CLRTAP-Scientific Assessment Report 2016

Key questions

1. What has been achieved in terms of reduction in health and ecosystem effects?
2. What are remaining problems?
3. What is the scope for further improvements
4. What is the scope for further co-benefits with climate change mitigation?

CLRTAP-Scientific Assessment Report 2016

Key questi…

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3. Wha… …e for further improvements
4. What … the scope for further co-benefits with climate change mitigation?

Is the remaining air pollution mainly a local issue?

Expectations

- Policy oriented results → beyond EB-delegates
- Focus on remaining policy challenges
- Encourage progress in all CLRTAP countries

- Answers based on reviewed scientific papers and reports
- Short policy document (10p text) + factsheets + links + specific reports

Timeline

- **30 June:** preliminary version for WGE/EMEP-SB (Sept 2015)
- **31 Oct:** First draft for EB/WGSR (Dec 2015)
- **8 Feb 2016:** Final draft for translation and approval by EB/WGSR May 2016
- **June 2016:** Presentation at Batumi ministerial conference

Kick off meeting

January 2015 Oslo

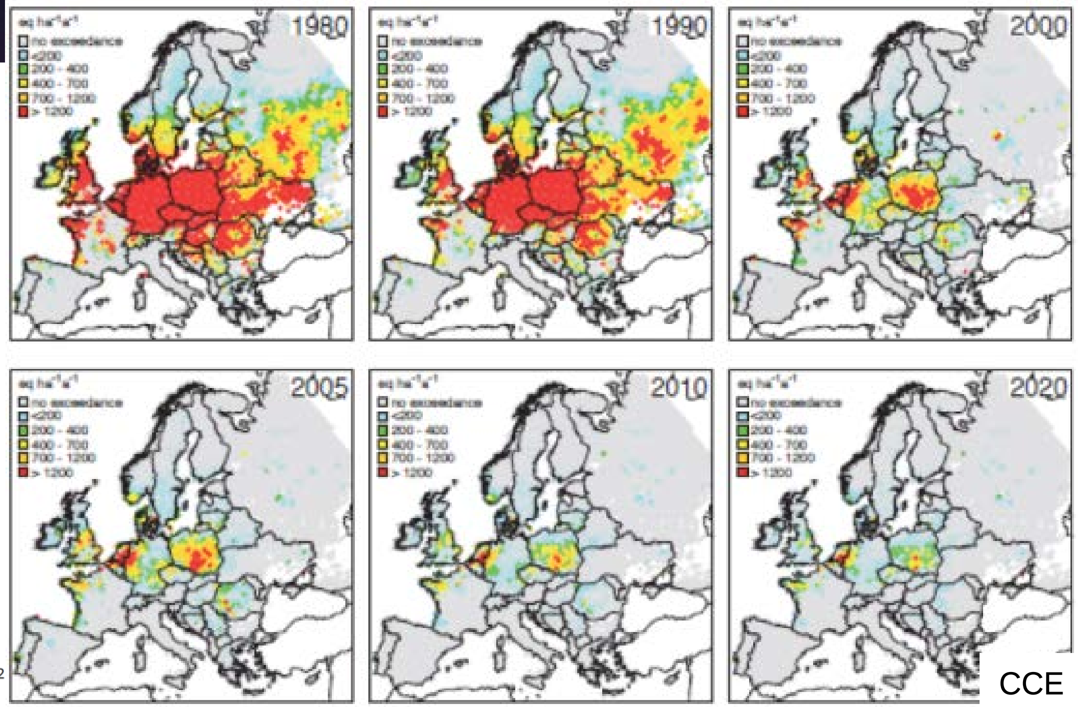
Elaboration on
16 key messages

Input uploaded on
EMEP-wiki

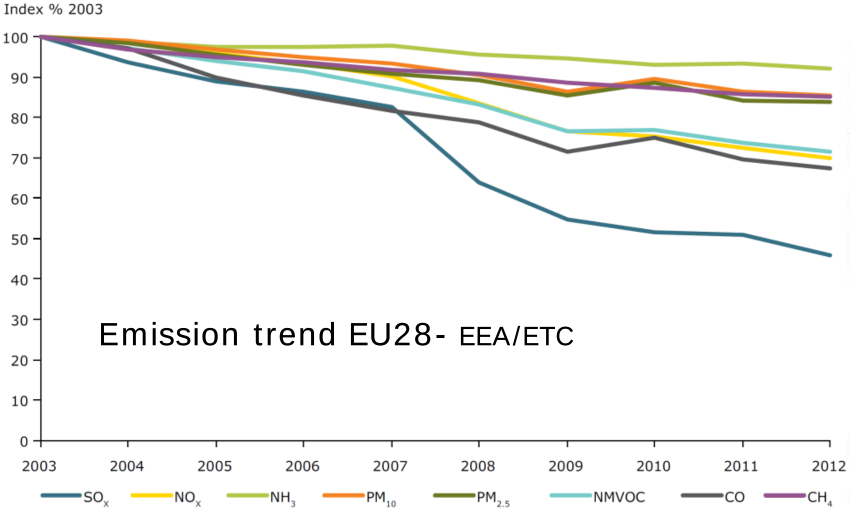
1960s: how a 'local' problem became a transboundary phenomena

