

**CMK**

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ENVIRONMENTAL SCIENCES



**UHASSELT**



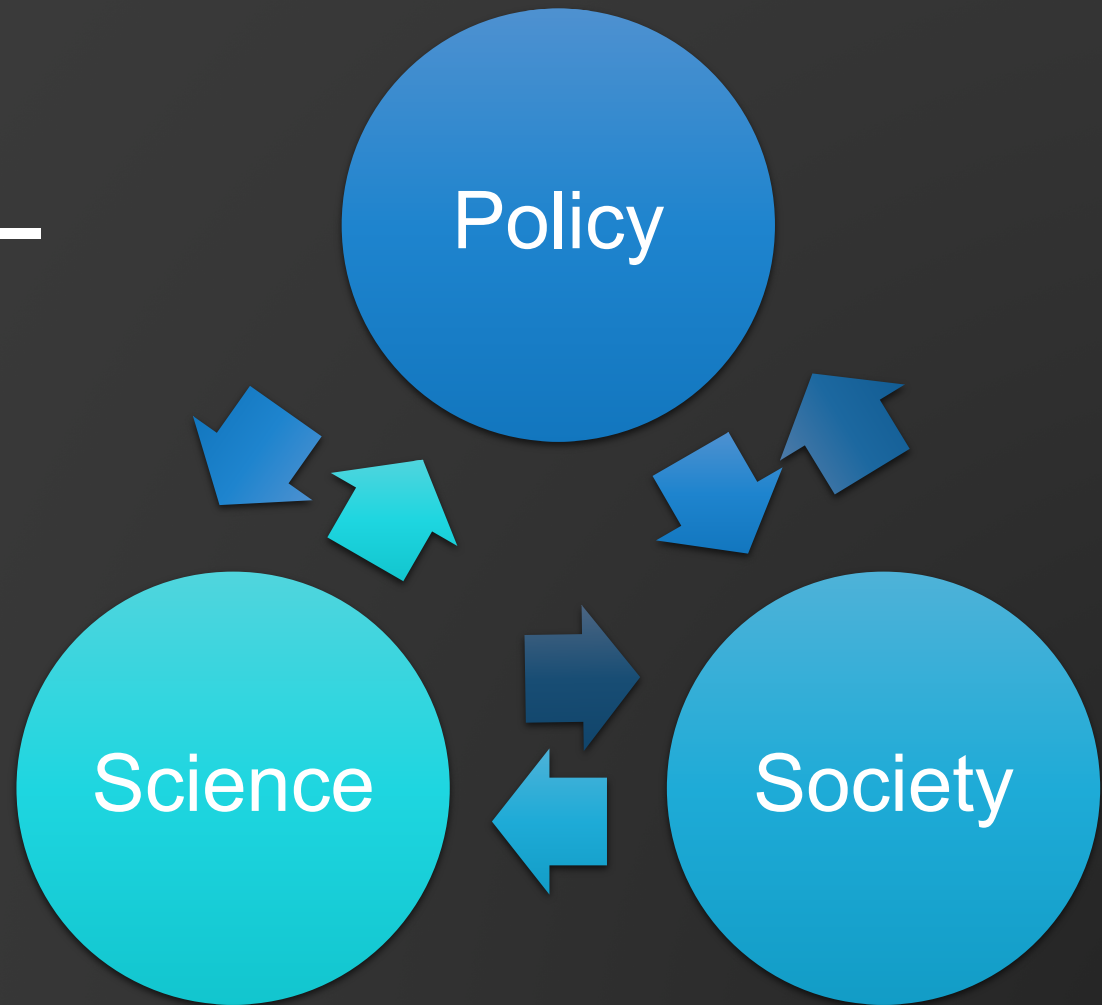
# The value of science in the diesel car emissions scandal

Robert Malina

CMK Symposium  
February 26 2019, Maasmechelen

Robert Malina Feb 26 2019

**Science's  
normative place –  
very simplified...**





# Science under fire

Science is sometimes perceived to be

- **too slow and expensive** to provide answers to policy-makers
- **out of touch** with the actual problems of normal people
- **just one truth** out of many

