



Sustainable Education: An essential contribution in the quadrupool helix interaction towards a sustainable paradigm shift.

Dirk V. Franco (presenting author) ^{1,2}, Alain De Vocht ¹, Tom Kuppens, Hilda Martens ¹, Theo Thewys ¹, Bernard Vanheusden ¹



UHASSELT

KNOWLEDGE IN ACTION



9 TH WORLD ENVIRONMENTAL EDUCATION CONGRESS
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Content

- Introduction
- Transition Paradigma Shift
- Higher Education Institutions and Sustainable Development
- Cleantech Management UHasselt
- EC Level A UHasselt
- PG EES PXL
- Conclusions for both HEI

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1) Introduction

Phenomena considered as a risk.

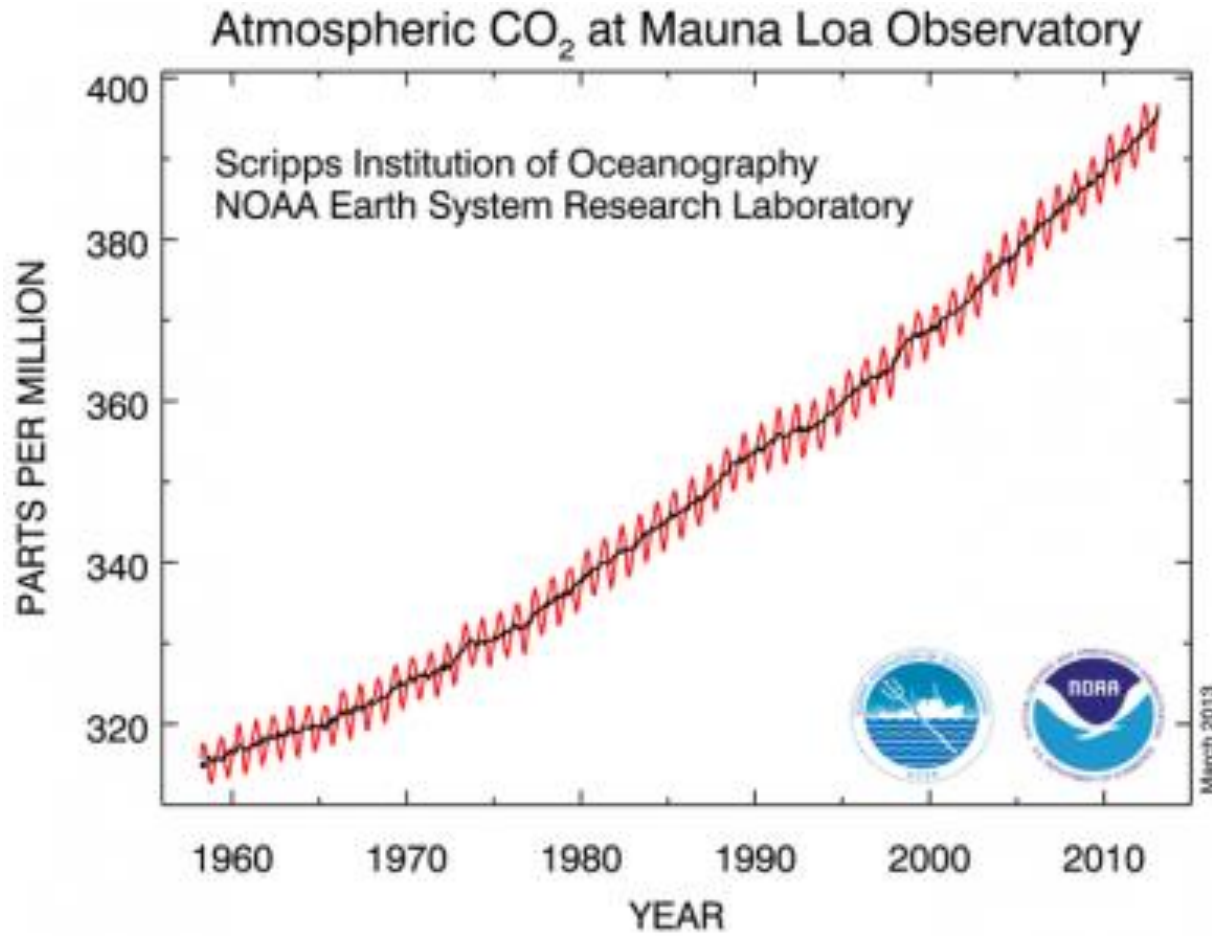
- climate change,
- decrease of biodiversity,
- amount of available,
- clean water and
- the decreasing variety of living organism in the oceans

