequent parts, Chapters 6.3-6.5.

6.2.1 Meaning of recycling

To briefly repeat what has already been explained about the recycling definition in previous Chapters:[1107] recycling is the third lever in the five-step hierarchy and the second of three recovery categories.[1108] According to Article 3(15) and (17) WFD, recovery and recycling mean:

> *'recovery' means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy…*
>
> *'recycling' means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations* (emphasis added)

[1105] Communication *Towards a thematic strategy on the prevention and recycling of waste*, COM(2003) 301. See also: its sequel COM(2005) 666.

[1106] COM(2011) 13, p. 5 and COM(2014) 398 final/2, pp. 5 and 10; Bio Intelligence Service, *Ex-post evaluation of certain waste stream Directives*, 2014, pp. 1-373; Institute for European Environmental Policy: C. Jackson and E. Watkins, 'EU waste law: the challenge of better compliance' (Institute for European Environmental Policy, *Directions in European Environmental Policy*, 5, 2012), pp. 3 and 4; and e.g. J. Krook, N. Svensson and M. Eklund, 'Landfill mining: A critical review of two decades of research' (*Waste Management*, 32, 2012), p. 514.

[1107] See Chapters 3.2.3 and 5.2.3-C (heading 'Waste Framework Directive').

[1108] See in particular Articles 4(1) and Article 3(15)-(17) WFD. Annex II WFD, which includes an illustrative list of recovery operations, contains several examples of recycling activities.

Recycling means the processing of *waste* into products, substances and (non-waste) materials, and the final aim of recycling is closing the life-cycle of the particular material and beginning a new one.[1109] Waste materials should be processed in order to alter its physico-chemical properties allowing it to be used again for the same or other useful applications.[1110] This is precisely the reason why the waste hierarchy puts recycling just after 'prevention' and 'preparation for reuse' (both targeting the *running* material cycle) but before 'other recovery, including energy recovery' and 'disposal' (both ending the running material cycle or, in some cases, providing for a new but low-quality material cycle under the current rules).[1111] What is more, the processing operation has not been characterized in the definition of recycling; as long as a waste treatment generates a substance, material or product that is used for the original or for other purposes, it can be called recycling. Significantly, the definition neither gives any information on the quality of the recycled materials. This feature is important because it underscores that there are no legally binding recycling categories whatsoever.

Not only is the meaning of recycling in EU waste legislation important for the application of the waste hierarchy, it simultaneously characterizes the setting of the waste treatments targets. The European Commission tries to progressively increase the legally binding targets in six EU waste Directives in the coming years.[1112]

According to the European Commission, it is essential to ensure comparable, good statistics across the entire Union, and to simplify the current system and encourage higher rates of effective recycling for separately collected waste.[1113] Indeed, harmonization is deemed necessary and probably rightly so. How else can the Commission measure and compare the recycling rates among the Member States? In the light of these targets, therefore, the CE Package proposes new calculation methods to be included in a new Article 11a WFD.[1114] It follows from this improvement that the recycling definition would need to be supplemented, because the rates are calculated on how much waste goes in (input) and how much recycled materials goes out (output) of the *final recycling process*. It is recommended to introduce Article 17a WFD, according to which 'final recycling process' means:

> *the recycling process which begins when no further mechanical sorting operation is needed and waste materials enter a production process and are effectively reprocessed into products, materials or substances* (emphasis added)

This reflects the most logical understanding of the concept: i.e. the process whereupon the waste material actually changes its status into a non-waste material (potentially in the shape of a substance or of a product whenever the material/substance is simultaneously used in a new product). Naturally, the definition resembles to a large extent the broader meaning of recycling. The same definition is proposed for the Packaging Directive in order to create coherence and consistency.

Building on this, the CE Package stresses the need to align the recycling definitions in EU waste measures with the definition provided in Article 3(17) WFD. For example, the legislative proposal for changing the Packaging Directive refers to the WFD definitions of recycling and of

---

[1109] European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, 2012, p. 25.
[1110] Ibid., p. 32.
[1111] Previous versions of the WFD (e.g. Article 3 Directive 2006/12) gave equal weight to preparation for re-use, recycling and other recovery (back then these terms were differently defined).
[1112] For example, the preparing for reuse and recycling target for municipal waste is increased from 50% in 2020 (i.e. the existing target) and 60% in 2025 to 65% in 2030. The Commission also suggests a target of 65% by weight of all packaging waste to be prepared for reuse and recycled by 2025, which will be increased to 75% by 2030. At the same time, it gradually raises several targets for specific materials, e.g. 75% of glass to 2025 and 85% by 2030. See e.g.: the CE Action Plan.
[1113] CE Action Plan, p. 9.
[1114] European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595, p. 19-20.

final recycling process instead of retaining the existing recycling definition in the Package Directive (which is, indeed, interestingly enough slightly different than the WFD definition!).[1115]

To conclude, despite the justifiable changes proposed in the CE Package regarding recycling, there are no suggestions made that would actually change the meaning of recycling. It is business as usual: 'recycling' retains its formal meaning, which means that it does not differentiate between the variations in quality of the recycled material.

In the past fifteen years, however, various terms have been introduced by the industry and academia to describe the different 'quality tracks' a material can (re)cycle. Put differently, these terms create recycling subconcepts, just as recycling is a category of recovery. Whereas previous EU policy documents used to refer to recycling only, they now occasionally mention expressions such as 'high-quality recycling'.[1116] Several commonly used terms are explained below, divided in two parts.

6.2.2 Open-loop recycling and closed-loop recycling

'Open-loop recycling' and its counterpart 'closed-loop recycling' are two concepts that are frequently used nowadays. On the one hand, open-loop recycling can be described as a concept according to which the recycled material *is not* (predestined to be) used in the same type of products or similar products as the original products. In practice this generally means that the waste material will not be recycled indefinitely due to the likelihood that the quality of the recycled material will be gradually decreased over time. The material will thus eventually end up in a non-recycling treatment process, such as energy recovery or landfilling. In other words, while the material tolerates several cycles (loops), it will eventually end up in a linear model due to the gradual quality loss, down to another recovery operation (not being preparing for reuse or recycling, but such as backfilling) or a disposal operation, in accordance with the waste hierarchy.

On the other hand, closed-loop recycling can be described as a recycling concept according to which the recycled material *is* (predestined to be) used in the same type of products or similar products as the original products. Closed-loop recycling therefore ideally means that the cycles of a material run indefinite.[1117] Due to the characteristics of glass, glass waste in principle offers a good opportunity for carrying out closed-loop recycling, as the glass cullet does not loose (much of its) clarity or purity. In some Member States closed-loop systems for container glass is common practice.[1118] True closed-loop recycling cannot be performed for all waste items, however.

Generally speaking, despite being the most difficult option of the two, it is presumed that closed-loop recycling is the preferred practice. The title of the CE Package 'Closing the loop - An EU action plan for the Circular Economy' alludes to this idea.[1119] The general perception that

---

[1115] Article 1(1)(d) European Commission, *Proposal for a Directive amending Directive 94/62/EC on packaging and packaging waste*, COM(2015) 596, p. 10. In fact, it is proposed to only use the WFD terminology.

[1116] See e.g.: European Commission, *Proposal for a Directive amending Directives 2008/98/EC on waste, 94/62/EC on packaging and packaging waste, 1999/31/EC on the landfill of waste, 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment*, COM(2014) 397, p. 0; 2014 CE Package, p. 2; and under Priority objective 2, 40 of the 7th EAP. A short scan on the European Commission's webpage reveals that such terminology is more frequently used by the Commission and in research and policy reports ordered by the Commission. This suggests that the European Commission is perfectly aware of the use of recycling subconcepts by certain actors and that it will probably increasingly use the concepts as well.

[1117] Another option is to return the material to the natural ecosystem instead of keeping it in the technical environment. W. McDonough, M. Braungart and A. Bollinger, 'Cradle-to-cradle design: creating healthy emissions e a strategy for eco-effective product and system design' (*Journal of Cleaner Production*, 15, 2007), p. 1343.

[1118] See for example some statistics of the UK made available by WRAP: http://www.wrap.org.uk/content/environmental-benefits-closed-loop-glass-recycling (consulted on 17 May 2017).

[1119] Note that neither 'open-loop recycling' or 'closed-loop recycling' is used.

quality loss is by definition undesirable for the creation of a Circular Economy is probably the underlying reason for it.

6.2.3 Downcycling and upcycling

Other commonly used expressions are 'downcycling' and 'upcycling'.[1120] In general terms, downcycling can be described as recycling which *'reduces the quality of a material over time*,'[1121] and is said to be the vast majority of all recycling activities.[1122] Downcycled materials are therefore generally used for low(er)-end applications.[1123] Because of the same reasons as regards open-loop recycling, namely the gradual loss of quality of the material, downcycling is generally regarded as something negative.[1124] Downcycling shares a lot with the concept of open-loop recycling, because if a material is downcycled too many times and thereby loosing much of its quality, the material cannot be recycled anymore and must accordingly be disposed of through other recovery forms or disposal. In the case of downcycled glass waste, for example, it is not yet possible to recycle glass waste wool into new glass products, so this is a dead end for further downcycling.[1125] The explanation of closed-loop recycling/downcycling reflects the wording of recycling in Article 3(16) WFD, for it states that the recycled waste materials may either serve the original purpose *or other purposes.* A false assumption would therefore be to classify downcycling as 'other recovery', as some may suggest.[1126]

Upcycling, on the other hand, is considered preferable to downcycling, because it *adds* quality through the recycling process rather than reduces it and, in that way, also adds value to the original material, because it can be used in higher-end applications. A comparable feature between downcycling and upcycling is that one cannot downcycle/upcycle a material in eternity. This makes both options definite (although upcycling requires much more effort). Upcycling is generally appreciated as 'more sustainable' in comparison to downcycling. However, this may not always be the case.[1127] While downcycling and open-loop recycling have much in common, upcycling has much less in common with closed-loop recycling. One generally refers to upcycling whenever the material at issue is 'upgraded' in terms of quality and/or application, resulting in *another* cycle than the previous one. This is clearly not the case for closed-loop recycling. Rather, upcycling shares a feature with the open-loop as well as the downcycling concept in that it does *not* address the same cycle.

Generally speaking, it is presumed that upcycling is the preferred practice despite being the most difficult option of the two. Of course, once upcycled does not mean that this will last

---

[1120] Equivalents of these terms are 'downgrading' and 'highgrading'.

[1121] W. McDonough and M. Braungart, *Cradle to Cradle. Remaking the Way We Make Things* (North Point Press, 2002), p. 56.

[1122] Ibid.

[1123] Bio Intelligence Service, *Ex-post evaluation of certain waste stream Directives*, 18 April 2014, p. 201.

[1124] For example, downcycling has also been described as one of the 'collateral damages' of recycling, and as the converting waste into new materials or products of 'lesser quality' and 'reduced functionality'. In: A. Paula Bortoleto, *Waste Prevention Policy and Behaviour. New approaches to reducing waste generation and its environmental impacts* (Routledge, 2015), p. 26. The European Topic Centre on Sustainable Consumption and Production (ETC/SCP) even equated downcycling with 'shame recycling' in one of its reports. In: Working paper 1/2012, *Overview of the use of landfill taxes in Europe*, 2012, p. 32. The ETC/SCP is contracted by the European Environment Agency (EEA) and does not therefore necessarily reflect the views of the EEA. Other significant examples are the reports made by the JRC on the EU EoW criteria for various waste streams. The report on plastics, for example, puts forward that it is not uncommon for the industry to avoid the term by referring to cascading terminology, which indicates that downcycling has a negative connotation. Joint Research Centre: A. Villanueva and P. Eder, *End-of-waste criteria for waste plastic for conversion* (European Union, EUR 26843 EN, 2014), pp. 53 and 54.

[1125] Dutch Waste Management Association: H. van de Wiel, *Closing the glass recycling loop. Glass has eternal life* (August 2015), p. 5.

[1126] See e.g.: in the case of construction and demolition waste: Bio Intelligence Service, *Final Report Task 2 – Management of Construction and Demolition Waste* (Bio Intelligence Service, 2011), p. 34.

[1127] Amongst others, this depends on which indicators are taken into account in the life-cycle assessment. Moreover, there are several types of assessments available, and there are variations of a particular type.

forever: it is more likely that there is a variation between upcycling and downcycling cycles, which would cause a yo-yo effect.

6.2.4 The meaning of qualitative recycling

Despite the clear trend to refer to any of the recycling subconcepts (i.e. downcycling, upcycling, closed-loop recycling and open-loop-recycling), there are no definitions in EU waste legislation that indicate or even imply the existence of these subconcepts, nor is there any sign of the adoption of other legal definitions or concepts relying on them in the nearby future.[1128] Additionally, the CJEU has never expressed any comments on the existence of these subconcepts in one of its recycling-related judgements. The only explicit points for departure for exploring the ways to increase the quality of recyclates in EU waste law are thus the application of the waste hierarchy, the broad definition of recycling in Article 3(17) WFD, the preparing for reuse and recycling targets and the changes to the WFD proposed in the CE Package.[1129] So what does 'qualitative recycling' actually mean and why is it used in this study instead of (one or a few of) the four recycling subconcepts discussed in the previous parts?

This research considers qualitative recycling as:

a recycling process after which the recyclate is of relatively high-quality

This is a definition not frequently heard of. Synonyms such as 'high-quality recycling' and 'high-value recycling' are concepts more commonly referred to by businesses and in policies. Significantly, the European Commission explicitly refers to 'high-quality recycling' in the CE Package and Article 11(1) of the WFD obliges Member States to take measures that *'promote high quality recycling'*. This is why stimulating the production of 'recyclates that are of relatively high-quality' is the starting point for this study. In view of terminological consistency, however, this study uses 'qualitative recycling' when aiming for these recyclates of high-quality, and 'quantitative recycling' when aiming for a large volume of recyclates.

Qualitative recycling is a technology-neutral, open concept, which does not say much about the actual quality level of the recycled material except that it is 'high'. This is a fundamental, paradoxical challenge in defining qualitative recycling. On the one hand, a generally applicable concept is sought for, whereas, on the other hand, 'quality' is a material-specific characteristic of the recyclate that cannot easily be captured in one general definition. Moreover, the interpretation of 'quality' could also depend on the final application of the recycled material, although the choice of product application is neither a distinctive element in the legal definition of recycling nor in the one of waste. As will be seen in the course of this Chapter, these issues are recurring challenges for addressing qualitative recycling.

All the same, qualitative recycling would seem to be more appropriate to use than the subconcepts 'upcycling' and 'closed-loop recycling', because, as indicated above, upcycling and closed-loop recycling (as well as downcycling and open-loop recycling!) do not result in high-quality recyclates in all situations.

'Downcycling' could theoretically mean qualitative recycling if the downcycling process still produces high-quality recyclates. This is generally not the case, however. 'Upcyling' could also theoretically mean qualitative recycling if this process results in high-quality recycled material. Even though this is more likely to be the case than with downcycling, as the quality of the recyclate is upgraded, it is not entirely the same. Similar to upcycling, 'closed-loop recycling' can generally be understood as a recycling process that leads to qualitative recycling, because the use of the recyclate in new products is similar to the original use, meaning that the quality of the material should at least equal the original quality. Evidently, if the input material is of low-quality, the output material is likely to be of low-quality as well, so closed-loop recycling is neither

[1128] E.g. the CE Package does not include a definition of downcycling or one of the other subconcepts.
[1129] These and more legal instruments will be further discussed in the next part, Chapter 6.3.

equivalent to qualitative recycling. The idea of 'open-loop recycling' is that the recyclate is *not* used for the original application, which generally means that it is used for lower-quality purposes. However, this does not hold true for all situations: it might still be that the recyclate is used in higher-quality products. All in all, none of the discussed recycling subconcepts accurately reflects the meaning of qualitative recycling.

In conclusion, 'qualitative recycling' is a catch-all term and appropriate to use, because it is applicable to all recycling processes resulting in high-quality recyclates, no matter what kind of waste material is recycled. Qualitative recycling can thus be considered a broadly defined 'recycling category'. In spite of the difficulties encountered in defining qualitative recycling, particularly regarding the varying levels of 'quality', the search for regulatory methods to stimulate qualitative recycling in the EU continues. In order to establish a market for high-quality recycled materials and to mainstream their use, incentives are required that bolster the legal transition towards a Circular Economy in terms of qualitative recycling.

6.3 Legal instruments for recycling: exploring avenues for change

Now that we know that the legal definition of recycling in the WFD does not offer any help in encouraging qualitative recycling and that the mere existence of the broadly defined concept of qualitative recycling is of little help either, notwithstanding the challenges inherent to the formulation of the concept's definition itself, of course, the question arises which legal incentives would support qualitative recycling. To this end, this section discusses the WFD to determine which instruments have and could have an impact on the quality of recycled materials.[1130]

6.3.1 Creating a benchmark for other instruments

A. Terminology

Inserting a *legal* definition of qualitative recycling can potentially be used as a tool to stimulate qualitative recycling. As indicted above in Chapter 6.1.1, the currently applicable recycling definition does not say anything about the quality of the recycled materials. Inserting a definition of qualitative recycling in Article 3 WFD poses certain interrelated challenges for the regulator, however.

The first challenge is a recurring topic in the context of the legal definition of recycling: the question is whether to base the definition of recycling on the *material* which is recycled or on the *application* of the recycled material. As we can understand from Chapter 6.2.1, the recycling definition is based on the material rather than on the material's final use, because recycling means any recovery operation by which *waste materials* are reprocessed in order to alter its physico-chemical properties allowing it to be used again in products, other materials or substances *for the original or other applications*. Reconsidering the application-track once again would only be attractive for some of the recycling subconcepts, because the application of the recycled materials can be regarded as an inherent feature for those concepts. The subconcepts where this is most evident are open-loop recycling and closed-loop recycling. Particularly the introduction of definitions of these two recycling subconcepts is therefore not self-evident, as this would frustrate the recycling definition. However, based on the definition proposed in Chapter 6.2.4, qualitative recycling makes *no* difference between the final applications of recycled materials.

The second challenge is closely related to the first and concerns the wording of the definition of qualitative recycling. The question is how 'good quality' can be determined in a definition. Where to draw the line between low, regular and high quality? This is overall a relevant question to answer, because, otherwise, there will be no difference between the different recycling categories. In other words, the EU regulator should demarcate the recycling definition and the definition of qualitative recycling, if it wants to make a distinction between them in other

[1130] Several of the currently available legal instruments have already been touched upon in previous parts of this dissertation and will therefore not be extensively repeated here – a simple reference to those parts and a brief explanation of the instrument at issue is sufficient.

instruments. This seems to be extremely difficult, because 'quality' is pre-eminently a matter of specification. Just as is currently already done in Article 3 WFD, it is recommended not to go into technical detail in the legal definitions, because they should be generally applicable. This would also seem to be the way forward with the definition of qualitative recycling. The definition can of course be further developed somewhere else in the WFD or in more specific legislation.

Despite the challenges, it is recommended to incorporate a definition of qualitative recycling in the WFD, which delineates between 'high-quality' recycled materials and regular recycled materials (i.e. of 'bad' or 'general' quality).[1131] Creating such a recycling category would at least create a benchmark that can be used in other instruments, either in EU legislation (see the next sections below for an exploration of the WFD) or in national legislation. As regards the latter, having a harmonized definition of qualitative recycling would be beneficial for frontrunner Member States, because it gives them room for experimenting with measures at national level, and it would encourage low-performing Member States to learn from the other Member States and to keep up. Furthermore, besides increasing the awareness and expanding the understanding of qualitative recycling across the Union, the definition would also open the door for further EU policies in this area. The introduction of a new definition would, of course, only have *direct* effect at EU level if EU waste legislation actually includes legal instruments that refer to the definition. In either way, the definition functions as a precondition for further use.

B. The waste hierarchy and life-cycle thinking

At first glance, life-cycle thinking and the waste hierarchy do not encourage qualitative recycling.[1132] The concept of recycling as it is currently used is placed third in the five-step hierarchy and does not include a recycling category based on quality. The application of life-cycle thinking is inherently linked to the waste hierarchy, because firstly the hierarchy is based on the concept and secondly life-cycle thinking may only be invoked when Member States wish to depart from the hierarchy if this delivers a better overall environmental outcome. This means that the aim of achieving the 'best overall environmental outcome' can only be based on the currently applicable recycling definition and not on a (so far) not legally binding recycling category 'qualitative recycling'. Nonetheless, there are two options worth considering that may change (the interpretation of) the waste hierarchy and life-cycle thinking in view of stimulating qualitative recycling.

The first and most obvious possibility is to insert a recycling category in the waste hierarchy. In this way, policymakers and legislators would need to give priority to qualitative recycling over 'regular recycling'. Member States and the EU Institutions will thenceforth be motivated to adopt measures that stimulate qualitative recycling, even if there are no further legal obligations to do so, such as any recycling targets (see below, Chapter 6.3.3-B). For this reason, similar to the introduction of a definition of qualitative recycling in the WFD, the insertion of recycling categories in the hierarchy is intimately related to the introduction of new legal instruments to the EU waste acquis and to the adaptation of existing ones. A consequence of the insertion would be that Member States have to justify their choice based on life-cycle thinking if they wish to deviate from the hierarchy for certain specific waste streams. Note in this respect that it could well be that qualitative recycling cannot be used as a synonym for 'delivering *the best overall environmental*

[1131] This has also been proposed in: M. Gharfalkar, R. Court, C. Campell, Z. Ali and G. Hillier, 'Analysis of waste hierarchy in the European waste directive 2008/98/EC' (*Waste Management*, 39, 2015), pp. 309 and 311. However, there, the authors recommend introducing three different recycling (they call it 'reprocessing') categories, based on different and varying measurement units ('higher purpose and/or value'): upcycling (i.e. higher purpose and/or value), recycling (i.e. same purpose and/or value) and downcycling (i.e. lower purpose and/or value). They do not elaborate on the challenges discussed above, namely that the application of the recycled material cannot be considered in the decision whether something is recycled/upcycled/downcycled or not, and that 'quality' is extremely difficult to grasp.

[1132] Article 4(1)-(2) WFD. See for a general explanation of the waste hierarchy and the application of life-cycle thinking therein Chapter 3.2.3.

outcome considering the whole life cycle(s) of the material'.[1133] There are still many research gaps to fill in in that regard. Hence, before inserting any recycling categories in the waste hierarchy, a common understanding of the real overall environmental impacts should be developed considering the life-cycles of the bulk of the waste materials. After all, the waste hierarchy is based on generalization and should in principle represent *all* waste streams. In any case, the European Commission does not propose changes to waste hierarchy in any kind in the CE Package.

The second option builds on the first options and concerns the concept of life-cycle thinking. Unlike the first option, however, it cannot easily be captured in legal obligations. The idea is that the application of life-cycle thinking could do more than the restraining order in the waste hierarchy. If interpreted in this way, life-cycle thinking can be used to prioritize recycling measures that aim at raising the quality of recyclates over other forms of recycling *within* the delineated recycling-step. As opposed to the first option, this could thus be done without inserting recycling categories in the priority list. On a more conceptual level, life-cycle thinking seems to be ideally suited to stimulate qualitative recycling, because the concept aims at recycling practices in the best way possible for the environment. If life-cycle thinking is to be interpreted this way, there is however a challenges to consider: the contemplation uttered in the light of the previous option (i.e. that 'the best overall environmental outcome' is not synonymous with qualitative recycling, which means that it could also mean in some cases that qualitative recycling is worse than, for example, low-quality recycling from a full environmental perspective) is also applicable to this second possibility. Naturally, the two options discussed in this section can also be pursued jointly.

To conclude, both the insertion of a definition of qualitative recycling in the WFD and the changes proposed to the waste hierarchy and/or the different interpretations of life-cycle thinking do not, in themselves, constitute a direct obligatory action for the Member States and the EU Institutions to install measures aiming for recyclers to produce recyclates of good quality. Nevertheless, their capacity to raise awareness of the issue amongst all stakeholders is of paramount importance. They can serve as a benchmark for further use in other EU as well as national instruments, and are as such crucial in the encouragement of qualitative recycling through legislation.

6.3.2 Before the waste stage: well-trodden ground by giving Member States the floor

There are two legal instruments in the WFD that regulate certain issues in the period *before* the waste stage, which can be used to increase qualitative recycling in the EU.

A. Waste prevention programmes

Waste prevention is the first step in the waste hierarchy and, more importantly, prevention measures should besides decreasing the volume of materials turning into waste also ensure that the input waste material in a recovery process is the best quality possible. This boils down to the idea that what goes in (the recycling process) must come out (the recycling process), so it is better to get things right at the very start.

The recommendation to clearer distinguish between two waste prevention categories (i.e. the first is 'waste precaution and qualitative waste prevention' and the second is 'quantitative waste prevention') and to place them in this hierarchical order in an adapted waste hierarchy, has already been explained in Chapter 5.3.2-B and D in the light of developing an ecodesign requirement on waste prevention in the Ecodesign framework. For this reason, I will not repeat it here. Important to stress, however, is that this dichotomy between quality and quantity in waste prevention measures would also be beneficial for qualitative recycling. This is because it emphasizes that the quality of the material cycle is more important than the volume which flows through recycling practices back to the economy. This idea to create two categories of waste prevention in the waste hierarchy has, of course, not yet been executed. So let us now have a

[1133] See Chapter 6.2.4.

closer look at what the WFD says about the *current* relationship between waste prevention and qualitative recycling.

According to Article 9 WFD, there are a number of issues the European Commission should have submitted to the European Parliament and the Council: a report on the evolution of waste generation and the scope of waste prevention in 2011; an Action Plan for further support measures at EU level seeking, in particular, to change current consumption patterns in 2011; and the setting of waste prevention (and decoupling) objectives for 2020 in 2014. If appropriate, these documents were to be accompanied by proposals for measures required in support of the prevention activities and the implementation of the national waste prevention programmes, referred to in Article 29 WFD. These waste prevention programmes should have been established no later than December 2013 and should have described the existing prevention measures that were in force at that time.[1134] Notably, pursuant to Article 29(3)-(4) WFD, Member States also had to determine *'appropriate specific qualitative or quantitative benchmarks for waste prevention measures adopted in order to monitor and assess the progress of the measures'* and could additionally have determined *'specific qualitative or quantitative targets and indicators'* other than the indicators for waste prevention measures. The reason why these provisions are significant to qualitative recycling is that while there are not many obligations to encourage waste prevention at EU level,[1135] Articles 9 and 29 WFD show that the objective to prevent materials from being waste predominantly lies within the competence of the Member States and that, therefore, there should be a patchwork in place of national waste prevention porgrammes. Moreover, these programmes should in any include quantitative benchmarks *or* qualitative benchmarks.[1136] Therefore, this *may* indicate that Member States already have specific waste precaution and qualitative waste prevention measures in place.[1137] The European Commission is, however, aware of the fact that the Member States had difficulties in measuring waste prevention developing and using reliable indicators. This is generally considered the result of the inherent difficulty in measuring 'prevented waste', as opposed to measuring recycled waste or waste sent to landfill.[1138] In order to ensure a uniform measurement of the overall progress in the implementation of waste prevention measures, the Commission states that common indicators should be established, and for that reason proposes to insert the right to adopt implementing acts to establish the indicators.[1139] Further research is therefore required on how to establish indicators for 'waste precaution and qualitative waste prevention'.

While the WFD obligations were novel at the time of the Directive's adoption, they are now completely outdated: all the deadlines have expired, the obligations are difficult to enforce, and the policy and legal framework for waste prevention is completely fragmented across the Union. It is not surprising, therefore, that the CE Package tries to modernize the rules on waste prevention. It proposes certain changes to Articles 9 and 29 WFD that should give more guidance to the Member States as regards their waste prevention measures and the communication thereof to the Commission.[1140] Unfortunately, the CE Package does not propose significant changes in view of qualitative recycling. For example, it is not suggested to change the waste hierarchy by

[1134] Article 29(1)-(2) WFD.
[1135] For example, there are no EU-wide waste prevention targets for certain waste streams in the WFD or in the Packaging Directive.
[1136] Notably, this will not be changed, if it were up to the Commission. See European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595, p. 18, on the possible amendment of Article 9(2) WFD.
[1137] Whether Member States have indeed established these indicators and targets is not investigated in this dissertation. The Commission provides for some guidance, at least. See European Commission: drafted by BioIntelligence Service S.A.S in association with the Copenhagen Resource Institute and the Regional Environmental Centre, 'Preparing a Waste Prevention Programme – Guidance document' (*European Commission*, 2012), see e.g.: pp. 27-28.
[1138] Ibid., see e.g.: p. 30.
[1139] See supra 1136, pp. 10 and 18 on the possible amendment of Article 9(4) WFD.
[1140] Ibid., pp. 17-18 and 22.

inserting the two categories for waste prevention, nor does the Commission set any qualitative prevention targets for particular waste streams.

B. Extended producer responsibility schemes

The aim of the EPR instrument, as set out in Article 8 WFD, is amongst others to facilitate recycling. It does so by ensuring that any natural or legal person who professionally develops, manufactures, processes, treats, sells or imports products (the producer of the product) has a responsibility to take care of other issues in different life-cycle stages as well. Setting up EPR schemes through special legislative and/or non-legislative EPR measures is the responsibility of the Member States.

The reason why these measures could be beneficial for qualitative recycling is that they may include an acceptance obligation of returned products and of the waste products after they have been used. The measures may also include the obligation to provide information to the public on the recyclability of the product.[1141] In accordance with these two possibilities, much first-hand information is thus theoretically available that could be used to improve the quality of the recycled materials. Additionally, Member States may also take EPR measures targeting a phase prior to when products become waste: the design stage. This is to stimulate the use of materials of good quality in products through the concept of ecodesign.[1142] If one uses high-quality materials in a product, high-quality waste materials generally enter the recycling process (if collected separately, if not contaminated during the use stage…). The Ecodesign framework should in theory also deliver product information to waste treatment facilities, such as on the product's and/or components' recyclability. The traceability and identifiability of materials is, however, a challenge particularly for post-user waste streams that have become waste after a long period of usage, such as construction products.[1143]

The European Commission proposes in the CE Package several general requirements for EPR schemes to provide more guidance to the Member States. To this end, the legislative proposal for amending the WFD adds a new Article 8a to the WFD, which introduces harmonized minimum operating conditions.[1144] It is particularly important for qualitative recycling that the Article obliges Member States to define measurable waste management targets that should be in line with the waste hierarchy and should *at least* entail aiming the completion of the quantitative targets for preparing for reuse and recycling (that are relevant for the EPR schemes). While thus primarily aiming at the volume of recyclates, it leaves open the possibility to define measurable waste management targets for qualitative targets to be achieved through EPR measures. This national opportunity should be encouraged more at EU level, for example through the CE Package. Moreover, if categories for recycling are indeed inserted in the waste hierarchy (see above, Chapter 6.3.1-B) and if new targets for qualitative recycling are to be adopted (see below, Chapter 6.3.3-B), this provision would gain momentum. Be that as it may, the shaping and execution of particular EPR schemes and the relevant policy and legal framework remains a national affair. Against this background, the Commission suggests introducing an obligation under Article 8 WFD that it will organize an exchange of information between Member States and the actors

[1141] Article 8(1) WFD.

[1142] Article 8(2) WFD. Chapter 5.4.1-C (heading 'Waste Framework Directive') already touched upon the EPR in light of ecodesigning products through the EFD.

[1143] See Chapter 5.4.1-B (heading 'Traceability and identifiability of materials'). This section stresses that the identification of materials that are present in the waste delivered at the recovery plant is crucial to decide on which recovery operation is most appropriate. This also applies to the question whether high-quality recycling is an option or whether one must choose for lower-quality recycling options. See Chapter 5.2.3-B (heading 'Categories and minimums for recycled content') for an explanation of the difference between pre-user and post-user waste streams.

[1144] European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595, pp. 15-17.

involved in EPR schemes.[1145] This should at least help getting information on EPR schemes relevant to qualitative recycling to other Member States, if any.

To conclude, waste prevention programmes and EPR schemes are two legal instruments that already exist under the current WFD rules and that could in principle already facilitate qualitative recycling, in both cases by starting from the period before the waste stage. The design stage is very significant in that respect. While indeed the instruments provide for well-trodden ground for Member States to act, the European Commission does not seize the opportunity in the CE Package to build on this foundation by improving them in the light of qualitative recycling. To that end, the instruments belong pre-eminently to the domain of the Member States.

6.3.3 Tightening well-working instruments in the waste stage

Next to the two instruments that were discussed in the previous part, which both depart from the period before the waste stage, there are two instruments contained in the WFD that regulate certain issues *in* the waste stage which could be significant to qualitative recycling.

A. Separate collection schemes

Articles 10(2) and 11(1) WFD oblige Member States to set up separate collection schemes for specific waste streams to facilitate or improve recovery, and to promote qualitative recycling in particular. According to Article 3(11) WFD, separate collection means

> *the collection where a waste stream is kept separately by type and nature so as to facilitate a specific treatment.*

The rationale behind separate collection is reflected in Recital 28 WFD where it is stated that the practice is used to move closer to a recycling society. The Guidance to the Waste Framework Directive underscores that it is used to enhance the quality of recovered products and to identify and eliminate hazardous compounds in mixed waste in order to reduce impacts.[1146] A precondition of setting up separate collection schemes is that the collection is '*technically, environmentally and economically practicable and appropriate to meet the necessary quality standards for the relevant recycling sectors*.' This means that the question what 'quality' means is basically outsourced to private parties and that, therefore, the recycling sector has a strong influential voice in the decision whether or not to set up separate collection scheme for a particular waste stream. While it is debatable whether the industry would really push itself to innovate and set the bar higher and higher,[1147] it is not surprising that the WFD relies on the industry considering the fact that there is no common legal definition for qualitative recycling in EU waste legislation.[1148]

Significantly, Article 11(1) WFD obliges Member States to set up separate collection for *at least* paper, metal, plastic and *glass* by 2015 where this is necessary to *promote qualitative recycling*. For these waste streams, therefore, the national collection schemes are formally set up because separately collected waste is beneficial for the quality of the recyclate (in comparison to mixed waste, which is of course cheaper from a collection perspective and less demanding for the users).[1149] The follow-up of the collection is very important, too. An option would be to set up closed-loop recycling systems (this is particularly the case for glass, because it the material's potential of 'eternal recycling'). The separate collection schemes also require involvement and collaboration with the waste producer. For example, n the Netherlands a collection scheme exists

[1145] Ibid.
[1146] European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, 2012, p. 53.
[1147] The importance of harmonized European standards for qualitative recycling is further elaborated on in the next Chapter, Chapter 6.4.
[1148] This has already been flagged in Chapters 6.2.1 and 6.3.1-A.
[1149] Joint Research Centre and Institute for Prospective Technological Studies: Elena Rodriguez Vieitez, Peter Eder, Alejandro Villanueva and Hans Saveyn, 'End-of-Waste Criteria for Glass Cullet: Technical Proposals' (*European Union*, EUR 25220 EN-2011, 2011), pp. 19-20.

for flat glass waste (C&D waste), which is initiated by the glass industry.[1150] The WFD collection obligations are complemented by requirements on separate collection in waste legislation aiming at specific waste streams.[1151] If one zooms in on (container) glass, however, the Packaging Directive does not contain any specific rules on separate collection. This means that Article 11(1) WFD establishes the only obligations for glass waste to be collected separately. Separate collection is even so extremely important for glass waste as it is in principle 100% recyclable.

In the CE Package, the European Commission introduces minimum conditions on transparency and cost-efficiency that Member States and regions can use,[1152] and underscores that compliance with the obligation to set up separate collection systems for paper, metal, plastic and glass is essential to increase the qualitative as well as quantitative recycling rates in Member States.[1153] It is therefore proposed to change the preparing for reuse and recycling targets in Article 11 WFD (see below, Chapter 6.3.3-B) and to add 'construction and demolition waste', 'wood' and 'aggregates' to the list of waste streams for which Member States should take measures to promote 'sorting systems'.[1154] This leaves all the other waste streams on the list, including glass.[1155] By adding C&D waste to the list, commercialized glass will to a large extent be covered, because the collection schemes are then also required for flat glass and glass wool (as part of C&D waste) – if this was not already the case under the current provision (as noted above, some Member States already have separate collection schemes that include C&D glass waste). In due time, it can be considered adding more waste streams to the list.

Moreover, the Commission has missed the opportunity to require Member States making a distinction between types of materials *within* a material group. This can particularly be valuable to glass: colour/transparence is a characteristic best taken into account in order to achieve the required standard for recycling. Nonetheless, besides separation at source, this can also be done mechanically *after* the collection.[1156] Whether Member States should aim at *separate* collection schemes based on colour or other characteristics is therefore not indisputable.

All in all, the CE Package does not radically change the rules on separate collection: the Member States remain responsible to set up those schemes. Even so, the changes to the number of waste streams for which separate collection schemes should at least be set up would probably also have a positive impact on qualitative recycling, amongst others because the Commission suggests to take into account the very large waste stream from C&D operation. All in all, glass waste is well covered by the (proposed) WFD rules on waste collection.

B. Recycling targets

The setting of the targets for preparing for reuse and recycling in EU waste legislation is a matter of prioritizing waste streams. The targets have already been put forward elsewhere in this

---

[1150] Ecorys, *EU Construction & Demolition Waste Management Protocol* (European Commission, 2016), p. 38.
[1151] Article 5 WEEE Directive (Directive 2002/96), Article 7 Batteries Directive (Directive 2006/66), Article 6(1) and (3) and Annex I End-of-Life Vehicles Directive (Directive 2000/53) and Article 6(3) PCB/PCT Directive (Directive 96/59). This is important because the collection of waste streams has been identified as an area with regulatory barriers. It appears that there is a lack of legislation allowing for the collection of homogenous waste streams. Many waste streams therefore end up as mixed waste, which is relatively more costly to treat. Technopolis Group, Wuppertal Institute, thinkstep and Fraunhofer ISI, Technopolis Group, Wuppertal Institute, thinkstep and Fraunhofer ISI, *Regulatory barriers for the Circular Economy - Lessons from ten case studies* (European Commission, 2016), p. 14.
[1152] CE Action Plan, p. 9.
[1153] Recital (2) European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595, p. 10.
[1154] Notably, no explanation of 'sorting systems' is provided in the legislative proposal for changing the WFD. One can assume that 'sorting systems' are, indeed, the separate collection schemes previously referred to.
[1155] Article 1(10)(a) Proposal for a Directive amending Directive 2008/98/EC on waste, p. 18.
[1156] FEVE: The European Container Glass Federation, *Good Practices in collection and closed-loop glass recycling in Europe*, 2012, p. 15, http://www.acrplus.org/images/glass_recycling/Good_Practices_in_collection_and_closed-loop_glass_recycling_in_Europe_REPORT_-_ACR_FINAL_DOC.pdf (consulted on 21 November 2017).

dissertation,[1157] so I will not repeat them. What is important to stress here is that the existence of these rigid 'performance targets' as such, does not say much about the quality of recyclates, nor do they necessarily improve them. Nonetheless, gains could still be made in this respect. An observation worth mentioning is that while there are relatively many materials and materials in specific applications targeted by a recycling target under current legislation (for example, for packaging glass see Article 6(1)(e)(i) Packaging Directive), not all materials or applications are addressed. For example, there are no mandatory targets for flat glass waste, even though flat glass requires high-quality glass and has therefore potential for the glass chain if it were to be recycled.

All in all, the currently applicable preparing for reuse and recycling targets above all stimulate Member States to increase the *quantity* of recycled wastes and by doing so they could, indeed, *indirectly* strengthen the market for recycled materials and encourage innovations when it comes to quality. But what else could be done to *specifically* improve the quality of the recycled materials through the targets?

An obvious possibility would be to adopt recycling targets that include a division between certain recycling categories and that would periodically increase, just as the current targets. This could also be done in other laws than the WFD, such as the WEEE Directive and the Packaging Directive. The adoption of such targets goes hand in hand with the challenges related to the insertion of categories into the waste hierarchy and the development of a corresponding definition of qualitative recycling (see above, Chapter 6.3.1). There are additional challenges as well.

A first challenge is more an observation on the introduction of qualitative recycling targets and questions the appropriateness of the legal instrument. In reaching the currently required EU recycling rates, the waste treatment industry is often forced to lose much of the overall quality of the recyclates. It could be argued that the reason for this large amount of waste being recycled in low(er) quality *is* the existence of the preparing for reuse and recycling targets and landfill targets – or at least they largely contribute to it. Regardless of what the exact qualitative recycling targets ought to be, one could argue that setting new targets is fighting fire with fire, because one basically wishes to move away from what is created by the same instrument. A convincing counter argument would be that since the current targets have proven themselves, setting targets for recycling categories might also do the trick. Additionally, the introduction of such targets would at least not do any harm to the existing targets as they just put an extra layer of difficulty to them, so why not give it a try?

A second challenge concerns the transposition and implementation of the targets. Despite the convincing shift from landfilling waste to recycling in the EU in the past decades, problems have been detected in the transposition of EU waste law into national law and in its patchy implementation and compliance by many Member States.[1158] The existing targets for recycling and preparing for reuse will in all likelihood not met by all Member States.[1159] The reasons for this are probably two-fold: 1) various Member States signed up for something they could not live up to; and 2) the European Commission lacked an effective follow-up programme.[1160] The fact that there are Member States that do not comply with the targets already existing questions whether new targets based on quality would actually have real potential, as they are probably even harder to meet. The more so since the CE Package gradually increases most of the quantitative targets, already pushing Member States to recycle progressively more. Why introducing qualitative targets if so many Member States already fall short in transposing and implementing the current targets? Of course, the best performing Member States may not have many problems in that respect; they have already reached the recycling targets and are now searching for

[1157] See e.g.: Chapter 6.2.1.
[1158] COM(2011) 13, pp. 2,3 and 6; and Institute for European Environmental Policy: C. Jackson and E. Watkins, 'EU waste law: the challenge of better compliance' (Institute for European Environmental Policy, *Directions in European Environmental Policy*, 5, 2012), p. 7.
[1159] Ibid.
[1160] Ibid., p. 2. The 7th EAP also indicates the problems regarding non-implementation: Article 2(1)(d) and Priority objective 2, 40 and 43 viii.

instruments to increase qualitative recycling. The logic of 'the best performing Member States should be the benchmark for raising the bar' is, nevertheless, common in waste legislation and might work in this case as well.[1161] The idea behind it is to encourage the best *as well as* the least performing Member States and local and regional authorities to actively pursue their efforts to improve their implementation and compliance.

To navigate between, on the one hand, the difficulties of implementation for some Member States and, on the other hand, the encouragement of the low performing Member States, the CE Package proposes to introduce tools to alleviate the implementation burdens for some Member States, e.g. by introducing a system that financially helps the weak performing Member States and by giving additional time to transpose and implement the new (mid-term) targets for some Member States,[1162] while maintaining to have (possibly too idealistic) long-term plans. It is said that the new targets should furthermore lead Member States gradually to converge on best-practice levels: if Member States that already aim at increasing qualitative recycling, spreading this specific information to low-performing States could help them to raise their standards as well. Evidently, this is the desired result – it is not guaranteed.[1163]

A final, more practical challenge is that the calculation method for verifying compliance with the targets will need to be developed. The challenge is to define and to measure what is 'qualitative recycling'. This is extremely difficult and may thus have a severe impact on the feasibility of introducing targets specifically designed for qualitative recycling. The existing quantitative recycling targets are based on the weight of the input (waste) material and of the output (non-waste) material, which is much easier to measure. The legislative proposals that raise the WEEE, Packaging and the WFD targets do not change the fact that the calculation methods are principally based on weight (in a given year), as they solely simplify and harmonize the methods. For example, the Commission introduces a complete new Article 6a to the Packaging Directive which clarifies, amongst others, the meaning 'the weight of the packaging waste recycled' and introduces a new Annex which sets the conditions for calculation. These newly introduced Article and Annex have identical twins in the other waste laws addressed by the CE Package.[1164] The reason why it is so hard to establish a harmonized calculation method for qualitative recycling is that 'quality' heavily depends on the material at issue.[1165]

To conclude, there are several drawbacks as regards the setting targets for qualitative recycling, both on a more theoretical level and on a practical level. Probably the most notable

[1161] It has apparently also inspired the drafting of the legislative proposal on the EU waste legislation revision, because the proposed targets are rather ambitious for many States. The targets in the 2014 CE Package were even more ambitious.

[1162] The withdrawn proposal on the revision of EU waste legislation (COM(2014) 397) actually introduced such measures, e.g. an early warning system for monitoring compliance with the recycling targets.

[1163] It is noteworthy to mention in this regard that when it seems unrealistic to introduce Union-wide qualitative recycling targets, Member States could nonetheless adopt more stringent national protective measures, such as the qualitative recycling targets, as long as they are compatible with the EU Treaties (Article 193 TFEU), such as the articles on free movement of goods (see Chapter 2.1.2 (heading 'Derogation possibilities Articles 193 and 114(4)-(5) TFEU')). Broadly speaking, if many Member States adopt qualitative recycling targets for certain waste streams, it could offer greater acceptance amongst the other Member States to introduce such systems, too, and it could push the European Commission to act accordingly as well. In addition, the differences in waste treatment rules between the Member States partly lies in the fact that the Commission choose to adopt waste *Directives* instead of Regulations, which is similar to most other environmental legislations. Directives are binding as to the result to be achieved, but leave to the national authorities the choice of form and methods of implementation (Article 288 TFEU). Even though the preparing for reuse and recycling and landfill targets set specific goals, it leaves open *how* to achieve them by the Member States. A Member State may thus issue customized policy on qualitative recycling to achieve the general recycling targets.

[1164] For example, see the proposed Article 11a and Annex VI to the WFD, as provided in Article 1(11) and Annex I to the Proposal for a Directive of the European Parliament and of the Council amending Directive 2008/98/EC on waste, COM (2015) 595.

[1165] The problem of defining quality has already been discussed above, in particular in Chapter 6.2.4. This is also the reason why the 2008 WFD introduced the possibility for the Commission to adopt End-of-Waste Regulations for *particular* waste streams to identify when these waste items cease to be waste (see below, Chapter 6.3.4).

challenge is the difficulty of determining the level of quality required to be called 'qualitative recycling' and developing an appropriate calculation method. This was not a problem for the currently applicable recycling targets, as they are based on weight. Tightening these existing targets, as is proposed in the CE Package, would nonetheless help to some degree already. The same applies to the national separate collection scheme: they, too, are tightened under the CE Package and will help qualitative recycling in the sense that Member States are obliged to set up schemes for two new waste streams, including C&D waste.

6.3.4 From waste to non-waste: a dead-end approach?

There is one instrument in the WFD which regulates when waste ceases to be waste and which could be used to increase qualitative recycling in the EU. This is the EoW criteria.

A. End-of-Waste criteria

While the waste definition does not, in essence, depend on the recycling definition or on any other legal instrument that stimulates recycling, the fact that materials are transported to a recycling facility or undergo a recycling process is strong evidence that the material at issue is waste.[1166] So far, therefore, there have not been any problems with the moment when a certain substance, material or product becomes waste and when the waste enters the recycling facility. What is more important to emphasize here is the link between recycling and the moment when waste ceases to be waste.[1167] More precisely: the possibility under Article 6(1) WFD for the European Commission to adopt EU-wide EoW criteria.[1168]

The sets of EU EoW criteria lay down criteria that should provide a high level of environmental protection and an environmental as well as an economic benefit. These criteria are significant to qualitative recycling, because they include quality standards for the recycled material, such as maximum levels of hazardous substances and maximum levels of impurities. In this respect, it is noteworthy that these standards are *inter alia* based on the technical (quality) requirements for the specific purposes and that they meet the existing legislation and product standards.[1169] This is important because, apparently, *product* legislation co-dictates when and how a material ceases to be waste,[1170] even though, firstly, it is generally assumed that this is a matter of waste legislation and, secondly, some may argue that these measures do not contain the most stringent environmental requirements. What is more, the EU EoW criteria contain technical thresholds that are generally the result of a mixture of detailed synthesis of large amounts of information on technology, economy and markets, legislation, environment and social acceptance.[1171] Put differently, the criteria are based on a blend of considerations,[1172] which arguably leads to compromises rather than high/strict technical quality thresholds.

[1166] See Chapter 6.1 for an explanation and discussion on the waste definition.

[1167] The EoW status is closely linked to the previous section (Chapter 6.3.3-B) in the sense that *only if* a certain waste item has completed the final recycling process, it (most likely) acquired the non-waste status and can as such be taken into account in the calculations of the preparing for reuse and recycling targets.

[1168] For a more extensive explanation and discussion on the EoW status and the role Article 6 WFD plays in this, see Chapter 6.1.2-C.

[1169] Article 6(1)(d) WFD.

[1170] However, the European Commission continues to believe that the *'clarification of end-of-waste criteria is a matter for waste legislation.'* European Chemicals Agency, *Guidance on waste and recovered substances* (ECHA, ECHA-10-G-07-EN, version 2, 2010), p.2.

[1171] Joint Research Centre, *End-of-Waste Criteria* (JRC, EUR 23990 EN, 2009), p. 16. For example, the technical working groups that should be consulted consist of experts from industry, academia and Member States authorities.

[1172] Such as old and new scientific understandings, lobby of the industry and NGOs, hazard and risk assessments, private law-based standards and public law-based legislation…

Another aspect of the EU EoW criteria providing food for thought is that the EU EoW criteria as a whole contain *minimum* quality benchmarks.[1173] This means that the industry is in principle free to require stricter quality standards for their own production. The fact that they establish minimum levels is hardly surprising considering the fact that the EoW criteria are established taking into account a variety of considerations (see above), and that they should apply to a whole waste stream, creating a certain 'basic quality level' for the recycled material. In other words, the EoW criteria should be beneficial for the entire relevant industry while guaranteeing environmental protection. For these reasons, it is debatable whether the EU EoW Regulations really encourage qualitative recycling.[1174]

A possible solution could consist of inserting different quality levels in EU EoW criteria for waste to obtain in order to cease to be waste. If this is executed, it follows that a recycled material may either have a 'high quality EoW status' or something like a 'basic quality EoW status'. On the face of it, this idea appears to be quite straightforward. So far, however, no such set of EoW criteria exists. The JRC just leaves it to the market to decide on the different uses of the output material as long as the minimum quality levels are met. The reasons for this are disclosed in the preparations for EU EoW criteria for certain waste streams, such as the one for glass waste.

In the preparation report for the EU EoW criteria for glass cullet, the JRC stresses that glass product quality is severely affected by the presence of glass types different from the main glass cullet type.[1175] It highlights in this respect that the waste sources and the original as well as future applications are significant. For example, only flat glass cullet can be used to manufacture flat glass (i.e. closed-loop recycling) and to manufacture container glass (of soda-lime physico-chemical composition, i.e. open-loop recycling).[1176] Overall, quality requirements for cullet use in the production of flat glass are much stricter than for container glass.[1177] This explains that even though the quality margins are the biggest in the loop for flat glass, the EoW criteria for glass cullet are *not* necessarily stimulating flat glass recycling.

It also underscores that since the EoW criteria apply to glass waste intended for a recycling process that involves *re-melting* (e.g. for container glass and in principle also for flat glass), which is commonly done through closed-loop recycling systems, glass waste cullet *not intended for re-melting* (i.e. intended as filling material or for water filtering, aggregate, landscaping…) falls outside the scope of the EoW Regulation.[1178] Because more than 90% of the EU market of glass cullet for recycling is for re-melting applications, the EU EoW criteria does not have any impact on this residual fraction of less than 10%.[1179] As one could expect, one of the reasons not to include this lower-quality recycling share is that these non-re-melting applications would require EoW criteria of a very different technical nature than the quality criteria required for re-melting uses. According to the JRC, it does not make sense to overburden or oversimplify the criteria for re-melting uses with those of the non-re-melting uses, just for the purpose of having an all-encompassing set of criteria.[1180] This is, indeed, a dilemma of choice: either you leave out a percentage of low quality to raise the basic quality level of the EU EoW status while at the same time discouraging the 10% for other recycling applications to join in, or you put everything

[1173] Even though the criteria's quality standards contain *maximum* limits for the undesirable substances/materials (within the meaning of: 'only less than … % is allowed'). This issue has already been flagged above. See in particular Chapter 6.1.2-C.I.

[1174] In theory, of course, if EoW criteria actually raise the minimum basic levels in comparison to what is conventional, they would promote qualitative recycling in many cases. This is also acknowledged in: ibid., pp. 21 and 22.

[1175] Joint Research Centre and Institute for Prospective Technological Studies: E. Rodriguez Vieitez, P. Eder, A. Villanueva and H. Saveyn, 'End-of-Waste Criteria for Glass Cullet: Technical Proposals' (*European Union*, EUR 25220 EN, 2011), p. 13.

[1176] Ibid. Hence the importance of the national separate collection schemes (see Chapter 6.3.2-A, above).

[1177] Ibid., p. 15.

[1178] This residual waste stream is generally downcycled and part of an open-loop system.

[1179] Supra note 1175, p. 66.

[1180] Ibid., pp. 66-67.

together which would have the effect of lowering the basic quality level of the EU EoW status. In either way, however, they take place at the bottom of the recycling options in terms of quality and do not, therefore, simulate qualitative recycling whatsoever.

Be that as it may, the JRC highlights in this respect that, taking into account the evolution of markets and technology, it does *not exclude* that clear, strong markets and demand are identified for EoW for glass cullet destined to 'one-use recycling applications' in the future. It suggests moreover that the EU EoW criteria could, indeed, be *'complemented with a separate set of EoW criteria on glass cullet for these specific non re-melting purposes. If appropriate, such additional criteria could be proposed as part of EoW focusing on the use, e.g. as part of "aggregates EoW criteria".*'[1181] This statement indicates that despite the focus on the lower-end of the recycling possibilities, the JRC does not exclude the possibility to introduce different quality levels and possibly corresponding EoW statuses in EoW Regulations at a later stage. Note, however, that this was the opinion of the JRC when the report was published: in 2011. A few years later, the debate continued for another waste stream: plastics.

Some experts in the Technical Working Group for preparing EU EoW criteria for plastic conversion commented that, in practice, there are two categories of plastic recyclates marketed: one containing a stricter maximum threshold for almost entirely homogeneous polymer materials (such as from pre-user sources through closed-loop systems) and another one containing a more gentle threshold for mixed materials (such as from post-user sources through open-loop systems).[1182] Even though the commercial aim of the plastics recycling industry is commonly to keep the same application for a plastic material as it previously had (i.e. closed-loop recycling), because this makes it easier to meet the technical requirements and to make use of the available additives, it is very hard to obtain homogenous plastics waste streams.[1183] In the end, the JRC therefore recommended only one threshold for non-plastic impurities, because a distinction would be impossible to enforce (the system would be too complex) and it was expected that only mixed origin plastics used for substitution of *non*-plastics (such as lumber) would need considerable additional efforts to reach the limit percentages.[1184] Regarding this latter argument, it is true that *even if* categories are introduced for the EoW status, it will not prevent a waste material from being recycled in a low-quality because it would still comply with this basic quality level (i.e. the 'lower category'). There are just no incentives *within* the EoW Regulation to raise the quality other than acquiring the label 'of better quality' (which could then, of course, be used in the market to attract clients). (Note that the EU EoW Regulation for plastics has not been adopted so far).

To conclude, inserting recycling categories in EU EoW criteria may at first sight appear to be a logical and potentially fruitful thing to do, because how the instrument is currently used only provides for a minimum quality level. However, as can be seen from the examples on glass and plastics, the idea to introduce such different quality levels in EU EoW Regulations for particular waste streams runs into several significant problems.[1185] It is worth mentioning that nothing in the

[1181] Ibid.

[1182] Ibid., p. 152. Although it is said that the former category is of 'high quality', most of these recyclates could probably still be classified as downcycling, because this category represents currently 70-80% of the EU market of recycled plastics. Nonetheless, the JRC report clearly states that downcycling activities often use materials of mixed origin, which refers to the latter category of recyclates. Ibid., pp. 53, 64, 183 and 184. This confusion prevents us from classifying either of the categories as downcycling (or upcycling).

[1183] Closed-loop systems are moreover very expensive to set up and maintain. Ibid., pp. 183 and 184.

[1184] Ibid., pp. 152-154.

[1185] Noteworthy to say in this respect is that the currently applicable Article 6 does not require Member States to follow the conditions a-d if the EU has not adopted EU-wide EoW criteria, and that these national criteria may therefore theoretically contain EoW categories to promote qualitative recycling. An important question in this regard is how such categories would influence the national and EU market, and whether the same challenges arise as discussed in this section.

CE Package hints towards any changes to the EoW instrument with respect to qualitative recycling.[1186]

6.3.5 Interim conclusion

The question had been raised in Chapter 6.3 which incentives in the WFD would support qualitative recycling, as they stand but definitely also when adapted. To this end, I studied eight legal instruments.

There are three instruments under the current rules that are useful to qualitative recycling: the waste prevention schemes, the EPR schemes and the separate collection schemes. These instruments are principally the concern of the Member States; the WFD merely provides for the very basic conditions for these instruments in order for the Member States to give concrete, customized meaning to them and to put them into action. In that respect, the WFD primarily facilitates these instruments to be implemented in the Member States. The three instruments at issue are useful for qualitative recycling, as they could: provide for valuable information for the recyclers on the content of the waste; make sure that the content of the input waste material is as monotonously and risk-free as possible. Indeed, these instruments have an impact on the period prior to the actual recycling process.

While the residual five instruments could have an impact on recycling practices in the EU (i.e. terminology, waste hierarchy, life-cycle thinking, recycling targets and EoW criteria), as they generally lay down 'hard rules' for the Member States in the WFD, it turns out that these instruments do *not* contribute to increasing qualitative recycling in the EU in the way they are currently shaped. The problem basically boils down to the fact that recycling is legally not categorized: not in the recycling definition, not in de waste hierarchy, not in the recycling targets and not in the EoW criteria. This is a recurring subject. Making adjustments to the instruments in that respect would be challenging, however. In some cases the challenges can to a certain extent be overcome, which would stimulate qualitative recycling, while in others we have to recognize the limits to our ability to exert influence, which would therefore make no impact at all.

Besides instrument-specific challenges that have been identified in each individual section, there are also challenges exceeding the particulars. Firstly, many of the instruments are interlinked and dependent on one another (including the other three instruments). For example, a common definition for qualitative recycling is a prerequisite for all the other instruments. Another example is that the introduction of a recycling category in the waste hierarchy would have a canopy effect on all of the other instruments, both on EU as well as on national level and both on present as well as future instruments. Secondly, 'qualitative recycling' cannot be captured in one single quality level that should be applicable to all materials and in all of the materials' uses. This implies that even if a general definition of qualitative recycling can be established, which is even so recommended as it provides for a benchmark for other instruments, the next step would be to determine technical quality levels on a material-level and/or application-level, which is a time-consuming, costly, politically difficult and in other ways burdensome process. Moreover, the more quality levels desired, the harder this process becomes – if feasible at all. For example, the introduction of different EoW statuses based on the quality of the recycled materials in EU EoW criteria does probably not achieve the desired result, because there is no incentive within the criteria to improve the quality of the recyclate: the 'low-quality EoW status' would still remain an option. Generally speaking, therefore, qualitative recycling is crucial to aspire from a Circular Economy perspective but at the same time proves harder to be incorporated in the WFD than perhaps initially expected. If one considers the legal instruments in place, it appears that inserting recycling categories may require further research to see how the mixture of instruments would strengthen each other in achieving the same goal, i.e. the stimulation of qualitative recycling, because the one thing that is clear is that the application and/or adaption of one instrument only would not be very helpful.

[1186] Commission proposes nevertheless to broaden the scope of the conditions set out in Article 6(1) WFD to Member States' policy and legislation as well.

It can be concluded that under the 2008 WFD it is relatively difficult to boost qualitative recycling at EU level. This observation leaves the legal obligation for the Member States to take measures in this area unaffected (Article 11(1) WFD). All in all, the European Commission has not seized the opportunities that actually were available to change EU waste legislation in view of improving qualitative recycling through the CE Package – it does not move beyond the beaten track (generally based on quantity). Rather, it fine-tunes the existing instruments, but without clearly focusing on the quality of the recycled material. This is also the direction the EP and Council will take: the provisional agreement between these EU Institutions and the Commission on the adoption of the revised legislative proposals – as initially proposed in the CE Package – does not profoundly change their contents.[1187] This is why it remains crucial that Member States continue to search for appropriate legal as well as non-legal instruments that could boost qualitative recycling at national scale, and that the European Commission should not stop with searching for opportunities either. In view of this, the next Chapter explores the opportunities for qualitative recycling through private-party rule-making, more precisely through harmonized European standardization. Maybe this track could complement the legal instruments.

6.4 Legal dynamics of private-party rule-making: standardization explored

The next step is to explore the opportunities for stimulating qualitative recycling in the EU other than through keeping to the 'public law path' of incrementally adjusting the legal instruments provided for in EU waste legislation, such as the ones in the WFD. More specifically, this part focusses on the role EU private standardization organizations play in the transition towards a Circular Economy.[1188] This is relevant for improving the quality of recyclates, because using such 'outsourced' standards is an increasingly prevalent phenomenon in product and environmental policies, and could seemingly fill the legal gap to address this issue to the satisfaction of the EU policy-makers and legislators.

Against this background, the CE Package announces that the European Commission will launch work on EU-wide 'quality standards' for recycled materials where needed, though in any case for plastics and always in consultation with the industries concerned.[1189] The Commission does not, however, tell much about the shape of these desired standards: it does not indicate whether the standards are to be initiated by the relevant industries and/or by the EU regulators; whether voluntary and/or legally binding standards are aimed at; who exactly would need to be involved in this process; to whom the standards should apply… As noted, there are various possibilities. This part focusses on private-party rule-making through the setting of harmonized European standards, which are standards requested by the Commission and are therefore part of the toolkit of the EU to address qualitative recycling. It is worth pointing out in this regard that the Commission's BRP stresses to consider *'both regulatory and well-designed non-regulatory means*' in search for policy solutions.[1190]

With this in mind, the next section first explains the meaning of standards and of 'harmonized European standards', and frames the standardization policy and regulatory framework in the EU.

[1187] Political agreement of 18 December 2017 between the European Commission, European Council and European Parliament on the legislative proposals for the EU waste laws under the Circular Economy Package, https://ec.europa.eu/commission/commissioners/2014-2019/vella/announcements/statement-commissioner-vella-political-agreement-reached-modernise-waste-rules_en and http://www.consilium.europa.eu/en/press/press-releases/2017/12/18/council-and-parliament-reach-provisional-agreement-on-new-eu-waste-rules/ (consulted on 29 January 2018)

[1188] This focus leaves out the use of other environmental instruments, such as certifications, so-called 'green deals' (voluntary agreements between the industry and governments) and other types of voluntary agreements or self-regulatory alternatives. This does *not* mean, whatsoever, that these instruments are not important for the transition towards a Circular Economy, nor – more specifically – for the promotion of qualitative recycling.

[1189] CE Action Plan, pp. 11 and 13.

[1190] See particularly European Commission, *Better regulation for better results - An EU agenda*, COM(2015) 215, p. 6. See Chapter 4.2.2 for an explanation of the BRP.

6.4.1 The EU policy and regulatory framework for standardization

The meaning of 'standards' is legally not fixed; standards have different nuances in different settings. Generally speaking, however, one could say that standards set technical and/or quality requirements for specific current and future products, materials, components, systems and services, or describe a particular method or procedure. They are intended to bring these things to a uniform standard and to be used for repeated or continuous application. They can have either a vertical or a horizontal effect.[1191] Standards are in essence voluntary specifications helping stakeholders in a value chain to interoperate easier,[1192] and are either the result of a private-private partnership (self-regulation, i.e. when stakeholders arrange it themselves spontaneously) or of a public-private partnership (co-regulation, i.e. when public regulators are involved through policies and government-driven processes). Furthermore, standards can be developed at a national level, regional level and international level, which requires good cooperation between all levels.[1193] Moreover, they touch upon different fields of law, both in the traditionally private as well as the public legal domain, namely on areas such as intellectual property law, competition law, security law, insurance law, energy law, health and safety law, environmental law…

As noted above, the CE Package and the BRP both underscore the potential of the use of standards. Standards can create and ensure trust in the use of recycled materials for all parties involved. This trust basically means that the recycled materials are just as good as virgin materials and can therefore replace them. The utilization of standards as a policy instrument is, however, nothing new to the EU. In fact, the EU has developed a new policy framework to support EU standardization.

