



International Institute for
Applied Systems Analysis
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science for global insight

Translating scientific findings into policy recommendations for the Clean Air Policy Package proposed by the European Union

Frontiers in Air Quality Science -
Celebrating 21 years of the
Environmental Research Group
June 23-24, 2014

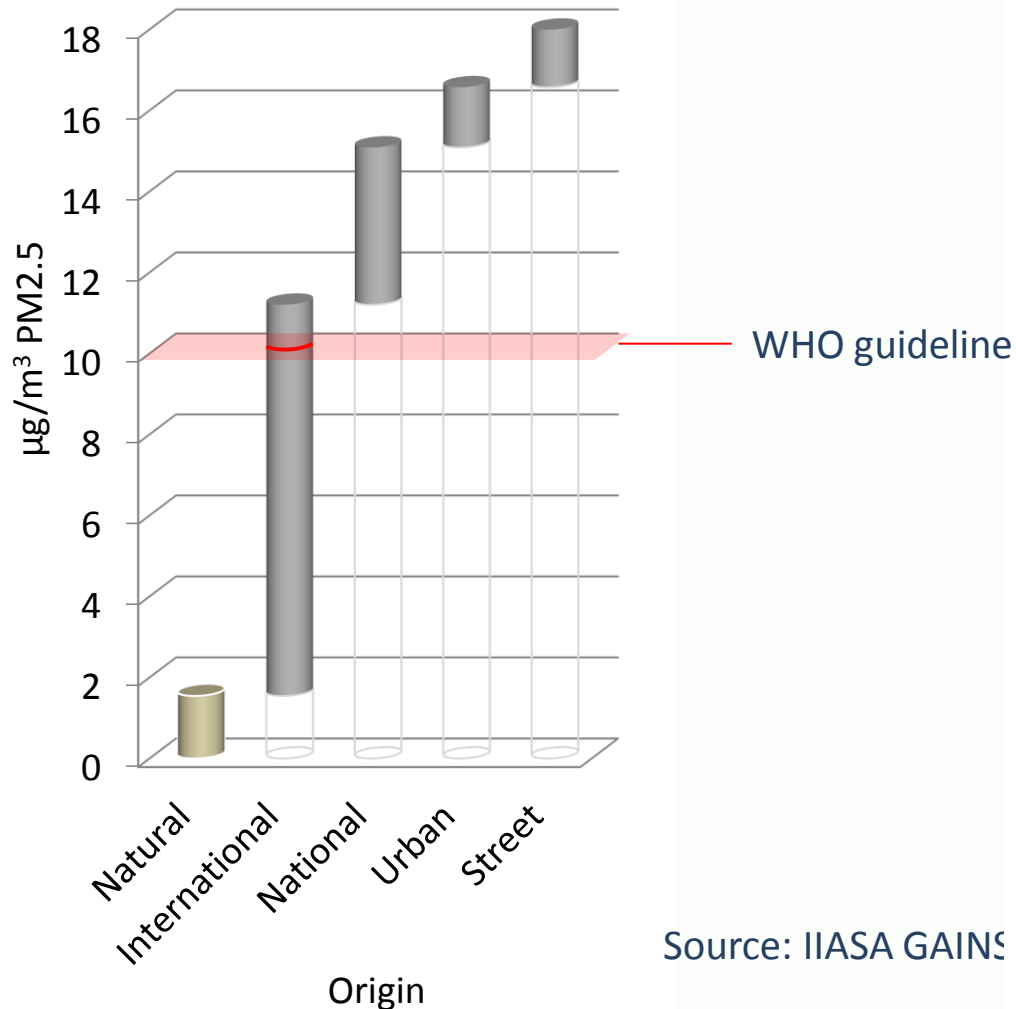
Markus Amann



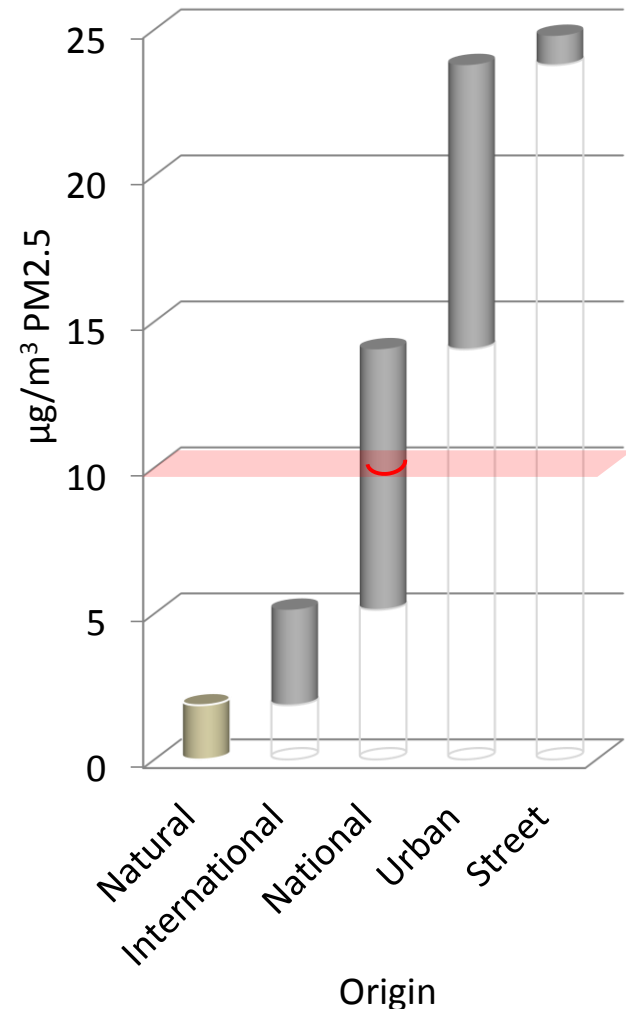
IIASA, International Institute for Applied Systems Analysis