1) Introduction

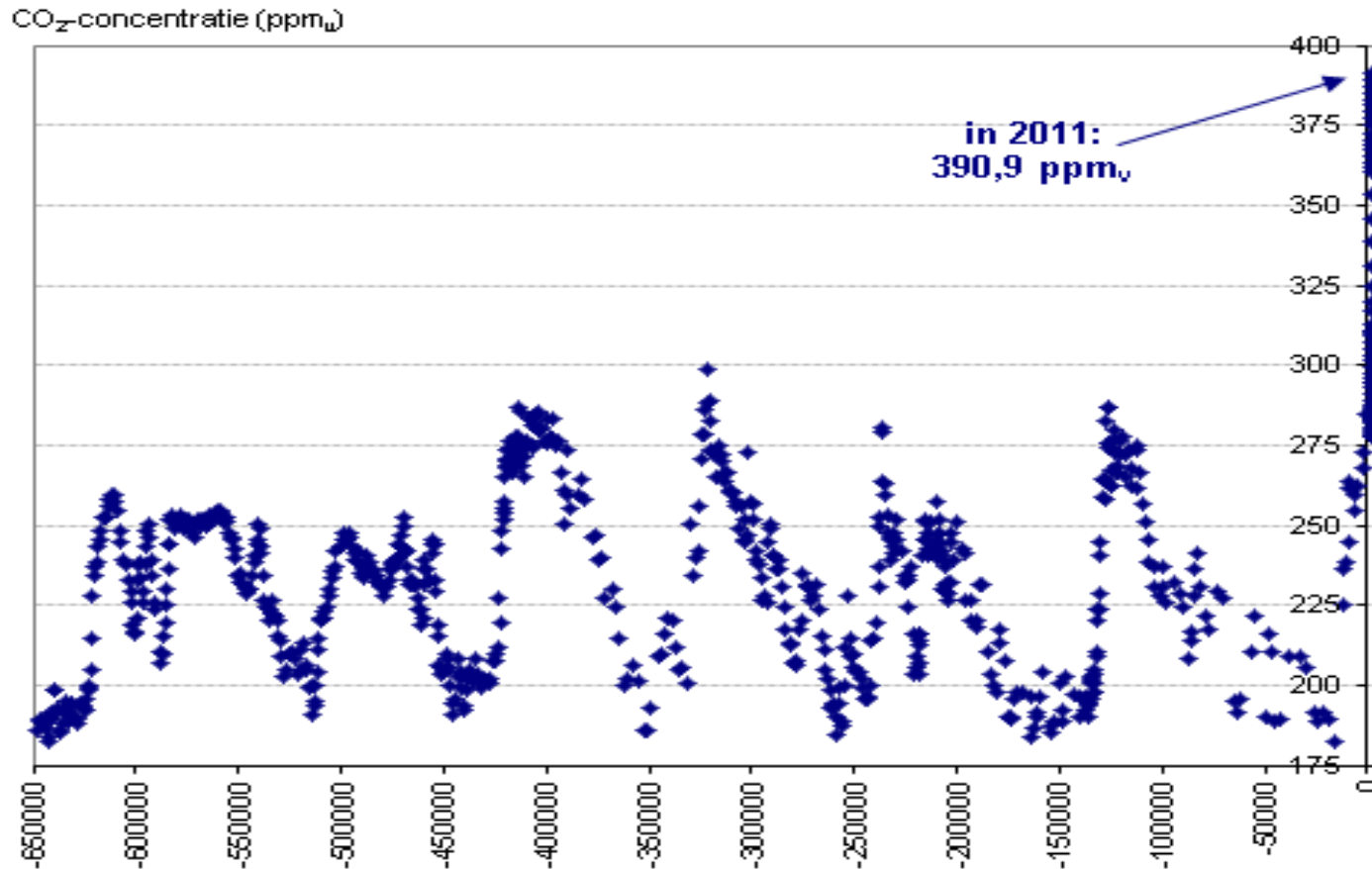
Following trends as catastrophic

- the sea level,
- the melting of the pole ice,
- the numbers of tornado's,
- floods and forest fires,
- the national security and
- the potential of 192 million climate migrants in 2060