Past achievements

Figure 1.1 Areas where critical loads for acidification (2008 database) are exceeded by acid depositions (EMEP50 model) caused by emissions between 1980 (top left) and 2020 (bottom right), the last projected under the Revised Gothenburg Protocol (RGP)

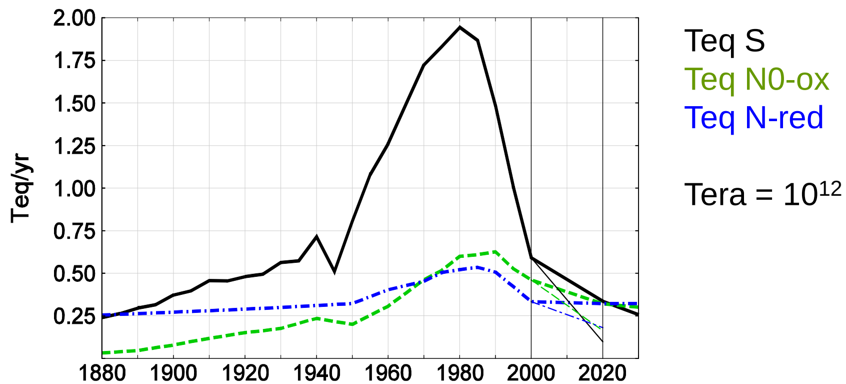


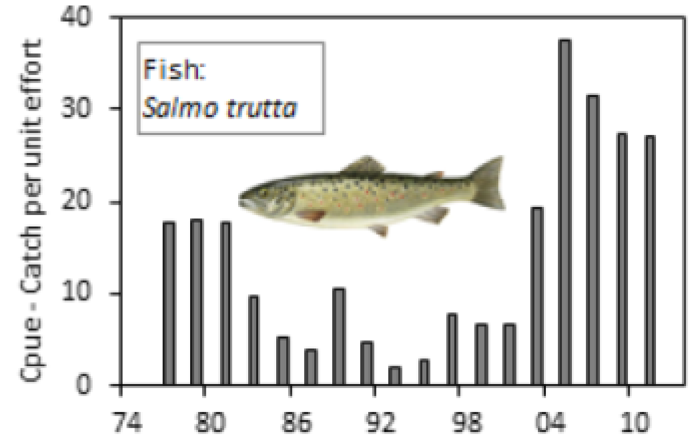
CCE



Emission trend EU28- EEA/ETC

‘Waldsterben’ avoided, lakes recover





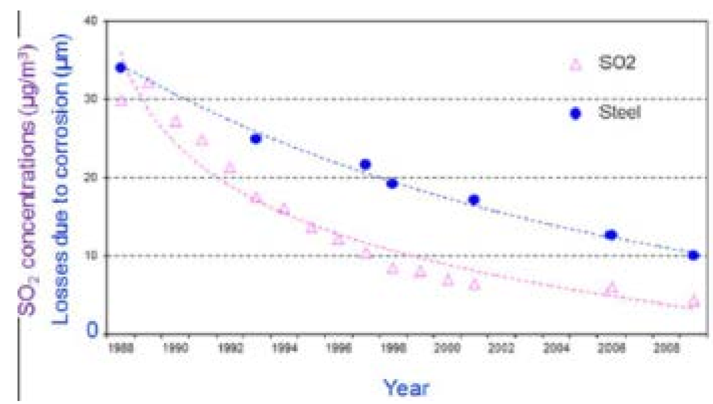


Table 34: Premature mortality from the exposure to fine particulate matter

	2000	2005	2010	2020 *Baseline*	2020 *MTFR*	2030 *Baseline*	2005 *MTFR*
Loss in statistical life expectancy (months)	10.0	8.5	6.6	5.2	3.9	4.8	3.5

What measures contributed to avoid a polluted world ?