Origin of PM2.5 - 2009

Netherlands
average of the urban AIRBASE stations



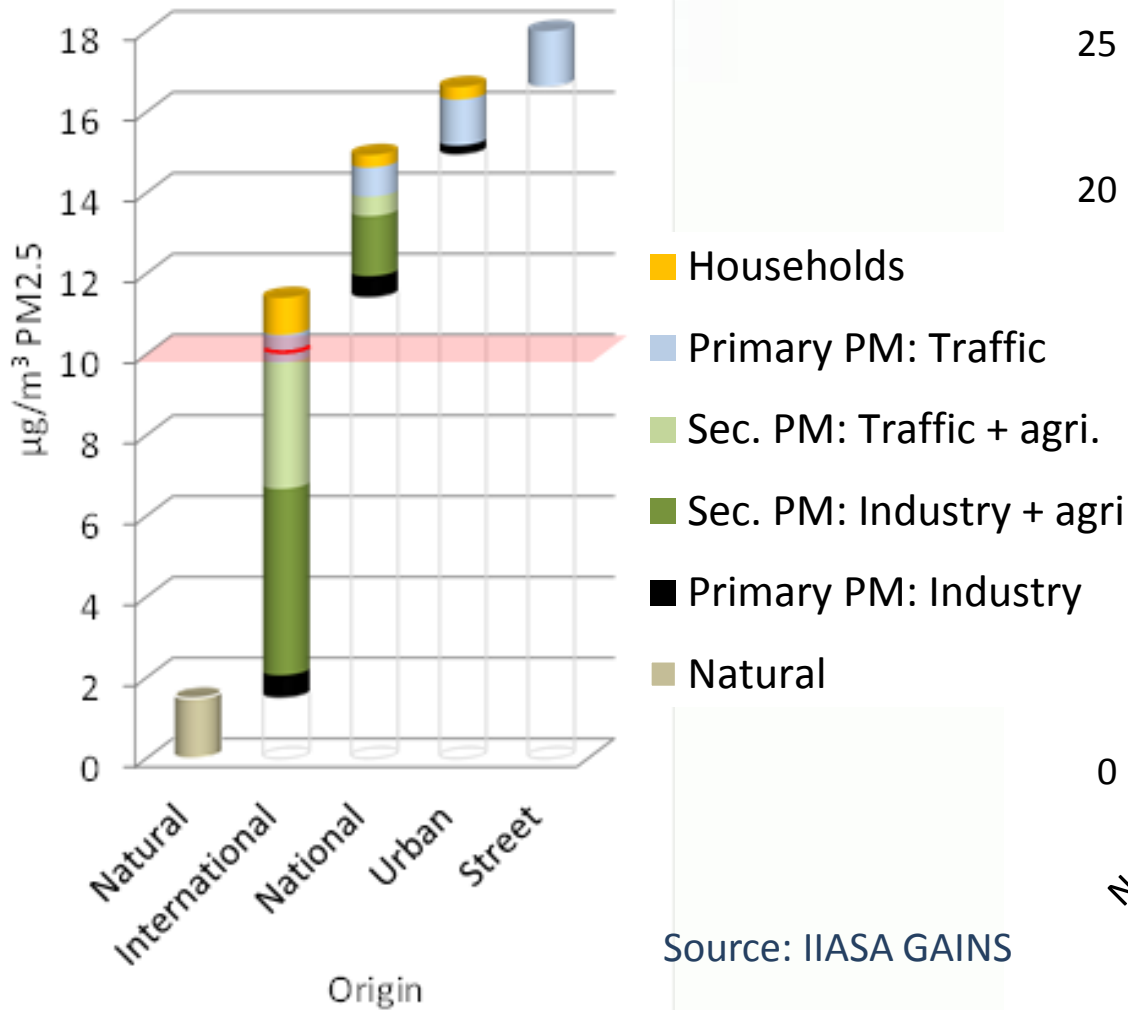
Lyon, Centre Ville



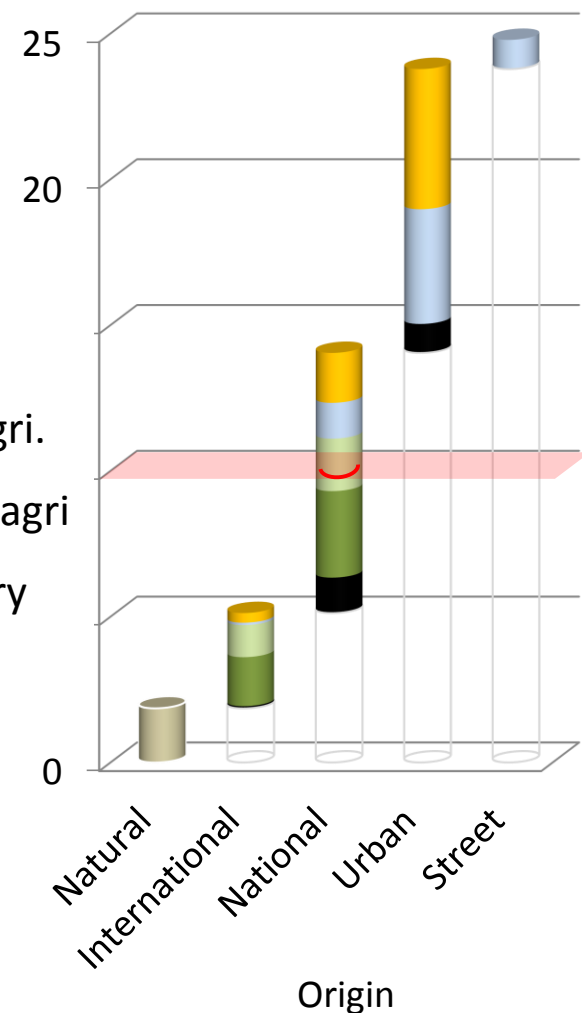
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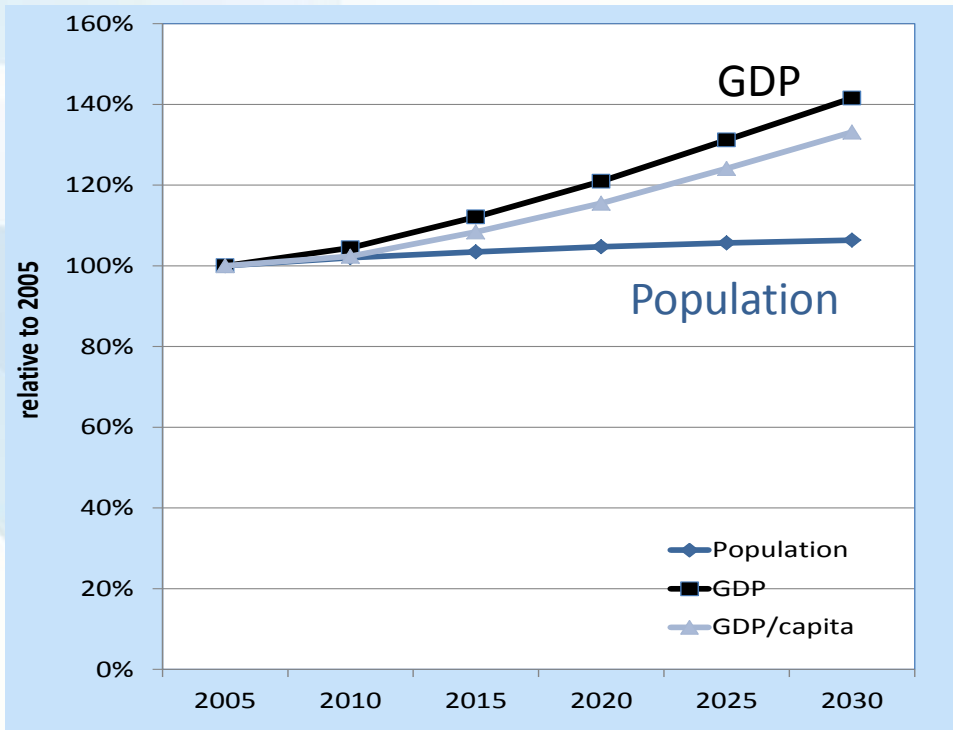
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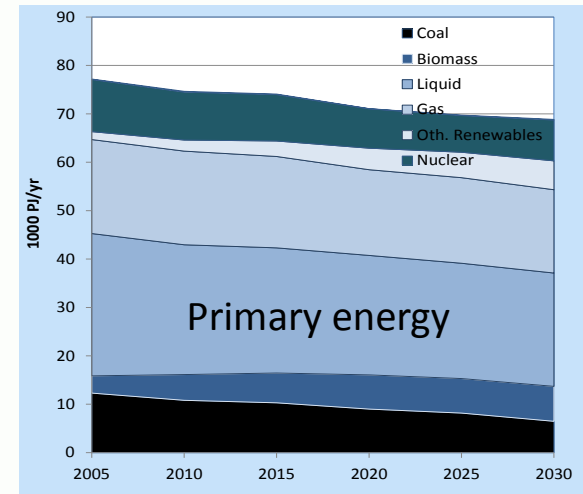