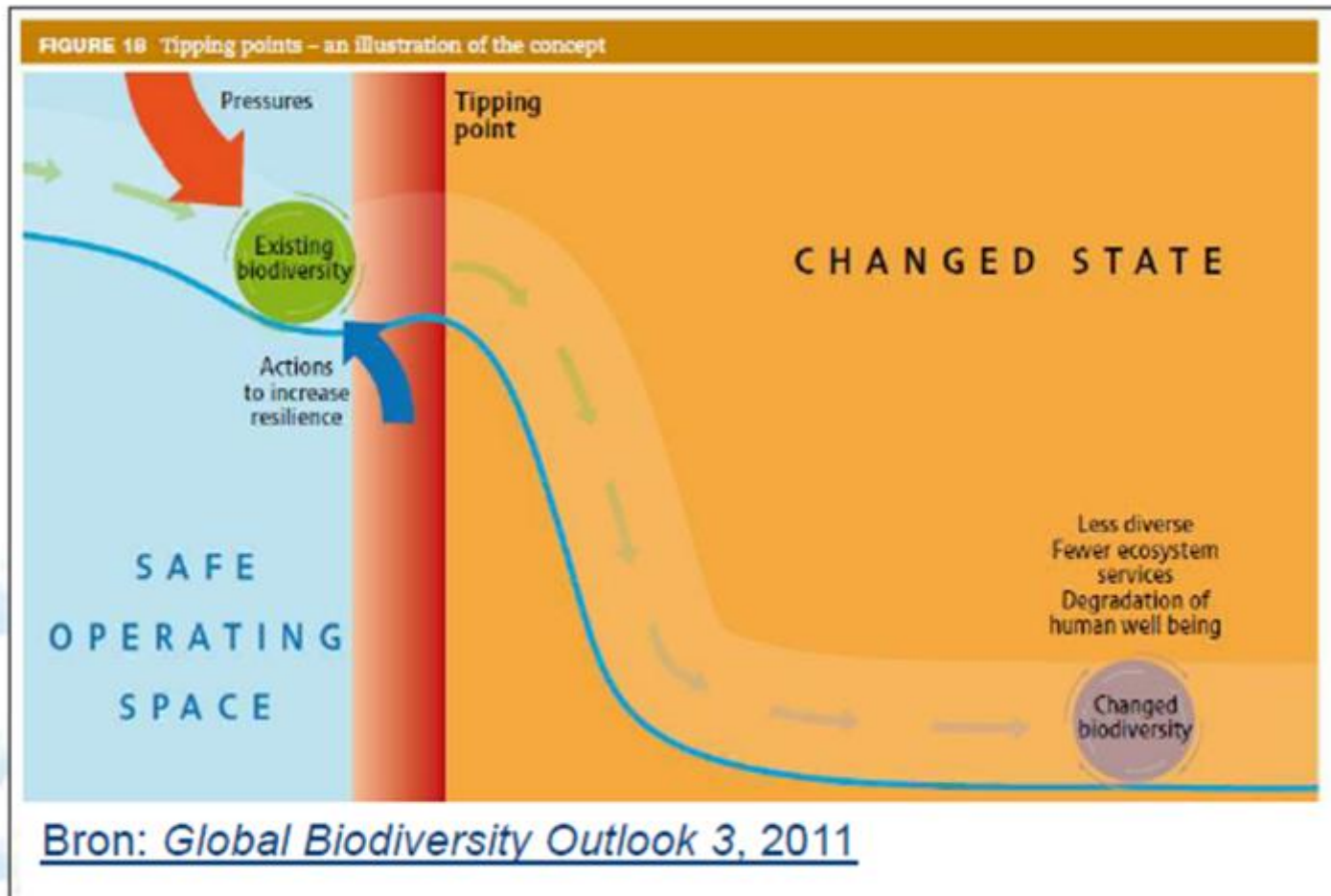
1) Introduction: CO₂-evolution



1) Introduction CO₂-evolution since 650000 years



1) Introduction Reversible versus Irreversible



=> So Cleantechnology is no longer

Nice to have

but

NEED TO HAVE

Content

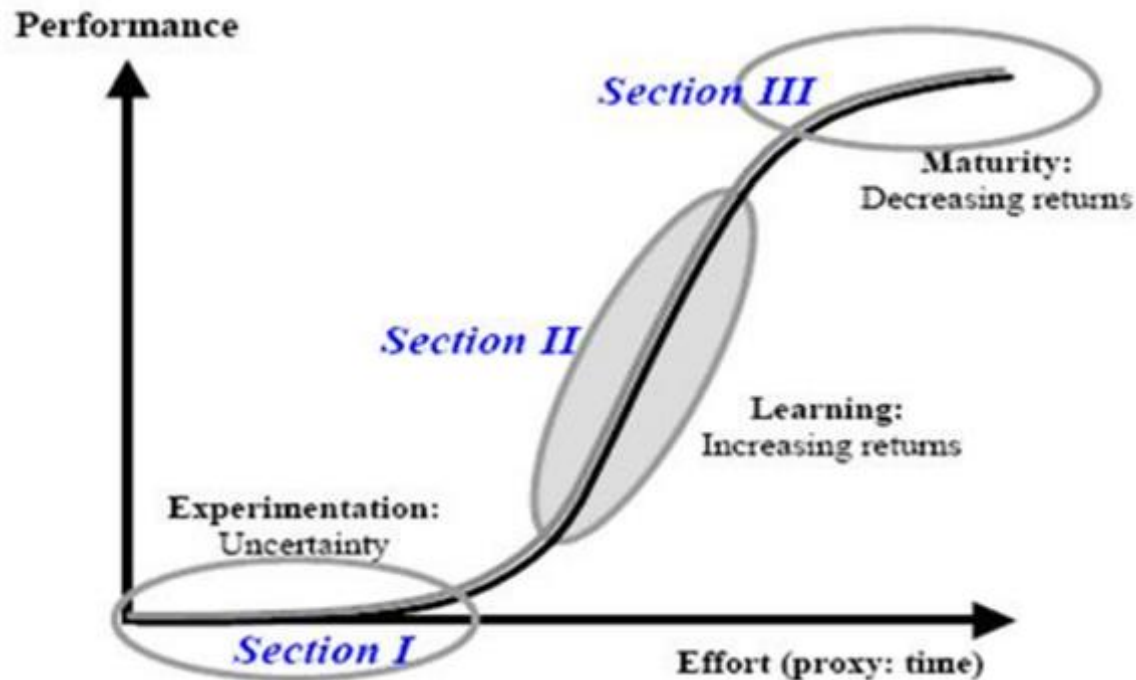
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2) Transition