**“irrelevant”**


**“elitist”**

**“biased”**

**A (simple) example on science's positive role in  
public policy and public debate**

***“DIESELGATE”***

# September 18, 2015: US EPA Notice of Violation

 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

SEP 18 2015

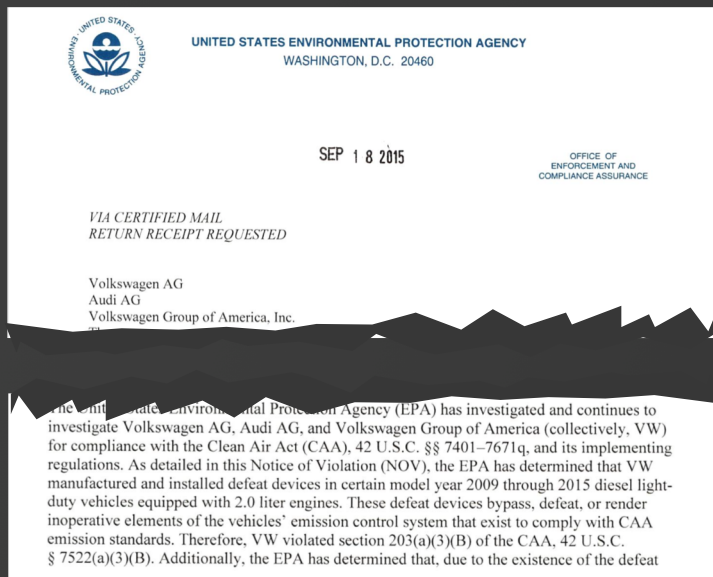
OFFICE OF  
ENFORCEMENT AND  
COMPLIANCE ASSURANCE

VIA CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

Volkswagen AG  
Audi AG  
Volkswagen Group of America, Inc.

The United States Environmental Protection Agency (EPA) has investigated and continues to investigate Volkswagen AG, Audi AG, and Volkswagen Group of America (collectively, VW) for compliance with the Clean Air Act (CAA), 42 U.S.C. §§ 7401–7671q, and its implementing regulations. As detailed in this Notice of Violation (NOV), the EPA has determined that VW manufactured and installed defeat devices in certain model year 2009 through 2015 diesel light-duty vehicles equipped with 2.0 liter engines. These defeat devices bypass, defeat, or render inoperative elements of the vehicles' emission control system that exist to comply with CAA emission standards. Therefore, VW violated section 203(a)(3)(B) of the CAA, 42 U.S.C. § 7522(a)(3)(B). Additionally, the EPA has determined that, due to the existence of the defeat

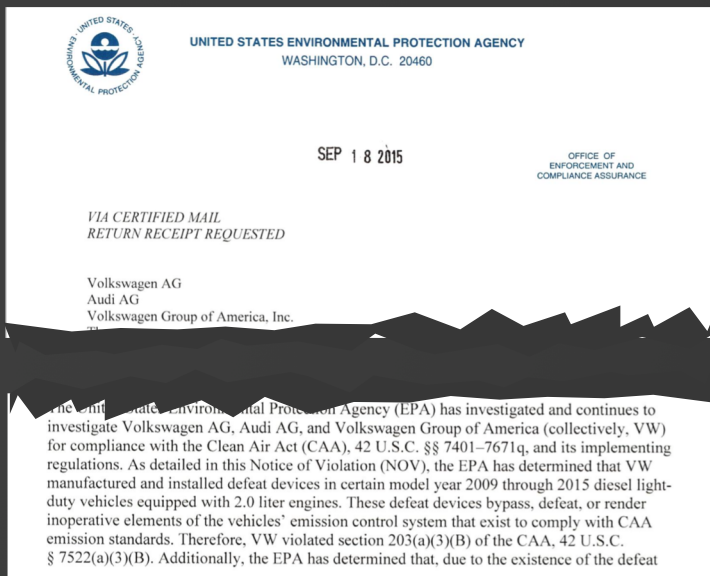
# Questions by the general public & policy-makers



1. What is the difference between **on-road** and **test-stand emissions** for VW cars?
2. Can we see a discrepancy for models of **other manufacturers**, as well?
3. What are the **consequences** of these “excess” emissions?
4. What can we **do** about the “excess” and how much would it **cost**?

