



International Institute for  
Applied Systems Analysis  
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# **GAINS scenarios for the TSAP proposal**

Task Force on Integrated Assessment Modelling  
43<sup>rd</sup> Session, Helsinki, May 6-7, 2014

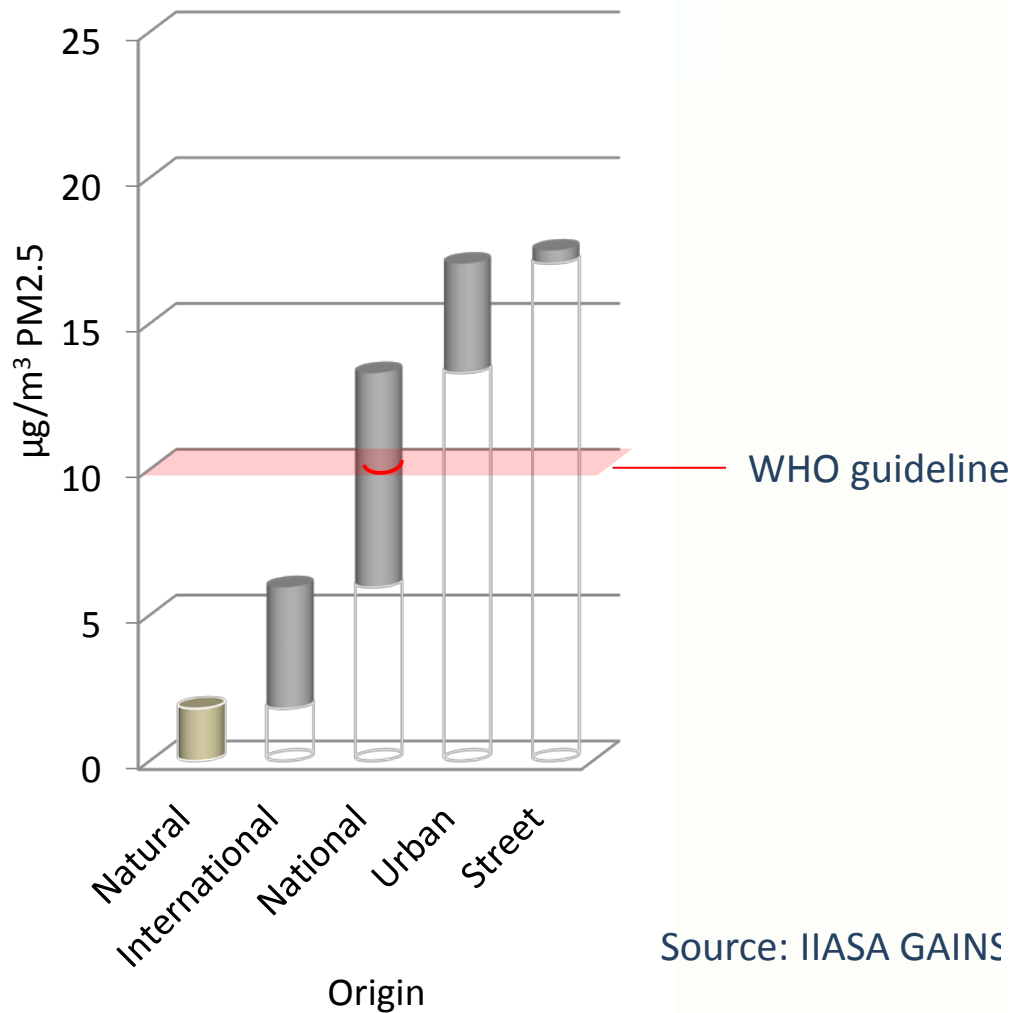
**Markus Amann**



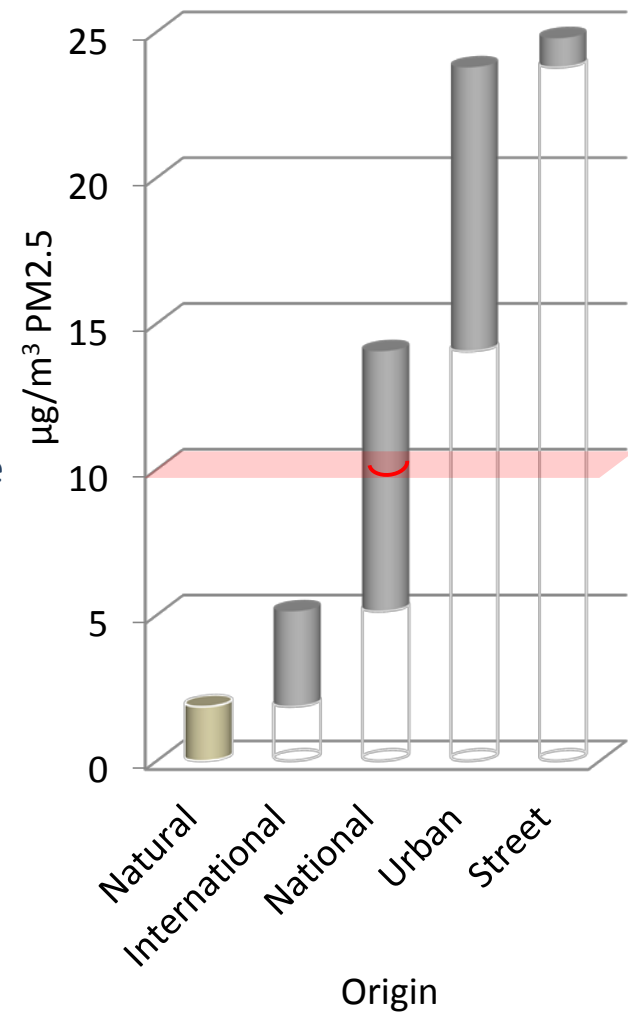
IIASA, International Institute for Applied Systems Analysis