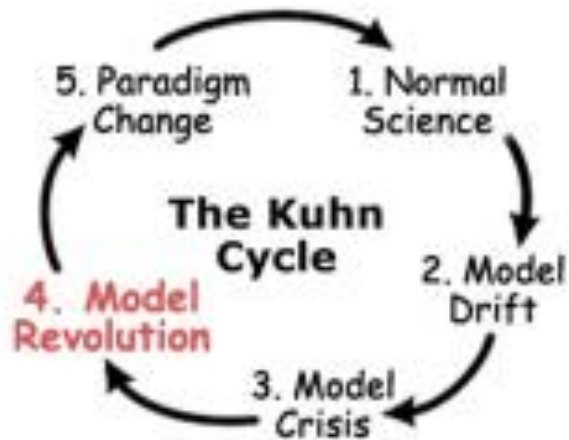
IT'S
ALL
ABOUT
S-CURVES

2) Transition => Paradigm shift is needed

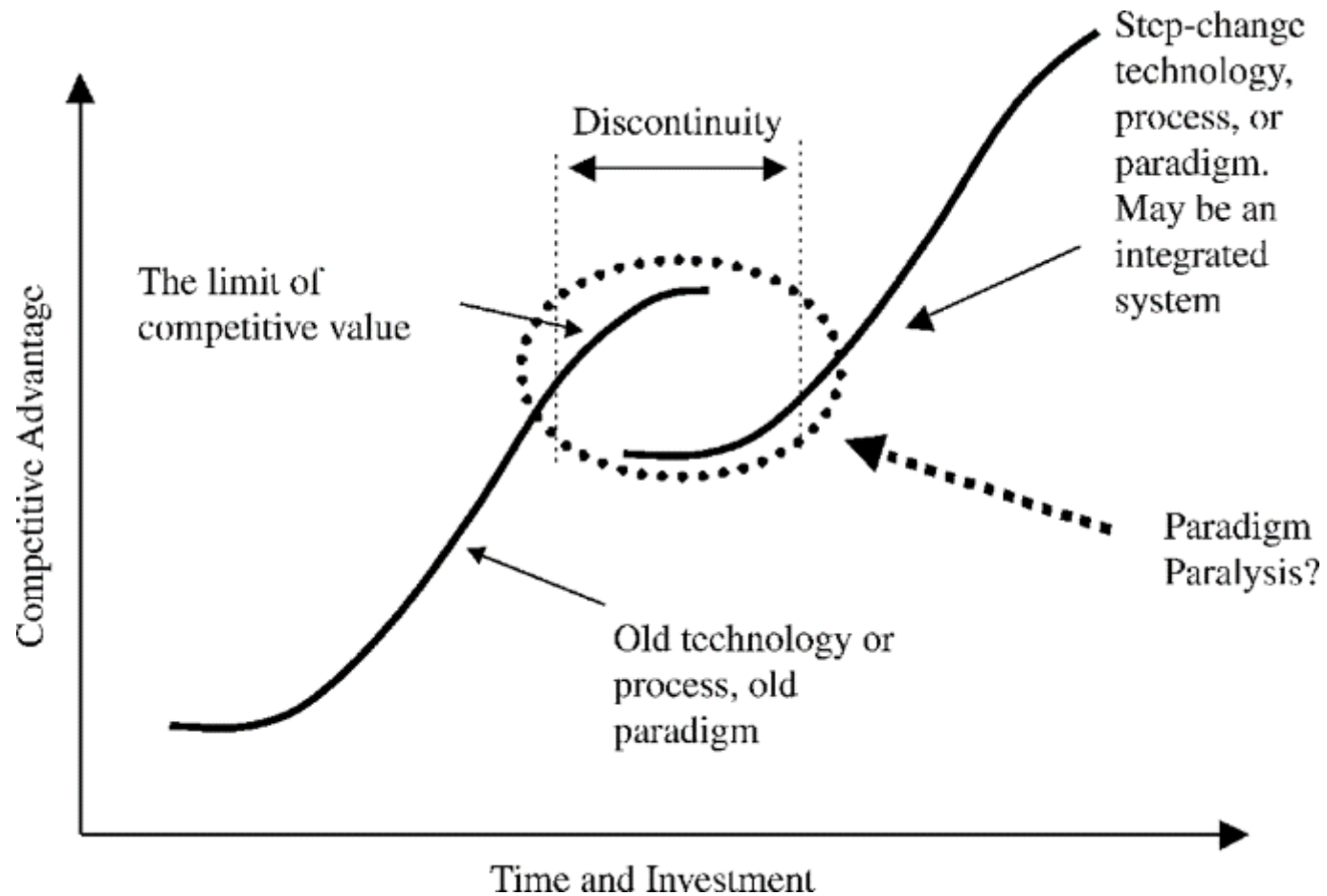
The "S" Curve of Technology



2) Transition Paradigm shift is needed



S-curve => new paradigm



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2) Higher education and their role in SD/paradigm shift

Higher education institutions (HEI), seen as a key player in the promotion of sustainable development (SD) are making advancements in SD implementation

in terms

of campus greening,
curriculum renewal and
research orientations

2) Higher education and their role in SD

Province of Limburg (BE) stated to become a sustainable, climate neutral region.



2) Higher education and their role in SD **UHasselt**

Hasselt University is a young, dynamic centre of expertise for teaching, research and service provision. It regards it as its social responsibility to contribute actively to a sustainable and innovative region.

It regards it as its social responsibility to contribute actively to a sustainable and innovative region. It aspires to be a hub in this innovation web.

