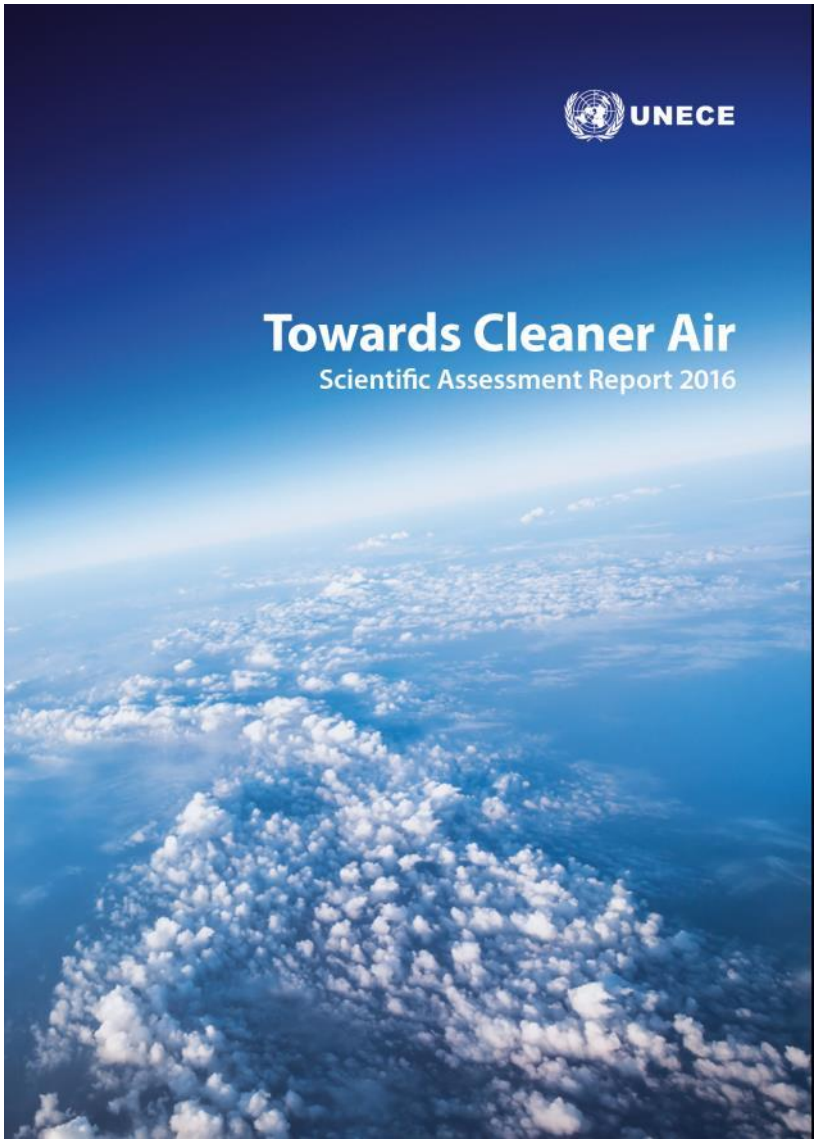
TFIAM Progress 2015-2016

Rob Maas

EMEP/WGE – Geneva – 13-16 September 2016

Scientific Assessment Report 2016



Launched 31 May 2017

Excellent cooperation with other Task Forces and ICPs

Review process could have been more structured

Perhaps a plenary review of the text would have been better?

Report received well among policy makers

Press coverage disappointing (except *Le Monde*)

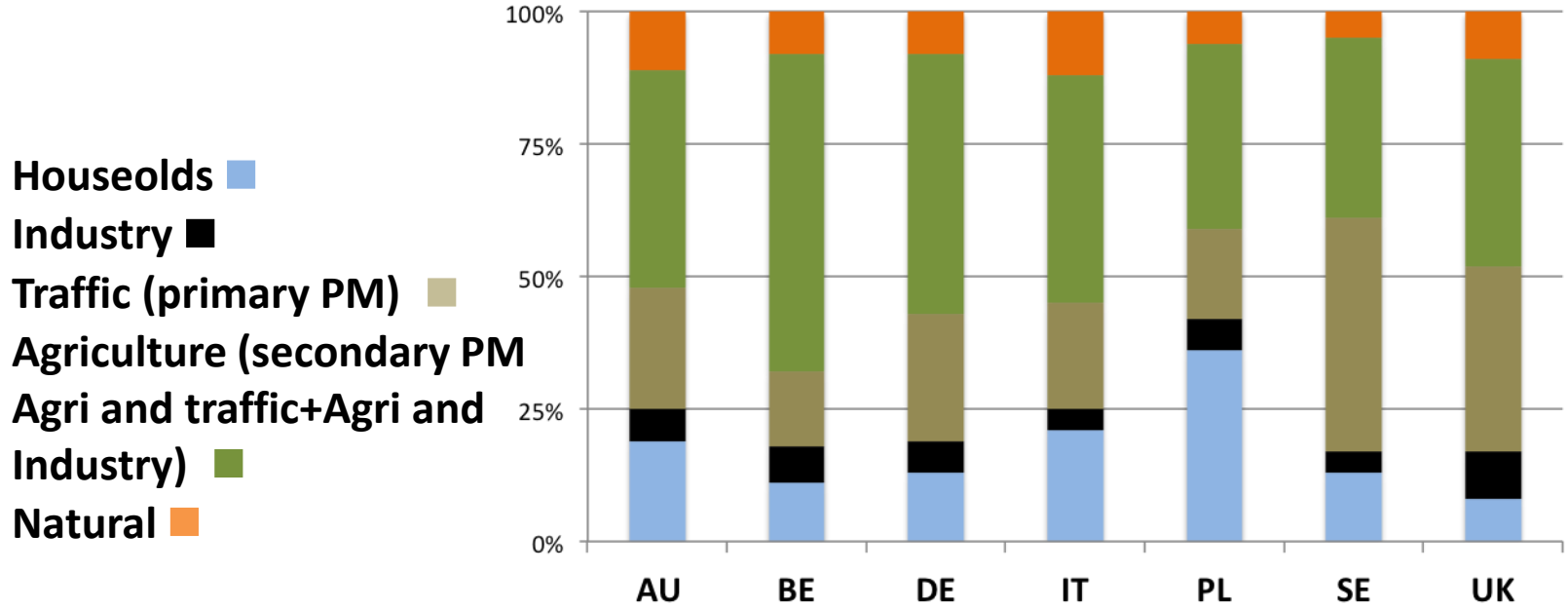
Research topics identified during AR process

1. **Emission data:**
   a. Completeness and accuracy of emission data : obstacles for EECCA/SEE ratification GP
   b. All parties: uncertainty emission data of PM , NH3, VOC, ships, real world emissions
   c. Improving the review process
   d. Treatment of 'condensables'
2. **Dispersion modelling:** e.g. ammoniumnitrate concentration, NH3 & N-deposition
3. **Implementation 'lean' monitoring strategy:**
   aimed at measuring progress in air quality, health risks and ecosystem improvement
4. **Health risks:** particulate matter(s) and NO2
5. **Biodiversity loss modelling:** multistress impacts (air-climate-water-land use)
6. **Ozone – nitrogen - climate interactions:** e.g. carbon sequestration
7. **Cost-effective control strategies**
   a. Combined strategies for PM, PB, Cd, Hg, PAH, HCB, …
   b. Integrated agricultural strategies for CH4, N2O and NH3
   c. Cost-effective multilayer governance to meet WHO AQGs: global to local
8. **Hemispheric transport and climate change**
   a. Emissions (present control, compatibility with national emission inventories)
   b. Source-receptor relationships (model comparisons)
   c. Assessment of effects
   d. Cost-effective hemispheric ozone strategies with and without further climate policy
9. **Outreach**: expansion of the policy-science network globally and to energy, transport and agricultural policy processes … SDGs

