For our Environment

Umwelt Bundesamt

45th Session, Task Force on Integrated Assessment Modelling (TFIAM) in Lisbon

# Air pollution impacts of climate and energy policy in Germany

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## Outline

- **Germany's climate and energy policy**
  - Scenarios for energy production

- **Impacts on emissions of air pollutants**

# Cornerstones of Germany's climate and energy policy

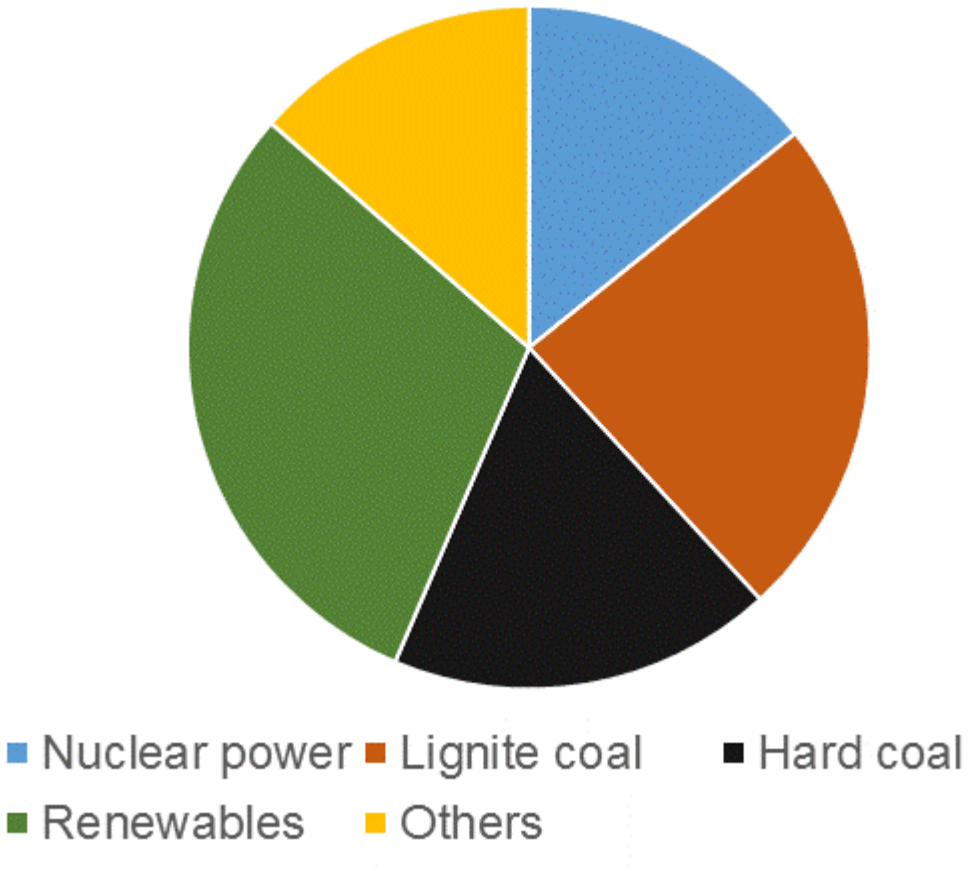
- Decision for nuclear phase-out until 2022 in 2011

https://de.wikipedia.org/wiki/Kernkraftwerk_Neckarwestheim#/media/File:Atomkraftwerk_GKN_Neckarwestheim.JPG

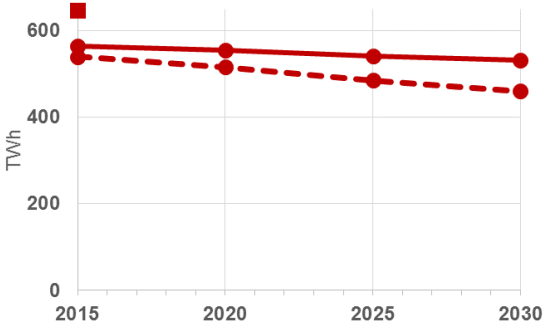
- National climate policy:
  Reduction of greenhouse gas emissions by 40 % from 1990 to 2020, including a program of action for climate protection