2) Higher education and their role in SD **UHasselt**

▶▶ **20** MASTER PROGRAMMES (4 ENGLISH TAUGHT)

▶▶ **2** CAMPUSES

▶▶ **6** FACULTIES + 1 SCHOOL

▶▶ **480** PHD STUDENTS, OF WHICH 35% INTERNATIONAL STUDENTS

▶▶ **16** BACHELOR PROGRAMMES

▶▶ **7** RESEARCH INSTITUTES

▶▶ **1 240** STAFF MEMBERS, OF WHICH 12% INTERNATIONAL STAFF MEMBERS

▶▶ **5 800** STUDENTS OF WHICH 12% INTERNATIONAL STUDENTS

▶▶ MORE THAN **680** INTERNATIONAL PARTNERS FOR RESEARCH AND EDUCATION

2) Higher education and their role in SD **PXL**

The PXL University College is a young dynamic and vibrant organisation; a centre of expertise for innovation, creativity and entrepreneurship.

PXL offers professional bachelor programmes in several domains but is also active on lifelong learning projects and is responsive to the (local) needs (research and education).

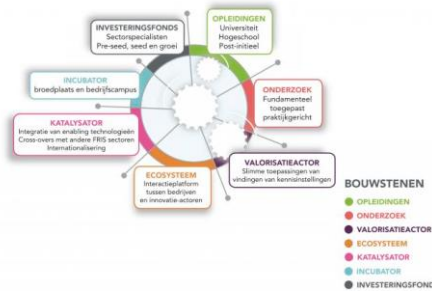
2) Higher education and their role in SD PXL

- **The university college PXL organizes her activities always starting from the quadrupole helix model**



Moreover, the university college strives to work in an interdisciplinary way in both teaching and research domains. Consequently, in education the attention is directed towards authenticity (for cases, teachers as well as for students).

Both HEI are active in all domains of sustainable development (research, education, campus greening,)



In the next section we go into details for 3 courses

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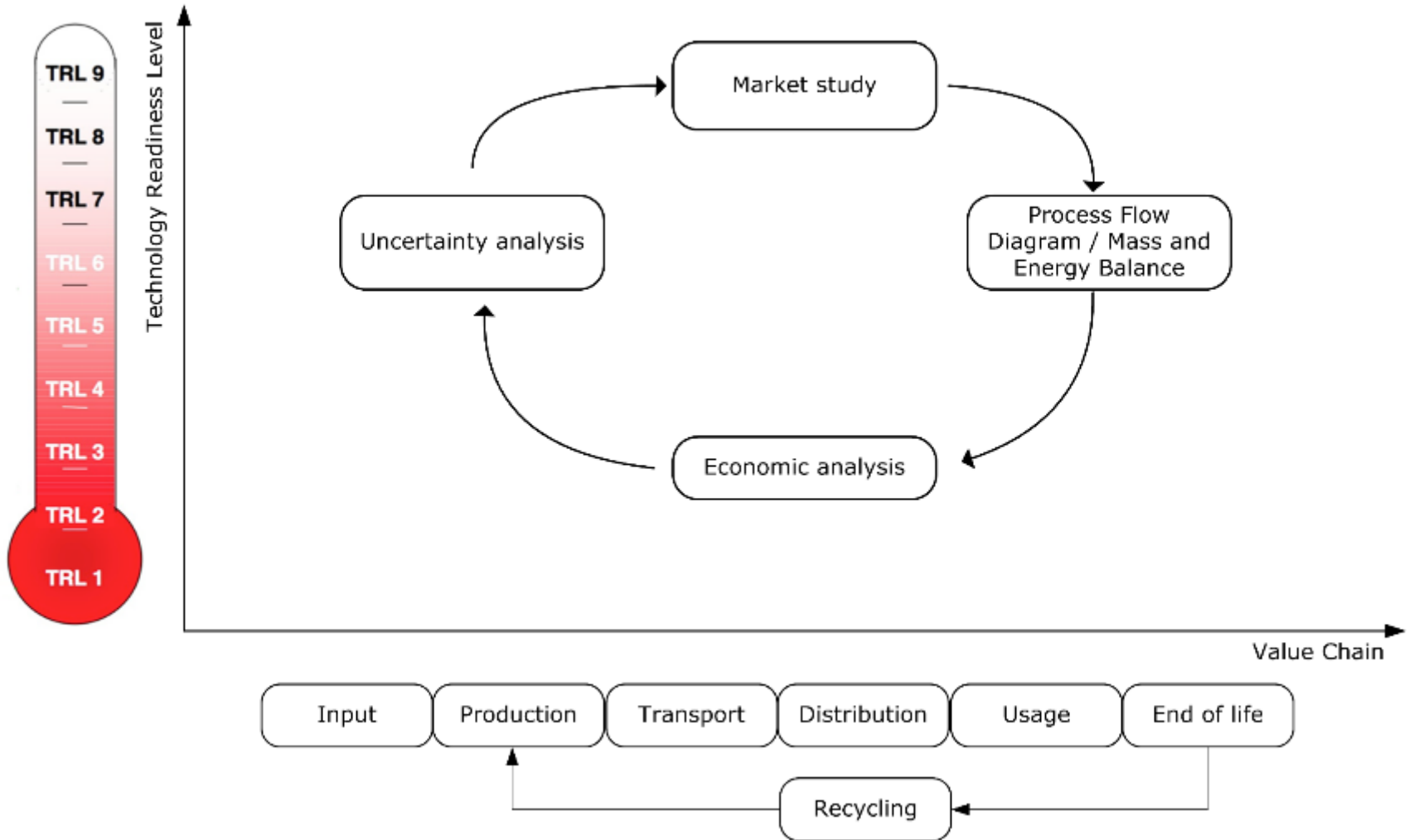
3.1 Cleantech Management Competences **UHasselt**

How to introduce clean technologies to the market?