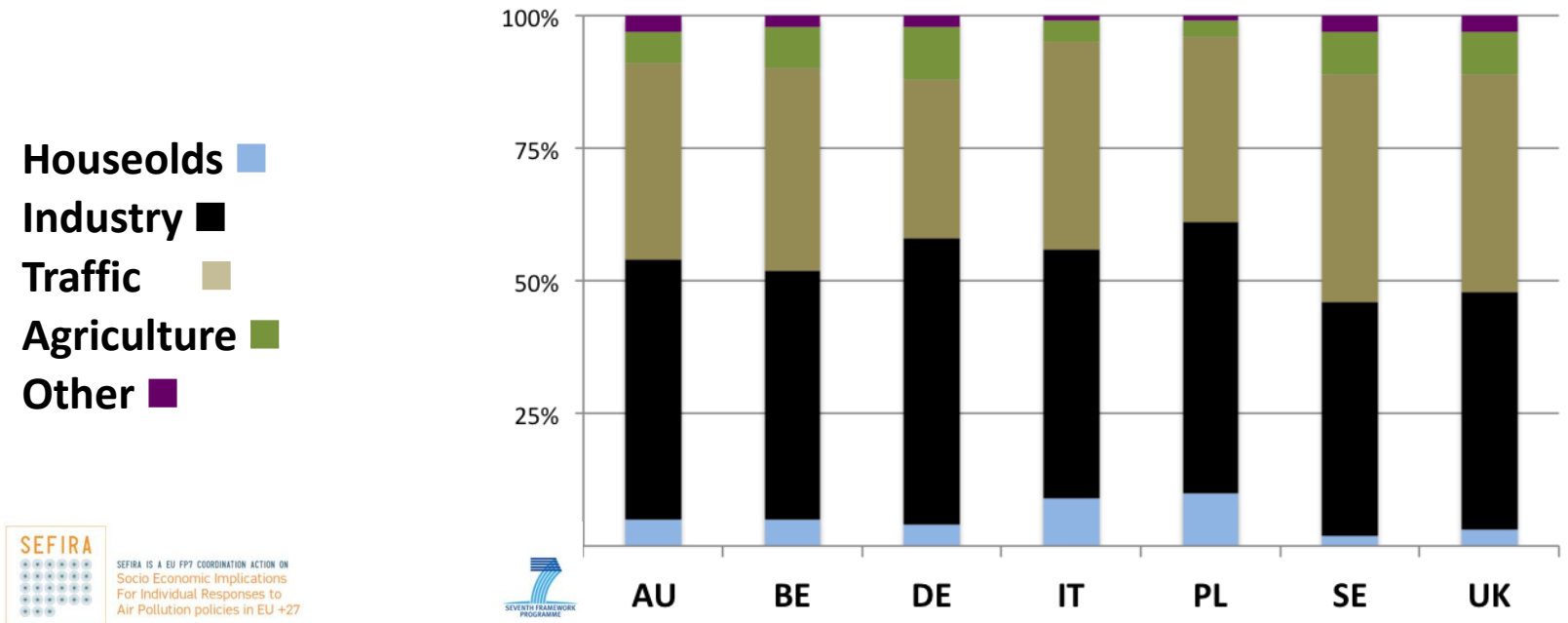
TFIAM45 Lisbon, 23-25 May 2016

- Recent developments in Integrated Assessment Modelling
- Discussion on the SHERPA model (JRC)
- Focus on air pollution impacts of climate policy

PM sources (IIASA TSAP report #12 2009)



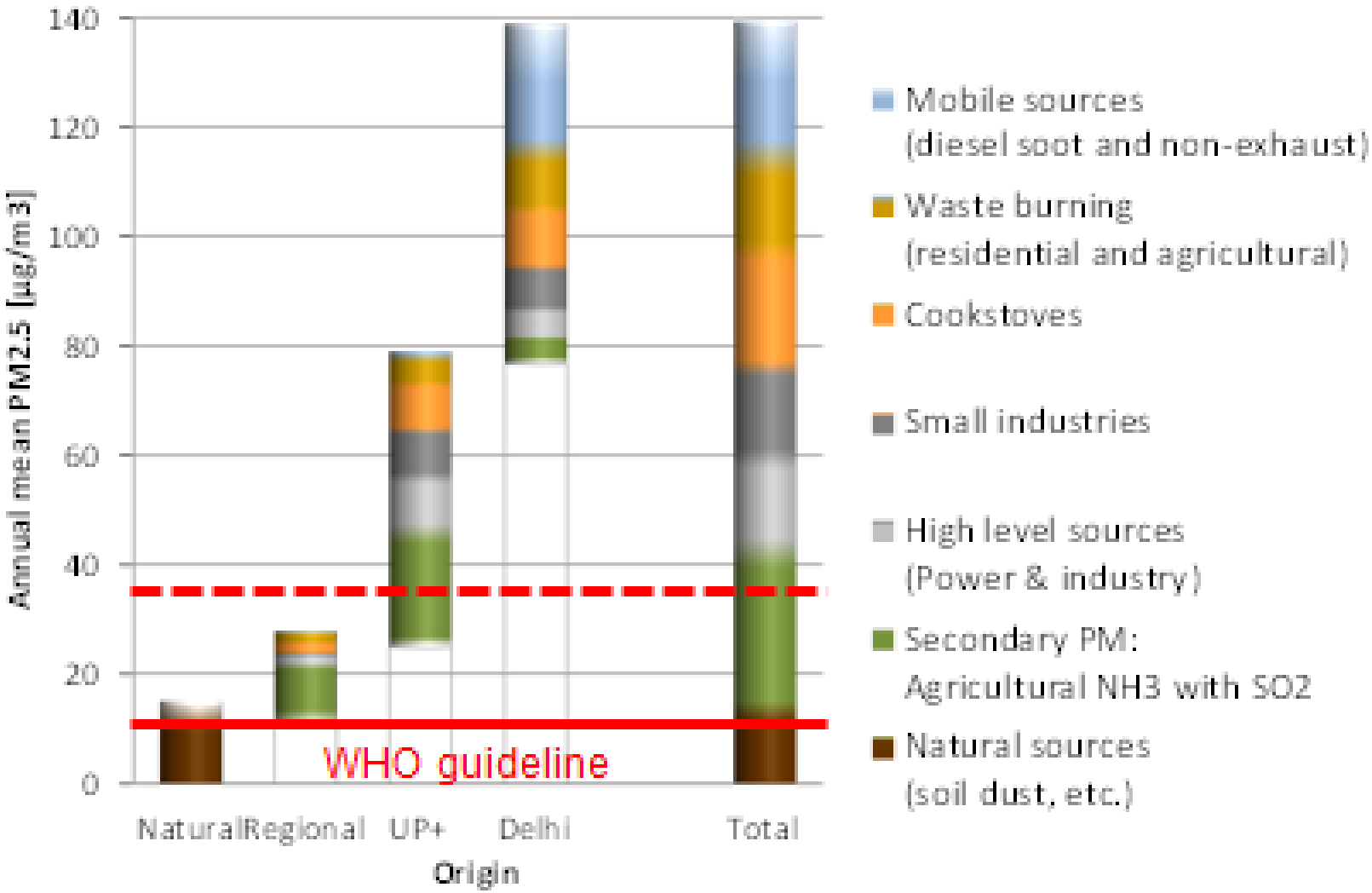
Citizens' perception of pollution sources (SEFIRA CAWI)



SEFIRA
SEFIRA IS A EU FP7 COORDINATION ACTION ON
Socio Economic Implications
For Individual Responses to
Air Pollution policies in EU +27

Sources of ambient PM2.5 in Delhi

Initial GAINS estimates



Kiesewettter et al., in prep

From: presentation Helen ApSimon, UK
Health damage based on COMEAP findings

Table 4: Health Impact from NO_2 (2013)

	Central (2.5%)	Low (1%)	High (4%)
Annual equivalent attributable deaths	23,500	9,500	38,000
Annual Social Cost	£13.3bn	£5.3bn	£21.4bn

Possible overlap between the health impacts associated with ambient concentrations of particulate matter (PM) and NO_2 need to be borne in mind when considering the above estimate. It is likely that there will be some overlap. Further work is being undertaken to understand and quantify this overlap but the current recommendation is that between 0 and 33% of the effects associated with ambient concentrations of the two pollutants overlap. Table 5 below provides an indication of the combined effect associated with these pollutants assuming that the two are completely independent.