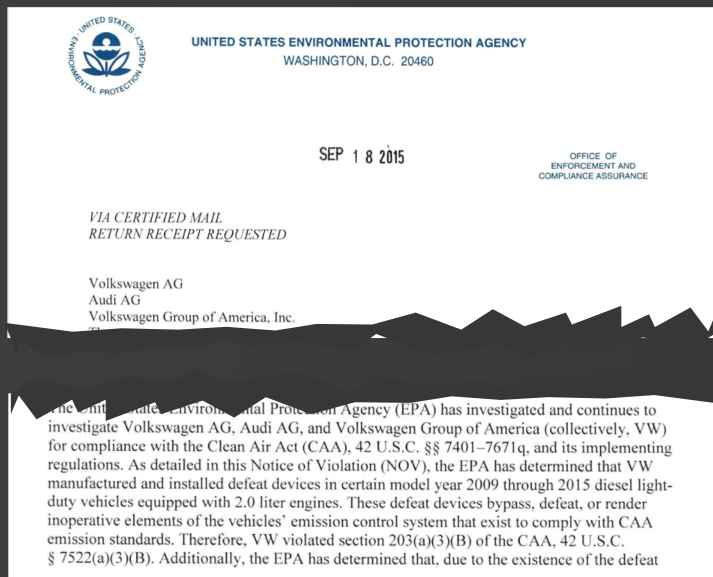


# TODAY, February 26 2019



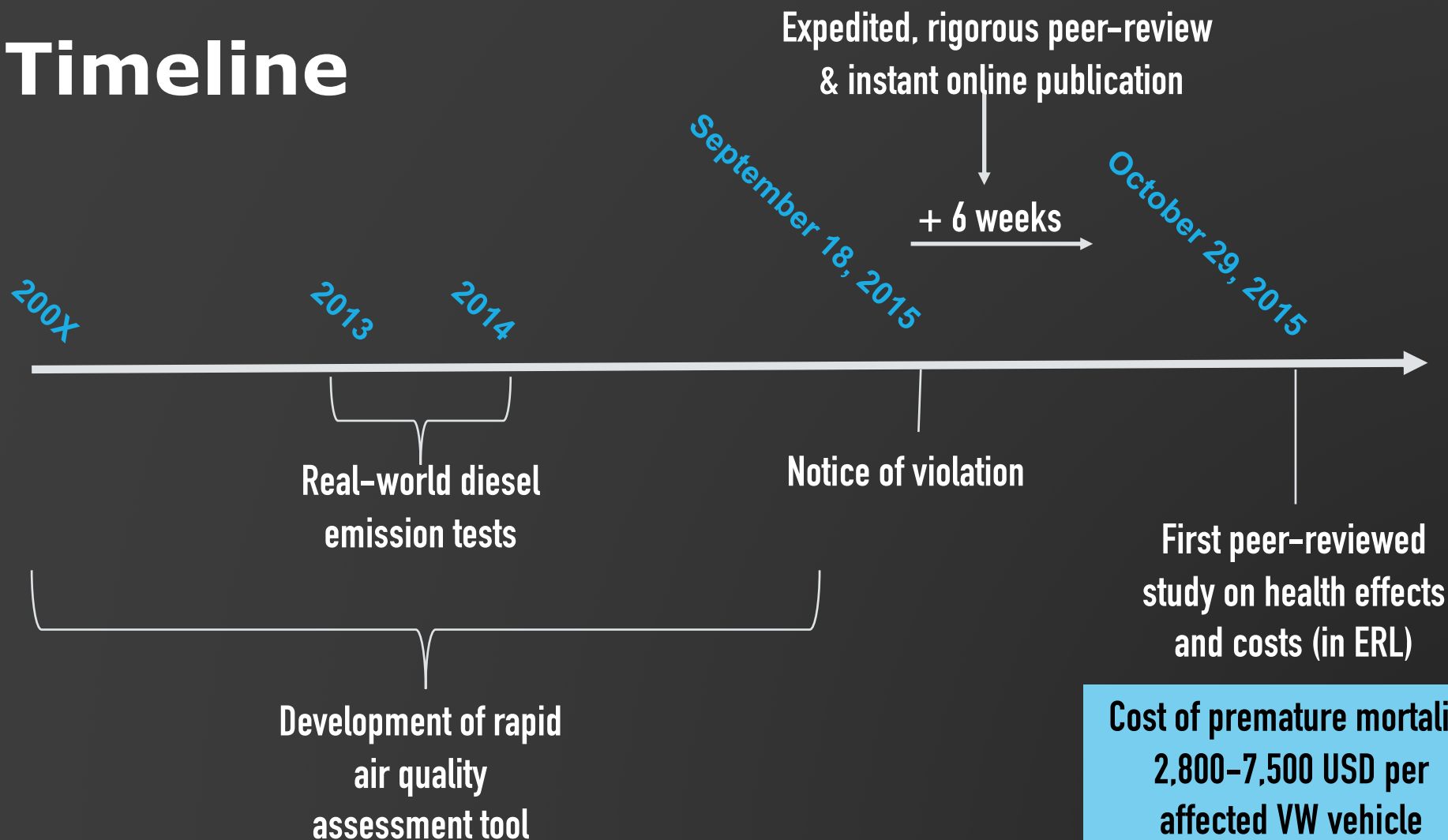
- Audi CEO in jail, with other executives from VW group
- VW group has paid approx. 27bn USD in fines/damages (with many law suits not completed, yet)
- What was the VW emissions scandal has become “dieselgate” with many car manufacturers implicated for