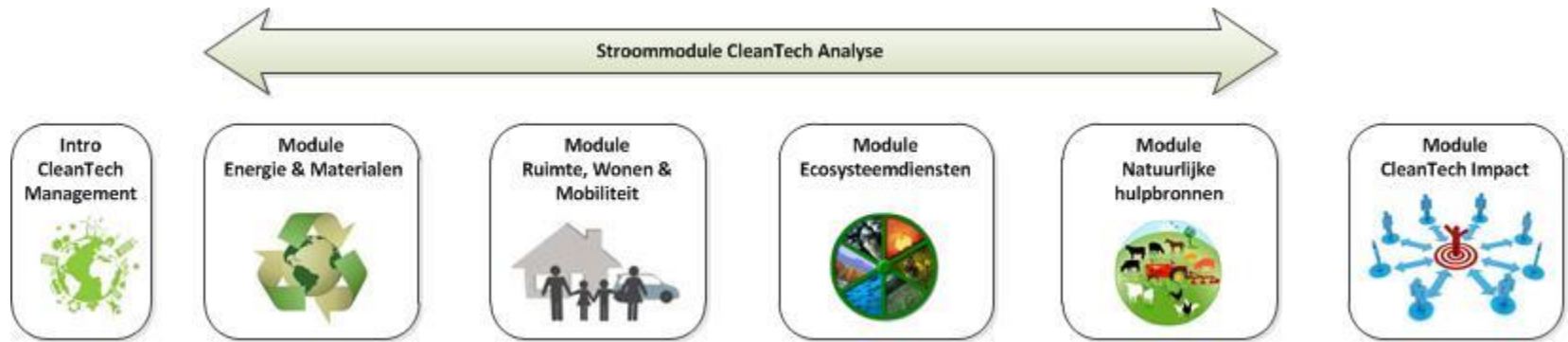
- **Technological competences**
Working principles state-of-the-art clean technologies
- **Management competences**
Scientifically underpinned investment and policy decisions based on techno-economic and sustainability assessments
- **Communication competences**
Convincing stakeholders such as financial institutions, government agencies, local community, ...

3.1 Cleantech Management Techno-economic analysis UHasselt

Techno-Economic Assessment



3.1 Cleantech Management Program and evaluation **UHassel**



■ Evaluation

- ✓ *Clean technologies*: portfolio of selected assignments tailored to professional needs of the participant
- ✓ *Cleantech analysis and impact*: business case for a clean technology of choice

3.1 Cleantech Management For whom? **UHasselt**

■ Functions

- CEOs, managers and experts in profit and non-for-profit organisations responsible for making their organisation more sustainable
- Consultants assisting organisations in designing and implementing sustainability measures
- Policy-makers responsible for the transition towards a more sustainable and circular economy
- Environmental coordinators who wish to update their knowledge in cleantech

3.1 Cleantech Management By

Organisation:



Powered by:



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3.2 EC level A Competences **UHasselt**

Environmental legislation, sustainability, green technology, environmental policy, These are current topics in each organization. The content of the program is listed in Appendix 2 of the VLAREL:

- *environmental issues,*
- *ecotoxicology,*
- *environmental law,*
- *environmental policy,*
- *environmental management systems (in correlation with quality, safety and sustainability)*
- *environmental technology.*

The program of Environmental Coordinator Level A is made up of 3 courses, with an integration piece (final work) and company visits. In total, the education takes 1.5 year

3.2 EC level A Content **UHasselt**

Partim 1 Basics, backgrounds and basic principles

- Principles of environmental sciences
- Environmental policy and instruments of government's environmental policy
- Monitoring and enforcement of environmental conditions including administrative and procedural aspects

3.2 EC level A Content **UHasselt**

Partim 2 Environmental management systems in companies And the functional tasks of the environmental coordinator

- The integration of environmental care into business management
- Starting an environmental management system in an enterprise
- Monitoring and enforcement of environmental conditions including administrative and procedural aspects
Interactive lectures and guest

3.2 EC level A Content **UHasselt**

Partim 3 Operationalization and deepening Of the task of EC level A

- Technological aspects
- Business Economics and Management
- Social and communicative aspects
- Methodological facets

3.2 EC level A for whom **UHassel**

■ Functions

- CEOs, managers and experts in profit and non-for-profit organisations responsible for making their organisation more sustainable
- Consultants assisting organisations in designing and implementing sustainability measures
- Policy-makers responsible for the transition towards a more sustainable and circular economy

3.2 EC level A Evaluation **UHasselt**

Evaluation

- ✓ The students have a lot of open book/real cases to be solved during the exams tailored to professional needs of the participant
- ✓ The students have to write a paper dealing with the previous mentioned topics
- ✓ The students need to set up a portfolio in view of their communication skills.