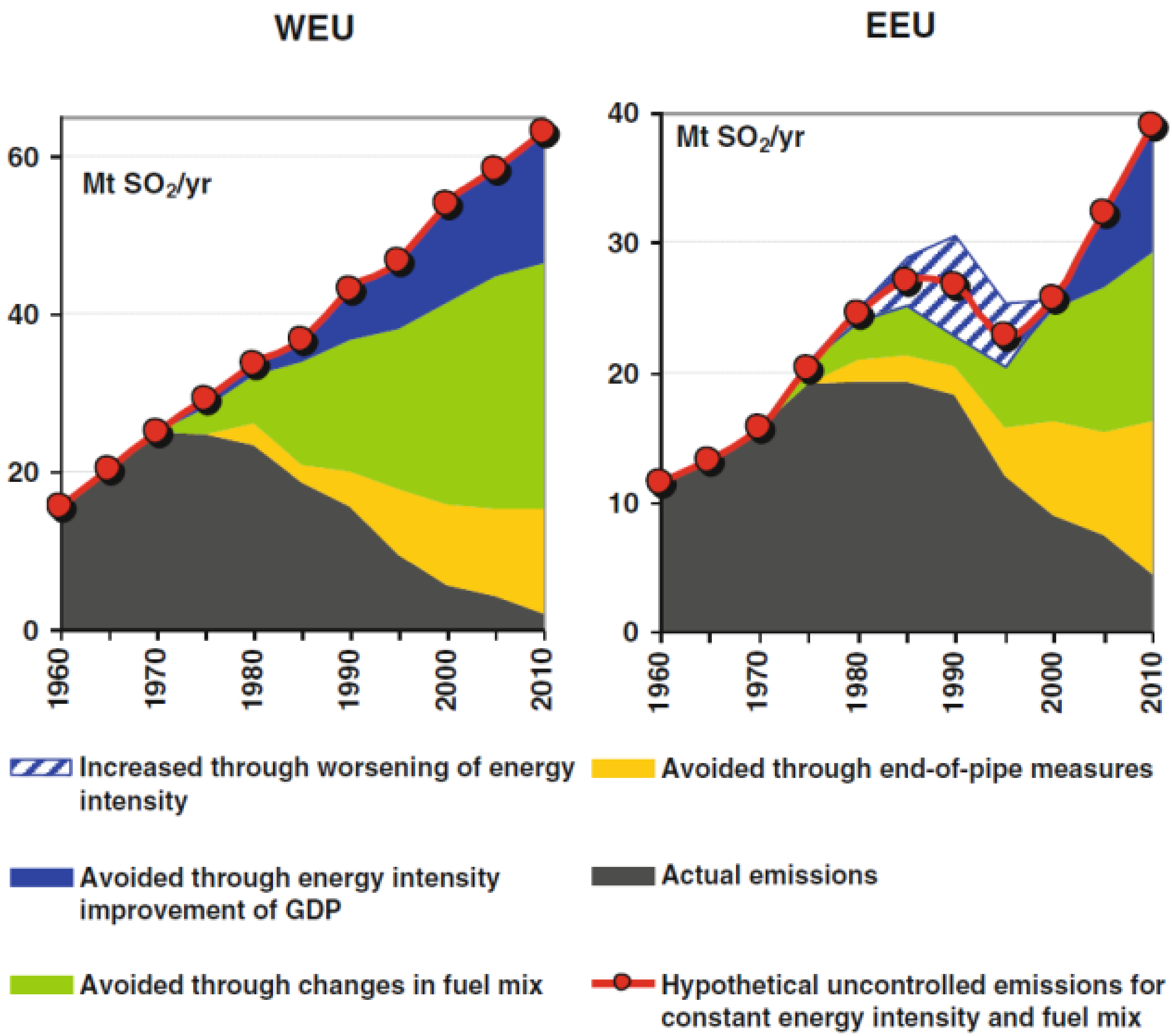


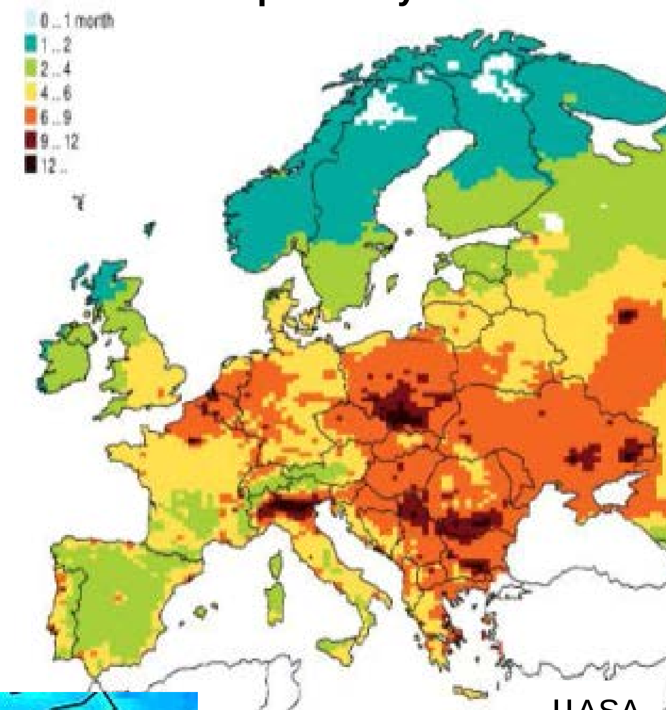
Fig. 9 Determinants of reductions in SO_2 emissions in Western Europe (WEU) and Eastern Europe (EEU), 1960–2010