# Electricity production in Germany in 2015

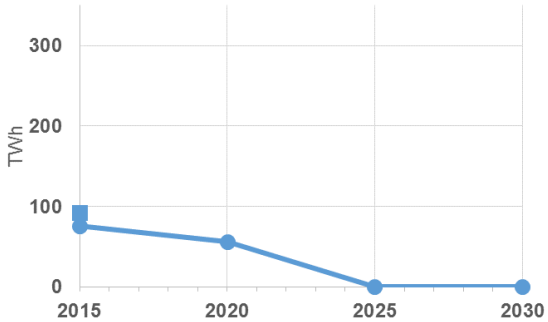
**Total production: 647 TWh**



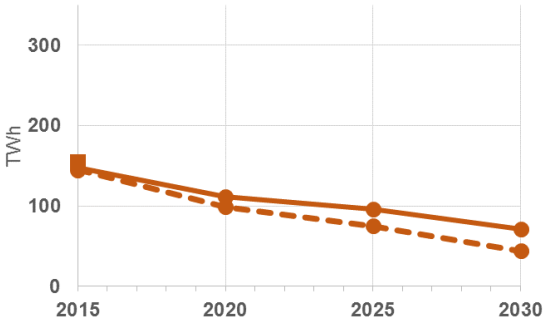
# Scenarios for electricity production in Germany until 2030