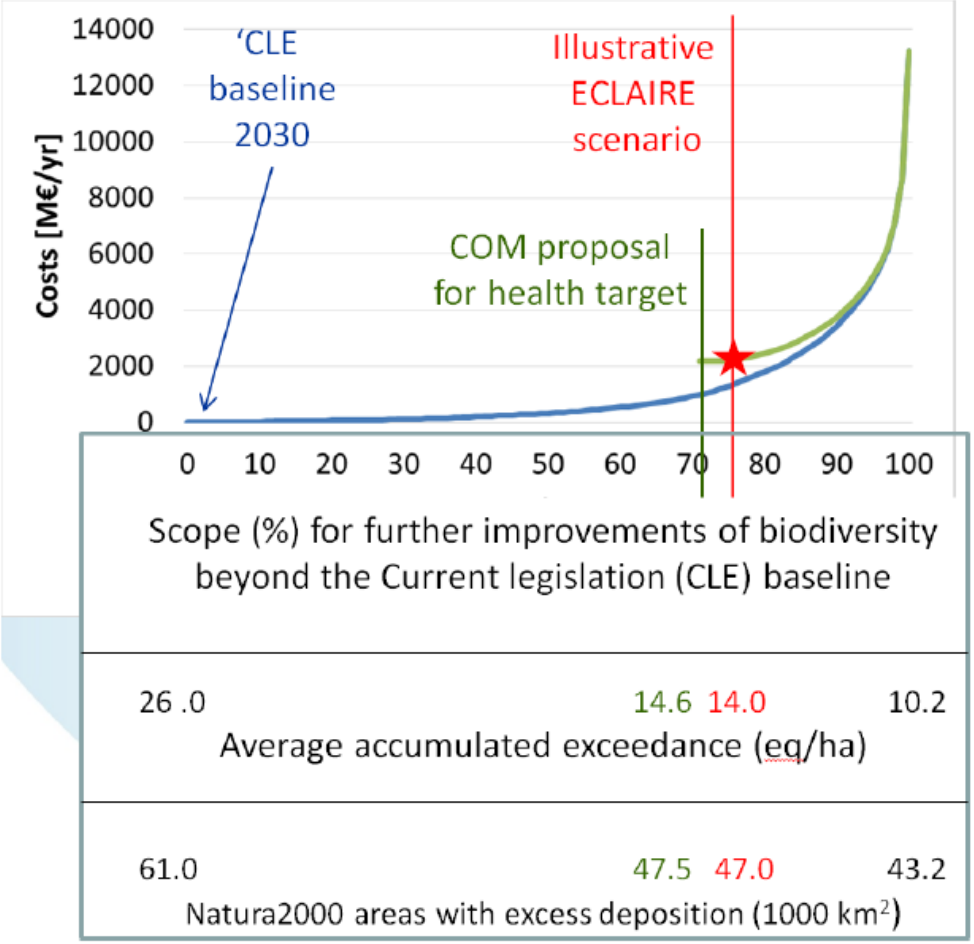
Table 5: Total health Impact from PM and NO_2

	Impact
Annual equivalent attributable deaths	44,750 - 52,500
Annual Social Cost	£25.3bn - £29.7bn

éclaire

Effects of climate change on air pollution impacts and response strategies for European ecosystems