3.2 EC level A **UHasselt** (Steering comité *)

Interdisciplinarity



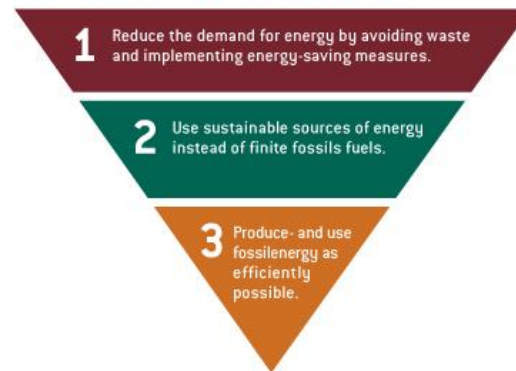
A lot of extern expertise



Intermezzo Energy Efficiency in Buildings

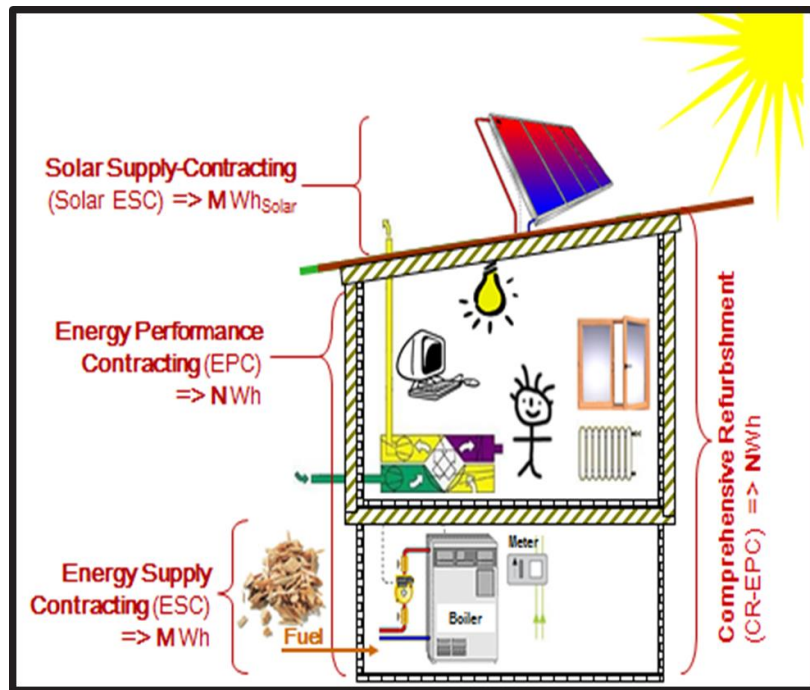
Traditional Trias Energetica

The Trias Energetica concept:
the most sustainable energy is saved energy.