Source: IIASA GAINS

Emissions will change in the future – even without further air quality policies

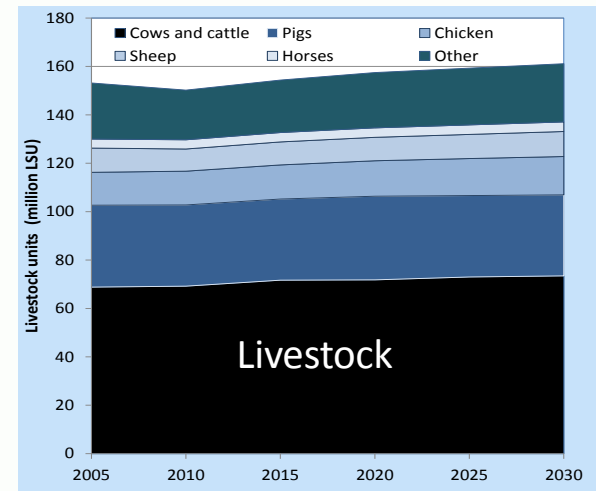
Commission assumption on future economic development



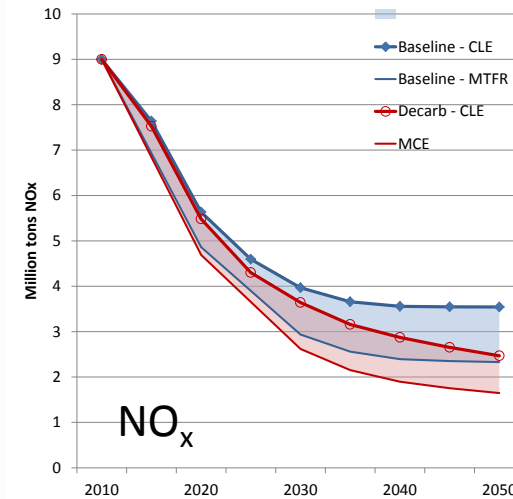
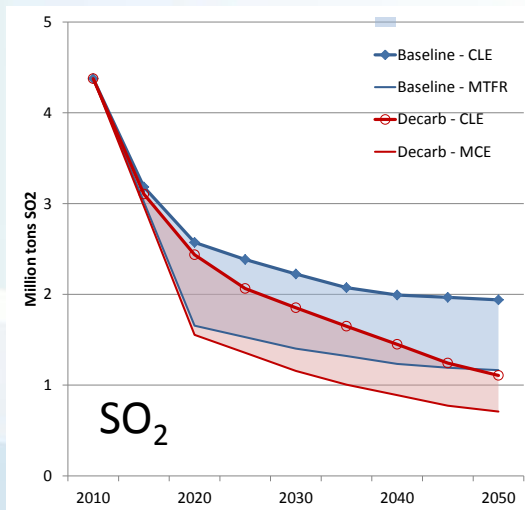
Energy: PRIMES 2013 Reference