How would air quality, health and ecosystems have looked like without these measures?

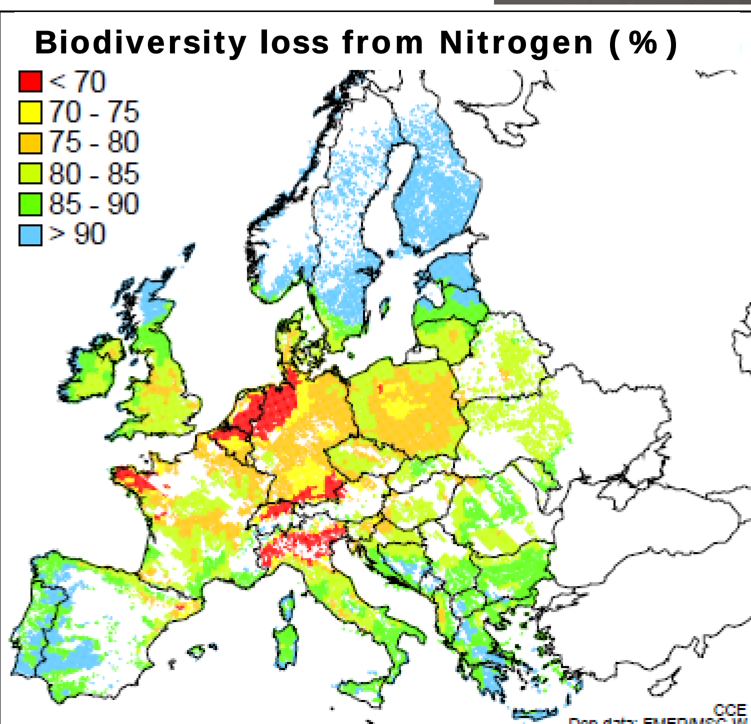
Rafaj et al, Climatic Change, 2013

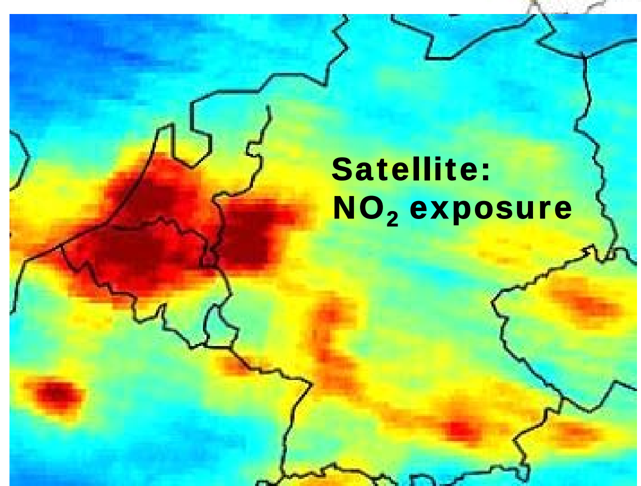
Current challenges

Loss of life expectancy from PM2.5