In the year following the adoption of the CE Package, in 2016, the Commission published its renewed policy: the Standardization Package, which includes a Communication called 'European Standards for the 21th Century'.[1194] In the Standardization Communication, the Commission sets out its vision for an efficient European Standardization System (ESS). In a few words, a well-functioning ESS is one that: increases competitiveness and innovations; brings further benefits to authorities, businesses, consumers/users, workers and society at large; and adapts to the changing and often demanding needs of standardization.[1195] Together with the Joint Initiative on

---

[1191] Vertical standards prescribe requirements of a specific nature and horizontal standards prescribe requirements of a general nature, so regardless of the characteristics of the products, materials, components, systems and services.

[1192] The stakeholders in the value chain are companies (whether or not organized in branch organization and represented by them), States and societal actors (environmental NGOs, consumers groups, workers groups, research institutes, universities…).

[1193] This description is loosely based on Recital (1) and Article 2(1) Regulation 1025/2012 of 25 October 2012 on European standardisation, amending Council Directives 89/686/EEC and 93/15/EEC and Directives 94/9/EC, 94/25/EC, 95/16/EC, 97/23/EC, 98/34/EC, 2004/22/EC, 2007/23/EC, 2009/23/EC and 2009/105/EC of the European Parliament and of the Council and repealing Council Decision 87/95/EEC and Decision No 1673/2006/EC of the European Parliament and of the Council, [2012] OJ L 316/12. Hereafter called the European Standardization Regulation or ESR. The ESR entered into force on 1 January 2013. Evidently, I am aware of the fact that there are many more clarifications and definitions of a standard, each of them having their own nuances.

[1194] European Commission, *European Standards for the 21th Century*, COM(2016) 358. It explicitly highlights that the ESS should support multiple policies, amongst which the CE Package. The Standardization Communication is *inter alia* based on one of the REFIT reports issued and published under the BRP, which ex-post evaluated the ESS: European Commission: EY, *Independent Review of the European Standardisation System* (European Commission, Ares(2015)2179280, 2015).

[1195] More extensively, a well-functioning ESS is one that: 1) increases competitiveness and innovations, and which thereby: contributes to the integration of the European internal market, contributes to job and economic growth, opens up markets outside the EU, reinforces the Union's leadership in international standardization and technical development, and is inclusive to assure that standards work for both standards developers and standards users; 2) brings further benefits to authorities, businesses, consumers/users, workers and society at large, by providing for standards that: raise the quality and safety of products and services, and protect the environment and human health; and 3) adapts to the changing and often demanding needs of standardization, such as: new and rapidly changing technologies and technology cycles, increasing complexity and interaction of

Standardization,[1196] which roughly expresses the same vision as the Standardization Communication, the European Commission tries to improve the functioning of the ESS by the end of 2019.[1197] One of the actions is to optimize the operational aspects of the European Standardization Regulation.

The ESS consists of three European Standardization Organizations (ESOs) that are recognized by the EU as such. The ESOs are: the CEN (Comité Européen de Normalisation, which deals with various kinds of products, materials, services and processes, 1961), the CENELEC (Comité Européen de Normalisation Électrotechnique, which deals with the electro-technical engineering field, 1973) and the ETSI (European Telecommunications Standards Institute, which deals with information and communication technologies, 1988).[1198] These ESOs are the only bodies that may develop a special type of standard in response to an official 'standardization request'[1199]. This type of standard is called 'harmonized European standards' or just 'harmonized standards', and is a form of co-regulation.[1200] It is significant that the EU-based companies choosing to use the harmonized European standards benefit from a 'presumption of conformity' to the requirements set out in the corresponding EU harmonized laws.[1201] Having attained the relevant standard, they can market their products or services throughout the entire EU internal market without many further hurdles. Harmonized European standards could therefore provide for great benefits for firms operating in the Union and are a tool to support EU policies and legislation.

The ESS and the ESR are closely related in the sense that the Regulation sets out the legal framework for the ESS by establishing rules on the cooperation between ESOs, national standardization bodies (NSOs), Member States and the Commission. It also lays down rules on the establishment of European standards and European standardization deliverables for products and for services and the financing of European standardization.[1202] All in all, the ESR harmonized the previously fragmented legislation on standardization, extended the scope of these laws to services and standardization deliverables other than standards, and intensified the role societal stakeholders and SMEs can play in the ESS.

When exploring the role harmonized European standards could play for qualitative recycling, there are several interconnected topics that require a closer look. Some of them have already been briefly touched upon. Some of them positively contribute to qualitative recycling, while others do less. The topics are discussed in the next couple of sections, evolving from more general topics

---

industrial systems, progressive integration of digital solutions, blurring of borders between products, services and ICT, diversification of business models; and increasing and deepening global value chains. In: ibid., *European Standards for the 21th Century*, see e.g.: pp. 2 and 5.

[1196] The Joint Initiative on Standardization is an initiative between public and private partners across the EU. The public and private partners are the ESOsn and NSOs and bodies, industry, including SMEs, consumer associations, trade unions, environmental organizations, Member States and European Commission. See for all participants to the Joint Initiative: Joint Initiative on Standardisation under the Single Market Strategy, document created and published by the Commission's DG GROW, GROW.DDG1.B.3, pp. 16-33 and a-c.

[1197] In brief, it does so by modernizing, prioritizing, speeding up and streamlining the delivery of standards through a set of 15 actions that will be developed later. Annex I European Commission, *European Standards for the 21th Century*, COM(2016) 358, p. 12. See also: pp. 5-8.

[1198] Their international counter-parts are ISO (the International Organization for Standardization), IEC (the International Electrotechnical Commission) and ITU-T (the International Telecommunication Union, telecommunication standardization sector) respectively. Despite the increasingly exchange of information and work between these organizations and the ESOs, the ISOs are not discussed in this thesis. This choice is based on

[1199] See Article 10 ESR for the procedure. These standardization request are done by the Commission in the form of a Decision for the application of particular EU harmonized legislation.

[1200] Articles 2(1)(c) and 10 ESR.

[1201] Examples of legislation making use of this method are the CPR and the EFD/Ecodesign Regulations. See Chapter 5 for an explanation of the use of standards in these legal frameworks. REACH also makes use of standards. This law will be explained in Chapter 7.

[1202] Article 1 ESR. The Article also indicates that the Regulation establishes rules on stakeholder participation in European standardization and the identification of ICT technical specifications eligible for referencing.

(the pros and cons of standardization as such) to more specific topics (the practicalities and potential consequences of using standardization to encourage qualitative recycling).

6.4.2 Legitimacy and stakeholder participation in the standardization process

A. The lack of legitimacy

The elephant in the room is the commonly assumed lack of legitimacy in using standardization for public regulatory purposes. This viewpoint is the direct result of the private nature of standardization and, therefore, of the absence of a democratic mandate.[1203] From an EU perspective, the criticism is thus that the use of standards shifts regulatory-making to bodies other than the formal EU Institutions, namely to the ESOs. Arguably, this gives these unelected organizations considerable interpretative latitude in fixing standards, which moreover frustrates the transparency of the standardization process.[1204] This is particularly apparent in the case of harmonized European standards, because companies using such standards benefit from a presumption of conformity to the requirements set out in the corresponding EU laws.[1205]

If harmonized European standards are developed for recycled materials or for products containing recycled materials, these standards would have a major impact on qualitative recycling. Particularly if those standards contain quality levels recyclers and manufacturers need to comply with. The fact that these standards are in essence not established by public authorities, and so without all the checks and balances applicable to formal law-making, is in principle an argument *against* the use of harmonized European standards. On the other hand, since this type of standard is initiated by a formal request by the Commission, the development of the standards can at least be managed in its initial phase, albeit only just a little (by prescribing the essential requirements of the standard). Moreover, the lack of legitimacy in standardization is, to a certain extent, alleviated by several integral features of standardization (e.g. efficiency, transparency…).[1206] One of these features will be further clarified below because of its particular importance for the Circular Economy transition: the participation of stakeholders in the standardization process.

B. Stakeholder participation

While the role of the EU Institutions is, indeed, considerably diminished in harmonized standardization compared to the classical top-down governance structure, the potential of the participation of a great share of the relevant stakeholders alleviates this flaw and establishes a

---

[1203] See e.g.: (in a global context): N. Hachez and J. Wouters, 'A Glimpse at the Democratic Legitimacy of Private Standard' (*Journal of International Economic Law*, 14:3, 2011), pp. 677-710.

[1204] P. Craig and G. de Búrca, *EU Law, Text, Cases, and Materials* (Oxford University Press, 6 edn, 2015) p. 628. See also: European Commission, *Towards an increased contribution from standardisation to innovation in Europe*, COM(2008) 133, pp. 8-9.

[1205] Besides the transfer of regulatory power on issues such as environmental and human health protection to non-elected private entities, there is also the issue of accessibility. The question arises whether all stakeholders in the supply chain could actually access the harmonized European standards (when this is *de facto* obliged by EU legislation: on this issue, see Chapter 6.4.3-B, below). It can be argued that intellectual property rights granted to the ESOs frustrate the accessibility of the standards. What this question of legitimacy boils down to is the tension between the free access to legal rules and other governmental documents on the one hand and the collection of profits from selling copyrights and the barrier this entails on the other hand. The question thus relates to the legitimacy of harmonized standards as a regulatory tool for regulators. Because an analysis of this question means that an entire new legal field would need to be studied, I only briefly touched upon the issue to demonstrate that the scope of the legitimacy question – and standardization as such – is much broader than what is explained in Chapter 6.4.

[1206] The EU standardization setting process is based on WTO principles (i.e. transparency, openness, impartiality and consensus, effectiveness and relevance, coherence, development dimension) as well as inclusiveness (e.g. of SMEs and societal stakeholders, which links to the feature of stakeholder participation discussed in this section). These principles are highlighted in European Commission, *European Standards for the 21th Century*, COM(2016) 358, p. 5 and in Recital (2) ESR. For the WTO principle see: World Trade Organization, *The WTO Agreements Series - Technical Barriers to Trade* (WTO, revised in 2014).

different kind of legitimacy.[1207] Ideally, standardization ought to be an open process for all interested parties. Participation by a great variety of stakeholders is particularly important in the Circular Economy transition, because transitions are not sparked off by public authorities alone. Niche developments such as in the area of recycling techniques and of materials could be developed by many kinds of stakeholders.[1208] Bottom-up approaches developed by the industry, SMEs, NGOs and research institutes are significant, too, to bring the transition to the next level. Above all, stakeholder participation is important for standardization because it implies that the harmonized standards are broadly supported by many relevant stakeholders in society, once adopted. This would increase the legitimacy of standardization.

The ESR has safeguarded and further deepened the involvement of stakeholders in the development of harmonized standards. Article 5(1) ESR now states that the ESOs shall *'encourage and facilitate an appropriate representation and effective participation of all relevant stakeholders, including SMEs, consumer organisations and environmental and social stakeholders in their standardisation activities*.' It adds that this should be done throughout the entire standardization process, in all the different stages (e.g. the technical discussion on proposals, the submission of comments on drafts, and the revision of existing European standards or European standardization deliverables). It is particularly important that stakeholders are included early in the standardization process to be able to steer it.[1209] Article 5(2) ESR further states that the ESOs shall *'encourage and facilitate appropriate representation, at technical level, of undertakings, research centres, universities and other legal entities'* if it concerns an emerging area *with significant policy or technical innovation implications*.[1210] The fact that societal organizations such as environmental NGOs could have a voice in the standardization process, and that, therefore, societal interests can now be taken into account better than before constitutes major progress in the variety of participants. Qualitative recycling may benefit from this. In the case where the participating companies are predominantly from the industry and are not committed to raise the quality of the recyclates at issue, for example, this could be an opportunity for qualitative recycling because these 'other' stakeholders who have different strategical reasons to join the process (e.g. environmental protection) may raise their voice at the negotiating table.

But then again, 'proactively engaging' the potential participants does not provide any *assurance* that they will actually be involved. For example, this would have been the case when NGOs are granted a formal right of opinion or when they are given a seat in the Technical Committees that actually draw up the standards – but this is not the case. In other words, there is no legal guarantee that all relevant parties are involved in the standardization process.[1211] The requirement of *encouraging* and *facilitating* an *appropriate* representation is not mandatory and therefore not very convincing.[1212] The same applies for the involvement of research entities. Moreover, it is questionable whether these institutes will have anything to say about 'regular standards', as their participation is only *encouraged* if the desired standard is to be developed in an *emerging area* with *significant* policy or technical *innovation implications.* This, too, leaves the ESO(s) quite some room to decide on whether and who to invite for participation, even though, in essence, standardization is an open system. Besides amending the ESR to solve this flaw such as in the way suggested above, the relevant legislation could also oblige the ESO(s) to

[1207] Regardless of the strategic reasons stakeholders have to join the standardization process.
[1208] See for an explanation of transitions and the legal transition towards a Circular Economy Chapters 4.1 and 4.2.
[1209] Nederlands Normalisatie-Instituut: M. van Rijn and D. Hortensius, *De rol van normen en certificaten in de circulaire economie* (NEN, 2015), p. 11.
[1210] But only if these legal entities *'participated in a project that is related to that area and that is funded by the Union under a multiannual framework programme for activities in the area of research, innovation and technological development, adopted pursuant to Article 182 TFEU*.' Article 5(2) ESR.
[1211] R. van Gestel and H. W. Micklitz, 'European Integration through Standardization: How Judicial Review is Breaking Down the Club House of Private Standardization Bodies' (*Common Market Law Review*, 50, 2013), p. 152.
[1212] In other words, only 'soft measures' are used. Ibid., p. 179.

ensure that the various categories of stakeholders are in all instances represented in a fair and equitable manner.[1213] Keep in mind, though, that participation is in essence voluntary, so if certain stakeholders are not willing to take part in the process, they do not.

Article 7 ESR sheds more light on the role public authorities play in EU harmonized standardization: next to their involvement in the Technical Committees by means of representatives,[1214] they should be encouraged by the Member States to participate in *national* standardization activities aimed at the development or revision of harmonized *European* standards.[1215] In the case of standards for qualitative recycling, public authorities could thus influence the making or revision of standards by arguing in favour of stricter norms. Note, however, that once again the participation of public authorities in the NSOs with the *particular* aim of developing or revisiting EU standards is merely *encouraged* by EU law – it is not obliged.[1216] Additionally, it is questionable whether public authorities would really participate in standard-setting, above all because it requires a lot of resources and specific knowledge on many different issues/standards. As it happens, these issues are precisely the reasons why governments wanted to outsource it to standardization organization/the industry in the first place.

In conclusion, the broad participation of stakeholders in the standardization process could in principle be an answer to the legitimacy issue, because it would provide for a broad support amongst the actors who are active in the materials system, e.g. in the design and manufacturing stage, the use stage and the waste stage. For this reason, stakeholder participation is very important for qualitative recycling. Moreover, by including societal stakeholders such as environmental NGOs, a different voice is raised in the development process of the standards, which could have a positive impact on qualitative recycling as well, for example if no action is taken by the industry to raise the quality. This also applies to public authorities. All in all, even though success is not guaranteed, stakeholder participation has potential for the standard-making qualitative recycling. Despite that, the ESR is not yet fully optimal to support this vision, amongst others because the participation of a variety of stakeholders is not legally guaranteed.

6.4.3 Market access and the (non-)legal status of harmonized European standards

A. The New Approach and market access

The market in a Circular Economy is above all a cross-border market, because substances, materials, products and wastes go from one State to another. Besides, companies settle relatively easily across the Union and internationally, and there is a constant knowledge flow between countries (e.g. through patent law).[1217] For businesses, harmonized European standards function as a bridge in as well as a gateway to the EU internal market, so that their goods can be mainstreamed. To explain what particular consequences the reliance on such standards entails for

[1213] For example, see Article 17(2) CPR, where it states that *'where stakeholders are involved in the process of developing harmonised standards pursuant to this Article, the European standardisation bodies shall ensure that the various categories of stakeholders are in all instances represented in a fair and equitable manner.'*

[1214] Technical Committees are formed by representatives of industry, governments and other stakeholders. These representatives are appointed by Standardization Organizations Members, being e.g. the NSOs of the EU Member States (plus several other countries, such as Turkey, Iceland, Norway and Switzerland) and have therefore a strong national interest.

[1215] Article 7(1) ESR. Considering the activities referred to, one could think of the platform created by Article 7 ESR, where it states that each ESO establishes a work programme together with its national equivalent at least once a year. This programme contains information on the standards and standardization deliverables which an ESO or national standardization organization intends to prepare or amend, is preparing or amending, and has already adopted in the preceding period.

[1216] Additionally, Recital (2) ESR states that NSOs should encourage and facilitate the participation of stakeholders in their own national standardization processes.

[1217] H.R.J. Vollebergh and E. van der Werf, 'The Role of Standards in Eco-innovation: Lessons for Policymakers' (*Review of Environmental Economics and Policy*, 8:2, 2014), p. 240.

qualitative recycling, we need to go back in time to the 1980s when the so-called 'New Approach' was introduced to EU policy.[1218]

The New Approach aimed to establish one market, where market entrance conformity is linked to the requirements set in EU legislation. The policy was adopted by the Council in 1985 and demarcates a big change in policy: instead of incorporating all technical details in legislation, it launched a procedure according to which the Commission requests an ESO (or more) to draw up a harmonized standard. This request is put in legislation, which simply includes the 'essential requirements' of the desired standard. As stated earlier, conformity with the harmonized standard implies conformity with these requirements and should give free passage to the EU market. In this way, the Commission does not have to develop the technical requirements, which saves a lot of time, money and other resources that would otherwise have been invested in the development of the standards. It is significant to note that the ESOs have in principle remained free to reject the Commission's request. This means that for a future harmonized standard on qualitative recycling, the European Commission should first file a request, potentially based on the WFD, in order for it to be developed by the ESO(s).

The voluntariness of the application of harmonized European standards had long been an argument *against* interpreting these standards as law: it was argued, amongst others by the Commission, that since there were (in theory) other means to show conformity with the essential requirements, which just as well gives passage to the internal market, they were not formally considered law.[1219] This indemnifies any responsibility and accountability of the EU law-maker.[1220] Some argue that this way of co-'regulation' has therefore integrated the EU market through a mild form of 'de-legalization'.[1221] The idea that standardization leads to the integration of the EU market is appealing for qualitative recycling in the sense that this would in any case create a broader area of distribution for recycled materials and for high-quality recycled materials, provided that it is possible to develop a fitting standard for such materials (see Chapter 6.4.5). The assumption of a 'non-law status' of harmonized European standards has, however, been contested right from the start. Moreover, it is still under development today.

B. Legal framing of harmonized European standards

The discussion concerns the gap between the theory and the practice of standard use. While harmonized European standards are used to gain free passage to the market, which has therefore a vital impact on businesses, market players are often left no choice but to join and comply with them.[1222] It is argued that it is prohibitively expensive and complicated to prove conformity with the essential requirements set out in the relevant legislation using alternative means. Indeed, companies that wish to use means having comparable results – *if available at all*, because the existence of alternatives is generally based on a mere assumption – are required to proof compliance themselves, whereas companies using the standards only have to show the CE mark affixed to their products. Moreover, it turns out that, in practice, potential users only purchase

[1218] Council Resolution of 7 May 1985 on a new approach to technical harmonization and standards, [1985] OJ L 136/01. See also the reinforcement of the New Approach: Decision 768/2008 of 9 July 2008 on a common framework for the marketing of products, and repealing Council Decision 93/465/EEC, [2008] OJ L 218/82.
[1219] For example, the New Approach had long proactively been encouraged and underpinned by the (previous versions of the) Better Regulation Programmes as a good way of *governance*. See e.g.: European Commission, European Governance – A White Paper, COM(2001) 428 p. 20.
[1220] H. Schepel, 'The New Approach to the New Approach: The Juridification of Harmonized Standards in EU Law' (*Maastricht Journal of European and Comparative Law*, 20, 2013), pp. 523-525. The voluntariness of the harmonized standards was moreover also often brought forward as an argument against the lack of legitimacy (see Chapter 6.4.2-A).
[1221] It is 'mild' because law and politics both remain present in standardization, for example through the participating stakeholders in the ESO Committees. See on this issue: C. Joerges, 'Integration through de-legalisation?' (*European Law Review*, 33:3, 2008).
[1222] In a general, international context see: K. Purnhagen, 'Mapping Private Regulation – Classification, Market Access and market Closure Policy and Law's Response' (*Journal of World Trade*, 49:2, 2015), pp. 311-312.

products bearing those CE marks.[1223] All things considered, it can be argued that standards have become *de facto* mandatory for businesses wishing to sell their products in the EU; they have become preconditions.[1224] This is also the case for recyclates: because the standardization mechanism can provide for a standardized guarantee of the quality of a particular material, recyclates can compete with virgin resources on the internal market. Standards are therefore often considered a precondition for manufacturers that receive the recyclates.[1225] From this point of view, it is difficult to consider harmonized European standards as purely non-law and therefore unchallengeable by private parties in (national) Court.[1226]

And so, it can be argued that measures erected under the New Approach should not escape judicial review any longer on the basis of the assumption that harmonized European standards are in principle voluntary for firms to obtain.[1227] The ESR also seems to support this position, as it explains in Article 10(6) that the Commission has to publish the references to harmonized standards in the Official Journal of the EU where they satisfy the essential requirements.[1228] Publication generally means that the published measure has a legal status. It seems that the possibility to have judicial review performed in the standardization arena indeed breaks down the 'club house of standardizers'[1229].[1230] It also seems that this development blurs the borders between public and private entities/law, making standardization a genuine form of co-*regulation.* It is still to be answered how far this goes and whether this triggers all the 'public law implications', however.[1231] The constitutional dimension of the ESS is still rather vague. The CJEU did, nevertheless, shed some more light on whether standards are considered voluntary or not.

In the same year as the adoption of the ESR, the CJEU had to rule on the legal status (public or private) of the German NSO 'DVGW' in the *Fra.bo.SpA* Case (and thus, it was *not* about the legal status of the standards themselves, which is a nuance worth pointing out).[1232] The dispute had been brought to court by an Italian company which was confronted by the presupposed need to adopt its products (copper fittings) to the DVGW's standards if it wanted them to be sold in Germany. The Italian firm argued, however, that the DVGW held *de facto* the power to regulate the entry to the German market and that this frustrates the four economic freedoms (in particular Article 34 TFEU on the movement of goods). The CJEU had to answer the question whether, in

---

[1223] These arguments have been expressed in: supra note 1220, p. 528; and R. van Gestel and H.W. Micklitz, 'European Integration through Standardization: How Judicial Review is Breaking Down the Club House of Private Standardization Bodies' (*Common Market Law Review*, 50, 2013), pp. 157 and 165.

[1224] See e.g.: N. de Sadeleer, *EU Environmental Law and the Internal Market* (Oxford University Press, 1 edn, 2014), p. 380.

[1225] Nederlands Normalisatie-Instituut: M. van Rijn and D. Hortensius, *De rol van normen en certificaten in de circulaire economie* (NEN, 2015), p. 3.

[1226] For example, one could imagine a NSO bringing a case before court if its viewpoint is not followed by the particular ESO.

[1227] Supra note 1220, p. 528. Evidently, this does not say anything about the legal standing at Court, which is based on whether someone is directly affected by the decision (e.g. the Commission's decision to confer the presumption of conformity on certain harmonized standard). See here pp. 531-532.

[1228] Ibid., pp. 529-532.

[1229] The 'club mentality of standardizers' is referred to by Bernstein in her well-known analysis of the standardization framework of the diamond industry (in the USA), where no public authorities and public law were involved because the industry governed it all by itself. In her view, a complete 'private legal system' was established, in which, amongst other building blocks, courts do not intervene. See L. Bernstein, 'Opting out of the Legal System: Extralegal Contractual Relations in the Diamond Industry' (*The Journal of Legal Studies*, 21:1, 1992), pp. 115-157.

[1230] About the change in the 'club house mentality', see: R. van Gestel and H.W. Micklitz, 'European Integration through Standardization: How Judicial Review is Breaking Down the Club House of Private Standardization Bodies' (*Common Market Law Review*, 50, 2013), pp. 145-182.

[1231] That is on whether standardization organizations also have to comply with the principles and rules applicable to public law-making and enforcement, such as the right to participate in the decision-making process and the right of access to information. See in particular: ibid., p. 160.

[1232] Judgement of 12 June 2012, *Fra.bo SpA v Deutsche Vereinigung des Gas- und Wasserfaches eV (DVGW) - Technisch-Wissenschaftlicher Verein*, C-171/11, EU:C:2012:453.

the light of *inter alia* the legislative and regulatory context in which it operates, the activities of a private-law body such as the DVGW has the effect of giving rise to restrictions on the free movement of goods in the same manner as do measures imposed by the State.[1233] It concludes that in such circumstances a body like the DVGW – by virtue of its authority to certify the products – *in reality* holds the power to regulate the entry to the German market of products, such as the copper fittings at issue in the main proceedings.[1234] Therefore, what counts is the *real* power to take regulatory decisions that may affect the internal market. The delegation to private entities therefore cannot avoid the applicability of the Treaty provisions on the freedom of goods.[1235] As stated above, unfortunately, despite underscoring the *public function* that is entrusted to *standardization organizations*, the CJEU does not say anything about the consequences of this in this one judgment. And so, the blurred lines between private and public law continued to exist.[1236] The CJEU had the opportunity to develop this further in 2016.

The Third Chamber of the CJEU further clarifies the odd place standards occupy in EU law in the *James Elliott Construction* Case.[1237] In brief, the judgment concerns a contractual dispute between two parties: soon after completion of the construction of a youth facility by James Elliott Construction, which was built using aggregates supplied by Irish Asphalt, cracks began to show in the floors and ceilings. James Elliott Construction repaired these issues and sued Irish Asphalt for a breach of the contract and asking for compensation, arguing that the presence of pyrite in the aggregate was the cause of the cracks. It is of key importance here that the tests on the aggregate showed that it did not meet the Irish standard (transposing a harmonized European standard, EN 13242:2002), which ought to ensure compliance with the essential requirements laid down in the Construction Products Directive 89/106, allowing the CE marking to be affixed to the product.[1238] The Supreme Court of Ireland referred several questions on the legal framing of harmonized standards to the CJEU for a preliminary ruling. The essence of the CJEU's decision is that the CJEU has jurisdiction to give a preliminary ruling concerning the *interpretation* of a harmonized standard, because in spite of the fact that the development of such standards is entrusted to an organization governed by private law and not to *'institutions, bodies, offices and agencies of the Union'* (Article 267 TFEU), it is *'a necessary implementation measure which is strictly governed by the essential requirements defined by* [the Construction Products Directive], *initiated, managed and monitored by the Commission, and its legal effects are subject to prior publication by the Commission of its references in the Official Journal of the European Union.*'[1239] Briefly put, the CJEU confirms that harmonized standards have, indeed, a certain public nature because of their legal ties with the European Commission, which makes them fall within its jurisdiction. Nevertheless, the remainder of the ruling tried to tame the overreaching effects of the finding that a harmonized standard is a provision of EU law. This still leaves a lot to be decided on the legal framing of harmonized European standards in the future.[1240]

[1233] Ibid., para. 26.
[1234] Ibid., para. 31.
[1235] See for a broader discussion on this topic: R. van Gestel and H.W. Micklitz, 'European Integration through Standardization: How Judicial Review is Breaking Down the Club House of Private Standardization Bodies' (*Common Market Law Review*, 50, 2013), pp. 159-161.
[1236] Moreover, national Courts are not clear on this either. See for a comparison between two national Cases (Dutch and German) and the *Fra.bo.SpA* Case: Ibid., pp. 161-177.
[1237] Judgement of 27 October 2016, *James Elliott Construction Limited v Irish Asphalt Limited*, C-613/14, EU:C:2016:821.
[1238] Directive 89/106 of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products, [1989] OJ L 40/512. This Directive is repealed by the Construction Products Regulation of 2011 (Regulation 305/2011), which is discussed in Chapter 5.
[1239] Supra note 1237, para. 43. See also: paras. 34, 35 and 47.
[1240] See for an overall review of the Case the blogpost on europeanlawblog.eu of M. Medzmariashvili: 'A harmonized European (technical) standard – Provision of EU law! (Judgement in C-613/14 James Elliott Construction)', 24 January 2017, http://europeanlawblog.eu/2017/01/24/a-harmonised-european-technical-standard-provision-of-eu-law-judgment-in-c-61314-james-elliott-construction/ (consulted on 3 August 2017).

The development in case law is important for the role standards could play for qualitative recycling, because it can be argued that a public legal nature of harmonized European standards makes the use of the standardization mechanism harder or less appealing for the European Commission. Because in essence, the discussion discussed above boils down to the prospect that everyone having direct concern could go to Court to challenge the legality of a regulatory act (i.e. the standard), and it can be assumed that the group of directly affected persons is quite substantial.[1241] While this was generally not considered possible before 2012, all recyclers, importers of recycled materials and manufacturers using recycled materials can then in theory go to Court if they feel their products are excluded from harmonized European standards. (To my knowledge, this has not yet happened so far). For societal stakeholders it is less clear, because they are not given any formal rights in the standardization process under the ESR.[1242] Arguably, if stakeholders of any kind can challenge a standard, this would severely delay the standardization process and could make the stakeholders more cautious of getting involved at all. If this happens, it would undermine the legitimacy of standardization in that less stakeholder participate in the process. Even the European Commission itself may be even restraint in requesting standards. It can be concluded that this development could *paralyze as well as legitimize* EU harmonized standardization.[1243] A fine paradox has arisen of which the foundations were already created by the New Approach. The CJEU has in any case paved the way for future questions concerning the legal framing of harmonized European standardization. We need to see how this progresses.

To conclude, the New Approach demarcates a change in policy, which sets the basis for today's practice that EU legislation relies on harmonized European standards. Nonetheless, a development is going on according to which standards are increasingly not merely considered 'voluntary' and purely 'private law-based' anymore. Now that standards can be more and more considered *de facto* mandatory, judicial review seems to be possible and it may be argued that standards should adhere to other basic principles of public law as well. The impact this could have on qualitative recycling is that the participation in standard-making and the use of standards would be less appealing. This would have an impact on qualitative recycling if harmonized standards on recyclates and/or on high-quality recyclates are set.

6.4.4 Eco-innovation: flexibility, consensus, expertise and coopetition

Now that two issues have been highlighted that mainly relate to the general nature of harmonized European standardization, we move closer to what the use of harmonized European standards could mean for qualitative recycling at a more practical level. This section expands on eco-innovation.[1244]

To find new ways of raising the quality of recyclates, research and technological development should be stimulated. Standards can play a significant role in eco-innovation. In fact, one could argue that scaling up eco-innovation is one of the key reasons of the European Commission to turn to harmonized European standards in environmental policy. For this reason, I will have a closer look at the role standardization plays in eco-innovation and vice versa. This is done by

---

One of the nuances in the judgement is that even though the conformity of products with an harmonized standard provides a 'presumption of fitness for the purposes' of free market access in correspondence with the Construction Products Directive, it does *not* affect the contractual obligation to supply products of 'merchantable quality' or fit for its purpose where a *national law* of a general nature governing the sale of goods requires that a construction product have such characteristics (e.g. paras. 52 and 61). This means, in effect, that conformity with a harmonized standard could not shield Irish Asphalt from the contractual obligation to supply goods of merchantable quality and payment of damages for failing to comply with this duty.

[1241] H. Schepel, 'The New Approach to the New Approach: The Juridification of Harmonized Standards in EU Law' (*Maastricht Journal of European and Comparative Law*, 20, 2013), p. 531. Basically, it could affect all the stakeholders who are given procedural rights in EU standardization under Article 5 ESR. See Chapter 6.4.2 on legitimacy and stakeholder participation.

[1242] See Chapter 6.4.2-B.

[1243] Supra not 1241, p. 533.

[1244] See for a general explanation of eco-innovation Chapter 2.2.3-B.II.

using two different perspectives: one according to which the standardization process is discussed (a procedural perspective) and one according to which the reasons for firms to eco-innovate through standardization are discussed (a firm-level perspective).

A. Procedural perspective: responsiveness, consensus and expertise

From a procedural perspective, three interrelated features of standardization can be highlighted in view of eco-innovation: firstly the responsiveness of standardization, secondly the consensus in standard-making and thirdly the expertise of the participating stakeholders. These features may adversely *and/or* positively impact eco-innovation and therefore also qualitative recycling if standards were to be drawn that encourage it.

As regards the responsiveness of standardization, it is generally assumed that the standardization process is much more dynamic in comparison to the rigid law-making procedures. This was, after all, also one of the reasons for the European Commission to launch the New Approach in the first place: by keeping only the essential requirements in EU legislation, whereby the technical details will be developed later outside the realm of the formal legislative procedures, the EU regulators can work more swiftly. This idea behind harmonized European standards implies simultaneously that the relevant legislation can remain unchanged if new scientific or technical developments have arisen, while at the same time the standards can be changed to stay up-to-date without a relatively lengthy legislative revision process.[1245] The responsiveness in standardization is one of the main elements that contribute to the dynamics of the instrument.

The responsiveness of keeping standards accurate is subject to several challenges. Examples are the changing patterns of technological development (e.g. the rapid shortening of innovation cycles and the convergence of technologies across the boundaries of the ESOs)[1246], the fast moving international standardization context (e.g. waste intended to be recycled and recycled materials may move relatively easily outside the EU) and the changing ideology on material use (i.e. the Circular Economy transition!). If not able to adapt, the ESS risks working as a brake on innovation.[1247] The challenges can be partially addressed in the ESS by the periodical evaluation of the standards. The ESR does not legally guarantee this, however; this is done by the relevant ESO(s) through self-corrective systems. In addition, Article 11 ESR and the legislation based on the New Approach ensure that the Member States, the European Commission or the EP can appeal whenever they think that a harmonized standard does not entirely satisfy the essential requirements set out in the relevant standardization request.[1248] Another option would be that the

[1245] Then again, the standardization process is not that speedy either: the average time required 26 months in 2013. European Commission, *European Standards for the 21th Century*, COM(2016) 358, p. 6. (By contrast, the Commission reported in 2011 that the preparation-adoption of standards required under the *Ecodesign framework* was six years at the latest, so there has already been taken major steps in recent years. See: European Commission, *Standardisation mandate to CEN, CENELEC and ETSI under Directive 2009/125/EC relating to harmonised standards in the field of Ecodesign*, 27 July 2011, M/495 EN, p. 3). I assume that the long process might have to do, amongst others, with the encouragement of including a large number of participating stakeholders in standardization. This, by the way, would seem to apply in particular to matters associated with the Circular Economy transition, because they are generally new, multidisciplinary and/or complex, requiring a broad vision that is supported by many in society. Any future standards on qualitative recycling will probably also have to deal with this. Additionally, an ESO can also refuse a standardization request, which would make the overall process for standard-setting even longer. All in all, it could be questioned whether standards are really much more responsive than legislation. Though, as stated above, the Commission and the ESOs are working on a timely development of harmonized European standards (see the Standardization Communication and the Joint Initiative on Standardization).

[1246] European Commission, *Europe 2020 Flagship Initiative Innovation Union*, SEC(2010) 1161, p. 18.

[1247] Ibid. The Commission further stresses that a dynamic standardization system is a pre-condition for the EU to maintain and further reinforce its impact on the setting of standards at global level. If applied in favour of the Circular Economy, this could help the EU from a strategical point of view.

[1248] The arguments should be delivered at a Committee of the relevant ESO(s), whereupon the Committee delivers its opinion without delay. (This Committee is especially erected pursuant to Article 5 of Directive 98/34 on the provision of information in the field of technical standards and regulations. According to Article 5, a Standing Committee consists of representatives appointed by the Member States who may call on the

Commission requests an entirely new standard, which should replace the existing standard completely. These are all possibilities for the EU to respond in the standardization process to changes in legislation, policy and technological development.

These possibilities may provide for opportunities for (any potential) standards on qualitative recycling, although there are several drawbacks to them as well. First of all, a periodical review of a standard is a perfect timing to raise the quality of the relevant material. A disadvantage is that in essence the participating stakeholders are in charge at the end of the day, which means that there is no guarantee that the quality will be actually increased, *unless* this is regulated in the EU regulation laying the foundation of the harmonized European standard at issue. Secondly, as regards the right to appeal, appealing the standard would only work if the essential requirements set out by the Commission entail a provision saying that the quality of the recyclate should be raised at regular intervals. It is doubtful whether such provisions can be incorporated in the essential requirements. Finally, the Commission could indeed requests entirely new standards if it finds that there has only been slow progress in quality improvement. While this is legally correct and may give new impetus to improvements, it is questionable whether it is practically feasible and desirable. It might be too cumbersome to take action, as it requires the Commission (or the JRC) to stay up-to-date with the latest developments and it takes a lot of time and resources, which is exactly why the Commission had outsourced it to the ESO(s) in the first place. An additional point of attention in the case of all the possibilities addressed above is that it is significant to timely respond: changing the standards to enhance eco-innovation must not take too long, because the innovations might then not have received support in time, *inter alia* due to obstructions in the exiting standards. On the other hand, if adaptations to the standards are made too early, innovations may not yet be ready to bloom.

The second feature of standardization concerns the fact that consensus would need to be reached amongst all participating stakeholders at the end of the process.[1249] Consensus can be described as *'a general agreement, characterised by the absence of sustained opposition to substantial issues by any important part of the concerned interests and by a process that involves seeking to take into account the views of all parties concerned and to reconcile any conflicting arguments. Consensus does not imply unanimity.*'[1250] A consensus-based standard seems to be attractive in view of participation, but for eco-innovation this could be a challenge: consensus may lead to mediocrity, which would not really help innovations in the quality of recyclates. Requiring consensus is in sharp contrast with law-making, because Regulations and Directives are imposed top-down. For this reason, legislation could (theoretically) impose stricter quality levels on businesses in order to accelerate innovation. Even so, the BPR tries to increasingly involve businesses and society at large in the preparations and evaluations of legislation, thus slowly shifting towards the standardization procedure (although it would never reach the point of full consensus, of course).

The third feature of standardization on the potential availability of expertise of the participating stakeholders links to the idea that standardization requires a broad participation and is consensus-based in the sense that the stakeholders are *ideally* characterized by their heterogeneity. This means that there should be a diverse background and composition of the participating stakeholders and that, therefore, there should be a mixture of expertise present in the pool of participants. This contradicts the general perception of law-making, namely of being prepared and adopted by non-specialized bureaucrats from only one department. The BPR tries to

---

assistance of experts or advisers, and its chairman shall be a representative of the Commission). On the basis of the Committee's advice, the Commission can then decide to withdraw the challenged standards from the Official Journal, which basically means that the standards are not a necessity anymore for market entry, or request for revision. For example see Article 9(4) Packaging Directive. The procedure between the ESR and the relevant legislation differs, however. See for the exact differences the Article 11 ESR and, for example, Article 9(4) Packaging Directive.

[1249] Article 10(1) ESR.

[1250] Annex II ESR.

tackle this viewpoint by taking note of the arguments submitted by the willing actors in the preparations and evaluations of the legislation. Additionally, the European Commission outsources research to private organisations or carries out its own research (through the JRC) to be up-to-date with the latest technological developments on a certain issue. So, while indeed the EU is making ground in that respect in the legislative procedure, there is probably still a lot more knowledge available in the standardization procedure, amongst others from innovative SMEs and large companies. This could stimulate eco-innovation on condition that this knowledge is shared with the other stakeholders involved. Whether this is done and to what extent, however, depends on the specific intensions for firms to participate in the standardization process (see Section B, below).

B. Firm-level perspective: coopetition

From a firm-level perspective, there are two reasons particularly significant for firms to exercise their powers in the standardization process in the light of eco-innovation: on the one hand companies join the process to compete with other relevant stakeholders, and on the other hand they join to cooperate with others. Both objectives are extremely important for eco-innovation, because standards provide companies opportunities to expand their businesses to other national markets in the EU at the possible expense of other firms, while at the same time they maintain a platform for exchanging knowledge and learning processes. 'Coopetition' is a good way to describe these interlinked strategical objectives.[1251] Pursuing coopetition (with varying focal points) raises a number of challenges for companies. This has an impact on how standardization is perceived by the European Commission as a tool to encourage qualitative recycling. So why do firms want to be involved? Why do/should recyclers care?

The main reason for companies to participate in the standardization process appears to be the opportunity to prevent legislation from being developed or to shape legislation in a way that it is industry-friendly and above all firm-friendly.[1252] The risks of influencing regulation through standardization in a way which might contradict the public interest, such as environmental and health protection, is called 'regulatory capture'.[1253] Generally speaking, regulatory capture does not have a good reputation in view of innovation, because it is feared that the industry could highjack public decision-making on issues that used to be primarily within the domain of public law. An important way to balance the interests and thus to counter regulatory capture is the participation of a broad and diverse group of sufficiently informed stakeholders (as a 'watchdog'), so including SMEs and 'non-firms' such as societal groups and research institutes.[1254] In the light of this, another safety measure is one of the inbuilt features of eco-innovation itself: big companies usually do not innovate alone, as collaboration and interdependence with other actors such as SMEs is generally required. Additionally, it is also argued that the risk of regulatory

[1251] Coopetition describes 'cooperative competition'. While I am aware of the research field on coopetition, I use the concept on a very basic level. For a thorough, academic explanation of coopetition and of the recent developments in the concept's meaning, see e.g.: M. Bengtsson, S. Kock, E. Lundgren-Hendriksson and M.H. Näsholm, 'Coopetition research in theory and practice: Growing new theoretical, empirical, and methodological domains' (*Industrial Marketing Management*, 57, 2016), pp. 4-11; and T. Galkina and E. Lundgren-Hendriksson, 'Coopetition as an entrepreneurial process: Interplay of causation and effectuation' (*Industrial Marketing Management*, 2017), *in press*.

[1252] K. Blind and A. Mangelsdorf, 'Motives to standardize: Empirical evidence from Germany' (*Technovation*, 48-49, 2016), pp. 17 and 19-22. The difference between industry-friendly and firm-friendly is the focus area of motivation. Motives based on what is best for the firm is more specific than industry-friendly motives. Naturally, they can overlap, but this does not always have to be the case.

[1253] In brief, this concept deals with the situation when the regulator follows the interest of the industry instead of the public interest. See for an explanation of regulatory capture: J. Laffont and J. Tirole, 'The politics of government decision-making: a theory of regulatory capture' (*The Quarterly Journal of Economics*, 106:4, 1991), pp. 1088-1127. See also: e.g.: Organisation for Economic Co-operation and Development, 'Voluntary Approaches for Environmental Policy: An Assessment' (OECD, 2000), pp. 31-38.

[1254] Supra not 1252, p. 21; and ibid., 'Voluntary Approaches for Environmental Policy: An Assessment', pp. 37-38. See also: Chapter 6.4.2-B.

capture is lower if regulators have a high level of technical knowledge.[1255] In the EU, the JRC fulfils this function.

On the other hand, regulatory capture could also generate positive effects for eco-innovation: when a large firm with high research and development (R&D) intensity introduces a radically new and environmentally sound idea for which not many competitors exist yet, this frontrunner has a clear advantage of getting its clean(er) technology to be taken into account in standardization.[1256] Both the upgrade of the entire chain and the company interest are supported in this way (without the use of law). In fact, firms may want to increase the probability that their own innovative technology becomes the *dominant* standard (and/or to win a standard battle and thereby backing of competing companies). They wish to introduce company-specific content into the standards with the goal of facilitating the market enforcement of their innovations.[1257] All in all, therefore, regulatory capture can go either way: either firms wish to circumvent or influence environmental legislation or firms wish to get their novel environmentally-friendly inventions to be mainstreamed as a way of competitive strategy. Clearly, this dilemma probably also arises in the case of qualitative recycling.

It is noteworthy in this regard that the participants probably do not have the same power in the standardization process. It is a truism that bigger companies have more money to invest in R&D than smaller companies such as SMEs and have therefore more incentives to shape the standard into a new direction. The company size and budget overall creates a stronger bargaining position. Smaller companies have therefore more to win in the standardization process in terms of knowledge gathering from the larger firms, as they do not have the size, time and budget to invest a lot in R&D. Moreover, SMEs generally neither have the required know-how about the standardization mechanism nor find that the broad work area of setting a standard suits their specific business.[1258] Even so, the advantage of knowledge acquisition arguably counterbalances the company size argument in the sense that SMEs, too, want to participate in the standardization process and could use it to innovate.[1259] And so, both small-sized recyclers and big-sized recyclers have innovation opportunities in the standardization process, albeit in different degrees.

The access to knowledge from other stakeholders, such as through deliberately knowledge sharing or through unintended knowledge spillovers, is an important driver for all sorts of firms to participate in the standardization process. As said above, participation in standardization is particularly attractive for smaller companies that (often) lack the capacity to invest in R&D (by the same token, note that the ability of these companies to absorb the information depends on its absorption capacity measured by its R&D intensity).[1260] For larger companies, too, knowledge acquisition could be a reason to join in, because they could complement their own R&D, they could pool their knowledge with the group and they could catch up with technological developments in the field. Collecting first-hand and early knowledge on technical issues from other stakeholders, not least of the participating research institutes and universities, and on regulatory specifications from public authorities could provide for a competitive advantage.[1261]

[1255] H.R. J. Vollebergh and E. van der Werf, 'The Role of Standards in Eco-innovation: Lessons for Policymakers' (*Review of Environmental Economics and Policy*, 8:2, 2014), p. 243.
[1256] Ibid., p. 239.
[1257] By the same token, however, companies investing a lot in R&D may act more carefully in standardization because they risk losing their investments if their technological developments are not incorporated into a standard. In that respect, standardization could also endanger a company's competitive advantage. K. Blind and A. Mangelsdorf, 'Motives to standardize: Empirical evidence from Germany' (*Technovation*, 48-49, 2016), pp. 15-17 and 19-20. There is a vast body of literature to which Blind and Mangelsdorf refer in this contribution.
[1258] See e.g.: Nederlands Normalisatie-Instituut: A. de Buck, M. van Rijn, E. Schiltkamp, R. Boon and M. Ritter, *De rol van normen en certificaten als stimulans voor de Circulaire Economie* (NEN, 2017), pp. 8-9 and 32-33.
[1259] K. Blind and A. Mangelsdorf, 'Motives to standardize: Empirical evidence from Germany' (*Technovation*, 48-49, 2016), p. 16.
[1260] Ibid., p. 15.
[1261] Ibid. There is a vast body of literature to which Blind and Mangelsdorf refer in this contribution.

To conclude, the features 'responsive' and 'expertise' of standardization are generally used as an argument in favour of standardization over regulation.[1262] This is in spite of some shortcomings to those matters or, alternatively, some catching up in these fields in conventional law-making. The fact that standardization is based on consensus-based decision-making is, however, less constructive for innovation. From a firm-level perspective, there are different opportunities for eco-innovation through coopetition: firms could receive several competitive benefits from joining the standardization process, depending on the firm size and resources available for R&D. One of the main reasons for companies is preventing or influencing legislation, which could on the other hand also hinder eco-innovation if lower standards are being aimed at by the firms. Overall, let it be clear that new technological developments could be an input to standardization as well as an output of the standardization process.

6.4.5 Shaping the standards for qualitative recycling

To this point, we have discussed various features and objectives of standardization that are significant to the question whether and how harmonized European standards contribute to qualitative recycling, and what the challenges are when using the instrument for that purpose. All the time, however, I have assumed that there actually are possibilities to create standards that stimulate quality improvement of recyclates. The question I would like to answer in this section is whether this is really the case. How may a standard on qualitative recycling look like? And is it feasible to design such standards under the current framework? This will be discussed in this part. Firstly, this will be done by shedding light on the possible types of standards. Secondly, one – what I believe – ideal option of a product standard for qualitative recycling will be suggested next. This section also includes a discussion on the potential limits to the adoption of the projected standard. Basically, this section builds on what has been explained in the previous sections on standardization.

A. Possible types of standards

In exploring the options for shaping the envisaged standards, one should first explore the kinds of standards that could be useful for qualitative recycling. As mentioned earlier, there are many types of standards potentially significant.[1263] According to the website of CEN and CENELEC,[1264] standards can be categorized into four main categories. Really all of these standard types could be significant for qualitative recycling. They are as follows:

1. Fundamental standards
2. Test methods and analysis standards
3. Organization standards
4. Specification standards, such as material-specific product standards

First, the fundamental standards clarify the terminology used in the other standards and/or prescribe certain signs, symbols… In the case of terminological standards, any definition for qualitative recycling must theoretically correspond to the terminology used in EU legislation, such as the WFD.[1265] However, as highlighted in Chapter 6.2.1, there is currently no legal definition for qualitative recycling (yet), nor is there any for related concepts (e.g. downcycling or closed-loop recycling). In theory, the ESOs have therefore room for interpretation as long as they stay within

[1262] See e.g.: Nederlands Normalisatie-Instituut: M. van Rijn and D. Hortensius, *De rol van normen en certificaten in de circulaire economie* (NEN, 2015), p. 6.
[1263] See Chapter 6.4.1. Generally speaking, standards set technical and/or quality and safety requirements for specific current and future products, materials, systems and services, or describe a particular method or procedure. They can have a vertical or a horizontal effect, and they can either be adopted through co-regulation (such as harmonized European standards – the central instrument of this Chapter) or through self-regulation.
[1264] See https://www.cencenelec.eu/research/innovation/standardstypes/Pages/default.aspx (consulted on 4 July 2017).
[1265] This is practically speaking not always the case, however.

the terminological boundaries of the term 'recycling'.[1266] Having said that, the challenges for fixing a legal definition in the WFD are, of course, equally relevant for the determination of terms in standards: while these terminological standards would probably have a horizontal nature, determining 'quality' largely depends on the specific product or material. To avoid duplication, it is questionable whether it is useful to come up with a terminological standard for qualitative recycling if the WFD already includes a definition (as recommended in Chapter 6.3.1-A). On the other hand, fundamental standards on signs and symbols are more significant, because these matters could visualize the guarantee that the recycled material complies with the definitions (set in the WFD, such as the one for qualitative recycling, if adopted as suggested) and with the other standards relevant to qualitative recycling (which are discussed below and in the subsequent sections).

Second, the test methods and analysis standards are also useful for qualitative recycling, because they would set uniform approaches to measure and evaluate the recyclability of (waste) products or the characteristics of recycled materials. These standards can be used to compare different products and materials, and could be both horizontal and vertical in nature. Test methods and analysis standards are crucial for qualitative recycling, for they would provide for a uniform and consistent way to differentiate between high-quality and what does not count for high-quality.

Third, the organization standards are relevant for qualitative recycling, firstly because they can describe the functions and relationships of a company, and secondly because they can cover specific organizational issues, e.g. quality management and assurance, maintenance, value analysis, logistics, project or system management, production management… Put differently, they determine general rules about the recycling facility to streamline and ensure its good functioning.[1267] The organization standards are generally of horizontal nature, too, because they should be able to be applied to different types of industries or are based on different types of activities or processes.[1268]

Finally, the name of the fourth type of standard says it all: 'specification standard'. These standards are *specific* to a certain product (group) or service (group) and define their *characteristics* and their performance thresholds, such as on the fitness for interoperability, health and safety, environmental protection, (re)use, *recycling*... The CEN-CENELEC combination defines 'product standard' as

> *a standard that specifies requirements to be fulfilled by a product or group of products, to establish its fitness for purpose.*[1269]

The ESOs further explain that a product standard *'may include in addition to the fitness for purpose requirements, directly or by reference, aspects such as terminology, sampling, testing, packaging and labelling and, sometimes, processing requirements*'.[1270] Let it be clear

[1266] See Chapter 6.2.1-A for the definition of recycling.

[1267] Examples of issues are that can be addressed are: how the recycling machines should be looked after, how the waste streams entering the recycling facility should be pretreated, or how the overall supply chain should be managed.

[1268] A novel and significant first step in developing standards to enhance the Circular Economy in organizations is recently made by the UK national standardization organization (BSI). The BSI developed such a national standard in collaboration with the Ellen MacArthur Foundation: 'BS 8001: 2017: Framework for implementing the principles of the circular economy in organisations'. See https://www.ellenmacarthurfoundation.org/news/worlds-first-standard-for-the-circular-economy-launched?utm_content=buffer49a9e&utm_medium=social&utm_source=linkedin.com&utm_campaign=buffer (consulted on 5 July 2017). Note that this is *not* a harmonized European standard.

[1269] See e.g.: CEN-CENELEC, *Guide 33 – Guide for addressing environmental issues in testing standards*, Ed. 1, 2016, p. 7. This definition is based on: ISO/IEC Guide 2:2004, definition 5.4. It can also be found in CEN, *Guide 4 – Guide for addressing environmental issues in product standards*, Ed. 3, 2008, p. 3.

[1270] Ibid., *Guide 33 – Guide for addressing environmental issues in testing standards*, p. 7. This may mean that the fundamental standards and the test methods and analysis standards relating to qualitative recycling are abundant. However, this is not desirable in all cases, because a fundamental standard may have horizontal effect,

that product standards are in essence vertical in nature and may set minimum or maximum thresholds, leaving it for firms to choose their own means to reach them. They can be customized completely. The CEN-CENELEC also highlights that a product standard can either be complete or not, meaning that the vertical standards do not need to cover all requirements in one go.[1271]

Although all the standard types are very useful for qualitative recycling, only the fourth type will be explored in more depth below. This is because specification standards *directly* impact the quality of the recyclates and thus the possibilities for using them in the manufacturing of new products. Product standards have also been the type of standard envisaged throughout Chapter 6.4 when reference was made to 'a standard for qualitative recycling'.

B. How may a material-specific product standards look like?

Product standards are in principle well-suited to address the quality of recyclates, because they can be material-specific and could therefore address the *quality* of the targeted material. As shown in Chapter 6.3, this is extremely important because the legal instruments laid down in the WFD are not well equipped to address this issue. This is why I turned to standardization in the first place. If the quality of a specific recyclate can be addressed, the quality *level* can in theory be addressed as well.

Various product standards can be developed for different applications, requiring different quality levels. For example, one for recycled glass intended for container glass products and one for recycled glass intended for flat glass. An extensive survey is required to identify which standards are already in place for which materials/products and, consequently, identify which are missing. Whether standards are desired depends on many issues, such as the quality level already attained and the (non-) existence and/or the (in-) effectiveness of non-harmonized standards in that area. Particularly for qualitative recycling, one could consider the technical potential of quality improvement and the potential environmental gains.

With this in mind, I would first like to sketch out some freewheeling ideas about how *I perceive* a product standard addressing *quality improvement* of a recyclate. There are two issues that a product standard ought to address: guaranteeing that a recyclate is of high-quality and fostering eco-innovation to increase the quality of a recyclate. Next, I will carry out a brief feasibility analysis of the suggestions, which may provide for a starting point for future research. To end, I will briefly explain the usefulness of a different kind of product standard: one that is not material-specific but product-specific.

Imagining an ideal situation

First, a product standard can guarantee the high-quality level. This could play a crucial role in the enlargement of the market of the relevant recycled material. Creating mutual trust between the recycler, the buyer and the public is essential to encourage qualitative recycling. Different materials and therefore also different quality levels can be addressed through customized product standards. In the case of recycled glass cullet, one could think of separate standards with different quality levels for recycled packaging glass and for recycled flat glass, each highlighting different characteristics, based on tailored life-cycle assessments. In function of the use of the recycled glass in final products, one could also consider more than just setting a predefined quality level: in due course, it might be an idea to consider introducing different quality levels for recycled content in *one* standard, ranging from the minimum quality level to a high(er) quality level. Depending on the final application of the recycled material, product manufacturers could then choose between these different qualities. This can be applied to new standards as well as to existing ones.[1272] All in

---

meaning that it could be applicable to a number of standards on qualitative recycling and related topics. If this is the case, product standards can just refer to these other standards.

[1271] Ibid., p. 7.

[1272] For example, existing standards requiring *virgin* resources for products could be evaluated and adapted, because sticking to virgin resources hinders the use of recycled materials. Nederlands Normalisatie-Instituut: A.

all, it appears that most standards currently lack a provision on recycled content,[1273] let alone on a recycled content that differentiates between high(er) and low(er) quality. It is recommended to address this.

Second, the question arises how to foster eco-innovation aiming at quality improvement within a standard. This, therefore, also builds on the previous section on eco-innovation (Chapter 6.4.4). There are several elements that could potentially be reflected in the standard.

The first is that the standard ought to contain criteria that are performance-based. In this way, the standard states objectives to be achieved, allowing the recyclers some flexibility in the (innovative) composition. Performance-based criteria focus on the desired characteristics of the recycled material instead of prescribing certain issue, for example on the composition of the cullet (those elements can be called a 'prescriptive elements').

The second element is that the quality levels in the products standards would need to be gradually increased over the years. In this way, the market buys some time to adapt. This is not only useful for the recycled materials derived from waste from conventional products, also emerging, innovative products might benefit from an incremental approach. Taking smart glass as an example: while smart glass may be a sustainable option from several perspectives, these products are not so much 'smart wastes' because they are more difficult to recycle than conventional glass. We can assume that relatively more of those glass waste products are probably downcycled in the early stages of their marketing. Particularly in those cases, harmonized European standards adopting an incremental approach may be useful, because manufacturers, too, require time to further develop and market their novel products, while at the same time being progressively pushed to innovate.

The third element concerns the way the quality levels are determined: one could adopt a frontrunner approach to stimulate eco-design. Such an approach ensures that the less motivated (low-performing) recyclers are at least in compliance with the required quality level, whereas the more innovative (good-performing) recyclers set the pace and have the space to further innovate in quality improvement.

Combined, in my view an ideal situation is that the product standard is performance-based, incrementally improved and based on a frontrunner approach.

Feasibility analysis

While the out-of-the-box features highlighted above may be desirable in my opinion, it turns out that many of the suggestions are difficult to reconcile with some of the core features of standardization.

Yes, a product standard can guarantee that the recyclate at issue is of a certain quality, but, in the end, it is the market that sets the level. The European Commission is the initiator of harmonized European standards, but it is the group of participating stakeholders that make the decision on how to complete the essential requirements set out by the Commission in a standardization request. The fact that the ESOs are only the facilitators of this all is inherent to the standardization process. Furthermore, it is also important to note that product standards are consensus-based, similar to any other type of standard. This means that the participating stakeholders *together* must agree on the quality level, which will be laid down in the standard. Therefore, it is assumable that the level they will agree on is in any case not the highest one can get, despite the underlying forces in the standardization process to join the process.[1274] (It is interesting to note in this respect that purely technical aspects (i.e. the quality of the recycled material) seem to be relatively less important for firms to participate in standardization than the

---

de Buck, M. van Rijn, E. Schiltkamp, R. Boon and M. Ritter, *De rol van normen en certificaten als stimulans voor de Circulaire Economie* (NEN, 2017), p. 8.

[1273] European Environment Agency, 'Circular by design - Products in the circular economy' (EEA, 6, 2017), p. 51.

[1274] As highlighted in Chapter 6.4.4-B.

regulatory and coopetition motives).[1275] One could conclude that product standards are first and foremost a trustworthy tool to get as many as possible stakeholders together to obtain consensus on the quality level, which is acceptable for as many participating stakeholders as possible. This is to establish a market for those recyclates, which, indeed, might lead to future developments in quality improvements but this is only a detail. Setting a quality threshold could at least be considered as a first step to create a market for recycled materials, based on quantity, so regardless of the recyclates' quality.

Building on this, the fact that standards are adopted by consensus is also a major obstacle to the adoption of a frontrunner approach. The idea that the best-performing recyclers set the pace is problematic considering the consensus-based approach; it is the group of participating stakeholders that determines the recyclate's quality in a combined effort. As regards the incremental increase of the quality, I am not familiar with any existing product standard that *intrinsically* increases the quality of the standard, nor of any development in that area. The main reason why this probably has not yet been developed is, yet again, that the participating stakeholders are the ones who make the standard at the end of the day. If they do not wish that the quality of the relevant recyclate will be gradually increased by means of an inbuilt mechanism, the standard does not contain such mechanism. Notwithstanding the question if it is even possible to create the mechanism. This should first be studied further, if the stakeholders even want to consider incorporating it in a standard.

Regarding the wish to create performance-based product standards, there are two main considerations. Firstly, product standards are in essence vertical in nature and may set minimum or maximum thresholds, leaving it for firms to choose their own means to reach them. In principle, therefore, product standards can be designed based on the performance of the recyclate. However, the *degree* to which a product standard addressing the quality of a recycled material can be performance-based depends on whether it is possible to describe performance goals that would raise the recyclates' quality. In my view, it is a real challenge to promote the use of high-quality recyclates through product standards that only contain performance-based criteria. A combination of both performance-based criteria and prescriptive-based criteria is more likely to be the case.

All in all, it seems that it is quite challenging to develop a product standard that *intrinsically* stimulates high-quality recyclates, because the desired features of the standard cannot be easily reflected. This conclusion should however not stop the Commission (or the Member States) from searching for other opportunities to address qualitative recycling within material-specific product standards.

The usefulness of product-specific product standards

So far, I have only discussed the development of material-specific product standards because whether waste ceases to be waste is predominantly a 'material issue' rather than a 'product issue'. A case in point is the EoW instrument: it regulates a material stream rather than a group of products. Product standards can, however, address final products as well. So how could this type of product standard be useful for qualitative recycling?

Requiring a certain percentage of recycled content is a well-known but still underutilized option in product design and could therefore be applied to newly developed standards as well as to existing ones. One could image that, ideally, the share of recyclates is subdivided in several quality levels. The share of high-quality recyclates could then be incrementally increased over the years. However, the idea to require different quality levels in product design means that the product-specific product standards should rely on the material-specific product standards, which, as we know from the section above, cannot be easily done. Stimulating qualitative recycling through product-specific product standards is therefore challenging as well.

[1275] K. Blind and A. Mangelsdorf, 'Motives to standardize: Empirical evidence from Germany' (*Technovation*, 48-49, 2016), pp. 21-22.

6.4.6 Interim conclusion

In Chapter 6.4, I focused on the role harmonized standardization plays in the legal transition towards a Circular Economy. As mentioned in the first part of this Chapter, the policy and regulatory framework for the European Standardization System has gained a great deal of support over the years. Recently, both the CE Package and the BRP underscore the potential of the use of standards. Moreover, in the Standardization Communication of 2016 the European Commission sets out its vision of a well-functioning ESS and promises to refine the system by the end of 2019. This includes the ESR. One could only await the actions that will be proposed until 2019 to see what the Commission actually wishes to change. In the meantime, it is worth reflecting upon whether standardization is indeed a useful tool, how the standardization process works and how the standards on qualitative recycling might look like. These insights could provide for a better understanding of what standardization could mean for the Circular Economy transition at large.

This research shows that there has been continuing critique on the use of standardization as a means to arrange market access, namely by outsourcing rule-making on certain issues that had once been primarily within the realm of law-makers, such as environmental and health protection, to private-based organizations. This is not only relevant for qualitative recycling, of course, but concern the mechanism of standardization as such. The main points of criticism are the lack of legitimacy to set standards in the private sphere and the supposed non-legal status of standards. There are, nevertheless, a number of inherent features of standardization and recent developments in that domain that alleviate these matters – in spite of their own shortcomings. Stakeholder participation is a good example in that respect, for participation in the standardization process creates a broad support in the entire supply chain and society, on condition that also societal stakeholders such as environmental groups and universities are better (legally) involved than is currently the case under the rules of the ESR. Another example is the recent case law of the CJEU that quietly but steadily opens the door to some sort of legal status for standards. So far, these two issues relate to standardization as such and are precisely for that matter also significant for the promotion of qualitative recycling through harmonized European standards.

When taking a closer look at what harmonized European standards could mean for qualitative recycling in the EU, one has to recognize the opportunities as well as the boundaries of the instrument. Overall, the core opportunity of a harmonized European standard is that it enlarges the market for recycled materials that are of an acceptable, predefined quality. Trust in this consensus-based quality level is the most fundamental asset of the instrument. The ESS is a relatively clear and open instrument.

Quality improvement, on the other hand, is not the first aim when adopting a standard – that is a next step that may be taken. The fact that harmonized European standards *may* encourage quality improvement as a next, inferior step is, in fact, the most important boundary of using the instrument: there is no guarantee that the quality of the recyclate will indeed be improved. Because it is difficult to stimulate quality improvement 'from the inside' of a standard, one has to consider and utilize some the objectives and features of standardization in the best possible way.

A difficulty of standardization is that it is consensus-based. On the one hand this ought to ensure that as many as possible stakeholders accept the quality level contained in the standard, which should be seen as a good thing, of course. However, on the other hand, basing the minimum quality level on consensus risks mediocrity. This would not raise the quality in any case, unless the participating stakeholders decide *on consensus* to raise the bar, even though this, too, seems to be a challenge to achieve. The promotion of eco-innovation is an essential aim of standardization in that respect, as this *may* impact the consensus-founded quality level at the end of the day.