# Origin of PM2.5 in France - 2009

France – average of 293 urban stations modelled in GAINS



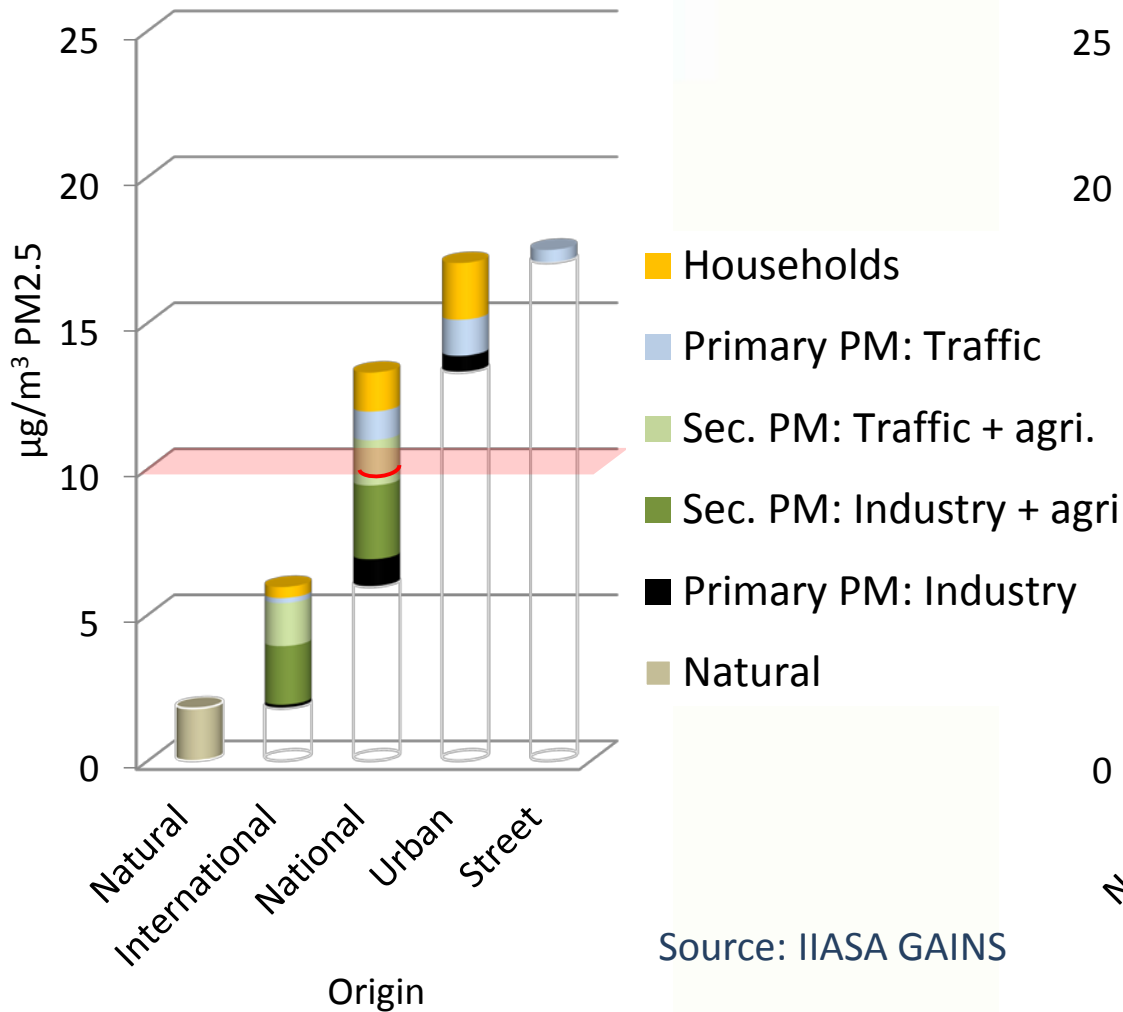
Lyon, Centre Ville



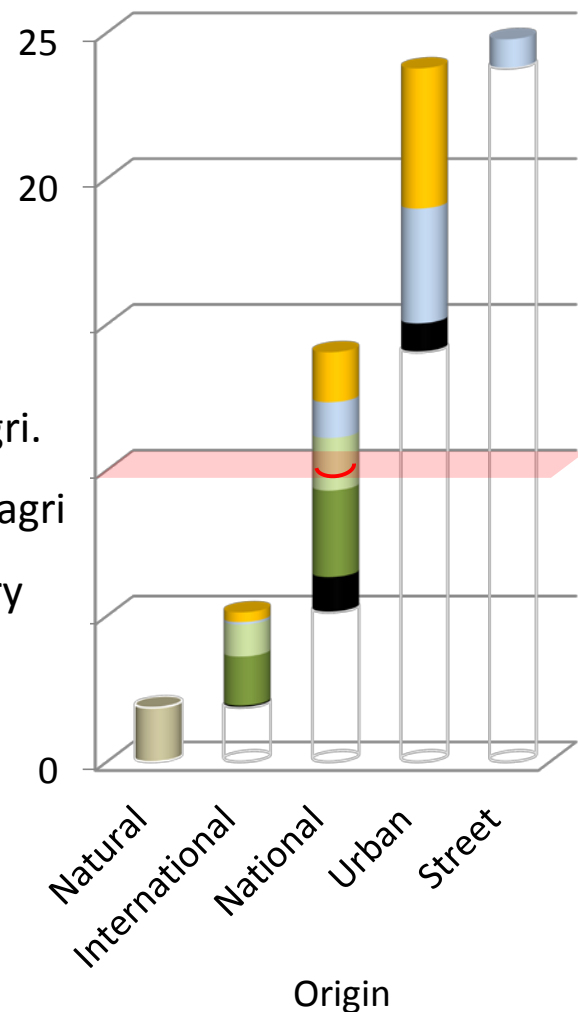
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Lyon, Centre Ville