Agriculture: CAPRI 2013 Scenario



Range of future SO₂ and NO_x emissions



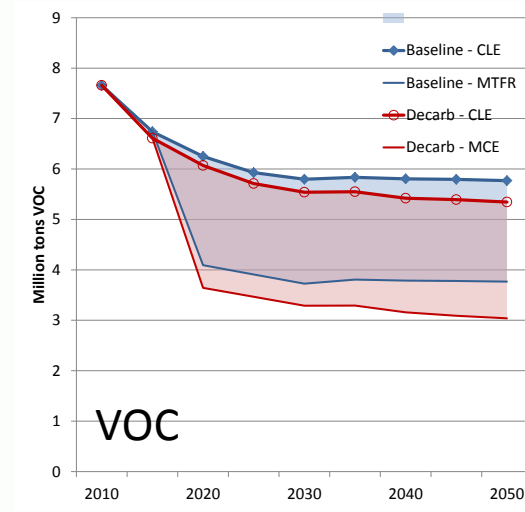
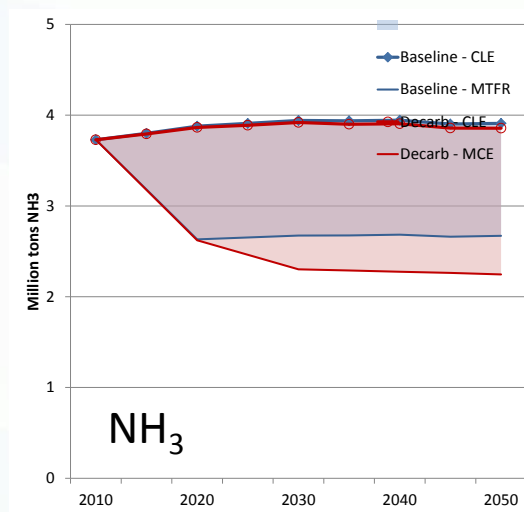
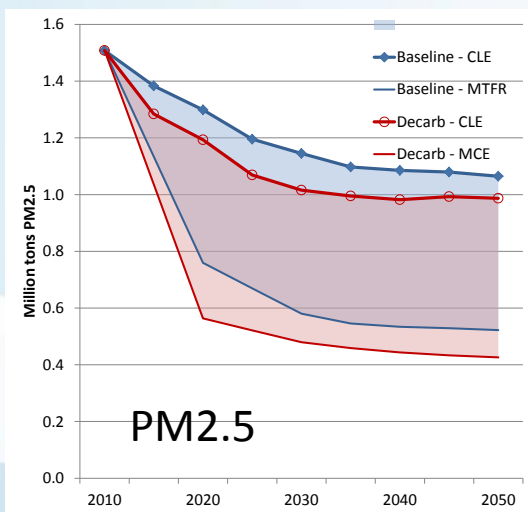
Blue: BAU baseline, Red: climate policy scenario

In the long run, further emission reductions of SO₂ and NO_x from:

- further climate policies, and/or
- further air pollution controls.

The EU Climate policy proposal will lead to lower SO₂ and NO_x emissions – not included in Clean Air proposal