Assume: on top of 70% gap closure for health 75% gap closure for biodiversity

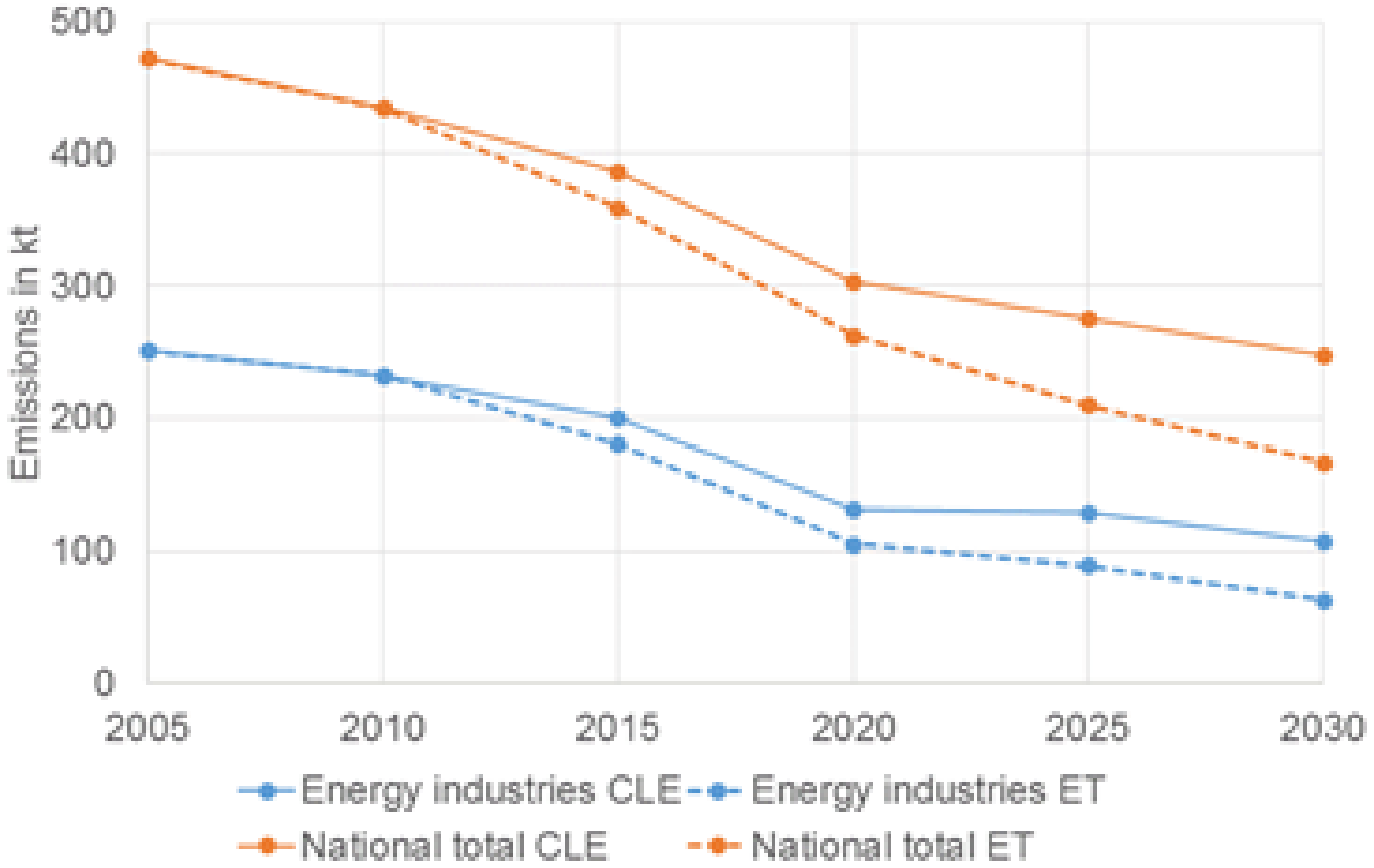


Additional cost (+1%) = 23 M€
Additional benefit = 35-2500 M€

Additional ammonia measures for 3% largest farms

From: presentation Marcel Langer, UBA

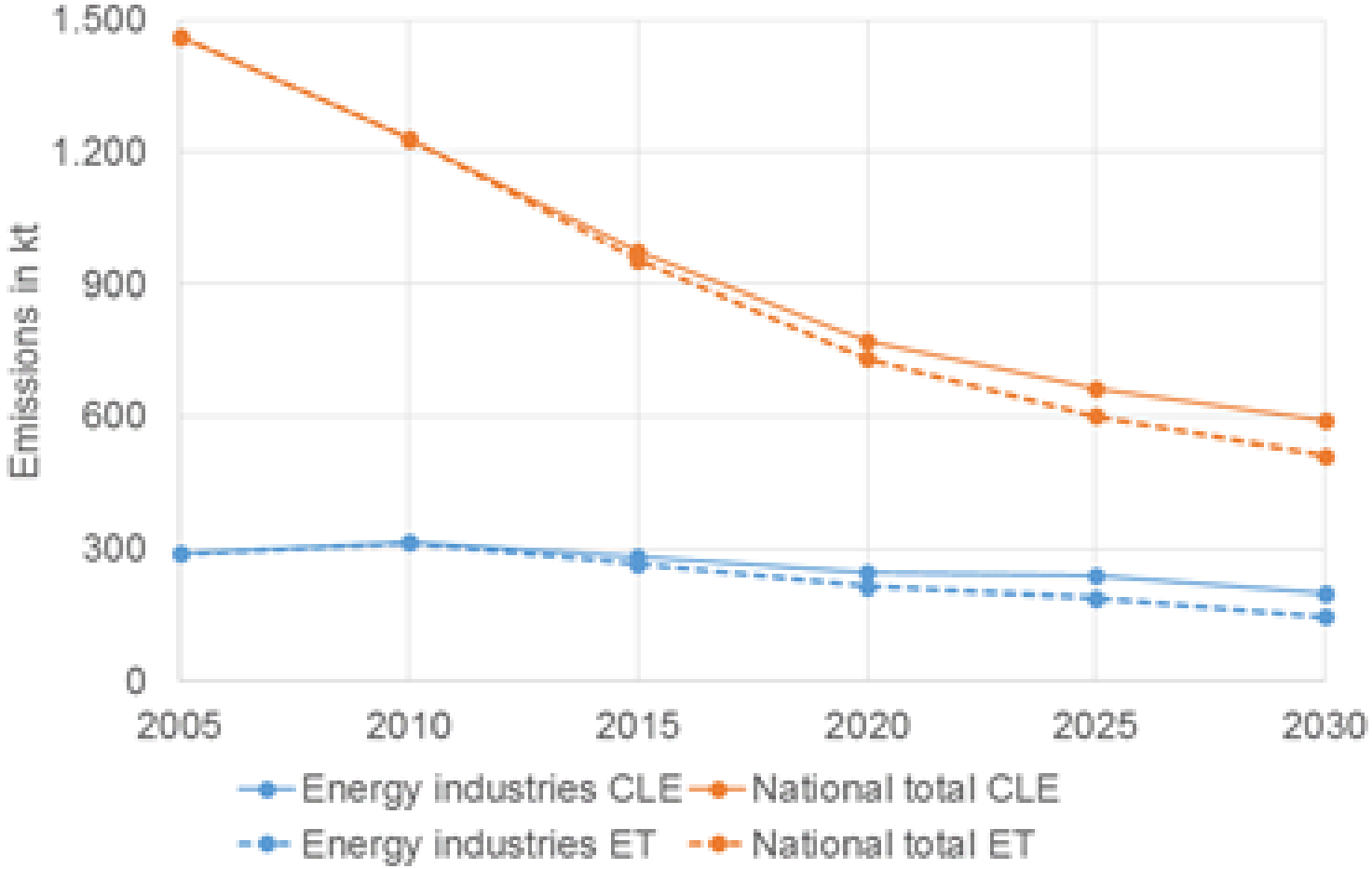
SO_2



- Energy transition will provide a significant additional reduction of emissions

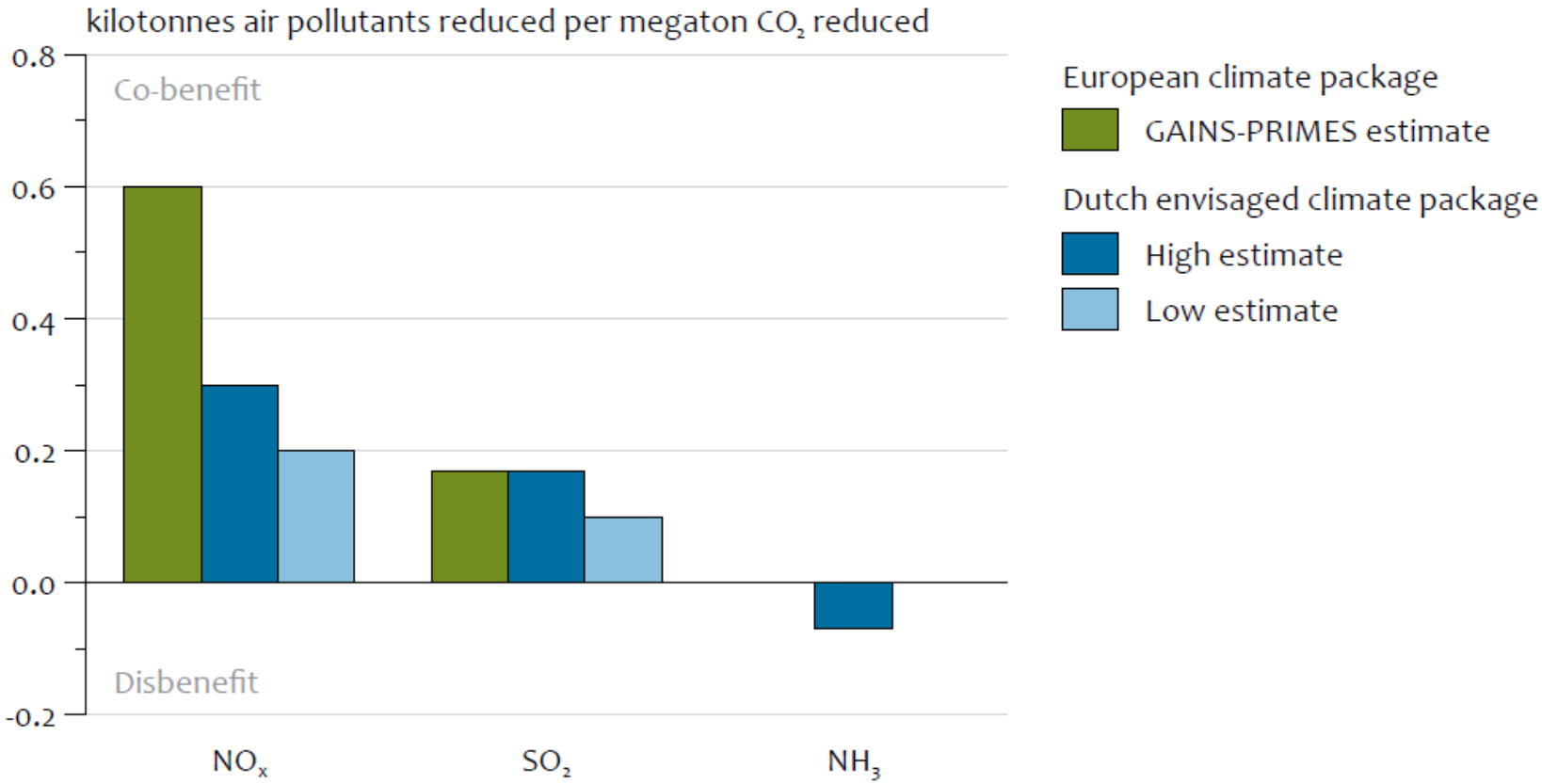
From: presentation Marcel Langer, UBA

NOx



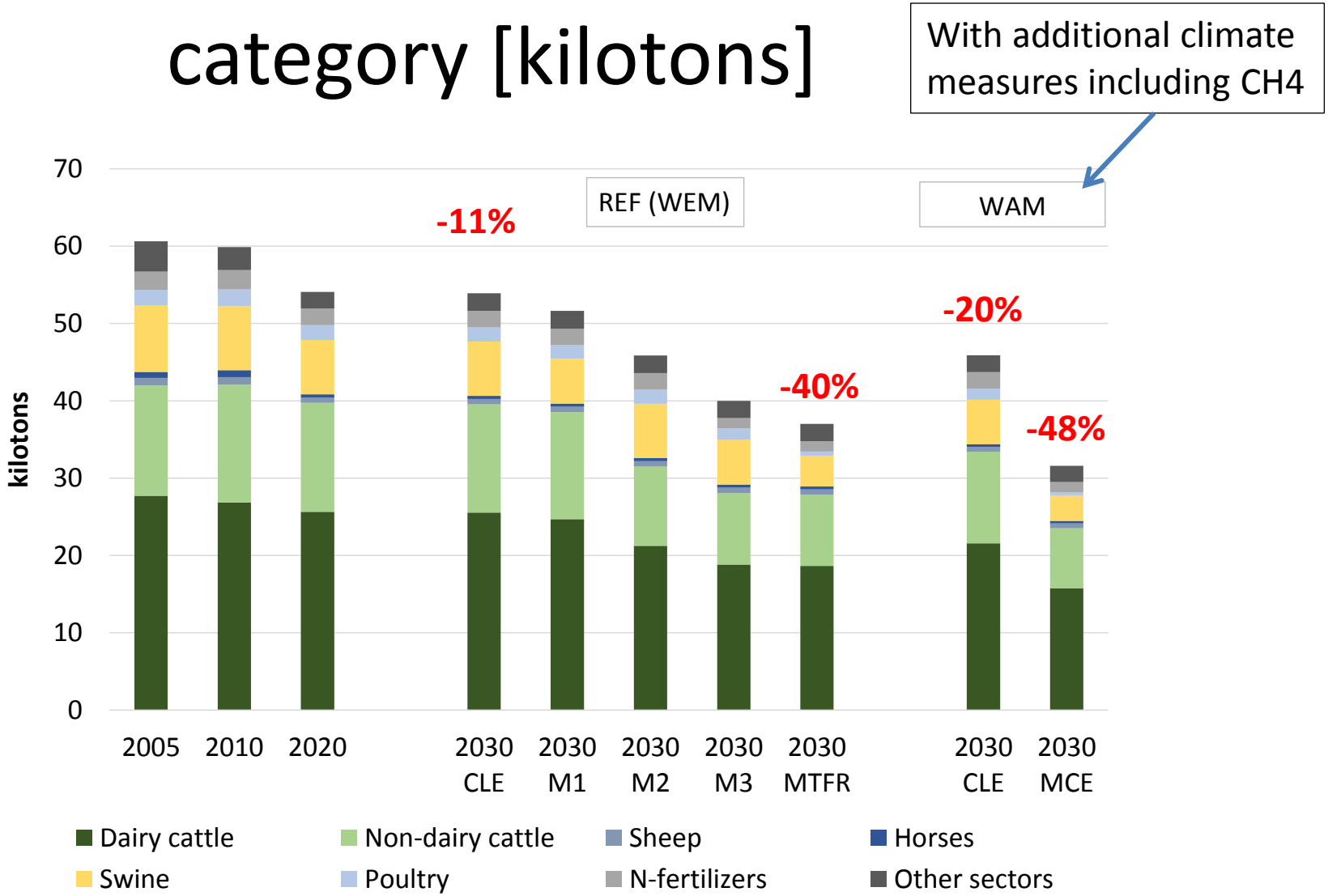
- National totals without agriculture
