M. Amann, I. Bertok, J. Cofala, F. Gyarfas, C. Heyes.
Z. Klimont, W. Schöpp, W. Winiwarter

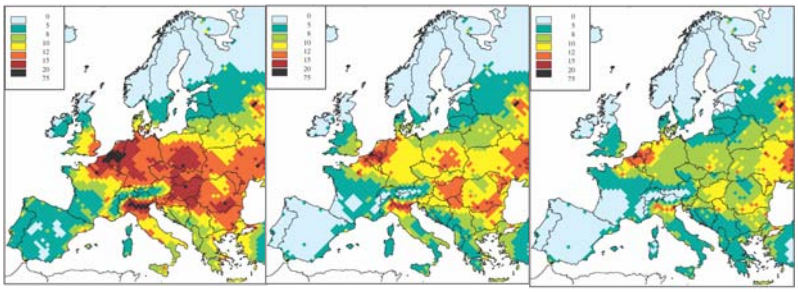
IIASA

The CAFE baseline scenarios:

Key findings

Anthropogenic contribution to PM2.5

IIASA

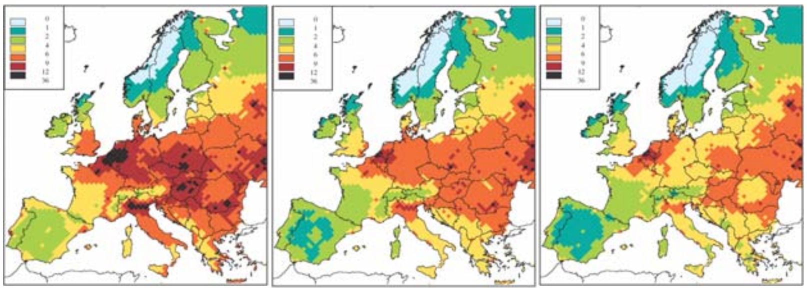


2000 2010 2020

Rural concentrations, annual mean [µg/m^3]
from known anthropogenic sources excluding sec. org. aerosols
Average of calculations for 1997, 1999, 2000 & 2003 meteorologies

Loss in life expectancy

attributable to anthropogenic PM2.5 [months]

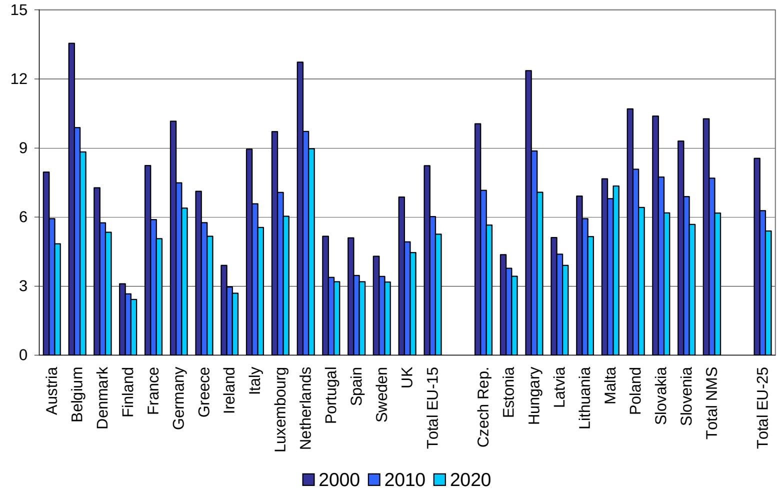


2000 2010 2020

Loss in average statistical life expectancy
due to identified anthropogenic PM2.5
Average of calculations for 1997, 1999, 2000 & 2003 meteorologies

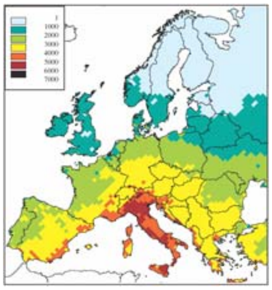
Loss in life expectancy

attributable to anthropogenic PM2.5 [months]