Innovations potentially raising the quality of recycled materials can be achieved through standardization in several ways and should consequently be nurtured, if possible through law. The responsiveness of standardization and the available expertise at the ESOs and of the participating stakeholders in the standardization process are significant in that regard, as these issues could positively impact the decision-making. As regards the first issue, periodical reviews are common

practice. It is a perfect opportunity to at least raise the issue of potential quality improvement. Stakeholders such as the European Commission and a Member State could moreover motive the market players of a certain chain, both recyclers and buyers, to aim for better qualities, amongst others through the provision of information or the organization of workshops. Theoretically the Commission could also request for new standards to give new impetus to the standardization dynamics, but this is strategy seems to be too laborious. As regards the latter issue, coopetition amongst the participating stakeholders, SMEs and big firms alike, may ensure that certain innovative ideas and techniques about how to make recyclates qualitatively better are shared in the standardization process and that this eventually raises the general quality threshold and could then push the entire chain forwards. Yet again, these stakeholders *may* act accordingly. Alternatively, (other) companies may of course also *obstruct* any further quality improvement.

All in all, the role standards could play in the search for quality improvement is twofold. On the one hand, the study pointed out that product standards can guarantee a certain quality of the recyclate and can, in that capacity, create confidence in using it, which in turn attracts and sustains a bigger market audience. Quality improvement could then be stimulated by means of inherent features of standardization and of indirect mechanisms. This is necessary because, on the other hand, product standards are not well-suited to increase the quality (via tools contained *within* the standards). In the end, quality improvement is above all ideally left to the industry, research institutes, societal groups and public authorities in a joined effort. Standardization is an important step in grasping 'quality' from a bottom-up approach on a case-by-case basis. This is essential because previous Chapters (e.g. Chapters 6.2 and 6.3.1-A) pointed out that this is one of the main challenges for stimulating qualitative recycling at EU level (i.e. the difficulty of knowing what quality level is required for a specific recycled material in order for the recycling process to be called 'qualitative recycling'). Therefore, standards might be the way forward, as they complement the legal instruments presently available under the WFD.

6.5 Reflection: addressing a more general challenge

6.5.1 Recap of the case study and the preliminary conclusion

Chapter 4.3.3 on the motives and methodology for this case study already explained that it is presumed that qualitative recycling is not yet very widely promoted and that there are still untapped opportunities to support it in the WFD. Both the definition for waste and the waste hierarchy, including associated definitions, are important in that regard, because they have shaped the waste framework to a great extent. Their exact meaning and application have always been important to many actors, and have for that reason simultaneously frequently been challenged. In fact, industries as well as public authorities are still experiencing difficulties in their interpretation and application. To address these issues, the European Commission calls in the CE Package for further clarification of the waste definition and for giving full effect to the waste hierarchy and the proper application of life-cycle thinking. In view of this, it particularly focusses on the encouragement of recycling, both in quantity as in quality. Against this background, Chapter 6 explained the development of the waste definition and explored the opportunities to encourage qualitative recycling under the WFD and through related instruments. The case study is restricted to glass waste if a more in-depth analysis is required to explain any particularities of a certain instrument.

The case study first discussed the waste definition. This was to clarify when a product or material becomes waste (waste status), when they do not become waste in the production stage (by-product status) and when they cease to be waste if they had become waste after all (non-waste or EoW status). The latter situation is particularly significant for the main body of the case study on qualitative recycling. For that part, the aim was to search for tools that would create a quality guarantee for recycled materials in order for the market players to trust the high-quality levels claimed, and that would provide for a continuing incentive to further improve the quality of recycled materials. To this end, three issues have been considered. First, the meaning of

qualitative recycling was framed. Second, the legal instruments available under the WFD were studied to see whether they currently stimulate qualitative recycling, and, if that is not the case, which changes can be made to realize it anyway. Finally, harmonized European standardization was explored to define the role this instrument could play in guaranteeing and raising the quality of recyclates.

Considering all parts of the case study, a preliminary conclusion can be drawn that will be further discussed throughout this final part of Chapter 6. The first conclusion concerns the wide range of instruments available for the EU regulator to potentially choose from to stimulate recycling. Examples are the separate collection schemes and the recycling targets. There are some that have already proven their use for quantitative recycling. It is now important that these instruments are fully applied to stimulate qualitative recycling as well and to improve them where possible. The Circular Economy only partly sets this in motion. There are also instruments in the WFD that are less useful for qualitative recycling in their current shape. For example, there are terminological and interpretational barriers, and, above all, there are problems with regard to the setting of quality levels because 'quality' is hard to grasp. In the face of some these challenges, adaptations to the relevant instruments can be proposed. For others, however, this is more difficult, such as for the EU EoW criteria. This means that opportunities may be sought in the 'outsourced' setting of harmonized European standards. These standards appear to be of crucial value for the stimulation of qualitative recycling, because they can actually be material-specific. This means that they can better determine what 'quality' is for a specific recyclate and can guarantee that a certain quality level is achieved. But then again, while the instrument of standardization as such also provides opportunities for eco-innovations in quality improvement, there is a lack of possibilities for quality improvement *within* the actual product standards.

All things considered, one can conclude that there are various (co-)regulatory instruments useful (to a certain extent) to increase qualitative recycling in the EU, either in a modified shape or as they are today. At the same time, many of those instruments are not or will not be perfect either. This is mainly because 'quality' is difficult to capture and/or because the instrument is not initially designed for encouraging qualitative recycling.

Building on this preliminary conclusion, the question arises which mixture of (adapted) regulatory instruments can be put into operation so as to increase qualitative recycling at EU level. Before moving to this conclusive analysis, the next section frames the selection of the 'right mixture of regulatory instruments' to address a specific issue. This provides a basis for the overall conclusion on which changes can be made to the WFD to boost qualitative recycling in the EU and how this could supplement the CE Package.

6.5.2 Framing the choice of regulatory instruments

Independently from the legal transition towards a Circular Economy, there is an extensive toolkit of environmental regulatory instruments available to the EU regulator.[1276] An essential 'one million dollar' question to answer when shaping environmental policy is which regulatory instruments are required to achieve a desired goal.[1277] Beyond the theoretical and empirical challenges related to this question, such as the difficulties linked to the perspective adopted (legal, economic, social…) and to the measurement of the instruments' final impacts, there is a sobering conceptual reality: there is no objective procedure for deciding how much weight one should give

[1276] Examples of instruments are: taxes, subsidies for research and innovation, tradable emissions permits, quality standards, performance standards, terminology, information supply, environmental principles, self-regulatory and co-regulatory standards, certifications, voluntary environmental agreements, mandates for the adoption of specific technologies or systems...

[1277] The other, most important question is what level of environmental protection is required. N.O. Keohane, R.L. Revesz and R.N. Stavins, 'The Choice of Regulatory Instruments in Environmental Policy' (*The Harvard Environmental Law Review*, 1998), p. 313.

the competing normative criteria.[1278] Selecting the 'right' mixture of regulatory instruments thus largely depends on the particular circumstances – there is no one-size-fits-all approach.[1279]

Seen from a policy-oriented perspective, however, there is some guidance available. The European Commission's Better Regulation Guidelines state that a range of regulatory as well as non-regulatory instruments (or, more likely, combinations thereof) may be used to reach the objectives of the regulatory intervention.[1280] It is emphasized that the merits of each alternative instrument should be considered thoroughly taking into account three matters.[1281]

First, the proportionality principle should be applied. The principle boils down to the idea that Union action should not go beyond what is strictly necessary to achieve the objective. The principle is laid down in Article 5 TEU, where it states that '*the content and form of Union action shall not exceed what is necessary to achieve the objectives of the Treaties*.' The principle is generally explained in combination with the subsidiarity principle, because the size and nature of policy intervention also depends on the answer of whether the intervention should best be done by the Member States and/or by the EU in areas in cases where neither of them has exclusive competence. The CJEU has developed an extensive body of case law regarding the principles (in their combined form; hereafter just called 'proportionality principle').[1282] In general terms, the proportionality principle requires a necessity test and an appropriateness test.[1283]

Second, the choice of instrument(s) should be based on the experience obtained from the evaluation of the existing policy framework, and that coherence with other related policy instruments will have to be considered (e.g. to exploit synergies or to avoid undermining the effectiveness of existing instruments or raising compliance costs).[1284] The evaluation of rules on their coherence is a fundamental element in the BRP.

Finally, in line with the above, one should be aware of the fact that the instruments can be placed into different but complementary and mutually supportive categories. Some combinations can also be counterproductive, of course, which should thus be avoided. The categories are:

- *hard legally binding rules*, such as in Regulations, Directive and Decisions and may include terminology, obligations, authorizations… (which are generally combined with the lower three categories);
- *soft regulation*, such as recommendations, self-regulation and co-regulation, e.g. harmonized European standards (which combines the flexibility of soft regulation with the specific objectives and mechanisms set out in hard legally binding rules);
- *information*, such as information and publicity educational campaigns, guidelines and the introduction of standardized testing or rating systems (which are unlikely to be effective on their own but they are important to complement other instruments); and
- *(market-based) economic instruments*, such as taxes, charges, fines, penalties, liability and compensation schemes, subsidies, deposit-refund systems, labelling schemes and tradable permit schemes (which almost certainly all involve hard legally binding rules).[1285]

[1278] L.H. Goulder and I.W.H. Parry, 'Instrument Choice in Environmental Policy' (*Review of Environmental Economics and Policy*, 2:2, 2008), p. 152.

[1279] See e.g.: Organisation for Economic Co-operation and Development, 'Sustainable Materials Management. Making Better Use of Resources' (*OECD Publishing*, 2012), p. 22

[1280] European Commission, *Better Regulation "Toolbox"*, Chapter 2, Tool #15, pp. 86-95, http://ec.europa.eu/smart-regulation/guidelines/docs/br_toolbox_en.pdf (consulted on 13 August 2017). This policy guidance document complements the *Better Regulation Guidelines*, SWD(2015) 111.

[1281] Ibid., *Better Regulation "Toolbox"*, Chapter 2, Tool #15, p. 86.

[1282] See Chapter 6.5.3-D for more information.

[1283] For more on the proportionality principle, see Chapter 5.2.2-B (heading 'Precaution in managing uncertain risks).

[1284] See for the coherence and consistency of the regulatory framework Chapter 5.5.2 in particular.

[1285] This list is based on the *Better Regulation "Toolbox"*. In addition to this, literature provides more guidance for policy-makers when choosing the mixture of regulatory instruments. Examples of additional guidelines are:

The European Commission makes no reference in the CE Package to the variety of regulatory choices it has in stimulating the Circular Economy transition, nor does it explain why certain ideas for change have made it to the Package while others have not. Rather, it provides for a detailed policy, which already reflects the preferences of the Commission on how it concretely wishes to shape the regime through adaptations to various regulatory instruments. The preliminary steps (i.e. the proportionality test, the evaluation the existing policy regime and taking account of the different categories of instruments available) have, of course, been taken prior to the CE Package's adoption.

6.5.3 Qualitative recycling analyzed: any complementary avenues?

The preliminary conclusion that there is a wide range instruments available for the EU regulator to choose from to stimulate qualitative recycling, does not tell us much about the further development of the WFD in an inclusive way. The 'right' combination of regulatory instruments is in any case not determined.

This part discusses the search for the proper mixture of regulatory instruments more thoroughly by zooming in on certain issues which have not yet been discussed in this Chapter but which are significant to address nonetheless in the light of pushing recycling practices in the EU to the next level.

A. Life-cycle thinking as a benchmark: guiding the choice between quality and quantity

Reflection of life-cycle thinking in instruments

When analyzing the choices of instruments available for the EU regulator to stimulate recycling, there is one clear, recurring theme in the WFD: life-cycle thinking is the guiding principle underlying many (if not all) of the regulatory instruments.[1286] The reflection of life-cycle thinking in these instruments shows that this highly significant building block for the Circular Economy is already seriously integrated into the legal and policy waste regime. This observation furthermore builds directly on the preliminary conclusion expressed in Chapter 6.5.1 in the sense that the application of life-cycle thinking actually nourishes the variety of instruments as well: there are many instruments that transgress the waste stage in which the actual recycling takes place. It goes without saying that life-cycle thinking has also greatly impacted the recommendations for adjustments of the instruments, as proposed throughout the Chapter, precisely *because* of the concept's role as a yardstick in the Circular Economy transition. It is for these reasons that it is appropriate to underline the significance of life-cycle thinking as a benchmark for determining a proper combination of instruments for encouraging recycling.

There are plenty of examples of how life-cycle thinking is reflected within the WFD instruments as well as in the diversity of these instruments. This applies to the instruments

---

- *No single instrument is clearly superior along all the dimensions relevant to policy choice; even the ranking along a single dimension often depends on the circumstances involved.*
- *Significant trade-offs arise in the choice of instrument. In particular, assuring a reasonable degree of fairness in the distribution of impacts, or ensuring political feasibility, often will require a sacrifice of cost-effectiveness.*
- *It is sometimes desirable to design hybrid instruments that combine features of various instruments in their "pure" form.*
- *For many pollution problems, more than one market failure may be involved, which may justify (on efficiency grounds, at least) employing more than one instrument.*
- *Potential interactions among environmental policy instruments are a matter of concern, as are possible adverse interactions between policies simultaneously pursued by separate jurisdictions* (emphasis added).

In: L.H. Goulder and I.W.H. Parry, 'Instrument Choice in Environmental Policy' (*Review of Environmental Economics and Policy*, 2:2, 2008), p. 153.

[1286] For more information about the policies providing the foundation for life-cycle thinking and therefore also for the Circular Economy transition, see Chapter 2.2.3-B.II.

(potentially) significant for recycling in its broadest sense, so including both quantitative recycling and qualitative recycling. For quantitative recycling examples are the very existence of the waste hierarchy in combination with the quality-neutral legal definition of recycling, and the fact that there are only weight-based targets for preparing for reuse and recycling incorporated in the WFD. All instruments primarily addressing the waste stage. Regarding qualitative recycling, on the other hand, the study shows that the WFD particularly provides for opportunities in the non-waste stages, either in the period before the waste stage or in the period after the waste stage, such as through qualitative waste prevention and EPR schemes. This suggests that stimulating qualitative recycling goes beyond the boundaries of the waste stage and that, therefore, addressing the quality of recyclates is currently first and foremost a matter for WFD instruments on the *non-waste* stage. Apparently, purely 'waste instruments' generate no incentive to realize high-quality recyclates. A good case in point is the EoW instrument: EU EoW criteria are useful to secure that at least a basic quality level is met by the targeted recycled materials before they are considered non-waste – the criteria do not ensure quality improvement. In that respect, the combination of all instruments currently contained in the WFD address all life-cycle stages in order to encourage recycling, which includes qualitative recycling to a greater (outside the waste stage) or lesser degree (inside the waste stage).

As regards the use of harmonized European standards, addressing qualitative recycling is by no means only a matter for waste policy either. Rather, just as in the legal instruments life-cycle thinking occupies an important place in the standardization strategy for qualitative recycling. Significant to stress in this respect is that 'life-cycle thinking' is even one of the 'principles' put forward in CEN's 'Guide 4: addressing environmental issues in product standards', which ought to shape products standards and other types of standards.[1287] According to the guidance document, the principle means that relevant environmental aspects and impacts at all stages of the product life-cycle should be considered. It is further particularly noted that the improvements to a specific life-cycle stage can adversely affect environmental impacts at other life-cycle stages, and that consideration for including environmental provisions should occur early in the process of developing a product standard.[1288] It is noteworthy that this self-acclaimed 'life-cycle thinking principle' is *not* recognized in EU policy and law as a formal environmental legal principle, unlike most of the other principles referred to in Guide 4 (e.g. the precautionary principle and the preventive principle).[1289] The inclusion of this new 'principle' is of particular importance for qualitative recycling, because it justifies that quality improvements should be emphasized within the standardization process in all possible ways. The use of raw materials in the design and manufacturing stage of a product is a particular issue that product standard-makers should systematically address.[1290] In line with this, it is even recommended in table 3 of Guide 4 (called 'Acquisition of raw material, pre-manufactured material and components') to have an explicit provision in the standards on the use of recycled materials.[1291] The document also stresses in that

[1287] The European Standardization Organizations recognize the role standards could play in environmental matters. The CEN published in the light of this 'Guide 4: addressing environmental issues in product standards' and erected the Environmental Helpdesk in order to provide guidance as to how standards could stimulate/do not unduly hinder eco-innovations and environmental protection. See for the guidance document: CEN, *Guide 4 – Guide for addressing environmental issues in product standards*, Ed. 3, 2008.

[1288] CEN, *Guide 4 – Guide for addressing environmental issues in product standards*, Ed. 3, 2008, pp. 3-4. This description is the same as the general understanding in EU policy documents, see Chapter 2.2.3-B.II.

[1289] There is also another principle mentioned in the guidance document that is particularly interesting for qualitative recycling, even though it is neither a formally acknowledged environmental principle: the 'principle of efficient use of natural resources'. As regards the 'principle' it is stated that '*in drafting provisions in product standards, standards writers should make efforts to reduce the depletion of natural resources, with particular consideration for their scarcity.*' See for the reference to the principles: CEN, *Guide 4 – Guide for addressing environmental issues in product standards*, Ed. 3, 2008, pp. 4-5.

[1290] See also: e.g. ibid., pp. 8-9.

[1291] Ibid., p. 16. 'Reuse' is also mentioned in that respect.

regard, however, that a lack of knowledge of the quality of the recyclate may limit the use of those materials and that this is a real challenge for the standard makers.[1292]

Quantity v quality

All in all, life-cycle thinking is a guiding *principle* underlying many of the regulatory instruments significant for stimulating recycling, both qualitative recycling and quantitative recycling. To take it a step further, the question arises as to what kind of relationship these two 'recycling goals' have. What happens is they are not mutually reinforcing but rather frustrate one another? To answer to this question may influence the choice of instruments. If there are conflicting instruments (quantity v quality), the consequence would be that one instrument should prevail over the other. Based on the significance of life-cycle thinking in the Circular Economy and in the existing regulatory framework as well as in the recommendations made throughout the case study, the concept should be the guiding principle in this matter.

Circularity means first of all the closing of one material life-cycle and beginning a new one, and the best known waste treatment for this conversional process is recycling.[1293] The concept of life-cycle thinking has emerged from product policies focusing on this aspect of circularity, namely on quantity rather than on quality per se. This is also what we see in the legal instruments currently available under the WFD: quantitative recycling is the principal objective. Life-cycle thinking has, however, evolved from a singular life-cycle approach to a life-*cycles* approach under the Circular Economy ideology. Because we need to think further ahead, viewed from a long-term perspective, it can be concluded that the Circular Economy now requires high-quality material cycles.[1294] High-quality recyclates could, after all, still be used for applications that practically do not require such high-quality standards, whereas low(er)-quality recyclates cannot be used in applications that really require high-quality materials. Therefore, if the EU wishes materials to be 'cycled' over and over again, so without too much downcycling resulting in low(er)-quality recyclates, it is a prerequisite for all the material life-cycles that will occur in the future that the recycled materials are of high-quality.

If we go back to the adjustments made to the legal instruments as proposed in this Chapter, we see that in many of them quality is given priority over quantity. To give a few examples: the introduction of qualitative waste prevention (which is an idea originally put forward in Chapter 5) as a prioritized category of waste prevention; the inclusion of qualitative recycling into the waste hierarchy, highest ranked after waste prevention and preparing for reuse; and the introduction of preparing for reuse and recycling targets that will be incrementally increased and that distinguish between a high-quality share of recycled materials and one for the residual share.

I do not see any (possibly adapted) instruments that would frustrate the priority given to qualitative recycling. Overall, synergies between instruments seem much more likely than any impediments, and therefore all instruments seems to contribute to the development of the market for high-quality recycled materials and to build confidence in them.

Nonetheless, it is important to note that it is not set in stone that qualitative recycling *always* prevails over quantitative recycling based on the environmental impacts material use could cause. There may be situations where the impacts are lower when waste materials are of downcycled to low-quality materials, aiming at more recyclate volume. This is for example the case when more risky chemicals are needed to attain the same high quality level as of the original material. Life-cycle thinking could thus justify the prevalence of quantity over quality on a case-by-case basis.

To conclude, clearly qualitative recycling is a hot topic in the transition towards a Circular Economy and for good reason: based on life-cycle thinking it can be argued that, indeed, it

---

[1292] Ibid.

[1293] See Chapter 2.2.3-B.II on the role of life-cycle thinking in the Circular Economy policy.

[1294] See e.g.: the interview of 16 April 2015 by S. van Renssen with e.g. K. Falkenberg (the former Director-General for Environment of the European Commission) to debate the question 'How can Europe capitalize on the Circular Economy?', http://www.vieuws.eu/environment/circular-economy-package-commission-to-favour-recycling-quality-over-quantity/ (consulted on 17 August 2017).

deserves the regulator's full attention, more than increasing quantitative recycling. Qualitative recycling is not merely a waste matter: the variety of instruments stretches its boundaries to other life-cycle stages as well, namely to the design and manufacturing stage, to the use stage and to the transitional stage from the waste stage to the next. The next section highlights this transitional stage and discusses the relationship between two different instruments that determine the transition from waste to non-waste, i.e. the EU EoW criteria and harmonized European product standards. Both instruments are important to recycling as a way to guarantee a certain quality of the recycled materials.

B. The interplay between EU End-of-Waste criteria and harmonized European standards

As pointed out in the BRP, the European Commission can choose between four categories of instruments that can in practice be combined into one regulatory instrument and/or into one regulatory mixture of instruments in all sorts of combinations. As the study shows, EoW criteria (as given shape by Article 6 WFD)[1295] and harmonized European product standards (which should be requested by the European Commission)[1296] are a hard law instruments and a soft law instrument significant to recycling.[1297] They are particularly interesting to emphasize here because their interplay raises the question how they relate to each other: whether they are complementary and compatible – which is obviously aimed at – or whether they compete with each other.

Without repeating too much of Chapter 6.3.4 on the role EU EoW criteria could play for increasing the quality of recyclates, it is sufficient to point out once more that Article 6(1)(c) WFD requires EU EoW criteria to comply with the condition that the relevant material fulfills '*the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products*.' In others words, it is important for the recycled materials to have a certain minimum level of quality for it to be useful for the market, and this minimum threshold is amongst others determined by product standards. Moreover, if the proposed changes made to the WFD in the CE Package are accepted by the Council and the European Parliament, this condition should also be met by national EoW criteria (if any). Therefore, on can conclude that standards are crucial building blocks for the development and application of EoW criteria.

In addition, it is not common that also *in* the EU EoW criteria references are made to standards. For example, the EU EoW Regulation for glass cullet requires glass cullet to comply with *'a customer specification, an industry specification or a standard for direct use in the production of glass substances or objects by re-melting in glass manufacturing facilities.*'[1298] Compliance therefore partly depends on technical specifications/standards that are in principle freely to choose by each glass recycler. The preparatory work for the EoW criteria for glass cullet indicates that while there is no common international standard (or specification) for glass cullet, there are standards that are commonly used in different regions in the EU[1299] and there are many case-by-case technical specifications established in private commercial agreements.[1300] These case-by-case specifications are said to be most common in the glass cullet trade in the EU.[1301] The

[1295] See Chapter 6.3.4 for an explanation on EU EoW criteria and the instrument's role in qualitative recycling.
[1296] See Chapter 6.4 for an explanation of the (potential) role harmonized European standards play in stimulation qualitative recycling at EU level.
[1297] Moreover, these instruments also relate to the category of 'information'. As has been stressed several times in the study, the lack of information is a huge problem for qualitative recycling because it is so difficult to address. The EU EoW criteria as well as harmonized European standards are two ways of coping with this challenge. Despite being a significant feature of the instruments, information will not play a decisive role in the explanation of the relationship between the instruments.
[1298] Annex I (section 1, 1.1) Regulation on EoW criteria for glass cullet.
[1299] Such as FERVER's for furnace-ready cullet (FERVER is the European Federation of Glass Recyclers) and the BSI PAS 101 for collected container glass cullet (BSI is the UK National Standards Body).
[1300] Joint Research Centre and Institute for Prospective Technological Studies: E. Rodriguez Vieitez, P. Eder, A. Villanueva and H. Saveyn, 'End-of-Waste Criteria for Glass Cullet: Technical Proposals' (*European Union*, EUR 25220 EN-2011, 2011), p. 67.
[1301] Ibid., p. 69.

fact that the existence of harmonized European standards on glass cullet is not mentioned in the preparatory work suggests that they do not exist. Glass recyclers can therefore rely on national standards, customer specifications and/or specification or standards made by the industry.[1302] This means that despite that the EU EoW criteria are meant to ensure a level playing field for businesses, the quality requirements for glass cullet on which the EoW criteria for glass cullet are based are actually quite varied across the EU and are, for that matter, also rather uncertain for the industry.

By requesting the ESOs to draw up harmonized European product standards, a harmonized 'package of rules' would be created. In this way, a clear interplay between EU EoW criteria and harmonized European standards is safeguarded, which would create a level playing field for the stakeholders involved. On the one hand, the harmonized European standards would set the quality level (although probably not an outstandingly high one, because product standards are just not well-equipped to set high levels). EU EoW criteria, on the other hand, include the basic criteria. In the case of glass cullet, this would for example include: the thresholds for non-glass components, a reference to chemical legislation that include restrictions on the use of hazardous substances, and the requirement of separate collection. Such a tandem construction can be quite easily created.

A radical change in strategy may be considered as well: to completely rely on harmonized European standards instead of using the tandem construction. It is an appealing idea because the EoW mechanism does not deliver (very smoothly) at the moment – despite the renewed interest in it in the CE Package, the development of new EoW criteria for other waste streams is currently still failing. And because of the lack of progression in this field, there is a risk of an increasingly incoherent and competing landscape for interpreting the moment when waste ceases to be waste. This could also impact the qualities of the recycled materials.

Switching from strategy would probably not cause too many problems and might therefore be a convincing approach. This is because current standardization practices *already* have a considerable effect on the EoW mechanism (albeit not necessarily through *harmonized European* standardization, as the glass cullet case showed). Moreover, what really counts for determining the non-waste status if no EoW criteria are adopted is whether the particular material still fulfils the conditions of the waste definition, which is based on 'to discard' and is therefore principally action-based. Why not demonstrating non-compliance with the definition via the use of product standards? Just like a purchase agreement between the recycler and the product manufacturer,[1303] product standards can be considered evidence of the non-waste status if they guarantee that the recyclate reaches the same minimum quality level as virgin raw materials and that the waste-related risks to health and the environment are controlled.[1304] The use of harmonized European standards is preferable in comparison with self-regulatory standards, because they ensure a level playing field across the internal market. All in all, replacing the currently failing EoW instrument with harmonized standardization may be worth considering.

To conclude, standardization already contributes to the EoW criteria in the sense that a standard could demonstrate compliance with the quality requirements for the relevant waste stream to become non-waste. It is fair to say that standards complement the EoW criteria. Not one particular but more categories of product standards can be used in that respect (e.g. self-regulatory and co-regulatory) as well as business-to-business specifications. This great variety of methods

[1302] The latter category includes: an agreement across the glass industry at large, in a glass manufacturing sector or on a case-by-case basis between individual companies, such as the glass recycler and the buyer of the glass cullet)

[1303] See Chapter 6.1.2-A.

[1304] Regarding the latter condition, as the Commission puts it: waste-related rules remain in force *until* a recovery operation has been completed in compliance with the aims of the WFD, thus minimizing the waste-related risks to health and the environment (European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, p. 22). See also: in this respect Article 6(1)(d) WFD, which stresses that the EoW status can only be obtained after recovery when, amongst others, the use of the (previously waste) substance or object will not lead to overall adverse environmental or human health impacts.

does not, however, support the main goals of the EoW mechanism, i.e. to clarify the waste definition and to establish a level playing field. It is therefore recommended to request for harmonized European standards that could support the relevant EoW Regulations. If the EU EoW practice will, indeed, die a quiet death, maybe in due course the complete replacement of EoW criteria with harmonized standards should be considered. All in all, standards are essential to the legal toolkit for regulating the conversion from the waste status to the non-waste status. Bear in mind, though, that these standards can only partly be used to stimulate *qualitative* recycling, as was concluded in Chapter 6.4.6.

C. Ecodesign: horizontal standards creating a basis for product standards

The interaction between life-cycle stages in the feasible tandem between EU EoW criteria (which is in principle based in EU *waste* framework) and harmonized European standardization (which is in principle based in the EU *product* framework), as highlighted in the previous section, confirms that life-cycle thinking is very much reflected in the regulatory mixture of instruments. However, what we also know is that these two different but complementary instruments are not very well suited to address qualitative recycling. This urges us to look beyond this specific regulatory construction and to see whether there are other complementary measures or instruments that could actually be relevant to qualitative recycling.

Based on life-cycle thinking, it is vitally important to address the environmental impacts of materials as early as possible in its life-cycle: in the design stage. Design plays could play a significant role for qualitative recycling at the demand side of the market. This idea brings us to the EFD, on condition, of course, that the scope of the EFD is broadened to include more than just energy-related products in the framework.[1305] In fact, standardization also plays a certain role in this legal framework, and this role is growing.

Conformity with the requirements in the Ecodesign Implementing Measures could be demonstrated by affixing a relevant CE mark to the product. It is worth noting that the Implementing Measures do not indicate in detail *how* one should comply with the requirements, which leaves much room for standard-makers to fill this gap. Bearing the CE mark therefore implicitly requires the manufacturer to have complied with the relevant standards.[1306]

The European Commission recognized the need to develop more standards for product design. It initiated a standardization request for all ESOs (particularly CEN and CENELEC) in the 2015 CE Package.[1307] The request was published as 'M/543' in December 2015 and was accepted by all three ESOs.[1308] Annex I to the Request Decision sets out the topics for future action.[1309]

[1305] This position is the hypothesis studied in Chapter 5.

[1306] Putting this into a broader perspective and thereby adding to the overall conclusions of Chapter 5, some argue that one of the reasons the Ecodesign framework has so far only marginally included requirements reflecting CE benchmarks into the Implementing Measures, is *precisely* the current lack of harmonized as well as non-harmonized standardized methods to measure these material-related Ecodesign requirements. See: R. Hughes, 'The EU Circular Economy package – life cycle thinking to life cycle law?' (*The 24th CIRP Conference on Life Cycle Engineering: Procedia CIRP 61*, 2017), p. 13; and P. Tecchio, C. McAlister, F. Mathieux and F. Ardente, 'In search of standards to support circularity in product policies: A systematic approach' (*Journal of Cleaner Production*, 2017), e.g. p. 2. This suggests that there is a reluctance to adopt more Circular Economy-driven legislation simply because there are no proper (harmonized) standards available that could support it. Explained in this way, standardization is one of the *preconditions* for the legal transition towards a Circular Economy, considering that we need to move from quantity to quality.

[1307] However, it is fair to say that in reality this standardization request was only accepted after three years of debate and after two previous standardization request attempts (which were declined), so initially it was not supposed to be under the umbrella of the CE Package.

[1308] M/543: Commission Implementation Decision of 17 December 2015 on a standardisation request to the European standardisation organisations as regards ecodesign requirements on material efficiency aspects for energy-related products in support of the implementation of Directive 2009/125/EC of the European Parliament and of the Council, C(2015)9096.

[1309] They are:

Many of these topics are in any case relevant to *quantitative* recycling. It is important to note that they are horizontal and quite open in nature. This means that the European Commission leaves significant room for the ESOs to develop the horizontal standards further and that the standards are intended to be referred to in product standards, which are either already in place or will be developed later. A total of 20 of such generic standards are to be completed by the end of March 2019.[1310] This can be considered proof of converging views and cooperation between the Commission and the ESOs to create trust in recycled materials and to establish a sustainable market for them. Although admittedly none of the topics from the list put forwards above explicitly address raising the quality of recyclates, the development in making horizontal standards is also an opportunity for stimulating *qualitative* recycling, because the institutions could at least place qualitative recycling on the standardization agenda via a different channel than the EU waste acquis.

On the face of it, the 'life-cycle topics' listed in Annex I to the Request Decision can lay the foundation for all sorts of standards. The horizontal standards are a first but necessary step to establish a framework from where vertical standards can be developed.[1311] Awaiting the standards, one can conclude that also in the area of the Ecodesign framework things are moving forward towards quantitative recycling,[1312] which may also provide for windows of opportunities for qualitative recycling. The EFD is significant because it plays a role in the demand of recycled materials. The EFD is in that respect a valuable contribution to the tandem construction between the EU EoW instrument and standardization.

- *Definition of parameters and methods relevant for assessing durability, upgradability and ability to repair, re-use and re-manufacture products;*
- *Provision of guidance on how standardisation deliverables for assessing durability, upgradability and ability to repair and re-manufacture products can be applied to product-specific standards;*
- *Ability to access or remove certain components, consumables or assemblies from products to facilitate repair or remanufacture or reuse;*
- *Reusability/recyclability/recoverability (RRR) indexes or criteria, preferably taking into account the likely evolution of recycling methods and techniques over time;*
- *Ability to access or remove certain components or assemblies from products to facilitate their extraction at the end-of-life for ease of treatment and recycling;*
- *Method to assess the proportion of re-used components and/or recycled materials in products;*
- *Use and recyclability of Critical Raw Materials (as listed by the European Commission);*
- *Documentation and/or marking regarding information relating to the material efficiency of a product taking into account the intended audience (consumers, professionals or market surveillance authorities).*

This list is copied from: R. Hughes, 'The EU Circular Economy package – life cycle thinking to life cycle law?' (*The 24th CIRP Conference on Life Cycle Engineering: Procedia CIRP 61*, 2017), p. 15.

[1310] This plan was stressed again in the third Ecodesign Working Plan 2016-2019: European Commission, Communication Ecodesign Working Plan 2016-2019, COM(2016) 773, p. 9. What these topics mean on a standard-level is not yet clarified by the ESOs. What such standards might need to cover is provided in: P. Tecchio, C. McAlister, F. Mathieux and F. Ardente, 'In search of standards to support circularity in product policies: A systematic approach' (*Journal of Cleaner Production*, 2017), pp. 7-8. Examples of building blocks are: potential requirements (e.g. 'improve performance' and 'supply of information'), metrics, tests and reporting/information formats.

[1311] It is argued that much of the standardization activity required ought to be horizontal – in any case in the beginning. Ibid., 'In search of standards to support circularity in product policies: A systematic approach', pp. 11-12. Note that the ESOs should be able to derogate from the generic standards previously defined if the products standards must comply with deviating product legislation and/or if deemed appropriate in order to be truly useful at a product-level, for example to allow for product-specific innovation (p. 12). Calculation methods and any levels for recycled content are examples of product characteristics that may need to be customized. Some flexibility in product standardization is important.

[1312] The Standardization Request emphasizes in two out of three main objectives that recycling is increasingly important. Annex I, p. 2 of Annexes to the M/543: Commission Implementation Decision of 17 December 2015 on a standardisation request to the European standardisation organisations as regards ecodesign requirements on material efficiency aspects for energy-related products in support of the implementation of Directive 2009/125/EC of the European Parliament and of the Council, C(2015)9096.

D. Shedding light on the adaptations of certain instruments: proportionate choices

As noted in Chapter 6.5.2 on the framing of the choice of regulatory instruments, the proportionality and subsidiarity principles, as laid down in Article 5 TEU, are significant and obligatory elements in legitimizing changes to regulatory instruments. Naturally, this only concerns the introduction of new instruments or the alteration of existing ones, because the currently applicable legal measures have already been tested on their compliance with the principles when they were adopted.[1313] In this case study, it thus concerns the cocktail of new instruments and changed instruments.[1314] So how do these principles apply to the present case?

The Protocol on the application of the principles of subsidiarity and proportionality, which was first annexed to the EC Treaty by the 1997 Amsterdam Treaty and was later in a slightly adapted version annexed to the EU Treaties by the 2007 Lisbon Treaty, lays down a list of nine Articles (initially thirteen) on the principles' application.[1315] Besides several procedural aspects,[1316] the Protocol indicates that any draft legislative act should contain a detailed statement,

> *making it possible to appraise compliance with the principles of subsidiarity and proportionality. This statement should contain some assessment of the proposal's financial impact and, in the case of a directive, of its implications for the rules to be put in place by Member States... The reasons for concluding that an objective of the Union can be <u>better achieved</u> at the level of the Union shall be substantiated by qualitative and, wherever possible, quantitative indicators. Draft legislative acts shall take account of the need for any burden, whether financial or administrative, falling upon the Union, national governments, regional or local authorities, economic operators and citizens, to be minimised and commensurate with the objective to be achieved.*[1317] (emphasis added).

While this Article is clear on that the proposals should be reasoned with due care, taking all sorts of burdens and all kinds of actors into account when considering whether stimulating recycling in the EU is better achieved at EU level than at Member State level, it does not elaborate on what 'better' really means. Better could mean many things, such as quicker, cheaper, more effective, more democratic or more coherent and consistent with other – national, European and/or international – policies and laws. Let it be clear that the EU Institutions enjoy a large amount of discretion to further flesh out the word's meaning and thus on what content a measure 'should' have. A one-size-fits-all approach is definitely not pursued: generally speaking, decisions are made on a case-by-case basis.[1318] Despite taking all facts of a specific case into account, it is often ambiguous ('political') when a particular measure violates the subsidiarity principle while another similar measure is considered not to violate it.[1319]

What we do know, however, is that for the environment it appears that much depends on the interpretation given to the requirement that the objective of environmental protection (Article 191 TFEU) cannot be sufficiently achieved by the Member States and can thus be *better* achieved at EU level.[1320] Based on the conclusion that the Circular Economy transition is well-founded by the

---

[1313] This is commonly put forward in one of the Recitals of the Directives and Regulations.

[1314] The new instruments concerns the proposed requests for harmonized European standards requested through EU product legislation. The adapted instruments include the proposed changes to the meaning of 'temporary storage' under the Landfill Directive, and the changes to Articles 3 and 4 WFD (i.e. the insertion of a definition of qualitative recycling and the incorporation of that recycling category into the waste hierarchy).

[1315] See for the Protocol on the application of the principles of subsidiarity and proportionality, annexed to the EC Treaty and introduced by the Treaty of Amsterdam: OJ C 340, 10 November 1997. See for the Protocol (No 2) on the application of the principles of subsidiarity and proportionality, annexed to EU Treaties and introduced by the Lisbon Treaty: OJ C 306, 17 December 2007.

[1316] Such as on the obligation for the European Commission to consult widely before proposing legislative acts and on the voting on the proposals by national Parliaments and on what the Commission must do with the voting results. Articles 2 and 7 Protocol on the application of the principles of subsidiarity and proportionality.

[1317] Article 5 Protocol on the application of the principles of subsidiarity and proportionality.

[1318] L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012), pp. 16-19. (Note that Krämer explicitly addresses the application of the subsidiarity principle in his commentary – not the proportionality principle).

[1319] Ibid., pp. 18-19.

[1320] Ibid., see in particular p. 17.

environmental objectives of the EU, as underscored in Chapters 2.1.1 and 2.1.2 and as strengthened by the 7th EAP, it could be argued that making relatively minor changes to the already existing legal instruments would probably not lead to many difficulties. The modifications can particularly be justified by the essentiality of the circularity of high-quality materials in the economy of the EU, as highlighted in Section A.

Matters such as the understanding of concepts (e.g. a definition of qualitative recycling in the WFD) and the contents and timing of the implementation of the newly adapted/adopted instruments should be the same throughout the Union, as the efforts in one Member State can easily be frustrated by the passivity of others due to the open borders for trade in materials, products and waste. Having said that, according to the subsidiarity principle EU legislation laying down rules on qualitative recycling should also leave room for Member States to invent and deploy their own instruments for the very fact that the EU does not have the right of exclusive competence on issues on the environment or the internal market. Both topics are shared competence, after all. Arguably, this enhances the legal transition towards a Circular Economy, as it provides frontrunner Member State the opportunity to further develop certain niche experiments and to supply these new ideas to the EU Institutions.

6.6 Conclusions

6.6.1 Conclusion of the case study

The ambition to transform the economy into a Circular Economy is gaining ground. This has influenced the instruments used in waste management. In fact, even before the Circular Economy had become the guiding philosophy, many aspects of the WFD have been gradually reflecting the concept. Good examples are the waste hierarchy and the waste definition and associated concepts such as the by-product status. These matters are extremely valuable for the contours of the currently applicable EU waste acquis and are, in point of fact, still under development, either in their interpretation or through (the proposal of) actual changes to the legal instruments.

Some of these developments also have an impact on how recycling is regulated under EU law. When turning the EU into a recycling society, as befitting a Circular Economy, the WFD is currently focused on the volume and the weight of recycled waste – on quantitative recycling. Studies have shown that this approach has worked out well so far. The preparing for reuse and recycling targets make good examples in that respect. It is illustrative that the definition of recycling is phrased quality-neutral.

Despite being a crucial step in the process of establishing a Circular Economy in the EU, it is not sufficient anymore to simply focus on quantitative recycling: it is the quality of recycled materials that should now draw the regulator's attention. In other words: *qualitative recycling*. However, no significant developments explicitly addressing this matter are taking place in the area of qualitative recycling. Aiming at improving the quality of recyclates is a fairly new objective in waste policy. The EU Institutions and the Member States have only just recently begun to realize the need to address it.

Regarding the legal meaning of 'qualitative recycling', the WFD does not provide for any guidance whatsoever: the WFD merely determines the meaning of 'recovery' and of its recovery categories such as recycling. And as pointed out above, the recycling definition lacks a condition on the quality of the recyclate. Overall, it appears that the main problem is to determine what 'quality' exactly means. This is challenging because the answer largely depends on the technicalities of the material at issue. Therefore, the question that was addressed in Chapter 6 is which incentives could stimulate qualitative recycling nevertheless. To this end, eight legal instruments were studied.

The study showed that there are three instruments that are (potentially) useful for qualitative recycling. The WFD rules merely provide for the basic conditions for Member States to implement these instruments and put them into practice (i.e. the waste prevention schemes, the EPR schemes and the separate collection schemes). Indeed, these instruments, which are already

in place, have an impact on the period prior to the actual recycling process. While the residual five instruments could have a greater impact on recycling practices at EU-level because they generally lay down 'hard rules' for the Member States in the WFD (i.e. terminology, waste hierarchy, life-cycle thinking, recycling targets and EoW criteria), it turns out that these instruments do *not* explicitly contribute to qualitative recycling in the way they are currently shaped or interpreted (life-cycle thinking may be an exception here). The problems basically boil down to the fact that recycling is legally not categorized in any of these instruments. However, making adjustments to these instruments in that respect would be challenging. In some cases the challenges can to some extent be overcome (the inclusion of recycling categories in the list of definitions and in the waste hierarchy may even have a canopy effect on the other instruments), while in other cases one should accept the limits to the ability to exert any influence.

With regard to the latter group, the instrument regulating the transitional period from waste to non-waste, most likely through recycling, is particularly problematic: the setting of EU EoW criteria. The reason why EU EoW criteria are not very helpful is because they set minimum quality thresholds. EU EoW criteria are therefore not very beneficial for many stakeholders in the supply chain who (might want to) use recycled materials of a high(er) quality than the materials that cease to be waste in accordance with the relevant criteria. In fact, approving on these mediocre quality levels was even the prime drawback for adopting more EoW Regulations in the first place (there are currently only three EoW Regulation, amongst which one for glass, and preparations had been made for criteria for paper and for plastics but were put on hold for an indefinite period). Clearly, assuring a certain quality of recycled materials through the EoW instrument is practically already difficult enough. This is a pity because the instrument is the only instrument in the WFD that could grasp 'quality' on a material-specific basis. It can be concluded that under the currently applicable WFD it is difficult to boost qualitative recycling at EU level, and even if the instruments were to be adapted, it remains challenging. This is where harmonized European product standards come into play.

The study showed that standardization may improve the quality of the recycled materials in variable ways, thereby filling in part the gap to set material-specific quality levels, which is left by the WFD instruments. While there are indeed opportunities for qualitative recycling through harmonized European standardization, it is also pointed out that there has been continuing critique on the use of standardization as a means to arrange market access, as it basically outsources a large part of rule-making to private-based organizations. Of course, this does not only relate to potential standards for qualitative recycling but concerns the mechanism of standardization as such. The main points of criticism are the lack of legitimacy to set standards in the private sphere and the supposed non-legal status of standards. Nevertheless, there are a number of inherent features of standardization and recent developments in that domain that alleviate these matters – in spite of their own shortcomings. Stakeholder participation is a good example in that respect, because participation creates a broad support in the entire supply chain and society, on condition that also societal stakeholders such as environmental groups and universities are better (legally) involved than is currently the case under the rules of the ESR. Stakeholder participation is, moreover, particularly important for the transition towards a Circular Economy.

When zooming in on what harmonized European standards could mean for qualitative recycling, one notes that the promotion of eco-innovation is a crucial aim of standardization, as this should deliver technological developments that could raise the quality of the recyclate. The research showed that standards differ from legislation in that they deliver greater flexibility, consensus and expertise in the standardization process as opposed to a more rigid, top-down and bureaucratic law-making process. Many of these features have elements that are generally considered a positive contribution to eco-innovation. There are also different opportunities for eco-innovation through coopetition: firms of all sizes could get several variable competitive benefits from cooperating with other participating stakeholders when joining the standardization process. If they wish to set a high-quality level in the standard, they need to convince the others to adopt 'their' level in the standard.

At the same time, this lies at the very heart of the problem of using harmonized European standards for qualitative recycling: although product standards can, indeed, grasp 'quality' at a material-specific level, the quality level adopted is based on consensus. Therefore, there is a genuine chance that the final quality level adopted is not set the highest it can get. As opposed to several other types of standards that are more clearly helpful for qualitative recycling, for example standards on terminology, test methods or a firm's organisation, *product* standards are not well-suited to increase the quality of a recyclate (via tools contained *within* the standards). In the end, quality improvement is above all left to the industry, research institutes, societal groups and public authorities in a joined effort. Nonetheless, product standardization is an important, first step in grasping 'quality' from a bottom-up approach on a case-by-case basis. The biggest asset of using standards for qualitative recycling is thus that they can guarantee a certain (minimum level of) quality of the recyclate and can, in that capacity, create confidence in using it. This in turn attracts and sustains a bigger market audience, which also positively influences the atmosphere for qualitative recycling. Within the product standardization arena, quality improvement can only be implicitly stimulated by some of the inherent features of standardization (e.g. the availability of expertise in the standardization process) and of some additional mechanisms (e.g. periodical reviews). Overall, harmonized European standards complement to a greater or lesser extent the legal instruments presently available under the WFD.

In the case of EU EoW criteria, standardization already plays a complementary role in the sense that standards are taken into account when determining the minimum quality level and because standards could help in demonstrating compliance with the quality criteria laid down in the EU EoW Regulation. There are two aspects that restrain the positive role of the standards in the EoW instrument in stimulating qualitative recycling: first, material-specific product standards are not very well suited to raise the quality of recyclates from within, and, second, there is a great variety of standards available that can be used, which does not create a level playing field in the EU internal market. Note, however, that this is common practice in standardization in the EU: the principle of mutual recognition between the Member States already deals with this. Despite these shortcomings of the harmonized European standardization instrument, full reliance on the instrument may be considered if the EU EoW practice will, indeed, fall out of favour in the long term.

Taking everything into account, the question arose how to deal with the diversity of instruments available for the European Commission to address qualitative recycling. Because most potential instruments are already in place or only require minor adjustments, the proportionality and substitution principles would presumably not be violated. If the Commission wishes to change the legislation, it should nonetheless clearly explain why this is necessary and appropriate. Qualitative recycling seems to be a justifiable objective, because it can be properly based on the EU environmental objectives laid down in the EU Treaties, on the 7th EAP and on the 2015 CE Package. Significantly, the study furthermore highlighted that the Commission should not only focus on the waste stage if it wishes to encourage qualitative recycling. It should also look outside the scope of waste legislation, namely by including the Ecodesign framework into the strategy, which, by the way, also relies on harmonized European standardization. This ensures that action is also taken at the demand side of recyclates. By cut-crossing life-cycle stages, life-cycle thinking is fully reflected in the toolbox to stimulate qualitative recycling. Overall, however, none of the instruments addressed in the case study is conclusively and irrefutably appropriate to address qualitative recycling, nor is there any guarantee that the mixture of instruments would do the trick. This leaves one wondering what other legal acts, legal instruments, soft-law instruments or private-party instruments can be used in addition to the WFD instruments and harmonized European standardization. Examples are green deals or covenants, or taxation. Several Member States have already taken some first steps in that respect. Further research on the suitability of these others means is therefore recommended.

6.6.2 Overview of recommendations

This final section is to reflect upon the conclusion of the case study. Most of the plans contained in the CE Package that are relevant to Chapter 6 have already been explained throughout the course of this case study. This includes the legislative proposals to change several EU waste laws, such as the WFD.[1321] This section provides for a systematic recap of those plans (including what the European Commission does *not* suggest) and, if any, the subsequent developments concerning the Commission's policy that have been taking place after the adoption of the CE Package in 2015.[1322] There are several recommendations for further actions or research enclosed as well to improve the CE Package or any subsequent policy documents. The recommendations are a useful contribution to the work of the European Commission, as they generally complement the existing policy framework for the Circular Economy.

As a preliminary observation I would like to highlight that even though the need to address qualitative recycling, which is stressed in various sections of the CE Package, the Commission does *not explicitly* address qualitative recycling by proposing *specific* actions. It is therefore important to consider the actions that would implicitly affect qualitative recycling. This is mostly the case when quantitative recycling is addressed. All in all, the Commission does not move beyond the beaten track in the CE Package. Rather, it fine-tunes the existing legal instruments. The recommendations are specifically aimed at qualitative recycling but do neither contain any suggestions to introduce entirely new instruments.

<u>Waste or non-waste</u>

- **CE Package:** The WFD waste definition remains the same. Overall, the Commission does not change anything which significantly changes the waste status.
- **Recommendations:** Inform about the developments concerning the interpretation of the waste definition. There are several issues going on at the moment. The study already gave some building blocks for further research. New developments could moreover be generated in the future, as new business models will be applied, new techniques will be used, and new materials and applications will be tried. In all likelihood, these imminent developments will cause that the waste definition continues to be challenged both at national Courts and at the CJEU.[1323]

<u>Definition of qualitative recycling</u>

- **CE Package:** The quality-neutral recycling definition under the WFD stays the same. Moreover, the Commission does not propose to introduce a separate definition for qualitative recycling either. As a general goal, it is however committed to simplify, harmonize and clarify the terminology in waste legislation. For example, it introduces a definition of 'final recycling process'.
- **Recommendations**: Introduce a definition for qualitative recycling in the WFD. Do not go into technical detail in the definition, because the definition should be applicable to all materials and recycling processes after which the recyclate is of relatively high-quality. Creating such a recycling category would create a benchmark that can be used in other instruments.[1324]

<u>Waste hierarchy</u>

- **CE Package:** The value of the waste hierarchy is fully acknowledged. The Commission therefore remains strongly committed to ensuring its impact on waste policy and legislation in its current shape. The CE Package underscores the adequateness of the

[1321] See also: Chapters 3.2.1 and 4.3.3.
[1322] This includes the Political agreement between EP, Council and Commission on the legislative proposals, which were
[1323] See for the location and the broader context of the recommendations: Chapters 6.1.2 and 6.1.3.
[1324] See for the location and the broader context of the recommendations: Chapters 6.2.4 and 6.3.1-A.

instrument to address the recycling objectives of the EU and is committed to improve the enforcement of the existing obligations. More broadly speaking, the Commission will assist Member States and regions to ensure that Cohesion Policy investments in the waste sector are guided by the waste hierarchy.

- **Recommendations**: Insert the recycling category 'qualitative recycling' in the waste hierarchy. This way, policymakers and legislators would need to give priority to qualitative recycling over 'regular recycling' (i.e. the overall recycling definition). It should provide a leverage effect on (the creation of) other instruments. However, before inserting qualitative recycling in the waste hierarchy, a common understanding of the real overall environmental impacts should be developed considering the life-cycles of the bulk of the waste materials. After all, the waste hierarchy is based on generalization and should in principle represent all waste streams.[1325]
  (In addition: see heading 'waste prevention schemes').

Life-cycle thinking

- **CE Package:** Although the CE Package reflects life-cycle thinking to a great extent and in many ways, the Commission does not explicitly underscore it. Nonetheless, the Commission does not change the WFD with respect to life-cycle thinking, meaning that its great impact on the EU waste acquis remains the same, not least through its impact on the waste hierarchy.
- **Recommendations:** Interpret life-cycle thinking as an environmental legal principle. If interpreted in this way, life-cycle thinking should be used to prioritize recycling measures aiming at qualitative recycling over other forms of recycling. For example, this may be useful if no additional step is created in the waste hierarchy, as it prioritizes qualitative recycling *within* the currently applicable recycling-step. Further research is required to develop a common understanding of whether qualitative recycling is indeed better than regular recycling in the bulk of the cases, and to look into the conditions for environmental legal principles to be recognized as such. Recognizing life-cycle thinking as a principle would in any case probably be a first step.[1326]
  (In addition: see heading 'waste hierarchy').

Waste prevention programmes

- **CE Package:** Waste prevention and reuse is promoted through the exchange of information and best practices and by providing Cohesion Policy funding for projects. In addition, in order to ensure a uniform measurement of the overall progress in the implementation of waste prevention measures, the Commission states that harmonized indicators should be established and proposes to insert in Article 9(4) WFD the right to adopt implementing acts to establish such indicators. Based on the current rules, this may include qualitative indicators.
- **Recommendations:** Study the potential of the creation of qualitative indicators and distinguish between two waste prevention categories (i.e. 'waste precaution and qualitative waste prevention' and 'quantitative waste prevention') and place them in this hierarchical order in the waste hierarchy.[1327]

Extended Producer Responsibility schemes

- **CE Package:** The Commission suggests introducing an obligation that it will organize an exchange of information between Member States and the actors involved in EPR schemes. It also suggests introducing minimum operating conditions for national EPR schemes.

[1325] See for the location and the broader context of the recommendations: Chapter 6.3.1-B.
[1326] See for the location and the broader context of the recommendations: Chapters 6.3.1-B and 6.5.3-A.
[1327] See for the location and the broader context of the recommendations: Chapter 6.3.2-A.

Amongst others, they should provide incentives for producers to take better into account the recyclability of their products when designing them. One of the conditions potentially significant for qualitative recycling is to establish a reporting system to gather data on the products placed on the internal market by the producers subject to EPR. Once these products become waste, the system shall ensure that data is gathered on the collection and treatment of that waste specifying, where appropriate, the waste material flows.

- **Recommendations:** Encourage the opportunity to nationally define measurable waste management targets for qualitative targets to be achieved through EPR measures. The current rules already provide for this opportunity.[1328]

Separate collection schemes

- **CE Package:** The Commission explicitly links the potential of separate collection schemes to qualitative recycling. It suggests introducing minimum conditions on transparency and cost-efficiency that Member States and regions can use, and underscores that compliance with the obligation to set up separate collection systems for paper, metal, plastic and glass is essential to increase the qualitative as well as quantitative recycling rates in Member States. To this end, it adds several new waste streams to the list for which Member States should take measures to promote 'sorting systems'.
- **Recommendations:** In due time, consider adding more waste streams to the list.[1329]

Preparing for reuse and recycling targets

- **CE Package:** The preparing for reuse and recycling targets in several EU waste acts are gradually increased in the CE Package and there are more targets being introduced for other waste streams as well, while all the time taking account of differences between Member States. The revised waste proposals address key issues relating to the calculation of the recycling rates to ensure comparable statistics. The adapted method proposed is still based on quantity. Finally, the Commission introduced an Early Warning System for monitoring compliance with the recycling targets.
- **Political agreement between EP, Council and Commission on the legislative proposals:**[1330] The preparing for reuse and recycling targets are slightly changed as compared to the targets proposed in the CE Package. However, gradually increasing newly added targets compromise the lowering of certain targets. All the same, the targets will remain addressing quantitative recycling. An additional point in the agreement is that stricter methods and rules to calculate the progress made towards the targets will be adopted'.
- **Recommendations**: Adopt recycling targets that include a division between certain recycling categories, including one for qualitative recycling. This could also be done in other laws than the WFD, such as the WEEE Directive and the Packaging Directive. Further research may however be useful on: whether such targets can theoretically be met by all Member States and whether it is possible to develop calculation method for verifying compliance with the targets.[1331]

EU EoW criteria

[1328] See for the location and the broader context of the recommendation: Chapter 6.3.2-B.
[1329] See for the location and the broader context of the recommendation: Chapter 6.3.3-A.
[1330] See: http://www.consilium.europa.eu/en/press/press-releases/2017/12/18/council-and-parliament-reach-provisional-agreement-on-new-eu-waste-rules/ and http://www.consilium.europa.eu/en/press/press-releases/2017/12/18/council-and-parliament-reach-provisional-agreement-on-new-eu-waste-rules/ (consulted on 29 January 2018). This information is extracted from a variety of news websites. It is not yet possible to attain the final text, because it is still to be finalized. The EP and the Council have to formally adopt the legislative proposals for changing the four EU waste laws.
[1331] See for the location and the broader context of the recommendations: Chapter 6.3.3-B.

- **CE Package:** The CE Package stresses the usefulness of EU EoW criteria. It does not, however, change the instrument to encourage qualitative recycling. The only significant change is that the conditions laid down in Article 6(1) WFD will also apply to national EoW criteria instead of to EU EoW criteria only, if the CE Package is adopted in its present form.
- **Recommendations**: Rephrase the new Article 6 in order to clarify that, indeed, the conditions laid down in Article 6(1) WFD will also apply to national EoW criteria. In addition, further investigate in due course the possibility to completely replace EU EoW criteria with product standards, if the EU EoW instrument turns out to be unworkable any longer.[1332]

Harmonized European standardization

- **CE Package:** The CE Package recognizes that it can be difficult to ascertain a certain quality level of a recyclate in the absence of 'EU-wide standards', as it would increase trust in these recycled materials and help support the market. According to the Commission, having such standards stimulates qualitative recycling. In the light of this all, it will launch work on quality standards for recycled materials where needed, in consultation with the industries concerned.
- **Recommendations**: legally require periodical reviews of a standard and take account of the possibility for the Commission to request new product standards if not enough progress is made to address quality improvement in the currently applicable (harmonized or non-harmonized) product standards. In addition, the Commission and the ESOs could indirectly try to motive the participating stakeholders to raise the quality of the recyclate at issue, in order to smoothly direct the standardization process to their capacity. Building on this, try to ensure that societal groups and research institutes are taken on board in the standardization process. Furthermore, identify which product standards are already in place for which materials/products and, consequently, identify which are missing. In any case, request for harmonized European standards that could support the EoW Regulations, if this has not already been done.[1333]

[1332] See for the location and the broader context of the recommendation: Chapters 6.1.2-C.II and 6.5.3-B.
[1333] See for the location and the broader context of the recommendations: Chapters 6.4.2-B, 6.4.4-A and 6.4.5-B.

7. REACH: regulating recyclates

The Regulation on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)[1334] is the reference law for this Chapter. Apart from a few exceptions, the law is applicable to all chemical substances on their own, in mixtures or in articles. This concerns virgin substances as well as recycled substances. REACH regulates their market access. Chapter 3.3 has already provided for an overview of the aim and scope of REACH and of its main instruments, them being the registration and evaluation of substances, the supply of information down the chain and the authorization or restriction of certain hazardous substances.[1335]

This case study considers REACH in the Circular Economy with a particular focus on the Regulation's role in the circularity of plastics through recycling. Because of this approach, however, one cannot but address EU waste legislation as well.[1336] Indeed, the interface between the waste stage and the non-waste stage – the conversional stage – is what Chapter 7 is all about. Despite being adopted in a time when increasing attention was being paid to recycling and life-cycle thinking (2006), REACH had been prepared having a more linear approach in mind – not a circular one. This may obstruct the use of recycled materials. This is moreover particularly emphasized in the CE Package, where it states that the Commission will analyze the interface between chemicals, product and waste legislation in the context of the Circular Economy, and that it will develop a 'Strategy on Plastics in the Circular Economy' in January 2018, addressing these issues as well.[1337] The motives and methodology for Chapter 7 have already been explained in Chapter 4.3.4. I will not extensively repeat them.

Against this background, I first explain the relationship between the WFD and REACH at its most fundamental level. This is done by separately describing the life-cycle of plastics according to the framework at issue, whereupon a reflection is being made on their main differences and similarities. The subsequent parts allow us to move beyond the rhetoric into the practical aspects of industrial innovation and the regulatory stumble-blocks it bumps into: they shed light on specific obstacles (mainly) under REACH for plastic recycling. They relate to the registration and evaluation of substances, to the authorization or restriction of substances, and to the international context of plastic recycling. The next part of Chapter 7 consists of a reflection of the findings of this case study and discusses these results against the background of a more fundamental question on how to regulate the Circular Economy transition.[1338]

[1334] Regulation 1907/2006 of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, [2006] OJ L 136/3.

[1335] Additionally, Chapter 5.2.2 on the CE benchmark on chemicals for product design also addressed these main instruments (see in particular Parts B and C (heading 'REACH') on regulating risks and on the application of the precautionary principle and the substitution principle in EU chemicals legislation, with emphasis on the REACH framework). To avoid plain repetition of these Chapters, this Chapter discusses REACH from yet another perspective, although some overlap cannot be totally prevented. Since Chapter 7 builds on these previous Chapters, references to them will be plentiful.

[1336] The possibility to erect EU EoW Regulations is of particular interest for recycling, because those measures would have a great impact on the conversional stage. While no EU EoW criteria for waste plastics had been adopted in the end, the preparatory work done in the run-up to these never adopted criteria is a precious source of information. The reason for not adopting the prepared set of criteria boils down to the difficulty to reach an appropriate quality level for all stakeholders, as has been explained in Chapter 6.1.2-C.

[1337] See European Commission, *Communication on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation*, COM(2018) 32; and European Commission, *A European Strategy for Plastics in a Circular Economy*, COM(2018) 28, respectively. These Communications will be discussed throughout Chapter 7.

[1338] A great part of Chapter 7 is based on: G. Van Calster and T. de Römph, 'Regulating opportunity and innovation in the EU. The case of sustainable materials (plastics) management' (*SSRN*, 2015), pp. 1-27, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2588562 (consulted on 18 January 2018).

7.1 Life-cycle of plastics: Waste Framework Directive and REACH compared

There are different ways of understanding the life-cycle of plastics. The most fundamental legal interpretations of the life-cycle of plastics are the 'REACH perspective' and the 'WFD perspective'. I explain the relationship between these two interpretations firstly by separately describing the life-cycle of plastics according to the legal framework at issue, whereupon I make a reflection on their main differences as well as on their complementary approaches and instruments.

7.1.1 Life-cycle of plastics from a REACH perspective: starting from manufacturing

According to the most common practice, i.e. using virgin resources, plastic begins its 'life' with the conversion of components of extracted raw materials into different kinds of hydrocarbon monomers. The materials commonly used today are natural products such as cellulose, coal, natural gas and salt, but most often crude oil. This branch of chemistry is called the petrochemistry.

Manufacturing

The chemical industry subsequently uses polymerisation to bond the generated monomers into chains, called polymers, in different combinations and lengths. This is done by the process of polymerization: a chemical reaction in which small molecules are combined to form larger molecules. Each composition creates a specific type of plastic with diverse properties and characteristics. The natural or legal person who carries out this kind of business is called a 'manufacturer' under REACH. According to Article 3(9) REACH, a manufacturer is

> *any natural or legal person established within the Community who manufactures a substance within the Community.*

A key mechanism of REACH is the obligation for any manufacturer (or importer) to register their substances,[1339] either on their own or in a mixture,[1340] in quantities of one tonne or more per year.[1341]

REACH also specifically regulates 'impurities'. In principle, impurities, i.e. unintended constituents present in a substance, do not have to be registered because they are regarded as an integral part of the substance. They may originate from the virgin materials or be the result of secondary or incomplete reactions:[1342] in the latter case, these materials are effectively recycled. When that recycled material is *intentionally* selected, however, those constituents should also be considered separate substances, even if they are present in smaller quantities than 20% (w/w).[1343] As a general rule, constituents present in these substances in quantities above 20% (w/w) can at any rate not be considered impurities: they are separate substances in a mixture, even if they have not been intentionally selected.

Polymers are subject to a special registration obligation per Article 6(3) REACH.[1344] Manufacturers of a polymer have to submit a registration for the monomers or any other substance(s) that have not already been registered by an actor up the supply chain, if both the following conditions are met

---

[1339] Article 3(1) REACH: a substance means *'a chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.'*

[1340] Article 3(2) REACH: a mixture is '*a mixture or solution composed of two or more substances.'*

[1341] Article 5 and 6(1) REACH.