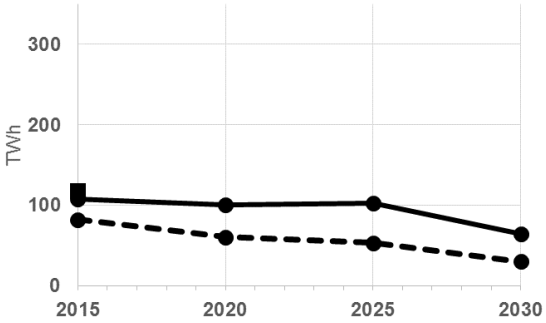

Total



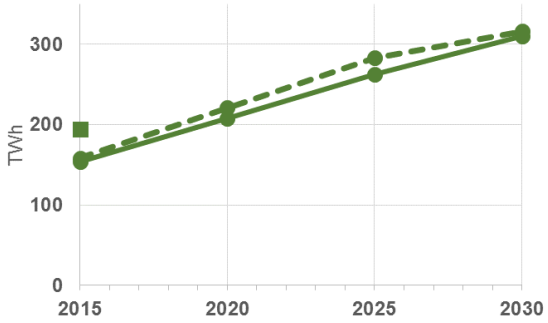

Nuclear power



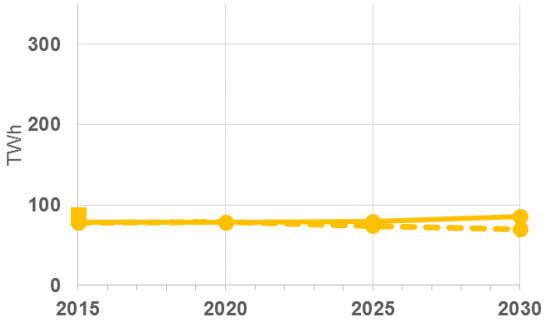

Lignite coal




Hard coal




Renewables

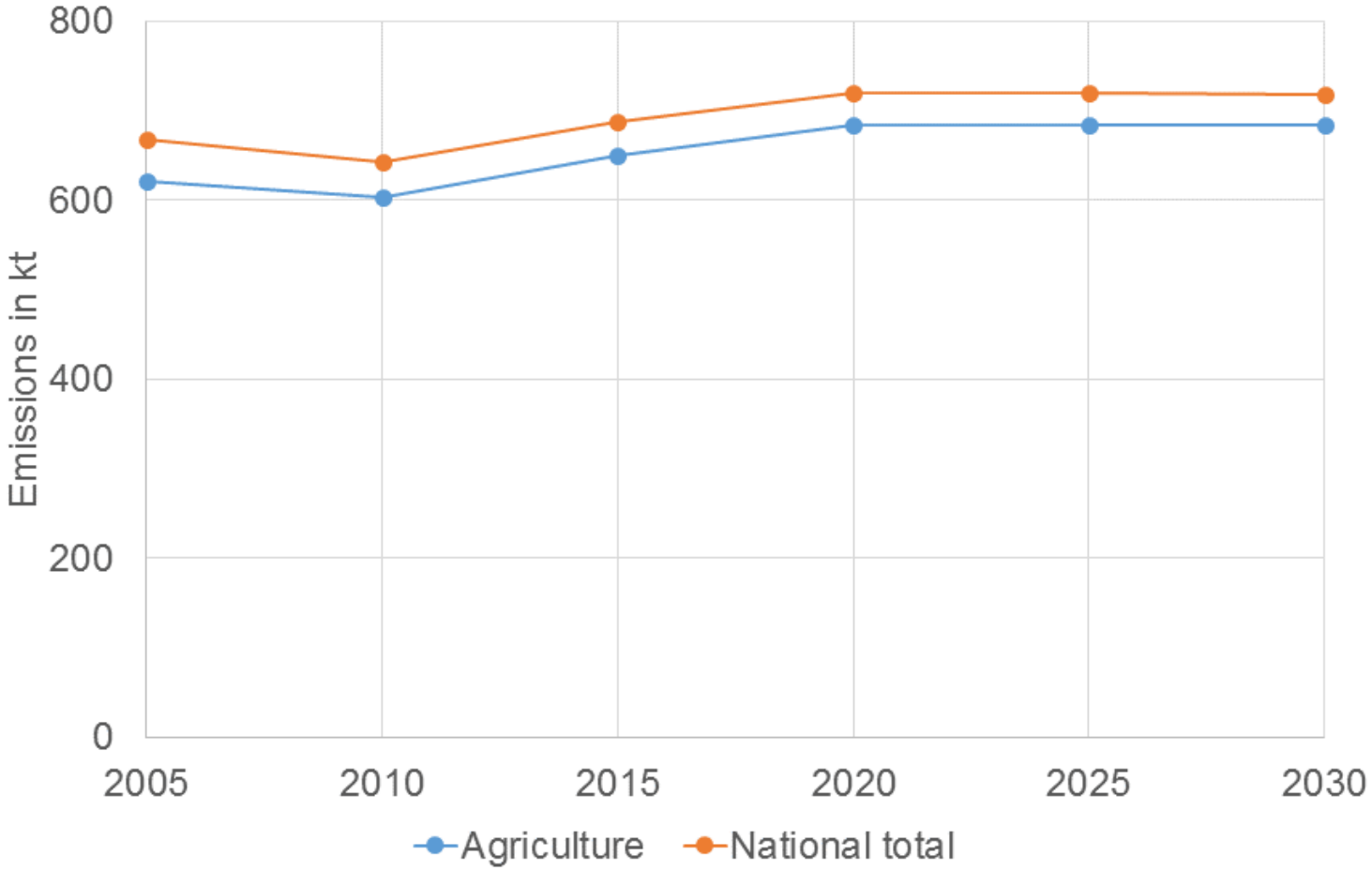



Others

Scenarios (CLE: current legislation scenario, including all measures set into force until 2011; ET: energy transition scenario) from 2013