Source: IIASA GAINS

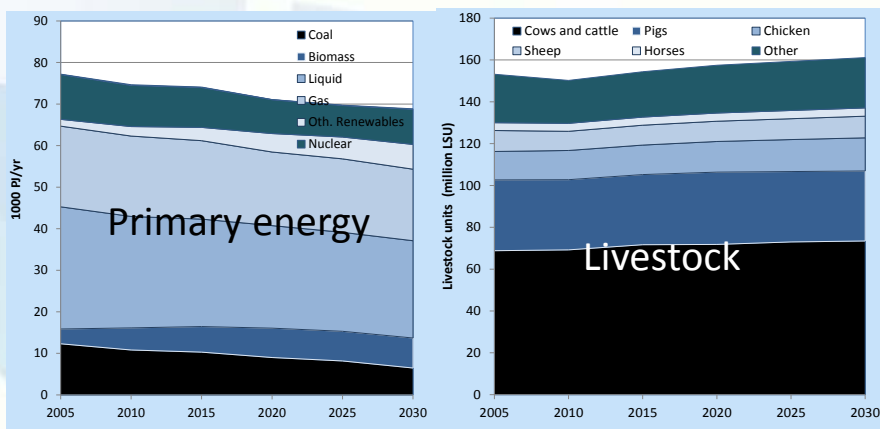


# Baseline assumptions

## Future economic development

Assumptions for Commission proposal:

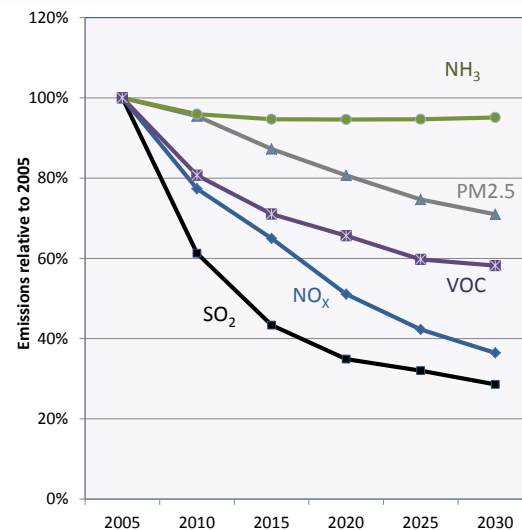
- Energy: PRIMES 2013 Reference
- Agriculture: CAPRI 2013 Scenario