[1342] European Chemicals Agency, *Guidance for identification and naming of substances under REACH and CLP* (ECHA, 1:2, 2012), p. 18.

[1343] European Commission, *Follow-up to 5th Meeting of the Competent Authorities for the implementation of Regulation (EC) 1907/2006 (REACH),* draft guidance document of 3 April 2009 (CA/24/2008 rev.3), p. 8.

[1344] See Chapter 7.2.3.

(a) the polymer consists of 2 % weight by weight (w/w) or more of such monomer substance(s) or other substance(s) in the form of monomeric units and chemically bound substance(s);
(b) the total quantity of such monomer substance(s) or other substance(s) makes up one tonne or more per year.

The safe use of substances for all their uses has to be proven by the registrant. Notably, the registrant should consider all stages of the substance's life-cycles, including the waste stage. The safe use should be reported in the Chemical Safety Report using Chemical Safety Assessments.[1345] A complementing instrument that also covers the waste stage is the Safety Data Sheet (SDS),[1346] which is the primary tool for information transfer through the supply chain. Summarized, the manufacturer of a substance or a mixture has to provide the receiver with a SDS in circumstances where the substances concerned might be harmful to human health and the environment.[1347] According to Article 31(1) and Annex II REACH, that is when the substance is: 1) classified as hazardous under the CLP Regulation; 2) (very) persistent, (very) bio accumulative and toxic in accordance with Annex XIII REACH; or 3) included in the list established in accordance with Article 59(1) REACH for reasons other than mentioned in 1) and 2).[1348]

Apart from these requirements on safety information, REACH contains several instruments that bluntly restrict the use of certain risky substances (in specific applications), intended to take precautionary measures and to substitute them with less risky alternatives. This is done through either the restriction or the authorization of these substances. Manufacturers are thus confronted with various rules that are based on the precautionary principle and the substitution principle.

Formulation and production

After the manufacturing of the polymer, a formulator blends the substance with additives to modify the plastic's mechanical, physical or chemical properties.[1349] The blend has to reflect the article's intended use, as reported by the manufacturer. The desired substance can for example be softened, hardened, coloured, foamed and/or be made flame retardant. Upon completion of the formulator's work, the polymers, which are in fact a blend of polymers and the additives, are used by the plastic industry to produce plastic articles ('products' in everyday language).[1350] The person who is engaged in this business is a 'producer of an article' and a 'downstream user'. According to Article 3(4) and (12) REACH, a producer of an article is

any natural or legal person who makes or assembles an article within the Community

and a downstream user is

any natural or legal person established within the Community, other than the manufacturer or the importer, who uses a substance, either on its own or in a mixture, in the course of his industrial or professional activities. A distributor or a consumer is not a downstream user.

Hence, a formulator/producer is also a downstream user.

Despite the industry's efforts to use as many materials as possible, not all can be optimally used in the production process or potentially as by-products. These kinds of residual streams are

[1345] Article 14 in conjunction with Annex I REACH.
[1346] Articles 31 and 32 in conjunction with Annex II REACH. The sheets include *inter alia* information about the properties of the substance or mixture, the hazards, instructions for handling, disposal and transport, and first-aid, fire-fighting and exposure control measures.
[1347] This also applies to importers.
[1348] See also: Article 31(4) REACH
[1349] While impurities are unintentionally added substances, additives are substances that have been added intentionally
[1350] Article 3(3) REACH: an article is '*an object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition.'*

discarded and become pre-user waste, such as defectively produced products (that cannot be used again in the production process).

As regards the registration of substances in articles, Article 7(1) REACH states that any producer or importer of articles shall submit a registration for any substance contained in those articles if the substance is present in those articles in quantities totalling over 1 tonne per producer or importer per year; and the substance is intended to be released under normal or reasonably foreseeable conditions of use.

Unlike for manufacturers, there is no obligation for producers (or importers) of articles to draft SDSs. Nonetheless, there is a duty for these suppliers to communicate minimal information on Substances of Very High Concern (SVHCs, see below) to allow safe use of the articles when these substances are present in articles in a concentration above 0,1 % weight by weight (w/w).[1351]

Use and waste

Ultimately, the plastic articles are sold by retailers to the final users.

The waste stage of these articles begins once they are being discarded, or are intended or required to be discarded (the waste definition has already been discussed in Chapter 6).[1352] This type of waste is also called post-user waste, although the waste definition does not make a distinction between pre-user and post-user waste. In principle, waste is excluded from REACH's scope because it is *not* considered to be a substance, mixture or article within the meaning of Articles 3(1),(2) and (3) REACH.[1353] Formally speaking, therefore, when plastic articles achieve a waste status the provisions of the WFD come into effect, including the instruments relevant to plastic recycling.

All things considered, from the plastic's manufacturing stage until the waste stage, gradually fewer obligations are prescribed under REACH. The burden of compliance, however, remains imposed on the whole plastic chain as far as possible, from upstream to downstream users (and vice versa).

7.1.2 Life-cycle of plastics from a WFD perspective: towards recycling and non-waste

As opposed to the most common beginning of the life-cycle of plastics, which starts with the extraction of natural raw materials and moves up to the manufacturing stage of substances, and so on… , an alternative way is to start with a recycling process. The EU waste acquis provides for several legal instruments relevant to recycling. Although there is a bunch of waste laws relevant to the plastic life-cycle and in particular for plastic recycling, this part focusses on the WFD. Many of the legal instruments contained in the WFD have already been extensively explained in Chapter 3.3 and in particular Chapter 6, and will for that reason only briefly be touched upon in this part. Two of them are discussed in more detail nonetheless, either because they have not been clarified before (i.e. the part about hazardous waste) or because different aspects can be highlighted than in other parts of the dissertation (i.e. the part about the EU EoW criteria).

Period prior to the waste stage and prior to the recycling process

Even though the WFD is in principle not applicable to non-waste, there are quite some instruments that explicitly or implicitly address the stages prior to the waste stage. For example, the concept of EPR could be used at national level to finance or even actually arrange the collection and/or the waste treatment of a specific waste stream.[1354] These EPR schemes may encourage the development, production and marketing of products that are suitable for multiple use and that are technically durable, and that are *'suitable for proper and safe recovery and*

[1351] Article 33 in conjunction with Article 3(33) REACH.
[1352] See Chapter 6.1. See Article 3(1) WFD for the waste definition.
[1353] Recital (11) and Article 2(2) REACH. However, as already mentioned above, REACH contains in some cases requirements that includes the waste stage of a substance.
[1354] Article 8 WFD.

environmentally compatible disposal.'[1355] Another example is the setting up of national waste prevention schemes. These schemes may target plastic waste. Significantly, prevention of waste is the first step in the waste hierarchy. As discussed in Chapter 5.3.2,[1356] waste prevention entails measures that both reduce the quantity of waste (quantitative waste prevention) and improve the technical *quality* of the waste and reduce the *risks* associated with the waste (qualitative waste prevention).[1357] Examples of waste prevention measures are laid down in Annex IV WFD, such as eco-labeling, voluntary agreements with the industry concerned and the substitutions of hazardous substances.

There are also some instruments for materials enjoying a waste status but which come prior to the actual recycling treatment. For example, the separate collection of plastic waste could be useful for the plastic chain, because it lowers the risk of non-plastic material entering the recycling process.[1358] Article 11(1) in conjunction with Article 10 WFD state that by 2015, separate collection shall be set up for plastics where necessary to comply with the Directive's objectives and to facilitate or improve recovery. So far, several EU Member States have implemented such schemes through various ways.[1359] Another example is the preparing for reuse and recycling targets. Although there is currently no target in the WFD for plastic waste alone,[1360] the general target for household waste contained in Article 11(2)(a) WFD covers plastics, of course, aiming at a minimum of overall 50 % by weight for preparing for reuse and recycling by 2020.[1361] Likewise, construction and demolition waste includes plastic waste as well. For this waste stream, Article 11(2)(b) WFD also sets a target. It is noteworthy that none of these targets will be changed according to the proposals put forward in the CE Package.

All things considered, when following the life-cycle of plastics from the moment when crude oil and other resources are processed to the actual recycling process, the WFD provides for several legal instruments (potentially) beneficial to plastic recycling.

Special regime for hazardous waste

Besides the familiar instruments that are highlighted above, the EU waste acquis contains a special regime for hazardous waste. This regime has not yet been clarified in this dissertation. It is relevant for plastic recycling because plastics – regardless of their status – could pose certain (known and unknown) threats to the environment and human health relating to their hazardousness. Both hazardous pre-user waste and hazardous post-user waste could end up in the recycling process, if not prevented, and could turn into non-waste, as confirmed in the *Lapin elinkeino* Case of 2013.[1362]

[1355] Article 8(2) WFD.

[1356] See in particular Chapters 5.3.2-B (heading 'Categories for waste prevention based on quantity and quality') and 5.3.2-C (heading 'Waste Framework Directive').

[1357] Article 3(12) WFD.

[1358] See also: Chapter 6.3.3-A on separate collection schemes.

[1359] The CE Package stresses the importance of setting up a separate collection scheme for plastics in order to increase preparing for reuse and recycling rates in Member States, see Recital (20) of European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595, p. 10.

[1360] The Packaging Directive includes a clearer plastic recycling target. See Article 6(1)(e)(iv) Packaging Directive. Notably, the CE Package increases the recycling targets for plastics from 22,5% by December 2008 to 55% by December 2025. The WEEE Directive contains a wide-ranging recovery target scheme, including special recycling targets. See Article 11 in conjunction with Annex V WEEE Directive. Other waste legislation 'only' promote plastic recycling. See for example Directive 2000/53 of 18 September 2000 on end-of life vehicles, [2000] OJ L 269/34: Recital (12) states that the recycling of all plastics from end-of life vehicles should be continuously improved and Annex I under 4 it is stated that in order to promote recycling, large plastic components should be removed.

[1361] According to Article 11(4) WFD, the Commission had to examine the target by 31 December 2014 at the latest. Clearly, the Commission has violated this obligation.

[1362] See Judgement of 7 March 2013, *Lapin elinkeino-, liikenne- ja ympäristökeskuksen liikenne ja infrastruktuuri –vastuualue v Lapin luonnonsuojelupiiri ry*, C-358/11, EU:C:2013:142. (See also: Opinion of Advocate General Kokott on 13 December 2012, *Lapin elinkeino-, liikenne- ja ympäristökeskuksen liikenne ja*

A distinction is made between non-hazardous and hazardous waste on the basis of the List of Waste, which is established by Decision 2000/532.[1363] Additionally, Article 7(2)-(3) WFD state that

> *a Member State may consider waste as hazardous waste where, even though it does not appear as such on the List of Waste, it displays one or more of the properties listed in Annex III,* [and that] *where a Member State has evidence to show that specific waste that appears on the list as hazardous waste does not display any of the properties listed in Annex III, it may consider that waste as non-hazardous waste.*

Such reclassification may in any case not be achieved by diluting or mixing the waste with the aim of not meeting the thresholds for hazardous waste.[1364] Waste holders generally do not wish to classify their waste as hazardous, because these stricter rules for hazardous waste apply. For example, hazardous waste must be packaged and labelled in accordance with (international and) EU standards, and should not be mixed with other waste, substances or materials – conforming to the prevention and precautionary principles.[1365] Moreover, Member States should take necessary action to ensure that the production, collection, transportation, storage and treatment of hazardous waste are carried out on an environmentally sound way that meets the conditions under the Waste Framework Directive, for example by ensuring the traceability from a hazardous waste's production to its final destination by means of record keeping.[1366]

To sum up, a special regime is applicable when plastic waste is considered hazardous, which basically means that extra care is required for the proper management of the waste. The CE Package merely strengthens record keeping and traceability mechanisms through the establishment of electronic registries for hazardous waste in the Member States – it does not set stricter rules regarding the actual management of the waste.[1367]

---

infrastruktuuri –vastuualue v Lapin luonnonsuojelupiiri ry, C-358/11, EU:C:2012:797, which was largely followed by the CJEU). The CJEU confirms in the *Lapin elinkeino* Case that even hazardous waste may be returned as non-waste to the economy after recovery, and that REACH (which does not apply to waste) may play a significant role in that it may be used in determining whether such hazardous waste ceases to be waste if REACH authorizes its use when it is non-waste (para. 64). The judgement concerns the use wooden duckboards for a hiking trail, part of which crosses a nature reserve. These duckboards are supported by structures made up of old wooden telecommunications poles that were CCA-treated for their previous use. 'CCA' is a dangerous mixture of copper, chromium and arsenic, which is therefore *in principle* restricted pursuant to Articles 67 and 128 in conjunction with point 19(3) Annex XVII REACH. Some uses are however permitted, see point 19(4) Annex XVII REACH. The referring national court has to decide on whether the present case fulfils any of the derogation possibilities (para. 45, see also: in this respect the considerations of the Advocate General in paras. 40-41 of her opinion on the Case) and on whether the use of the pools, in all likelihood, will involve repeated skin contact with the treated wood (para. 52), because this is the fundamental reason to restrict the use of CCA mixtures in the first place. All in all, according to paras. 63-64 of the judgement, if the treated wood fulfills the REACH requirements, this could be an indication that the wood is fully recovered and ceased to be waste, based on the case law and the waste definition (*not* on Article 6(1) WFD, because this provision does not have to be taken into account under the current rules if no EU EoW criteria have been adopted [para. 60, see also: paras. 73-75of the Advocate General's opinion]).

[1363] Decision 2000/532/EC of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste, [2000] OJ L 226/3.

[1364] Article 7(4) WFD.

[1365] Articles 18(1) and 19 WFD. According to Article 18(2) WFD, there is nevertheless a derogation possibility to this ban.

[1366] Articles 17 and 35 WFD.

[1367] European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595, p. 22.

Reaching End-of-Waste status

The WFD predominantly aims to stimulate Waste-to-Material activities, not least through the waste hierarchy according to which recycling is the third step. A lot has already been explained about the relationship between recycling and the EoW status. For issues such as the recycling definition, its interpretation by the CJEU, its embedment in the waste hierarchy and the role of EU EoW criteria for recycling, see Chapter 6 and in particular Chapters 6.1.2-C and 6.2.1. Without duplicating those sections too much, one can shed light on the link between the final step in the recycling process and the legal switch from waste to non-waste from a somewhat different perspective. Regarding this link, it should be stressed that

> [t]*he moment when a material or substance reaches EoW is simultaneous with the completion of the* […] *recycling processes* […] *Generally speaking, the point of completion of a recovery operation may be considered to be the moment where a useful input for further processing, not representing any waste-specific risks to health and the environment, becomes available*.[1368]

So when the waste is fully recycled it ceases to be waste and falls automatically outside the scope of the waste acquis (all previous recycling steps are still subject to the waste regime).

The WFD provides that specific, harmonized criteria could be established for certain waste streams that indicate this tipping point – or failing that at national level.[1369] These EU EoW criteria must be defined in accordance with the conditions identified in Article 6(1) WFD. One of the conditions explains that the relevant waste substance or object should fulfil the technical requirements for the specific purposes and should meet the existing legislation and standards applicable to them once they derive from the recycling process. Another condition clarifies that the use of the substance or object must not lead to overall adverse environmental or human health impacts. Compliance with this criterion can be indicated by

> *comparing the use of the material under the relevant product legislation with the use of the same material under waste legislation. The following questions are also relevant: Is the product legislation sufficient to adequately minimise the environmental or human health impacts? Would releasing the material from the waste regime lead to higher environmental or health risks?*[1370] (emphasis added)

These two conditions in Article 6(1) WFD show that EU EoW criteria rely besides on technical product standards also very much on product legislation,[1371] such as REACH, as long as environmental and human health protection will still be guaranteed pursuant to the precautionary principle. In the end, it is the quality and the low-riskiness of the final output material that counts for the EoW status.

Thus far, there are no Union-wide EoW criteria for plastic waste, leaving the setting of criteria up to the Member States if they want to. Accordingly, if a plastic recycler wants to know the appropriate implementation of the information requirements under REACH, they should go to their Competent Authority (under the WFD), for they should know when exactly the waste status ends according to national law.

Even though plastic is not indicated as a specific material waste stream for which Union-wide EoW criteria should be considered,[1372] the Commission had nonetheless been working on EU criteria.[1373] The reasons for harmonization seem quite opportune, as there seems to be

---

[1368] European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, 2012, p. 25

[1369] Article 6(4) WFD.

[1370] Supra note 1368, p. 24.

[1371] See Chapter 6.5.4-B for the interplay between EU EoW criteria and the use of standards.

[1372] The current Article 6(2) WFD only lists aggregates, paper, glass, metal, tyres and textiles – this list is however deleted in the CE Package, giving the Commission an opening for all types of waste streams.

[1373] See in particular the report of the Joint Research Centre of the EC: IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, second working document, 2012. This report will be used

> *a certain degree of de facto recognition of some reprocessed products (e.g. regrind, pellets) as products, i.e. non-waste. This situation needs clarification and harmonisation at EU level, as it is currently dependent on national rules that may be diverging.*[1374]

The Proposal for EU EoW criteria for plastics clarifies the reason further by stating that the current waste status of plastic creates in some cases a variety of administrative and economic burdens,[1375] and creates legal uncertainty

> *by keeping under waste legislation a material that in practice is perceived and treated as a product* [= non-waste]. *On the other hand, doubts have been raised on the de facto product condition of some recycled plastic materials (most prominently some agglomerates with high impurity content), which are considered a product by some* [Member States] *authorities and not by others*.[1376]

What this tells us is that there are several administrative and economic problems, and that it is unclear whether a material falls under the waste legislation of each single Member State and/or already under the EU manufacturing and production legislation, such as REACH. These issues are considered to disturb the market and could potentially influence the quality of the plastic chain.

These issues may therefore well propagate EU-wide EoW criteria for plastic waste. Importantly, EU EoW criteria should only be introduced where '*it is judged that the magnitude of the risks of unintended consequences or of impact to health and the environment requires it*.'[1377] According to the Commission this is apparently the case. The criteria should thus ensure that only low-risk plastic waste will cease to be waste.

The development of the EU EoW criteria for plastic waste is currently on hold, primarily because of a point of discussion with regard to the development of EU EoW criteria for paper waste.[1378] As stated several times before, the European Commission will try to revitalize the development of new EU EoW criteria through the Circular Economy, so it remains to be seen which consequences this has for the development of the EU EoW criteria for plastic waste.

In conclusion, while there is a need to establish EU EoW criteria for plastic waste due to different points across the EU at which the final recycling process is finished, indicating the tipping point from waste to non-waste based on EU waste legislation *but at the same time* referring to EU product legislation as well, no final decision has been made so far on the formal establishment of the criteria. The industry should therefore decide on this issue by themselves based on the waste definition and other national (voluntary) initiatives, if no national EoW criteria are established.

7.1.3 Comparing the perspectives

If one compares how REACH regulates the plastic life-cycle with how this is done by the WFD, one may conclude that despite the differences between the two frameworks, they could complement each other. This statement is elucidated below.

---

exhaustively in Chapter 7. See also: IPTS, JRC, *Study on the selection of waste streams for End of Waste assessment*, Final Report, 2009.

[1374] Ibid., *End-of-waste criteria for waste plastic for conversion*, p. 111.

[1375] Which are apparently particularly related to storage and shipment.

[1376] IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, Final draft report, 2013, p. 157.

[1377] Ibid.

[1378] Amongst other events, the EP rejected the Commission's proposal in July 2013. European Commission, *Proposal for a Council Regulation on defining criteria determining when recovered paper ceases to be waste pursuant to Article 6(1) of Directive 2008/98/EC on waste*, COM(2013) 502 final. For the Parliament's Motion for a resolution, see Doc B7-0000/2013, 18 October 2013, on http://www.europarl.europa.eu/meetdocs/2009_2014/documents/envi/re/1005/1005273/1005273en.pdf (consulted on 22 December 2017).

A. Focus and foundation

Both the main objective of REACH (i.e. '*to ensure a high level of protection of human health and the environment, including the promotion of alternative methods for assessment of hazards of substances, as well as the free circulation of substances on the internal market while enhancing competitiveness and innovation'*)[1379] and the main objective of the WFD (i.e. *'to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use'*)[1380] testify to the EU environmental objectives laid down in Article 191 TFEU, despite the fact that REACH is exclusively based on Article 114 TFEU.[1381] The actual application of these environmental objectives into secondary EU law is however quite different in the framework laws, each stressing different aspects.

On the one hand, the WFD puts great emphasis on safe waste treatment and on Waste-to-Material activities, particularly and quite successfully on quantitative recycling, as pointed out in Chapter 6. The focus of REACH, on the other hand, is mainly on the gathering and the passing on of information on substances ('no data, no market'), and on the management of certain substances of concern, with the purpose of substituting them. This has already been extensively highlighted in Chapter 5.2.2.

There are also differences in the implementation of the precautionary principle in both legal frameworks. REACH gives expression to the principle through a better and earlier identification of chemical substances, and also aiming at using less hazardous substances and, indeed, replacing them with alternative substances or technologies.[1382] The WFD has a different approach. It lists prevention as the first priority on the waste hierarchy, which includes promoting the use of less hazardous materials, and thus generating less hazardous waste. In addition, the WFD stipulates the principle of precaution as one of its leading principles, because there are many unknown but potentially dangerous impacts of waste treatment. When determining whether waste ceases to be waste, the precautionary principle plays a significant role. In general terms, the importance of the principle parallels REACH but is differently applied: REACH focusses on market access at the beginning of the plastic life-cycle, whereas the WFD focusses on end-of-pipe activities, the waste stage, and tries to safeguard that the waste ceasing to be waste is of relatively good quality and does not impact the environment and human health worse than under the waste framework.

Having said that, neither of the legal frameworks addresses one stage of the material life-cycle only: they regulate other stages as well. As could have already been drawn from Chapters 7.1.1 and 7.1.2,[1383] both measures implement life-cycle thinking, though on their own, distinctive way. Although REACH does not specifically mention life-cycle thinking, the text refers to the life-cycle of a substance at several places and thus also includes the waste stage to a certain extent, for example with regard to the risk management, the chemical safety assessments and the exposure scenarios.[1384] As for the WFD, it expressly introduces life-cycle thinking in particular in

[1379] Article 1(1) REACH.

[1380] Article 1 WFD.

[1381] REACH's objective is besides the securement of a high level of protection of human health and the environment, also the free circulation of chemical substances in the internal market while enhancing competitiveness and innovation. Hence, REACH takes Article 114 TFEU concerning the approximation of laws as its legal basis (in conjunction with Article 26 TFEU concerning the functioning of the internal market). In the WFD there are some minor references to the good functioning of the internal market as well, such as in the Recitals (27) and (38) WFD, but it is surely not an objective of the Directive.

[1382] The alternatives may also be hazardous according to CLP Regulation, nevertheless, but may not contain SVHC properties.

[1383] See also: Chapters 3.3.3 and 3.3.4.

[1384] As for the latter, by way of example, even though waste is generally excluded from the scope of REACH, exposure scenarios should include *'operational conditions and risk management measures, that describe how the substance is manufactured or used during its life-cycle* […].' It should be noted that exposure scenarios and its risk management measures *'cannot be used to reduce any obligation arising under waste legislation.'* It is rather to assist downstream users by making clear the legal requirements under the waste legislation. There are

the context of the waste hierarchy. Furthermore, it modernized the concept of 'waste' to encourage a life-cycle approach by clarifying the distinction between waste and by-products, and introducing EU EoW criteria.

One can conclude that EU waste legislation mainly focusses on one life-cycle while stimulating the adding of another cycle through quantitative recycling, whereas REACH wants to create a qualitative and low-risky plastic chain but without specifically encouraging recycling. At first glance, the approach adopted in the WFD is more favourable to plastic recyclers because it stimulates their business. If one looks beyond the first thoughts, though, plastic recyclers will also benefit from a high-qualitative plastic chain. These two different perspectives embodied by REACH and the WFD evidently need not be contradictory; rather, they ought to be complementary and are both an expression of the Circular Economy. Plastics are a case in point: they can generally be recycled without necessarily loosing most of their characteristics and in continuing to be recycled, they save precious resources. The next discusses this apparent contradiction more profoundly.

B. The apparent contradiction between manufacturing and recycling

As is evident from the explanation of the plastic life-cycle from the REACH and WFD perspectives, apparently there is a difference between waste recycling (dealing with waste, WFD) and the manufacturing of substances and the production of articles (dealing with non-waste, REACH). But is that really the case? It is not.

To support this claim, one has to take a closer look at the meaning of 'recycling' and 'manufacturing'. Starting with the first, the common idea behind recycling is that

> *a waste material is processed in order to alter its physico-chemical properties allowing it to be used again for the same or other applications.* […] *Recycling includes any physical, chemical or biological treatment leading to a material which is no longer a waste.*[1385]

Hence, if a waste material is subject to a chemical modification through recycling, the waste treatment also fulfils the definition of manufacturing, because it can be described as the production or extraction of substances in the natural state. If, however, this is not the case, the recycling process does not qualify for the 'manufacturing of a substance' in the strict sense of the wording of Article 3(8) REACH. Because re-melting plastic wastes does not necessarily modify the chemical composition of the substance, mechanical plastics recycling[1386] does not *prima facie* equate to manufacturing. Nevertheless, for the sake of consistency and enforceability,

---

however limits as regards the amount of details that should be given in the exposure scenarios. Since the WFD is a directive and should thus be transposed into national law, it will be impossible for instance to cover all these national (and local) laws in the scenarios. Also, law may change over time, so it is challenging to keep them up to date. Nonetheless, the Commission services do not see a contradiction between the WFD and REACH's exposure scenarios. Rather, *'the interaction between substance specific risk management measures and general waste specific legislation should further increase protection of human health and the environment,'* because the recommendations on how best to control the substances' risks should lead to the safe recovery and reduce risks to health and environment, in addition to the requirements under the waste legislation. If this is not the case, when the risk management measures suggested in the exposure scenarios are in conflict with the national (or local) laws, the measures' unsuitability must be communicated up the supply chain (Article 34(b) REACH). European Commission, *Follow-up to 5th Meeting of the Competent Authorities for the implementation of Regulation (EC) 1907/2006 (REACH)*, draft guidance document, CA/24/2008 rev.3, 3 April 2009, pp. 3-4.

[1385] European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, 2012, p. 32.

[1386] The JRC differentiates between mechanical and chemical (or feedstock) recycling. Mechanical recycling requires the melting of the polymers, including the adding of certain additives, whereas chemical recycling requires the breakdown of the polymers (meaning a chemical modification). Mechanical recycling is by far the most common plastics recycling practice in the EU. IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, Final report, 2014, pp. 52-53.

> *all forms of recovery, including mechanical processing, are considered a manufacturing process whenever, after having undergone one or several recovery steps, they result in the generation of one or several substances as such or in a mixture or in an article that have ceased to be waste.*[1387]

The demarcation between REACH and the WFD is supposed to be clear, with recyclers occupying a transitional position: their treatment of the waste has to abide by relevant obligations under the WFD; and because their process leads to a substance, they are also a manufacturer (or a producer in some cases)[1388] under REACH. It is noteworthy that recyclers may also be downstream users under REACH when they add primary substances during the process. Equally clear is that the transitional period ends the moment the recycling process is fully completed, that is when the waste becomes 'end-of-waste' and the WFD really no longer applies.[1389]

The delay in developing the EU EoW criteria for plastic waste may be partially explained by the noise created by the variety of regulators involved in this area. Should it be the European Chemicals Agency (ECHA), which ought to clarify the criteria and therefore the relation between waste legislation and chemical/product legislation, or should that be left to the Commission's DG ENV in accordance with its previous work in waste regulation? And if one assumes it can be both, how does one coordinate these two sets of regulatory guidance?

Based on ingrained habits and processes, and undoubtedly on the fear of losing its grip on the demarcation of the waste definition and thus of the boarders of EU waste law, the European Commission

> *continue*[s] *to believe that clarification of end-of-waste criteria is a matter for waste legislation and that REACH should follow the definition and interpretations taken in waste legislation. It is therefore not appropriate to develop separate guidance on this matter in the context of REACH*[1390]

This has not stopped ECHA from opining on the matter, as various sources referenced in this contribution show. Despite not taking an explicit stand in who should coordinate the EU EoW criteria, the preparatory study for the establishment of EU EoW criteria for plastic waste of 2014 confirms, indeed, that product legislation plays a crucial role in EoW criteria for plastic conversion, especially in the case of setting thresholds for problematic risky substances, such as SVHCs.[1391] Existing definitions of hazard profiles and the lists of risky substances in the CLP Regulation and REACH should therefore be referred to in the EU EoW criteria, as this would safeguard the coherence and consistency between waste legislation and product legislation.[1392] Another positive consequence would be that recyclers are compelled to stay up to date with product legislation.[1393]

All things considered, 'recycling' under the WFD is similar to the 'manufacturing process' under REACH (and in some cases to the production of articles), which means that recyclers should comply with two different legal frameworks, each laying down its own terminology, obligations and procedures. The WFD and REACH are in a 'complicated relationship', because it

---

[1387] ECHA, *Guidance on waste and recovered substances* (ECHA, 2:0, 2010), p. 5; and M. Hoppenbrouwers and B. Vanheusden, 'De relatie tussen de REACH-verordening en de (Europese) regelgeving inzak afvalstoffen' (*Milieu- en Energierecht*, 2009), p. 4.

[1388] Plastic waste that has ceased to be waste within the meaning of the WFD is to be considered a *substance or mixture*, such as the main polymer (constituent) and its additives, with or without impurities. On the other hand, products that are obtained directly after recovery fall under the definition of *articles* instead of substances or mixtures, such as public sound walls, outdoor furniture and plastic lumber.

[1389] Except for the Directive's legal instruments that regulate the period prior to the waste stage, such as the EPR instrument and the waste hierarchy, which gives preferences to waste prevention. See Chapter 7.1.2 (heading 'Period prior to the waste stage and prior to the recycling process').

[1390] European Commission, *Follow-up to 5th Meeting of the Competent Authorities for the implementation of Regulation (EC) 1907/2006 (REACH)*, draft guidance document of 3 April 2009 (CA/24/2008 rev.3), p. 2.

[1391] Supra note 1386, pp. 186-187.

[1392] The same reasoning has been applied in the case study on the EFD, see Chapters 5.2.2-D.

[1393] Supra note 1386, p. 186.

is unclear which measure/who has the appropriate claim to regulate the conversional stage between the waste status and the non-waste status. Up to now, the moment when waste ceases to be waste is generally determined by waste legislation. However, it would only seem logical that there is great interdependency between these two legal frameworks – the WFD and REACH have a dual claim to be involved in the matter. The CJEU and regulatory reality have underscored this point. This should be the starting point for further research, which was already in the CE Package pipeline. In the Communication on the interface between chemical, product and waste legislation, which was adopted in January 2018, the Commission underscores the main challenge is to consolidate two of the Union's objectives: on the one hand enabling recycling and improving the uptake of recyclates (waste policy), and on the other hand substituting substances of concern and reducing their presence and improving their tracking (chemical policy). However, this is an open question to the other EU Institutions as well as to the public – it does not provide for clear answers yet.[1394] A future study should therefore clarify the policy frameworks' interdependence to give clear signals to economic operators, to start with by reaffirming that recyclers (by the WFD definition) are also manufacturers and in some case also producers (by the REACH definitions).

7.1.4 Interim conclusion and *summarizing flowchart*

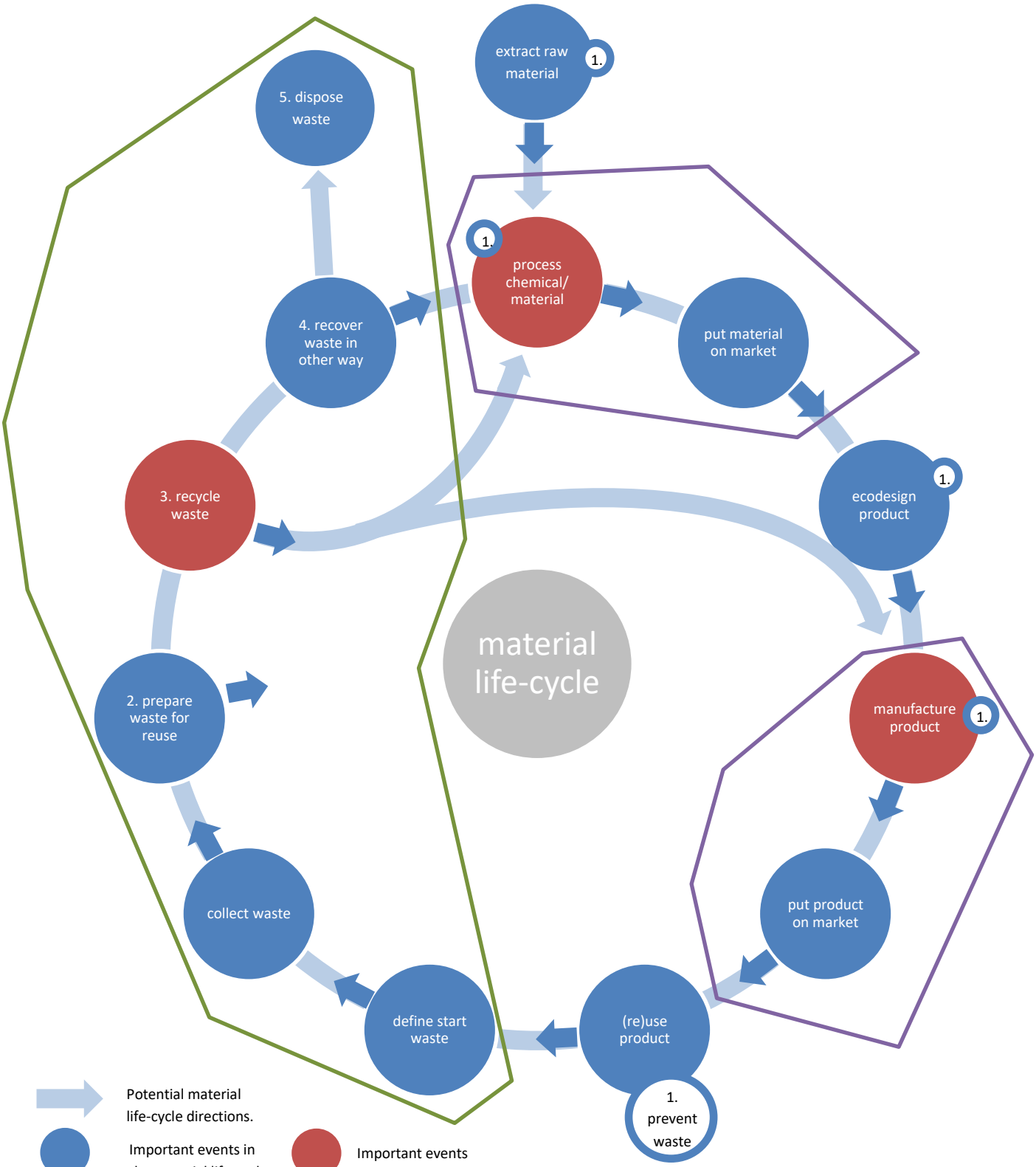
As explained in the previous parts, recyclers occupy a pivotal position in the REACH-WFD transition. From a regulatory compliance point of view, theirs should be an easy walk: one which is subject consecutively to the WFD *and* REACH, with the EU EoW criteria potentially having a transitional role in the future. While compliance with these two legal frameworks may be cumbersome (regulatory compliance rarely is free of challenges and of the need to devote financial resources to it), it should not be prohibitive in the sense that it should stop industry from pursuing activities in the sector in which those laws apply: the plastic recycling industry. Absence of legal clarity turns the recyclers' stroll into balancing on a rola bola. As in life, some entrepreneurs thrive on uncertainty and risk. Many others, though, avoid it. Why take the innovation, rola bola path through the regulatory circus if a relatively neatly laid pavement right next to it equally takes you to success? Why, in other words, take the 'Circular Economy Recycling path', requiring investment in R&D and innovation, when plastics made from natural raw materials may lead to a similar and better informed, indeed perhaps financially a more immediately rewarding Excel turnover sheet? [1395]

To answer this question, it requires more in-depth knowledge on the problems plastic recyclers run into. Therefore, the next three Chapters identify the obstacles for plastic recyclers and for plastic recycling as a concept.

Below, *Flowchart 9* first shows the overlap (in red) between the WFD and REACH, namely that the recycling of plastics (WFD) is the same as the processing of chemicals/materials (REACH) or the production of products (REACH), if the recycling process results in products directly.

Flowchart 9: the overlap between WFD and REACH (on the next page)[1396]

[1394] European Commission, *Communication on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation*, COM(2018) 32, pp. 1-2.
[1395] See similarly: J. Fleith de Medeiros *et al*., 'Success factors for environmentally sustainable product innovation: a systematic literature review' (*Journal of Cleaner Production*, 65, 2014), p. 82.
[1396] The flowchart is authentic, designed especially for this research.



Potential material life-cycle directions.

Important events in the material life-cycle.

Important events that overlap

Most predictable material life-cycle direction after important events.

1-5

The numbers indicate the waste hierarchy. Accordingly, waste prevention (1.) is placed outside the waste stage, whereas the waste treatments (2-5) are within that stage. For the waste treatments, the corresponding dark blue arrows show the way the waste goes after the specific treatment. The light blue arrows indicate the direction(s) which are also possible. The choice between these light blue arrows is not optional: the arrow should be picked with a sequence number. However, one could also ignore the numbers if this is justified by life-cycle thinking: then the waste treatment most optimal for the environment can be chosen.

Main focus of a particular key legislation (WFD, REACH). This does not mean that the laws do not regulate other important events and life-cycle stages, because each law is shaped according to life-cycle thinking in its own way.

7.2 Registration: composition profile

This section identifies and discusses the obstacles for plastic recycling with regard to the registration of chemical substances. It deals with the issue of generating recycled plastic particles that are as technically pure as REACH requires. The section first explains the biggest practical problem for the plastic recycling industry, whereupon the legal obstacles are clarified one by one.

7.2.1 Identification of composition: information void

Recycling installations may generally assume that all the delivered materials are waste – this is not really a problem in daily practice.[1397] The biggest problem for recyclers of plastic waste is that it is very hard for them to gather useful information on the waste's composition. For example, there is no legal obligation for the waste producers to deliver any information to recyclers. This could nevertheless help them to figure out the composition profile of the waste. This great void of information applies to both pre-user waste and post-user waste. Avoiding that the waste contains non-plastic components is important to recyclers in order to comply with the requirements of registration (which will be further discussed below in Chapter 7.2.2). Recyclers know, of course, that nothing in the recycled plastic which was not contained previously in the input material or was added deliberately during recycling process can be part of the output material.

There are two options for plastic recyclers for obtaining the required information on the composition of plastic waste: 1) by accessing available information on the composition and 2) by carrying out their own (laboratory) analysis of the constituents. The latter requires an in-depth, ad hoc research which generates prohibitively high costs for recyclers and is time-consuming, especially when the input material is of an unknown mixed composure, generally post-user waste. What is more, in theory recyclers should either test all shredded plastic pieces coming into the recycling facility (input material) or all the recycled plastics (output material). Alternatively, one could also argue that they should execute a random test analysis for each delivery, which would increase the costs as well. If non-plastic components will be detected in that case, the question can be raised whether the recycler should then sell the entire delivery to other waste treatment facilities, such as an energy recovery plant, even though the detection might just have been 'bad luck' and the bulk is still relatively free from non-plastic particles and thus still suitable for recycling? As one can see, there are quite some practical and economic barriers in place when opting for the second option. The first option is therefore more appealing to plastic recyclers, even though a number of other problems emerge.

The first option is in practice only open to recyclers involved in plastics recycling with established industry suppliers of such waste. In such a chain, the composition of the plastics waste can be more or less guaranteed to be constant. Industry suppliers of such pre-user waste do, of course, have a strong incentive to do so, given that the recycling industry takes wastes of their hands and may even compensate them for it. In most events of pre-user waste and in almost all instances of post-user waste, the hypothesis is however different. The composition of post-user waste and of much of pre-user waste is highly varied due to its innumerable sources and the

[1397] If the manufacturing of substances and the production of plastic articles also generate other materials than the intended materials/items, the question may arise what legal status these materials/items have. Do these residuals fall under the scope of REACH or the WFD? The answer to this question is quite simple: when they are by-products, the production installation needs to comply with REACH and thus remains a downstream user of the chemical substances or plastic articles. When the materials become pre-user waste, on the other hand, the WFD is applicable. In *theory*, a problem may occur when a producer wants to keep a material in the non-waste sector (REACH), because it is presumed that there are stricter requirements in place for waste. The by-product status could be in that regard (mis)used as an alternative to avoid compliance with the EoW criteria. This is however not likely to be the case, because the conditions for by-products are actually stricter than the ones for EoW: Article 5(b) and (c) WFD are not required for attaining the EoW status under Article 6(1) WFD and *'would only be met by some high quality flows of* [pre-user] *waste plastic.*' (IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, Final draft report, 2013, p. 117). In *practice*, the concepts of by-products and pre-user waste do not cause many problems. Producers use their materials in the best possible way, for they know that every piece of plastic generates opportunities.

diversity of articles. These moreover chance on a daily basis and each delivery is different. Practically speaking, therefore, there is not much available information on the composition at hand.

Little further is to be expected from the legal requirements concerning the registration of substances under REACH. These problems will be identified in the next part where the registration requirements for plastic recyclers are discussed.

7.2.2 Exempted from registration or not

As noted earlier, plastic recycling installations are also manufacturers under REACH. Recycled substances are therefore subject to the registration requirements. One would intuitively have thought that recyclers work with materials which upstream have already been registered and assessed: in other words, that the supply of materials with which recyclers work have already passed REACH compliance. Indeed among the exceptions to registration, evaluation and relevant downstream users information requirements, are among others previously registered substances. In accordance with Article 2(7)(d) REACH, substances (on their own, in mixtures or articles) that have been registered before and which are recovered in the EU are exempt if

> *(i) the substance that results from the recovery process is the same as the substance that has been registered in accordance with Title II; and*
> *(ii) the information required by Articles 31 or 32 relating to the substance that has been registered in accordance with Title II is available to the establishment undertaking the recovery.*[1398] (emphasis added)

In practice it is really difficult – if not impossible – for recyclers to live up to the underlined criteria,[1399] the poor presence of information being the biggest obstacle. Below, each criterion will be briefly expounded on.

Firstly, the recycled substance should be previously registered (Title II REACH), by any actor, so not necessarily from the substance's own supply chain leading to the waste generation. If registration has not been accomplished at the primary manufacturing or import stage, the substance should be registered nevertheless. The recycling plant should check whether there is already a registration in place or not. Identity with previously registered substances is all but excluded because, as pointed out in Chapter 7.2.1, collection of information on the composition is generally prohibitively burdensome.

Secondly, the substance must be the same. Because REACH lays down the responsibility for registration at the manufacturers, the plastic recyclers are the ones obliged to assess the 'sameness' of the substances – not the ECHA, for example. Variations in the composition or any impurity do not necessarily mean that it is a different substance.[1400] Regarding substances of well-defined compositions, substances are the 'same' where the mono-constituent makes up 80% or more and has the same name as another (already registered) substance. The substances may thus contain up to 20% (w/w) of impurities, regardless their origin or purpose in the original substance. When the substance contains more than one main constituent (multi-constituent substances), in principle each constituent is more than 10% and lesser than 80% (w/w), preserving again 20% (w/w) for impurities).[1401] There is an exception to these rules, though: when one or more of the components is/are *deliberately* added, the substance is a mixture (Chapter 7.2.4-B will further elaborate on mixtures).

[1398] Under i), the main plastic waste polymers and the additives that do not undergo chemical transformation are meant. And under ii) the main plastic waste polymers and additives that do not undergo chemical transformation are meant which are not covered in i). IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, second working document, 2012, p. 121.

[1399] Some authors, however, consider Article 2(7)(d) a 'privilege'. For example in: U. Lahl and B. Zeschmar-Lahl, 'Risk based management of chemicals and products in a circular economy at a global scale (risk cycle), extended producer responsibility and EU legislation' (*Environmental Sciences Europe*, 25:3, 2013), p. 4.

[1400] See e.g.: ECHA, *Guidance on data sharing* (ECHA, 2:0, 2012).

[1401] ECHA, *Guidance for identification and naming of substances under REACH and CLP* (ECHA, 1:3, 2014), pp. 7 and 18.

Thirdly, to benefit from the registration exemption recyclers must provide for the information that should be contained in a Safety Data Sheet, or if the substance is supplied to the general public, sufficient information to enable users to take the necessary protection measures. However, recyclers normally do not receive any Safety Data Sheets or other safety information required in Title IV REACH ('information in the supply chain') – no sheet is delivered or attached to the *waste* item when it enters the waste treatment facility. (Even so, consumers may still receive *some* information regarding the product's safe use, for example through the CLP Regulation. Of course, labels will get lost as well, because plastic waste is generally delivered at the recycling facility all shredded. It should furthermore be noted that although recipients of waste articles will normally not receive Safety Date Sheets, they may receive information on the safe use of an article in accordance with Article 33 REACH when the substance contains a SVHC above 0.1% w/w, *'or similar information and therefore other measures need to be applied in order to ensure the safe use of those substances in articles (including their waste stage).*' There is no tonnage trigger for these obligations: they also apply below 1 tonne per year. Having said that, this information will also easily get lost when product-users discard their plastic articles). As a consequence, recyclers would need to prepare a Safety Data Sheets themselves or use existing ones. The first option would in any case be applicable to post-user waste. The last option may be applicable to pre-user waste and would totally depend on the willingness of the original owners (the plastic industry) of the SDSs to give them theirs, because they are under no legal obligation to deliver them to the recyclers.[1402] This could be addressed in future adjustments to REACH, while acknowledging the legal boundaries of requiring producers of *pre*-user waste to share all the information they have obtained themselves with the recycling facilities, for example regarding intellectual property rights and the application of the proportionality principle. As for post-user waste, the introduction of product passports may provide recyclers with useful information about the origin and composition of post-user waste. The question remains, however, how the product passports reach them.

Besides these difficulties for recyclers to make use of the exemption rules, significant to note is that the substances covered by Annex V ('exemptions from the obligation to register in accordance with Article 2(7)(b) REACH') are exempted from Titles II, V and VI REACH, because registration is deemed *'inappropriate or unnecessary'* and their exemption does not prejudice the objectives of REACH.[1403] In the case of plastics, this would include

> *substances which are not themselves manufactured, imported or placed on the market and which result from a chemical reaction that occurs when:* (…) *a stabiliser, colorant, flavouring agent, antioxidant, filler, solvent, carrier, surfactant, plasticiser, corrosion inhibitor, antifoamer or defoamer, dispersant, precipitation inhibitor, desiccant, binder, emulsifier, de-emulsifier, dewatering agent, agglomerating agent, adhesion promoter, flow modifier, pH neutraliser, sequesterant, coagulant, flocculant, fire retardant, lubricant, chelating agent, or quality control reagent functions.*[1404]

In summary, for the vast majority of plastics recyclers the criteria of 'primary registration' and 'sameness' are hard to comply with. Moreover, there is no obligation for waste producers to supply SDSs, which makes it also difficult for recyclers to attain the required information regarding safety measures. It would seem, therefore, that in the current state of regulation, recyclers are destined to register their substances by means of their own analysis. This undoubtedly puts manufacturers using virgin materials in an advantageous position, which hardly supports the Circular Economy ideology. Industry ought not to be guided purely by impossibilities in regulatory compliance, when choosing between virgin and recycled materials.

[1402] See also: Umweltbundesamt, Ökopol Institut, *Reach and the recycling of plastics, Reference manual for an appropriate implementation of the REACH requirements for the operators of recycling plants*, (2012), p. 22.
[1403] Article 2(7)(b) REACH. In addition, these substances are *not* dangerous in the sense that they do not meet the criteria for classification as dangerous according to the CLP Regulation. IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, second working document, 2012, p. 121.
[1404] Annex V(4)(a) REACH.

7.2.3 Different registration regime for polymers

As regards recycled polymers, Article 2(9) REACH states that the provisions of Titles II (registration) and VI (information in the supply chain) do *not* apply to polymers.[1405] According to Article 6(3) REACH, any manufacturer (alias the plastic recycler) of a polymer must submit a registration file to the ECHA for

> *the monomer substance(s) or any other substance(s), that have not already been registered by an actor up the supply chain, if both the following conditions are met:*
> *(a) the polymer consists of 2 % weight by weight (w/w) or more of such monomer substance(s) or other substance(s) in the form of monomeric units and chemically bound substance(s);*
> *(b) the total quantity of such monomer substance(s) or other substance(s) makes up one tonne or more per year.* (emphasis added)

Simply put, although polymers are exempted from registration, recovery plants should in theory still register the monomers and other substances used to manufacture the 'new' polymer under the conditions set out above.[1406] For primary substance manufacturers, it is rather easy to live up to these conditions, as the monomers and other substance(s) used will normally be registered by the suppliers of those substances, earlier in the supply chain.[1407] For recyclers, this is a different story: recyclers encounter several barriers, such as the high expenses to identify the polymers' composition. Here, basically the same obstacles are in place which had been detected in the previous part on the information void.

> *Therefore, a pragmatic approach was agreed between the industrial associations and the authorities. The appropriate trade associations assist in determining the monomers and additives normally used in various types of plastic. This information can be used as a reference when implementing the REACH registration requirements applicable to recycling*.[1408] (emphasis added)

In addition, internationally standardized symbols are introduced that incorporate each plastic identification code (the so-called SPI resin identification coding system) in order to help recycling plants to identify the substances in plastic items. There are six numbers corresponding to six commonly used recyclable plastic resins, and one number (number 7) that indicates *any other* kind of plastic, recyclable or not.

Despite the power of combining forces, the *registrant* should still register its monomers and other substances in the end. In order to identify these substances used in the polymers, the recycler should first identify any *intentionally* added substances (additives) in the recovered material originally present in the polymeric material that was recovered.[1409] *Unintentionally* added substances present in the recovered polymer substance less than 20% should be to be called 'impurities' (see Chapter 7.2.4-A below) and do *not* have to be registered, as they are covered by the registration of the monomer substance(s).[1410] Nonetheless, recyclers still have to gather

---

[1405] The provisions regards downstream users actually do apply to polymers.

[1406] Nonetheless, it is stated that *in practice* recovery installations not have to register the monomers, but 'merely' have to find information about them to prepare the Safety Data Sheet that accompanies the recycled material. *'Obtaining such information for the large amounts of additives and impurities present in waste plastics can* [however] *be more difficult.'* According to IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, Final draft report, 2013, p. 127.

[1407] See also: ECHA, *Guidance on monomers and polymers*, *Guidance for the implementation of REACH* (ECHA, 2:0, 2012), p. 14.

[1408] Umweltbundesamt, Ökopol Institut, *Reach and the recycling of plastics, Reference manual for an appropriate implementation of the REACH requirements for the operators of recycling plants*, August 2012, pp. 15-16.

[1409] For example substances added to adjust the appearance and/or the physicochemical properties of polymeric material.

[1410] The preparatory work for the EU EoW criteria for waste plastics exemplifies this with pigments that have not the intended function anymore or impurities that are introduced after polymer manufacturing. Supra note 1406, p. 125.

information on the identity and quantities *'in which hazardous minor constituents or impurities are present in the recovered polymer.*'[1411] If an impurity is hazardous, further communication obligations in the supply chain are triggered. Yet, no analysis is required when no 'significant impurities' are expected, for example when dealing with certain 'clean' pre-user waste streams. In addition, in some cases it is possible to characterize the recovered polymeric substance sufficiently even without considering its origin.[1412] In any case, if the impurities comprise *more* than 20% of the substance, the constituent is seen as a substance (in a mixture), even if its presence is unintentional.

A final but crucial point to stress once again is that the monomers and other substance(s) may in principle rely on the registration exemption of Article 2(7)(d) REACH. As already discussed in Chapter 7.2.2, recyclers should have information about the substances. In the case of polymers, this would thus refer to their monomers, any additives and other reactants. In practice, recyclers can request Safety Data Sheets from the primary manufacturers or gather information via an online database.[1413] Nevertheless, since recyclers of polymers neither handle, manufacture or market monomers, information about monomers is actually of little practical benefit for them; they are only useful to a very limited degree in the preparation of their own Safety Data Sheets for the recycled polymers.[1414]

All in all, while polymers are exempted from the registration duty, the monomers and other substances used in the polymers should be registered pursuant to a few conditions based on weight/volume. It is difficult to comply with these conditions because of a lack of available information. This void is equally throws a spanner in the works regarding the exemption for registration, as laid down in Article 2(7)(d) REACH, which could theoretically still apply to these monomers and additives.

7.2.4 Identification of certain substance(s)

Recycled substances can be substances, mixtures or articles. For the registration requirements it is essential to know what it is. However, it is not always clear which track to take, which creates legal uncertainty for the recycler. For example, it may be unclear whether a constituent of a recovered material is a substance or an impurity. Neither is it always crystal-clear whether to identify the recycled material as a mixture or as a so-called 'UVCB substance'. These two issues are discussed below.

A. Substance or impurity?

Importantly, recycled substances may contain impurities that could distinguish them from corresponding substances deriving from the primary manufacturing. As one would expect, the main reason of the presence of impurities in the recycled substance is that they were contained in the input material.

As previously touched upon, constituents present in quantities above 20% (w/w) should *not* be considered impurities but as separate substances in a mixture. However, when that recycled material is *intentionally* selected for the presence of certain constituents, such as additives related to colouring or flame retardancy, those constituents should nonetheless be considered to be separate substances, even if they are present in smaller quantities than 20% (w/w).[1415] Whether

[1411] Ibid., p. 25.
[1412] Ibid.
[1413] Umweltbundesamt, Ökopol Institut, *Reach and the recycling of plastics, Reference manual for an appropriate implementation of the REACH requirements for the operators of recycling plants*, August 2012, pp. 15-16.
[1414] Ibid.
[1415] European Commission, *Follow-up to 5th Meeting of the Competent Authorities for the implementation of Regulation (EC) 1907/2006 (REACH),* draft guidance document, CA/24/2008 rev.3, 3 April 2009, p. 8.

impurities have to be registered separately is not relevant for the classification and labelling of the substance or mixtures in which they are presented.[1416]

All in all, even though 20% can be considered impurities (or precisely *because* 20% can be considered impurities), recyclers need to have knowledge of the composition of the substances. Each constituent therefore requires substantial analytical efforts.

B. Mixtures with a complex composition: mixture or UVCB substance?

The successful registration depends crucially on their unambiguous identification. A substance of 'unknown or variable composition, complex reaction products or biological materials', collectively called 'UVCB' under the REACH framework,[1417] is a point of concern in that respect because – just what the name implies – the composition cannot be sufficiently identified by its chemical composition, because

- The number of constituents is relatively large and/or
- The composition is, to a significant part, unknown and/or
- The variability of composition is relatively large or poorly predictable.[1418]

As a consequence, UVCB substances require other types of information for their identification, in addition to what is known about their chemical composition, which should still be given.[1419] These *known* constituents and all constituents present at concentrations below 10% should be specified by at least an IUPAC name[1420], and the typical concentrations and concentrations ranges of the known constituents should also be given.[1421] On the other hand, *unknown* constituents should be identified as far as possible by a generic description of their chemical nature. The main identification parameters the substance are the substance's name, its origin or source and the most relevant steps taken during processing.[1422]

Similar to UVCB substances, mixtures are also considered a blend of substances according to Article 3(2) REACH. The difference between mixtures and UVCB substances is that the REACH registration obligations apply individually to each of the substances contained in a mixture, whereas UVCB substances can be registered jointly. According to Recital (45) REACH, UVCB substances may be registered as a single substance, *'despite their variable composition, provided that the hazardous properties do not differ significantly and warrant the same classification.*' So, only if there is any 'significant change' in input material that may lead to a substantial different substance, the UVCB substance should be registered. Hence, due to the fact that the source of the

---

[1416] '*Relevant risk management measures may need to be recommended in safety data sheets or information according to Article 32. These risk management measures can consist e.g. in further purification steps to eliminate impurities or measures to ensure the safe handling of the substance with the impurities in it'.* Ibid. p. 9.

[1417] The concept is not explained in REACH; this is done in the plentiful and regularly updated guidance documents provided by the ECHA.

[1418] ECHA, *Guidance for identification and naming of substances under REACH and CLP* (ECHA, 2:1, 2017), p. 37. For example, glass qualifies as a UVCB substance, see e.g.: European Commission, *4th Meeting of the Competent Authorities for the implementation of Regulation (EC) 1907/2006 (REACH)*, final summary record, CA/38/2010, 2010.

[1419] This known information can be based on well-known reference samples or standards and in many cases indexes and existing codes. According to the ECHA. other generic information on the composition of a UVCB substance can consist of so called 'fingerprints', such as through chromatographic or spectral images that show a characteristic peak distribution pattern. ECHA, *Guidance for identification and naming of substances under REACH and CLP* (ECHA, 2:1, 2017), p. 38.

[1420] International Union of Pure and Applied Chemistry is the world authority on chemical nomenclature and terminology (i.e. the naming of elements), standardized methods for measurement, and on atomic weights and many other critically-evaluated data. See the authority's website: https://iupac.org/who-we-are (consulted on 16 September 2017).

[1421] Supra note 1419, p. 38.

[1422] For more information, see: ibid., pp. 38-46.

input material (primarily post-consumer waste) fluctuates, there is a chance that the recycled UVCB substance should indeed be registered. These

> *mixtures of recovered materials with a complex composition will often not have corresponding new materials that have been registered as UVCB substances before.* (…) *Nevertheless, the individual constituents of the material may have already been registered (or are exempted from registration), thus enabling the use of the exemption in Article 2(7)(d) of REACH provided that the relevant safety information is available* [and that all the other conditions are also complied with]. *In such cases, while both options are in principle acceptable, it may therefore be easier for the manufacturer* [i.e. the recycler?] (…) *to consider the material as* [a mixture] *in which the individual constituents/substances have been registered before and therefore benefit from the exemption in Article 2(7)(d)* (…).[1423]

Although there is a different approach to mixtures and UVCB substances under REACH, the definitions are often hard to distinguish from one other, making them interchangeable to a certain degree. It is said that the manufacturer (i.e. the recycler) can decide on which of the two options better fits the characteristics of the material,[1424] and thus on which track displays less registration hurdles.

For primary manufacturers the approach referred to in the quote above will probably work out well. However, since it is hard for recyclers to comply with the exception rules in Article 2(7)(d) REACH (see Chapter 7.2.2), the UVCB track may in the end take less of an effort. After all, a UVCB substance can be registered as a single substance and should in any case be identified by a laboratory, whereas for mixtures a recycler should identify all substances separately.

7.2.5 Interim conclusion

As can be derived from Chapter 7.2, it is more challenging for recyclers than for primary manufacturers to collect the information that is required under the rules regarding the registration of substances and mixtures. This information void has not only an impact on the rules specifically on the registration of substances (including monomers and additives), it certainly also negatively influences the opportunities for the recycler to adhere to the exception rules in Article 2(7)(d) REACH, regardless of whether the facility recycles pre-user waste or post-user waste. It would seem that in the current state of regulation, recyclers are destined to register their substances by means of their own burdensome analysis. This undoubtedly puts manufacturers using virgin materials in an advantageous position, which hardly supports the Circular Economy ideology. Furthermore, information about the composition of the recycled plastic material is also relevant for identifying if a recycler deals with a substance (which should be registered) or an impurity (which does not have to be registered), and with a mixture (of which each substance should be registered separately) or a UVCB substance (which should be registered jointly). Particularly regarding the final two competing options there is legal uncertainty. To date, recyclers can basically choose what fits best for them, which would probably be the UVCB track.

The rules on registration, including the criteria under Article 2(7)(d) REACH, do not have any influence on the recyclers' obligation to determine the risk profile of the recycled plastics. In fact, the thresholds for a substance to be regarded as risky for human health and the environment differ significantly from those used to determine the composition of a substance. For example, recyclers are allowed to manufacture substances that contain 20% or fewer impurities without them being specified in more detail. Yet, the substances within the 20% may easily meet the thresholds of hazardousness. The next Chapter discusses the obstacles for plastic recycling with regard to the restriction and authorization of certain chemical substances under REACH.

[1423] ECHA, *Guidance for identification and naming of substances under REACH and CLP* (ECHA, 1:3, 2014), pp. 16 and 26.

[1424] European Commission, *Follow-up to 5th Meeting of the Competent Authorities for the implementation of Regulation (EC) 1907/2006 (REACH),* draft guidance document, CA/24/2008 rev.3, 3 April 2009, p. 9.

7.3 Authorization and restriction: risk profile

Determining the hazard and risk profile is the basis for further information requirements, such as classification, labelling and providing information downstream and to customers, as is prescribed under the CLP Regulation and REACH.[1425] Recyclers therefore have to determine whether the substances they manufacture have hazardous properties and pose risks to the environment and/or human health.

This section identifies and discusses the obstacles for plastic recycling with regard to the main instruments to restrict the use of hazardous substances: the authorization of Substances of Very High Concern and the restriction of dangerous substance. The next section however firstly touches upon the information void which had already been previously discussed in Chapter 7.2.1.

Before addressing these issues, attention should be drawn to the part of the dissertation where the risk approach, the precautionary principle and the substitution principle are explained, Chapter 5.2.2,[1426] because these matters lay important foundations for the legal instruments discussed and will help to understand them better.

7.3.1 Information void

Building on what has been explained in Chapter 7.2.1 about the information void hindering the registration of recycled plastics, the lack of information is also the main concern for recyclers considering the authorization and restriction of risky substances (on their own, in mixtures or in articles). Because almost all issues have already been pointed out earlier, this section only highlights an additional aspect that actually helps plastic recyclers to fill the information gap – at least to some extent.

It should be recalled that it is very likely that both pre-user and post-user plastic waste is not accompanied by Safety Data Sheets or any clear labels when entering the recycling facility, as those information flows are disturbed by the product's use. The non-plastic particles in the composition of these waste streams can therefore be difficult to identify. Unsurprisingly, this also applies to the hazardous content of the plastic waste. Despite the information flaw, it is said that particularly relating to the mitigation of potential risks it is still possible to produce adequate knowledge in many situations.

> *For instance, with regard to waste from mixed food packaging, it can be assumed that no substances are contained that are banned or restricted under the EU food regulations, and trigger classification. Also, it is plausible that waste from electrical equipment contains flame retardants and possible other additives that are hazardous. Verification at the manufacturer plant may be needed to know the exact composition, and/or published studies on these particular product and waste streams.*[1427]

The source of the waste streams is very important for recyclers – this is precisely why pre-user waste is generally easier to recycle than post-user waste. As rightly pointed out, food packaging requires high risk standards due to the higher risks for human health than in most other products. This is also the reason why food packaging is largely regulated through the *lex specialis*-format.[1428] Careful sourcing of waste may, indeed, at least help in lowering the risk of including

[1425] See in this respect also the Stockholm Convention on Persistent Organic Pollutants (POPs) of 22 May 2001, which entered into force on 17 May 2004, is of importance here, because it can declare substances hazardous without the consent of the EU.

[1426] See particularly Parts B and C (heading 'REACH'), the latter section focusses on the REACH framework.

[1427] Umweltbundesamt, Ökopol Institut, *Reach and the recycling of plastics, Reference manual for an appropriate implementation of the REACH requirements for the operators of recycling plants*, August 2012, p. 23.

[1428] See amongst others: Regulation 1935/2004 of 27 October 2004 on materials and articles intended to come into contact with food and repealing Directives 80/590/EEC and 89/109/EEC, [2004] OJ L 338; and Regulation 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food, [2011] OJ L 12/1. The 'Food Contact Plastics Regulation' was substantially amended by Regulation 2016/1416 of 24 August 2016 amending and correcting Regulation 10/2011 on plastic materials and articles intended to come into contact with food, [2016] OJ L 230/22. Amongst other, it introduced a new list of authorized substances and new

risky substances in the input material. And as explained in Chapter 7.1.2,[1429] separate collection or taken-back schemes pursuant to the EPR concept (both instruments are based on the WFD) can further contribute to this.

Be that as it may, the bulk of the plastic waste arriving at the recycling facility is all shredded and/or post-user waste and therefore remains problematic. The information void will be further explained in the subsequent sections if relevant, Chapters 7.3.2 and 7.3.3, where the legal obstacles are clarified.

7.3.2 Authorisation of substances of very high concern

The authorization instrument is an expression of the precautionary principle and the substitution principle. Substances of Very High Concern need authorization to assure the potential hazards and/or risks are properly controlled and that, in the end, these substances are progressively replaced by suitable alternatives or processed by environment friendly technologies, when economically and technically viable. Of course, the requirement of authorization also applies to plastic recyclers.