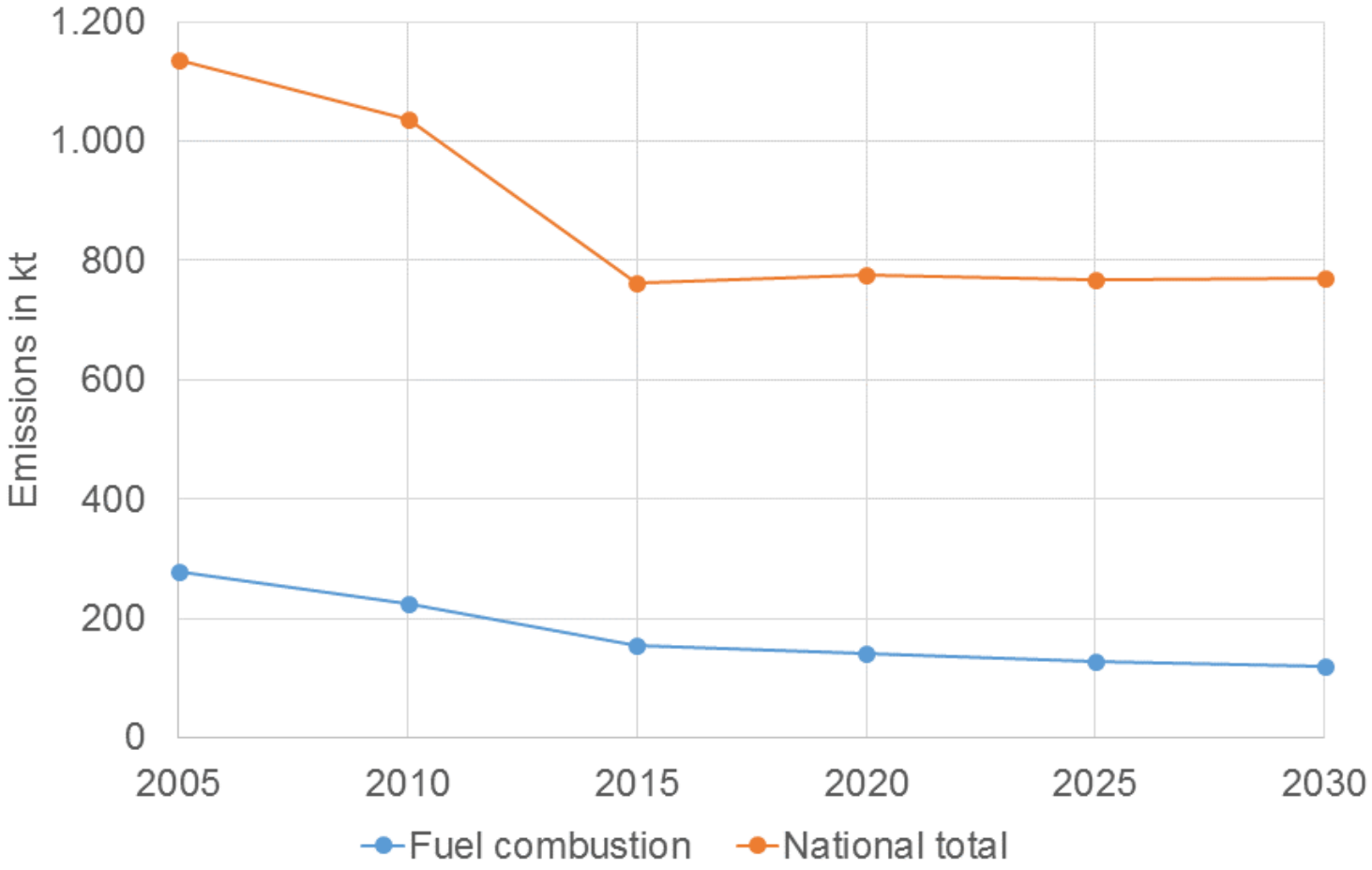
Square: actual value 2015; solid line: CLE; dotted line: ET