- Main reductions comes from transport sector
- Difference between CLE and ET is mainly caused by energy industries

Co-benefit study Netherlands



PM-emission impact uncertain: domestic wood burning, biofuels, biomass

Ammonia emissions by source category [kilotons]



From: presentation Gaston Theis, Swiss Federal Office for the Environment

Air pollution risks of climate policies

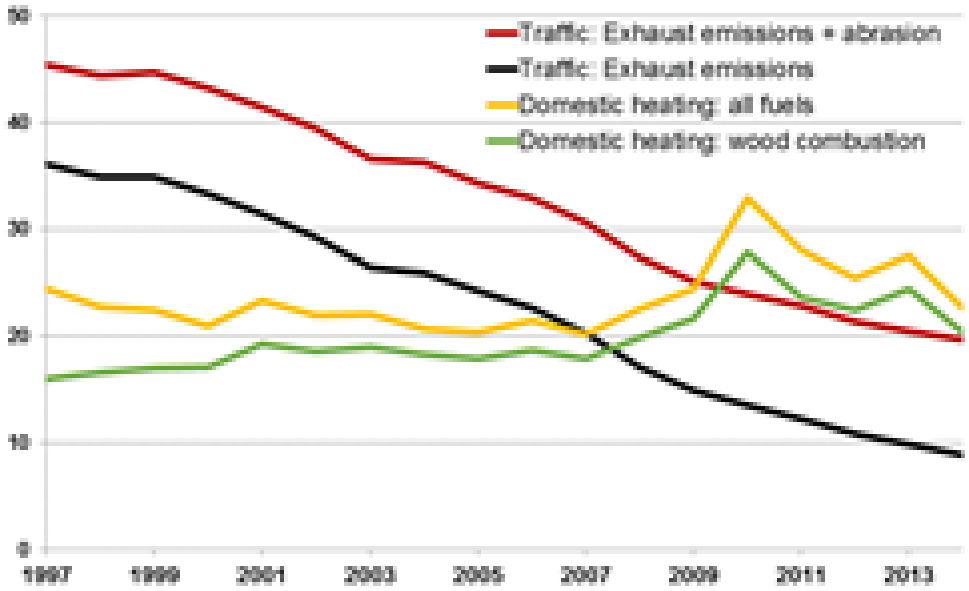
- Wood burning
- Diesel, direct injection gasoline cars
- Biofuels
- Biodigesters
- ….

Integrated climate-air policy approach is needed: one atmosphere!