Range of future PM2.5, NH₃, and VOC emissions

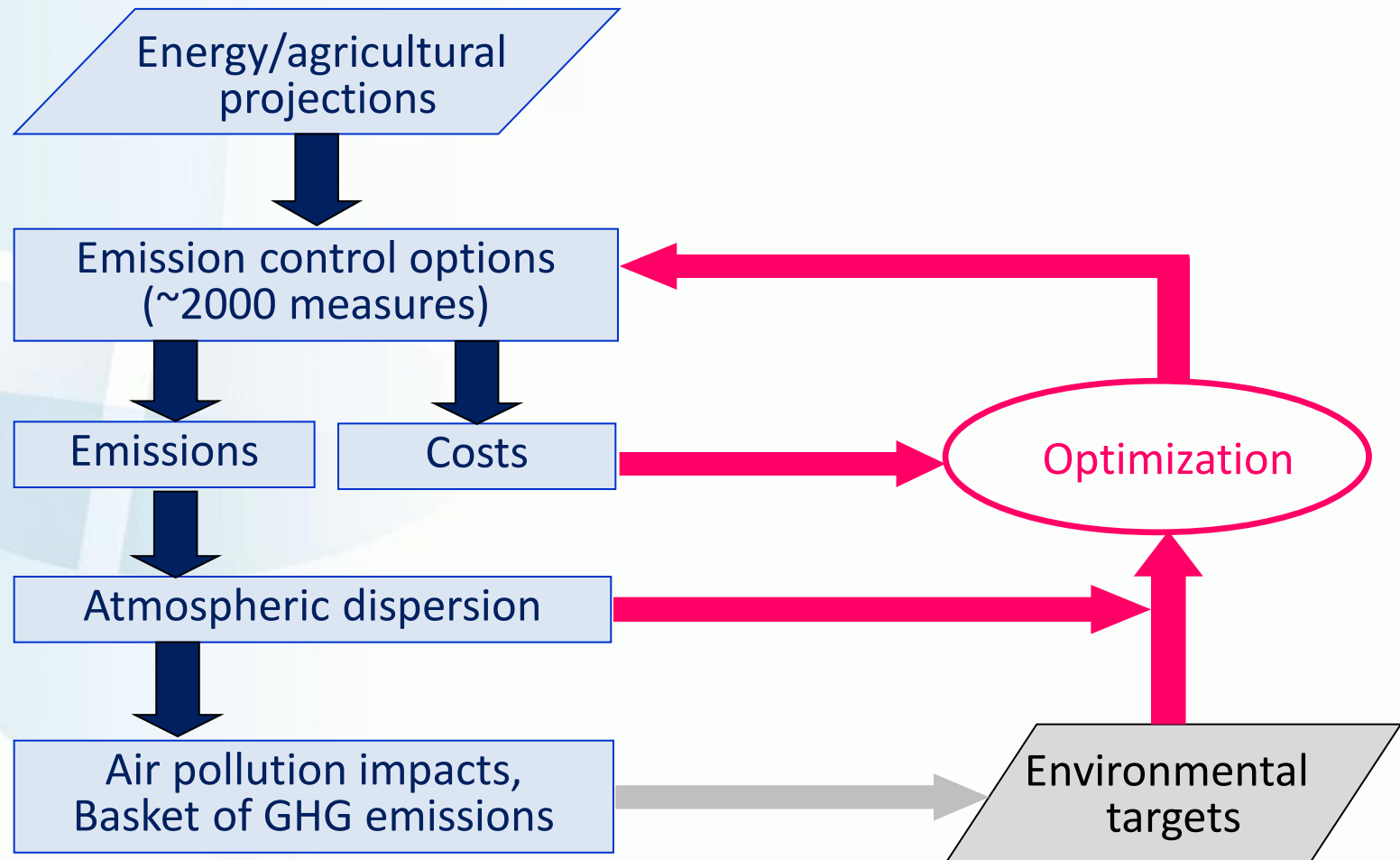


Blue: BAU baseline, Red: climate policy + healthy diet scenario

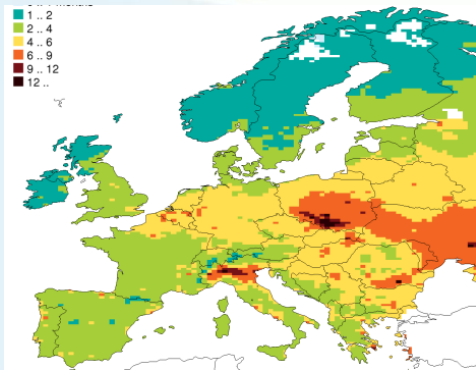
Climate policy will not greatly affect emissions of PM2.5, NH₃ and VOC

Future emissions will be determined by air pollution regulations

IIASA's GAINS systems approach to identify cost-effective international emission reduction strategies

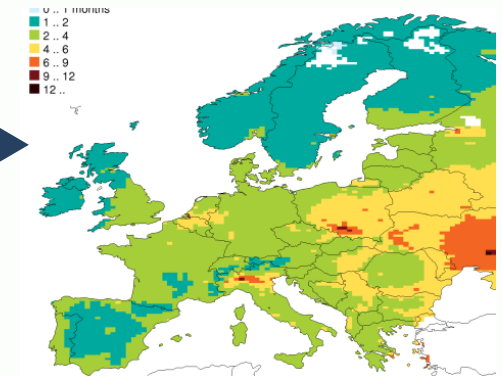


The target of the Thematic Strategy on Air Pollution for 2030



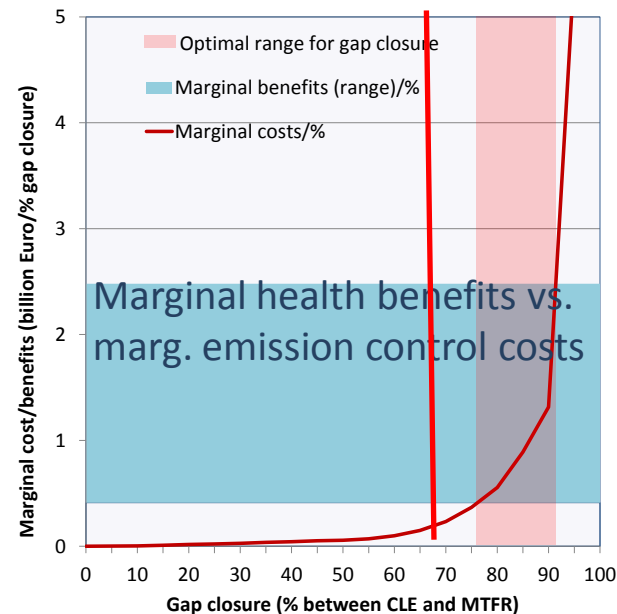
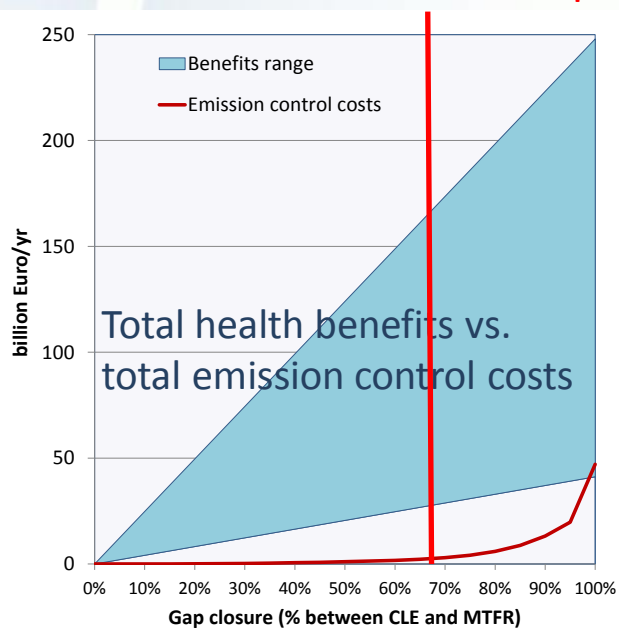
Current legislation 2030:
5 months life shortening

Loss in statistical life expectancy



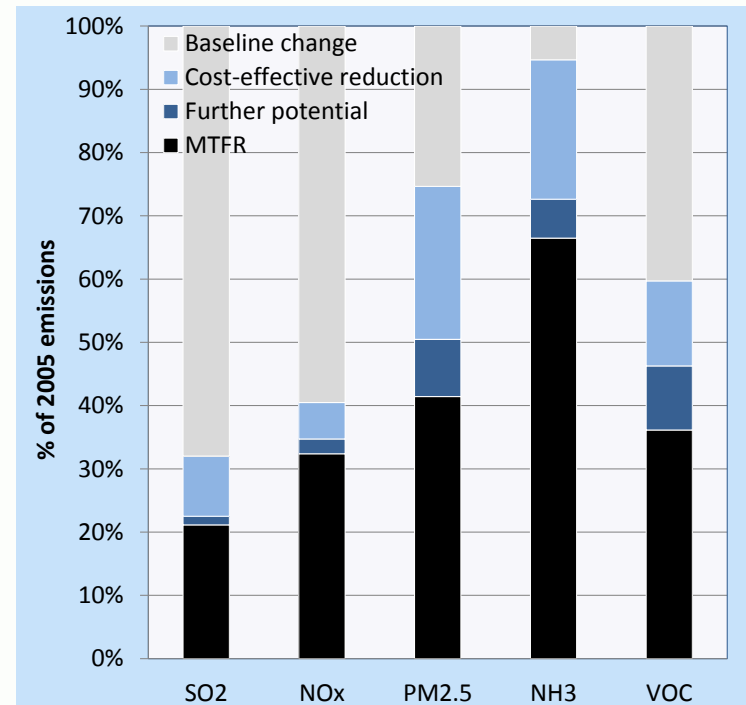
Maximum additional controls:
3.6 months life shortening