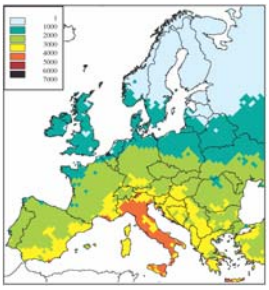


Health-relevant ozone concentrations

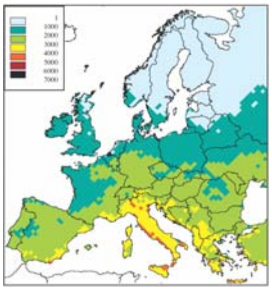
[SOMO35, ppb.days]



2000



2010

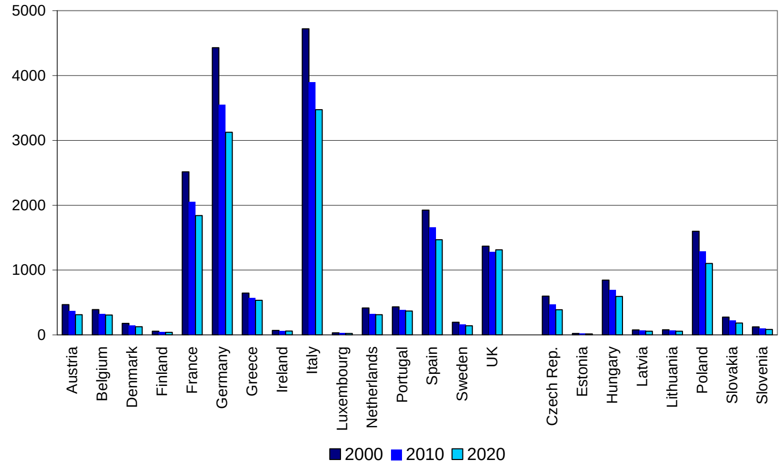


2020

Rural concentrations
Average of calculations for 1997, 1999, 2000 & 2003 meteorologies

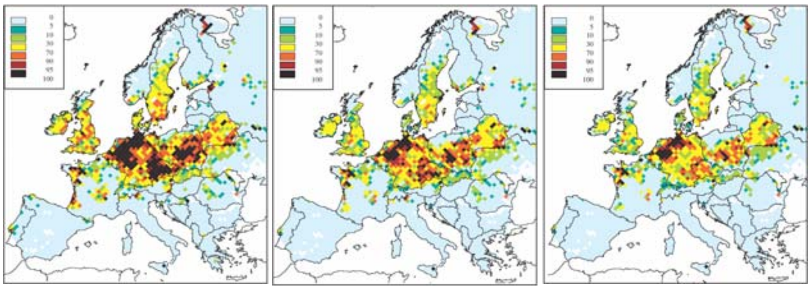
Premature deaths attributable to ozone

[cases/year]