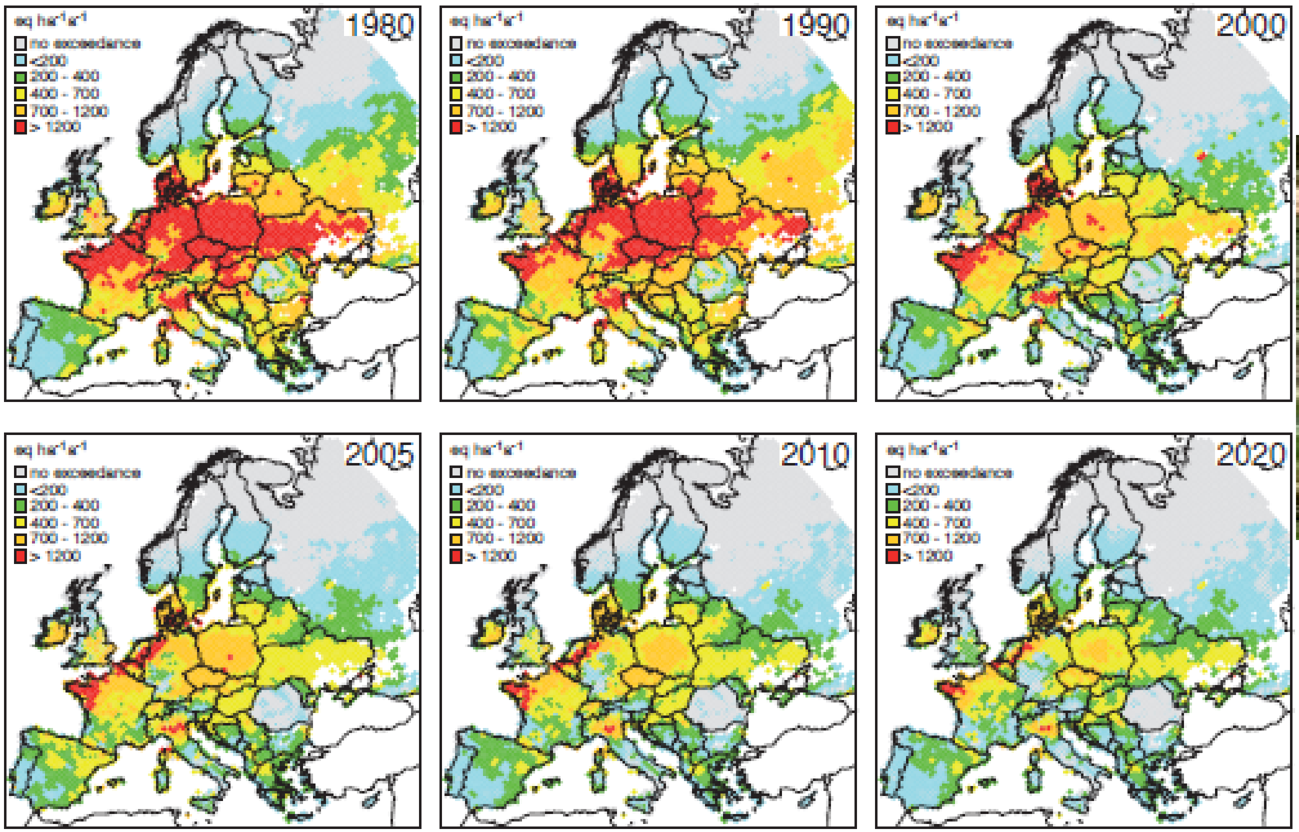
IIASA

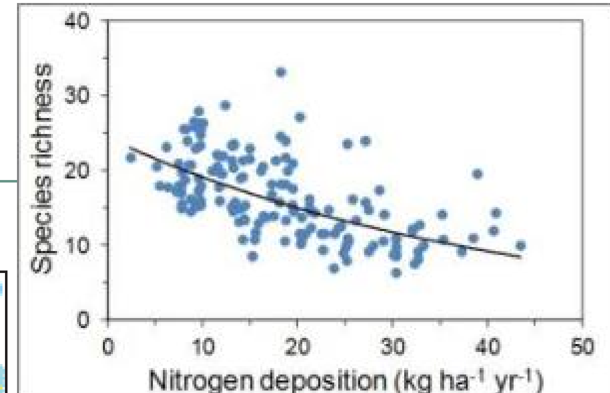




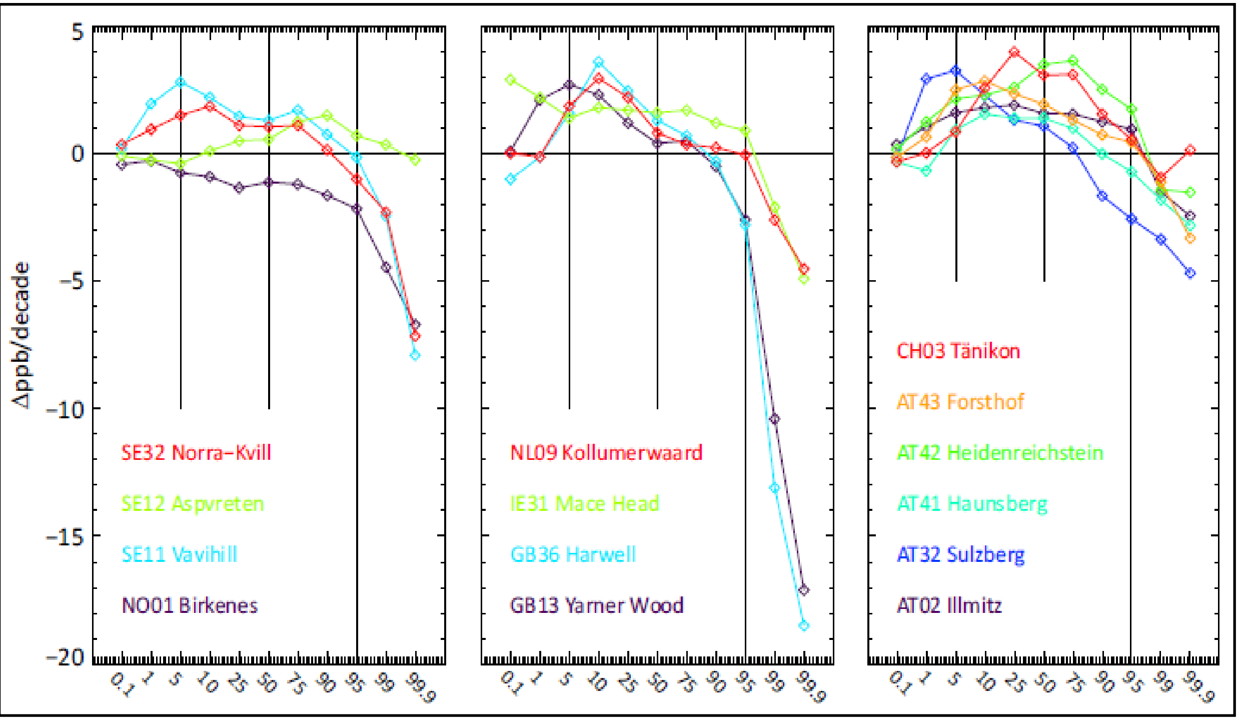
Biodiversity still at risk

Figure 1.6 Areas where critical loads for eutrophication are exceeded by nutrient nitrogen depositions caused