Commission proposal:
67% 'gap closure' in 2030:
-50% health impacts
compared to 2005



The Commission proposal for National Emission Ceilings (NECs) in 2030

	EU-28 (relative to 2005)	EU-28 (in addition to Baseline)
SO ₂	-81%	-8%
NO _x	-69%	-4%
PM2.5	-51%	-24%
NH ₃	-27%	-20%
VOC	-50%	-9%
CH ₄	-33%	-9%



NH₃: Key measures for achieving the proposed NECs

Improved storage of manure (e.g., closed tanks) at large farms



Improved application of manure on soil, e.g., trailing hose, slot injection (for large farms)

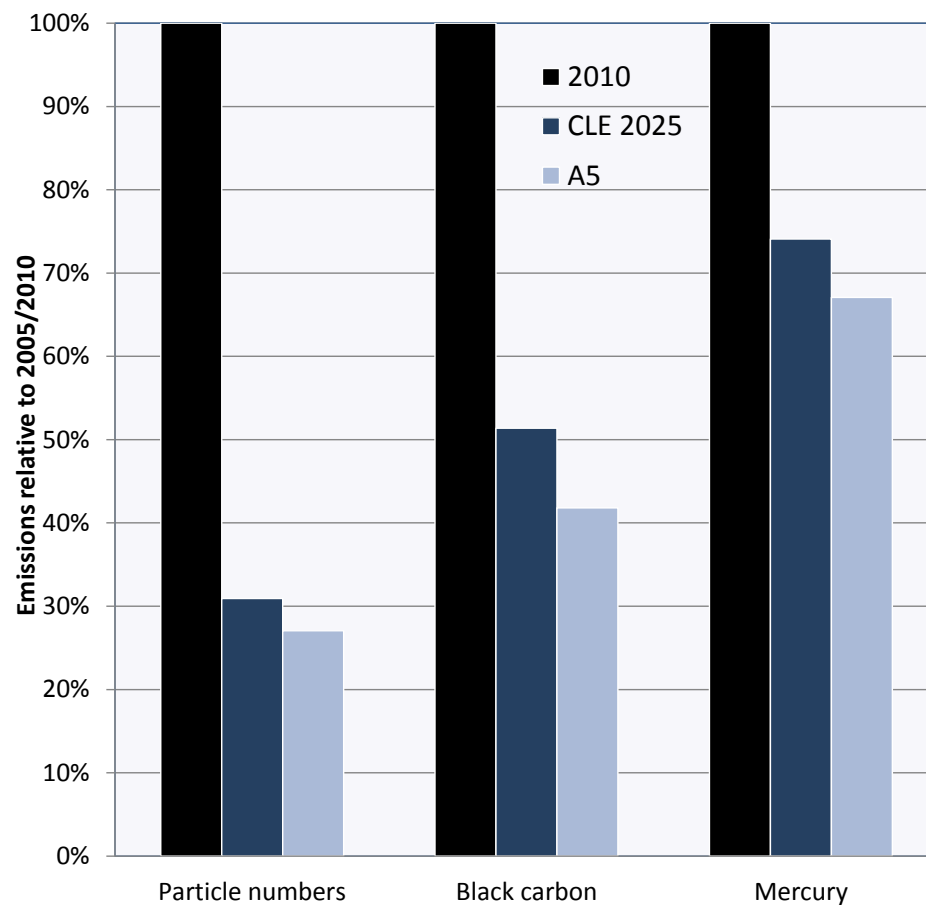


Improved application of urea fertilizer or substitution by ammonium nitrate



Although the focus is on PM2.5 mass, the proposed measures will also improve other particle characteristics

- PM2.5: -51%
- Particle numbers: -73%
- Black carbon: -58%
- Mercury: -33%



Costs and benefits of the additional measures

Costs:

Air pollution control measures:

€ 2.5 - 3.3 bn/yr
(0.016% - 0.021% of GDP)

Methane measures:

Cost savings € 2.4 - 4.0 bn/yr

Net costs:

**Between costs of € 0.9 bn/yr
and savings of € -1.5 bn/yr
(0.006% to -0.010% of GDP)**

Benefits:

Gains in statistical life expectancy
from lower PM2.5:

4.4 months (-50% of 2005)