Provisional calculations with 50*50 km resolution

Acid deposition to forests

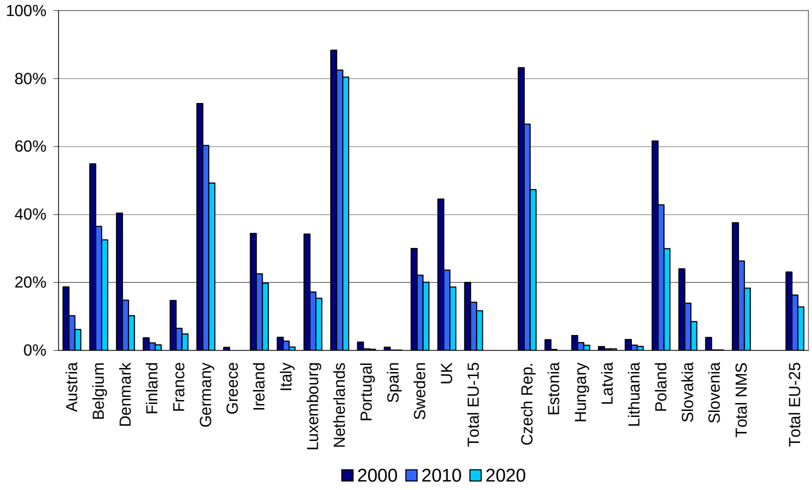


2000 2010 2020

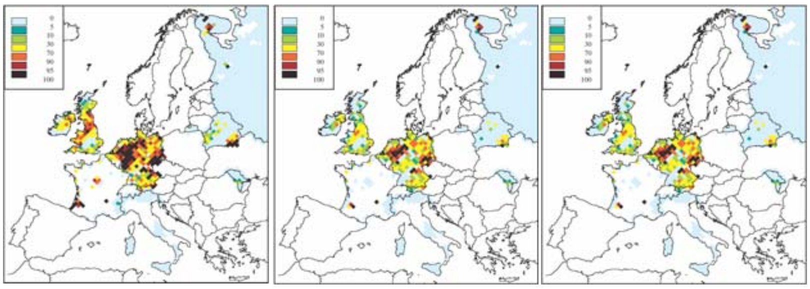
Percentage of forest area
with acid deposition above critical loads,
using ecosystem-specific deposition,
Average of calculations for 1997, 1999, 2000 & 2003 meteorologies

Percent of forest area

with acid deposition above critical loads



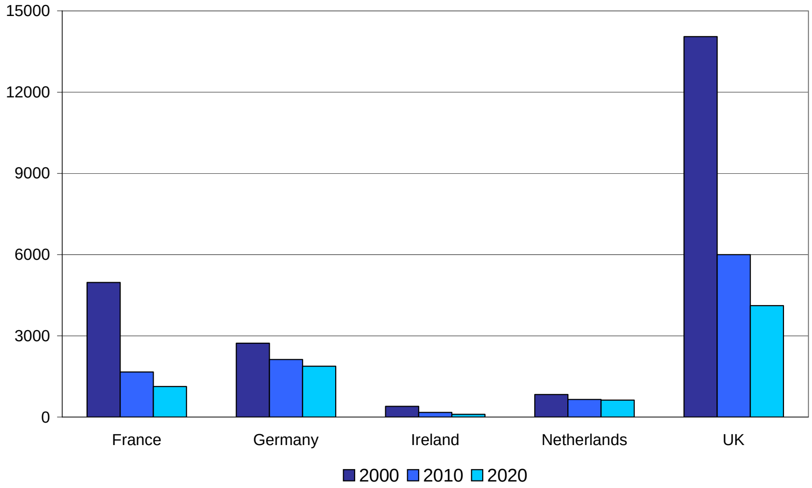
Acid deposition to semi-natural ecosystems
including HABITAT areas



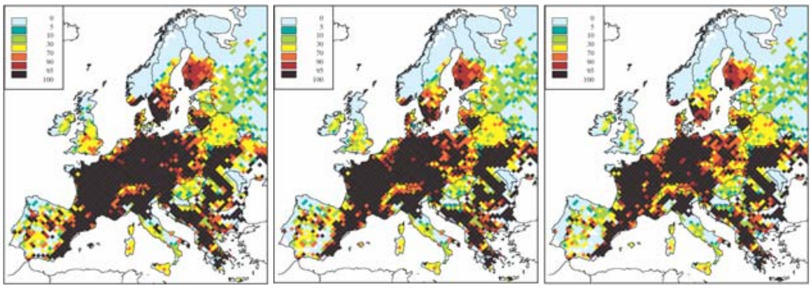
2000 2010 2020

Percentage of area of semi-natural ecosystems
with acid deposition above critical loads,
using ecosystem-specific deposition.
Average of calculations for 1997, 1999, 2000 & 2003 meteorologies

Semi-natural ecosystems
with acid deposition above critical loads [km^2]



Excess of critical loads for eutrophication

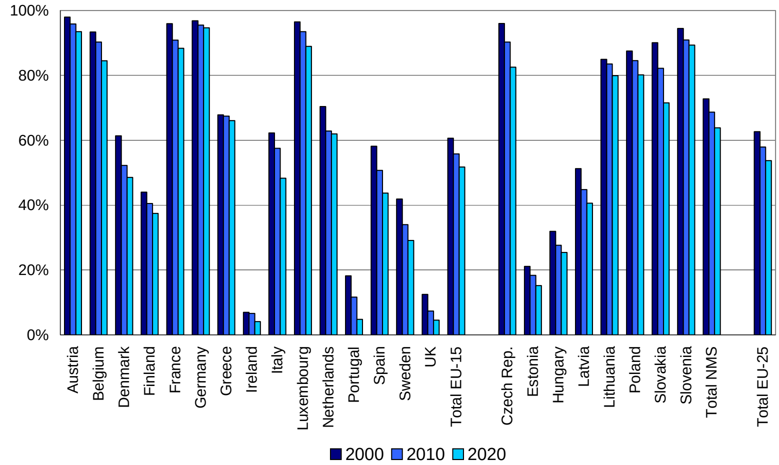


2000 2010 2020

Percentage of ecosystems area
with nitrogen deposition above critical loads,
using grid-average deposition.
Average of calculations for 1997, 1999, 2000 & 2003 meteorologies