Accordingly, they can only place the specific substance or article on the market when the manufacturer itself (or its immediate downstream user and importer) is authorized to do so. Another option to place SVHCs on the market is when the substance is present in mixtures below a concentration limit of 0,1 % w/w for substances in accordance with Annex XIII (the SVHC criteria) as referred to in Article 57(d), (e) and (f) REACH (on PBT substances, vPvB substances and substances having endocrine disrupting properties or PBT or vPvB properties, respectively). For all other hazardous substances the recycler should look at the concentration limits specified in the CLP Regulation which results in the classification of mixtures as dangerous.[1430]

There are several problems with regard to the authorization of SVHC that have an impact on plastic recycling. Firstly, the basic principle underlying authorization is a general ban on the use of certain substances *unless* authorized for specific applications (a 'positive list approach'). The problem is that as recyclers do not know the exact composition of the shredded plastics, amongst others because the composition of the plastic waste varies depending on each delivery, it is hard to tell whether they should ask for authorization in the first place. As already stressed many times before, there is a considerable information gap.

Secondly, besides the fact that the application for authorization is a lengthy procedure, it is very costly, too: more than 60,000 EUR plus additional costs,[1431] such as the costs on the analysis of alternatives.[1432] This may cause a huge economical barrier for recyclers. In the spirit of the Circular Economy, it could be considered to reduce these burdens only for recyclers.[1433] There are, however, already reduced fees for micro, small and medium enterprises, so the burden for SMEs has not remained unnoticed.[1434] Additionally, the question can be raised whether a recycler should ask for an authorization for each and every recycling practice owing to the fluctuating

---

restrictions. In 2017, new substances were added authorization list, through: Regulation 2017/752 of 28 April 2017 amending and correcting Regulation 10/2011 on plastic materials and articles intended to come into contact with food, [2017] OJ L 113/18.

[1429] Heading 'Period prior to the waste stage and prior to the recycling process'.

[1430] Regulation 1272/2008 (CLP Regulation) repealed the CPL Directives (Directive 1999/45/EC and Directive 67/548/EEC, respectively CPL of dangerous preparations and of dangerous substances) on 1 June 2015.

[1431] See for the actual fees for application: Article 62 REACH and Article 8 in conjunction with Annex VI, Table 1 Regulation 340/2008 of 16 April 2008 on the fees and charges payable to the European Chemicals Agency pursuant to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), [2008] OJ L 107/6.

[1432] The alternative is actually rather simple: the use of primary materials, which is, of course, in contrast with the notion of the Circular Economy concept and the very reason of recycling... The search for alternatives is required pursuant to the substitution principle.

[1433] It must first be determined whether this will be an unlawful discriminatory measure.

[1434] See Table 1, Annex VI Regulation 340/2008.

composition of predominantly post-user waste. Noticeable, there are still some uncertainties to be cleared out in this regard.

Thirdly, authorization decisions define a time-limited review period. In June 2013, it was agreed that there are three periods: either 'short', 'normal' or 'long' (four, seven or twelve years respectively).[1435] A time-limited review period serves the idea to phase-out the use of a particular material; indeed, a reflection of the substitution principle. Authorizations are valid until the Commission decides to withdraw (or amend) the authorization in the context of such review periods. Besides, an authorization may be reviewed at any time '*if the circumstances of the authorised use change so as to affect the risks or the socio-economic impact, or if new information on alternatives becomes available.*'[1436] Therefore, besides constantly bearing the risk that the authorisation for a substance will be withdrawn after the review period, recyclers also need to take note of any sporadic decisions during those years. This causes great legal uncertainty and production certainty, because after the review period recycling plants need to apply for authorization all over again, not knowing if it will be allowed to continue their business and if their investments will pay off.[1437] This is a fate to which all REACH notifications are subject, however.

Fourthly, the Candidate List is amended every half a year, adding several SVHCs each time. To date, there are 174 substances on the Candidate List (with 5 added in 2017 – so far).[1438] At first sight, this might seem as a positive development. After all, humans and the environment are presumably better protected by the immediate legal obligations against the supposed adverse impacts these substances may cause, according to the risk approach and the precautionary principle. According to some, the listing of SVHCs on the Candidate List is going too slow in order to trigger the process of substitution as intended by REACH.[1439] In addition, one could perfectly argue that the sooner the substances are added, the better. However, this practice simultaneously raised some obstacles for plastic recycling. As the Candidate List contains more and more substances every few years,[1440] it does not take account of the substances that have been put on the market *before* their identification as a SVHC and their inclusion on the Candidate List. These substances are generally called 'legacy additives' because most of them are additives such as certain flame retardants – not the main constituent. Put differently, these legacy additives that were legally allowed to use for many years, are now significantly restricted via the Candidate List. This means that innumerable plastic products have been placed on the EU market containing presently declared SVHCs in the last decades. One could consider these products as 'plastic stocks' in society and are now being discarded, finding their ways to the recycling plants as post-user waste.

[1435] See ECHA's press release http://echa.europa.eu/view-article/-/journal_content/title/rac-and-seac-agree-jointly-on-the-main-principle-for-the-length-of-the-review-period-for-applications-for-authorisation and ECHA, *Setting the review period when RAC and SEAC give opinions on an application for authorisation*, SEAC/20/2013/03, 2013, see http://echa.europa.eu/documents/10162/13580/seac_rac_review_period_authorisation_en.pdf (consulted on 22 December 2017).

[1436] See http://echa.europa.eu/regulations/reach/authorisation/applications-for-authorisation (consulted on 22 December 2017).

[1437] The 7th EAP also endorsed that REACH must ensure stability and predictability for economic operators in (5) of its Annex.

[1438] In September 2017.

[1439] European Environmental Bureau and ClientEarth: C. Schaible and V. Buonsante, *Identifying the Bottlenecks in REACH Implementation. The role of ECHA in REACH's failing implementation* (EEB and Client Earth, 2012), p. 43.

[1440] The Roadmap on a Resource Efficient Europe stresses that by 2020 all relevant SVHC should be placed on the Candidate List, which implicates that the list will be finished. European Commission, *Roadmap to a Resource Efficient Europe*, COM(2011) 571, p. 7. This, however, would seem to be illusive, for example because new scientific research can theoretically always come up with proof that other risks could be caused by some (novel) substances or mixtures.

Legacy additives may still be present in the input material in recycling processes, because they can be absorbed by the polymer matrix. In most cases (in 2013), no demonstrated and economical technique exists for removing these additives from the recyclate.[1441] If the plastic waste items containing these legacy additives cannot be used anymore in the recycling process due to the technical and economic difficulties in detecting and filtering out the contaminated plastic particles in the shredded plastic input material, the system precludes a solid amount of plastic waste from starting a new life-cycle in the plastic chain. As long as the Candidate List continues to be frequently amended with new substances albeit legitimized by the precautionary and substitution principles, this obstacle for plastic recyclers will continue to be in place as well. The mopping up of historic lack of regulation consequently is not evenly spread across industry, favouring primary manufacturers.

Fifthly, the CJEU has solved a problem concerning the calculation method for the '> 0.1% w/w rule' (see earlier in this section) in one of its judgements in 2015. But because this problem also relates to the import of articles and components of articles, it is further explained in Chapter 7.4.

In conclusion, plastic recyclers have a lot to take into account considering the authorization rules under REACH. While some of these burdens are also born by primary manufacturers, recyclers are generally most significantly affected.

7.3.3 Restrictions of dangerous substances

Placing a restriction is an instrument to protect human health and the environment from unacceptable potential risks posed by chemicals. Restrictions may limit or completely ban the manufacture, placing on the market or use of a dangerous substance on their own, in a mixture or in an article, including those that do not require registration. It can also apply to imports. Just as authorizations, restrictions are an expression of the precautionary principle and the substitution principle.

REACH sets out the restrictions of the targeted substances and the corresponding conditions in Annex XVII. To date, 65 restrictions can be found in the list.[1442] The ones having an impact on plastics were in 2013: low molecular weight phthalates in toys and childcare articles; cadmium from recycled PVC in some specific PVC construction applications;[1443] cadmium in crates; lead in PVC; and HM in plastics in general.[1444] Since then, new restrictions had been added, such as

[1441] See the Parliamentary question of 25 February 2013 on http://www.europarl.europa.eu/sides/getDoc.do?type=WQ&reference=E-2013-002047&language=EN (consulted on 22 December 2017). See also: Chapter 7.2.1 and A. Sevenster, 'VinylPlus, the new European PVC industry's voluntary programme toward sustainability' (*Journal of Material Cycles and Waste Management*, 14), p. 283.

[1442] In September 2017. However, entries 33, 39, 42, 44 and 53 (on POPs and substances that deplete the ozone layer) have been deleted from the Annex XVII list because they are regulated elsewhere.

[1443] The preparatory work for the EU EoW criteria for waste plastics includes a description of cadmium in PVC. See IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, Final draft report, 2013, pp. 128-129). A short summary: when debating on the new Regulation EU/494/2011 that amends REACH as regards Annex XVII, the EU legislators had to balance the reduction of cadmium in PVC and allowing the recycling, rather than incineration or landfilling, which is in line with the waste hierarchy in the WFD. *'Before the regulation, a concentration limit on cadmium in PVC applied for articles such as pipes, flooring, cabling and related items but not for profiles, square cable ducts or roofing. The implication of an expansion of the recycling of PVC waste into new construction articles is that pipes and round cable ducts which may contain recyclates may inadvertently be placed on the market with a cadmium concentration exceeding the regulatory limit of 100 ppm.'* On the other hand, adherence to the 100 ppm cadmium content limit might have significant adverse effects for recycling of PVC construction waste in the EU. *'The policy option chosen was a complete restriction on the use of cadmium in PVC with an exemption for specified rigid PVC construction articles, if recycling takes place in a closed loop. The proposed option for profiles/square cable ducts was to maintain 'business as usual', for pipes/round cable ducts, to raise the existing limit to 1,000 ppm for non-pressure pipes and round cable ducts for an initial period of 10 years (…), and for flexible roofing to introduce an EU wide cadmium concentration limit of 100 ppm.'*

[1444] According to ibid., p. 128. See Annex XVII REACH for the full names of the abbreviations.

PAHs in *inter alia* sport equipment, tools for domestic use and watch-straps.[1445] A problem for recyclers is that an increasing number of restricted substances are being recognised. Ultimately, the products containing these currently restricted substances will still be discarded and will thus end up in the recycling facility. This has a direct result on the recycled material and its further use. Primary manufacturers do not have this problem.

Just as the growing list of restricted substances and the list of authorizations, the existence of legacy additives are also an obstacle for plastic recyclers in view of the restriction rules under REACH (this was highlighted in Chapter 7.3.2).

To build upon the difficulty of guaranteeing a certain quality level of the recycled plastic, one has to bear in mind that in spite of REACH being a Regulation that must accordingly be applied the same across the EU, there are diverging point of views and interpretations of REACH among Member States. A Member States may under certain conditions (set out in Article 129 REACH) take appropriate provisional, derogating measures if it has justifiable grounds for believing that urgent action is essential to protect human health or the environment in respect of a substance, on its own, in a mixture or in an article, '*even if satisfying the requirements of this Regulation*.'[1446] This was apparent in the case of the approved ban (total restriction) on cellulose wadding insulation materials containing ammonium salts adjuvants by France in 2013.[1447] This was the first and the last time that the safeguard clause has been successfully applied since the entry into force of REACH. However, other substances used in the manufacturing of plastic or processing of plastic products can also be restricted by single Member States in the future, taking France as an example. It may very well be hypothetical, but this is a concern worth flagging because frequent use of the clause could lead to market fragmentation.[1448] While such restrictions may be legitimized by the precautionary principle and will probably protect the quality of the entire plastic chain at the end of the day, it could potentially also create a hurdle for recyclers to sell their recycled plastics in those Member States, in addition to the need to stay up-to-date with all the new restrictions across the Union. This is of course not only an obstacle for recyclers, but also for primary manufacturers.

In conclusion, similar to authorization, restrictions are plentiful in the EU. Plastic recyclers should take account of these restrictions. While some of these burdens are also born by primary manufacturers, recyclers are generally affected most significantly.

[1445] See Annex XVII REACH for more.

[1446] Article 129(1) REACH. Another option would be to rely on Article 114(5) TFEU if new scientific evidence on the environmental impact, which is specific to that Member State and has arisen after the adoption of the EU harmonized measure, can support the national measure. The adoption of other conditions by the Member States than the ones under REACH is incompatible with the objectives of REACH. See: Joined Cases C-281/03 and C-282/03 *Cindu Chemicals and Others* [2005] ECR I-8069, para. 44; and Judgement of 7 March 2013, *Lapin elinkeino-, liikenne- ja ympäristökeskuksen liikenne ja infrastruktuuri –vastuualue v Lapin luonnonsuojelupiiri ry*, C-358/11, EU:C:2013:142, para. 37. See also: Chapter 2.1.2 (heading 'Derogation possibilities Articles 193 and 114(4)-(5) TFEU') on the derogation possibilities under Article 114(5) TFEU.

[1447] Decision 2013/505 of 14 October 2013 authorising the provisional measure taken by the French Republic in accordance with Article 129 of Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) to restrict the use of ammonium salts in cellulose wadding insulation materials, [2013] OJ L 275/52. This Decision is no longer in force, because pursuant to Article 1(1) of the Decision, the provisional measure had initially been authorized for a time period of 21 months beginning on 15 October 2013, whereupon it was extended with an additional 15 months (Decision 2015/1131 of 10 July 2015 amending Implementing Decision 2013/505/EU authorising the provisional measure taken by the French Republic in accordance with Article 129 of Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) to restrict the use of ammonium salts in cellulose wadding insulation materials, [2015] OJ L 184/20).

[1448] Note, however, that in order to make use of the safeguard clause, the Member State concerned must prepare a proposal to initiate an EU restrictions procedure within three months of the Commission's Decision confirming the provisional national measure (Article 129(3) REACH).

7.3.4 Choice between authorization and restriction

The criteria to decide upon the 'suitable' precautionary measure – either authorization or restriction – are unclear. In principle, both authorization and registration are equally important under the REACH framework and for plastic recycling; the choice between the two instruments seems to be quite arbitrary. Along these lines, Bergkamp and Penman describe REACH as *'a collection of several stand-alone regulatory regimes that loosely hang together, but are not well coordinated,*' amongst others because, *in theory*: two or more risk assessments can be undertaken at the same time, both regimes can be established for one single substance, and both regimes can address differentiated risks of one substance at the same time.[1449] The lack of clarity is further enhanced by the ambiguous application of the substitution principle on the selection of regulatory measures. The evaluation of the availability of alternatives is currently only required in relation to individual authorization applications ('which *substance* is better?'). It is however *not* required when deciding on the *proper instrument* to address the risks deriving from the use of the substances. Consequently, a substance may be subject to (the more expensive) authorization procedure even though it could be more efficiently handled through the restriction regime.[1450]

A clue on this issue might have been provided by the Commission, as it declares that restriction serves as the 'ultimate safety net'.[1451] This could indeed be the case, because whereas according to the authorization mechanism all uses of the listed substances are banned *unless* applicants can successfully defend their specific use, pursuant to the restriction tool it is the authorities that should deliver justifications for banning specific uses. Moreover, it is in line with the philosophy of REACH to transfer responsibility to the industry, which first points towards the direction of authorization (e.g. based on less administrative costs and deployed resources). This means that the Commission should probably first look at the authorization procedure before turning to restriction. This strategy would however not always be compatible with the substitution principle, as pointed out above, and cannot be evidenced by practice. For plastic recyclers, therefore, the developments in both procedures are interchangeably important to understand and to monitor closely.

Against this critical background, the 'Roadmap for SVHC identification and implementation of REACH Risk Management measures from now to 2020' of 2013 (the SVHC Roadmap) introduced a tool to analyze the risk management options (initially called 'RMOs' but now 'RMOAs') appropriate to a particular SVHC, either in REACH (authorization, restriction or substance evaluation) or outside of REACH (with another legislation).[1452] A Member State or ECHA (through the Commission) can carry out this case-by-case analysis. Currently for 159 substances a RMOA is concluded or under development.[1453] The tool is an important step in determining a proper, synchronized risk management instrument to address a substance of concern and to share useful information about it, but then again it is voluntary.

[1449] L. Bergkamp and M. Penman, 'Conclusions', in: L. Bergkamp (ed.) *The European Union REACH Regulation for Chemicals. Law and Practice* (Oxford University Press, 2013), p. 427; see also: L. Bergkamp and N. Herbatschek, 'Regulating Chemical Substances under REACH: The Choice between Authorization and Restriction and the Case of Dipolar Aprotic Solvents' (*Review of European Community & International Environmental Law*, 23:2, 2014), p. 232. See for an explanation of how REACH attempts to control the possibility to address the same substance through both regimes: pp. 229-230 of the latter.

[1450] Ibid., *The European Union REACH Regulation for Chemicals. Law and Practice*, p. 428. See for more unanswered questions related to the 'authorization or restriction' choice: ibid., 'Regulating Chemical Substances under REACH: The Choice between Authorization and Restriction and the Case of Dipolar Aprotic Solvents', pp. 221-245, see in particular pp. 229-237.

[1451] European Commission, *Questions and Answers on the European Chemicals Agency (ECHA) and REACH*, MEMO/07/218, 2007.

[1452] European Commission, *Roadmap on Substances of Very High Concern*, 6 February 2013, 5867/13. See also: European Chemicals Agency, *SVHC Roadmap to 2020 Implementation Plan*, 9 December 2013, ECHA-13-R-11-EN.

[1453] On April 2017. See on RMOA: European Chemicals Agency, *Progressing together to identify substances of concern. Roadmap for SVHC identification and implementation of REACH risk management measures - Annual Report.* April 2017, ECHA-17-R-06-EN, pp. 25-32.

In order to further clarify the choice between restriction and authorization, I suggest that the RMOA tool is appended to the formal REACH toolbox. Moreover, the Commission should further elaborate on how to legally address the other ambiguities under REACH as well. This includes the role the substitution principle plays in the choice between the two instruments. This should create better clarity and predictability for stakeholders.

7.3.5 Interim conclusion

As can be concluded from Chapter 7.3, it is more challenging for recyclers to comply with the rules on authorization and restriction than for primary manufacturers. The obstacles that stand in the way for plastic recycling are actually quite similar for each instrument. They do not only relate to the information void that has also been discussed in view of the registration rules, but include procedural aspects as well, such as the ever-extending lists of restricted substances which leads to more and more legacy additives (which are, moreover, difficult to identify in the plastic waste). This example neatly reveals the friction between the application of the precautionary principle and the substitution principle in the plastic chain – of which the restriction and the authorization instruments under REACH are an expression – and the aim to increase plastic recycling in the EU, which are in principle both supported by the Circular Economy ideology.

The next Chapter expounds on yet another angle to plastic recycling in the Circular Economy: the international dimension of plastic recycling.

7.4 Transboundary movement of plastics: REACH leakage

This section identifies and discusses the obstacles for plastic recycling with regard to the transboundary movement of plastics.

7.4.1 Exporting hazardous waste outside the European Union

Exports of plastic waste outside of the EU are problematic. This is partially explained by the overall enforcement challenges of the Waste Shipments Regulation (WSR)[1454] (including fraud and misrepresentation), and partially by the confusing overlap between the Basel, EU, and OECD waste shipments regimes.

The EU's WSR is in part a stand-alone Regulation which regulates import and export of wastes within the EU (i.e. between Member States), and the implementation by the EU of the Basel Convention on the transboundary shipments of hazardous wastes and their disposal, as well as the OECD Council decisions on waste shipments. The Basel Convention[1455] at its core requires environmentally justifiable processing of hazardous wastes. See in this respect Article 4(8):

> *Each Party shall require that hazardous wastes or other wastes, to be exported, are managed in an environmentally sound manner in the State of import or elsewhere. Technical guidelines for the environmentally sound management of wastes subject to this Convention shall be decided by the Parties at their first meeting.*

In accordance with Article 4(10) Basel Convention, the State of export itself needs to ascertain whether a planned export will be processed in the State of destination in line with sound waste management principles. This duty of ascertainment cannot be delegated to either the State of transit or import, according to the provision which reads as follows:

> *The obligation under this Convention of States in which hazardous wastes and other wastes are generated to require that those wastes are managed in an environmentally sound manner may not under any circumstances be transferred to the States of import or transit.*

[1454] Regulation 1013/2006 of 14 June 2006 on shipments of waste, [2006] OJ L 190/1.
[1455] Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal of 22 March 1989, which entered into force on 5 May 1992.

The WSR, too, confirms that each Member State carries responsibility to ensure that wastes which are being transported, are processed in an environmentally-friendly way, from the moment of transport right through to final processing.

Specifically with respect to plastics waste, the most relevant entry under the WSR is entry B3010: Solid plastics waste. This entry is not preceded by an Asterix, meaning that unless the conditions included in the entry are fulfilled (see below), the waste concerned is not considered to be hazardous. In such case, the general ban on export of hazardous wastes to non-OECD countries does not apply, and within the EU, importing and exporting Member States have far less scope for refusing the shipment.

In its Frequently Asked Questions on the implementation of REACH,[1456] the European Commission has combined the provisions of Entry B3010 and the introduction to the Annex into 5 conditions:

> *Plastic waste can be regarded as plastic waste coming under entry B3010 if*
> *• it is scrap plastic of non-halogenated polymers and copolymers, cured waste resins or condensation products and certain fluorinated polymer wastes (i.e. perfluoroethylene/propylene (FEP) and certain perfluoro alkoxyl alkanes) or mixtures thereof;*
> *• it is not mixed with other wastes;*
> *• it is prepared to a specification;*
> *• it is not contaminated by other materials to an extent which*
> ° *increases the risks associated with the waste sufficiently to render it appropriate for submission to the procedure of prior written notification and consent, when taking into account the hazardous characteristics listed in Annex III to Hazardous Waste Directive 91/689/EEC; or*
> ° *prevents the recovery of the waste in an environmentally sound manner*

In case of doubt, the classification with the environmentally most interesting results (read: those which encourage refusal of export) must get priority.

It is clear that each of these conditions in and of itself creates a lot of regulatory fog, leading to diversified practice in the Member States and ultimately much wriggle room for operators to evade the application of the export regime when it comes to export of plastic wastes.

This is of particular importance because increasing amounts of plastic waste generated in the EU are being exported outside the EU.[1457] Once exported outside of the Union, and despite the intention of the WSR, the plastics wastes may be recycled and processed into new articles which can be imported back into the Union, *without* them requiring authorization: for imported articles, the substances listed in Annex XIV that are an integral part of articles do *not* require an application for authorisation, even if substances in imported articles may still be subject to restriction. This should be addressed because it places EU-based producers at a disadvantage as opposed to non-EU producers importing into the EU. Creating a level-playing field between EU-produced and non-EU-produced articles would seem important for the competitiveness of the EU economy.

> *Industry can and should help, but not at any cost. Too many times the ones that complied with the rules were those that had to undergo the strengthening of the law. The dissidents did not care or did not feel*

[1456] European Commission, Frequently asked questions on Regulation (EC) 1013/2006 on shipments of waste, September 2010, http://ec.europa.eu/environment/waste/shipments/pdf/faq.pdf, p. 10 (consulted on 22 December 2017).

[1457] IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, Final report, 2014, p. 200. For a few decades, the plastic waste had been transported to China for recycling. However, a new chapter has only recently been added to the EU-China relationship concerning plastics waste and recycling. As from January 2018, the Chinese government has banned the import of most types of plastic waste. See: WTO Notifications G/TBT/N/CHN/1211 of 18 July 2017 and G/TBT/N/CHN/1233 of 15 November 2017. This has a great impact on the practice in the EU, for new markets should be sought, not least within the EU itself. Besides the Circular Economy movement at large, this development has undoubtedly contributed to the adoption of the Commission's Plastic Strategy. See: European Commission, *A European Strategy for Plastics in a Circular Economy*, COM(2018) 28, p. 4.

affected, or managed to escape to a 'non-applicable' geographical or structural area. […] *Not mentioning the economic effects of REACH is deliberate. One should question if – on a global scale with REACH-like legislation being on the shelve in many non-EU countries – it would make sense for the REACH legislation not to authorize the use of a substance within the EU, but at the same time allow an article manufactured with that same substance to be imported.*[1458]

Using a climate change analogy, there is in other words great scope for 'REACH leakage'.[1459] Building on the CE Package, the Commission has in any case taken action in stepping up the enforcement of the WSR.[1460]

7.4.2 Importing (components of) articles into the European Union

Of further note is that the absence of a need for notification does not mean that there is no information requirement: there is a general duty under Article 33 REACH to communicate information (sufficient information, available to the supplier, to allow safe use of the article) on any SVHC in articles in a concentration above 0,1% w/w. The question arises, however, *how* the 0,1% threshold needs to be calculated when the components of an article are themselves articles (i.e., products composed of several articles). This issue has been resolved by the CJEU in 2015 (see below). It was, indeed, not only a problem for recyclers, but also for producers of articles in the EU that use predominantly virgin materials.[1461]

In the light of Articles 7(2) (notification of SVHCs in articles to the ECHA) and 33 REACH, there were dissenting views on the calculation method by some Member States. ECHA took the view that recyclers should calculate the concentration of SVHC on the weight of the whole article, whereas six Member States agreed upon a more stringent alternative, namely to calculate on the basis of the weight of the part of the complex article containing the SVHCs.[1462] The Commission and the ECHA had stuck to the first method,[1463] although the issue had not yet been firmly settled between the Member States back then.[1464]

Pursuant to the ECHA interpretation, plastic recyclers located in the EU were disadvantaged in comparison to non-EU recyclers by the ECHA formula, because they would needed to comply with the 0,1 % threshold for each article that is not composed of several articles and directly marketed. For importers of articles, on the other hand, it would be easier to stay below the limit for SVHCs, because the recycled material has already been processed by the plastic industry and they are commonly composed of several articles. Hence, the ECHA method allowed wriggling one's way out of the REACH requirements.

[1458] M. Butti and P. Heylen, 'A Business Strategy for Enterprises – A Practitioner's Viewpoint', in: D. Drohmann and M. Townsend, *REACH, Best Practice Guide to Regulation (EC) No 1907/2006 (*Hart Publishing, 2013), pp. 539-540.

[1459] This, despite the fact that REACH serves as a blueprint for international initiatives in relation to chemical regulation, and the regulation's impact on other jurisdictions. E. Fisher, 'The 'perfect storm' of REACH: charting regulatory controversy in the age of information, sustainable development, and globalization' (*Journal of Risk Research*, 8:4, 2008), pp. 554-555.

[1460] European Commission, *Report on the implementation of the Circular Economy Action Plan*, COM(2017) 33, p. 9. It did so by adopting an implementing act setting out a preliminary correlation table between customs and waste codes to help customs officials identify waste crossing EU borders illegally, for instance labelled as second-hand goods. Regulation 2016/1245 of 28 July 2016 setting out a preliminary correlation table between codes of the Combined Nomenclature provided for in Council Regulation (EEC) No 2658/87 and entries of waste listed in Annexes III, IV and V to Regulation (EC) No 1013/2006 of the European Parliament and of the Council on shipments of waste, [2016] OJ L 204/11.

[1461] B. Enderle, 'Substances in Articles', in D. Drohmann and M. Townsend, *REACH, Best Practice Guide to Regulation (EC) No 1907/2006* (C.H. Beck oHG, Hart Publishing and Nomos Verlagsgesellschaft mbH & Co, München, Oxford and Baden-Baden, 2013), pp. 260-262.

[1462] M. Hoppenbrouwers, 'The Story of the Button on the Jacket—Substances of Very High Concern in Complex Products' (*Journal for European Environmental & Planning Law*, 8:4, 2011), pp. 356-357.

[1463] See ECHA, *Guidance on requirements for substances in articles* (ECHA, 2:0, 2011), p. 20.

[1464] Both options have advantages and disadvantages. For a more extensive discussion concerning this topic, see: supra note 1462, pp. 353-371.

As announced, the CJEU ruled on this issue in 2015.[1465] The landmark judgement clarifies that the obligations under Articles 7(2) and 33 REACH also apply to articles which are present in complex products as long as these articles keep a special shape, surface or design or as long as they do not become waste (paras. 69 and 82). As explained above, this is a positive development considering the safeguarding of a level playing field for EU-based recyclers and non-EU-based recyclers. This is because the importer of a complex article must also be considered to be the importer of the component articles and must be subject to the same obligations as those to which manufacturers in the EU are subject in order to ensure genuine competition within the internal market. This is despite the difficulty for importers to obtain the required information from their suppliers established in those non-EU States. The simple unawareness of the presence of the substance and the trade secrecy are two reasons put forward in this respect. Difficulties of that nature do not, however, affect the interpretation of Article 7(2) REACH, the CJEU ruled.[1466]

7.4.3 Interim conclusion

The international dimension of plastic recycling concerns both EU waste law and REACH, and concerns both export and import. On the one hand, the export of plastic waste outside the EU is regulated by the WSR, which in essence allows non-hazardous waste to be exported if it will be recycled. On the other hand, the import of plastic non-waste is mainly regulated by REACH. Concerns may particularly be raised concerning the import of plastic articles made from recycled materials, because while importers of these articles are obliged to comply with the registration requirements, they are exempted from the authorization rules. This leads to REACH leakage in the sense that SVHCs could enter the Union through the backdoor.

7.5 Reflection: addressing a more general challenge

7.5.1 Recap of the case study and the preliminary conclusions

It had been explained in Chapter 4.3.4 on the motives and methodology for this case study that it is presumed in the CE Package that there are shortcomings in the overall legal framework for chemicals, more specifically in the interface between chemicals, product and waste legislation. Chemical recycling is a case in point. The case of plastic recycling is particularly emphasized in that respect and is, amongst others, for that reason also addressed in Chapter 7. Together with the WFD, REACH is right at the center of the debate on this transition between the waste stage/legislation and the resource stage/legislation because it most recycled plastics fall within the scope of REACH when it is recycled. As a consequence, recyclers should in principle meet the REACH requirements on registration, evaluation, authorization and restriction if they want to put their materials on the EU market, just like any other primary manufacturer would have to do. Apparently there are obstacles in place which hamper plastic recycling. In order words, it is a challenge for them to satisfy the demands under REACH. To address this problem, Chapter 7 identified and discussed the obstacles in place under REACH for plastic recycling, although the EU waste legislation was also part of the study to explain how this legal field contributes to plastic recycling.

The case study first ran over the life-cycle of plastics from a REACH and a WFD perspective separately, whereupon both perspectives were compared to look for any overlaps and obstructive or complementary aspects. Subsequently, the study zoomed in on three of the main instruments

[1465] Judgement of 10 September 2015, *Fédération des entreprises du commerce et de la distribution (FCD), Fédération des magasins de bricolage et de l'aménagement de la maison (FMB) v Ministre de l'Écologie, du Développement durable et de l'Énergie*, C-106/14, EU:C:2015:576.

[1466] Ibid., para. 68; and Opinion of Advocate General Kokott on 12 February 2015, *Fédération des entreprises du commerce et de la distribution (FCD), Fédération des magasins de bricolage et de l'aménagement de la maison (FMB) v Ministre de l'Écologie, du Développement durable et de l'Énergie,* C-106/14, EU:C:2015:9, paras. 71 and 89. See also: Judgement of 7 July 2009, *S.P.C.M. SA, C.H. Erbslöh KG, Lake Chemicals and Minerals Ltd and Hercules Inc. v Secretary of State for the Environment, Food and Rural Affairs*, C-558/07, EU:C:2009:430, para. 60.

under REACH to identify and discuss the specific obstacles for plastic recycling for those particular instruments. In this order, the instruments are: registration, and authorization and restriction. Finally, the obstacles for plastic recyclers with regard to the transboundary movement of plastics under REACH as well as EU waste legislation were talked over.

All things considered, this preliminary conclusion can be drawn that will be further discussed throughout this final part of Chapter 7: generally speaking, recyclers of plastic waste are indeed faced by more obstacles related to the registration of substances and the compliance with relevant authorizations and restrictions in comparison to primary manufactures. Most of these hurdles relate to the information void and thus to the uncertainty on the composition of pre-user waste and in particular of post-user waste – and legal clarity on the non-existence of non-plastic particles in chemical substances and on the non-riskiness of substances is precisely what is intended to be achieved by the instruments in REACH. The obstacles are prohibitive in the sense that it may stop the recycling industry from pursuing innovative activities in the area of plastic recycling; some entrepreneurs thrive on uncertainty and risk, while many others simply avoid it. In other words, one would wonder why recyclers are encouraged by EU and national waste policy and legislation and the CE Package to take the 'Circular Economy Recycling path', requiring investment in R&D and innovation, when plastics made from natural raw materials may lead to a similar but much easier result.

Building on this preliminary conclusion, the question arises whether plastic recyclers are excessively obstructed in their activities. Before moving to this conclusive analysis, the next section frames how regulators may regulate innovation and uncertainty. This provides a basis for the overall conclusion on how plastic recycling is obstructed by REACH and whether this is legitimized. Based on the outcome of this, recommendations can be made to the EU policy concerning the Circular Economy transition.

7.5.2 Framing regulating uncertainty and innovation

A challenge is to put in place rules that create space of innovations to bloom and can adapt to the increasing pace of new technologies and other forms of innovations. Literature and policy documents provide for some guidance as to how uncertainty and innovation could be regulated. In this respect, significant aspects that ought to be addressed are whether there are (other) regulatory considerations to be taken into account in enhancing eco-innovation through regulation, and the role environmental legal principles play in regulating uncertain risks. These two matters are discussed below in that order.

Eco-innovation: flexibility and barriers

The European Commission is also very much involved in the debate on how to regulate uncertainty and innovation through the Eco-innovation Action Plan.[1467] This policy framework focuses on the specific bottlenecks, challenges and opportunities for achieving environmental objectives through innovation. Put differently, amongst others, it searches for regulatory ways to help the potential of new technologies flourish by bridging the gap between innovation and the market through the acceleration of market uptake while helping safeguard the environment and human health protection.[1468] The 2011 Eurobarometer survey on the attitudes of SMEs to eco-innovation, providing insights in how they perceive obstacles and stimuli for eco-innovation, points out that the interviewees generally claim that besides uncertainties about financing,[1469] on the one hand, the uncertain demand from the market and the uncertain return on investment or too

[1467] See in particular: European Commission, *Innovation for a sustainable Future - The Eco-innovation Action Plan (Eco-AP)*, COM(2011) 899.
[1468] See for a further explanation and definition of eco-innovation Chapter 2.2.3-B.I.
[1469] The lack and/or hesitation of financing opportunities in business R&D investments, either for small or larger firms, are generally seen as a crucial barrier for bringing innovations to the market. Changes in the regulatory regime are presumed to be required and are therefore addressed by the Innovation Union Flagship Initiative. European Commission, *Europe 2020 Flagship Initiative Innovation Union*, SEC(2010) 1161, pp. 16-17.

long a payback period for eco-innovation are two of the *main barriers*.[1470] Interestingly, existing regulations and structures not providing incentives to eco-innovate is ranked averagely, despite the fact that the Commission actually acknowledges that a regulatory framework could, indeed, create unwanted lock-ins, for example into insufficiently ambitious or outdated technologies.[1471] On the other hand, the survey also shows that high material prices, good access to external knowledge, and new and existing regulations and standards are amongst the *main drivers*.[1472] Using law could help in addressing the obstacles mentioned, namely by creating legal and production certainty in those areas.

It is therefore not surprising that the use of environmental policy and legislation is recognized as 'Action 1' – the first action point out of six. The Eco-innovation Action Plan fleshes this out in practical terms by stressing that when designing, redesigning and implementing environmental legislation, attention should be paid to these issues:

> *(a) the potential of innovation for improving the environment for example through allowing for flexibility in prescribed technological solution or by providing room for more stringent and robust environmental standards (in order to avoid technological lock-ins);*
> *(b) the barriers to innovation within environmental legislation and its implementation;*
> *(c) the need to facilitate the emergence of commercially viable new products or practices;*
> *(d) the need to accelerate the uptake of eco-innovation in all policy areas.*[1473] (emphasis added)

As regards the first point, the level of rigidity of law has always been a point of discussion in governmental regulation, because it touches upon one of the essences of regulation, i.e. on the assurance of legal certainty and predictability and on the avoidance of unnecessary burdens.[1474] Apparently, eco-innovation requires some degree of flexibility within the boundaries of legal certainty, although it is hard to say anything decisive on the level of stringency. Generally speaking, assessing the complex relationship between innovation and regulation is a case-by-case exercise.[1475] In any case, less regulation does not necessarily equal more innovation, nor is the reverse true.

The meaning of the second point is less clear, because it does not indicate what kind of barriers are meant. The Impact Assessment accompanying the Action Plan explains Action 1 by providing for a number of broadly phrased and maybe rather self-evident operational levers.[1476] On the whole, one can conclude that the *'barriers to innovation within environmental legislation'* will have to be sought in the entire panoply of EU environmental law and, as the EU

[1470] European Commission, *Innovation for a sustainable Future - The Eco-innovation Action Plan (Eco-AP)*, COM(2011) 899, pp. 4-5.
[1471] Ibid., p. 7.
[1472] Ibid., pp. 4-5.
[1473] Ibid., pp. 6-8.
[1474] These regulatory aims are self-evident and have also been stressed in the Better Regulation Programma, in: European Commission, *Better regulation for better results - An EU agenda*, COM(2015) 215, p. 4.
[1475] See also: European Commission, *Better regulations for innovation-driven investment at EU level*, Commission Staff Working Document 2016, pp. 5 and 11; and J. Pelkmans and A. Renda, *'Does EU regulation hinder or stimulate innovation?'* (CEPS Special Report, 96, 2014), pp. 26-27, see also: p. 8.
[1476] One of the self-evident levers particularly significant to Action1 is, for example: 'putting in place an eco-innovation friendly environmental regulatory framework'. European Commission, *Impact Assessment – Accompanying the document: Innovation for a sustainable Future - The Eco-innovation Action Plan (Eco-AP)*, Commission Staff Working Document, SEC(2011) 1599, see primarily pp. 41-42. For the rest, see particularly the parts where Action 1 is discussed in view of Options 3 and 4 in more detail (the Impact Assessment assessed five potential options, but Options 3 and 4 were considered best to boost eco-innovation). However, a useful, more concrete lever that has not yet been highlighted in this Chapter is to strengthen eco-innovation capacities of SMEs through increased networking and the spread of best practice. This level reflects the idea in transition management that regime change particularly happens from a bottom-up approach; SMEs are important actors in the Circular Economy transition because they often come up with unconventional ideas. Moreover, by networking and sharing this knowledge, existing locked-in structures and technologies could eventually incorporated in a (new) regime.

advocates,[1477] considering a broad concept of eco-innovation. The great variety of barriers is fortunately much better illustrated by a policy document that combines the insights of the Flagship Initiative Innovation Union and the BRP. According to the document,[1478] the possible regulatory obstacles are:

I. *The regulatory framework (i) is de jure or de facto prescriptive in technology choice and discourages different solutions and new entrants; (ii) establishes a level of stringency which is inconsistent with available cost-efficient technology, hence delaying investment and deployment of solutions or (iii) allows too frequent changes in standards which may also limit the incentive for investment if a technology is relatively recent*. […]
II. *Regulatory frameworks not sufficiently friendly for innovation can be identified when: (i) the regulatory environment is not fully interoperable across sectors and blocks co-operation and the development of open innovation based on multi-technology sourcing; (ii) regulations which are technology specific are not adapted in a timely way to technological progress or (iii) inconsistencies between regulations give rise to legal uncertainties and unnecessary additional compliance costs.* […]
III. *Problems in the implementation of innovation-friendly regulations can also discourage investment and limit the marketing of innovative products, when: (i) legislation is not uniformly or not appropriately implemented across Member States; or (ii) European and National legislation duplicates, overlaps or is not fully consistent or repetitive controls and authorisation procedures are maintained.* […]
IV. *If no EU legislation exists in a given field, barriers to the internal market may arise or there may be uncertainty for investment in innovation.* […]

The document further stresses that it is necessary to analyze the (case-by-case) business needs in specific regulatory contexts linked to innovative solutions '*with appropriate risk management'* in order to identify possible improvements in the impact of regulation on innovation and growth**.** Risk management should thus be taken into account when trying to enhance innovation through regulation. This directly links the policies on eco-innovation to the risk approach and the precautionary principle, as will be discussed below.

Risks: the precautionary and substitution principles

As regards the environmental principles relevant to the regulation of uncertain risks posed by chemicals on the environment and human health, Chapter 5.2.2-B already extensively explained that the risk approach and the precautionary and the substitution principles play crucial roles. It is appropriate to dwell on these issues a bit more in this particular context, though, but without going into excessive details.[1479]

'Risk' relates to the actual ability of hazards to cause harm. A risk assessment thus assesses the likelihood and level of exposure of the hazards to humans and the environment under specific circumstances. A risk assessment is highly complex, as there are many factors that make it difficult to determine the damages risks may cause (e.g. localisation, frequency, duration, extent, nature and scale). Uncertainty may touch upon all these factors, because if science cannot fully establish the causation between the activity/substance/product and effect, it is replaced by a relationship of 'possibility, eventuality or plausibility'. Evidently, these assumptions could influence the outcome of the risk assessment significantly. Science in itself has flaws, too, when relied on in the risk assessments. To name just a few: the variety and boundaries of methodologies and disciplines, the use of expertise and assumptions, the use of out-of-date information, the enduring existence of contradictions, the focus on well-known hazards instead of possible hazards, inertia, and arguably the narrow (quantitative or economic) focus.[1480] The complexities of

[1477] See for definition of eco-innovation Chapter 2.2.3-B.I. See also the broader concept of 'innovation': European Commission, *Europe 2020 Flagship Initiative Innovation Union*, SEC(2010) 1161, p. 9.
[1478] European Commission, *Better regulations for innovation-driven investment at EU level*, Commission Staff Working Document 2016, see in particular pp. 10-11.
[1479] For that, Chapter 5.2.2-B should be consulted. See also: *Flowchart 7* in the Annex to this dissertation.
[1480] R.E. Lofstedt, 'Risk versus Hazard – How to Regulate in the 21st Century' (*European Journal of Risk Regulation*, 2, 2011), p. 154; N. de Sadeleer, 'The Precautionary Principle in EC Health and Environmental Law' (*European Law Journal*, 12:2, 2006), pp. 155-156; P. Grandjean, 'Science for precautionary

ecosystems, societal structures and material-cycles are also hard to study and to fully understand.[1481] The inevitability of the presence of uncertainty in science – on which these risk assessments are based – is hard to shy away from. That science is nonetheless decisive in the creation as well as the justification of secondary environmental legislation is needless to say, if only it is to say that there are scientific uncertainties. As De Sadeleer neatly points out, this 'marriage' between uncertainty and regulation is not free from strife:

> *legal rules are meant to provide predictability, yet nature is unpredictable; while the jurist seeks certainty, the scientist points to the uncertainty inherent to ecological risk.*[1482]

Particularly in regulating chemicals, there are many uncertain risks that regulators need to deal with. The precautionary principle should guide them in making management decisions on those uncertainties. In brief, the precautionary principle allows protective measures to be taken in environmental decision-making when there is no scientific certainty that harm to the environment or human health will occur. Precautionary action thus reconciles science that reveals the scientific uncertainties with normative decision-making. Importantly, risk management measures must be subject to review taking into consideration new scientific findings, bringing legislation up-to-date by responding to the dynamics of scientific and technological development. Ultimately, precautionary measures could result in the substitution of certain substances by less risky substances, pursuant to the substitution principle. This should enhance innovations because manufacturers and producers are encouraged search for suitable alternatives.

In sum, scientific uncertainty on the ability of hazards to negatively impact the environment and/or human health is widespread. To manage these unknown risks, precautionary measures are legitimized that may also aim for the substitution of the plausible risky chemicals in the long run. All in all, regulating risks is one of the components to enhance eco-innovation through legal means. The Eco-Innovation Action Plan and associated policies identify a number of other focus areas and practical levers to boost eco-innovation and to clear any obstacles. Regulation should in any case create legal certainty while at the same time provide for some degree of flexibility to experiment, not least for SMEs, as such a flexible approach could eventually lead to the market uptake of innovations – or at least of some.

7.5.3 Balancing risks and quantity: what are the options?

Taking the encouragement of recycling as the main objective for potentially adapting REACH, which thereby sheds a different, more 'waste policy' light on that particular framework, the following sections discuss whether plastic recycling is 'excessively' frustrated while taking into account the need to secure a low-risk plastic-cycle, as this is advocated by the Circular Economy concept just as much as circularity through recycling.

A. Regulating the risk-cycle: cocktail effects and many more shortcomings

Following the angle of the Circular Economy concept that encourages circularity, one could argue that the same requirements for recyclates should be requested as for virgin plastics, because recycled plastics are just as much useful resources as natural raw materials. The *idea* is to treat them the same, whereas in *regulatory reality* this is not the case – the case study of Chapter 7 made this very clear. The reason for this disparity can be found in the lack of information on the

---

decision-making' in: European Environment Agency, *Late lessons from early warnings: science, precaution, innovation* (EEA, 2013), pp. 623-642.

[1481] Scientific knowledge is much more advanced in the field of human health than in the field of the environment. Hence, in the latter case, the complexities bring about more uncertainties: the ecological risks are harder to study and to predict (e.g. the reaction of a substance on ecosystems or climate change).

[1482] N. de Sadeleer, 'The Precautionary Principle as a Device for Greater Environmental Protection: Lessons from EC Courts' (*Review of European Community and International Environmental Law*, 18:1, 2009), p. 4; and supra note 1480 'The Precautionary Principle in EC Health and Environmental Law', p. 144.

input material in the recycling process, which means, as a result, that it is very difficult to comply with the registration and precautionary rules under REACH.

As regards the precautionary measures (i.e. the authorizations and restrictions), they have greatest impact at the very beginning of the chemical chain, namely to lower the risks posed to the environment and human health. This should ensure that the entire chemical chain is safeguarded from those risks. The point where the chemicals enter the market thus functions as some sort of controllable gateway to another risk-cycle. If one imagines REACH as a well-functioning framework, where human health and the environment are only faced by predefined and to a certain point managed low-risks, this would be the situation that can be weighed up against the advantages of plastic recycling. In that case, one could possibly argue that the risk measures should be 'loosened up' a bit in certain circumstances given that quantitative recycling also plays a major role in the material-cycle. However, before fleshing out this attractive idea in subsequent sections, this section first highlights certain general flaws in REACH's approach to lower the risks present in the chemical risk-cycle. This is important, because it would add another layer to the debate on whether plastic recycling is indeed excessively disadvantaged. On top of the presence of legacy additives,[1483] there are more problems with the risk-cycle that are arguably not sufficiently tackled by REACH. In other words, concerns can be raised about the adequateness of risk control in REACH. These problems are all related to what extent the unknown risks are addressed.

REACH is principally a risk management measure: scientific knowledge underpins the framework. It includes several provisions requiring hazard assessments, risk-dose assessments, exposure assessments, dissemination of information... The incorporation of the precautionary principle in REACH is deemed necessary in order to respond to the complexity of chemicals and their unknown risks. This does not mean, however, that REACH is designed to establish or confirm *real cause-effect relations in a scientifically absolute manner*.[1484] The immediate problem to be addressed is that REACH is not very effective in assessing synergisms and combined effects – also called 'cocktail effects' – of risky chemicals. Put differently, the accumulation of risks is not well addressed under the REACH framework.[1485] This has several interrelated reasons.

This weakness is first and foremost attributable to the fact that REACH is designed to address each substance separately or to a lesser extent in mixtures. This approach allows that the accumulation of risks is not well taken into account.

Secondly, the REACH exposure scenario instrument, which is at the core of the process of carrying out a chemical safety assessment and very significant in gathering data intended for risk management decisions,[1486] underestimates the *real* exposure situations, revealing a gap between reality and REACH's objective (to establish an acceptable risk-cycle). Generally, the reason for underestimation is that REACH does not include all *indirect* exposure sources,[1487] such as the

[1483] Legacy additives are previously allowed substances that are now restricted but are still around in society and will consequently become waste one day. This is discussed in Chapters 7.3.2 and 7.3.3.
[1484] L. Bergkamp and M. Penman, 'Conclusions', in: L. Bergkamp (ed.) *The European Union REACH Regulation for Chemicals. Law and Practice* (Oxford University Press, 2013), p. 421.
[1485] Regarding the accumulation of risks (including non-chemical stressors and unintended risks), one could argue that the assessment and treatment thereof are better addressed in other more specific contexts than REACH, because REACH is essentially about *chemicals* (i.e. substance-based, see below). An overview of the reasons for and the difficulties of an 'integrated treatment of risks' in REACH are given in: T. Assmuth, M. Hilden and M. Craye, 'Beyond REACH: roadblocks and shortcuts en route to integrated risk assessments and management of chemicals' (*Science of the Total Environment*, 2010), pp. 3956-3959. This argument feeds the debate on the limits of REACH's scope. See also: J. Lee *et al*., 'Childhood exposure to DEHP, DBP and BBP under existing chemical management systems: A comparative study of sources of childhood exposure in Korea and in Denmark' (*Environment International*, 63, 2014), pp. 88-89; and J. Lee *et al.* 'The influence of resource strategies on childhood phthalate exposure-The role of REACH in a zero waste society' (*Environment International*, 73, 2014), pp. 313 and 318.
[1486] See Annex to this dissertation for *Flowchart 7*.
[1487] See Section 5 Annex I REACH.

import of articles made from SVHC contaminated recycled plastics (see below) and the use of substances from multiple sources (i.e. the accumulation of risks).[1488]

Thirdly, the volume-based approach adopted in REACH is problematic. The framework presumes that the quantities in which substances are produced, used or imported correlate to their exposure, which, in turn, correlates to the negative impacts on humans or the environment. The EU regulator therefore decided to include volume (t/y) thresholds for certain procedures to set in motion.[1489] These volume-based thresholds clearly do not address all risks: e.g. information is not gathered through registration on chemicals in quantities *below* one tonne a year, which can be particularly troublesome in the case of nano-scale chemicals,[1490] and CSAs are not required for chemicals in quantities *above* 10 t/y.[1491] Whether this volume-based approach is a proper application of the precautionary principle can be interpreted in two ways. On the one hand, not all uncertain risks are covered by the provisions on registration. From an environmental and human health perspective this aspect is open to criticism.[1492] On the other hand, leaving a certain amount of chemicals untouched by these provisions is an expression of the proportionality principle, which balances the environment and health concerns with other interests.[1493] For most SMEs, for example, the registration burdens are reduced in that way. Either way, the fact is that certain volumes are exempted from the rules and that, thus, it cannot be disputed that the risks associated with this volume are neglected and can still pose a threat to the environment and humans on an accumulative basis, particularly if accumulated and 'tramping' throughout the plastic life-cycle.[1494] The Commission might therefore need to reconsider the level of some of the thresholds.

Fourthly, recyclers sometimes have to deal with yet another information gap. This is for example the case for some of the cubitainers (or 'intermediate bulk containers', IBCs) that end up at the recycling facility. IBCS are made of non-risky plastic and are used to store and transport

---

[1488] With regard to the specific issue of the risk exposure assessment in REACH, and the link to other regulatory management tools and national regulations, see J. Lee *et al*., 'Framework for combining REACH and national regulations to obtain equal protection levels on human health and the environment in different countries – Comparative study of Denmark and Korea', (*Journal of Environmental Management*, 125, 2013), pp. 106-116.

[1489] F. Fleurke and H. Somsen, 'Precautionary regulation of chemical risk: How REACH confronts the regulatory challenges of scale, uncertainty, complexity and innovation' (*Common Market Law Review*, 48, 2011), pp. 372-373.

[1490] As regards nanomaterials, the emerge and ever-expansion of nanotechnology (nanomaterials are substances with particle sizes between 1-100 nanometres) is yet another challenge for plastic recycling, because it directly relates to the use of innovative but maybe risky materials that will end up at the waste treatment facilities at the end of their lives. Uncertainty and innovation clearly set the tone for regulating nanomaterials, because the use of such materials is surrounded by scientific uncertainties about the eventual environmental and health risks, while, at the same time, they offer many benefits to society and will for that reason certainly not disappear. Nanomaterials are sometimes also being mixed with plastics, endowing them with new properties. For this reason, plastic recyclers should also deal with regulation for nanomaterials. In the case of nanomaterials, the regulation which after a certain time took place was effected by placing 'nano-hooks' in existing regulation, amongst which REACH and the Biocidal Products Regulation, rather than by making a tailor-made 'nano-law'. Put differently, the existing legal frameworks were politically considered adequate to deal with potential risks posed by nanomaterials, which led to the application of an incremental approach. (Similar developments are taking place for shale gas regulation. See for a discussion on this e.g. L. Reins, 'European minimum principles for shale gas: preliminary insights with reference to the precautionary principle' (*Environmental Liability*, 2014), pp. 16-27). This fragmentational regulation of nanomaterials are arguably another obstacle to plastics recycling.

[1491] F. Fleurke and H. Somsen, 'Precautionary regulation of chemical risk: How REACH confronts the regulatory challenges of scale, uncertainty, complexity and innovation' 48 *Common Market Law Review* (2011), p. 372.

[1492] Supra note 1484. See also on this matter: ibid., pp. 376-379, where the authors state amongst others that it is actually an over-simplification, because there are special mechanisms that are set in motion regardless of volume, such as SVHC authorisation.

[1493] Ibid., 'Precautionary regulation of chemical risk: How REACH confronts the regulatory challenges of scale, uncertainty, complexity and innovation', p. 391. It can further be seen as a way to endeavour regulatory-efficiency (p. 277).

[1494] So-called 'tramp elements', which are unwanted elements in a cycle, are an increasing threat to the anthroposphere and environment. U. Kral, K. Kellner and P. Brunner, 'Sustainable resource use requires "clean cycles" and safe "final sinks"' (*Science of the Total Environment*, 2013), p. 820.

toxic fluids and bulk materials, such as ink, paint thinners and other solvents. The problem is that these toxic substances are gradually absorbed by the cubitainer. Once absorbed, they stay inside the matrix of the plastic. Evidently, these IBCs are hazardous waste when they fulfill the criteria of Article 3(2) in conjunction with Article 7 and Annex III WFD and Decision 2000/532/EC, and should therefore be treated accordingly. In practice, they could either report the waste as being hazardous or could (possibly falsely) hold on to the product's composition *before* the contamination took place, with the probability that these hazardous plastics enter the plastic chain via recycling (if the input or output material of a recycling plant has not been safeguarded properly or if the plastic waste items are not suspicious – which, admittedly, is in the case of IBCs not very convincing). Besides, the final holders of the cubitainers do not know whether the IBCs should indeed be considered hazardous as they do not know to what extent the hazardous substances are absorbed.[1495] This example of the IBCs shows that recyclers also have to deal with plastic waste that does not correspond anymore to the waste product's original non-hazardous composition. The problem for recyclers is thus that their input material could be unexpectedly posing risks to the environment and human health. Typically this concerns packaging.

Fifthly, risky substances are also included in the risk-cycle via the transboundary movement of plastics, such as through the imported articles which are exempted from the authorization rules (see Chapter 7.4.1) or through imported articles containing tramp elements below the many volume-based thresholds in REACH (see above). This shows that the EU is not some sort of fortress where everything is successfully controlled: the risk-cycle in the Union is part of a global risk-cycle. This manifestation requires not only an international approach to the use of chemicals as such (which is by the way not the case), but also, for example, an international approach to the involvement of recyclers in the design stage of products and in waste management in general. The accumulation of risky substances in the EU is thus also 'supplemented' by these imported articles.

All things considered, when balancing the hurdles recyclers need to take against the objective to create an as much as possible risk-free material-cycle, one should take into account that REACH is not perfect either; various, accumulated risks are not sufficiently addressed under REACH. Against this background, it could be argued that the current rules under REACH should at least be retained in consideration of the precautionary principle, particularly considering the role recycling plays in the accumulation of the risks, which is apparently not sufficiently regulated. It could even be argued, therefore, that, in the light of this flaw, REACH requires even stricter requirements on the use of risky substances to make the material-cycle as risk-free as possible. Taking into account the accumulating risks would also be legitimized on the precautionary principle. It is recommended to further study the opportunities under REACH to address the accumulation of risks under the umbrella of the CE Package, while, amongst others, taking into account the additional and maybe unattainable work inserting such a new approach in the REACH framework would cause.[1496]

[1495] Although those IBCs are subject to a marking system, also called the 'UN certification', it could still be very hard to tell whether such products are contaminated or not. Details on the marking system can be found in the UN Economic Commission for Europe's European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR). The consolidated version is applicable as from 1 January 2013. See http://www.unece.org/trans/danger/publi/adr/adr_e.html (consulted on 22 December 2017). Alternatively, one can use ISO 13274:2013(en).

[1496] To make REACH more workable, it is suggested that REACH should move away from the use of generalized checklist approaches such as in the case of the exposure scenarios instrument, to a more intelligent and pragmatic manner of data gathering and risk management. This includes combining exposure and hazard data effectively and trying to group chemicals, resulting in a 'category approach' according to which the risk assessment of individual chemicals is abandoned (a chemical category is '*a group of two or more substances that have or are expected to have similar structural, chemical and toxicological characteristics'* p. 75). See in this respect: G. Schaafsme, E.D. Kroese, E.L.J.P. Tielemans, J.J.M. Van de Sandt and C.J. Van Leeuwen, 'REACH, non-testing approaches and the urgent need for a change in mind set' (*Regulatory Toxicology and Pharmacology*, 53, 2009), pp. 70-80. The study does not, however, address how the category approach relates to or could contribute to addressing the problem of the accumulation of risks. This may well be included in a study

B. Room for R&D in REACH

Returning to what has been suggested in Section A: one could argue that REACH should be 'loosened up' in certain circumstances given that quantitative recycling also plays a major role in the material-cycle next to the creation of a low-risk and as homogeneous as possible material-cycle (i.e. through the mitigation of risks and the production of material that has an acceptable level of non-plastic elements). Based on Chapter 7.5.2, this idea can be supported by the advice to allow for flexibility in technological solution and to provide room for more stringent environmental standards in order to avoid technological lock-ins, and – by the same token – the advice to avoid regulatory frameworks that discourage different solutions and new entrants, and that establish a level of stringency which is inconsistent with available cost-efficient technology.[1497] The fact that the conclusion drawn in the previous sections indicates that REACH does not sufficiently address the accumulated risks, evokes a different point of view than initially taken. This is a factor that should be taken into account when discussing the possibilities to ease off the framework to some extent for recycling purposes.

When having a closer look at REACH, it appears that the framework already contains a number of provisions on R&D that provide several, sometimes volume-based and/or time-limited exemptions for research-orientated companies engaging in Research and Development (R&D). While the rules on the information down the supply chain remain obligatory when applicable,[1498] certain exemptions are laid down for the registration, restriction and authorisation requirements (Articles 9 (registration), 56(3) (authorization) in conjunction with Annex XIV and 67(1) in conjunction with Annex XVII (restriction) REACH).[1499] Based on Article 3(22)-(23) REACH, R&D can be divided in two R&D categories to which the exemption rules refer: 'product and process orientated research and development' (PPORD) and 'scientific research and development' (SR&D). They mean respectively:

> *any scientific development related to product development or the further development of a substance, on its own, in mixtures or in articles in the course of which pilot plant or production trials are used to develop the production process and/or to test the fields of application of the substance;*[1500] [and] […]
> *any scientific experimentation, analysis or chemical research carried out under controlled conditions in a volume less than one tonne per year;*[1501]

Overall, despite the fact that SR&D is limited to volumes less than one tonne per annum, the scope of it is broader than of PPORD, because SR&D more generally applies to experimentation, analysis and research. The ECHA points out in this respect that, therefore, what would be 'PPORD below 1 tonne per year' is actually also SR&D.[1502] In other words, there is more allowed

---

on how to change REACH to address the accumulation of risks, as the category approach could reduce the potentially rising burdens relating to risk assessment and management.

[1497] See Chapter 7.5.2 (heading 'Eco-innovation: flexibility and barriers').

[1498] See Articles 31-32 REACH on the SDSs and other information required.

[1499] See for the general provisions: Recital (28) and Article 3(22)-(23) REACH). See for the specific provisions. Additionally, R&D has also consequences for the CLP Regulation. The obligations for substances used in R&D are all summed up on pp. 31-33 of the ECHA guidance document, which is useful for plastic recyclers to get an overview of the procedural steps they need to take.

[1500] The ECHA further clarifies that the scope of PPORD activities is very wide, and includes *'any scientific development of a substance consisting of, for example, campaign(s) for the scaling-up or improvement of a production process in a pilot plant or in the full-scale production, or the investigation of the fields of applications for that substance, falls under the definition of PPORD. This applies irrespective of the tonnage involved and whether the substance is a new or an already existing substance.'* ECHA, *Guidance on Scientific Research and Development (SR&D) and Product and Process Orientated Research and Development (PPORD)* (ECHA, 2.0, 2014), pp. 9-10.

[1501] The ECHA further clarifies that SR&D may include *'any experimental research or analytical activities at a laboratory scale such as synthesis and testing of applications of chemicals, release tests, etc. as well as the use of the substance in monitoring and routine quality control or in vitro diagnostics at a laboratory scale under controlled conditions.'* Ibid., p. 9.

[1502] Ibid., p. 10.

for volumes below 1 tonne than for volumes above 1 tonne. For this reason, the PPORD rules are clarified in more detail below. It is also important to point out in this respect that the ECHA specifically stresses that the development of recycling technologies and the development of new substances or products, including mixtures and articles, could take advantage of the PPORD exemption rules. The question is, however, whether the companies involved in plastic recycling would end up disappointed, as standard SMEs are not necessarily considered 'research institutions'.[1503]

As for the authorization rules, authorization is required for a substance listed in Annex XIV and used for PPORD *unless* it is exempted. Restrictions under Annex XVII REACH, on the other hand, apply to PPORD by default *unless* the restriction is explicitly exempted in the Annex, and if so, the maximum quantity exempted from the restriction.

To benefit from a PPORD exemption rule for registration, the manufacturer or importer of the substance (alone or in mixtures) or producer of the articles must submit specific information on the identification, classification and calculation of the substance to ECHA.[1504] Furthermore, it is extremely important to note that this exemption requires that it is forbidden to make PPORD substances (on their own, in a mixture or in an article) available to the general public at any time,[1505] and that it must be ensured by the notifier that the *remaining* quantities are recollected after the end of the exemption period (which is generally five years, but which can be extended).[1506]

What happens with the PPORD substances that have become waste has not explicitly been regulated. This is highly questionable in view of the recycling aims of EU waste legislation and of the Circular Economy policy, as these 'PPORD experiments' could exert pressure on the material-cycle just as the pressures that have been discussed in Chapters 7.2-7.4 and 7.5.3-A. Fortunately, however, the ECHA *may* decide to impose additional conditions aiming to ensure that the substance, mixture or article will only be handled in 'reasonably controlled conditions'.[1507] For example, a condition could be: to require that the notifier should ascertain proof that the PPORD quantities are traceable; to provide assurance that the substance will be used in accordance with the requirements of legislation for protection of human health and the environment; or to implement other conditions, as appropriate and on a case-by-case basis, if risks from using the substance are identified relevant for each life-stage of the substance. Although these 'reasonably controlled conditions' could thus include specific conditions that would improve recycling practices, there is no legal obligation under REACH for the ECHA to create them. Both for SR&D and PPORD, this should be considered.

In addition to this opportunity especially created in the REACH framework for R&D in materials and technologies, another complementary route worth considering is the creation of EPR schemes – an instrument that has been given shape by the WFD. For example, these schemes could require from the waste producers to set up special agreements with specific waste treatment facilities specialized in dealing with 'experimental' waste posing certain (unknown) risks to the environment and human health – if there are any. Despite increasing the burden to recyclers in this way and stretching the degree in which sensitive information should be shared with the waste facility, it could be useful in order to control the potential risks and, thus, not to contaminate the risk-cycle any further. While deploying the EPR concept in this way could indeed bridge the chemical and product legislation with waste legislation, a considerable limitation is that EPR schemes are introduced by the Member States; the WFD merely provides for guidance as to how Member States could implement such schemes.

[1503] Ibid., p. 9.
[1504] Article 9(2) REACH.
[1505] According to Article 9(4) REACH, the notifier should carry out the PPORD activities himself or in cooperation with listed customers.
[1506] Any other quantity of the same substance not used for PPORD is subject to the general registration obligations.
[1507] Article 9(4) REACH. See for example for conditions that may be required: supra note 1500, pp. 29-30.