using defeat devices or gaming the emission testing protocols
- Wider public better aware of the public health consequences of vehicle emissions
- Emission regulation has been severely tightened across Europe

# Questions by the general public & policy-makers:



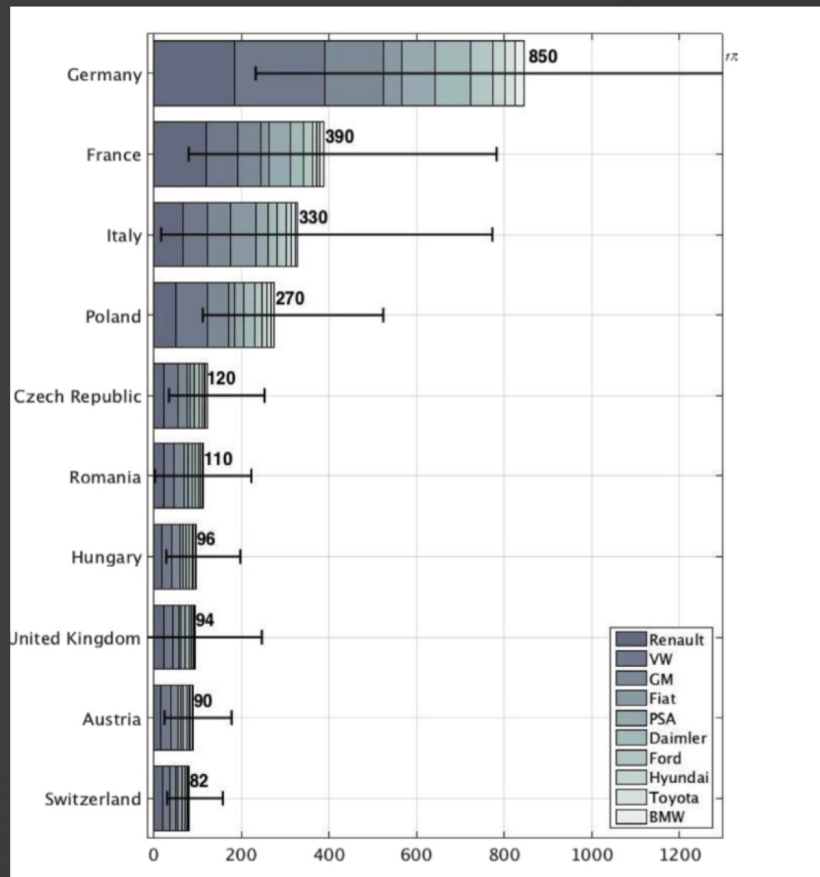
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# Timeline