# Ammonia



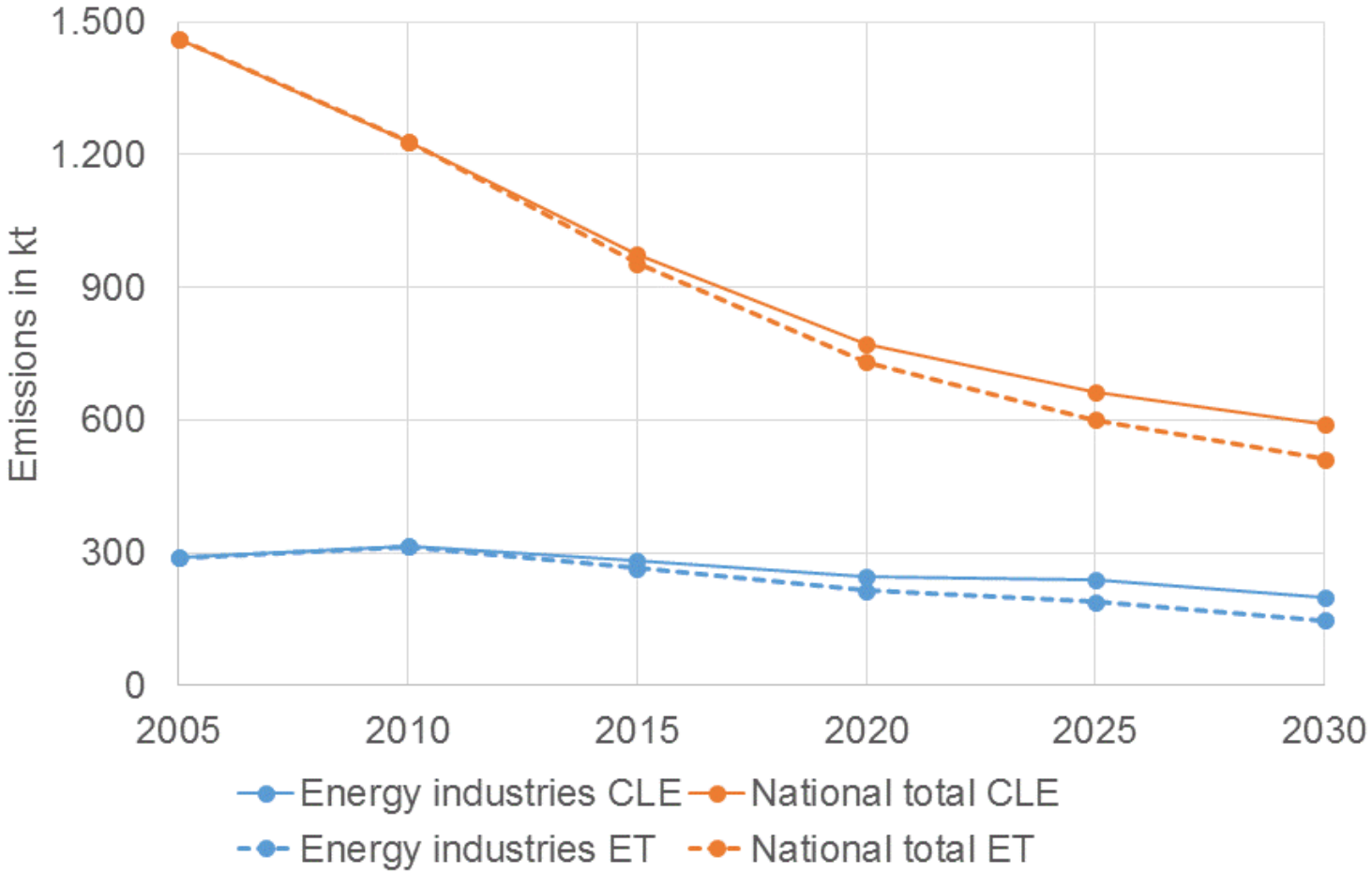

- Negligible difference between CLE and ET
- Decline of emissions until 2030 needs additional measures