In conclusion, it is clear from the case-study on plastic recycling that the regulation of uncertainty and innovation challenges the existing regulatory framework, as REACH, like all other legislation, tries to create legal certainty. By combining these two objectives, REACH establishes a legal area where recyclers can experiment. This has a positive as well as a negative consequence for the Circular Economy: on the one hand new technologies and materials could be developed by recyclers and primary manufacturers, while, on the other hand, these newly created materials could end up at the recycling facility once they have been discarded. The latter issues should therefore be addressed, through the REACH framework and/or the WFD.

This final consideration touches upon a very urgent challenge that has been a constant factor throughout Chapter 7 but which has not yet been discussed so far: i.e. the fact that recyclers do not have much to say about the *composition of the waste streams* they receive. The next section will further reflect upon this challenge, firstly by introducing the problem in more detail.

C. Life-cycle thinking to enhance better recycling: back to the drawing board

A critical reflection can further be made regarding the application of life-cycle thinking in the case-study on plastic recycling. As we have seen from Chapter 7.1, both REACH and the WFD predominantly depart from a seemingly different perspective in the life-cycle of a material: the first from the manufacturing stage whereupon products are put on the market, whereas the latter from the waste stage after which a new life ought to begin through recycling where other preceding waste management and treatment options (would) have failed to deliver. However, both perspectives come together in 'recycling', as the final recycling process can also be legally interpreted as the manufacturing of substances and/or the production of articles. In that respect, recycling 'bridges' the two regulatory frameworks (in the case of plastic waste *not* with the help of EU EoW criteria, because they have not yet been adopted). However, learning from what has been clarified in Chapters 7.2-7.4, recyclers encounter many obstacles to the REACH registration, authorization and restriction requirements, the lack of information being the main reason for these obstacles. These obstacles make it difficult to be 'REACH proof', which is grounded on risk management but which simultaneously entails additional, burdensome efforts for recyclers to compete with primary manufacturers and producers. I have stressed this legal challenge throughout the text. It could be argued that the obstacles to plastic recycling create legal uncertainties and give rise to superfluous additional compliance costs, which can be regarded as a barrier to innovation.[1508]

Besides creating a certain space where recycling facilities (and primary companies and research institutes, both potentially using recycled materials) could experiment with new materials and technologies, i.e. where there is a legally delineated room for uncertainties and innovations, as discussed in Section B above, the Circular Economy concept provides for another solution through the concept of life-cycle thinking that would facilitate innovation, as well as improve the opportunities for them to be compliant with REACH: recyclers should be able to influence the decision making long *before* the waste stage of a material, namely at the design stage. As has also been the starting point for Chapter 5 of this dissertation: it has been estimated, after all, that more than 80 % of all environmental impacts caused by a product is determined at the design stage. Life-cycle thinking preaches precisely this: to consider the entire life-cycle of a material and address the environmental and human health impacts in the material-cycle where this is best. This requires cooperation between the different stakeholders along the whole loop,[1509]creating bridges between life-cycle stages. A legal obligation to involve recyclers at the design stage would be a powerful lever to realize that the recycling industry has more to say about the composition of the waste streams they receive.

By incorporating the views of the recycling industry into product design, it might well be that recyclers are no longer falsely considered the sole boogeyman of the Circular Economy in relation to the REACH framework. Put differently, where recyclers now bear the greatest responsibility

[1508] See Chapter 7.5.2 (heading 'Eco-innovation: flexibility and barriers').
[1509] This is something that is also advised in transition literature. See Chapter 4.1.

for manufacturing 'REACH proof' recycled materials, which is particularly for them a hard nut to crack given the information void they need to deal with, they should actually share the burden of compliance with the entire loop, primarily with the actors involved at the very beginning of the material-cycle using primary and/or recycled materials. What the recycling industry would probably try to do in this 'meddling' of recycling issues into the first stage of a material life-cycle is creating *volume* as well as *quality* because they need both: volume to have business and quality to add value to their business. Generally speaking, one could argue that recyclers are in a good and crucial position to handle, because they inherently have a broad vision, merging both objectives; they are more generalists than primary manufacturers – so to speak – as they are confronted with all types of plastics and materials, whereas primary manufacturers are specialists focusing on specific substances and mixtures.

Based on these two objectives (volume and quality), it would not be surprising that recyclers will put great efforts in filling the information gaps hindering them in their recycling processes. In this respect, one could think of pushing for the manufacturing and use of more homogeneous materials, though without requiring specific technologies or materials for innovation reasons, and taking into account the accumulation of risks that are not yet sufficiently addressed under REACH (see Section A), which thus goes beyond the REACH compliance issue but more into the broader vision of the Circular Economy. Really all barriers to recyclers that have been pointed out in the course of this case study may be discussed in the new setting of cooperation. The development of product passports could also be considered.[1510] Note that these ideas are by no means facts; they are based on optimistic assumptions what the recycling industry might want to put on the table.

So what about the legal structure for recyclers, substance manufacturers, designers and product producers to contemplate the composition of materials in products? In order words, how can one incorporate the view of the recycling industry into product design? Given that the barriers to plastic recycling are imposed by the REACH framework, it would at first glance seem to be a perfect place for any such incorporation. However, the point is that REACH primarily regulates substance-level and much less on product-level.

The only legislation regulating product design by incorporating Circular Economy aspects into the design is the EFD – or, rather, the 'would-be only legislation', because currently it is still chiefly focused on energy-related aspects in product design (this had also been the starting point of Chapter 5). According to Article 15(4)(a) EFD, the European Commission should consider the entire life-cycle of the product and all its significant environmental aspects in preparing a draft Ecodesign Implementing Measure. It further states that the depth of analysis of these environmental aspects and of the feasibility of their improvement shall be proportionate to their significance. One could argue that, indeed, the barriers to plastics recycling, including the ones not addressed under REACH, are extremely important because they hamper (as well as enable) the Circular Economy in several ways. Therefore, it could be argued that the Commission should at least discuss with the recycling industry the obstacles they face, particularly considering Article 15(4)(a) EFD where it states that the Commission should carry out *'appropriate consultation with stakeholders.*' In order to legally fix the incorporation the vision of recyclers into the development of Ecodesign Implementing Measures, it could, for example, be an option to revise the latter conditions by adding *'..., such as at least the relevant… and recyclers'*. This would in any case provide for a legally anchored platform to discuss divergent views.

[1510] This option has also been brought forward in Chapter 5.5.5 to investigate further. Significantly, the EP urged the Commission to consider introducing product passports as one of the potential remedies for the lack of information about the presence of substances of concern in products in 2017. At the same time, it also highlights the possible difficulties when implementing the instrument, such as the administrative burdens. See: European Parliament, *Briefing of October 2017: Chemicals and the circular economy – Dealing with substances of concern*, PE 608.725, p. 7, http://www.europarl.europa.eu/RegData/etudes/BRIE/2017/608725/EPRS_BRI(2017)608725_EN.pdf (consulted on 29 January 2018).

There are three limitations to this incorporation of the recycler's view into the Ecodesign framework. First of all, there would be no legal obligation to act upon the ideas raised by the plastic recycling industry – it would just be an obligation for the Commission to hear the opinions of the recyclers. Secondly, the Ecodesign framework does not horizontally address all plastics: Implementing Measures only address specific product groups, leaving a lot of plastic streams untouched. If we really want to change the composition of plastics in the light of improving the quality of recycled plastics and thus of the whole plastic chain, we will still be only scratching the surface. Finally, a limitation of this approach is that each product group addressed by the Ecodesign framework requires different, tailored characteristics and therefore a different composition of substances. This great variety of plastics will eventually end up at the recycling facility, in spite of everything

In sum, life-cycle thinking requires that the responsibility of REACH compliance by the plastic recycling industry is shared amongst other stakeholders, too, in particular the ones at the start of the plastic chain such as the product designers. This goes beyond what is obligatory to be in compliance with the REACH requirements. For example, the heterogeneousness of the materials used in products would probably be addressed. Because REACH is a substance-focused measure, the EFD may be a better but not a perfect option to insert levers that would legally create a place where recyclers, primary manufacturers and other stakeholders can discusses diminishing at least some of the obstacles to recyclers and to the Circular Economy transition in general. Such cooperation between sectors and actors in different life-cycle stages could create space for innovation and could reduce the seemingly contradiction between REACH and the WFD.

D. Potential role for EU End-of-Waste criteria for plastic waste

To facilitate the cooperation of recyclers and primary manufacturers, EU EoW criteria could play a crucial role in plastic recycling, because the instrument functions precisely at the borderline between waste and non-waste by requiring that the recycled plastics are of a certain quality and are – to a certain extent – risk-free. The establishment of the EU EoW criteria could help to bridge the gap between the two laws and life-cycle stages; to make sure there is a large amount of plastic waste being recycled, amongst others to save resources, while at the same time that those recycled plastics live up to a certain quality standard that allows the recycling, over and over again. In other words, quality and risk requirements are needed to secure the plastics repeating suitability as input to production as alternatives to virgin raw materials.

> *This refers to the usefulness both in the short term (production of recycled plastics) and in a long-term perspective that considers several cycles of* […] *recycling and the progressive potential accumulation of trace elements that can not be removed from the cycle.*[1511]

EU EoW criteria are also particularly useful considering the envisaged uniformity of determining *when* waste ceases to be waste. Harmonization of this moment is deemed necessary, for it would make short shrift of the fragmented landscape throughout the Union. The current situation allows for own interpretations of the waste definition and the creation of national EoW criteria, which causes production unpredictability and legal uncertainty as to when one deals with waste/the WFD or non-waste/REACH. This creates barriers to the internal market.[1512] This, in turn, could hinder eco-innovation.[1513] In fact, one of the very few examples of the barriers to innovation within environmental legislation, as referred to in the Eco-innovation Action Plan, is the creation of EU EoW criteria, because this would develop demand and confidence in recycled materials and because it would *'support and drive innovative waste collection, separation and treatment*

[1511] According to IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, Final draft report, 2013, p. 145.
[1512] See Chapters 6.1.2-C and 6.3.4 for an explanation of EU EoW criteria, more in particular for the aim for creating such criteria.
[1513] As explained in Chapter 7.5.2.

technologies for high quality secondary materials.'[1514] This idea to harmonize when waste ceases to be waste and becomes a tradable non-waste product through the establishment of ties in with the Commission's general vision that the internal market stimulates innovation, because it is *presumed* to attract innovative investments and businesses, spur competition for the best innovations, and enable entrepreneurs to commercialize successful innovations and grow their businesses rapidly.[1515]

Having said that, two things should be taken into account here. Firstly, the Eco-Innovation Action Plan was adopted in 2011; this was *before* the moment when the previously dominating enthusiasm about the introduction of new EU EoW criteria drastically changed into reluctance. Secondly and most importantly, as concluded in Chapter 6 the statement that EU EoW criteria would induce 'high-quality recycled materials' cannot be supported: generally speaking, the criteria establish *minimum* quality thresholds for waste to get rid of the waste status. This does not necessarily promote qualitative recycling in the sense that it is not very helpful in improving the desired 'pureness' of the composition of the plastic recyclates. Of course, having a minimum quality standard to attain gives room to experiment above the threshold but it does not *stimulate* innovation in itself. Against this background, it has already been discussed in Chapter 6.3.4-A that introducing a dual track that distinguishes between a stricter threshold (1-2%) for *homogeneous* polymer materials (such as from pre-user sources) and a less strict threshold (3-6%) for *mixed* materials (such as from post-user sources), is considered too difficult to enforce. In addition, it is expected that only mixed origin plastics used for substitution of *non-plastics* (such as lumber, which is an alternative building material used instead of timber) would need considerable additional efforts to reach the limit percentages.[1516] Based on these insights, any incentives for innovation in the composition profile of recycled substances other than achieving predictability and legal certainty therefore appear to be lacking in the preparatory work for EU EoW criteria for plastic waste.

Chapter 6 has not, however, sufficiently explained the role EU EoW criteria could play with respect to *risk* management of chemical use, because glass waste recyclers have little or no problems in that respect. In the case of plastic waste, however, managing risks *is* significant. The regulator chiefly reverts to existing product and chemicals legislation to reduce and control the (uncertain) risks associated with chemical use. And because of the high variety of substances present in plastics, it is very unlikely that a future EU EoW Regulation for plastics conversion would by any different. According to the preparatory work for the adoption of EU EoW criteria for plastic waste, previous work on EoW had relied on the identification of hazardousness in EU waste legislation (i.e. the WFD's Annex III in combination with Decision 2000/532). A direct link to REACH and the CLP Regulation seems however more appropriate than the waste legislation, because this avoids the duplication of work.[1517]

The preparatory work for EU EoW criteria for plastic waste further lays down three options to control the hazard profile of recycled plastic. Firstly, a direct criterion on the quality of the recycled material could be helpful. A qualitative evaluation of the output material seems therefore necessary. This has, however, been identified earlier as one of the barriers to the recycling industry.[1518] Secondly, an option would be the adoption of a criterion on the entire exclusion of the use of hazardous waste as input material. This option is however difficult to execute by recycling installations due to the many sources of plastic waste: namely, this criterion assumes that recyclers know the composition of their input material, which is precisely the main challenge

[1514] European Commission, *Innovation for a sustainable Future - The Eco-innovation Action Plan (Eco-AP)*, COM(2011) 899, p. 8.
[1515] See European Commission, *Europe 2020 Flagship Initiative Innovation Union*, SEC(2010) 1161, pp. 17-19.
[1516] See also: JRC, *End-of-waste criteria for waste plastic for conversion*, EUR 26843 EN, 2014, pp. 152-154.
[1517] Supra note 1511, pp. 151-152. The EU EoW criteria should besides referring to the limits in REACH and the CLP Regulation also refer to the limits in POPs, because these thresholds are often stricter than the limits for hazardousness in CLP.
[1518] See e.g.: Chapter 6.2.4.

for plastic recyclers.[1519] Thirdly, the preparatory work suggests a criterion on the processing for the removal of hazardous material, which is – contrary to the first and second alternatives – not already operational in most recovery installations (in 2013); apparently, most are not prepared to or cannot avoid plastic impregnated with solvents or other toxic powders.[1520] Another but closely related point raised is the removal of *visible* chemical or biological contamination (non-hazardous) of the input material, such as oils.[1521] Apparently, it is also quite difficult (or/and costly!) to remove these kinds of contamination. A provisional conclusion is that each of these potential criteria has its own practical inhibitions, many of which have to do with the information void identified as the main obstacle to plastic recycling. Despite them being quite logical to include, their inclusion into the EU EoW criteria and their practical use may therefore be a real challenge.

In conclusion, the innovation potential for adopting EU EoW criteria for plastic waste mainly lies in the creation of legal certainty and predictability, and not so much in the stimulation of high-quality recycled plastics. Nor does it tackle any of the barriers to plastic recycling under REACH.

7.6 Conclusions

7.6.1 Conclusion of the case study

At its core, the Circular Economy approach aims to preserve resources and to minimize the environmental and human health impacts throughout the entire life-cycle of a material when we use it. To achieve these objectives, a well-functioning and integrated legal regime should be in place. In Chapter 7, the regulatory uncertainty faced by those wanting to practice the Circular Economy idea has been highlighted. The case study has reviewed the nuts and the bolts of one particular industry solution to resources being wasted, namely plastics recycling.

Plastic recycling is a type of waste recovery treatment falling within the meaning of recycling *as well as* of manufacturing. Significantly, the two core pieces of legislation for plastic recycling, the WFD ('recycling') and REACH ('manufacturing'), put emphasis on different stages in the plastic life-cycle (waste cq non-waste). Moreover, whereas the WFD highly promotes the need of resource-efficiency through recycling, REACH advocates a high-quality plastic chain, with reduced and manageable (uncertain) risks. Recyclers thus occupy a pivotal position in the REACH-WFD overlap. Although both perspectives seem to contradict, they should actually be complementary. While compliance with these two legal frameworks may be cumbersome (regulatory compliance rarely is free of challenges and of the need to devote financial resources to it), it should not be prohibitive in the sense that it should stop industry from pursuing activities such as in much-needed eco-innovations.

The study reveals that plastic recyclers encounter several compliance problems under REACH. Generally speaking, it is more challenging for recyclers than for primary manufacturers to collect the information that is required under the rules regarding the (exemption of the) registration of substances or mixtures, resulting in the performance of burdensome analyses. On top of that, the information gap also affects meeting the requirements on the authorization or the restriction of certain risky substances or mixture. Besides, some rules and procedures are unclear or unpredictable, and there is REACH leakage in the sense that certain risky substances could enter the Union through the backdoor. All things considered, this creates legal uncertainty and uncertainty about productivity for plastic recyclers. As a result, the industry concerned (often of

[1519] See Chapters 7.2.1 and 7.3.1. Evidently, this measure should not be taken alone, because else the recycler may avoid any responsibility when simply claiming that (only) the input was properly controlled (if practically possible at all). Additionally, it could also be stated that in the case of 'total exclusion' of hazardous waste as input there is a chance that larger amounts of waste plastics will go to landfills and incineration facilities, instead of recycling.

[1520] Some recovery plants only wash, dry and/or heat the input materials, even though all are in fact needed to get rid of all contamination in the output material. Then again, specialized facilities are also available and in place.

[1521] IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, Final draft report, 2013, p. 148

SME size) in effect can either choose to carry on in a regulatory vacuum, running the risk of being met by enforcement agencies imposing a 'linear designed' law, or they can abandon the project and carry on in the old scenario that may lead to a similar and easier achieved result, in this case study by using virgin materials. This undoubtedly puts primary manufacturers in an advantageous position, which, on the face of it, hardly supports the Circular Economy philosophy. However, as mentioned above, it is precisely this aim that has fundamentally formed the REACH framework: to establish a qualitative chemical cycle in which substances, mixtures and articles do not pose certain undesirable risks to human or the environment. The precautionary and the substitution principles legitimize this approach and have for that reason impacted the provisions on registration, authorization and restriction. Significantly, managing the risk-cycle is also part of the Circular Economy.

To reconcile both goals, the study identified that the real problem – or rather: opportunity! – is that the plastic recycling industry should be given a certain space to innovate in technology and materials. This is where uncertainty is allowed or even encouraged, and where, at the same time, certain boundaries are drawn to manage the risks, even if these risks are uncertain. In fact, the REACH framework already provides for room for R&D. It is however noteworthy that there are no rules under REACH with regard to the waste management of the materials deriving from these R&D projects. This is particularly remarkable considering the risks associated with the experiments conducted. In addition to that, REACH is not perfect either: various, accumulated risks are currently hardly regulated at all under REACH and therefore endanger the material-cycle. These risks may negatively contribute to the risk-cycle just as well and should therefore ideally be taken into account in the R&D project and, if possible, under the REACH framework in general. Another way to address the possible negative consequences of R&D wastes is through the use of EPR schemes, although there are certain limitations to this strategy.

There is another way to reconcile the goals to enhance both quantity and quality in the material-cycle: that is by applying life-cycle thinking. As already stressed in Chapter 5, more than 80% of the environmental impact of a product is determined at the design stage; there, designers choose which substances (on their own or in a mixture) are used in their products. In view of this, it could be argued to legally oblige designers to at least consider the barriers to recyclers, such as the ones regarding REACH compliance. The EFD is well-suited for this kind of use. It could create a place where stakeholders are obliged to come together. This includes primary manufacturers as well as recyclers. The sharing of information and cooperation is considered important for eco-innovation. The creation of such a legally framed platform should free the recycling industry from the sole responsibility of REACH compliance, as it distributes it to other stakeholders as well, particularly the ones operating in the design stage. In view of stimulating eco-innovation, there is also potential for the creation of EU EoW criteria for plastic waste, because it should create at least legal certainty about when plastic waste ceases to be waste and could be traded under the product rules/REACH throughout the EU. Any future EU EoW criteria will not directly result in better compliance with the troublesome REACH requirements, because the criteria generally set a minimum quality level to be obtained for the waste stream to have ceased to be waste (see Chapter 6). In the end, therefore, REACH will still be setting the tone.

It can be concluded that without prejudice to the aims of the WFD and REACH, the Circular Economy is very much driven by rising to opportunities. This, the EU finds much harder to surround with the required legal certainty. The EU regulator should keep in mind that industry potential and enthusiasm for innovative solutions does not prima facie raise new challenges for the environment and human health. Uncertainty and eco-innovations should therefore get space within certain legal boundaries, which are based on the precautionary and substitution principles, managing the uncertain risks associated with the use of certain chemicals.

7.6.2 Overview of recommendations

This final section is to reflect upon the conclusion of the case study. Most of the plans contained in the CE Package that are relevant to Chapter 7 have already been explained throughout the

course of this case study.[1522] This section provides for a systematic recap of those plans (including what the European Commission does *not* suggest) and, if any, the subsequent developments concerning the Commission's policy that have been taking place after the adoption of the CE Package in 2015.[1523] There are several recommendations for further actions or research enclosed as well to improve the CE Package or any subsequent policy documents. The recommendations are a useful contribution to the work of the European Commission, as they generally complement the existing policy framework for the Circular Economy.

As a preliminary observation, I would like to highlight that the CE Package designates the plastic chain as a priority area, but does not explicitly address REACH, and therefore does not contain any particular actions specifically targeting the Regulation. It does, however, address EU chemical policy in general, and more in particular recycled chemicals. Because the recommendations suggested below follow from the case study, they, on the contrary, specifically address REACH and other legal measures, if of course previously touched upon. Because of this, one may notice that the recommendations do not fit well with the actions suggested in the CE Package.

<u>Relation between REACH and the WFD</u>

- **CE Package:** The Commission underscores that a link should be made between waste legislation and chemical legislation in order to facilitate recycling and to develop a market for recycled materials and to give clear signals to economic operators. It announces that it will analyze and, if deemed necessary, propose options for changing the interface between waste, chemicals and products legislation, all in the context of creating a Circular Economy. This is to overcome unnecessary barriers while preserving the high level of protection of human health and the environment. The Commission also announces it will develop a 'Strategy on Plastics in the Circular Economy' in 2017 as well.
- **2018 CE Package:**[1524] Although the Commission stresses the need to aim for qualitative recycling, it does not propose any actions to that end in the Plastic Strategy. In any case, the Commission aims at a fourfold increase of the sorting and (quantitative) recycling capacity by 2030. The Commission is much more straightforward in the Interface Communication. There, it underscores the main challenge is to consolidate two of the Union's objectives: on the one hand enabling recycling and improving the uptake of recyclates (waste policy), and on the other hand substituting substances of concern and reducing their presence and improving their tracking (chemical policy). This is an open question to the other EU Institutions as well as to the public.
- **Recommendations:** Make the relationship between the WFD and REACH the starting point for further research, because the framework laws have a dual claim to be involved in legally framing recycling. This should clarify their interdependencies, to start with by reaffirming that recyclers (by the WFD definition) are also manufacturers and in some case also producers (by the REACH definitions).[1525]

[1522] See also: Chapters 3.3.1 and 4.3.4.
[1523] This includes the 2018 CE Package and the Political agreement between EP, Council and Commission on the legislative proposals that were launched in the 2015 CE Package.
[1524] These policy documents from the 2018 CE Package are jointly referred to: European Commission, *A European Strategy for Plastics in a Circular Economy*, COM(2018) 28; and European Commission, *Communication on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation*, COM(2018) 32. The Plastic Strategy sets out the vision of the Commission concerning plastic policy for the next few years. The Interface Communication raises four challenges to fuel discussion on how to address them at EU level. See also: European Commission, *Communication on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation*, SWD(2018) 20. For the Plastic Strategy, see: European Commission, *Roadmap for the strategy on plastics in a circular economy*, 26 January 2017.
[1525] See for the location and the broader context of the recommendation: Chapters 7.1.3 and 7.1.4.

Registration and information void

- **CE Package:** The Commission announces that the Communication on the interface between waste, chemicals and products legislation will include addressing the question on how to improve the tracking of chemicals of concern in products.
- **2018 CE Package:** The Commission further elaborates on the registration rules and the lack of information. It emphasizes that the diversity of (compositions of) plastics placed on the market can complicate the recycling process. It also specifically recognizes that there is a lack of information regarding the possible presence of chemicals of concern, creating a significant obstacle to achieving higher recycling rates. The Commission further signals that the information void results in complex and costly assessment strategies on incoming waste and on the final recycled material, including exhaustive sampling and analytical work. To that end, the Commission will accelerate its work on identifying possible ways to make chemicals easier to trace in recycled streams. It does not give any solutions yet. Particularly regarding registration rules under REACH, the Commission also considers enacting implementing legislation to allow an effective control of the use of the exemption rule for recovered substances (to what extent is however unclear).
- **Recommendations:** Improve the supply of documented information on the composition and risk profile of a substance throughout its life-cycle. At the very least producers of *pre*-user waste can be legally obliged to share all the information they have obtained themselves with the recycling facilities, while acknowledging the legal boundaries, for example regarding intellectual property rights. A case in point is the supply of SDSs down to waste treatment facilities. In addition, consider to introduce product passports, because they may also provide recyclers with useful information about the origin and composition of post-user waste.[1526]

Authorization and restriction

- **CE Package:** The promotion of non-toxic material cycles is emphasized throughout the CE Package several times. The study that will be performed on the interface between waste, chemicals and products legislation aims at deciding on the right course of action at EU level to address the presence of substances of concern and to facilitate risk management in the recycling process. The Commission does not, however, indicate in detail in the CE Package how the 'right course' should practically look like. Yet, it does say that the study will feed into a future EU strategy for a non-toxic environment, so this policy is expected to further delineate the strategy for the next years, as previously announced in the 7th EAP. Without going into any detail, the Commission further states that the forthcoming study will aim at limiting the *'unnecessary burden for recyclers'*.
- **Political agreement between EP, Council and Commission on the legislative proposals:**[1527] The provisional agreement includes improvements in the traceability of hazardous substances in products and waste, and the decontamination of hazardous waste.
- **2018 CE Package:** The presence of legacy additives, the growing number of restricted substances, the long life-time of certain products containing these substances, substances that are difficult or costly to detect or remove (altogether called 'substances of concern') are challenges for recyclers that are expressly recognized by the Commission. To address

[1526] See for the location and the broader context of the recommendation: Chapters 5.5.5, 7.2.1, 7.2.2, 7.2.3 and 7.5.3-C.

[1527] See: http://www.consilium.europa.eu/en/press/press-releases/2017/12/18/council-and-parliament-reach-provisional-agreement-on-new-eu-waste-rules/ and http://www.consilium.europa.eu/en/press/press-releases/2017/12/18/council-and-parliament-reach-provisional-agreement-on-new-eu-waste-rules/ (consulted on 29 January 2018). This information is extracted from a variety of news websites. It is not yet possible to attain the final text, because it is still to be finalized. The EP and the Council have to formally adopt the legislative proposals for changing the four EU waste laws.

these challenges, the Commission will develop a specific methodology by mid-2019 to support decisions on the recyclability of waste containing such substances. The Commission will also prepare guidelines to ensure that the presence of substances of concern in recovered materials is better addressed in the early stages of the preparation of proposals to manage the risk of substances of concern. The Commission further signals that the rules to decide which wastes and chemicals are hazardous are not well aligned and this affects the uptake of secondary materials. To address this matter, it is about to publish guidelines on waste classification to assist waste operators and competent authorities to have a common approach to waste characterization and classification. Significantly, the Commission stresses that there is information void on substances of concern that hinders the recycling of materials containing chemicals. To address this matter it will launch a feasibility study on the use of different information systems, innovative tracing technologies and strategies in order to reach recyclers with useful information. This study is expected by the end of 2019. It will further finance research and innovation projects on better identification of contaminants and on decontamination of plastic waste through the Horizon 2020 programme.

- **Recommendations**: Reconsider the two procedural aspects of the authorization and restriction rules. First, the authorization fees, additional costs and the procedure time may be reduced. In the spirit of the Circular Economy, it may (again) be considered to reduce these burdens only for recyclers. Second, the frequency of amendments to the restriction and authorization lists should be reconsidered. In addition to these procedural aspects, in order to further clarify the choice between restriction and authorization, the RMOA tool should be appended to the formal REACH toolbox. Moreover, the Commission should further elaborate on how to address the other ambiguities under REACH as well. This includes the role of the substitution principle in the choice between restriction or authorization. This should create better clarity and predictability for stakeholders. Finally, order the ECHA to set up a study on the opportunities under REACH to address the accumulation of risks under the REACH framework. This may include the reconsidering of the level of some of the volume-based thresholds in the risk management measures.[1528]

Transboundary movement

- **CE Package:** Without focusing on recycled chemicals or plastics as such, the CE Package stresses the necessity to ensure an easy cross-border circulation of recycled materials *within* the EU. Action in this area will include the simplification of cross-border formalities on waste shipment, *inter alia* through the use of electronic data exchange. The Commission explains that it is currently examining other barriers to the smooth circulation of waste in the EU as well. To improve the availability of data on recyclates, the Commission will also further develop the Raw Materials Information System[1529] and will further support EU-wide research on raw materials flows. Finally, the Commission pledges to step up enforcement of the WSR.
- **2018 CE Package:** The Commission stresses the importance of ensuring that any plastics sent abroad for recycling are handled and processed under conditions similar to the WSR rules, and announces that an EU certification scheme for recycling plants will be

[1528] See for the location and the broader context of the recommendation: Chapters 7.3.2, 7.3.3, 7.3.4 and 7.5.3-A.
[1529] The Raw Materials Information System is the Commission's reference web-based knowledge platform on non-fuel, non-agricultural raw materials from virgin and recovered sources, covering their entire value chain. Amongst others, it can be embedded in the 2008 Raw Materials Initiative (European Commission, *Communication - The raw materials initiative - meeting our critical needs for growth and jobs in Europe*, COM(2008) 699), 2011 Resource-efficiency policy and the 2015 Circular Economy Package. The overarching goal of the System is to facilitate: the availability, coherence and quality of knowledge required by specific EU raw materials policies and EU services; and access to key raw materials information from knowledge bases within and beyond Europe. See http://rmis.jrc.ec.europa.eu/ (consulted on 24 November 2017).

developed. The Commission further announces that it will develop working procedures to make sure that imported articles do not contain substances which are not authorized for use in the production of articles in the EU.

- **Recommendations:** Enhance the unified application of the WSR when it comes to the export of solid plastic wastes *outside* the EU. Additionally, address the issue that non-EU-based producers articles do not have to comply with the authorization rules under REACH (through importers), while EU-based producers are required to do just that.[1530]

R&D

- **CE Package:** As highlighted in the point above, the Commission will further support EU-wide research on raw materials flows. But that is not all: by way of horizontal, broader policy objective, it will ensure favourable conditions for all innovation at large to contribute to the competitiveness and modernization of EU industry. Particular focus in paid in the CE Package to the 'Industry 2020 in the Circular Economy' policy initiative,[1531] which grants over 650 EUR million for innovative demonstration projects in a wide range of industrial and service activities. It also explores a pilot approach to help innovators facing regulatory obstacles (e.g. ambiguous legal provisions), by setting up agreements with stakeholders and public authorities ('innovation deals'). Next to the Industry 2020 in the Circular Economy, the CE Package contains several references to EU financing instruments and policies that will be utilized to boost innovations in the context of the Circular Economy, such as EU GPP and the Cohesion Policy.[1532] All in all, the Commission does not specify in the CE Package how it would stimulate R&D through REACH.
- **2018 CE Package:** The Commission further builds on the 2015 CE Package by focusing on enabling frameworks for investments and innovation in the plastics chain, such as through Horizon 2020 and the European Structural and Investment Fund. Amongst others, the traceability of plastics in put on the agenda, linking it to the challenge of getting the right information at the recyclers.
- **Recommendations:** Ensure through the REACH framework and/or the WFD that innovative chemicals and (new) materials including those chemicals are managed properly once they become waste.[1533] Under REACH, opportunities lie in amending the SR&D and PPORD instruments. Under the WFD, the EPR instrument may offer solutions.

Life-cycle thinking and Ecodesign framework

- **CE Package:** The Commission states that the Communication on the interface between waste, chemicals and products legislation will address the question on how to reduce the presence of chemicals of concern used in products. Although it is silent about the use of the Ecodesign framework, it stresses that a key factor in creating a dynamic market for recyclates is sufficient demand, driven by the use of recycled materials in products. It also underscores the significant role of the private sector in creating demand and helping to shape supply chains. The Commission highlights that a number of industrial and economic actors have already given public commitment to ensuring a certain level of recycled

[1530] See for the location and the broader context of the recommendation: Chapter 7.4.1.
[1531] European Commission, *Horizon 2020 - Work Programme 2016 -2017*, p. 11 (Decision C(2017)2468 of 24 April 2017): see http://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-intro_en.pdf (consulted on 24 November 2017).
[1532] As regards the latter, the Commission stresses its importance: the Circular Economy is one of the priorities highlighted in the so-called 'Smart Specialization Strategies', which is one of the policies under the Cohesion Policy. See the Smart Specialization Platform, http://s3platform.jrc.ec.europa.eu/home (consulted on 24 November 2017). See also: Regulation 1301/2013 of 17 December 2013 on the European Regional Development Fund and on specific provisions concerning the Investment for growth and jobs goal and repealing Regulation (EC) No 1080/2006, OJ L 374/289.
[1533] See for the location and the broader context of the recommendation: Chapter 7.5.3-B.

content in their products. This should be encouraged, it declares. Public procurement can likewise contribute to the demand for recycled materials.

- **2018 CE Package:** The Commission explicitly stresses that plastics and products containing plastics should be designed to allow for higher plastics recycling rates for all key applications, but most certainly also for products which are addressed under the EFD. Moreover, without mentioning life-cycle thinking, the Commission also emphasizes that the plastics value chain must become far more integrated, and that, particularly, the chemical industry should work more closely with plastics recyclers to help them find wider and higher value applications for their output. This would also further support innovation. In concrete terms, the Commission aims for a situation where all plastics packaging placed on the EU market is either reusable or recyclable in a cost-effective manner by 2030. The Commission announces that it will work on a revision of the essential requirements for placing packaging on the market (Packaging Directive). This includes looking for ways to promote recycled content. The same is done in the revision process of the EU rules on construction products, end-of-life vehicles and GPP. Any changes to REACH or to the EFD are not considered.
- **Recommendations:** Create a discussion platform under the Ecodesign framework where recyclers and primary manufacturers are obliged to take part in. This is to create a space at the best place in the material life-cycle where the barriers to recycling under REACH can be brought forward in order to share the responsibility of REACH compliance.[1534]

EU EoW criteria

- **CE Package:** In the light of the conversional stage in the life-cycle of a material, the CE Package presses on with the development of new EU EoW criteria and proposes certain changes to the EoW rules. The most significant change is that the conditions laid down in Article 6(1) WFD will also apply to national EoW criteria instead of to EU EoW criteria only. A matter related to the development of EU EoW criteria is that the Commission will launch work to develop quality standards for recycled materials where they are needed. It expressly states that this is in particular the case for plastics. These standards may be useful in any future EU EoW criteria for plastic waste, if the Commission decides to continue working on that.
- **2018 CE Package:** The Commission highlights that the EU rules on EoW are not fully harmonized, which makes it uncertain when waste cases to be waste. To address this, it will facilitate closer cooperation between chemical and waste management expert networks, and it will prepare an online EU repository for all adopted national and EU EoW criteria. As a basis for possible future guidelines, it will also launch a study to gain a better understanding of the national practices as regards implementation and verification of provisions on EoW.
- **Recommendations:** Adopt EU EoW criteria for plastic waste. Admittedly, EU EoW criteria would not necessarily result in high-quality recycled materials. The need for Union-wide EoW criteria is nevertheless pressing, because it is now current practice to establish either EoW criteria or similar initiatives that nationally apply, or to leave the decision of whether waste ceases to be waste to the industries and the national authorities on a case-by-case basis. This diversity of when plastic waste ceases to be waste is bound to affect the market and innovation, as it creates legal uncertainty, productivity uncertainty and no level playing field in the EU.[1535]

[1534] See for the location and the broader context of the recommendation: Chapter 7.5.3-C.
[1535] See for the location and the broader context of the recommendation: Chapter 7.5.3-D.

PART IV – CLOSING

8. Overall conclusions and recommendations

8.1 Research perspective

This research reviews the legal fundamentals of the Circular Economy in the EU, thus contributing to the Circular Economy transition in European Union (EU) environmental law. The Circular Economy concept is founded on the idea that the value of materials is maintained in the economy for as long as possible. The concept not only aims at conserving resources, it also tries to minimize and control the environmental and human health impacts of the materials we use throughout the running and succeeding life-cycles. Life-cycle thinking lies at the heart of the Circular Economy paradigm. It means that the environmental impacts of the entire material life-cycle and the life-cycles to come should be considered in an integrated way, and that, in view of that, it is important to search for opportunities to intervene in the life-cycle stage(s) where it is best.

To achieve a Circular Economy in the EU, a fundamental change of the economy would need to take place. Indeed, part of the Circular Economy transition is the conversion of the regulatory regime: the legal transition. Establishing the right regulatory regime is clearly one of the challenges faced by the EU. The European Commission (Commission) tries to contribute to the regime change through the 2015 Circular Economy Package (CE Package). Two questions arose in the process of translating the aim to establish the right regulatory regime for a Circular Economy in the EU into practice.

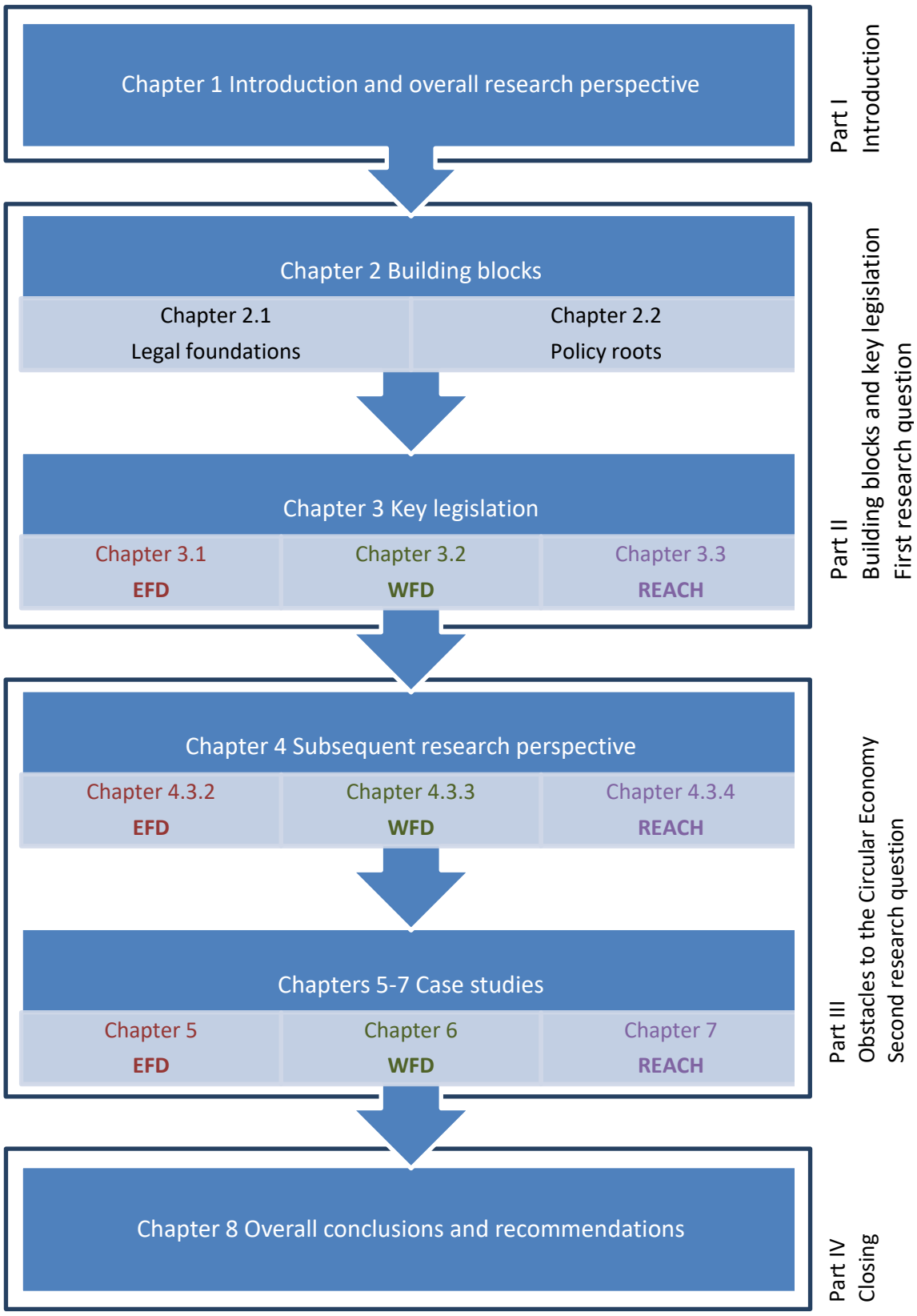
1. **What are the main building blocks and the key laws of the Circular Economy Package?**
2. **Which aspects of the key legislation obstruct the transition towards a Circular Economy, either because they are present or absent, and which improvements can be made to the Circular Economy Package to encourage the transition?**

Asking these questions was justified for the following reasons. By identifying and explaining the building blocks of the CE Package, the transition towards the Circular Economy in EU environmental law was solidified. It also allowed the creation of a rudimentary knowledge base of the CE Package and the Circular Economy transition in general. Two types of building blocks were identified: the legal foundation for action on the Circular Economy in EU environmental law and the policy roots of the CE Package. Highlighting significant laws was justifiable, too, because the laws give substance to the building blocks and can for that reason be considered core elements of the legal transition towards the Circular Economy. The key laws selected are the Ecodesign Framework Directive (EFD), the Waste Framework Directive (EFD) and the Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (REACH). The second research question built on these key laws on a more practical level. It was answered using a case study approach. The key laws were separately analyzed in three case studies to pinpoint which aspects obstruct the transition towards a Circular Economy and, considering the obstacles, which improvements can be made to the CE Package and subsequent policies in order to encourage the Circular Economy transition in general. In essence, the policy paradigm of the Circular Economy was taken as the starting point in the dissertation to review how this paradigm is anchored in three representative case studies and how to move on.

Flowchart 6, which was also displayed in Chapter 4.4, provides for an overview of the overall research design for the dissertation. It distinguishes four parts, each comprising one or more Chapters. It also indicates the recurrent connections between the Chapters concerning the identified key laws (red: EFD; green: WFD; purple: REACH).

Flowchart 6: research design dissertation, Chapters 1-8 (on the next page)[1536]

[1536] The flowchart is authentic, designed especially for this research.


Chapter 1 Introduction and overall research perspective
Part I
Introduction
Chapter 2 Building blocks
Chapter 2.1
Legal foundations
Chapter 2.2
Policy roots
Chapter 3 Key legislation
Chapter 3.1
EFD
Chapter 3.2
WFD
Chapter 3.3
REACH
Part II
Building blocks and key legislation
First research question
Chapter 4 Subsequent research perspective
Chapter 4.3.2
EFD
Chapter 4.3.3
WFD
Chapter 4.3.4
REACH
Chapters 5-7 Case studies
Chapter 5
EFD
Chapter 6
WFD
Chapter 7
REACH
Part III
Obstacles to the Circular Economy
Second research question
Chapter 8 Overall conclusions and recommendations
Part IV
Closing

8.2 First research question: main building blocks and key legislation

The first element of the first research question concerns the building blocks for the CE Package and therefore also for the Circular Economy transition in EU environmental law. There is a strong foundation in EU primary law for the Circular Economy transition. The environmental provisions laid down in the EU Treaties require policy and legislation to be continuously improved, aiming at an increasingly higher level of environmental protection in its broadest sense. This includes the prudent and rational utilization of natural resources. The CE Package fits well into this context, as it sends out strong messages to transform the economy into a more sustainable one.

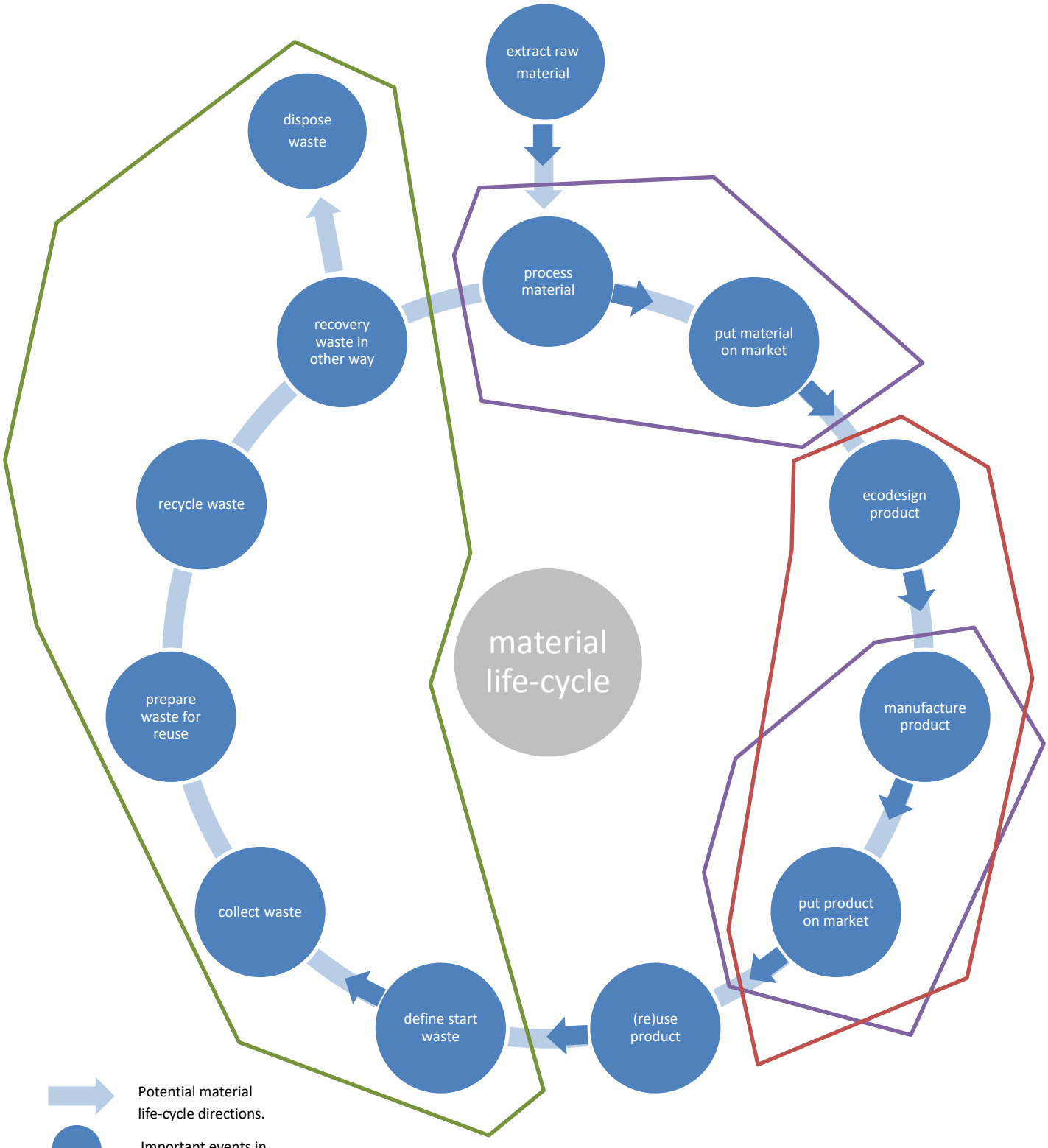
In addition, several EU policies have been launched in the past ten to fifteen years that address particular aspects of the Circular Economy. Prominent examples are the Integrated Product Policy, the Environment Action Programmes and many pillars of the Horizon 2020 Strategy, e.g. the Resource-Efficiency Europe Initiative and the Eco-innovation Action Plan. Life-cycle thinking originates from product policy and has since then also been integrated in policies addressing other life-cycle stages. The CE Package can be seen as the culmination of all these different EU policies merged into one policy framework, which is furthermore updated and complemented by new insights deriving from the Circular Economy rationale. Legal measures have, of course, always been adopted and adapted in view of new policies. As a matter of fact, life-cycle thinking has already influenced legislation since its emergence in EU policy. The Treaty on the Functioning of the EU (TFEU) offers a number of legal bases for secondary EU legislation. The most significant ones are Articles 192 on the environment and 114 TFEU on the internal market. These provisions are also the foundation of the three key laws.

Regarding the second element of the first research question, the selection of the key legislation was based on the CE Package and on the level of impact the laws have on (parts of) the material life-cycle. As already mentioned in Chapter 8.1, the key laws are: the EFD, the WFD and REACH. *Flowchart 10*, which is basically a stripped version of *Flowchart 4* as laid down in Chapter 3.4, shows that, at their core, these framework laws regulate different events along the life-cycle of a material (note, however, that they also explicitly regulate other important events throughout the material life-cycle for the very reason that they are, one way or another, shaped by life-cycle thinking). In other words, they were selected because together they almost cover the entire material life-cycle and, in their capacity as framework laws, have a great impact on 'their' part in the life-cycle stage.

All things considered, answering the first research question had been a descriptive exercise. The answer is that the main building blocks for the CE Package can be found in EU primary law and in a number of EU policies. The key laws in the legal transition towards a Circular Economy under EU environmental law are the EFD, the WFD and REACH.

Flowchart 10: stripped version of Flowchart 4 (on the next page)[1537]

[1537] The flowchart is authentic, designed especially for this research.



Potential material life-cycle directions.

Important events in the material life-cycle.

Most predictable material life-cycle direction after important events.

Main focus of a particular key legislation (**EFD**, **WFD**, **REACH**). This does not mean that the laws do not regulate other important events and life-cycle stages, because each law is shaped according to life-cycle thinking in its own way.

8.3 Second research question: obstacles to the Circular Economy

8.3.1 Case study approach

The second research question was raised in view of contributing to the challenge of establishing a new regulatory regime for the materials system on a more substantive level. To address the question, a case study approach was adopted. The main reason for a case study approach is the complexity and comprehensiveness of the legal transition towards a Circular Economy.
A legal study on the regime change is complex and comprehensive for many reasons, not least by the many EU legal acts that are relevant to the Circular Economy. With that in mind, it is not sufficient to either address the entire regulatory regime for the Circular Economy or to resort to one life-cycle stage, one legal field or one legal act. This is why each key law was addressed separately in a case study: these framework laws represent a life-cycle stage of the material life-cycle. The obstacles to the transition towards a Circular Economy where found in these key laws.

Practically speaking, however, a study on all possible obstacles would have been too broad. Consequently, one cannot but zoom in on certain issues. For each law, a pressing issue was selected based on life-cycle thinking. This was translated it into an objective for the case study in question to see where the obstacles lie and which improvements can be made to the CE Package to encourage the Circular Economy transition. Importantly, since there would still be a risk that the research becomes too broad when all potential obstacles were to be analyzed, each case study was restricted to one material in cases where the clarity of the case study benefited from it. Naturally, an important aspect of the selection of materials is the connection with the specific obstacles in the key law, which required an early scan. The choice of materials is furthermore largely based on the creation of variety. Variation is significant because it would make stronger arguments for any considerations and recommendations about possible changes to the entire regulatory regime, if the case studies complement each other or, alternatively, contradict each other. In general, adopting a case study approach would particularly be meaningful if the case studies generate results that are to some extent generic, and therefore contribute to the legal transition as a whole.

Before I reflect upon the relation between the case studies, the answer to the second research question is provided first. This is done in order of the location of the case study in the dissertation. Each section includes: 1) a description of the state-of-the-art of the key law at issue; 2) an explanation of the main obstacle that is in place; 3) the objective for the particular case study and the way how it was addressed (this includes the selection of the material); and 4) the conclusions of the case study at issue.

8.3.1 Ecodesign Framework Directive: extending the scope

So far, the Implementing Measures accompanying the EFD, which set ecodesign requirements for specific product groups, have predominantly been focusing on energy-efficiency. This approach can be clarified by the scope of the EFD and of its predecessor: the scope has been broadened from energy-using products (EuPs) in the first Ecodesign Directive (2005) to energy-related products (ErPs) in the currently applicable EFD (2009). It is not surprising given the fact that the EFD was erected based on energy policy. Moreover, targeting energy-efficiency is relatively easy to achieve and easy to measure.

The European Commission signals in the CE Package that while the current focal point can be historically and practically justified, the Circular Economy requires a different approach: ultimately, non-energy-related impacts occurring throughout the entire life-cycle of ErPs should ideally also be addressed in product design. Based on this viewpoint, the Commission announces in the CE Package that it will study the possibilities of better implementing material-related aspects into future and existing Ecodesign Implementing Measures. Another frail but constructive tendency can be observed outside the scope of the CE Package: growing concern on the way we use materials further triggered discussion on the justification on yet another enlargement in scope

of the EFD. Generally speaking, however, there is still a lot of skepticism regarding the expansion of scope at EU level.

Even so, the case study examined the opportunities for the Ecodesign framework assuming that the scope of the EFD would have been broadened to all products. It is inherent to this hypothesis that the material-related aspects and the entire material life-cycle in product design were emphasized as well. I selected wooden products to exemplify this radical, new strategy, mainly because the current EFD does yet not have any impact on these types of products. Several so-called 'CE benchmarks' were identified to organize the case study. These benchmarks are material-related themes along the material life-cycle that should be considered. A survey of the overall EU regulatory framework for wooden products was executed to draw inspiration from for the Ecodesign framework and to examine the coherence and consistency of the imagined Ecodesign framework with the rest of the regulatory framework.

The conclusion of the case study is that the broadening of the scope of the EFD and the greater emphasis on material-related throughout the entire life-cycle of a product can be legally founded. Apparently, the assumption made in the CE Package, namely that more attention should be paid to material-related aspects and to other life-cycle stages than the use stage is based on practice rather than on legal reasons. Despite that, if the scope of the EFD is indeed enlarged to all products, certain aspects of the Ecodesign framework must be (re)considered. First, the wording of Articles 1 and 15 EFD should be changed, further clarified and/or not be applied restrictively. Second, a number of additional features for each CE benchmark were identified. These should be considered on top of the criteria laid down in Article 15 EFD. Other legal acts and frameworks regulating wooden products were examined as well to see how they address the additional features at issue. This survey of the EU regulatory framework showed that most of the legal acts and frameworks deal with the additional features differently and some of them require changes. The case study also established that most of the additional features (or elements thereof) actually enhance the coherence and consistency, and should possibly for that reason have a permanent place in the EFD. The features are: the use of the same and suitable terminology, which is preferably laid down in horizontal framework laws; the use of information along the life-cycle of the product to proof what is claimed, amongst others through the instruments under other EU legal acts or through external instruments such as standards and certifications; the use of environmental principles, such as the preventive and precautionary principles; and the use of life-cycle thinking. Furthermore, the use of existing categories of certain concepts and the introduction of new categories, which are also part of the recommended additional features, can only be coherent and consistent with the overall EU regulatory framework for wooden products if the categories are properly defined and delineated. This mostly applies to the WFD.

Whether it is legally possible to extend the scope of the EFD to all products, including wooden products, could in this preliminary stage be positively answered, although continued efforts are needed to monitor the coherence and consistency of the Ecodesign framework with the overall EU regulatory framework for wooden products. It is furthermore recommended to launch a similar study for a different material stream to see whether the same results are obtained so as to use the additional features as yardsticks in the Ecodesign framework in the future, and possibly to add them to Article 15 EFD. In that respect, the case study fulfils an explorative function.

8.3.2 Waste Framework Directive: encouraging qualitative recycling

The WFD contains a number of instruments aiming at stimulating recycling. The most significant is the waste hierarchy, which places recycling almost at the top of the options for waste treatment. Another extremely important instrument is the setting of quantity-based preparing for reuse and recycling targets for specific waste streams, which are complemented by comparable targets in waste stream-specific legislation. A final example of a highly relevant instrument is the quality-neutral definition of recycling. Taking all instruments into consideration, the WFD encourages quantitative recycling – not qualitative recycling.

The main challenges identified by the Commission in the CE Package are the rightful application of the waste definition and of the waste hierarchy. It furthermore clearly focusses on

the stimulation of quantitative recycling. On the whole, the Commission upgrades and further clarifies the well-working instruments. For example, the targets set in EU waste legislation are incrementally increased and the number of targets is increased as well. Moreover, the measurement of the targets is simplified and better harmonized. In addition to the predictable focus on quantitative recycling, the CE Package repeatedly underscores the importance of high-quality recyclates. Although the Commission does not explicitly explain why it emphasizes qualitative recycling, the motive can be found in the Circular Economy concept itself. At its core, the Circular Economy is founded on the idea to maintain the value of materials in the economy for as long as possible, while still protecting the environment and human health. Generally speaking, the longer a material stays in the material-cycle (due to its high value!), the less virgin resources have to be excavated. This provides a cogent reason to aim for qualitative recycling. In spite of this all, the Commission proposes only a few actions in that respect. When interpreting their underlying notion, they make at least clear that the quality of the recyclates must be guaranteed by the recyclers in order for the producers to be confident enough to use them in the production process as a reliable replacement of virgin raw materials. Similar to some of the frontrunner Member States that have already met the preparing for reuse and recycling targets, the Commission apparently struggles with addressing qualitative recycling.

To analyze the possibilities for addressing qualitative recycling through the WFD, the case study first clarified the waste definition to frame the waste stage, in particular when waste ceases to be waste. Next, it examined the options to use the instruments laid down the WFD for encouraging qualitative recycling. After that, the same was done with harmonized European standards, because, as will be explained below, it is rather difficult to address qualitative recycling under the WFD, which encouraged me to look beyond the standard WFD instruments. Overall, the legal meaning of 'qualitative recycling' the WFD does not provide any guidance whatsoever. As pointed out above, the recycling definition lacks a condition on the quality of the recyclate. The main problem is therefore to determine what 'quality' means. This is challenging because the answer largely depends on the technicalities of the material at stake. The exemplary material in this case study was glass, because amongst the three sets of EU End-of-Waste (EoW) criteria currently in force, there is one for glass waste. As a consequence, glass has generally only been addressed whenever the EoW status was discussed.

The conclusion of the case study is that there are some useful WFD instruments. They generally address the life-cycle stages *other* than the waste stage, e.g. the waste prevention programmes and the separate collection schemes, and should be implemented by the Member States. However, there are other instruments that do not directly contribute to qualitative recycling in their current form. These instruments are commonly designed to be applied at EU level as well and, if things were different, could therefore have been interesting to be further developed by the Commission in the CE Package. The problem basically boils down to the fact that recycling is legally not categorized based on the quality of recyclates. Making adjustments to these instruments to that end would be challenging. In some cases, the problem can to some extent be overcome (i.e. the inclusion of a definition of qualitative recycling and its inclusion in the waste hierarchy, which may also have a canopy effect on the other instruments), whereas in other cases one should recognize the limits to the ability to exert any influence. A case in point is the only instrument that is material-specific and could therefore have potentially grasped 'high quality': the EoW instrument. Nevertheless, EU EoW criteria only set minimum quality thresholds whereupon regular market forces take over. To fill this gap, the setting harmonized European standards was studied as an alternative. It was concluded that the mechanism as such could be positive for qualitative recycling, for it creates trust in the market of recycled materials and may stimulate eco-innovation in the field of qualitative recycling. However, there is no guarantee eco-innovation would actually occur. Moreover, the standardization process establishes a minimum quality level. In the end, the participating stakeholders (typically the industry) are the ones who, in a joint effort, decide by consensus on the standard's quality level. Therefore, there is a genuine chance that the adopted quality threshold is not the highest it can get. Moreover, as opposed to several

types of standards that are more clearly beneficial to qualitative recycling, for example the standards on terminology, measurement or a firm's organisation, *product* standards are not well-suited, because there are no incentives *within* them that could stimulate quality improvement of the material at issue. Even so, standardization and EU EoW criteria are complementary in the sense that standards are taken into account when determining the minimum quality level under the latter instrument and because they could help in demonstrating compliance with the EU EoW Regulation.

All things considered, the study showed that finding the right mixture of instruments remains a challenge. In fact, none of the individual instruments analyzed is conclusively and indisputably appropriate to address qualitative recycling. Neither is there any guarantee that the mixture of instruments would do the trick instead. This leaves one wondering which other legal acts, legal instruments, soft-law instruments and/or private-party instruments can be used in addition to the WFD instruments and harmonized European standardization. Possible examples are green deals or covenants. It is recommended to conduct further research on the suitability of these additional means. Several Member States have already taken some first steps in that respect.

8.3.3 REACH: regulating recyclates

Chemical manufacturers should in principle meet the requirements under REACH regarding the registration, evaluation, authorization and restriction of substances, alone or in a mixture, before putting them on the EU market. REACH effectively and to varying degrees places the burden of proof on industry to identify substances and to assess, manage and pass on relevant information of the environmental and human health risks linked to certain substances. Because recyclers are factually the same as manufacturers, the same rules under REACH apply to the recycling industry as those applicable to manufactures using virgin resources. Recyclers therefore occupy a pivotal position in the REACH-WFD transition.

The European Commission does not propose particular changes in the CE Package to the regulatory framework for chemicals, let alone specifically to REACH. However, the Commission announces it will conduct a study on the interface between chemicals, product and waste legislation in the context of the Circular Economy. Apparently, there are still shortcomings in the area of recycling. By identifying these shortcomings, the Commission tries to choose the right course of action at EU level in addressing the presence of substances of concern, limiting unnecessary burden for recyclers, further developing the market for recycled materials containing chemicals and promoting non-toxic material-cycles. Overall, the Commission set out its vision for future work which will be finalized in 2019. It did not yet propose specific changes.

As opposed to the case study on qualitative recycling where recycling had initially been viewed from a waste perspective, namely through the WFD, this case study primarily considers recycling from a resource perspective by analyzing REACH. Given the importance of life-cycle thinking in the Circular Economy, the goal is not only to analyze the regulation of virgin resources but of recycled materials as well. The comparison between those two sources is what the case study is really all about. With that in mind, the main instruments under REACH were analyzed. The registration and evaluation of substances were addressed first. The second set of REACH instruments considered was the authorization and the restriction of certain chemicals of concern. A final point was made about the transboundary movement of wastes and articles containing chemicals. The selection of plastic recycling as a case study provides for a stronger focus. The choice is primarily based on the fact that plastics have become an indispensable part of society and because plastic is so frequently used, it may pose certain risks to humans and the environment.

The conclusion of the case study is that plastic recyclers encounter several compliance problems under REACH. Generally speaking, it is more challenging for recyclers than for primary manufacturers to collect the information that is required under the (exemption of the) registration rules, resulting in the performance of burdensome analyses. The information gap also affects the possibility to meet the requirements on the authorization or restriction of certain risky substances or mixture. Besides, some rules and procedures are unclear or unpredictable. In addition, there is

REACH leakage in the sense that hazardous waste could possibly leave the EU and, in accordance with the current rules under REACH, return to the EU in a recycled form without requiring them to comply with relevant authorization requirements. Altogether, these issues create legal uncertainty and uncertainty about productivity for plastic recyclers. As a result, the industry concerned in effect can either choose to carry on in a regulatory vacuum, running the risk of being met by enforcement agencies, or they can carry on in the old scenario that may lead to a similar and easier achieved result, namely by using virgin materials. This undoubtedly puts primary manufacturers in an advantageous position, which, on the face of it, hardly supports the Circular Economy philosophy. However, the question is whether the current framework should actually allow for more possibilities to market recycled plastics than plastics made from virgin resources. Creating and maintaining a qualitative chemical cycle in which substances, mixtures and articles do not pose certain undesirable risks to human or the environment is precisely what has fundamentally formed REACH. The precautionary and the substitution principles legitimize this approach and have for that reason impacted the provisions on registration, authorization and restriction. Besides, REACH does not even address the accumulating risks and is for that reason not perfect either. Significantly, managing the risk-cycle is next to the throughput of recyclates in the economy *also* part of a Circular Economy concept. To reconcile the goals of enhancing both quantity and quality in the material-cycle, the possibilities to create space for R&D under REACH could be reshaped and the Ecodesign framework could be used, because the recycling industry should not have the sole responsibility of REACH compliance.

Without prejudice to the aims of the WFD and REACH, the Circular Economy is very much driven by rising opportunities, derived from uncertainty and innovation. This, the EU finds much harder to surround with considering the required legal certainty. The EU regulator should keep in mind that the industry's potential and enthusiasm for innovative solutions does not prima facie raise new challenges for the environment and human health. It is therefore recommended to create room for uncertainty within certain legal boundaries, which should, indeed, still be based on the precautionary and substitution principles.