Percent of ecosystems area

with nitrogen deposition above critical loads for eutrophication

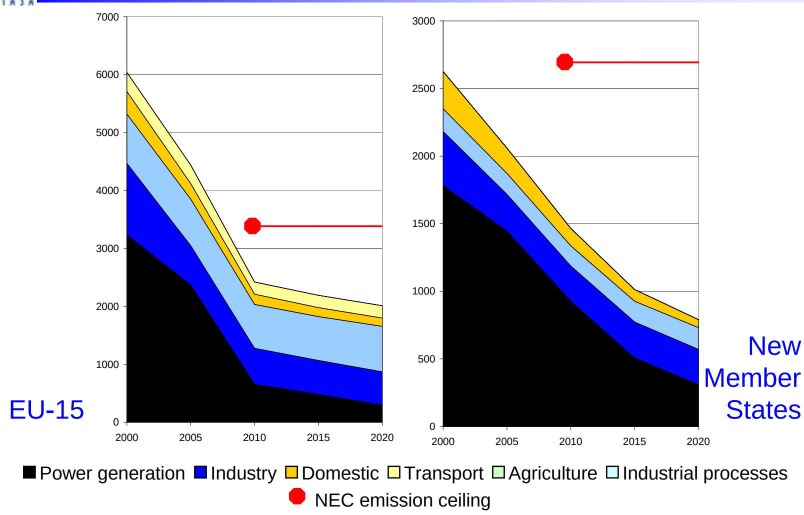


Conclusions

- **With decreasing pollution, also impacts are expected to decline in the future.**
- **However, problems will not be entirely resolved:**
  - **PM remains serious (~5 months life expectancy loss in 2020)**
  - **Ozone:**
    - **Remains a significant cause for premature deaths (Several 1000 cases in 2020)**
    - **Vegetation damage:**
      Wide-spread violations of AOT40 critical level will prevail
  - **Acidification: Will not disappear, mainly due to NH_3**
  - **Eutrophication remains unresolved**

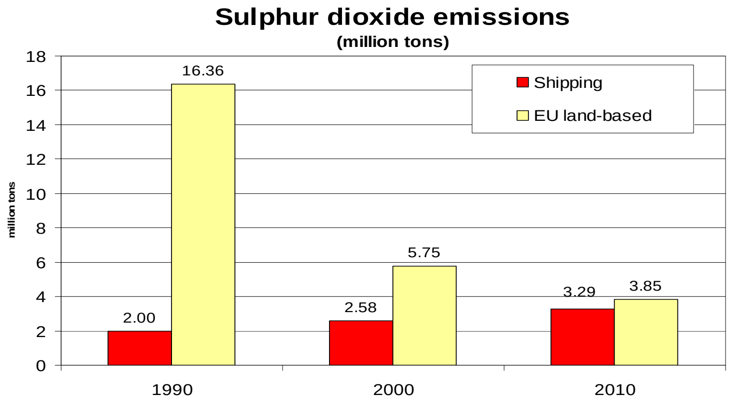
SO_2 emissions by sector

"With climate measures" scenario [kt]



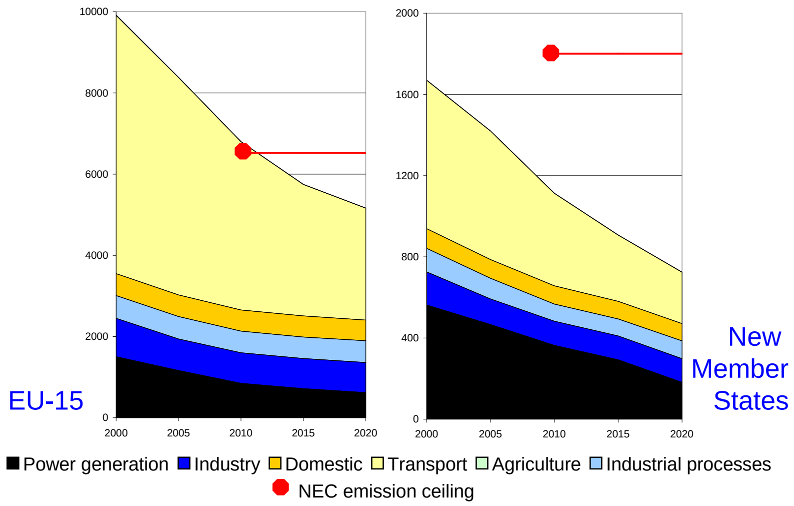
Seagoing ships - a large and growing share of EU emissions