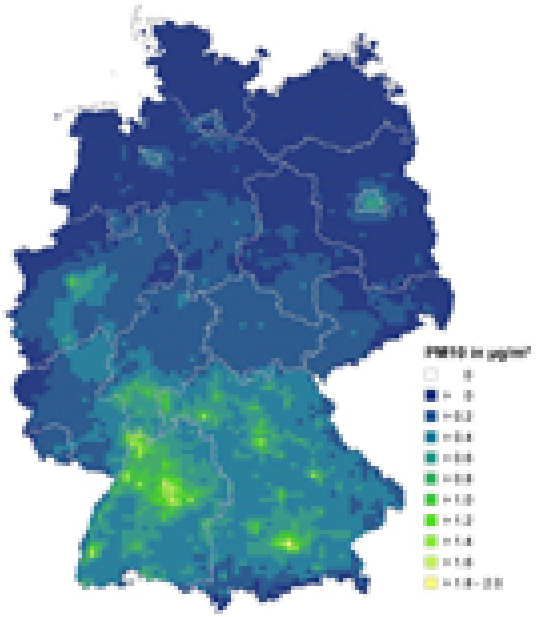
From: presentation Marcel Langer, UBA

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

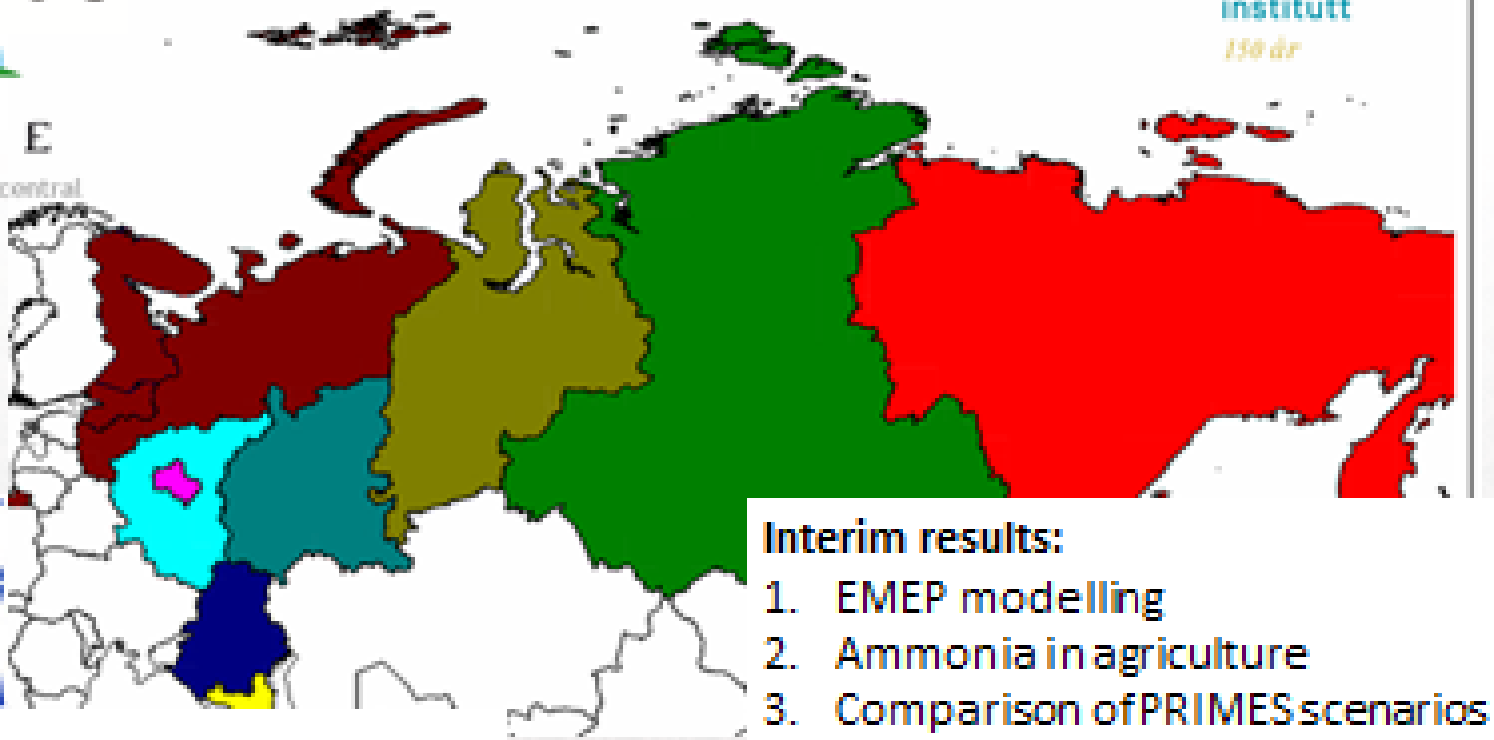


- Regulation of dust emissions for stoves are based on measurements on a test bench
- Impact on climate by emissions of black carbon

Recent IAM activities in Russia

Further investigation of the advantages of new regionalization in the GAINS Russia model.

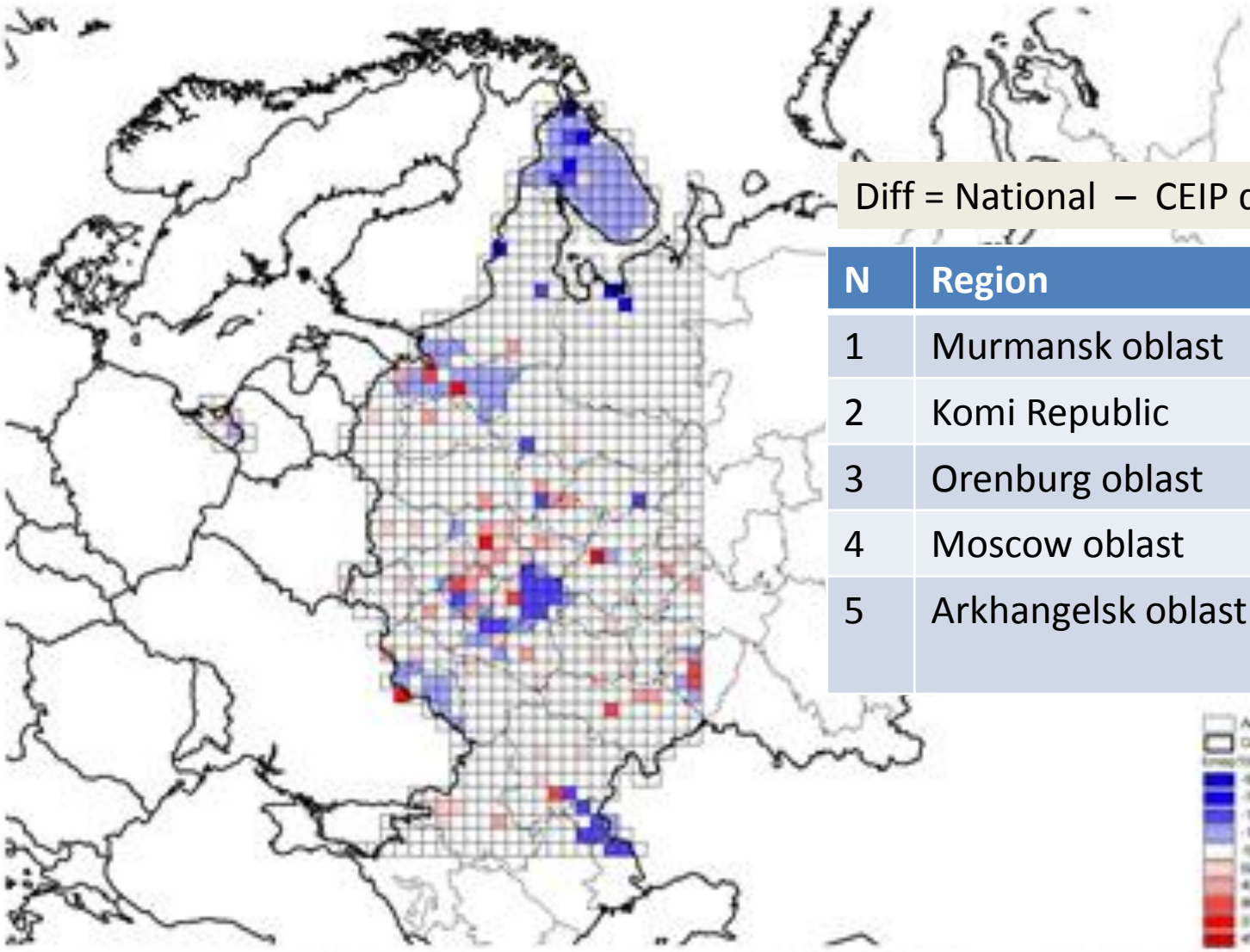
Financed by the Nordic Council of Ministers, 2015-2017



Interim results:

1. EMEP modelling
2. Ammonia in agriculture
3. Comparison of PRIMES scenarios
4. BC (gridded) EI comparison

1. EMEP modelling: CEIP vs. national data, SO_2 in 2012

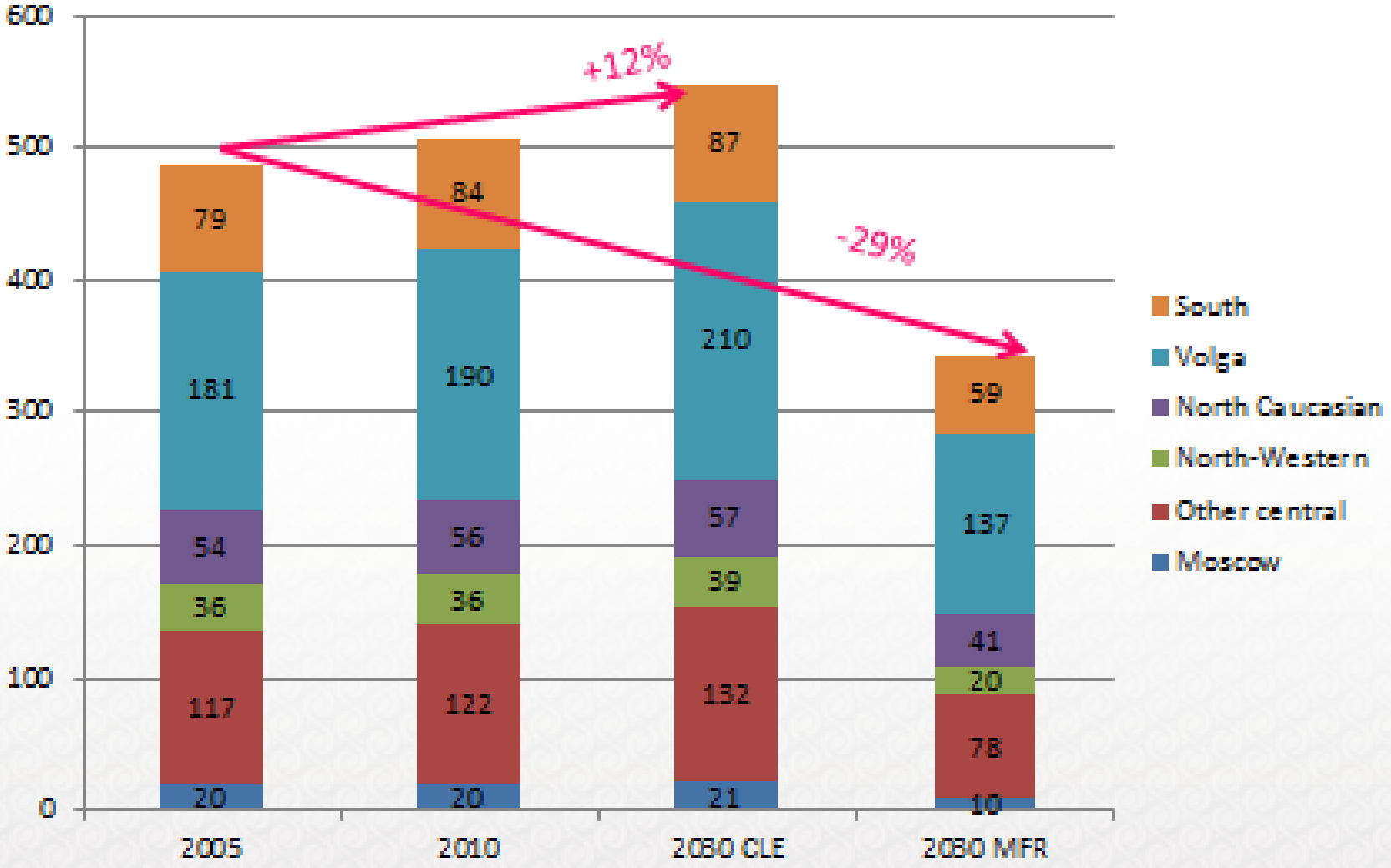


Diff = National – CEIP data

N	Region	Diff, kt
1	Murmansk oblast	182
2	Komi Republic	94
3	Orenburg oblast	87
4	Moscow oblast	-69
5	Arkhangelsk oblast	58

ivl

2 Ammonia: Results MFR vs CLE: Emissions, kt (AGR)

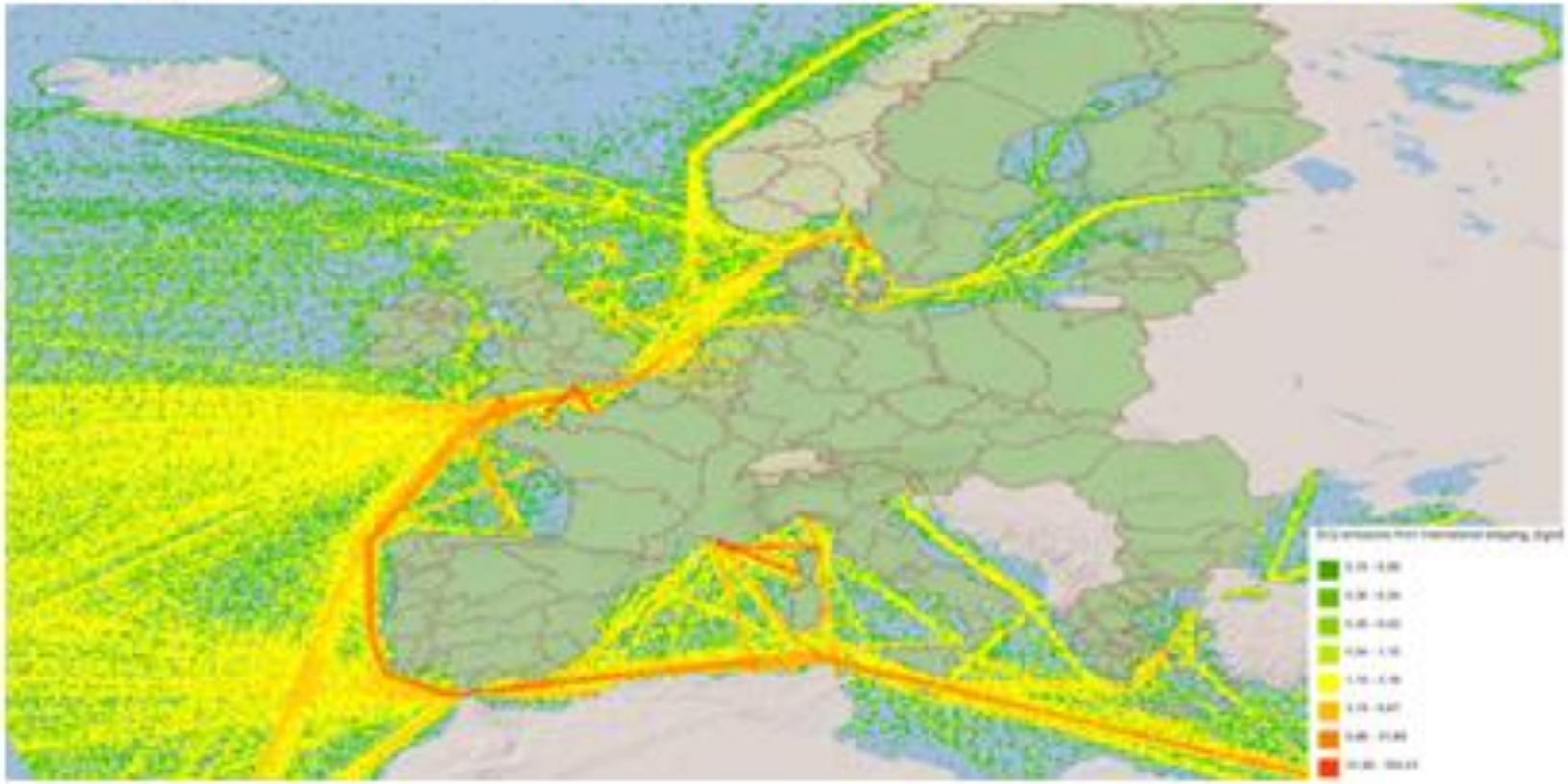


Animal stock + fertilizer production and use

ivl

Ship emissions occur close to land

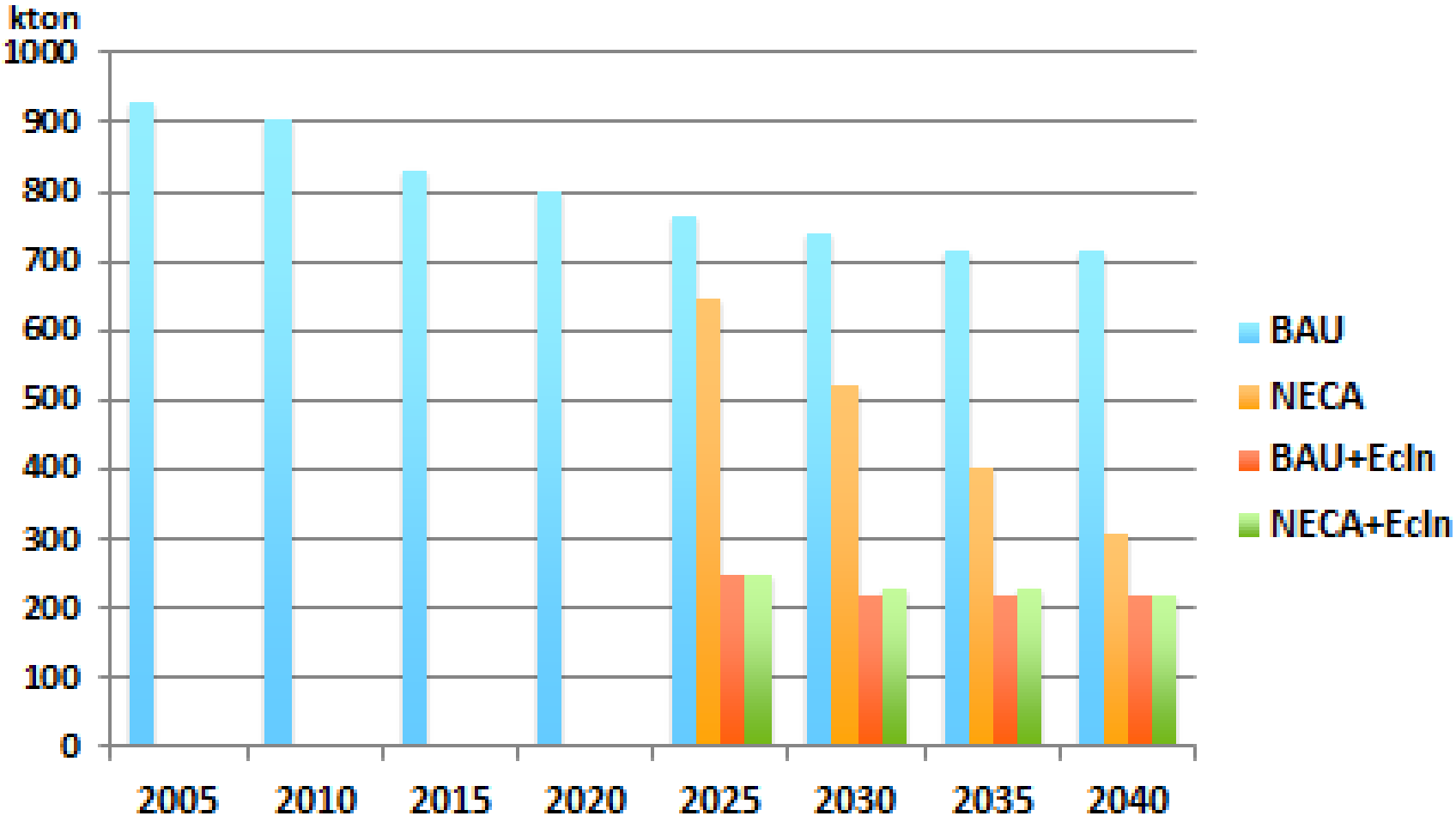
Globally, 70-80% of ship emissions take place within 400 km from shore