(also basis for Commission proposal for 2014 Energy & Climate Package, but without the proposed climate targets)

## Baseline emissions EU-28

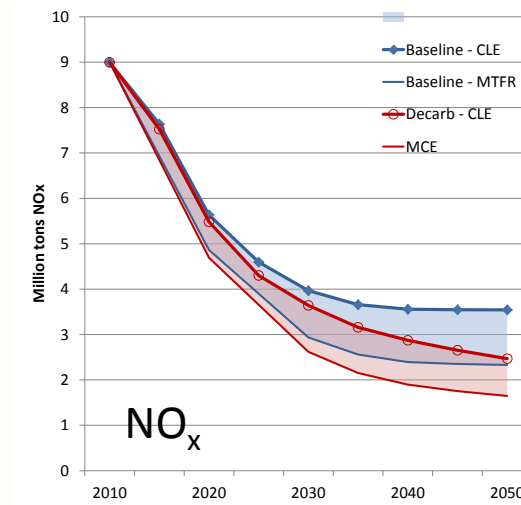
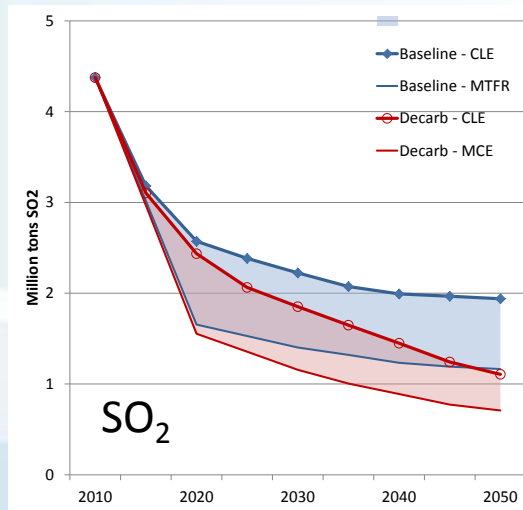
Implementation of current legislation according to plan (Euro-6c from 2017)



# Assumptions on the potential for additional measures

- No change in activity levels, behavior, fuel mix, production, etc. compared to baseline projection
- Technical measures that are applied at large scale in another country under similar conditions or available on the market (e.g., based on BREFnotes)
- Country-specific limits on applicability (agreed with national experts)
- Only for new investments, no premature retirement of existing equipment
- International cost data, based on analyses by the EU Commission

# Future emissions of SO<sub>2</sub> and NO<sub>x</sub> (EU-28)



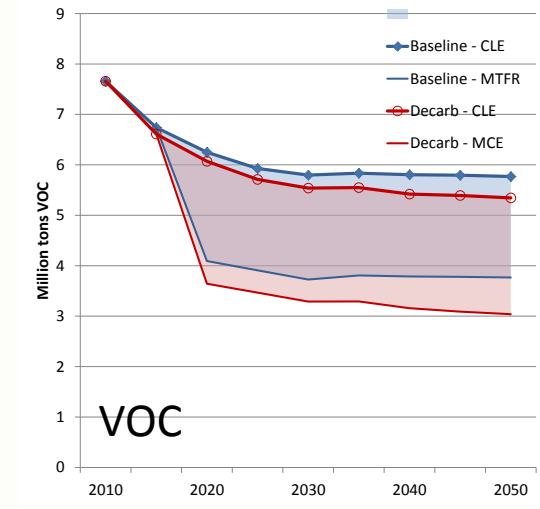
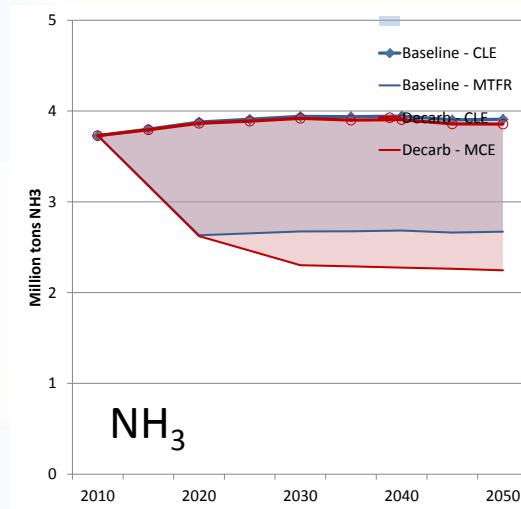
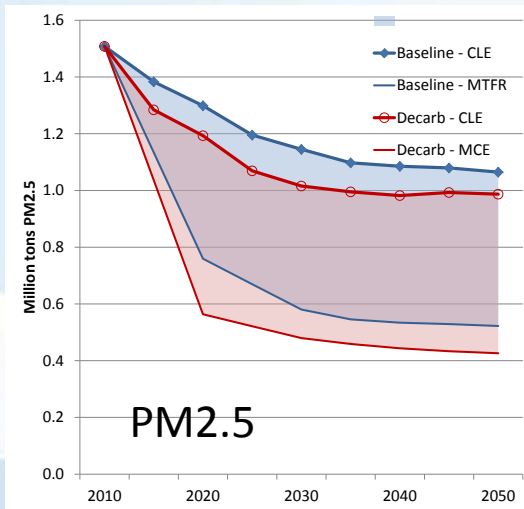
Blue: BAU baseline, Red: climate policy scenario