- As land-based sources of air emissions are abated eg from combustion plants and other transport modes (to comply with 2010 National Emissions Ceilings), ship emissions are growing
- Potential evolution 1990-2010 for SO2:



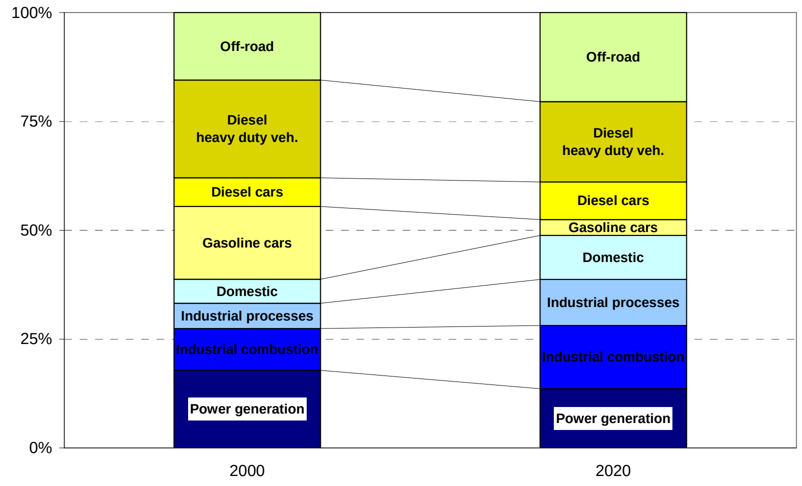
NO_x emissions by sector

"With climate measures" scenario [kt]