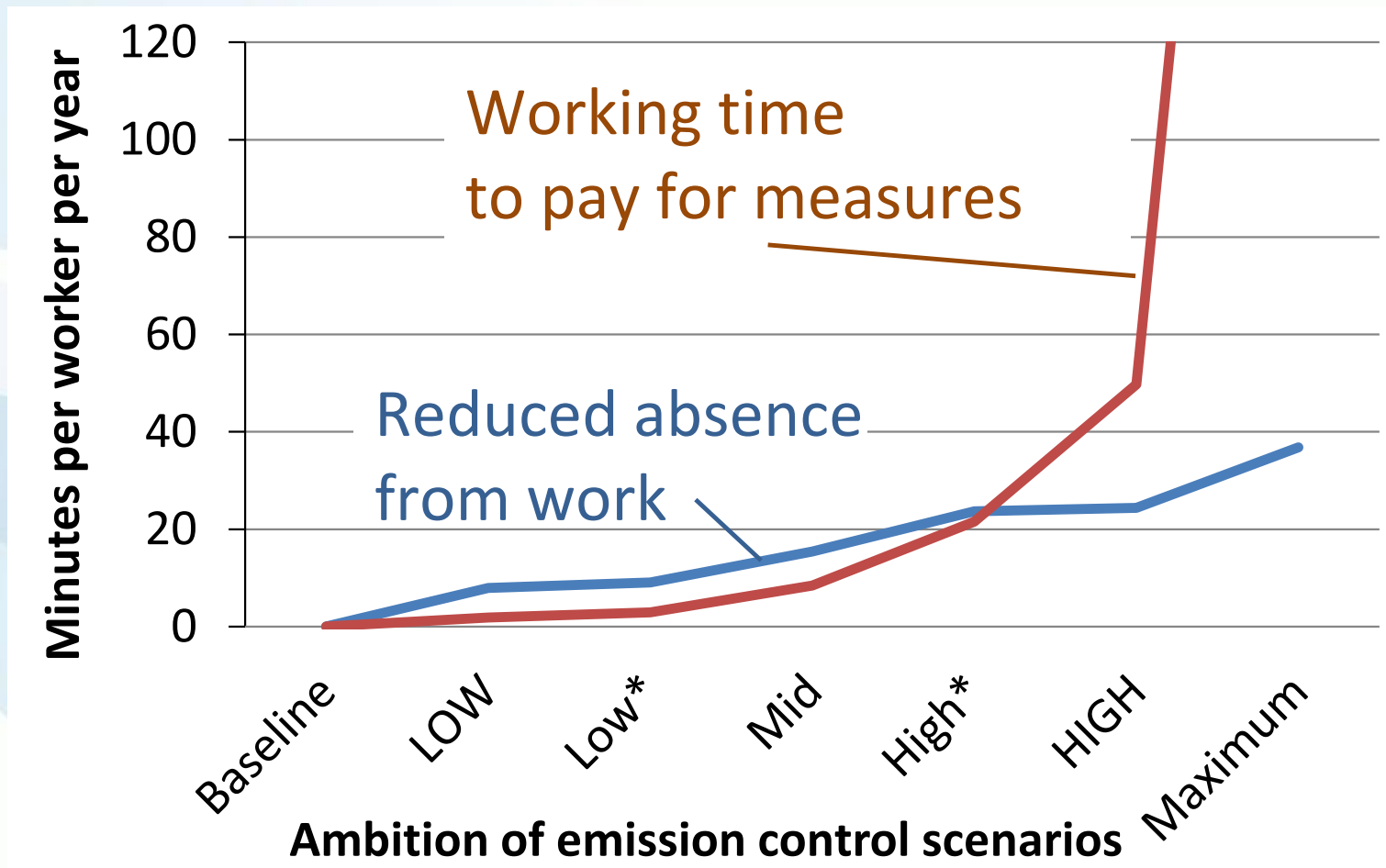
Additional Natura2000 areas
protected against eutrophication:

150,000 km²

Monetized *health* benefits
(mainly mortality)