8.4 Reflection on the case studies

8.4.1 Reflection on the more general challenges identified in each case study

Looking at the key legislation from a Circular Economy perspective (i.e. based on the objective determined for each individual case study) has besides exposing specific obstructions and recommendations, which are addressed in Section 8.4.2, also revealed more general challenges to the legal transition towards a Circular Economy. These challenges were separately identified in the reflection of each case study (see Chapters: 5.5, 6.5 and 7.5). It turns out that each of the challenges also applies to the remaining two case studies.

The coherence and consistency of the regulatory framework for wooden products was considered a challenge in the case study on the extension of the scope of the EFD. If the Ecodesign framework will indeed address the material-related aspects in product design, it would require coordination with the rest of the regulatory framework for the product group studied. This therefore concerns a set of rules that is new to the Ecodesign framework. The case study identified several (recurring) problems, often related to terminological differences. Close monitoring of the coherence and consistency of the overall regulatory framework for a particular product group, so including the other material-related legal acts and framework, should be carefully considered. Coherence and consistency is also significant to the other case studies. In the study on the WFD, the coherence and consistency of the studied instruments is crucial, too, both internally (the instruments within the WFD) and externally. Regarding the latter strand, the relation between the WFD, the EU EoW Regulations, the harmonized European standards and the EFD requires special attention. In the case study on REACH, the coherence and consistency between the WFD and REACH was discussed to show the similarities and differences between them. In that case, it was demonstrated that actually both frameworks have a rightful and complementary claim on

regulating recycling and recyclates. Further integration of this dual claim should be stimulated, because this conversional stage is currently mainly regulated from a silo perspective.

Finding the right regulatory mixture of instruments is anotherm more general challenge. The case study on the encouragement of qualitative recycling through the WFD showed that this is particularly a challenge in that specific case, because neither the use of the instruments under the WFD nor harmonized European standards would probably sufficiently encourage qualitative recycling, alone or together. For this reason, the Commission should also look beyond the instruments addressed in the case study. The challenge of finding the right regulatory mixture of instruments also extends to the other case studies. In the case of the EFD, one of the conclusions was that certain CE benchmarks could contradict each other, requiring fine-tuning between the possible ecodesign requirements. Another conclusion was that certain issues are better left to the instruments in other legal acts or frameworks or private-party instruments, such as the CPR and sustainability certificates. The questions how to create a coherent and consistent regulatory framework and how to find the right mixture of instruments are clearly closely related. In the case study on REACH, finding the right instruments also resulted in looking beyond the scope of REACH, namely the instruments laid down in the WFD and the EFD.

Regulating uncertainty and innovation also proved to be a challenge for the EU. This was highlighted in the case study on the regulation of recyclates through REACH. This is much more a 'showcase challenge' to the legal transition towards a Circular Economy than the other two challenges, as they have a more general nature. Regulating uncertainty and innovation is ingrained in the DNA of the Circular Economy transition because a sustainability transition is pre-eminently about change. In the REACH case, one of the conclusions was that in order to provide more opportunities to plastic recyclers outside the strict rules under REACH, the legal area where they could start R&D projects should be broadened and better clarified. Uncertainty and/or eco-innovation were also issues addressed in the case studies on the EFD and the WFD. In the case of the EFD, one of the questions asked was how to deal with the unknown risks relating to the use of certain chemicals in/on products. The case study also showed that the EFD can be used to encourage eco-innovation, such as through the setting ecodesign requirements on recycled content and the adoption of Implementing Measures in general. In the case of the WFD, the obvious example of how eco-innovation play a role in stimulating qualitative recycling is the use of harmonized European standards, although there is no guarantee that this would actually happen.

Considering that each of these more general challenges are also common themes in the other case studies, one can conclude that they are symptomatic of the legal transition towards a Circular Economy. The recommendations addressing the challenges, which were put forward at the end of each case study, may therefore be considered in a broader context than solely in the specific case study. On the whole, it is recommended to pay special attention to these challenges in future policies and legislative proposals concerning the EU legal regime for the Circular Economy.

8.4.2 Reflection on the specific obstructions and recommendations in each case study

Considering the numerous smaller obstacles and recommendations, which were put forward in the final section of each individual case study, several resurfacing issues can be identified.

First of all, terminology is a recurring theme in the case studies. Many definitions and concepts are not well clarified or correctly applied. This could create confusion for any actor in the material life-cycle, which could, in turn, result in ambiguity about the applicable rules. The 'waste v non-waste' discussion is an extreme example in that respect, but also minor issues relate to this matter, such as the (incorrect) use of WFD terminology in non-waste legislation. Besides the correct use of these definitions, plain references to the WFD are in many cases sufficient to overcome this problem. In addition, the introduction of new terminology is frequently recommended as a solution to other obstructions, such as in the case of 'qualitative recycling' and 'waste precaution and qualitative waste prevention'. In these cases, it is generally recommended to consider inserting the terminology in the WFD due to its horizontal nature.

Second, the gathering and supply of information is a commonly addressed issue. Basically, REACH's slogan 'no data, no market' applies to many of the legal acts, frameworks and

instruments that were discussed in the case studies. It is a normal practice to gather and assess information before a product can be put on the market, whereupon the information is supplied along the chain. In both cases, the information guarantees what is claimed and/or serves as guidance for further use or treatment. This is done through the use of legal instruments (laid down in the particular legal act or 'borrowed' from other legal acts, which is commonly done by laws regulating a specific subject matter, such as the BPR), through co-regulation (a process with a great impact is harmonized European standardization) and/or through public-private partnerships (e.g. chain-of-custody certificates, such as the ones for sustainably sourced wood or recycled wood). Despite the great emphasis on information and the variety of instruments available, the case studies showed that the information is not always available where it is needed in the material life-cycle. This problem is particularly important in the case studies on the WFD and REACH. Some of the recommendations try to address this flaw, such as the suggestion to oblige the industry to supply the relevant SDSs when they deliver pre-user waste to the waste treatment facilities. In addition, the EFD is put forward in both cases as a possible solution to the problem.

Third, eco-innovation is a common theme in the case studies (as was already flagged in the previous section on the more general challenges). Stimulating eco-innovation is considered necessary to encourage qualitative recycling and to regulate recyclates in general. This should not be surprising, of course, because eco-innovation plays a critical role on the Circular Economy transition. Consequently, some of the recommendations are specifically aimed at eco-innovation, such as the suggestion to create an institutionalized platform under the Ecodesign framework where recyclers are given a seat.

Fourth, a recurring challenge is (the possibility) that certain (partly overlapping) objectives of the Circular Economy concept conflict with each other. There are plenty of examples. To give a few that could also be phrased in the opposite way: encouraging product durability does not always improve the recoverability of products or the management of risks; stimulating qualitative recycling does not always mean that this is best for the environment; encouraging quantitative recycling does not always help qualitative recycling; and controlling risk does not always stimulate quantitative recycling. In principle, in all of these cases one should decide on a case-by-case basis, taking the specific circumstances into account such as the costs and clarity of the supposed rule. However, these examples suggest that, by drawing inspiration from life-cycle thinking, 'quality objectives' and 'risks objectives' should generally come prior to 'quantity objectives' to secure the quality and value of the materials system. Moreover, derogation from this general guidance can be justified by the goal to decrease or control (other) environmental pressures, which also stems from life-cycle thinking.

Fifth, environmental principles play an important role as well. This could have been predicted because they are significant cornerstones of EU environmental law in general. As a consequence, many principles lay at the foundation of the key laws and have been used as justification of certain recommendations. Examples of this are the introduction of 'waste precaution and qualitative waste prevention' in the WFD and the recognition that the EFD is essentially based on the substitution principle.

Finally, life-cycle thinking is a persistent element in the case studies. This can be explained by the fact that life-cycle policies have already shaped many legal acts and frameworks (note that many of these policies are also considered roots of the CE Package!). Moreover, life-cycle thinking is a key element of the Circular Economy concept. Be that as it may, based on the obstacles identified in the case studies, it can be concluded that the existing regulatory regime reflects where the EU is now in this transition towards a Circular Economy: it is not entirely linear anymore but it is neither completely circular. Life-cycle thinking therefore underpins many of the recommendations put forward at the end of each case study. The next section builds further on the role life-cycle thinking should and could play in the EU regulatory regime for the Circular Economy.

8.4.3 Reflection on the role of the Member States in the case studies

The case studies have predominantly addressed the key legislation from the perspective of the EU law-maker: what are the legal obstacles and what recommendations can be made to change the CE Package in order to encourage the CE transition. But of course, as highlighted in Chapter 4 on the research perspective for the case studies, the legal transition towards a Circular Economy cannot and should not be pushed and shaped by the EU Institutions alone. The Member States have an essential role in the transition as well, in the Union at large as well as within their own territories. I will first briefly reflect upon the first viewpoint, whereupon a specific matter regarding the latter will be discussed by way of example.

The impact of Member States' residual regulatory space on the key legislation

Next to the Member States' role in the Council as an EU decision-maker, Member States have influential powers within their residual regulatory space whenever the EU has already regulated a certain policy area or will regulate it with new rules. This essentially builds on Chapter 2.1.2,[1538] where the derogation possibilities from measures adopted under Articles 192 and 114 TFEU are explained. Articles 193 and 114(4)-(5) TFEU namely provide conditions to deviate from Union rules. It has also been highlighted that there are different opinions with regard to the benefits of derogation from an environmental law perspective. In my opinion, derogating Member States are indeed necessary to the functioning of EU environmental law, in particular considering the legal transition towards a Circular Economy. New ideas and beliefs, new evidence, new technologies or new regulatory methods – or in other words: niche developments – that have matured in the Member States and could in the long term bring about a radical change of the unsustainable regime in place, can in this way reach the European Commission and the other law-making EU Institutions. Member States are therefore in principle allowed to set higher environmental standards. I will now reflect upon this taking the three case studies into consideration.

In the case study on encouraging qualitative recycling (Chapter 6), it must be noted that the WFD is based on Article 192 TFEU and not fully harmonized, which therefore generally provides the Member States much room for manoeuvre. Evidently, however, these differentiating national measures must not undermine the coherence of the WFD, which may be the case if the national measure is disproportionate to the proper functioning of the regime. Amongst others, the case study also considered the introduction of a definition of qualitative recycling at Member State level. This would certainly not cause any problems to the functioning of the framework law, for it does not radically change the situation at EU level. All in all, Member States have quite some opportunities to derogate from the non-harmonized WFD rules.

This is different for the EFD (Chapter 5), which is based on Article 114(1) TFEU: the framework law establishes full harmonization. Member States are however not entirely toothless. Exceptions to Article 114(1) TFEU can be based on allowance (explicitly or implicitly) provided *within* the EU legal act. Recital (11) EFD states that Member States may base their derogations on the conditions laid down in Article 114(4) and (5) TFEU. Generally speaking, the possibilities for introducing special national product requirements are limited. Let us have a closer look at both provisions in this specific case.

In the first case (Article 114(4) TFEU), maintaining national ecodesign requirements could be aimed for by Member States whenever an Implementing Measure is adopted *later* than the national measure imposing less CE-friendly requirements. The link to wooden products is evident in the *current* situation, because these products are currently not covered by the Ecodesign regime: there may be national rules in place regulating these products.

The second case (Article 114(5) TFEU) takes place when Member States wish to introduce *new* measures. In the imaginary case that there are Ecodesign Implementing Measures regulating wooden products, Member States would probably have to invoke this provision. Justifications for invoking this mechanism seem to be less numerous than for the first mechanism

[1538] See in particular Chapter 2.1.2 (heading 'Derogation possibilities Articles 193 and 114(4)-(5) TFEU').

under paragraph (4). Firstly, only 'the protection of the environment' and 'the working environment' can be invoked – Article 36 TFEU is left aside. Secondly, new national measures are likely to jeopardize the functioning of the internal market. For this reason, the provision includes three cumulative conditions. A newly introduced national ecodesign requirements can be justified by 1) *new scientific evidence* on grounds of a 2) *problem specific* to that Member State 3) *arising after the adoption* of the Implementing Measure. I will briefly running over them.

Firstly, new scientific evidence should be available to back up any stricter national rule than the EU rules. The Commission is likely to consult external experts to evaluate the provided information. This 'new scientific evidence' – which by the way can also already exist before the adoption of the harmonizing rules but which did not entirely validate at that time – does not necessarily have to provide a full proof of the causation of the damage to the environment. A *'possible link between the fact in question and the damage'* is sufficient and which does not necessarily have to be supported by the entire scientific community.[1539] Generally, whereas the Commission applies this first condition rather restrictively, the CJEU takes a more alleviate approach to the (different) nature of the risk assessment made by the notifying Member State.[1540] It appears to me that providing new scientific evidence is difficult but not impossible. The difficulty to comply with a certain ecodesign requirement applicable to a targeted wooden product group may be of particular interest, because wood is not very known of being used in product areas where technological development changes happen. The innovation-cycle is generally relatively slow. This, of course, does not apply to the chemicals that are used to preserve wood. New scientific evidence of the hazardousness of certain substances may therefore be easier accepted as a justifiable ground under Article 114(5) TFEU.

Secondly, there needs to be a specific problem to the notifying Member State, meaning that social, demographic, geographic or epidemiological circumstances require a different approach than what is established at EU level.[1541] There are two interrelated challenges for any ecodesign requirement in an Implementing Measure on wooden products. First, most problems notified to the Commission thus far concern particular risks which are often associated with chemical substances. Arguably, national requirements on stricter levels of toxic substances have a better chance surviving the Commission's approval than requirements on, for example, the repairability of a wooden product or the recycled content of a wooden product (on condition that the Member State(s) can proof that the problems are specific enough). This builds on to the second challenge: it seems difficult for Member States to address any CE topic other than the use of toxic substances, because issues such as dismantleability, sustainably sourced materials and recyclability are generally *not* specific to a Member State for they are common to the EU as a whole.

Finally, the specific problem must occur *after* the harmonization Implementing Measure. For example, this would be the case when a chemical substance is categorized as 'toxic' by science *after* the adoption of a potential Implementing Measure on a wooden product and which includes a requirement on the permissible level of that specific substance. On the whole, this third condition under Article 114(5) TFEU seems quite troublesome for Member States to derogate from, because many environmental challenges related to wooden products in the CE are already known, such as the unsustainable sourcing of timber.

All in all, the brief survey of the options to derogate from the Ecodesign framework provided above showed that in all likelihood it is indeed rather difficult to derogate from any future Implementing Measure targeting a wooden product group, which contains CE ecodesign requirements

[1539] N. de Sadeleer, *EU Environmental Law and the Internal Market* (Oxford University Press, 1 edn, 2014), p. 368.
[1540] Ibid.
[1541] An important difference between paragraphs (4) and (5) is that the reason to derogate does *not* need to be Member State-specific to maintain the national ecodesign requirement based on Article 114(4) TFEU.

REACH is also based on Article 114(1) TFEU. Regarding the case study on regulating recyclates (Chapter 7), a brief recap of Chapter 7.3.3 is appropriate. In principle, REACH should be applied the same across the EU. It is fully harmonized. However, based on Article 129 REACH, a Member State may under certain conditions take derogating measures if it has justifiable grounds for believing that urgent action is essential to protect human health or the environment in respect of a substance, on its own, in a mixture or in an article, even if satisfying the requirements of this Regulation.[1542] This was apparent in the case initiated by France in 2013. It was the first and the last time that the safeguard clause has been successfully applied since the entry into force of REACH. However, in the future, other substances used in the manufacturing of plastic or processing of plastic products can of course also be restricted by single Member States. In my eyes, such unilateral restrictions may be legitimized by the precautionary principle and will probably protect the quality of the entire plastic chain at the end of the day. REACH is right, therefore, in giving Member States the opportunity to pose stricter rules, despite that it is yet another barrier to plastic recyclers.

In conclusion, this reflection on the impact of Member States' residual regulatory space on the key legislation shows that, while I hold the view that Member States in principle *should* use this space in view of the legal transition towards the Circular Economy in EU environmental law, which often can and happens, EU law itself sometimes (in effect) restricts the execution of this position in given case studies.

What Member States could do on their own account – exemplified by taxation

Member States have several instruments at their disposal to address the materials system, including ones that are not thoroughly regulated under EU environmental law. A significant example is environmental taxation, which aims at tackling environmental challenges and, ultimately, a mentality change of manufacturers, product users and waste producers alike. Because taxation has only been mentioned in the passing in this thesis, I will take environmental taxation as an example to explain what Member States could potentially do, voluntarily and/or encouraged by EU legislation related to the materials system, which presently often concerns waste legislation.[1543]

While national waste taxation is already very common in the EU Member States, in particular to deviate waste from being landfilled, labour taxation is by far the most common form of taxation. Fortunately, the idea to induce national tax-shifting programmes has received more political attention in the context of the CE transition more recently – also at EU level.[1544] As the term already indicates, tax-shifting programmes aim at a sweeping change in our focus on taxable policy areas. In respect of the Circular Economy this boils down to a shift from labour to environmental policy, such on resource use and environmental harm. When applying this idea to the case studies in this dissertation, the tax system could possibly look as follows.

Particularly considering the use of resources in products, taxation could work in tandem with the Ecodesign framework (Chapter 5). For example, taxes can be implemented according to which virgin renewable and virgin non-renewable resources are differently taxed (e.g. higher taxes for non-renewable resources or higher tax reductions for renewable resources). The same

[1542] Another option would be to rely on Article 114(5) TFEU if new scientific evidence on the environmental impact. This has already been highlighted above and will for that reason not be explained here.

[1543] See e.g.: *'Member States shall take measures, as appropriate, to promote the re-use of products and preparing for re-use activities, notably by* […] *the use of economic instruments* […] *or other measures'* and *'Member States that can affect the framework conditions related to the generation of waste [i.e. waste prevention]: 1. The use of planning measures, or other economic instruments promoting the efficient use of resources'* in Article 11(1) and Annex IX WFD, respectively. See also: *'If, in order to achieve the objectives of this Directive* [i.e. the Batteries Directive], *and, in particular, to achieve high separate collection and recycling rates, Member States use economic instruments, such as differential tax rates, they should inform the Commission accordingly'* in Recital (21) Directive 2006/66.

[1544] See e.g.: CE Action Plan, p. 6; European Commission, *A European Strategy for Plastics in a Circular Economy*, COM(2018) 28, p. 15. See also point 71 of the 7th EAP.

could be done for products made from primary resources only and products containing an X share of recycled content (in addition, second-hand products could be a third product group). As for the use of substances of concern, it could be argued to introduce higher taxes on products containing non-biodegradable materials or substances of concern. As regards the latter, this can be done based on existing classifications and restrictions/authorizations through the BPR, REACH and the CLP Regulation, although one should carefully consider whether it is justified to pose an additional burden on these substances/products.

Taxation on the use of hazardous substances could also contribute to the case study on regulating recyclates (Chapter 7), because, by doing so, probably less substances of concern enter the material-cycle. On the other hand, it would also create another barrier to recyclers who already have to deal with an information gap for many of the waste streams they receive.

With respect to the case study on encouraging qualitative recycling (Chapter 6), which indeed concludes by stating that other instruments than the WFD and standardization should be investigated as well, it is also befitting to look at economic instruments such as taxation. In theory, a new tax system could create a difference in taxation between high-quality recyclates and low-quality recyclates. However, it would be very difficult to determine the thresholds per item, as the case study on qualitative recycling already stressed. For this reason, I doubt whether taxation could actually raise the quality of recyclates. It should also be noted that even though landfill taxes may indeed have boosted recycling in the past few decades, it might simultaneously have stimulated the production of low-qualitative recyclates. Therefore, one could argue that creating taxes on low-quality recyclates (if possible in the first place) is fighting fire with fire (which is the same argument already posed in relation to the possible introduction of qualitative recycling targets).

All in all, for these suggestions to become reality, strong national political will is required. I doubt whether it is the right time to set the tax-shift in motion across Europe – it requires great reforms in the national systems. I am nevertheless convinced that the fiscal nudging of the Circular Economy is a great tool in the whole range of different instruments available to the Member States.

8.5 Overarching considerations and recommendations

On top of the recommendations that were made at the end of each case study and the reflection made above, this section sets out some significant overarching considerations and recommendations.

8.5.1 Recognize the life-cycle thinking principle

Life-cycle thinking is currently *not* considered a formal environmental principle. It seems, however, that some progress has been made in recognizing this special status. This should be welcomed and encouraged in view of realizing a Circular Economy in the EU, because it would help further embedding the Circular Economy ideology in the regulatory regime for the materials system.

Evidently, one cannot declare a particular concept to be an 'environmental principle' all of a sudden; there must be evidence of this special status. Yet, literature is not clear on which set of indicators is precisely required to assess the birth of a principle. There is no checklist that can be used. Nevertheless, it may still be possible to suggest certain general indicators that could play a role in this process.[1545]

In general terms, one could envisage the references to an environmental principle in legal sources, most importantly in EU primary law. Article 191(2) TFEU does not, however, refers to life-cycle thinking of any kind. Additionally, one could also consider EU secondary legislation. Although only few legal acts explicitly mention life-cycle thinking in the text, let alone that they recognize its supposed status as an environmental principle, there are many EU laws that are to a

[1545] This is loosely based on the methodology and sources used in: N. de Sadeleer, *Environmental Principle, From Political Slogans to Legal Rules* (Oxford University Press, 2002), see in particular pp. 5-9.

large extent shaped by the concept. The key legislation and many of the supplementary laws discussed in the case studies are proof of this.

Other indicators of a guiding concept being considered an environmental principle are if the potential principle is recognized as such in international and/or national legal systems and, moreover, if there is interaction between the different legal spheres in that respect. Presumably, there are no international agreements that directly refer to life-cycle thinking as a legal principle. There are however national laws explicitly referring to the concept, though generally because they transpose and implement EU secondary legislation.

Courts play a critical role in the development and recognition of environmental principles through judicial interpretation. This concerns the judgments of the CJEU, but definitely also of the courts of the Member States. The current lack of reference to life-cycle thinking as an environmental principle (or even as a concept) in the case law of the CJEU is a strong argument against interpreting the concept as a principle. Of course, this, too, can be explained by the fact that Article 191 TFEU lacks any reference to the concept and that EU secondary legislation seldom explicitly refers to the concept.

EU environmental policies refer more frequently directly to life-cycle thinking than legislation, as the dissertation showed. In fact, the Commission has even dedicated several policy documents explicitly to the concept's meaning and application, where it considers life-cycle thinking as a highly important 'policy principle'. Moreover, the CE Package is the latest edition to the body of policies relevant to the embedding of the concept in EU environmental policy.

Another related, promising indicator of the recognition of a new environmental principle is the use of the potential principle in supporting sources, such as soft law instrument, academic literature and private-party rule-making. For example, the Joint Research Centre adopts a broad life-cycle approach in its work, such as through the use of life-cycle assessments and comparable life-cycle measurement tools. The European Commission relies heavily on this work when preparing legislative proposals for changing laws relevant to the Circular Economy. As flagged in one of the case studies, another example is that one of the European Standardization Organizations (CEN) recognizes the 'life-cycle principle' as a way to help shaping product standards and other types of standards. Notably, it does the same with the established environmental principles.

The fact that Article 192 TFEU does not mention life-cycle thinking does not necessarily mean that the concept is not an environmental principle, nor that it is totally unrelated to these other generally accepted principles. In fact, life-cycle thinking can actually be linked to them. For example, the preventive and precautionary principles back up the idea of a life-cycle thinking principle because all three principles address the question where it is best to address known or unknown environmental risks. In that respect, life-cycle thinking could serve as evidence in that choice. The connection with the substitution principle is basically the same: life-cycle assessments could provide for proof that the substance or product at issue is suitable for substitution. In fact, the substitution 'principle' is not even mentioned as such in Article 192 TFEU either, which could raise doubts about its status as a principle too.

As with all environmental principles, life-cycle thinking can also come in conflict with another principle. For example, theoretically, the source principle could direct towards a solution that rectifies the environmental impact at the source, whereas the application of the life-cycle thinking principle advocates for interference in the material life-cycle where this is done best. This means that this could potentially be at another stage in the material life-cycle where the initial harm is caused. In any event, these possible controversies provide fuel for any discussions on how best to regulate an issue. In view of this, it is typical for environmental principles that they do not have well-defined meanings, but are open to interpretation. In this way, they can be applied on a case-by-case basis, taking all circumstances into account. This idea also underpins the concept of life-cycle thinking, for instance by the fact that there is no formal definition in EU law and that there are many ways available to proof life-cycle thinking.

An environmental principle of a different kind than those discussed above is the integration principle, which has more of a general nature and is as laid down in Article 11 TFEU. This principle obliges that environmental protection requirements and therefore implicitly also the environmental principles, should be integrated in all EU policies in order to prevent that damage to the environment is caused by other policies, including policies on energy, the internal market and industrial development. The integration principle goes hand in hand with the life-cycle thinking principle, because all policies and laws, no matter which life-cycle stage they regulate, which topics they address in the material life-cycle or on which legal basis they are based, should integrate environmental considerations, such as the ones enshrined in the CE Package, which in turn can be based on Article 191(2) TFEU. In this respect, the integration principle is essential to the application of the life-cycle thinking principle.

All things considered, it seems that life-cycle thinking is already recognized in EU policy, in the design of policies and legal frameworks and in specific instruments of secondary legislation – although there are shortcomings, as the case studies demonstrated – and in supporting sources. However, the fact that the concept is neither explicitly referred to as an environmental principle in EU primary and secondary legislation, nor by the European Commission and, significantly, the CJEU, is evidence that it is not yet matured to be called an environmental principle. Of course, simply adding life-cycle thinking to the list of environmental principle under Article 192 TFEU would help further embed the Circular Economy ideology in the regulatory regime for the materials system. The same applies to the more frequent referring to the concept in EU policies and (proposals for) secondary legislation. As regards the latter, this could be a crucial role for the European Commission. By formally recognizing the life-cycle thinking as an environmental *legal* principle, which I am suggesting, the Commission could play its part in the principle's development. The Commission's work could have snowball effect, for example by 'facilitating' the uptake of the concept by the CJEU. As already clarified at the beginning of this section, I believe this is significant to the Circular Economy transition because life-cycle thinking is at the heart of the Circular Economy concept, so it could be a lever for strengthening the Circular Economy in EU law. It would also be an acknowledgement of its existing role in policy and legislation. Furthermore, it has another function as well: as already underscored in one of the case studies, it could enhance the coherence and the consistency of the overall regime for the Circular Economy. Building on this latter observation, the question that could be raised is whether there is something as 'EU materials law' and, moreover, whether this body of law should actually be called like that.

8.5.2 Recognize EU materials law

Related to the recognition of life-cycle thinking as an environmental principle, the legal transition towards a Circular Economy would indeed be strengthened if the European Commission recognizes the existence of 'EU materials law'.

EU materials law could be regarded as a branch of EU environmental law that regulates the socio-technical system for materials, ideally according to the Circular Economy ideology. In fact, EU materials law would transgress EU environmental law, because the Circular Economy movement also aims at other issues outside its direct scope, such as job growth. Through the application of the integration principle, it could be argued that the objectives and principles of EU materials law are also applicable outside the scope of the possibly newly recognized branch of EU environmental law.

As regards the objectives of EU materials law, this research confirmed that EU materials law has already a legal foundation in EU primary legislation. The environmental objectives laid down in Article 191 TFEU correspond to the Circular Economy objectives (i.e. the objectives of EU materials law). The study moreover showed that its substantive contours have also become visible over the years, with comprehensive horizontal laws as significant reference points, surely including the key laws identified.

As regards the principles of EU materials law, this research already highlighted the important role many of the existing environmental principles of EU environmental law play in the Circular

Economy. In addition to that, the life-cycle thinking *principle* is absolutely crucial to the Circular Economy as well. The life-cycle thinking principle can therefore also be regarded as a common denominator in EU materials law. Generally speaking, the life-cycle thinking principle and EU material law would reinforce each other and therefore cannot be seen in isolation from one another. Considering the discussion on the state of recognition of life-cycle thinking as an environmental principle, namely that the concept is not yet matured to be called an environmental principle, this simultaneously suggests that although the contours of EU materials law are already visible, it is currently not yet considered as such.

Therefore, further strengthening of both EU materials law and the life-cycle thinking principle is required. If the European Commission recognizes the existence of EU materials law as a separate body of law within EU environmental law, this would be a step in the right direction towards 2050, when, according to the 7th EAP, the Circular Economy should be fully established in the EU. It would make a strong push towards the recognition of life-cycle thinking as an environmental principle (just as it would be the other way around).

This is desirable, because in spite of the successes in the last decades, there are still a lot of things to be desired. The research demonstrated that the legal acts, fields of law and life-cycle stages are not yet fully connected to one another. There are some occasions where rules even needlessly contradict each other. Further action should be taken to enhance the coherence and consistency of EU materials law. Confirming the interconnectedness between the life-cycle thinking principle and EU materials law may provoke interpreting and further developing EU materials law as a distinctive comprehensive body of law, justified and guided by life-cycle thinking. This new way of understanding the EU regulatory regime relevant to the Circular Economy would go beyond a mere semantic recognition, for it actually aims at practical output by virtue of the application of the life-cycle thinking principle in regulatory decisions, such as the preparations of secondary legislation.

Building on the idea to recognize EU materials law as a separate branch of EU environmental law, why can the EU not go one more step further by aiming for the adoption of an 'EU materials *legislation*'? In that way, all EU secondary legislation applicable to the materials system would be integrated into one legal act. The added value of merging all (or as many as possible) legal acts concerning the materials system into a single law would be that certain instruments could be integrated, decreasing the risk of an incoherent and inconsistent regulatory regime. For example, some procedures, terminology or ways to get information across in the material-cycle could be integrated. Building on this, bringing everything together would make the regime better comprehensible for its users, including the enforcement authorities, product users and the industry.

However, while the idea is very appealing to develop further from a legal point of view, the unification of a large part of EU materials law seems, in my opinion, a bridge too far. This is mainly because there would be too many political constrains. Creating an EU materials legal act implies many radical changes to the regulatory regime as we know it. Strong political will is essential.

Major steps are yet to be taken, particularly considering the Commission's silo mentality and institutional structure, which has been developed over the year. The European Commission has incrementally grown into what it is today. Political decisions, EU primary law, the CJEU and, in many ways, the expansion of the EU have amongst others contributed to its development. As the Commission further developed, an increasing number of DGs have been created as part of the Institution, each having a specific field of expertise and responsibilities. Arguably, this encouraged the creation of a mindset that is inward looking and protective, which is frequently supported and maintained by formal rules. It should not come as surprise that the policies and secondary legislation derived from the silo mentality and institutional structure of the Commission follow the same pattern. This is not any different in the key laws analyzed in the case studies. For example, the waste v non-waste debate is essentially regulated through EU waste legislation (primarily the responsibility of DG ENV), even though product legislation (primarily

the responsibility of DG GROW) are equally important to the question when waste ceases to be waste. Another prime example relates to the political feasibility of the proposition made in the case study on the EFD. DG ENER and DG GROW currently have the EFD in their portfolios, but extending the scope and emphasizing more material-related aspects and the entire material life-cycle in product design would probably mean that DG ENV will need to be involved as well. Now why would the DGs currently in charge potentially weaken or even 'hijack' the well-working and by the industry widely accepted Ecodesign framework? In that respect, it is already quite an improvement that the CE Package recognizes the need to put more emphasis on material-related aspects and on other life-cycle stages than the use stage. All in all, I do not mean the Commission should not change its silo mentality and institutional structure to come to a more integrated approach – on the contrary! – but I think this cannot be achieved by pushing for the adoption of an EU materials legislation, mainly because it is just too radical for now.

One of the other problematic issues is the question on which legal basis the legislation should be based. Currently, most of the legal acts adopted within EU materials law are either based on Article 192 TFEU (the dominant basis for waste legislation) or on 114(1) TFEU (the dominant basis for product and chemical legislation). The choice has great consequences for the derogation possibilities for the Member States and determines, to some extent, which DG is responsible for the development and follow-up of the regulation. An additional problem is the choice of legal instrument: Directives and Regulations have of course a different effect on the legal systems of the Member States, and could moreover be adopted through different legislative procedures, distributing the legislative powers differently as well. A final potential problem is that a well-delineated EU materials legislation – if that is possible at all – does not cover the many other ways of regulating issues in the materials system. An example is through soft law instruments. The case studies demonstrated that these means are also required to take into account, because one may not always find the answer to certain problems in legislation alone. All in all, all of these issues must first be settled before the EU materials legislation can be adopted. As stated above, is would require unrealistic political determination. Nevertheless, this does not rule out the option of establishing an EU materials legislation in the future. Maybe a first step could be to merge certain related legal acts.

In sum, to enhance the legal transition towards a Circular Economy in EU environmental law, the Commission should recognize the existence of EU materials law as a separate field of law within EU environmental law. This should be done in conjunction with the recognition of life-cycle thinking as an environmental principle. The acknowledgement of EU materials law seems more fruitful in the short term than the creation of an EU legislation, because the latter would be politically impossible at the moment.

8.5.3 Introduce product passports and an online product database

When analyzing the recommendations made at the end of each case study, I would like to stress two possible instruments that reflect the life-cycle thinking principle and could have an impact on EU materials law on a more practical level: the introduction of product passports and the launch of an online product registration database. The idea to introduce these instruments has already been proposed under the EU Research-Efficiency policy by the European Resource Efficiency Platform and has been endorsed several times by the EP.[1546] It has however never been supported by the European Commission.

The instruments could act as a bridge between legal acts, legal fields and life-cycle stages, this is because the information flows required by the variety of rules, including the ones under the EFD and REACH, are bundled together in one instrument. This includes information about the origin of the materials used in the product and about the product's composition, hazards, known

[1546] See for further clarification on these instruments: Chapter 5.5.3-E. That part further shows that the EP backs up the idea to introduce mandatory product passports. See also: Chapters 5.6.2, 7.2.2, 7.5.3 and 7.6.2. See for one of the most significant policy document on product passports and an online registration data base: European Commission, *European Resource Efficiency Platform (EREP), Manifesto & Policy Recommendation,* 2014.

as well as unknown risks, and the risk management options such the use of alternatives. The information hub that is created provides valuable information for many actors in the material life-cycle about the product's history, its current state, how it should be used and how it could best be treated when it turns into waste. Furthermore, the information should be freely available and should be updated whenever new evidence or practices become available. These characteristics are particularly useful for the implementation of the WFD and for compliance with the REACH requirements considering recycling, because the database fills in at least some of the information gaps relating to post-user waste and because it can stand the test of time, which is particularly significant for products that stay a considerable long time in the economy, such as flat glass, or products that are made of materials that may change their risk status relatively quickly during their use, such as certain plastics.

The bundling of several requirements on information gathering and supply which are set out in different legal acts into one horizontal act, has the advantage that all other laws could refer to the act that would legally shape the introduction of product passports and the online product registration database. If deemed necessary, vertical laws could then require specific information for particular substances, products or waste items. Which instruments it should replace and which information should be shared are issues that will probably provoke intense discussions and therefore need to be clarified further. If the imagined law only bundles the existing instruments, no problems would probably be encountered, for example relating to the legal boundaries provided in intellectual property law. Clearly, if the Commission wishes to pursue this idea of introducing product passports and the online product database, it would require much more clarification on the substance of the pictured law.

Bibliography

Legal acts of the European Union

2017
Regulation 2017/752 of 28 April 2017 amending and correcting Regulation 10/2011 on plastic materials and articles intended to come into contact with food, [2017] OJ L 113/18
Decision 2017/176 of 25 January 2017 on establishing EU Ecolabel criteria for wood-, cork- and bamboo-based floor coverings, [2017] OJ L 28/44
2016
Regulation 2016/1416 of 24 August 2016 amending and correcting Regulation 10/2011 on plastic materials and articles intended to come into contact with food, [2016] OJ L 230/22
Regulation 2016/1245 of 28 July 2016 setting out a preliminary correlation table between codes of the Combined Nomenclature provided for in Council Regulation (EEC) No 2658/87 and entries of waste listed in Annexes III, IV and V to Regulation (EC) No 1013/2006 of the European Parliament and of the Council on shipments of waste, [2016] OJ L 204/11
Decision 2016/1332 of 28 July 2016 establishing the ecological criteria for the award of the EU Ecolabel for furniture, [2016] OJ L 210/100
2015
Decision of 17 December 2015 on a standardisation request to the European standardisation organisations as regards ecodesign requirements on material efficiency aspects for energy-related products in support of the implementation of Directive 2009/125/EC of the European Parliament and of the Council, C(2015)9096
Decision 2015/1131 of 10 July 2015 amending Implementing Decision 2013/505/EU authorising the provisional measure taken by the French Republic in accordance with Article 129 of Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) to restrict the use of ammonium salts in cellulose wadding insulation materials, [2015] OJ L 184/20
2014
Decision 2014/312 of 28 May 2014 establishing the ecological criteria for the award of the EU Ecolabel for indoor and outdoor paints and varnishes, [2004] OJ L 164/45
Directive 2014/25 of 26 February 2014 on procurement by entities operating in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC, [2014] OJ L 94/243
Directive 2014/24 of 26 February 2014 on public procurement and repealing Directive 2004/18/EC, [2014] OJ L 94/65
Directive 2014/23 of 26 February 2014 on the award of concession contracts, [2014] OJ L 94/1
2013
Regulation 1301/2013 of 17 December 2013 on the European Regional Development Fund and on specific provisions concerning the Investment for growth and jobs goal and repealing Regulation (EC) No 1080/2006, [2013] OJ L 374/289
Decision C(2013) 6658 of 14 October 2013 authorising the provisional measure taken by the French Republic in accordance with Article 129 of Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) to restrict the use of ammonium salts in cellulose wadding insulation materials, [2013] OJ L 275/52
Regulation 333/2011of 31 March 2011establishing criteria determining when certain types of scrap metal cease to be waste under Directive 2008/98/EC of the European Parliament and of the Council, [2011] OJ L 94/2; Regulation 715/2013 of 25 July 2013 establishing criteria determining when copper scrap ceases to be waste under Directive 2008/98/EC of the European Parliament and of the Council, [2013] OJ L 201/14
2012
Regulation 1179/2012 of 10 December 2012 establishing criteria determining when glass cullet

ceases to be waste under Directive 2008/98/EC of the European Parliament and of the Council, [2012] OJ L 337/31
Regulation 1025/2012 of 25 October 2012 on European standardisation, amending Council Directives 89/686/EEC and 93/15/EEC and Directives 94/9/EC, 94/25/EC, 95/16/EC, 97/23/EC, 98/34/EC, 2004/22/EC, 2007/23/EC, 2009/23/EC and 2009/105/EC of the European Parliament and of the Council and repealing Council Decision 87/95/EEC and Decision No 1673/2006/EC of the European Parliament and of the Council, [2012] OJ L 316/12
Implementing Regulation 607/2012 of 6 July 2012 on the detailed rules concerning the due diligence system and the frequency and nature of the checks on monitoring organisations as provided for in Regulation (EU) No 995/2010 of 6 July 2012 laying down the obligations of operators who place timber and timber products on the market, [2012] OJ L 177/16
Regulation 547/2012 of 25 June 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for water pumps, [2012] OJ L 165/28
Regulation 206/2012 of 6 March 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for air conditioners and comfort fans, [2012] OJ L 72/7
Regulation 528/2012 of 22 May 2012 concerning the making available on the market and use of biocidal products [2012] OJ L 167/1
2011
Directive 2011/83 of 25 October 2011 on consumer rights, amending Council Directive 93/13/EEC and Directive 1999/44/EC of the European Parliament and of the Council and repealing Council Directive 85/577/EEC and Directive 97/7/EC of the European Parliament and of the Council, [2011] OJ L 304/64
Regulation 2011/65 of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, [2011] OJ L 174
Regulation 305/2011 of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC, [2011] OJ L 88/5
Regulation 182/2011 of 16 February 2011 laying down the rules and general principles concerning mechanisms for control by Member States of the Commission's exercise of implementing powers, [2011] OJ L 55/13
Regulation 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food, [2011] OJ L 12/1
2010
Regulation 66/2010 of 25 November 2009 on the EU Ecolabel, [2010] OJ L 27/1
Regulation 1016/2010 of 10 November 2010 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for household dishwashers, [2010] OJ L 293/31
Directive 2009/125 of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products, [2010] OJ L 285/10
Regulation 995/2010 of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market, [2010] OJ L 295/23
VPA of 19 March 2010 between the European Community and the Republic of Ghana on forest law enforcement, governance and trade in timber products into the Community, [2010] OJ L 70/3
2009
Decision 2009/894 of 30 November 2009 on establishing the ecological criteria for the award of the Community eco-label for wooden furniture, [2009] OJ L 320/23
Decision 2010/18 of 26 November 2009 on establishing the ecological criteria for the award of the Community Ecolabel for wooden floor coverings, [2009] OJ L 8/32
Regulation 66/2010 of 25 November 2009 on the EU Ecolabel, [2009] OJ L 192/24
Directive 2009/125 of 21 October 2009 establishing a framework for the setting of ecodesign

requirements for energy-related products, [2009] OJ L 285/10

Regulation 642/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for televisions, [2009] OJ L 191/42

Directive 2009/33 of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles, [2009] OJ L 120/5

Decision 2009/300 of 12 March 2009 establishing the revised ecological criteria for the award of the Community ecolabel to televisions, [2009] OJ L 82/3

2008

Regulation 12/72/2008 of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 [2008] OJ L 353/1

Directive 2008/98 of 19 November 2008 on waste and repealing certain Directives, [2008] OJ L 312/3

Regulation 1024/2008 of 17 October 2008 laying down detailed measures for the implementation of Council Regulation 2173/2005 on the establishment of a FLEGT licensing scheme for imports of timber into the European Community, [2008] OJ L 277/23

Decision 768/2008 of 9 July 2008 on a common framework for the marketing of products, and repealing Council Decision 93/465/EEC, [2008] OJ L 218/82

Regulation 340/2008 of 16 April 2008 on the fees and charges payable to the European Chemicals Agency pursuant to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), [2008] OJ L 107/6

Regulation 282/2008 of 27 March 2008 on recycled plastic materials and articles intended to come into contact with foods and amending Regulation (EC) No 2023/2006, [2008] OJ L 86/9

2007

Treaty of Lisbon of 7 December 2007 amending the Treaty on European Union and the Treaty establishing the European Community [2007] OJ C 306/1

Protocol (No 2) of 7 December 2007 on the application of the principles of subsidiarity and proportionality, annexed to EU Treaties and introduced by the Lisbon Treaty: OJ C 306,

2006

Regulation 1907/2006 of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, [2006] OJ L 136/3

Directive 2006/66 of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC, [2006] OJ L 266/1

Directive 2006/12 of 5 April 2006 on waste, [2006] OJ L 114/9

2005

Regulation 2173/2005 of 20 December 2005 on the establishment of a FLEGT licensing scheme for imports of timber into the European Community, [2005] OJ L 347/1

Directive 2005/32 of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council, [2005] OJ L 191/29

2004

Regulation 1935/2004 of 27 October 2004 on materials and articles intended to come into contact with food and repealing Directives 80/590/EEC and 89/109/EEC, [2004] OJ L 338

Directive 2004/18 of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts, [2004] OJ L 134/114

Directives 2004/17 of 31 March 2004 coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors, [2004] OJ L 134/1
Earlier dates
Decision 1600/2002 of 22 July 2002 laying down the Sixth Community Environment Action Programme, [2002] OJ L 242/1
Directive 2001/95 of 3 December 2001 on general product safety, [2002] OJ L 11/4
Treaty of Nice of 10 March 2001 amending the Treaty on European Union, the Treaties establishing the European Communities and certain related acts, [2001] OJ C 80/01
Directive 2000/53 of 18 September 2000 on end-of life vehicles, [2000] OJ L 269/34
Decision 2000/532/EC of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste, [2000] OJ L 226/3
Resolution 1999/C of 15 December 1998 on a forestry strategy for the European Union, [1999] OJ L 56/1
Decision 1999/468 of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission, [1999] OJ L 184/1
Directive 1999/44 of 25 May 1999 on certain aspects of the sale of consumer goods and associated guarantees, [1999] OJ L 171/12
Directive 98/8 of 16 February 1998 concerning the placing of biocidal products on the market, [1998] OJ L 123/1
Protocol of 10 November 1997 on the application of the principles of subsidiarity and proportionality, annexed to the EC Treaty and introduced by the Treaty of Amsterdam, OJ C 340
Regulation 338/97 of 9 December 1996 on the protection of species of wild fauna and flora by regulating trade therein, [1997] OJ L 61/1
Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation, [1996] OJ L 159/1
Directive 94/62 of 20 December 1994 on packaging and waste packaging, [1994] OJ L 365/10
Regulation 259/93 of 1 February 1993 on the supervision and control of shipments of waste within, into and out of the European Community, OJ L 30/1
Maastricht Treaty of 7 February 1992 on European Union, OJ C 191
Directive 91/689 of 12 December 1991 on hazardous waste, OJ L 377/20
Directive 91/156 of 18 March 1991 amending Directive 75/442/EEC on waste, [1991] OJ L 78/32
Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products, [1989] OJ L 40/12
Regulation 2658/87 of 23 July 1987 on the tariff and statistical nomenclature and on the Common Customs Tariff, [1987] OJ L 256/1
Single European Act of 17 February 1986 and 28 February 1986, [1986] OJ L 169/1
Council Resolution of 7 May 1985 on a new approach to technical harmonization and standards, [1985] OJ L 136/01
Directive 75/439 of 16 June 1975 on the disposal of waste oils, [1975] OJ L 194/23
Directive 75/442 of 15 July 1975 on waste, [1975] OJ L 194/39
Directive 67/548 of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances, [1967] OJ L 234
Treaty of Rome of 25 March 1957 establishing the European Economic Community, [1957]

CJEU judgements and opinions

2017-2011
Judgement of 27 October 2016, *James Elliott Construction Limited v Irish Asphalt Limited*, C-

613/14, EU:C:2016:821

Judgement of 10 September 2015, *Fédération des entreprises du commerce et de la distribution (FCD), Fédération des magasins de bricolage et de l'aménagement de la maison (FMB) v Ministre de l'Écologie, du Développement durable et de l'Énergie*, C-106/14, EU:C:2015:576

Judgement of 4 March 2015, *Fipa Group and Others*, C-534/13, EU:C:2015:140

Opinion of Advocate General Kokott on 12 February 2015, *Fédération des entreprises du commerce et de la distribution (FCD), Fédération des magasins de bricolage et de l'aménagement de la maison (FMB) v Ministre de l'Écologie, du Développement durable et de l'Énergie,* C-106/14, EU:C:2015:93

Opinion of Advocate General Jääskinen on 18 December 2014, *Council v Commission,* C-409/13, EU:C:2014:2470

Judgement of 12 December 2013, *Shell Nederland Verkoopmaatschappij NV* and *Belgian Shell NV*, Joined C-241/12 and C-242/12, EU:C:2013:821

Opinion of Advocate General Jääskinen on 18 June 2013, *Shell Nederland Verkoopmaatschappij NV* and *Belgian Shell NV*, Joined C-241/12 and C-242/12, EU:C:2013:405

Opinion of Advocate General Cruz Villalón on 16 May 2013, *Donal Brady v Environmental Protection Agency*, C-113/12, EU:C:2013:324

Judgement of 7 March 2013, *Lapin elinkeino-, liikenne- ja ympäristökeskuksen liikenne ja infrastruktuuri –vastuualue v Lapin luonnonsuojelupiiri ry*, C-358/11, EU:C:2013:142

Opinion of Advocate General Kokott on 13 December 2012, *Lapin elinkeino-, liikenne- ja ympäristökeskuksen liikenne ja infrastruktuuri –vastuualue v Lapin luonnonsuojelupiiri ry*, C-358/11, EU:C:2012:797

Judgement of 21 July 2011, *Etimine SA v Secretary of State for Work and Pensions*, C-15/10, EU:C:2011:504

Judgement of 19 July 2012, *Parliament v Council*, C-130/10, EU:C:2012:472

Judgement of 12 June 2012, *Fra.bo SpA v Deutsche Vereinigung des Gas- und Wasserfaches eV (DVGW) - Technisch-Wissenschaftlicher Verein*, C-171/11, EU:C:2012:453

Judgement of 10 May 2012, *Commission v Netherlands*, C-368/10, EU:C:2012:284 (*Dutch Coffee* Case)

2010-2001

Judgement of 22 December 2010, *Gowan Comércio Internacional e Serviços Lda v Ministero della Salute*, C-77/09, EU:C:2010:803

Judgement of 9 July 2010, *Afton Chemical Ltd v Secretary of State for Transport*, C-343/09, EU:C:2010:419

Judgement of 9 March 2010, *ERG and Others v Ministerio dello Sviluppo económico*, C-378/08, EU:C:2010:126

Judgement of 28 January 2010, *Commission v France*, C-333/08, EU:C:2010:44

Judgement of 15 October 2009, *Enviro tech (Europe) Ltd v Etat belge*, C-425/08, EU:C:2009:635

Judgement of 7 July 2009, *S.P.C.M. SA, C.H. Erbslöh KG, Lake Chemicals and Minerals Ltd and Hercules Inc. v Secretary of State for the Environment, Food and Rural Affairs*, C-558/07, EU:C:2009:430

Judgement of 6 November 2008, *Parliament v Council*, C-155/07, EU:C:2008:605

Judgement of 10 September 2008, *Evropaïki Dynamiki - Proigmena Systimata Tilepikoinonion Pliroforikis kai Tilematikis AE v Commission*, T-59/05, EU:T:2008:326

Judgement of 24 June 2008, *Commune de Mesquer v Total France SA, Total International Ltd*, C-188/07, EU:C:2008:359

Judgement of 20 May 2008, *Commission v Council*, C-91/05, EU:C:2008:288

Judgement of 18 December 2007, *Commission v Italy*, C-263/05, EU:C:2007:808

Judgement of 18 December 2007, *Commission v Italy*, C-195/05, EU:C:2007:807

Judgement of 13 September 2007, *Land Oberösterreich and Austria v Commission*, Joined C-439/05 and C-454/05P, EU:C:2007:510

Judgement of 18 July 2007, *Industrias Químicas del Vallés, SA v Commission*, C-326/05 P, EU:C:2007:443

Judgement of 11 July 2007, *Sweden v Commission*, T-229/04, EU:T:2007:217 (*Paraquat*)

Judgement of 1 March 2007, *KVZ retec GmbH v Austria*, C-176/05, EU:C:2007:123

Judgement of 6 December 2005, *ABNA Ltd and Others v Ministero delle Politiche Agricole e Forestali and Others*, Joined C-453/03, C-11/04, C-12/04 and C-194/04, EU:C:2005:741

Judgement of 14 April 2005, *Deponiezweckverband Eiterköpfe v Land Rheinland-Pfalz*, C-6/03, EU:C:2005:222

Judgement of 3 March 2005, *Fabricom SA v Belgium*, Joined C-21/03 and C-34/03, EU:C:2005:127

Judgement of 14 December 2004, *Swedish Match AB and Swedish Match UK Ltd v Secretary of State for Health*, C-210/03, EU:C:2004:802

Judgement of 2 December 2004, *Commission v The Netherlands*, C-41/02, EU:C:2004:762

Judgement of 11 November 2004, *Criminal proceedings against Antonio Niselli*, C-457/02, EU:C:2004:707

Judgement of 15 January 2004, *Criminal proceedings against Marco Antonio Saetti and Andrea Frediani*, C-235/02, EU:C:2004:26

Judgement of 4 December 2003, *EVN AG and Wienstrom GmbH v Austria*, C-448/01, EU:C:2003:651

Judgment of the Court of 23 September 2003, *Commission v Denmark*, C-192/01, EU:C:2003:492

Judgement of 11 September 2003, *AvestaPolarit Chrome Oy, formerly Outokumpu Chrome Oy*, C-114/01, EU:C:2003:448

Judgement of 9 September 2003, *Monsato Agricoltura Italia SpA and Others v Presidenza del Consiglio dei Ministri and Others*, C-236/01, EU:C:2003:431

Judgement of 20 March 2003, *Denmark v Commission*, C-3/00, EU:C:2003:167

Judgement of 13 February 2003, *Commission v Germany*, C-228/00, EU:C:2003:91

Judgement of 21 January 2003, *Germany v Commission*, C-512/99, EU:C:2003:40

Opinion of Advocate General Mischo on 12 December 2002, *Commission v Denmark*, C-192/01, EU:C:2002:760

Judgement of 10 December 2002, *Ex p. BAT*, C-491/01, EU:C:2002:741

Judgement of 26 November 2002, *Artegodan GmbH and Other v Commission*, Joined T-74/00, T-76/00, T-83/00 to T-85/00, T-132/00, T-137/00 and T-141/00, EU:T:2002:283

Judgement of 19 September 2002, *Austria v Martin Huber*, C-336/00, EU:C:2002:509

Judgement of 17 September 2002, *Concordia Bus Finland Oy Ab v Helsingin kaupunki, HKL-Bussiliikenne*, C-513/99, EU:C:2002:495

Judgement of 11 September 2002, *Alpharma v Council*, T-70/99, EU:T:2002:210

Judgement of 11 September 2002, *Pfizer Animal Health SA v Council*, T-13/99, EU:T:2002:209

Judgement of 25 April 2002, *Maria Victoria González Sanchez v Medicina Asturiana SA*, C-183/00, EU:C:2002:255

Judgement of 25 April 2002, *Commission v Greece*, C-154/00, EU:C:2002:254

Judgement of 25 April 2002, *Commission v France*, C-52/00, EU:C:2002:252

Judgement of 18 April 2002, *Palin Granit and Vehmassalon kansanterveystyön kuntayhtymän hallitus*, C-9/00, EU:C:2002:232

Opinion of Advocate General Mischo on 13 December 2001, *Concordia Bus Finland Oy Ab v Helsingin kaupunki, HKL-Bussiliikenne*, C-513/99, EU:C:2001:686

Judgement of 13 December 2001, *DaimlerChrysler AG v Land baden Württemberg*, C-324/99, EU:C:2001:682

Judgement of 15 November 2001, *Abfall Service AG v Bundesminister fur Umwelt, Jugend and Familie*, C-6/00, EU:C:2001:610

2000-1991

Judgement of 11 July 2000, *Kemikalieinspektionen and Toolex Alpha AB*, C-473/98,

EU:C:2000:379 (*Toolex* Case)

Judgement of 4 July 2000, *Laboratoires Pharmaceutiques Bergaderm SA and Jean-Jacques Goupil v Commission*, C-352/98 P, EU:C:2000:361

Judgement of 15 June 2000, *ARCO Chemie Nederland Ltd v Minister van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer and Vereniging Dorpsbelang Hees, Stichting Werkgroep Weurt+ and Vereniging Stedelijk Leefmilieu Nijmegen v Directeur van de dienst Milieu en Water van de provincie Gelderland*, Joined C-418/97 and C-419/97, EU:C:2000:318

Opinion Advocate General Mischo on 21 March 2000, *Kemikalieinspektionen and Toolex Alpha AB*, C-473/98, EU:C:2000:147

Judgement of 11 November 1999, *Commission v Germany*, C-184/97, EU:C:1999:546

Judgement of 5 October 1999, *Paolo Lirussi and Francesca Bizzaro*, Joined C-175/98 and C-177/98, EU:C:1999:486

Judgement of 14 July 1998, *Safety Hi-Tech Srl v S. & T. Sri*, C-284/95, EU:C:1998:352

Judgement of 25 February 1999, *European Parliament v Council*, Joined C-164/97 and C-165/97, EU:C:1999:99

Judgement of 17 December 1998, *Società Italiana Petroli SpA (IP) v Borsana Srl*, C-2/97, EU:C:1998:613

Judgement of 25 June 1998, *Chemische Afvalstoffen Dusseldorp BV and Others v Minister van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer*, C-203/96, EU:C:1998:316

Judgement of 5 May 1998, *United Kingdom v. Commission*, C-180/96, EU:C:1998:192 (*BSE disease* Case)

Judgement of 5 May 1998, *The Queen v National Farmers' Union and Others*, C-157/96, EU:C:1998:191

Judgment of the Court of 19 March 1998, *The Queen v Minister of Agriculture, Fisheries and Food, ex parte Compassion in World Farming Ltd*, C-1/96, EU:C:1998:113 (*World Farming* Case), paras. 57-60

Judgement of 18 December 1997, *Inter-Environment Wallonie ASBL v Région Wallone*, C-129/96, EU:C:1997:628

Judgement of 25 June 1997, *Criminal proceedings against Euro Tombesi and Others*, Joined C-304/94, C-330/94, C-342/94 and C-224/95, EU:C:1997:314

Judgement of 13 May 1997, *Germany v Parliament and Council*, C-233/94, EU:C:1997:231

Opinion of Advocate General Jacobs on 24 October 1996, *Criminal proceedings against Euro Tombesi and others*, Joined C-304/94, C-330-94, C-342/94 and C-224/95, EU:C:1996:399

Judgement of 26 March 1996, *Parliament* v *Council*, C-271/94, EU:C:1996:133

Judgement of 10 May 1995, *Commission v Germany*, C-422/92, EU:C:1995:125

Judgement of 28 June 1994, *European Parliament v Council*, C-187/93, EU:C:1994:265

Judgement of 17 March 1993, *Commission v Council*, C-155/91, EU:C:1993:98

Judgement of 9 July 1992, *Commission v Belgium*, C-2/90, EU:C:1992:310

Judgement of 11 June 1991, *Commission v Council*, C-300/89, EU:C:1991:244

1990-earlier

Judgement of 13 November 1990, *The Queen v The Minister for Agriculture, Fisheries and Food and the Secretary of State for Health, ex parte: Fedesa and Others*, C-331/88, EU:C:1990:391

Judgement of 28 March 1990, *Criminal proceedings against E Zanetti and Others*, C-359/88, EU:C:1990:148

Judgement of 11 May 1990, *Parliament* v *Council*, C-70/88, EU:C:1990:217

Judgement of 28 March 1990, *Criminal proceedings against E Zanetti and Others*, Joined C-206/88 and C-207/88, EU:C:1990:145

Opinion of Advocate General Jacobs on 13 December 1989, *Criminal proceedings against E Zanetti and Others*, Joined C-206/88 and C-207/88, EU:C:1989:644

Judgement of 20 September 1988, *Gebroeders Beentjes BV v Netherlands*, C-31/87, EU:C:1988:422

Judgement of 12 July 1988, *Commission v United Kingdom*, C-60/86, EU:C:1988:382 (*Dim-dip*

Lighting Case)
Judgement of 12 May 1987, *Ministère public Oscar Van Traen and Others*, Joined C-372 to C-374/85, EU:C:1987:222
Judgement of 26 March 1987, *Commission v Council*, C-45/86, EU:C:1987:163
Judgement of 6 October 1982, *Srl CILFIT and Lanificio di Gavardo SpA v Ministry of Health*, C-283/81, EU:C:1982:335
Judgement of 10 December 1968, *Commission v Italy*, C-7/68, EU:C:1968:51

EU policy documents, reports and websites

2018
European Commission, *Communication on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation*, COM(2018) 32
European Commission, *A European Strategy for Plastics in a Circular Economy*, COM(2018) 28
European Commission, *Communication on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation*, SWD(2018) 20
2017
Political agreement of 18 December 2017 between the European Commission, European Council and European Parliament on the legislative proposals for the EU waste laws under the Circular Economy Package, see e.g. https://ec.europa.eu/commission/commissioners/2014-2019/vella/announcements/statement-commissioner-vella-political-agreement-reached-modernise-waste-rules_en and http://www.consilium.europa.eu/en/press/press-releases/2017/12/18/council-and-parliament-reach-provisional-agreement-on-new-eu-waste-rules/ (consulted on 29 January 2018) – it is not yet possible to attain the final text, because it is still to be finalized. The text will still have to be adopted by both the EP and the Council
European Parliament, *Briefing of October 2017: Chemicals and the circular economy – Dealing with substances of concern*, PE 608.725
European Parliament, *Resolution of 4 July 2017 on a longer lifetime for products: benefits for consumers and companies*, P8_TA-PROV(2017)0, 287 2016/2272(INI)
European Commission, *Report on the implementation of the Circular Economy Action Plan*, COM(2017) 33
European Commission, *Horizon 2020 - Work Programme 2018-2020*, C(2017) 7124
European Commission, *Report on the review of implementation of Regulation (EC)No 122/2009 of the European Parliament and of the Council on 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS) and the Regulation (EC) No 66/2010 of the parliament and of the Council of 25 November 2009 on the EU Ecolabel*, COM(2017) 335
European Commission, *EU Green Public Procurement criteria for Furniture*, SWD(2017) 283
European Commission, *Communication on the Mid-Term Review on the implementation of the Digital Single Market Strategy - A Connected Digital Single Market for All*, SWD(2017) 155
European Commission, *The role of waste-to-energy in the circular economy*, COM(2017) 34
European Commission, Review of the 2012 European Bioeconomy Strategy, 2017, brochure: http://ec.europa.eu/research/bioeconomy/pdf/review_of_2012_eu_bes.pdf#view=fit&pagemode=none (consulted on 19 December 2017)
European Commission, *Roadmap for the strategy on plastics in a circular economy*, 26 January 2017, http://ec.europa.eu/smart-regulation/roadmaps/docs/plan_2016_39_plastic_strategy_en.pdf (consulted on 22 December 2017)
2016
European Commission, Decision of 25 July 2016 *Horizon 2020 Work Programme 2016-2017*, C(2016)4614
European Commission, *Ecodesign Working Plan 2016-2019*, COM(2016) 773
European Council, *Council conclusions on the EU action plan for the circular economy*, press

release 367/16, http://www.consilium.europa.eu/en/press/press-releases/2016/06/20/envi-conclusions-circular-economy/ (consulted on 22 December 2017)
European Commission, *European Standards for the 21th Century*, COM(2016) 358
European Commission, *EU GPP Criteria for Office Buildings Design, Construction and Management*, SWD(2016) 180
European Commission, *Exploiting the potential of Waste to Energy under the Energy Union Framework Strategy and the Circular Economy*, ENV-UNIT A2–2016/ENV/086, 2016
European Commission, *First communication of the Commission about the Community's policy on the environment*, SEC (71) 2016
European Commission, *An EU Strategy on Heating and Cooling*, COM(2016) 51
European Commission, *Better regulations for innovation-driven investment at EU level*, Commission Staff Working Document 2016, https://ec.europa.eu/research/innovation-union/pdf/innovrefit_staff_working_document.pdf (consulted on 22 December 2017)
2015
European Parliament, *Resolution of 9 July 2015 on resource efficiency: moving towards a circular economy*, 2014/2208(INI)
European Commission, *Closing the loop – An EU action plan for the Circular Economy*, COM(2015) 614
European Commission, *Annex to the Communication Closing the loop – An EU action plan for the Circular Economy*, COM(2015) 614/2
European Commission, *Proposal for a Directive amending Directive 94/62/EC on packaging and packaging waste*, COM(2015) 596
European Commission, *Proposal for a Directive amending Directive 2008/98/EC on waste*, COM(2015) 595
European Commission, *Proposal for a Directive amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment*, COM(2015) 593
European Commission, *Implementation Plan*, SWD(2015) 260
European Commission, *Additional analysis to complement the impact assessment SWD (2014) 208 supporting the review of EU waste management targets*, SWD(2015) 259
European Commission, *Better regulation for better results - An EU agenda. Accompanying the document Better Regulation for Better Results – An EU Agenda*, COM(2015) 215
European Commission, *Impact Assessment - Accompanying the document Proposal for a Regulation of the European Parliament and of the Council setting a framework for energy efficiency labelling and repealing Directive 2010/30/EU*, SWD(2015) 139
European Commission, *Better Regulation Guidelines*, SWD(2015) 111
European Commission, *Regulatory Fitness and Performance Programme (REFIT): State of Play and Outlook*, SWD(2015) 110
European Commission, *Annex to the Roadmap for the Energy Union*, COM(2015) 80/2
European Commission, *Energy Union Package. A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy*, COM(2015) 80
European Commission, *The 'Blue Guide' on the implementation of EU product rules*, Version 1.1 – 15/07/2015
European Parliament, European Parliamentary Research Service: D. Bourguignon, *Understanding waste streams Treatment of specific waste*, PE 564.398, Briefing July 2015)
European Commission, *The 'Blue Guide' on the implementation of EU product rules*, Version 1.1 – 15/07/2015
European Commission, *Better Regulation Toolbox*, http://ec.europa.eu/smart-regulation/guidelines/docs/br_toolbox_en.pdf (consulted on 22 December 2017)
European Commission, fact sheet: 'Circular Economy Package: Questions & Answers', 2 December 2015, see http://europa.eu/rapid/press-release_MEMO-15-6204_en.htm (consulted on 10 May 2017)