by emissions between 1980 (top left) and 2020 (bottom right), the last projected under the Revised Gothenburg Protocol (RGP).



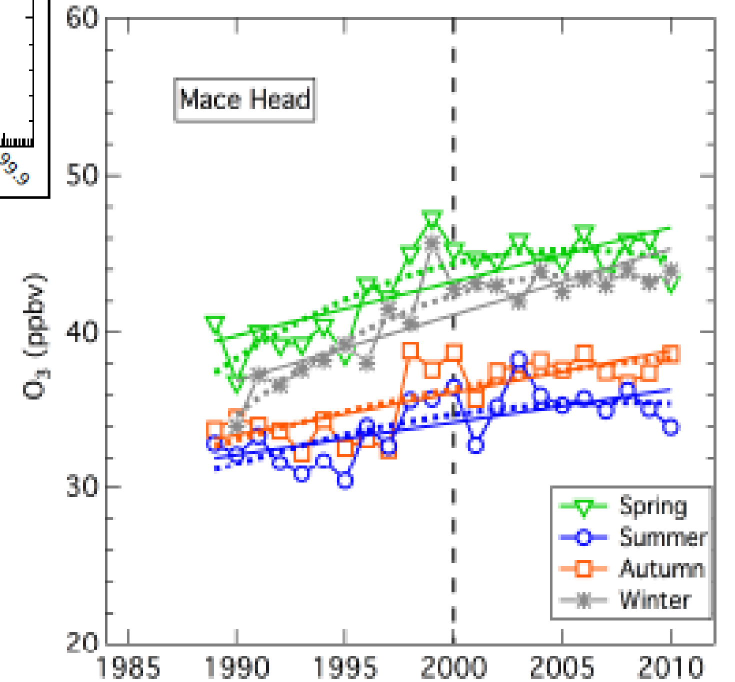


Less ozone peaks, background ozone increasing, no significant decrease in damage to vegetation