Intermezzo Energy Efficiency in Buildings

New Cleantechnologies dealing with Energy Efficiency

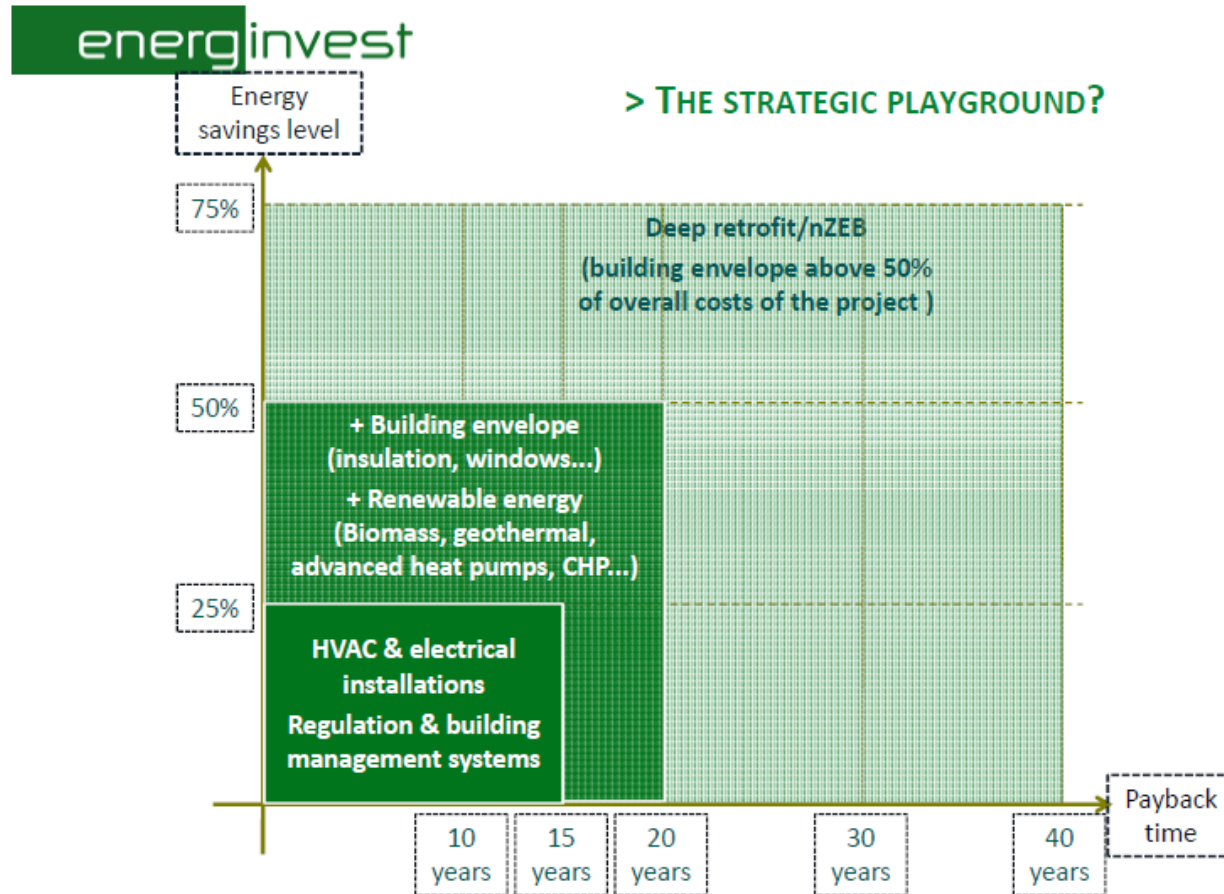


The University College PXL started only two years ago together with several in- and extern stakeholders a new postgraduate Energy Efficiency Services (EES). As a result of this curriculum renewal the PXL performs at this moment Energy Quick Scans for all their buildings. In view of this result they will eventually decide to opt for an Energy Performance Contracting (EPC)

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Intermezzo The timescale in EES can be very variable.



3.3 PG EES Program **PXL**

Module 1 (56h)

The iterative project cycles, including the audits, measurements and verification and the role for facilitator.

3.3 PG EES Program **PXL**

Module 2 (36h).

The elements to describe the project cycle costs are studied

It is obvious that the ***legal conditions*** should be ***discussed and worked out in advance***.

Only in this way the measurement and verification protocol can be performed in a proper way.

=> In order to monitor the energy savings and so the distribution between the ESCo/owner of the realised cost savings.

3.3 PG EES Program **PXL**

Module (2)

In addition the concept *the green value/added value* are discussed.



POSTGRADUAAT
ENERGY EFFICIENCY
SERVICES

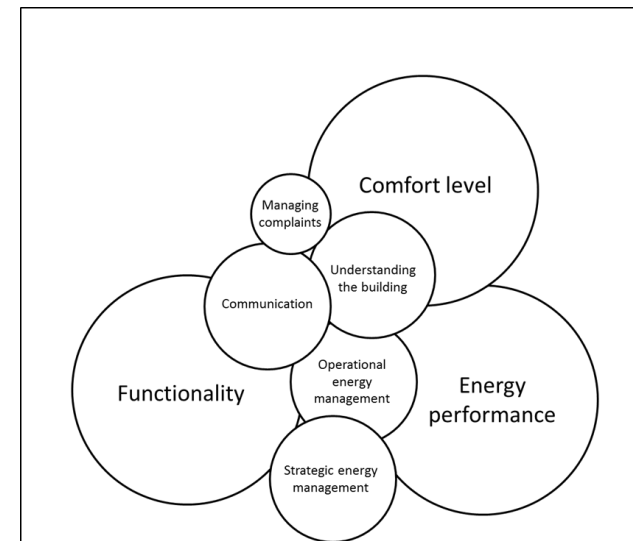


3.3 PG EES Program **PXL**

Module 3 In- en external communication (26h).

A well organised ***change management*** strategy will be needed as

- an EES project is performed during ***a longer period*** (in comparison to quick wins opportunities) and often
- ***NEB are present.***



3.3 PG EES for whom **PXL** ?

The course addresses to whom (policy, technical and financial) interested from

- government,
- SMEs,
- energy agencies and energy experts, architects,
- consultants,
- schools,
- real estate companies,
- financial institutions,
- ESCOs and ESCO facilitators,
- facility managers,

3.3 PG EES evaluation **PXL**

Evaluation

- ✓ The students have a lot of open book/real cases to be solved during the exams tailored to professional needs of the participant
- ✓ The students have permanent evaluation for the communication module
- ✓ The students make calculations on real (public, private) EE projects.

3.3 PG EES **PXL** by whom



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4 (some) Conclusions for both HEI



- Good practices of principle of quadrupole helix knowledge centre and the FRIS concept in collaboration with industry, government and society.
- The need for new (energy, material) technologies and energy flexibility, accompanied with new business models (a paradigm shift)
- Dissemination of knowledge concerning (techniques and developing new business models) towards the (Eu)regio but also abroad

4 (some) Conclusions for both HEI



- Research has been started to eliminate ESCO-barriers for SME and public authorities
- Legal and financial barriers were discussed and will be introduced in policy discussions for local and Flemish government
- Involvement and behaviour of future generations 'decision-makers'.
- New events (congress, symposia, GRI rapport,)
- Living lab (in collaboration with all users) and stimulating start-ups in the (eu)regio.
- Introduction of SDG in faculties
-

More info



ENERGY EFFICIENCY
SERVICES



Cleantech Management

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EC level A (UHasselt) and PG EES (PXL)

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- www.UHasselt.be