## NMVOC



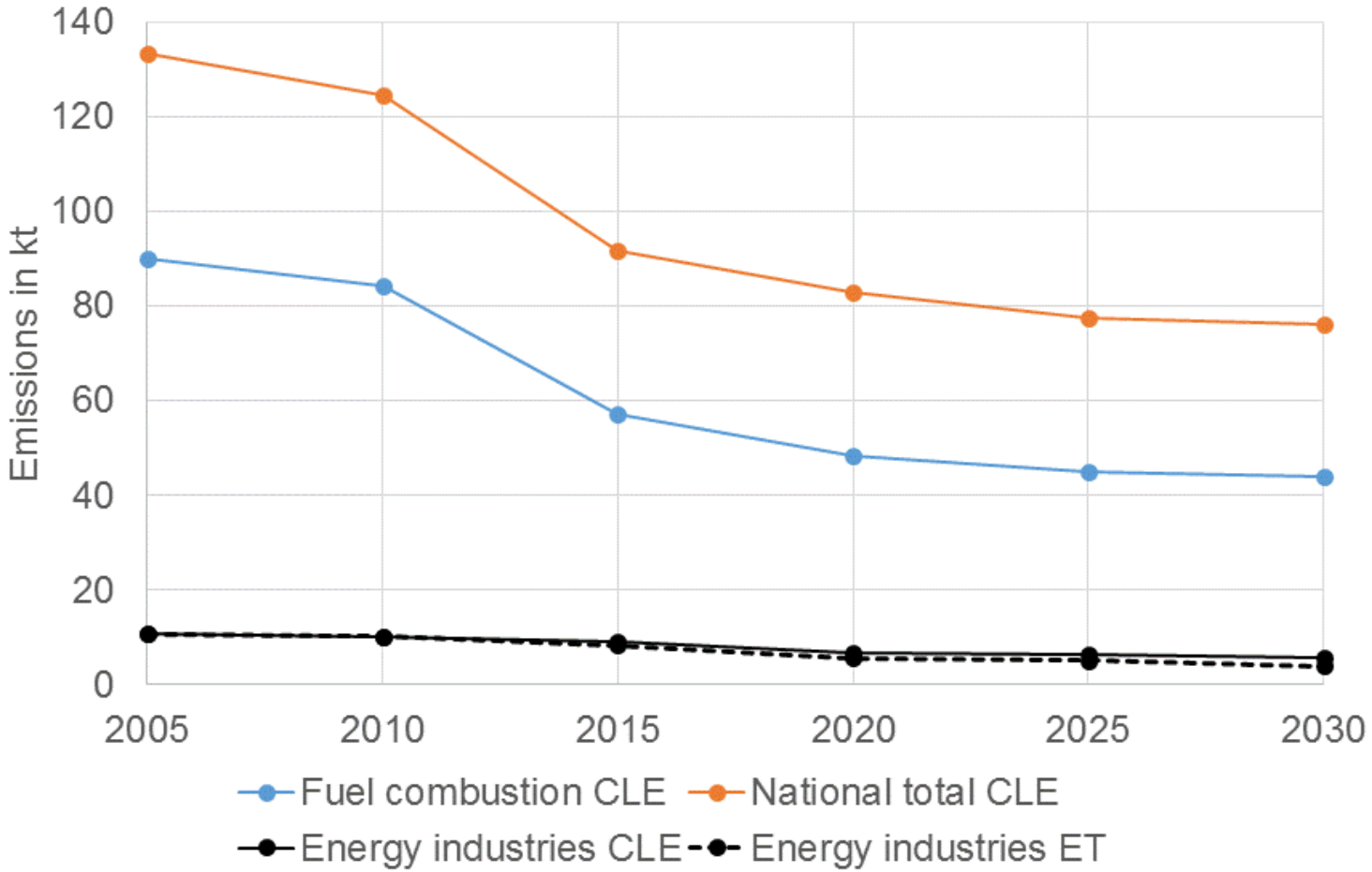

- National totals without agriculture
- Negligible difference between CLE and ET

## NOx




- National totals without agriculture
- Main reductions comes from transport sector
- Difference between CLE and ET is mainly caused by energy industries

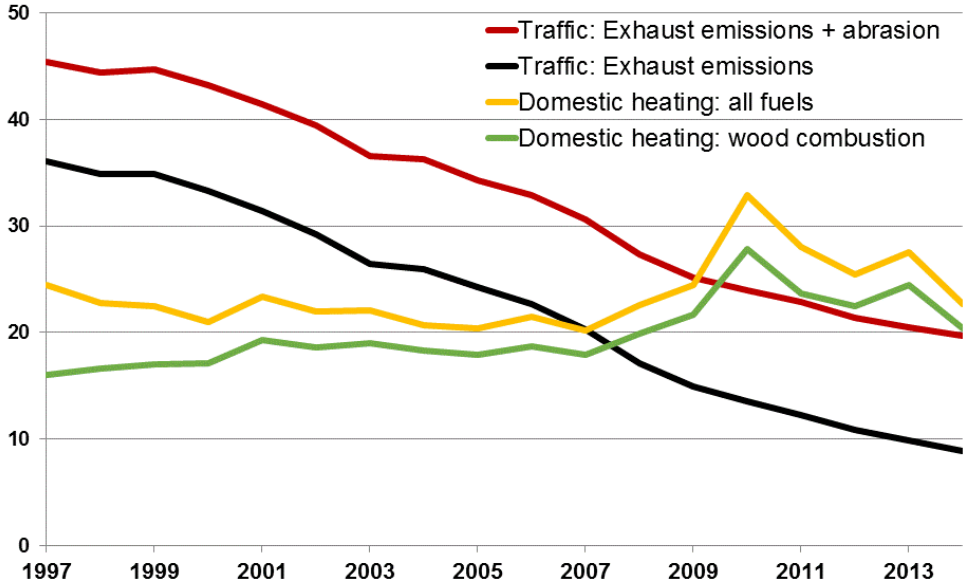
## $PM_{2.5}$



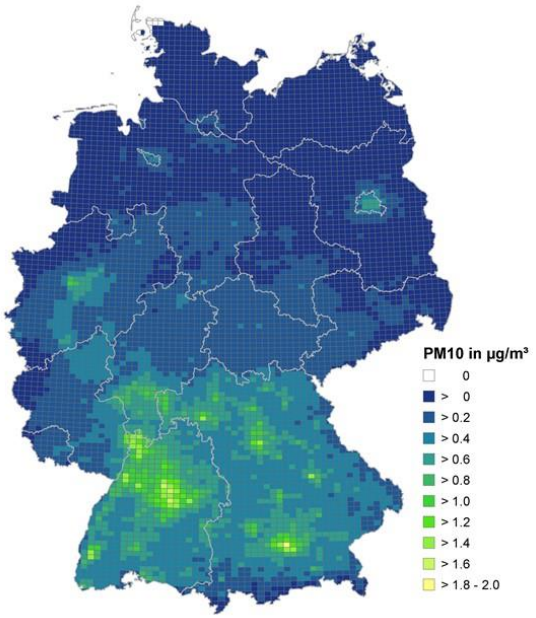

- Main reduction comes from transport sector
- Reduction caused by energy industries is compensated by increase caused by domestic heating