In the long run, further emission reductions of SO<sub>2</sub> and NO<sub>x</sub> from:

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

The EU Climate policy proposal will lead to lower SO<sub>2</sub> and NO<sub>x</sub> emissions – not included in Clean Air proposal

# Future emissions of PM2.5, NH<sub>3</sub> and VOC (EU-28)

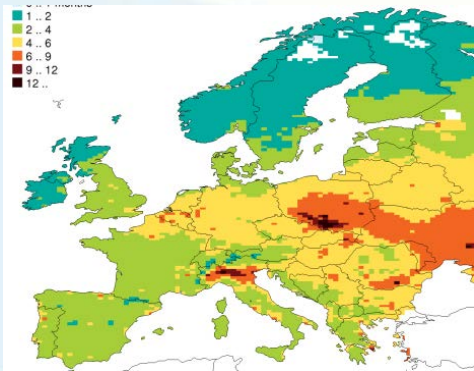


Blue: BAU baseline, Red: climate policy + healthy diet scenario

Climate policy will not greatly affect emissions of PM2.5, NH<sub>3</sub> and VOC

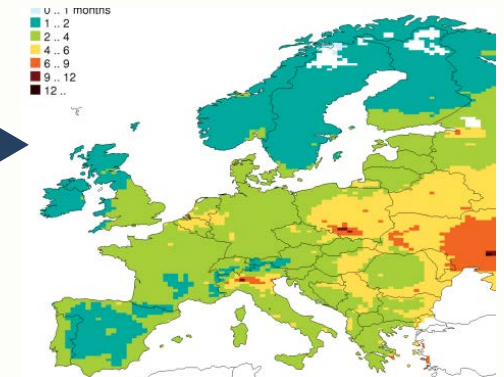
Future emissions will be determined by air pollution regulations

# The target of the Thematic Strategy on Air Pollution for 2030



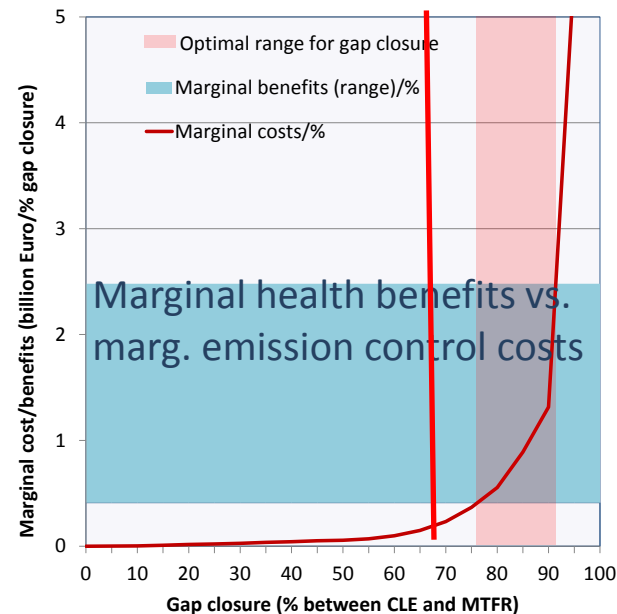
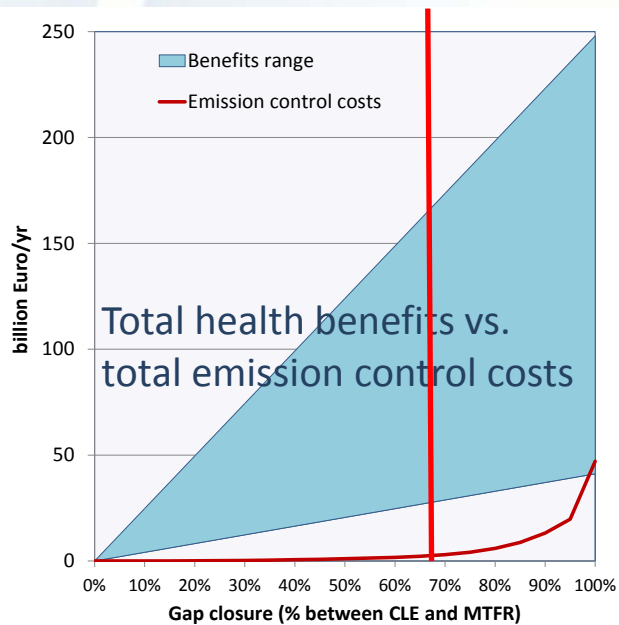
Current legislation 2030:  
5 months life shortening