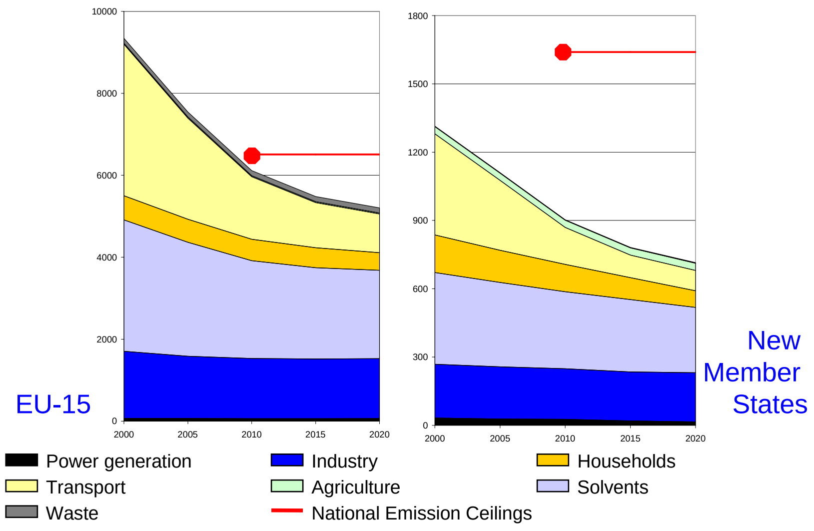
NO_x emissions

"With climate measures" scenario, EU-25



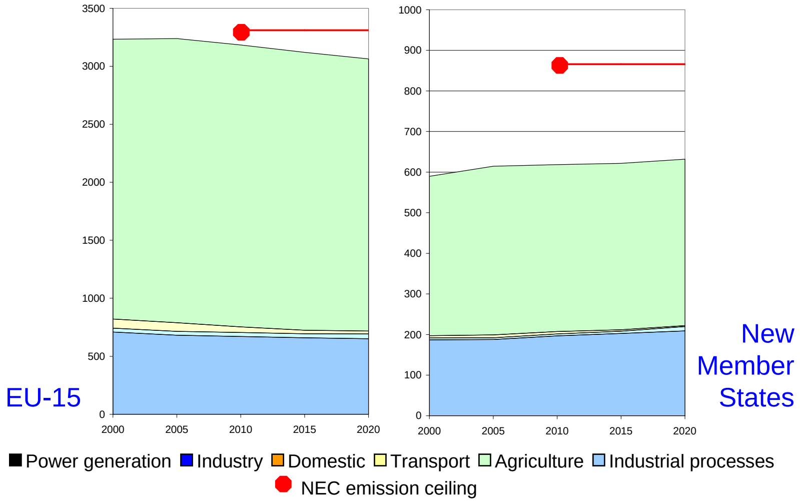
VOC emissions

"With climate measures" scenario [kt]



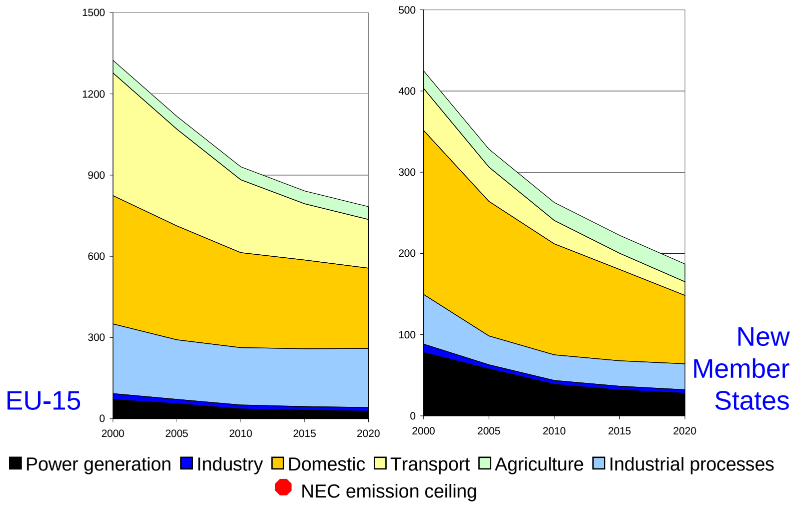
NH_3 emissions

"Pre-CAP reform" scenario [kt]



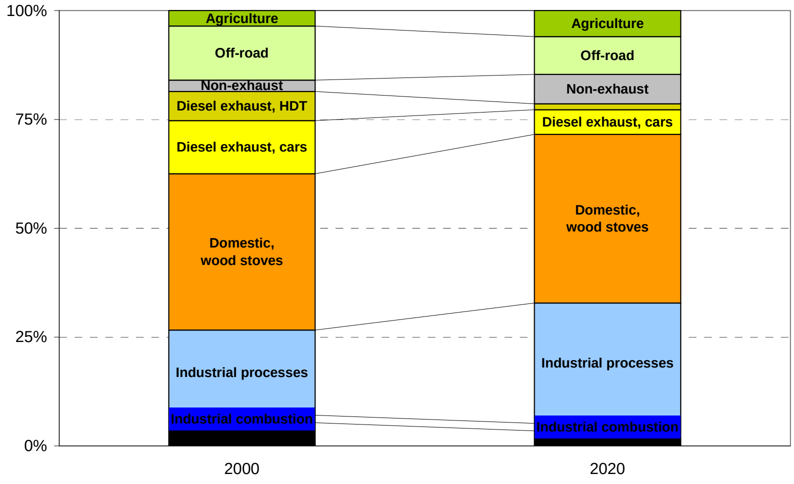
PM2.5 emissions by sector

"With climate measures" scenario [kt]



Contribution to primary PM2.5 emissions

"With climate measures" scenario, EU-15



Conclusions

- While accounting for continued economic growth …
- National emissions of air pollutants will decrease up to 2020:
  SO_2 -65%, NO_x-50%, VOC -45%, NH_3 -4%, PM2.5 -45%
- Due to structural changes and emission control legislation
- Relevance of sectors for further measures will change.
  - Small combustion sources!
  - Industrial processes, solvents!
  - Off-road vehicles and machinery!
- Emissions from maritime activities will surpass land-based emissions of EU-25