# Biomass burning and air quality in Germany

Annual emissions of $PM_{2.5}$ in kt in Germany

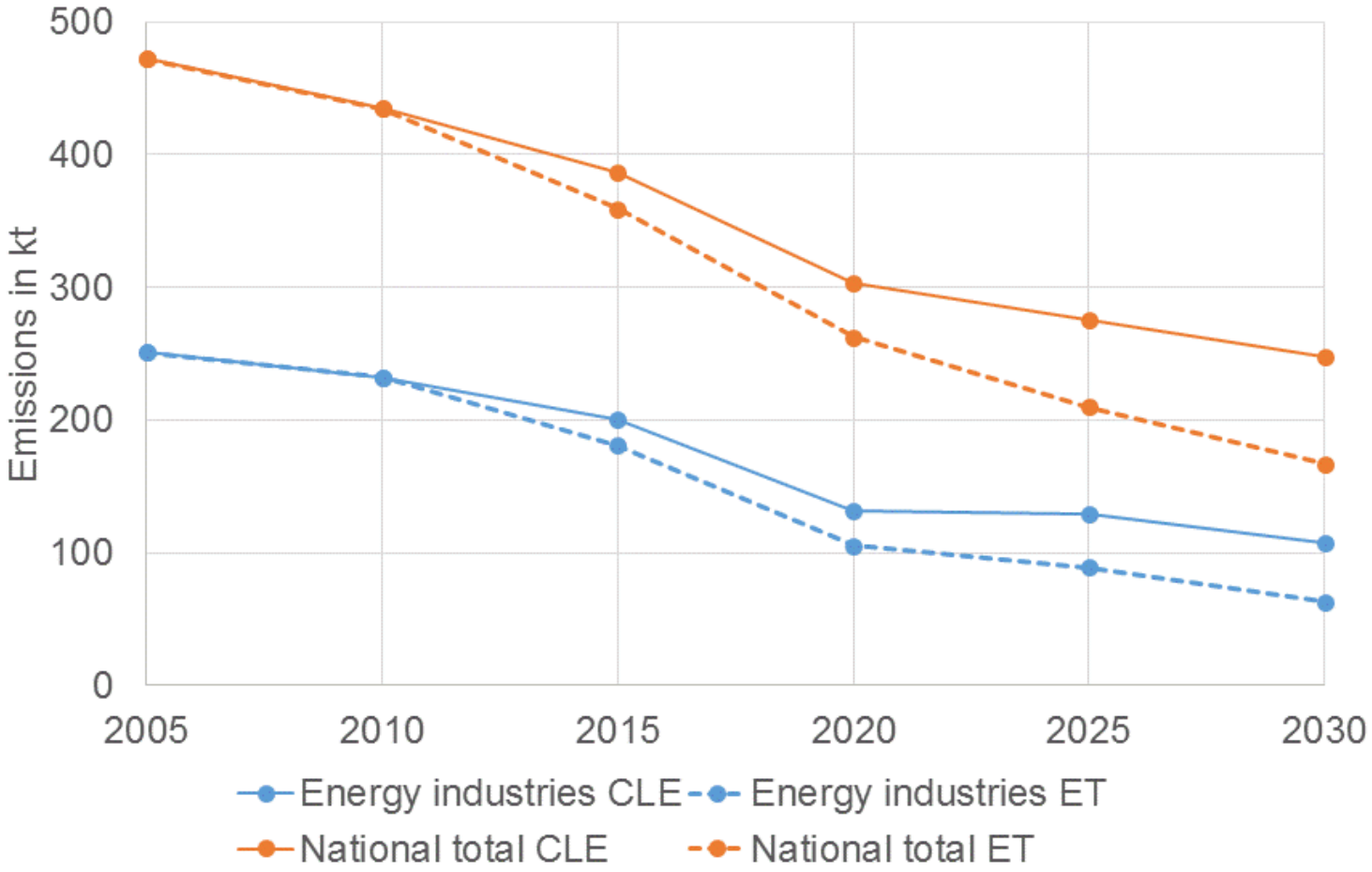



Modelled contribution from biomass burning to PM concentrations in the rural background in 2005