# Health effects & costs from excess emissions in Europe

- Strong evidence from multiple studies that diesel car excess emissions cause premature mortality in Europe on the order of several thousand cases per year, leading to health costs of several bn. EUR annually.



Annual premature mortalities from excess diesel emissions in Europe, 10 countries with the highest impact,  
Source: Chossiere et al. (2018).



# Health effects & costs from excess emissions in Europe

	Premature mortalities per million cars
BMW	13 (−0.4; 35)
Daimler	49 (1.6; 140)
Fiat	25 (2.5; 47)
Ford	20 (2.6; 42)
GM	52 (8.9; 120)
Hyundai	41 (8.7; 83)
PSA	18 (4.2; 40)
Renault	58 (13; 140)
Toyota	20 (3; 48)
VW	32 (0.85; 89)
<b>Total</b>	<b>33<sup>b</sup> (8; 167)</b>

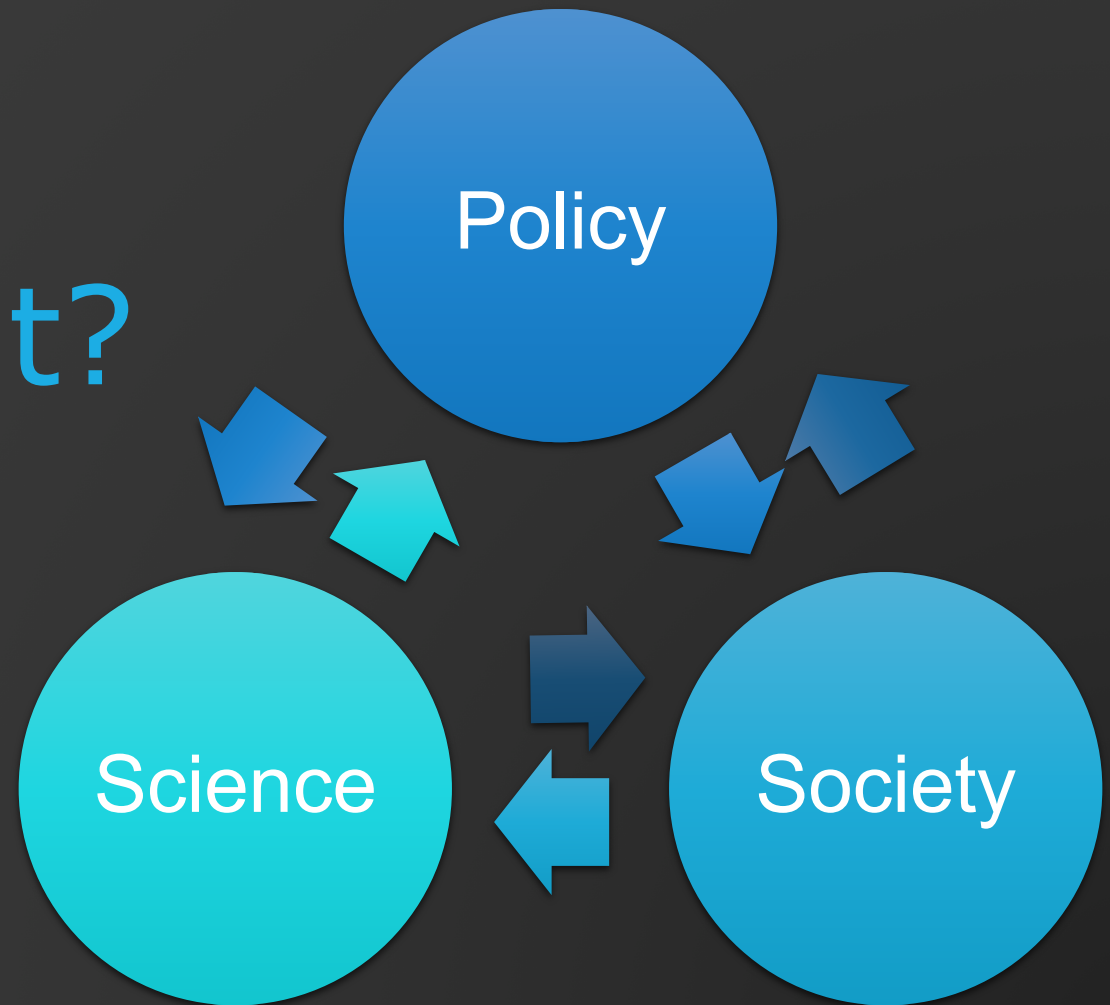
Total impacts of excess on-road NO<sub>x</sub> emissions in Europe attributed to each manufacturer. Mean values are presented, with 95% confidence intervals in parenthesis.