€ 35 - 135 bn/yr

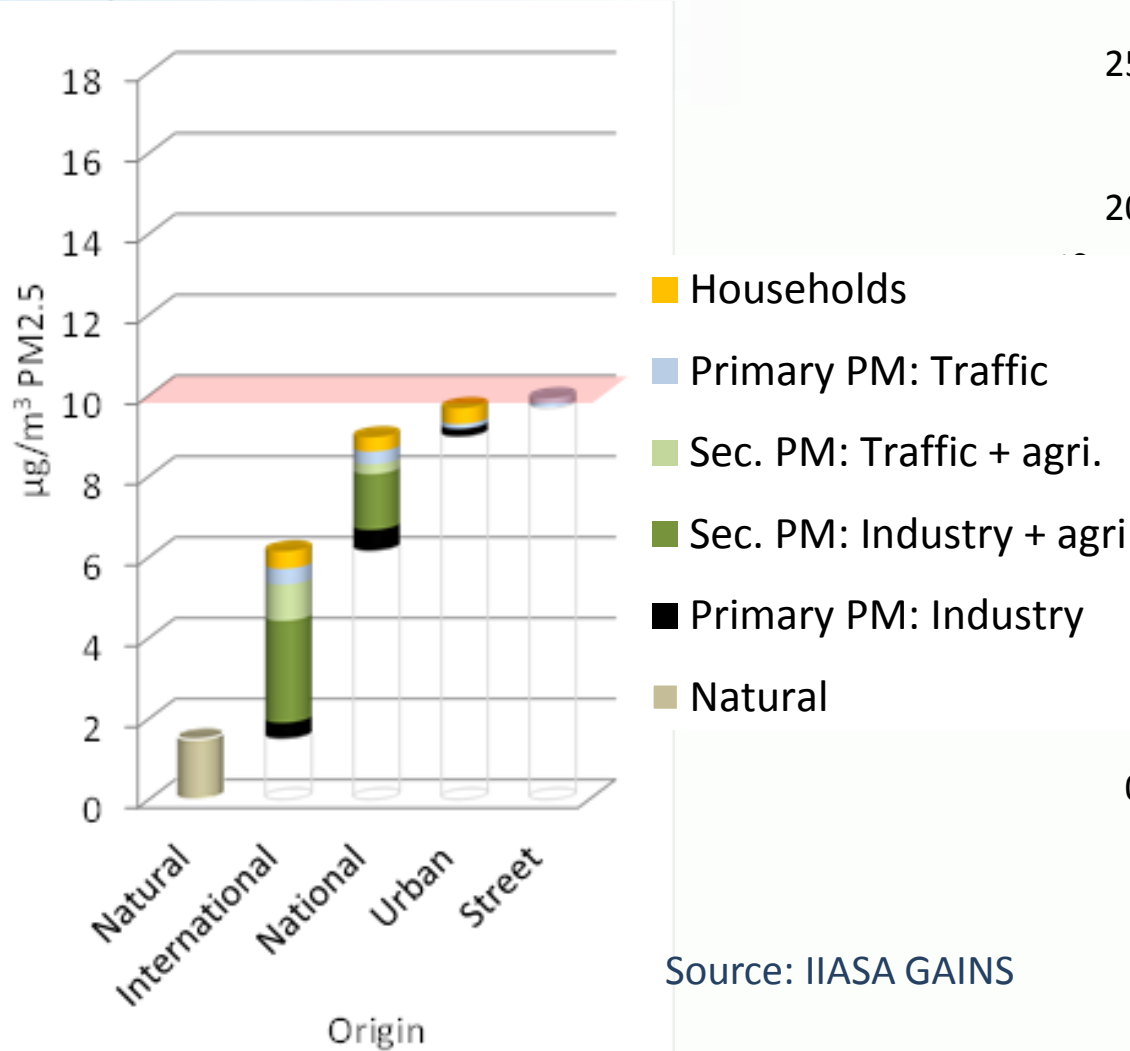
Gains in labour productivity



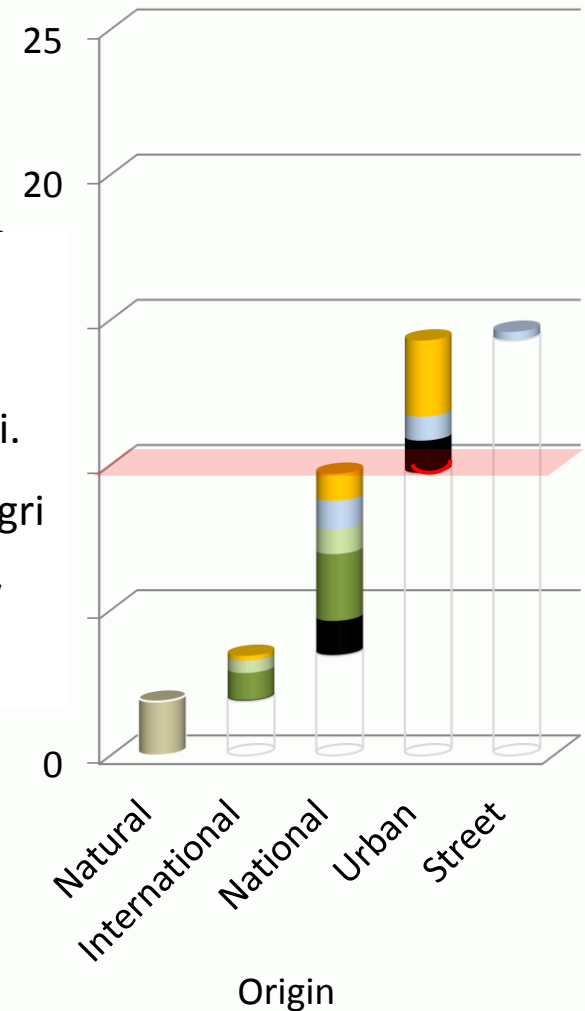
Source: IIASA GAINS

PM2.5 in 2030: Commission proposal

Netherlands
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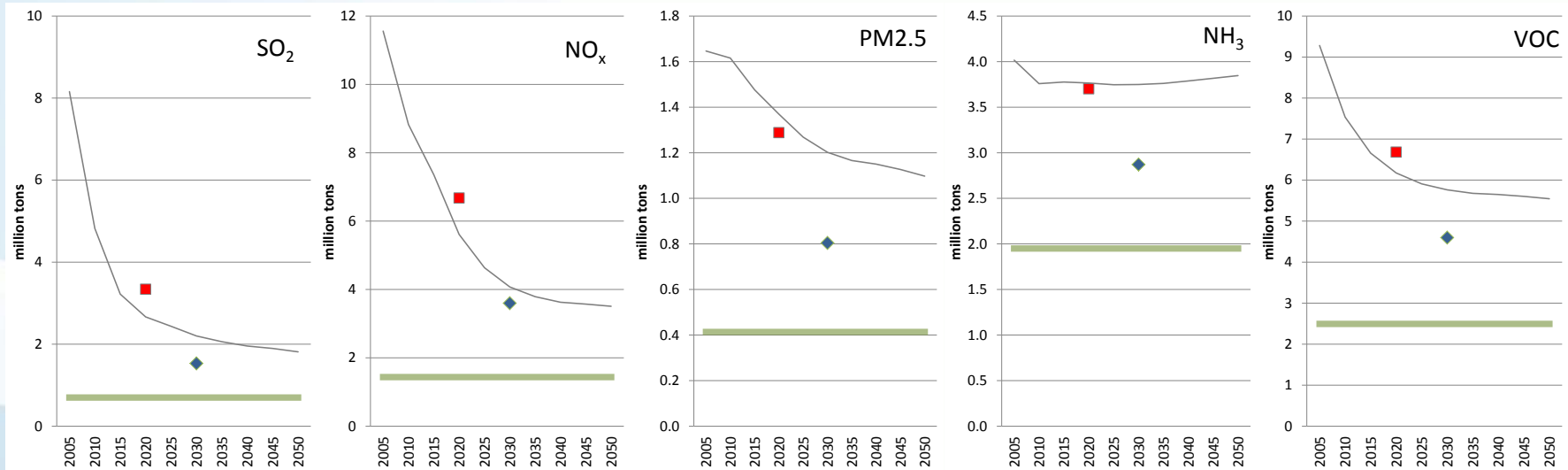


Lyon, Centre Ville



Source: IIASA GAINS

Are we on track towards sustainability?



— Baseline with current legislation

■ Gothenburg ceilings

◆ Proposed NEC ceilings

■ Illustrative low emission set

While the proposed NECs are important milestones, long-term sustainability will require further policy interventions

Conclusions

- The Commission proposal for the ‘Clean Air Policy Package’ suggests a concrete path for solving the remaining air quality problems in Europe, based on
 - solid scientific understanding, especially on health impacts,
 - economic efficiency, and
 - fully utilizing the potential from international cooperation.
- Health impact information was most instrumental for reaching agreement on the ambition level of the proposal (i.e., the ‘70% gap closure’)
- However, there is significant resistance from governments against further measures. Highlighted (health) benefits are not always sufficient to convince stakeholders.
- More info: <http://gains.iiasa.ac.at>