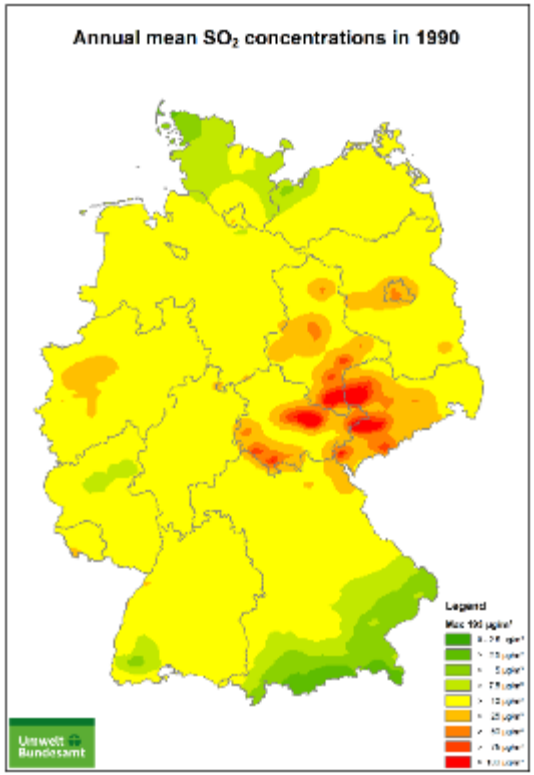

- Regulation of dust emissions for stoves are based on measurements on a test bench
- Impact on climate by emissions of black carbon

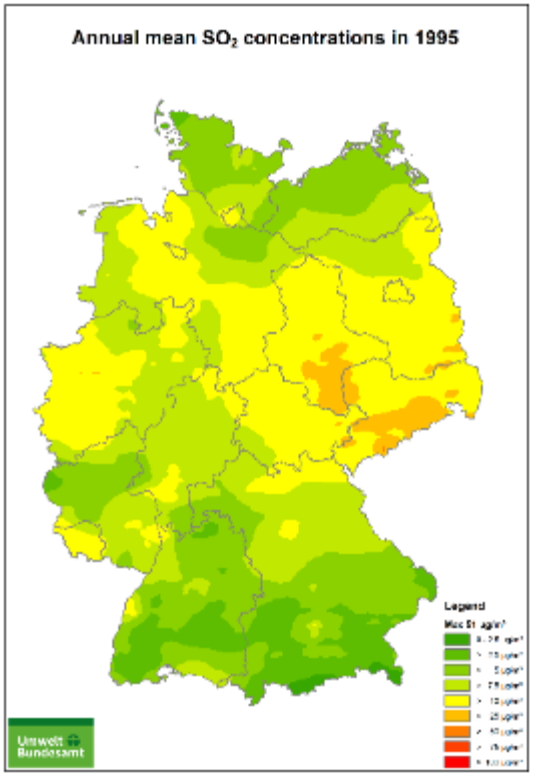
## $SO_2$

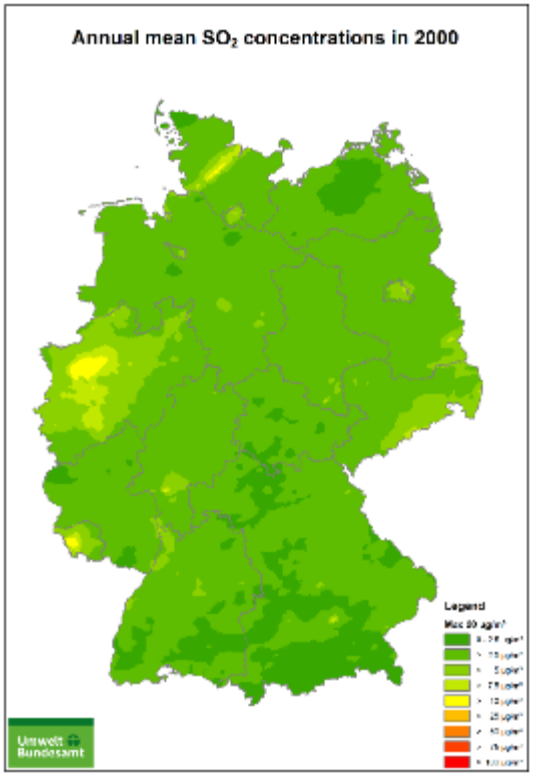



- Energy transition will provide a significant additional reduction of emissions

# Ambient $SO_2$ concentrations after German reunification




Structural changes were main drivers to improve air quality

- Economic decline in Eastern part of Germany (= decline of activity)
- Power plants and other industrial installations had to become compliant with (West) German regulations (= improved emission factors)

# Thank you very much for your attention!

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**http://www.umweltbundesamt.de/en/topics/air**