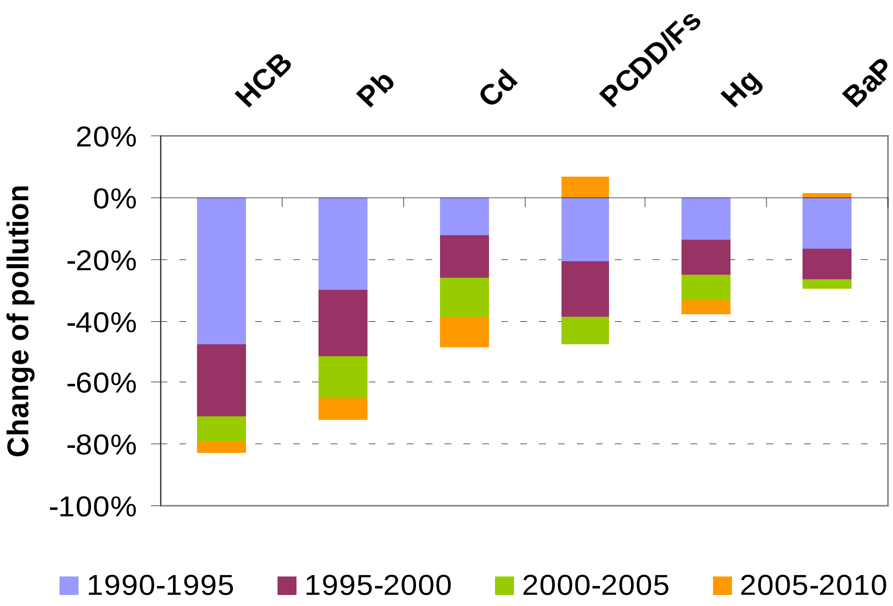


Changes in ozone concentration at EMEP sites between 1990-1999 and 2000-2009 per percentile (source Simpson et al 2014)

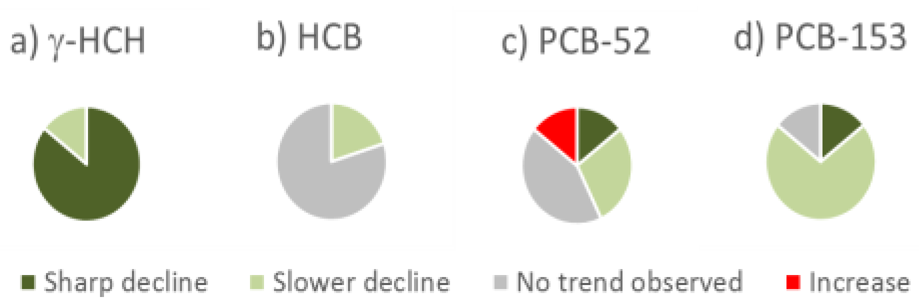
Background ozone trend (Source: Parish et al 2012)



Stagnating decline in heavy metal and POP concentrations

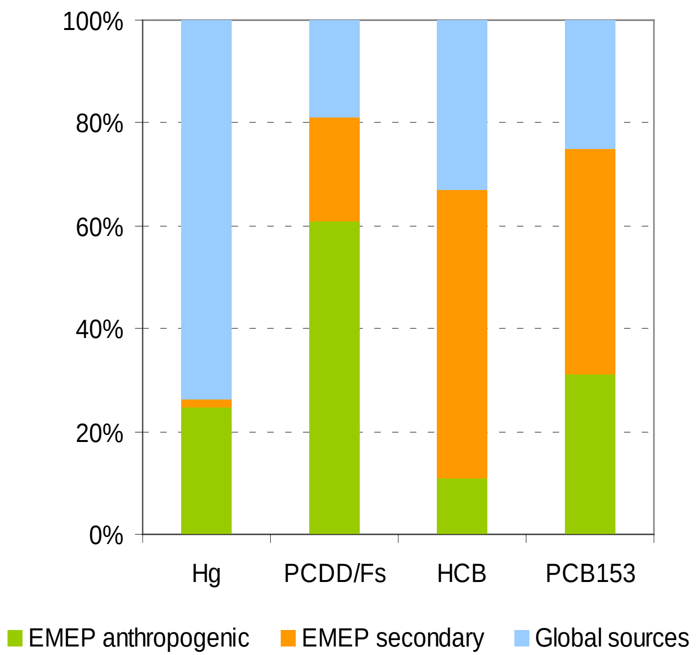


Relative reduction of HM and POP pollution levels over the period 1990-2010 in the EMEP region

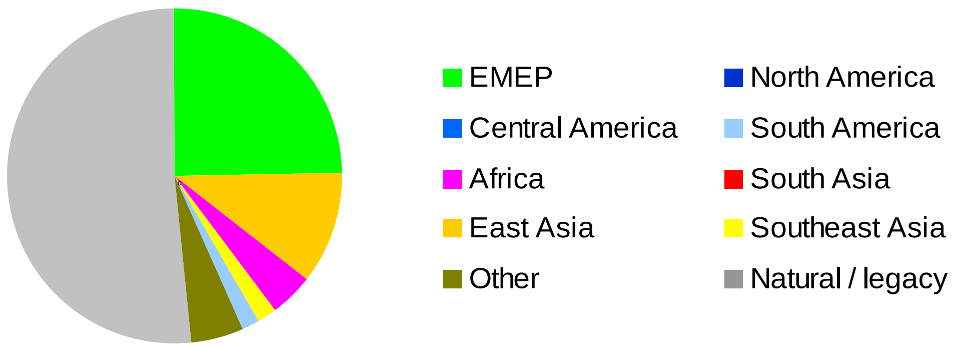


Long-term time trends in concentrations of selected POPs in air from selected EMEP sites