Loss in statistical life expectancy



Maximum additional controls:  
3.6 months life shortening

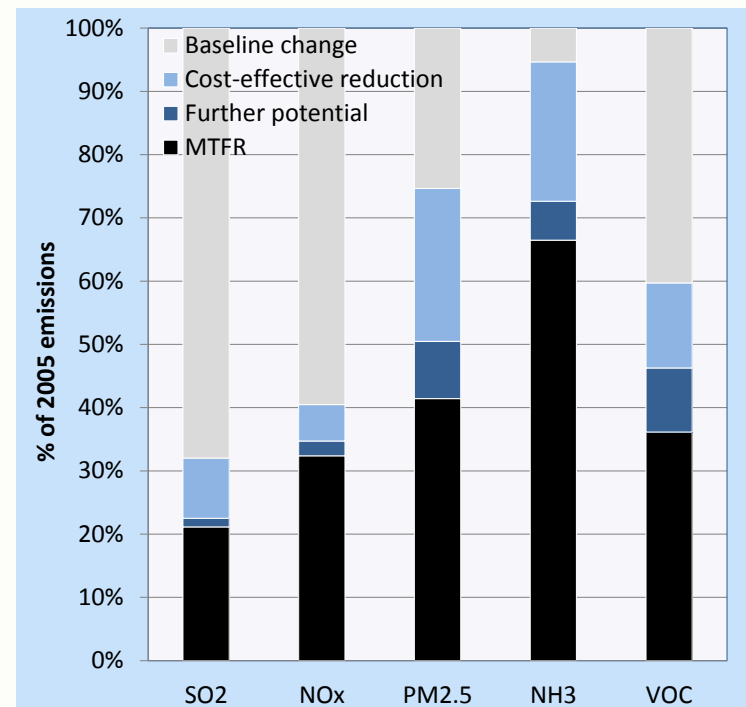
Commission proposal:  
67% 'gap closure' in 2030:  
-50% health impacts  
compared to 2005





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

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



# Key measures for achieving the proposed NECs in 2030: Energy use

Industry, heating plants:

- New 'Mid-size Combustion Plant' (MCP) Directive: Commission proposal for limit values for 1-50 MW
- Lower range of BREFnotes emission factors for some industries in some countries
- Anaerobic digestion of industrial food waste (CH<sub>4</sub>)

Households:

- New Ecodesign directive: Pellets for new biomass boilers in single family houses (20 mg/m<sup>3</sup>)

Off-road machinery:

- Stage V for inland waterways (SCR) and construction machinery

# Key measures for achieving the proposed NECs in 2030: Agriculture

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



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



Improved application of urea fertilizer  
or substitution by ammonium nitrate



# Costs and benefits from the additional measures

## Costs for air pollution controls

PRIMES REF:	€ 3.3 bn/yr (0.021% of GDP)
Climate scenario:	€ 2.1 bn/yr (0.014% of GDP)

## Cost savings

from methane measures: € 2.4 - 4.0 bn/yr

## Net costs:

Between *costs* of € 0.9 bn/yr (0.006% of GDP)  
and *savings* of € 0.7 bn/yr (0.004% of GDP)