2014

European Commission. *Commission Work Programme 2015: A New Start*, COM(2014) 910

European Commission, *Annex to the Commission Work Programme 2015: A New Start*, COM(2014) 910

European Commission, *Green Employment Initiative: Tapping into the job creation potential of the green economy*, COM(2014) 446

European Commission, *Communication on resource efficiency opportunities in the building*, COM(2014) 445

European Commission, *Towards a circular economy: A zero waste programme for Europe*, COM(2014) 398

European Commission, *Proposal for a Directive amending Directives 2008/98/EC on waste, 94/62/EC on packaging and packaging waste, 1999/31/EC on the landfill of waste, 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment*, COM(2014) 397

European Commission, *Research and innovation as sources of renewed growth*, COM(2014) 339

European *Commission, Helping Firms Grow - European Competitiveness Report 2014*, SWD(2014)277

European Commission, *Commission Staff Working Document - Ex-post evaluation of Five Waste Stream Directives Accompanying the document Proposal for a Directive of the European Parliament and of the Council reviewing the targets in Directives 2008/98/EC on waste, 94/62/EC on packaging and packaging waste, and 1999/31/EC on the landfill of waste, amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EC on waste electrical and electronic equipment*, SWD(2014) 209

European Commission, *European Resource Efficiency Platform (EREP), Manifesto & Policy Recommendation*, 2014

European Commission, *Frequently Asked Questions (FAQ) on the Ecodesign Directive 2009/125/EC establishing a framework or the setting of ecodesign requirements for energy-related products and its Implementation Regulations*, website former Commission regime, last updated December 2014 (not available anymore)

2013

European Commission, *Proposal for a Council Regulation on defining criteria determining when recovered paper ceases to be waste pursuant to Article 6(1) of Directive 2008/98/EC on waste*, COM(2013) 502 final

EC, *Green Paper on a European Strategy on Plastic Waste in the Environment*, COM(2013) 123

European Commission, *Consultation on the Review of the European Waste Management Targets*, which ran from 4 June 2013 to 10 September 2013, http://ec.europa.eu/environment/consultations/waste_targets_en.htm (consulted 22 December 2017)

European Commission, *Roadmap on Substances of Very High Concern*, 6 February 2013, 5867/13

European Commission, *Guidance document for the EU Timber Regulation*, 2013, http://ec.europa.eu/environment/eutr2013/_static/files/guidance/guidance-document-5-feb-13_en.pdf (consulted on 22 December 2017)

2012

European Commission, *Review of Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (recast) - 2012 Review*, COM(2012) 765

European Commission, *Establishment of the Working Plan 2012-2014 under the Ecodesign Directive*, SWD(2012) 434

European Commission, *Strategy for the sustainable competitiveness of the construction sector and its enterprises*, COM(2012) 43

European Commission, *Innovating for Sustainable Growth: A Bioeconomy for Europe*,

COM(2012) 60
European Commission, *Ecodesign Your Future, How Ecodesign can help the environment by making products smarter*, brochure 2012, https://publications.europa.eu/en/publication-detail/-/publication/4d42d597-4f92-4498-8e1d-857cc157e6db/language-en (consulted on 22 December 2017)
European Commission, *Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste*, 2012, http://ec.europa.eu/environment/waste/framework/pdf/guidance_doc.pdf (consulted 22 December 2017)
European Parliament, *Motion for a resolution*, Doc B7-0000/2013, 18 October 2013
European Parliament, *Resolution of 24 May 2012 on a resource-efficient Europe*, A7-0161/2012
2011
European Commission, *Impact Assessment – Accompanying the document: Innovation for a sustainable Future - The Eco-innovation Action Plan (Eco-AP)*, Commission Staff Working Document, SEC(2011) 1599
European Commission, *Europe 2020 Flagship Initiative Innovation Union*, SEC(2010) 1161
European Commission, *Innovation for a sustainable Future - The Eco-innovation Action Plan (Eco-AP)*, COM(2011) 899
European Commission, *Proposal for a Directive on public procurement*, COM(2011) 896
European Commission, *Roadmap to a Resource Efficient Europe*, COM(2011) 571
European Commission, *Standardisation mandate to CEN, CENELEC and ETSI under Directive 2009/125/EC relating to harmonised standards in the field of Ecodesign*, 27 July 2011, M/495 EN
European Commission, *A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy*, COM(2011) 21
European Commission, *Green paper of 27 January 2011 on the modernisation of EU public procurement policy - Towards a more efficient European Procurement Market*, COM(2011) 15
European Commission, *Report on the Thematic Strategy on the Prevention and Recycling of Waste*, COM(2011) 13
European Commission, *Buying green! A handbook on green public procurement*, 2 edn, 2011, http://ec.europa.eu/environment/gpp/pdf/handbook.pdf (consulted on 22 December 2017)
European Commission, *Guidelines on the interpretation of the R1 energy efficiency formula for incineration facilities dedicated to the processing of MSW*, 2011, http://ec.europa.eu/environment/waste/framework/pdf/guidance.pdf (consulted on 22 December 2017)
European Commission, *statement of Commissioner Potočnik, see: Parliamentary questions of 4 August 2011*, www.europarl.europa.eu/sides/getAllAnswers.do?reference=E-2011-005520&language=SV (consulted on 13 November 2016)
2010
European Commission, *Europe 2020 A strategy for smart, sustainable and inclusive growth*, COM(2010) 2020
European Commission, *An Agenda for new skills and jobs: A European contribution towards full employment*, COM(2010) 682
European Commission, *Europe 2020 Flagship Initiative Innovation Union*, COM(2010) 546
European Commission, *4th Meeting of the Competent Authorities for the implementation of Regulation (EC) 1907/2006 (REACH)*, final summary record, CA/38/2010, 2010
European Commission, *Frequently asked questions on Regulation (EC) 1013/2006 on shipments of waste, September 2010*, http://ec.europa.eu/environment/waste/shipments/pdf/faq.pdf (consulted on 7 May 2015)
European Commission, *Wall Panels – Green Public Procurement Product Sheet*, 2010, http://ec.europa.eu/environment/gpp/pdf/wall_panels_GPP_product_sheet.pdf (consulted on 22 December 2017)
2009
European Commission, *Mainstreaming sustainable development into EU policies: 2009 Review of*

the European Union Strategy for Sustainable Development, COM(2009) 400
European Commission, *Third strategic review of Better Regulation in the European Union*, COM(2009) 15
European Commission, *Follow-up to 5th Meeting of the Competent Authorities for the implementation of Regulation (EC) 1907/2006 (REACH)*, draft guidance document of 3 April 2009 (CA/24/2008 rev.3)
2008
European Commission, *The raw materials initiative — meeting our critical needs for growth and jobs in Europe*, COM(2008) 699
European Commission, *Establishment of the working plan for 2009-2011 under the Ecodesign Directive*, COM(2008) 660
European Commission, *Proposal for a Regulation laying down the obligations of operators who place timber and timber products on the market*, COM(2008) 644
European Commission, *Public procurement for a better environment*, COM(2008) 400
European Commission, *Proposal for a Directive establishing a framework for the setting of ecodesign requirements for energy related products*, COM(2008) 399
European Commission, *Communication on the Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan*, COM(2008) 397
European Commission, *Towards an increased contribution from standardisation to innovation in Europe*, COM(2008) 133
European Parliament, *Recommendation of 18 April 2008 for second reading on the Council common position for adopting a directive of the European Parliament and of the Council on waste and repealing certain Directives* (11406/4/2007 – C6-0056/2008 – 2005/0281(COD)), A6-0162/2008
2007
European Commission, *Questions and Answers on the European Chemicals Agency (ECHA) and REACH*, MEMO/07/218
2006
European Commission, brochure on Better Regulation, *Better Regulation — simply explained*, 2006, http://ec.europa.eu/smart-regulation/better_regulation/documents/brochure/brochure_en.pdf (consulted 22 December 2017)
European Parliament, Report of 15 December 2006 on the proposal for a directive of the European parliament and of the Council on waste (COM(2005)0667 – C6-0009/2006 – 2005/0281(COD)), A6-0466/2006
European Council, *Review of the EU Sustainable Development Strategy (EU SDS) - Renewed Strategy*, 10917/06, 26 June 2006
European Council, *Review of the EU Sustainable Development Strategy (EU SDS) - Renewed Strategy*, 10917/06
2005
European Parliament, *Position of the European Parliament adopted at second reading on 13 April 2005 with a view to the adoption of Directive 2005/.../EC of the European Parliament and of the Council establishing a framework for the setting of ecodesign requirements for Energy-Using Products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council*, P6_TC2-COD(2003)0172, OJ C 33E/443
European Parliament, *Recommendations on 18 March 2005 for second reading on the Council common position for adopting a directive of the European Parliament and of the Council establishing a framework for the setting of eco-design requirements for Energy-Using Products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council (11414/1/2004 – C6-0246/2004 - 2003/0172(COD))*, A6-0057/2005, PE 353.311v02-00
European Commission, *Thematic Strategy on the sustainable use of natural resources*, COM(2005) 670

European Commission, *Taking sustainable use of resources forward: A Thematic Strategy on the prevention and recycling of waste,* COM(2005) 666
European Commission, *On the review of the Sustainable Development Strategy - A platform for action*, COM(2005) 658
European Commission, *Draft Declaration on Guiding Principles for Sustainable Development*, COM(2005) 218
European Commission, *Better regulation for growth and jobs,* COM(2005) 97
2004
European Parliament, *Report of 17 March 2004 on the proposal for a directive of the European Parliament and of the Council on establishing a framework for the setting of Eco-design requirements for Energy-Using Products and amending Council Directive 92/42/EEC (COM(2003) 453 – C5-0369/2003 – 2003/0172(COD)), Opinion of the Committee on Legal Affairs and the Internal Market on the legal basis,* PE 337.058, A5-0171/2004
European Council, *Position commune arrêtée par le Conseil du 29 novembre 2004 en vue de l'adoption de la directive du Parlement européen et du Conseil établissant un cadre pour la fixation d'exigences en matière d'éco-conception applicables aux produits consommateurs d'énergie et modifiant la directive 92/42/CEE du Conseil et les directives 96/57/CE et 2000/55/CE du Parlement européen et du Conseilm*, CS/2004/11414
2003
European Commission, *Proposal for a Directive on establishing a framework for the setting of Eco-design requirements for Energy-Using Products and amending Council Directive 92/42/EEC*, COM(2003) 453
European Commission, *Integrated Product Policy - Building on Environmental Life-Cycle Thinking*, COM(2003) 302
European Commission, *Towards a thematic strategy on the prevention and recycling of waste*, COM(2003) 301
European Commission, *Forest Law Enforcement, Governance and Trade (FLEGT) – Proposal for an EU Action Plan*, COM (2003) 251, see also http://www.euflegt.efi.int/flegt-action-plan (consulted on 22 December 2017)
2001
European Commission, *European Governance A White Paper*, COM(2001) 428
European Commission, *Action plan "Simplifying and improving the regulatory environment"*, COM(2002) 278
European Commission, *European Governance – a White Paper* COM(2001) 428
European Commission, *A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development*, COM(2001) 264
European Commission, *Strategy for a Future Chemicals Policy*, COM(2001) 88
European Commission, *Green paper on integrated product policy*, COM(2001) 68
European Commission, *Environment 2010: Our future, Our choice*, COM(2001) 31
European Commission, *Communication on the precautionary principle*, COM(2000) 1
Unknown year
European Commission, *online Ecolabel Catalogue,* http://ec.europa.eu/ecat/ (consulted on 26 November 2017)
European Commission, *Better Regulation "Toolbox"*, http://ec.europa.eu/smart-regulation/guidelines/docs/br_toolbox_en.pdf (consulted on 13 August 2017)
European Commission, *Statistics: Survey on the evaluation of the EU Timber Regulation two years after its entry into application*, date unknown, http://ec.europa.eu/environment/forests/pdf/eutr_review/Statistics.pdf (consulted on 22 December 2017)
European Commission, *Joint Initiative on Standardisation under the Single Market Strategy, document created and published by the Commission's DG GROW*, GROW.DDG1.B.3
European Commission, *Frequently asked questions EU GPP*,

http://ec.europa.eu/environment/gpp/faq_en.htm#AretheEUGPPcriteriamandatory, (consulted on 26 November 2017)
European Commission, *Raw Materials Information System*, http://rmis.jrc.ec.europa.eu/ (consulted on 24 November 2017)
European Commission, *Smart Specialization Platform,* http://s3platform.jrc.ec.europa.eu/home (consulted on 24 November 2017)

Journal publications

T. Assmuth, M. Hilden and M. Craye, 'Beyond REACH: roadblocks and shortcuts en route to integrated risk assessments and management of chemicals' (*Science of the Total Environment,* 2010)
M. Bengtsson, S. Kock, E. Lundgren-Hendriksson and M.H. Näsholm, 'Coopetition research in theory and practice: Growing new theoretical, empirical, and methodological domains' (*Industrial Marketing Management,* 57, 2016)
L. Bergkamp and N. Herbatschek, 'Regulating Chemical Substances under REACH: The Choice between Authorization and Restriction and the Case of Dipolar Aprotic Solvents' (*Review of European Community & International Environmental Law*, 23:2, 2014)
L. Bernstein, 'Opting out of the Legal System: Extralegal Contractual Relations in the Diamond Industry' (*The Journal of Legal Studies*, 21:1, 1992)
K. Blind and A. Mangelsdorf, 'Motives to standardize: Empirical evidence from Germany' (*Technovation,* 48-49, 2016)
R. Caranta, 'The changes to the public contract directives and the story they tell about how EU law works' (*Common Market Law Review*, 52, 2015)
E. Dudley, 'Comment on Lofstedt's "The substitution principle in chemical regulation: a constructive critique"' (*Journal of Risk regulation,* 17:5, 2014)
J. Fiksel, 'A Framework for Sustainable Materials Management' (*Journal of Materials,* 2006)
E. Fisher, 'The 'perfect storm' of REACH: charting regulatory controversy in the age of information, sustainable development, and globalization' (*Journal of Risk Research*, 8:4, 2008)
J. Fleith de Medeiros *et al*., 'Success factors for environmentally sustainable product innovation: a systematic literature review' (*Journal of Cleaner Production*, 65, 2014)
F. Fleurke and H. Somsen, 'Precautionary regulation of chemical risk: How REACH confronts the regulatory challenges of scale, uncertainty, complexity and innovation' (*Common Market Law Review*, 48, 2011)
S. Foss Hansen, L. Carlsen and J.A. Tickner, 'Chemicals regulation and precaution: does REACH really incorporate the precautionary principle' (*Environmental Science and Policy,* 10:5, 2007)
T. Galkina and E. Lundgren-Hendriksson, 'Coopetition as an entrepreneurial process: Interplay of causation and effectuation' (*Industrial Marketing Management*, 2017)
M. Gharfalkar, R. Court, C. Campell, Z. Ali and G. Hillier, 'Analysis of waste hierarchy in the European waste directive 2008/98/EC' (*Waste Management,* 39, 2015), p. 309.
F.W. Geels, 'Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective' (*Research Policy*, 39, 2010)
F. Geels and J. Schot, 'Typology of sociotechnical transition pathways' (*Research policy,* 36, 2007)
F.W. Geels, 'From sectoral systems of innovation to socio-technical systems Insights about dynamics and change from sociology and institutional theory' (*Research Policy*, 33, 2004)
R. van Gestel and H. W. Micklitz, 'European Integration through Standardization: How Judicial Review is Breaking Down the Club House of Private Standardization Bodies' (*Common Market Law Review*, 50, 2013)
L.H. Goulder and I.W.H. Parry, 'Instrument Choice in Environmental Policy' (*Review of Environmental Economics and Policy*, 2:2, 2008)
N. Hachez and J. Wouters, 'A Glimpse at the Democratic Legitimacy of Private Standard'

(*Journal of International Economic Law*, 14:3, 2011)
S.O. Hansson, L. Molander and C. Rudén 'The Substitution Principle' (*Regulatory Toxicology and Pharmacology*, 59, 2011)
V. Heyvaert, 'Balancing Trade and Environment in the European Union: Proportionality Substituted?' (*Oxford University Press*, 13:3, 2001)
M. Hoppenbrouwers, 'The Story of the Button on the Jacket—Substances of Very High Concern in Complex Products' (*Journal for European Environmental & Planning Law*, 8:4, 2011)
M. Hoppenbrouwers and B. Vanheusden, 'De relatie tussen de REACH-verordening en de (Europese) regelgeving inzak afvalstoffen' (*Milieu- en Energierecht*, 2009)
R. Hughes, 'The EU Circular Economy package – life cycle thinking to life cycle law?' (*The 24th CIRP Conference on Life Cycle Engineering: Procedia CIRP 61*, 2017)
D.R. Iritani, D.A.L. Silva, Y.M.B. Saavedra, P.F.F. Grael and A.R. Ometto, 'Sustainable strategies analysis through Life Cycle Assessment: a case study in a furniture industry' (*Journal of Cleaner Production*, 96, 2015)
J. Jans and L. Squintani, with Aragão, Macrory and Wegener, ''Gold plating' of European Environmental Measures? (*Journal for European Environmental and Planning Law*, 6:4, 2009)
C. Joerges, 'Integration through de-legalisation?' (*European Law Review*, 33:3, 2008).
N.O. Keohane, R.L. Revesz and R.N. Stavins, 'The Choice of Regulatory Instruments in Environmental Policy' (*The Harvard Environmental Law Review*, 1998)
D. Keyaerts, 'Impact of Better Regulation in the Case Law of the European Court of Justice' (*European Journal of Risk Regulation*, 2, 2012)
U. Kral, K. Kellner and P. Brunner, 'Sustainable resource use requires "clean cycles" and safe "final sinks"' (*Science of the Total Environment*, 2013)
J. Krook, N. Svensson and M. Eklund, 'Landfill mining: A critical review of two decades of research' (*Waste Management*, 32, 2012)
P. Kunzlik, 'Green Public Procurement – European Law, Environmental Standards and 'What To Buy' Decisions' (*Journal of Environmental Law*, 25:2, 2013)
J. Laffont and J. Tirole, 'The politics of government decision-making: a theory of regulatory capture' (*The Quarterly Journal of Economics*, 106:4, 1991)
U. Lahl and B. Zeschmar-Lahl, 'Risk based management of chemicals and products in a circular economy at a global scale (risk cycle), extended producer responsibility and EU legislation' (*Environmental Sciences Europe*, 25:3, 2013)
D. Lazarevic, N. Buclet and N. Brandt, 'The application of life cycle thinking in the context of European waste policy' (*Journal of Cleaner Production*, 29-30, 2012), pp. 199-207
J. Lee *et al.* 'The influence of resource strategies on childhood phthalate exposure-The role of REACH in a zero waste society' (*Environment International*, 73, 2014)
J. Lee *et al*., 'Childhood exposure to DEHP, DBP and BBP under existing chemical management systems: A comparative study of sources of childhood exposure in Korea and in Denmark' (*Environment International*, 63, 2014)
J. Lee *et al*., 'Framework for combining REACH and national regulations to obtain equal protection levels on human health and the environment in different countries – Comparative study of Denmark and Korea', (*Journal of Environmental Management*, 125, 2013)
T. Lindhqvist, 'Extended producer responsibility in cleaner production: Policy principle to promote environmental improvements of product systems' (*IIIEE*, 2000)
R.E. Lofstedt, 'The substitution principle in chemical regulation: a constructive critique' (*Journal of Risk Research*, 17:5, 2014)
R.E. Lofstedt, 'Risk versus Hazard – How to Regulate in the 21st Century' (*European Journal of Risk Regulation*, 2, 2011)
E. Maitre-Ekern, 'Resolving problems of fragmentation of environmental protection in European Union law? An analysis of Life-Cycle Thinking in EU product legislation' (*MILEN 2012 Conference: Advancing the Research and Policy Agendas on Sustainable Energy and the Environment*, 2012)

J. Markard, R. Raven and B. Truffer, 'Sustainability transitions: An emerging field of research and its prospects' (*Research Policy*, 41, 2012)
M. Martens and S. de Margerie, 'The Link to the Subject-Matter of the Contract in Green and Social Procurement' (*European Procurement & Public Private Partnership Law Review*, 1, 2013)
R. Nasi and P. G. H. Frost. 'Sustainable forest management in the tropics: is everything in order but the patient still dying?' (*Ecology and Society*, 14(2):40, 2009)
K. Nordlander, Carl-Michael Simon and Hazel Pearson, 'Hazard v. Risk in EU Chemical Regulation' (*European Journal of Risk Regulation*, 3, 2010)
K. Parikka-Alhola and A. Nissinen, 'Environmental impacts and the most economically advantageous tender in public procurement' (*Journal of Public Procurement*, 12:1, 2012)
D. Pesendorfer, 'EU environmental policy under pressure: chemicals policy change between antagonistic goals?' (*Environmental Politics*, 15:1, 2006)
D.M. Peters and U. Schraml 'Does background matter? Disciplinary perspectives on sustainable forest management' (*Biodiversity Conservation*, 23, 2014)
K. Purnhagen, 'Mapping Private Regulation – Classification, Market Access and market Closure Policy and Law's Response' (*Journal of World Trade*, 49:2, 2015)
L. Reins, 'European minimum principles for shale gas: preliminary insights with reference to the precautionary principle' (*Environmental Liability*, 2014)
J. Rockström *et al.*, 'Planetary Boundaries: Exploring the Safe Operating Space for Humanity' (*Ecology and Society*, 14:2, 2009)
M.D. Rogers, 'Risk management and the record of the precautionary principle in EU case law' (*Journal of Risk Research*, 14:4, 2011)
T. de Römph and L. Reins, 'Waste-to-Energy and the Circular Economy - Connecting the dots' (*Oil, Gas, Energy Law Intelligence*, 14:3, 2016)
T. de Römph, 'Terminological Challenges to the Incorporation of Landfill Mining in EU Waste Law in View of the Circular Economy' (*European Energy and Environmental Law Review*, 25:4, 2016)
L. Rushton, 'Health hazards and waste management' (*British Medical Bulletin*, 68, 2003)
N. de Sadeleer, 'Scrap Metal intended for Metal Production: The Thin Line Between Waste and Products' (*Journal for European Environmental & Planning Law*, 9:2, 2012)
N. de Sadeleer, 'The Precautionary Principle as a Device for Greater Environmental Protection: Lessons from EC Courts' (*Review of European Community and International Environmental Law*, 18:1, 2009)
N. de Sadeleer, 'The Precautionary Principle in EC Health and Environmental Law' (*European Law Journal*, 12:2, 2006
J. Sanden, 'Coherence in European Environmental Law with particular regard to the Industrial Emissions Directive' (*European Energy and Environmental Law Review*, 2012)
G. Schaafsme, E.D. Kroese, E.L.J.P. Tielemans, J.J.M. Van de Sandt and C.J. Van Leeuwen, 'REACH, non-testing approaches and the urgent need for a change in mind set' (*Regulatory Toxicology and Pharmacology*, 53, 2009)
H. Schepel, 'The New Approach to the New Approach: The Juridification of Harmonized Standards in EU Law' (*Maastricht Journal of European and Comparative Law*, 20, 2013)
A. Schiavello, 'On "Coherence" and "Law": An Analysis of Different Models' (*Ratio Juris*, 2001)
J. Scott, 'From Brussels with Love: The translantic travels of European Law and the chemistry of regulatory attraction' (*American Journal of Comparative Law*, 57, 2009)
A. Sevenster, 'VinylPlus, the new European PVC industry's voluntary programme toward sustainability' (*Journal of Material Cycles and Waste Management*, 14)
E. Stokes, 'The EC court's contribution to refining the parameters of precaution' (*Journal of Risk Research*, 11:4, 2008)
P. Tecchio, C. McAlister, F. Mathieux and F. Ardente, 'In search of standards to support

circularity in product policies: A systematic approach' (*Journal of Cleaner Production*, 2017)
J. Teekens, 'Better Rules for Better Results, MIW - Make it Work' (*Vereniging voor Milieurecht*, 2016)
H. Tegner Anker, K. de Graaf, R. Purdy and L.Squintani, 'Coping with EU Environmental Legislation -Transposition Principles and Practices' (*Journal of Environmental Law*, 27, 2015)
H.R.J. Vollebergh and E. van der Werf, 'The Role of Standards in Eco-innovation: Lessons for Policymakers' (*Review of Environmental Economics and Policy*, 8:2, 2014)
L. Waalkes and R.G.J. Laan, 'Eigendom van afvalstoffen' (Stichting vervoeradres, *Weg en wagen*, 27:70, June 2013) (Ownership of waste')
J. Wante, 'A European Legal Framework for Enhanced Waste Management' (*1st Int. Symposium on Enhanced Landfill Mining*, 2010) , on file with the author

Books and book chapters

A. Ahrens, A. Braun, A. vom Gleich, K. Heitmann and L. Lißner, *Hazardous Chemicals in products and Processes. Substitution as an Innovative Process* (Physica-Verlag, 2006)
C. Backes, *Law for a circular economy* (Inaugural address, Eleven International Publishing, 2017)
L. Bergkamp and M. Penman, 'Conclusions', in: L. Bergkamp (ed.) *The European Union REACH Regulation for Chemicals. Law and Practice* (Oxford University Press, 2013)
P. Birnie, A. Boyle and C. Redgwell, *International Law & the Environment* (Oxford University Press, 3 edn, 2009)
R. van der Brugge, *Transition dynamics in social-ecological systems. The case of Dutch water management* (PhD dissertation, Erasmus University Rotterdam, 2009)
M. Butti and P. Heylen, 'A Business Strategy for Enterprises – A Practitioner's Viewpoint', in: D. Drohmann and M. Townsend, *REACH, Best Practice Guide to Regulation (EC) No 1907/2006 (*Hart Publishing, 2013)
G. Van Calster, *EU Waste Law* (Oxford University Press, 2 edn, 2015)
G. Van Calster, 'Opportunities and Pitfalls for Sustainable Materials Management', in: I.K. Panoussis and H.H.G. Post (eds.), *Waste Management in European Union Law. The Examples of Naples and Campania* (Eleven International Publishing, 2014)
G. Van Calster and L. Reins, *EU Environmental Law* (Edward Elgar Publishing, 2017)
P. Craig and G. de Búrca, *EU Law, Text, Cases, and Materials* (Oxford University Press, 6 edn, 2015)
C. Dalhammar, 'The application of 'life cycle thinking' in European Environmental law: theory and practice' (*Journal for European Environmental & Planning Law*, 2015)
G. Dieterle, 'Sustaining the World's Forests: Managing Competing Demands for a Vital Resource – The Role of the World Bank' in: P. Spathelf (ed.), *Sustainable Forest Management in a Changing World: a European Perspective* (Springer, 2010)
R. Dworkin, 'On Interpretation and Objectivity', in: R. Dworkin, *A Matter of Principle* (Harvard University Press, 1985)
R. Dworkin, *Law's Empire* (Harvard University Press/Fontana, 1986)
B. Enderle, 'Substances in Articles', in D. Drohmann and M. Townsend, *REACH, Best Practice Guide to Regulation (EC) No 1907/2006* (C.H. Beck oHG, Hart Publishing and Nomos Verlagsgesellschaft mbH & Co, München, Oxford and Baden-Baden, 2013)
I. Ferrara and P. Missios 'Household waste management: waste generation, recycling, and waste prevention' in: T.C. Kinnaman and K. Takeuchi (eds.) *Handbook on Waste Management* (Edward Elgar Publishing, 2014)
E. Fisher, B. Lange and E. Scotford, *Environmental Law. Text, Cases and Materials* (Oxford University Press, 2013)
E. Fisher, *Legal Reasoning in Environmental Law. A study of Structure, Form and Language* (Edward Elgar Publishing Limited, 2013)
S. Foss Hansen and J.A. Tickner, 'The precautionary principle and false alarms — lessons

learned' in: European Environment Agency, *Late lessons from early warnings: science, precaution, innovation* (EEA, 2013)
J.D. Graham and J.B. Wiener, *Risk Vs Risk. Tradeoffs in Protecting Health and the Environment* (Harvard University Press, 1995)
P. Grandjean, 'Science for precautionary decision-making' in: European Environment Agency, *Late lessons from early warnings: science, precaution, innovation* (EEA, 2013)
S. Guest, *Ronald Dworkin* (Stanford University Press, 2013) (First edition: *Edinburgh University Press*, 1992)
B. Hansen, 'Background and structure of REACH', in L. Bergkamp (ed.), *The European Union REACH Regulation for Chemicals – Law and Practice* (Oxford University Press, 2013)
N. Herbatschek, N. Bergkamp and M. Mihova, 'The REACH Programmes and Procedures', in: L. Bergkamp (ed.), *The European Union REACH Regulation for Chemicals. Law and Practice* (Oxford University Press, 2013)
T.P. Hughes, 'The Evolution of Large Technological Systems' in: W.E. Bijker, T.P. Hughes and T.J. Pinch (eds.), *The Social Construction of Technological Systems. New Directions in the Sociology and History of Technology* (The MIT Press, 1989)
J.H. Jans and H.H.B. Vedder, *European Environmental Law* (Europa Law Publishing, 4 edn, 2012
J.H. Jans and H.H.B. Vedder, *European Environmental Law* (Europa Law Publishing, 3 edn, 2008)
S. Kingston, V. Heyvaert and A. Cavoski, *European Environmental Law* (Cambridge University Press, 2017)
L. Krämer, *EU Environmental Law* (Sweet & Maxwell, 7 edn, 2012)
M. Lee, *EU Environmental Law, Governance and Decision-making* (Hart Publishing, 2 edn, 2014)
D. Loorbach and J. Rotmans, 'Towards a better understanding of transitions and their governance: a systemic and reflexive approach', in: J. Grin, J. Rotmans and J. Schot (eds.), *Transition to Sustainable Development. New Directions in the Study of Long Term Transformative Change* (Routledge, 2010)
D. Loorbach, *Transition Management. New mode of governance for sustainable development* (PhD dissertation, Erasmus University Rotterdam, 2007)
N. MacCormick, *Legal Reasoning and Legal Theory* (Oxford University Press, 1987).
N. MacCormick, 'Coherence in legal justification', in: W. Krawietz, H. Schelsky, G. Winkler, A. Schramm (eds.), *Theorie der Normen: Festgabe für Ota Weinberger zum 65 Geburtstag* (Duncker & Humblot, 1984)
W. McDonough and M. Braungart, *Cradle to Cradle. Remaking the Way We Make Things* (North Point Press, 2002)
C. McGrath, *Does environmental law work. How to evaluate the effectiveness of an environmental legal system* (Lambert Academic Publishing AG & CO, 2010)
A. Paula Bortoleto, *Waste Prevention Policy and Behaviour. New approaches to reducing waste generation and its environmental impacts* (Routledge, 2015)
E. Paredis, *A winding road. Transition management, policy change and the search for sustainable development* (PhD dissertation, Political Science Ghent University, 2012-2013),
J. Rawls, *A Theory of Justice* (Harvard University Press, 1971)
L. Reins, *The Coherent Regulation of Energy And Environment In The European Union – Using Shale Gas As A Case Study* (PhD dissertation, Law, KU Leuven, 2012-2015
A. Remmen, R.D. Andersen and C. Dalhammer, *Expanding the Scope of the EuP Directive* (Norden, 2011)
C. Ryngaert, 'Whither Territoriality? The European Union's Use of Territoriality to Set Norms with Universal Effects', in: C. Ryngaerts, E.J. Molenaar and S.M.H. Nouwen (eds.), *What's Wrong with International Law?* (Brill Nijhoff, Leiden/Boston, 2015)
T. de Römph, 'WtE and the Circular Economy: Environment and Energy', In: Post, H. (eds.),

From waste to energy: technology, the environment and the implications under EU law (Eleven International Publishing, 2018)
T. de Römph, 'Pressing Forward – Developments in the Transition Towards Sustainable Materials Management in EU Environmental Law' in: V. Mauerhofer (eds.), *Legal Aspects of Sustainable Development: Horizontal and Sectorial Policy Issues* (Springer International Publishing, 2015)
N. de Sadeleer, *EU Environmental Law and the Internal Market* (Oxford University Press, 1 edn, 2014)
N. de Sadeleer, *Environmental Principle, From Political Slogans to Legal Rules* (Oxford University Press, 2002)
E. Salminen, R. Valo, M. Korhonen and R. Jernlås, *Wood preservation with chemicals - Best Available Techniques (BAT)* (Norden, 2014)
L. Squintani, *Gold-Plating of European Environmental* (PhD dissertation, Law, University of Groningen, 2013)
G. van Thuyne and F. Goossens, 'Authorisations and Restrictions', in: D. Drohmann and M. Townsend (eds.) *REACH. Best Practice Guide to Regulation (ED) No 1907/2006* (C.H. Beck, Hart Publishing and Nomos, 2013)
J. Tuson, 'How the EU handles uncertain risks: understanding the role of the precautionary principle' (*Journal of European Public Policy*, 20:10, 2013)
Van Weenen: J. van Weenen, *Waste prevention: theory and practice* (PhD dissertation, Chemistry, Technical University Delft, 1990), pp. 200-208.
M. Wittmann, 'Chemical leasing – legal questions' in: T. Jakl and P. Schwager (eds.), *Chemical leasing goes global. Selling Services Instead of Barrels: A Win-Win Business Model for Environment and Industry* (*Springer Vienna*, 2008)

Blogposts and online research dissemination platforms

Blogpost 'Towards a 'due diligence' jurisprudence: The EU Timber Regulation's requirements in courts' by W.Th. Douma (senior researcher at the Asser Institute, the Netherlands), 27 July 2017, http://www.asser.nl/DoingBusinessRight/Blog/post/towards-a-due-diligence-jurisprudence-the-eu-timber-regulation-s-requirements-in-courts-by-wybe-th-douma (consulted on 21 December 2017)
Blogpost 'Has the ECJ saved reverse logistics from a compliance nightmare judgment in shell' by C. Van Calster (Professor International and EU law, KU Leuven, Belgium), 12 December 2013, https://gavclaw.com/2013/12/12/has-the-ecj-saved-reverse-logistics-from-a-compliance-nightmare-judgment-in-shell/ (consulted on 3 August 2017)
Blogpost 'A harmonized European (technical) standard – Provision of EU law! (Judgement in C-613/14 James Elliott Construction)' by M. Medzmariashvili, 24 January 2017, http://europeanlawblog.eu/2017/01/24/a-harmonised-european-technical-standard-provision-of-eu-law-judgment-in-c-61314-james-elliott-construction/ (consulted on 3 August 2017)
G. Van Calster and T. de Römph, 'Regulating opportunity and innovation in the EU. The case of sustainable materials (plastics) management' (*SSRN*, 2015), pp. 1-27, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2588562 (consulted on 18 January 2018).

Reports published by public and private entities

2017

European Environment Agency, 'Circular by design - Products in the circular economy' (EEA, 6, 2017), https://www.eea.europa.eu/publications/circular-by-design (consulted on 22 December 2017)
European Chemicals Agency, *Progressing together to identify substances of concern. Roadmap for SVHC identification and implementation of REACH risk management measures - Annual Report*. (ECHA-17-R-06-EN, 2017)
European Chemicals Agency, *Guidance for identification and naming of substances under*

REACH and CLP (ECHA, 2:1, 2017)
Joint Research Centre: S. Donatello, H. Moons and O. Wolf, *Revision of EU Ecolabel criteria for furniture products* (JRC, EUR 28443 EN, 2017)
Joint Research Centre: S. Donatello, M. Gama Caldas and O. Wolf, *Revision of the EU Green Public Procurement (GPP) criteria for Furniture* (European Union, EUR 28729 EN, 2017)
Joint Research Centre: N. Dodd, M. Cordella, M. Traverso and S. Donatello, *Part 3: How to make performance assessments using Level(s)* (European Commission, 2017), http://susproc.jrc.ec.europa.eu/Efficient_Buildings/docs/170816_Levels_EU_framework_of_building_indicators.pdf (consulted on 22 December 2017)
Nederlands Normalisatie-Instituut: A. de Buck, M. van Rijn, E. Schiltkamp, R. Boon and M. Ritter, *De rol van normen en certificaten als stimulans voor de Circulaire Economie* (NEN, 2017)
2016
Ecorys, *EU Construction & Demolition Waste Management Protocol* (European Commission, 2016)
Technopolis Group, Wuppertal Institute, thinkstep and Fraunhofer ISI, *Regulatory barriers for the Circular Economy - Lessons from ten case studies* (European Commission, 2016), https://ec.europa.eu/growth/content/regulatory-barriers-circular-economy-lessons-ten-case-studies-1_en (consulted on 31 January 2018)
CEN-CENELEC, *Guide 33 – Guide for addressing environmental issues in testing standards*, Ed. 1, 2016
Joint Research Centre: Nicholas Dodd, Elena Garbarino and Miguel Gama Caldas, *Green Public Procurement Criteria for Office Buildings Design, Construction and Management* (European Union, EUR 27916 EN, 2016)
Joint Research Centre: N. Dodd, E. Garbarino and M. Gama Caldas, *Green Public Procurement Criteria for Office Buildings Design, Construction and Management* (European Union, EUR 27916 EN, 2016)
2015
CBI, *CBI Trade Statistics: Tropical Timber* (CBI Market Intelligence, 2015), https://www.cbi.eu/sites/default/files/market_information/researches/trade-statistics-timber-2016.pdf (consulted 22 December 2015)
CEN/CENELEC, *Work Programme 2016. European standardization and related activities* (CEN/CENELEC, 2015), https://www.cencenelec.eu/news/publications/publications/cen-cenelec-wp2016_en.pdf (consulted on 22 December 2017).
Ernst & Young, *Independent Review of the European Standardisation System* (European Commission, Ares(2015)2179280)
European Chemicals Agency, *Guidance on information requirements and chemical safety assessment. Chapter R.19: Uncertainty analysis* (ECHA, version 1.1, 2012), https://echa.europa.eu/documents/10162/13632/information_requirements_r19_en.pdf (consulted on 22 December 2017)
European Chemicals Agency, *Transitional Guidance on the Biocidal Products Regulation, Transitional Guidance on Efficacy Assessment of product Type 8 Wood Preservation* (ECHA, 2015),https://echa.europa.eu/documents/10162/23492134/tg_efficacy_pt8_superseded_en.pdf/a8000e3f-0a05-134d-f98f-72e460b6d78b (consulted on 22 December 2017)
European Chemicals Agency, *Introductory Guidance on the CLP Regulation* (ECHA, 2.1, 2015), https://echa.europa.eu/documents/10162/23036412/clp_introductory_en.pdf/b65a97b4-8ef7-4599-b122-7575f6956027 (consulted on 22 December 2017)
European Chemicals Agency, *ECHA's REACH 2018 Roadmap* (ECHA-15-R-01-EN, 2015)
European Forest Institute, *Assessment for the EU Timber Regulation and FLEGT Action Plan – From Science to Policy* (European Forest Institute, 2015), http://www.efi.int/files/attachments/publications/efi_fstp_1_2015.pdf (consulted on 22 December 2017)
Van Holsteijn en Kemna BV, ift Rosenheim, VHK and VITO, *LOT 23 / Ecodesign of Window*

Products. TASK 6 – Design Options (VITO, 2015), http://www.ecodesign-windows.eu/downloads/TASK6_Lot32_WINDOWS_FINAL.pdf (consulted on 22 December 2017)

Van Holsteijn en Kemna BV, ift Rosenheim, VHK and VITO, *LOT 23 / Ecodesign of Window Products. TASK 7 – Policy Options & Scenarios* (VITO, consolidated version 2015), http://www.ecodesign-windows.eu/downloads/TASK7_Lot32_WINDOWS_CONSOLIDATED.pdf (consulted on 22 December 2017)

Nederlands Normalisatie-Instituut: M. van Rijn and D. Hortensius, *De rol van normen en certificaten in de circulaire economie* (NEN, 2015), https://www.rijksoverheid.nl/documenten/rapporten/2015/12/04/rapportage-de-rol-van-normen-en-certificaten-in-de-circulaire-economie (consulted on 22 December 2017)

Organisation for Economic Co-operation and Development, *Material Resources, Productivity and the Environment*, (OECD Publishing, 2015), http://www.oecd-ilibrary.org/environment/material-resources-productivity-and-the-environment_9789264190504-en (consulted on 22 December 2017)

Risk & Policy Analysts: T. Nwaogu, S. Upson , S. Marshall, Y. Le Crom and H. Vermande, *Analysis of the implementation of the Construction Products Regulation. Executive Summary & Main Report* (European Commission, 2015), https://publications.europa.eu/en/publication-detail/-/publication/d3449aa6-8775-11e5-b8b7-01aa75ed71a1/language-en (consulted on 22 December 2017)

2014

BIO by Deloitte, Oeko-Institut and ERA Technology, *Preparatory Study to establish the Ecodesign Working Plan 2015-2017 implementing Directive 2009/125/EC – Task 1 Draft Final Report* (Deloitte, 2014), http://www.ecodesign-wp3.eu/sites/default/files/Ecodesign%20WP3_Task%201_Draft%20final%20report_17092014_0.pdf (consulted on 2 December 2017)

BIO by Deloitte, Oeko-Institut and ERA Technology, *Preparatory Study to establish the Ecodesign Working Plan 2015-2017 implementing Directive 2009/125/EC – Task 2: Supplementary Report "Identification or resource-relevant product groups and horizontal issues"* (Deloitte, 2014), http://www.ecodesign-wp3.eu/sites/default/files/Ecodesign%20WP3_Task%202_Supplementary%20report%20on%20resources_17092014_0.pdf (consulted on 2 December 2017)

BIO Intelligence Service; in collaboration with Arcadis, Ecologic, Institute for European Environmental Policy (IEEP) and Umweltbundesamt (UBA), *Development of Guidance on Extended Producer Responsibility (EPR)* (BIO Intelligence Service by Deloitte, 2014), http://ec.europa.eu/environment/waste/pdf/target_review/Guidance%20on%20EPR%20-%20Final%20Report.pdf (consulted on 22 December 2017)

Bio Intelligence Service, *Ex-post evaluation of certain waste stream Directives*, 2014

Centre of European Policy Studies: J. Pelkmans and A. Renda, *'Does EU regulation hinder or stimulate innovation?'* (CEPS Special Report, 96, 2014), https://www.ceps.eu/system/files/No%2096%20EU%20Legislation%20and%20Innovation.pdf (consulted on 22 December 2017)

European Chemicals Agency, *Guidance on Scientific Research and Development (SR&D) and Product and Process Orientated Research and Development (PPORD)* (ECHA, 2.0, 2014)

European Chemicals Agency, *Guidance for identification and naming of substances under REACH and CLP* (ECHA, 1:3, 2014)

Ecofys *et al.*, *Evaluation of the Energy Labelling Directive and specific aspects of the Ecodesign Directive* (Ecofys Netherlands B.V., 2014), http://ec.europa.eu/environment/waste/pdf/target_review/Guidance%20on%20EPR%20-%20Final%20Report.pdf (consulted on 22 December 2017)

Forest trends, *Meeting Summary: The EU Timber Regulation and the Pulp and Paper Sector*

(Forest Trends, 2014), http://www.forest-trends.org/documents/files/doc_4491.pdf (consulted on 22 December 2017)

IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, Final report, 2014, https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/end-waste-criteria-waste-plastic-conversion-technical-proposals (consulted on 2 December 2017)

Joint Research Centre: A. Villanueva and P. Eder, *End-of-waste criteria for waste plastic for conversion* (European Union, EUR 26843 EN, 2014)

Policy Research Centre for Sustainable Materials Management: S. Happaerts, *International discourses and practices of Sustainable Materials Management* (SuMMa, 2014), https://steunpuntsumma.be/docs/research%20paper%205.pdf (consulted on 22 December 2017)

ProBos, *Import of secondary timber products by the EU28 - The Netherlands in focus* (Stichting Probos, 2014), http://assets.wnf.nl/downloads/141128_eu28_secundary_wood_products_eu_extra_imports__netherlands_in_foc.pdf?_ga=1.163547704.58006932.1441004219 (consulted on 22 December 2017)

2013

BIO Intelligence Service, Fraunhofer IZM and Wuppertal Institute, *Material-efficiency Ecodesign Report and Module to the Methodology for the Ecodesign of Energy-related Products (MEErP) - Part 1: Material Efficiency for Ecodesign* (BIO Intelligence Service, 2013), https://www.researchgate.net/publication/275037783_Material-efficiency_Ecodesign_Report_and_Module_to_the_Methodology_for_the_Ecodesign_of_Energy-related_Products_MEErP (consulted on 22 December 2017)

CBI, *CBI scenario planning Impact of the European Timber Regulation for SME timber exporters in developing countries, 'A strategic future roadmap for BSOs'* (CBI Market Information Database, 2013)

European Chemicals Agency, *Setting the review period when RAC and SEAC give opinions on an application for authorisation*, SEAC/20/2013/03, 2013, http://echa.europa.eu/documents/10162/13580/seac_rac_review_period_authorisation_en.pdf (consulted on 22 December 2017)

European Chemicals Agency, *SVHC Roadmap to 2020 Implementation Plan*, 9 December 2013, ECHA-13-R-11-EN

IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, Final draft report, 2013, http://susproc.jrc.ec.europa.eu/activities/waste/documents/EoWPlasticsfinalDrepMar2013WEB.pdf (consulted on 22 December 2017)

Policy Research Centre for Sustainable Materials Management: R. Hoogmartens, M. Dubois and S. Van Passel, *Recycled content as a policy instrument: International examples in law and further development* ('Recycled content als beleidsinstrument: Internationale wetgevings voorbeelden en verdere ontwikkeling') (SuMMa, 2013)

2012

BioIntelligence Service S.A.S in association with the Copenhagen Resource Institute and the Regional Environmental Centre, 'Preparing a Waste Prevention Programme – Guidance document' (*European Commission*, 2012)

European Chemicals Agency, *Guidance for identification and naming of substances under REACH and CLP* (ECHA, 1:2, 2012)

European Chemicals Agency, *Guidance on data sharing* (ECHA, 2:0, 2012)

European Environmental Bureau and ClientEarth: Christian Schaible and Vito Buonsante, *Identifying the Bottlenecks in REACH Implementation. The role of ECHA in REACH's failing implementation* (EEB and Client Earth, 2012), https://steunpuntsumma.be/docs/recycled-content-als-beleidsinstrument (consulted on 22 December 2017)

European Topic Centre on Sustainable Consumption and Production (ETC/SCP), Working paper 1/2012, *Overview of the use of landfill taxes in Europe*, 2012,

http://scp.eionet.europa.eu/publications/WP2012_1/wp/WP2012_1 (consulted on 22 December 2017)

Institute for European Environmental Policy: C. Jackson and E. Watkins, 'EU waste law: the challenge of better compliance' (Institute for European Environmental Policy, *Directions in European Environmental Policy*, 5, 2012), https://ieep.eu/publications/eu-waste-law-the-challenge-of-better-compliance (consulted on 22 December 2017)

International Tropical Timber Organization: F. Seidel with E. Fripp, A. Adams and I. Denty, *Tracking Sustainability - Review of Electronic and Semi-Electronic Timber Tracking Technologies* (ITTO, 2012), http://www.itto.int/sfm_detail/id=3145 (consulted on 22 December 2017)

IPTS, JRC, *End-of-waste criteria for waste plastic for conversion*, Technical proposals, second working document, 2012

ISO, *Environmental labels and declarations - How ISO standards help* (ISO Central Secretariat, 2012), https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/environmental-labelling.pdf (consulted on 22 December 2017)

Organisation for Economic Co-operation and Development, *Sustainable Materials Management. Making Better Use of Resources*, (OECD Publishing, 2012), http://www.oecd.org/env/waste/smm-makingbetteruseofresources.htm (consulted on 22 December 2017)

Organisation for Economic Co-operation and Development, *Environmental Outlook to 2050. The Consequences of Inaction*, (OECD Publishing, 2012), http://www.oecd-ilibrary.org/environment/oecd-environmental-outlook-to-2050_9789264122246-en (consulted on 22 December 2017)

2011

Umweltbundesamt, Ökopol Institut, *Reach and the recycling of plastics, Reference manual for an appropriate implementation of the REACH requirements for the operators of recycling plants*, (2012), https://www.umweltbundesamt.de/sites/default/files/medien/461/publikationen/4263.pdf (consulted on 6 May 2015)

BIO Intelligence Service, in association with Arcadis and the Institute for European Environmental Policy: V. Monier, S. Mudgal, M. Hestin, M. Trarieux and S. Mimid, *A project under the Framework contract ENV.G.4/FRA/2008/0112 – Service contract on management of construction and demolition waste – SR1 Final Report Task 2* (BIO Intelligence Service, 2011), http://ec.europa.eu/environment/waste/pdf/2011_CDW_Report.pdf (consulted in 22 December 2017)

Bio Intelligence Service, *Final Report Task 2 – Management of Construction and Demolition Waste* (Bio Intelligence Service, 2011) (BIO Intelligence Service, 2011), http://ec.europa.eu/environment/waste/pdf/2011_CDW_Report.pdf (consulted in 22 December 2017)

European Chemicals Agency, *Guidance on requirements for substances in articles* (ECHA, 2:0, 2011)

European Chemicals Agency, *Assessing the Health and Environmental Impacts in the Context of Socio-economic Analysis Under REACH - Part 1: Literature Review and Recommendations* (ECHA, 2011), https://echa.europa.eu/documents/10162/13580/reach_sea_part1_en.pdf (consulted on 22 December 2017)

Glass for Europe, 'End-of-Waste criteria for waste glass. Glass for Europe comments on the second draft of the background document for the Expert Workshop - (Seville, December 2010)' (*Glass for Europe*, 2011)

Joint Research Centre and Institute for Prospective Technological Studies: E. Rodriguez Vieitez, P. Eder, A. Villanueva and H. Saveyn, 'End-of-Waste Criteria for Glass Cullet: Technical Proposals' (*European Union*, EUR 25220 EN-2011, 2011)

Joint Research Centre and Institute for Prospective Technological Studies: Elena Rodriguez Vieitez, Peter Eder, Alejandro Villanueva and Hans Saveyn, 'End-of-Waste Criteria for Glass

Cullet: Technical Proposals' (*European Union*, EUR 25220 EN-2011, 2011)
Joint Research Centre and Institute for Prospective Technological Studies: E. Rodriguez Vieitez, P. Eder, A. Villanueva and H. Saveyn, 'End-of-Waste Criteria for Glass Cullet: Technical Proposals' (*European Union*, EUR 25220 EN, 2011)
Milieu Ltd, T.M.C. Asser Instituut and Pace, *Considerations on the application of the Precautionary Principle in the chemicals sector* (Milieu Ltd, 2011), http://ec.europa.eu/environment/chemicals/reach/pdf/publications/final_report_pp.pdf (consulted on 22 December 2017)
Organisation for Economic Co-operation and Development, *Resource Productivity in the G8 and the OECD. A Report in the Framework of the Kobe 3R Action Plan* (OECD, 2011), http://www.oecd.org/env/waste/47944428.pdf (consulted on 22 December 2017)
United National Environment Programme, 'Waste. Investing in energy and resource efficiency'. in: *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication* (UNEP, 2011), https://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=126&menu=35 (consulted on 22 December 2017)
2010
European Chemicals Agency, *Guidance on waste and recovered substances* (ECHA, 2:0, 2010)
2009
IPTS, JRC, *Study on the selection of waste streams for End of Waste assessment*, Final Report, 2009, http://susproc.jrc.ec.europa.eu/documents/SelectionofwastestreamsforEoW-FinalReport13_02_2009.pdf (consulted on 22 December 2017)
2008
CEN, *Guide 4 – Guide for addressing environmental issues in product standards*, Ed. 3, 2008,
Waste & Resources Action Programme, *Collection of flat glass for use in flat glass manufacture. A Good Practice Guide* (WRAP, 2008), http://www.wrap.org.uk/sites/files/wrap/WRAP_Flat_Glass_GoodPractice_FINAL%20(2).pdf (consulted on 22 December 2017)
2007
UK Royal Society of Chemistry, *Exploring the Practical Aspects of Chemical Substitution* (Royal Society of Chemistry, 2007), https://substitution.ineris.fr/sites/substitution-portail/files/documents/rsc_2007.pdf (consulted on 22 December 2017)
World Health Organization Europe, *Population health and waste management: scientific data and policy options*, (World Health Organization Regional Office for Europe, 2007)
2000
Organisation for Economic Co-operation and Development, 'Voluntary Approaches for Environmental Policy: An Assessment' (OECD, 2000), http://www.oecd-ilibrary.org/environment/voluntary-approaches-for-environmental-policy_9789264180260-en (consulted on 22 December 2017)
Date unknown
European Chemicals Agency, *Chemical Safety Report, An illustrative example, Part 1 - Introductory note & Part 2 - Illustrative CSR* (ECHA, date unknown), https://echa.europa.eu/documents/10162/13634/csr_illustrative+example_en.pdf (consulted on 22 December 2017)

Other sources

International law and notifications

United Nations Sustainable Development Agenda - Resolution adopted by the General Assembly on 25 September 2015

United Nations Rio Declaration on Environment and Development – Declaration adopted by the general Assembly on between 3-14 June 1992

National case law

Judgement of 24 May 2017, *B.V. X v de staatssecretaris van Economische Zaken*, WB–16_5358, NL:RBNHO:2017:4474

Judgement of 5 October 2016, *Almträ Nordic AB* v *Skogsstyrelsen*, 2095-16

WTO documents

World Trade Organization, Notifications G/TBT/N/CHN/1211 of 18 July 2017 and G/TBT/N/CHN/1233 of 15 November 2017. See: http://tbtims.wto.org/en/RegularNotifications/View/137356 and http://tbtims.wto.org/en/RegularNotifications/View/138802?FromAllNotifications=True, respectively (consulted on 30 january 2018)

World Trade Organization, *The WTO Agreements Series - Technical Barriers to Trade*, 2014, https://www.wto.org/english/res_e/publications_e/tbttotrade_e.pdf (consulted on 22 December 2017)

Policy and guidance

European parliamentary question of 25 February 2013 on 'Legacy additives in recyclates under REACH', http://www.europarl.europa.eu/sides/getDoc.do?type=WQ&reference=E-2013-002047&language=EN (consulted on 22 December 2017)

Department for Environment, Food and Rural Affairs (UK government), *Guidance in the legal definition of waste and its application*, 2012, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69590/pb13813-waste-legal-def-guide.pdf (consulted on 22 December 2017)

Third Ministerial Conference on the Protection of Forests in Europe, Resolution L1 Socio-Economic Aspects of Sustainable Forest Management, adopted between 2-4 June 1998 in Lisbon

Second Ministerial Conference on the Protection of Forests in Europe, Resolution H1 General Guidelines for the Sustainable Management of Forests in Europe, adopted between 16-17 June 1993 in Helsinki

Presentations and interviews

Interview of 16 April 2015 by S. van Renssen with e.g. K. Falkenberg (the former Director-General for Environment of the European Commission) to debate the question 'How can Europe capitalize on the Circular Economy?'. http://www.vieuws.eu/environment/circular-economy-package-commission-to-favour-recycling-quality-over-quantity/ (consulted on 17 August 2017)

J. Sachs, 2014 Green Week, organized by the European Commission, item 'Jeffrey Sachs: We need a sixth wave of sustainable and green technologies' of 12 June 2014 on http://cordis.europa.eu/news/rcn/36601_en.html (consulted on 25 October 2017)

Data, information, projects and instruments

Glass Alliance Europe, information about the glass industry in EU-28, http://www.glassallianceeurope.eu/en/industries (consulted on 29 October 2017)

Joint Research Centre, *European Platform on Life Cycle Assessment*, http://eplca.jrc.ec.europa.eu/ (consulted on 4 December 2017)

Joint Research Centre, *Raw Materials Information System*, http://rmis.jrc.ec.europa.eu/ (consulted on 19 December 2017)

WRAP, statistics on glass recycling in the UK, http://www.wrap.org.uk/content/environmental-benefits-closed-loop-glass-recycling (consulted on 17 May 2017)

Wageningen University & Research, project called 'Timtrace', project leader P.A. Zuidema, http://www.wur.nl/en/show/Timtrace.htm (consulted on 22 December 2017)

Forest Stewardship Council, https://ic.fsc.org/en/choosing-fsc/fsc-stories (consulted on 22 December 2017)

Forest Steward Council, *FSC Standard. Sourcing reclaimed material for use in FSC Product Groups or FSC Certified Projects* (FSC, FSC-STD-40-007 (V2-0) EN, 2011)

Programme for the Endorsement of Forest Certification, https://www.pefc.org/ (consulted on 22 December 2017)

Eurostat, statistics on waste generation in 2014, http://ec.europa.eu/eurostat/statistics-explained/images/a/a0/Waste_generation_by_economic_activities_and_households%2C_2014-

1.png, see also http://ec.europa.eu/eurostat/statistics-explained/index.php/Waste_statistics (consulted on 22 December 2017)

NL Agency of the Ministry of Economic Affairs, *Competition in wood waste: Inventory of policies and markets* (NL Agency, 2013), https://www.dropbox.com/s/yhcf43g2ii25dqd/Competition%20in%20wood%20waste%20-%20Policies%20and%20markets.pdf?dl=0 (consulted on 22 December 2017)

World Resources Institute, information on technologies that help target illegal logging, 25 May 2016, http://www.wri.org/blog/2016/05/5-technologies-help-thwart-illegal-logging-tracing-woods-origin (consulted on 22 December 2017)

Cefic, *The European Chemical Industry Facts and Figures Report 2015* (2015), see http://fr.zone-secure.net/13451/186036/#page=4 (consulted at 25 November 2016) (not available anymore)

Circular Economy Toolkit, http://circulareconomytoolkit.org/products-as-a-service.html (consulted on 3 May 2017)

Press releases

Letter of Concern (University of Oslo Faculty of Law Research Paper) signed by:
Avosetta Group: A. Aragao, G. Bándi, A. Epiney, O. K. Fauchald, N. H. Fournerau, B. Iwanska, J. Jendroska, R. Knez, L. Krämer, L. Lavrysen, R. Macrory, M. Montini, L. Ofak, N. de Sadeleer, A. García Ureta, H. Veinla and G. Winter, 'The True Face of Better Regulation Regarding Environmental Policy', 15 January 2015, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2549477 (consulted on 22 December 2017)

Philips press release 'Philips en Thomas Rau starten proef van nieuw duurzaam verlichtingsconcept 'Pay per lux', 7 February 2011, http://www.lighting.philips.nl/bedrijf/newsroom/persberichten/2011/20110207-verlichtingsconcept-pay-per-lux (consulted on 2 November 2017) (in Dutch)

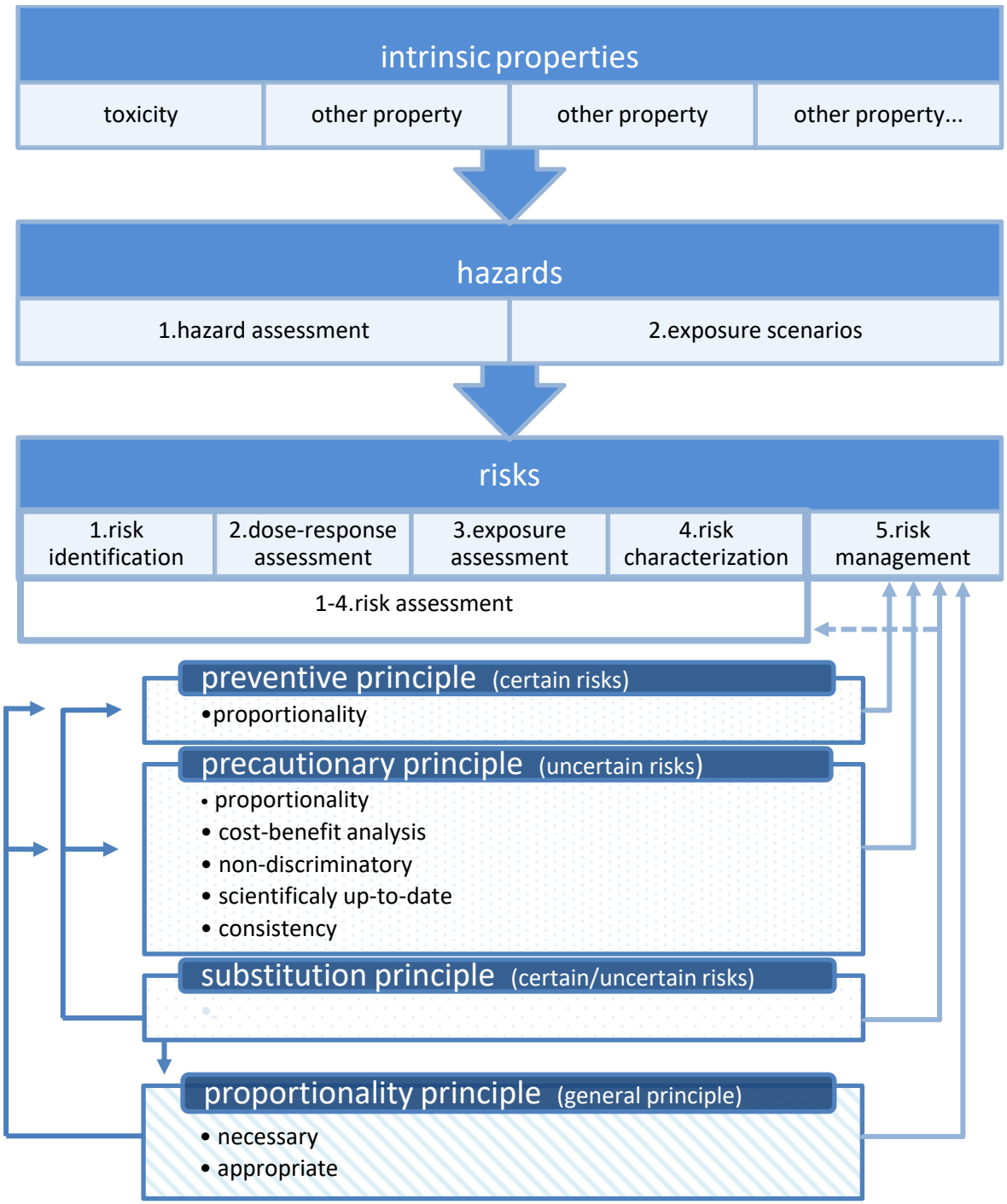
Confederation of the European Paper Industries press release 'End-of-Waste = End of recycling?' of the of 10 September 2013, http://www.cepi.org/topic/recycling/pressrelease/endofwaste (consulted on 22 December 2017)

ECHA press release 'RAC and SEAC agree jointly on the main principle for the length of the review period for applications for authorisation', 12 June 2013, http://echa.europa.eu/view-article/-/journal_content/title/rac-and-seac-agree-jointly-on-the-main-principle-for-the-length-of-the-review-period-for-applications-for-authorisation (consulted on 22 December 2017)

FEVE: The European Container Glass Federation press release *'Good Practices in collection and closed-loop glass recycling in Europe',* 2012, http://www.acrplus.org/images/glass_recycling/Good_Practices_in_collection_and_closed-loop_glass_recycling_in_Europe_REPORT_-_ACR_FINAL_DOC.pdf (consulted on 21 November 2017)

Annex

Annex – Flowchart 7: hazard-risk-action



Clarification of the flowchart (top-down)[1547]

- The intrinsic properties are determined, amongst which a variety of toxicity properties. These properties determine the hazard(s).
- The hazard assessment and the exposure scenarios determine the risks at issue.
- There are two parts of what follows: on the one hand the risk assessment, on the other hand the risk management (there is a third follow-up: risk communication – this stage is however not displayed).
- The risk assessment consists of four successive parts: risk identification, dose-response assessment, exposure assessment and risk characterization. The risk management follows these four parts.
- There are three environmental principle which are particularly important for the risk management, as they guide the decision-maker: the preventive principle (when it turns out via the risk assessment that the risks are certain), the precautionary principle (when it turns out that the risks are uncertain) and the substitution principle (when alternatives pose less risks – this principle is also reflected in the prevention and precautionary principles, as both known and unknown risks may be substituted by less risks).
- Not only can the environmental principles affect risk management, they can also influence the risk assessment, e.g.: alternatives should be included in the assessment, new assessments should be consistent with former assessments for similar substances, *et cetera*.
- The proportionality principle also serves as a guiding principle for risk management. Because it is a general principle, it has to be taken into account whenever the prevention or the precautionary principle is invoked. The substitution principle may influence on the proportionality of a measure.
- Step 6 on risk communication is not included in the flowchart

[1547] The flowchart is authentic, designed especially for this research.