In the North Sea, 90% of emissions take place within 90 km from shore

AirClim

NOx emissions with/without a NOx-ECA and with/without a NOx levy



Source: IVL/CE Delft (2016)

AirClim

From: presentation Helen ApSimon, UK

Scenario	Technological and behavioural changes
Tech 1	All double-deck buses to hybrid; all single deck buses to zero emission; all taxis to Euro 6 (diesel black cabs)
Tech 2	Tech 1 + Ultra Low Emission Zone (ULEZ) implemented
Tech 3	Tech 2 + ban diesel cars completely from London
Behaviour 1	Cycle superhighway (all reduced car traffic to bicycles) – reduce traffic flow 10%
Behaviour 2	Increased active travel (5% car trips to cycling; 5% car trips to walking) and public transport (10% car trips to bus) = 20% of car trips replaced
Behaviour 3	Most increased active travel (25% car trips to cycling; 15% car trips to walking) and public transport (10% car trips to bus) = 50% of car trips replaced
Combined “ideal”	No private cars in London (30% car trips to bus, all of which are zero emission; 50% car trips to cycle; 20% car trips to walking) and all black cabs zero emission, including London wide ULEZ standards for remaining vehicles

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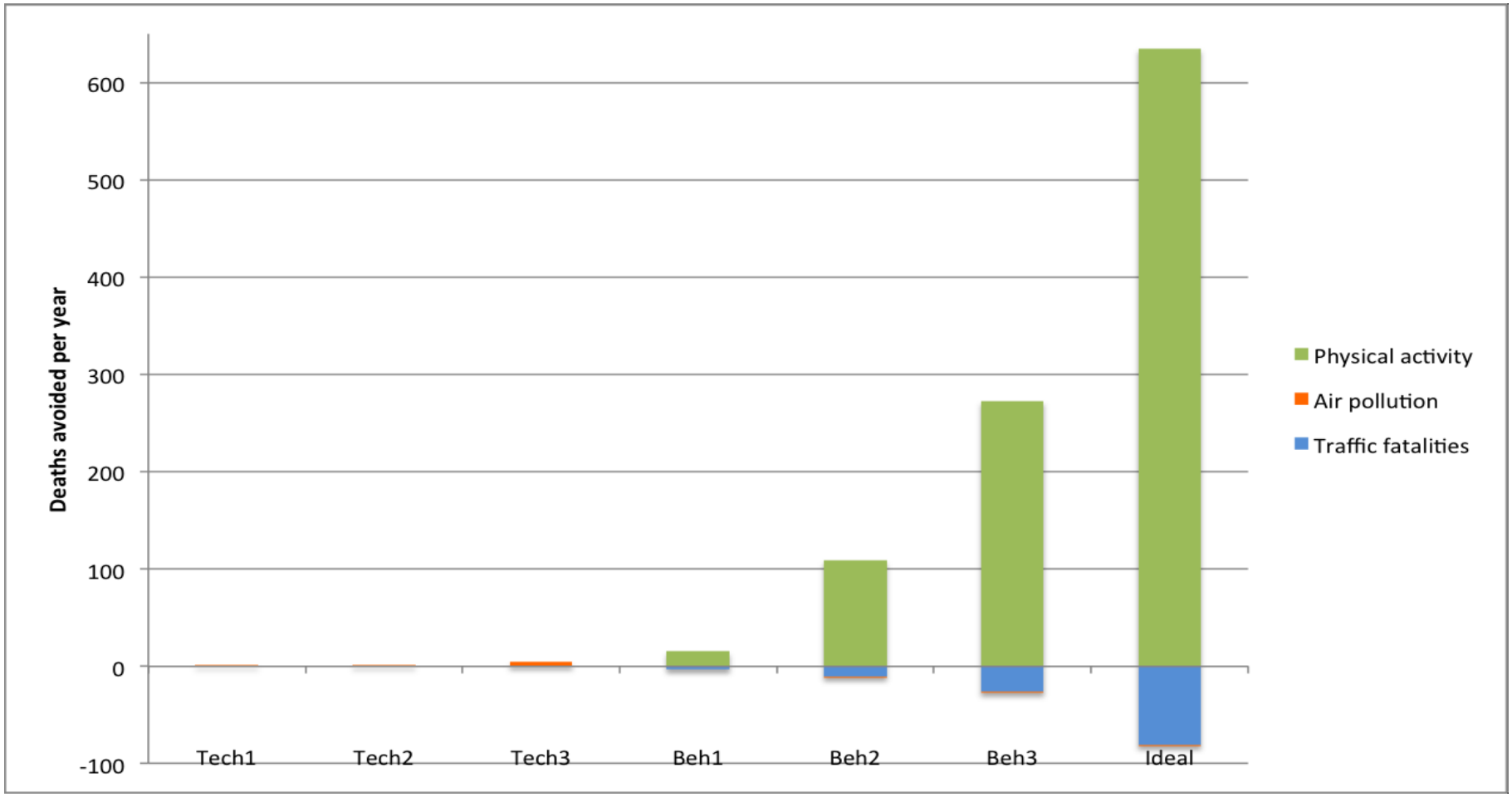
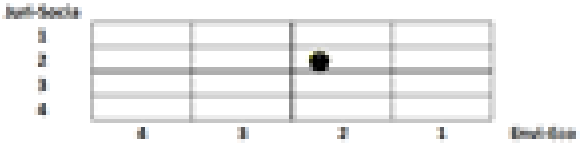


Health impacts, estimated as number of deaths avoided per year resulting from changes in air pollution, physical activity, and traffic fatalities, for the 7 policy scenarios (based on TAPAS)

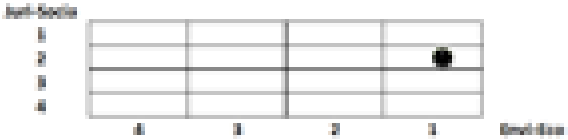
ACT OF 26 AUGUST 2013 FOR COMBUSTION INSTALLATION OF 20 TO 50 MW AND ACT OF 25 AUGUST 1997 MODIFIED (IN 2013) (4/ 4)

Legal leverage	No special needs (3)
Level controversy and acceptability	Controversy noted (1) but less correct today as the act has been implemented
Operationnality in 2020	The deadlines for compliance ranges from 2016 and 2018 according to size plants and fuels used. The reduction techniques are available

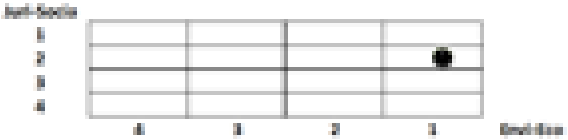
SO_2



NOx



PM_{10}



Future plans

- Scenario analyses:

Updated emissions, projections, transfer matrix, risk factors, measures, evaluation NECD, new evaluation Climate & Energy measures, ….

- Workshop on local measures (Feb 2017)
- TFIAM46: Paris 2-3 May 2017
- TFIAM47: Brescia May 2018

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