## Gains in statistical life expectancy

from lower PM2.5: 4.4 months

## Monetized *health* benefits:

€ 35 - 135 bn/yr

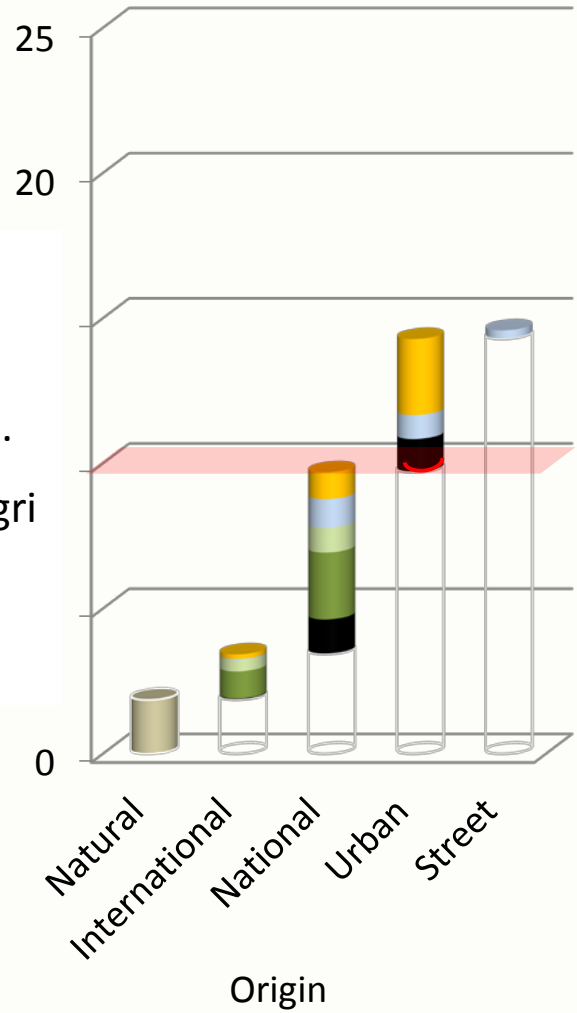
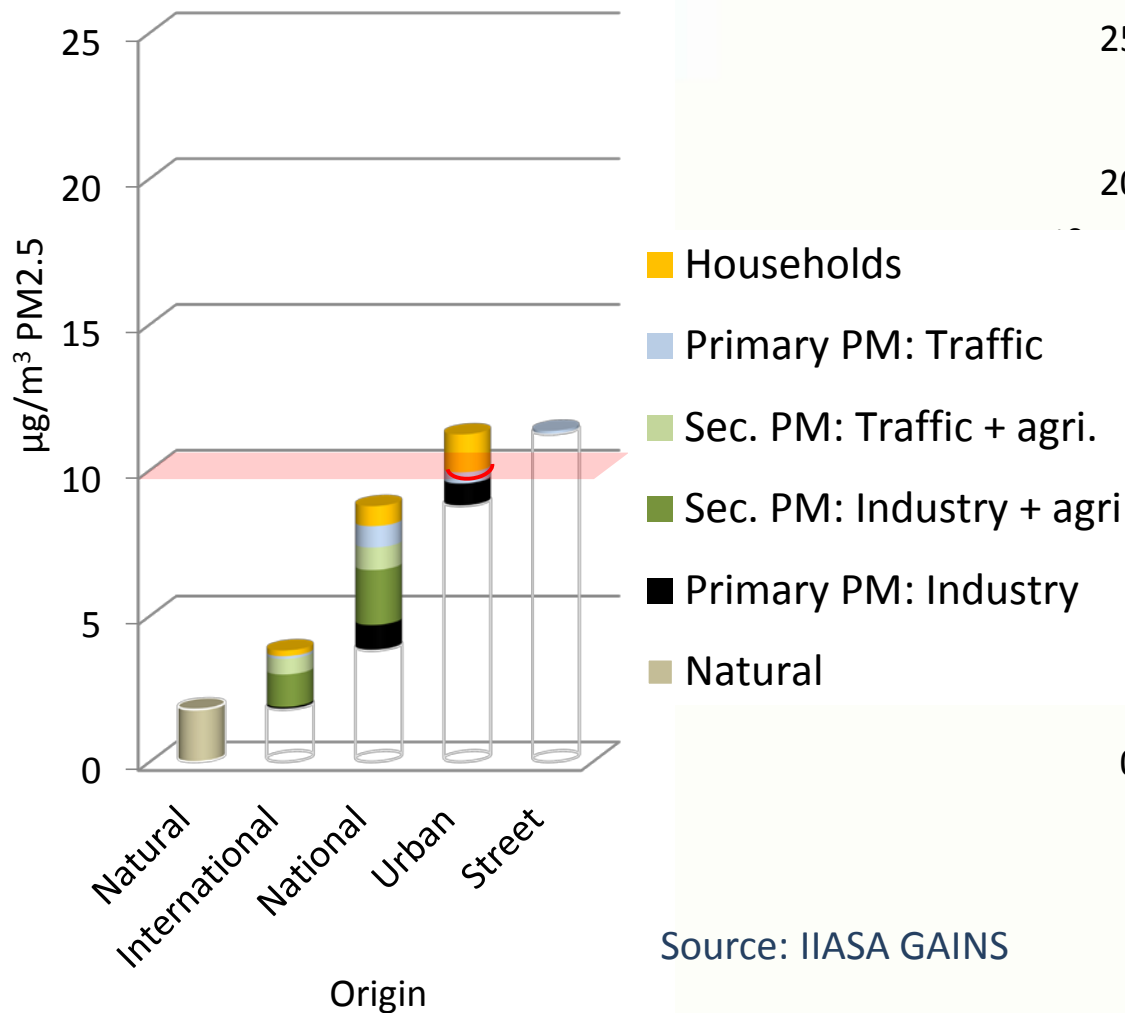
## Additional Natura2000 areas