Source: Chossiere et al. (2018).

- Strong evidence from multiple studies that diesel passenger car excess emissions cause premature mortality in Europe on the order of several thousand cases per year, leading to health costs of several bn. EUR annually.
- Strong evidence that differences in impacts between manufacturers cannot be fully explained by differences in fleet size or market penetration: **It is possible to emit less!**

**“Dieselgate  
science”**

Irrelevant?  
Elitist?  
Biased?



# What is Science?

- Science is **not** the “**view from nowhere**”, uniformed by human goals and values
- It is **influenced** by **human values** and **value judgements**, e.g.:
  - Research questions impacted by society’s values (and funding decisions)
  - Ethical boundaries of research
- **Value-free** science is **unattainable**, and **non-desirable**

# What is Science?

- Science is aiming to be **impartial** – but not **neutral**
- **Impartiality**: All arguments / hypotheses within the societal boundaries of research are assessed with the same rigorous tools of inquiry. — **ex ante all** arguments / hypotheses are **equal**.
- **Non-Neutrality**: Some arguments / hypotheses carry higher “credibility” after the assessment with the same tools of inquiry. — **ex-post NOT all** arguments / hypotheses are **equal**.



# Non-neutrality of science confused with biased science

- It is **non-neutral** to say that there is a link between excess diesel emissions and morbidity and mortality.
- It is **non-neutral** to say that immediate and substantial action is required in order to keep global warming below 1.5 degree celsius.
- But both claims are **not biased** as long as they are backed by best available evidence using impartial methods of inquiry.

# “Dieselgate science”

A small example for science's ability to **abandon** the **ivory tower** and to provide answers for questions of high societal urgency, in an **impartial, non-neutral** way.

**robert.malina@uhasselt.be**

**References:**

- (1) Barrett, S. / Speth, R. / Eastham, S. / Dedoussi, I. / Ashok, A. / Malina, R. / Keith, D. (2015): Impact of the Volkswagen emissions control defeat device on US public health, in: Environmental Research Letters, Vol. 10, 114005**
- (2) Chossière, G. / Malina, R. / Allroggen, F. / Eastham, S. / Speth, R. / Barrett, S. (2018): Country- and manufacturer-level attribution of air quality impacts due to excess NO<sub>x</sub> emissions from diesel passenger vehicles in Europe, in: Atmospheric Environment, Vol. 189, pp. 89-97**

Robert Malina Feb 26 2019