protected against eutrophication: 150,000 km<sup>2</sup>

# PM2.5 in France 2030: Commission proposal

France – average of 293 urban stations modelled in GAINS

Lyon, Centre Ville

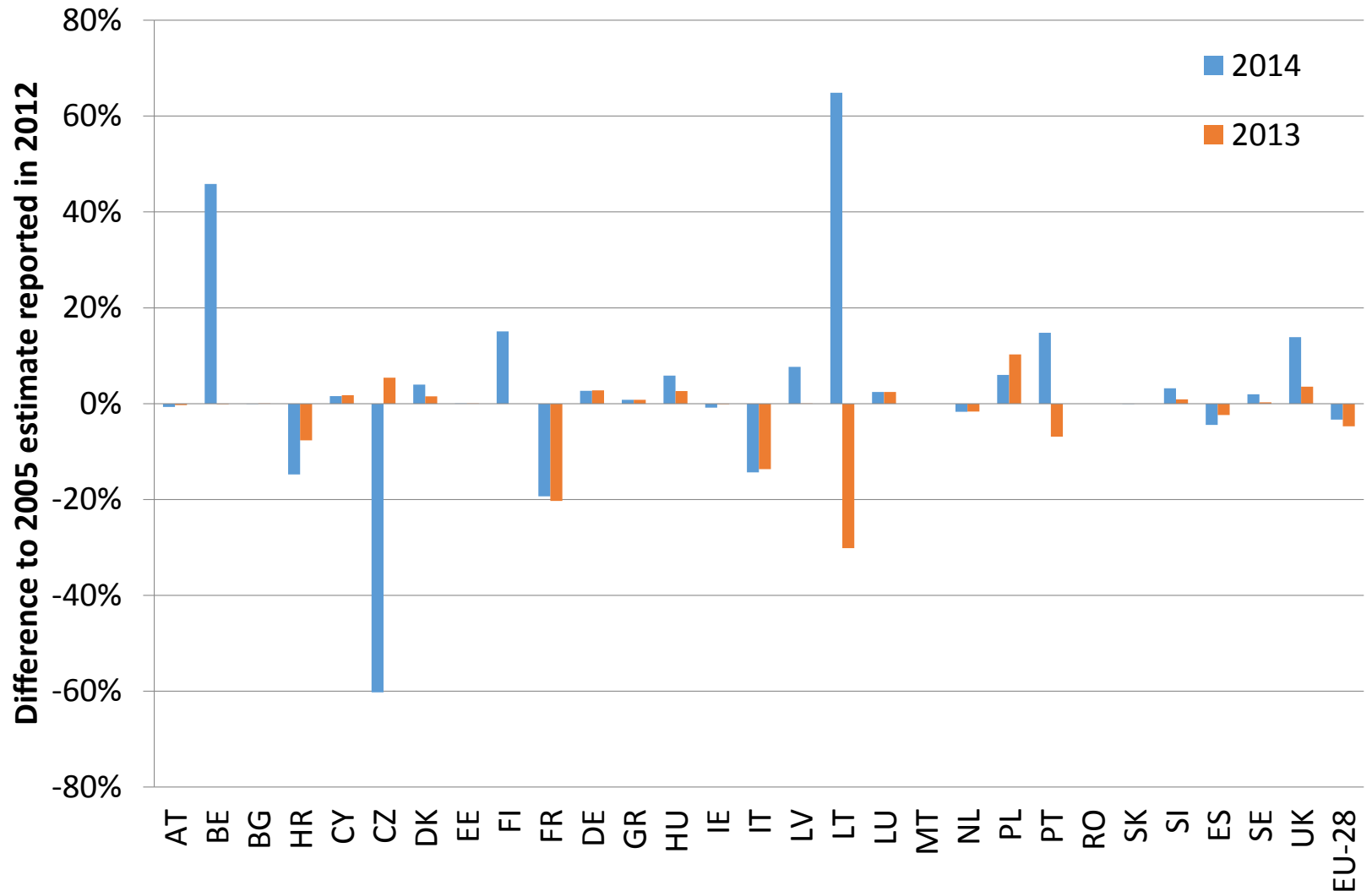


Source: IIASA GAINS

# Bilateral consultations with national experts

- With 22 Member States (mid March – end May 2014)
- Objectives:
  - Clarify misunderstandings
  - Spot and correct factual mistakes
  - Substantiate information on 2014 changes of 2005 emission inventories
  - Identify relevance of different perspectives on future developments on emission ceilings
  - Collect national activity projections
- Findings will be reported to Commission

# PM2.5 inventories reported for 2005



# 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,
  - economic efficiency, and
  - fully utilizing the potential from international cooperation.
- Additional measures predominantly in sectors that have contributed less to emission reductions in the past
- More info: <http://gains.iiasa.ac.at>