Mercury and some POPs are global problems

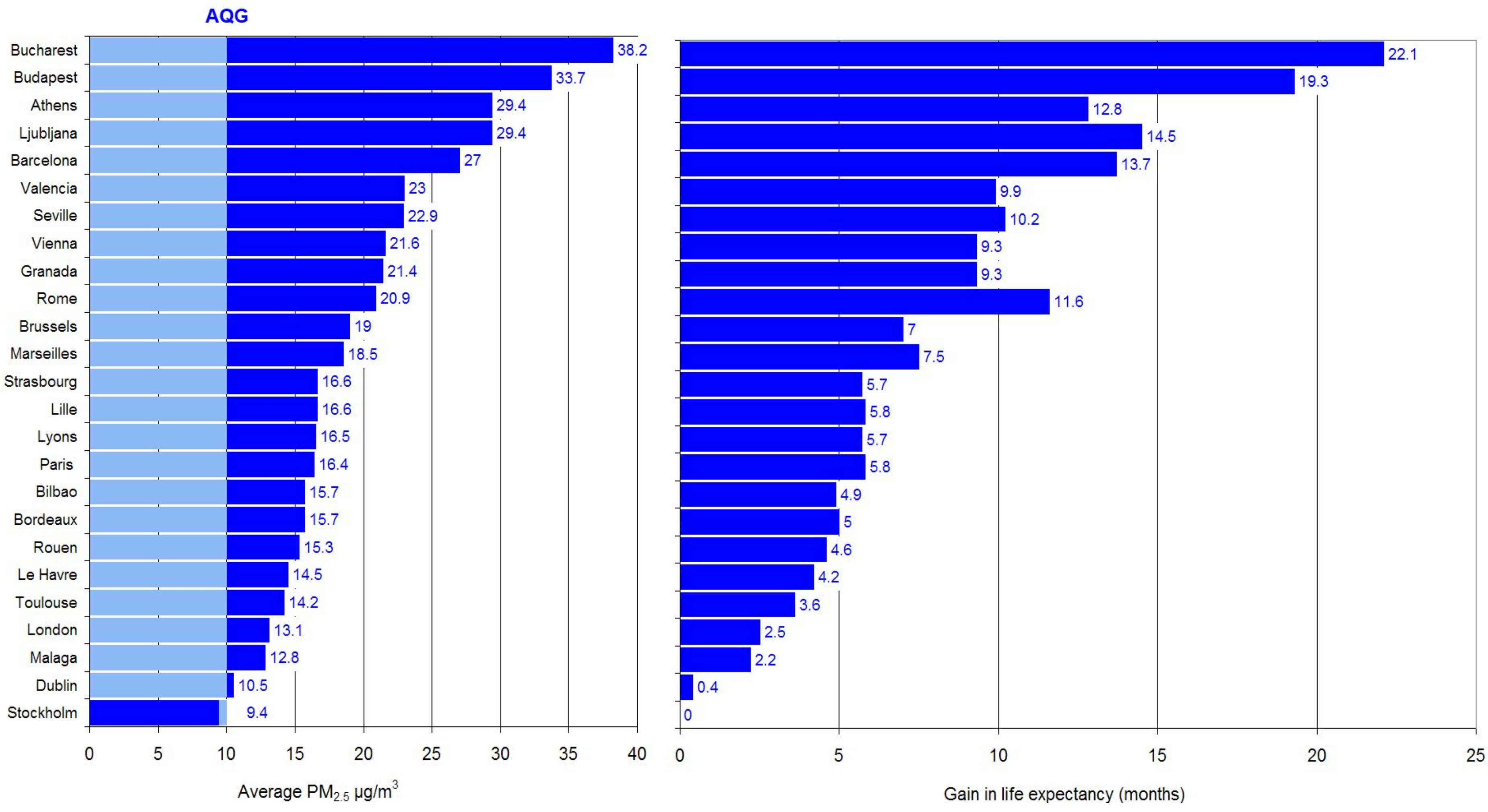


Relative contribution of different source types to contamination of the EMEP countries with Hg and some POPs.



Source attribution of average mercury deposition to the EMEP countries

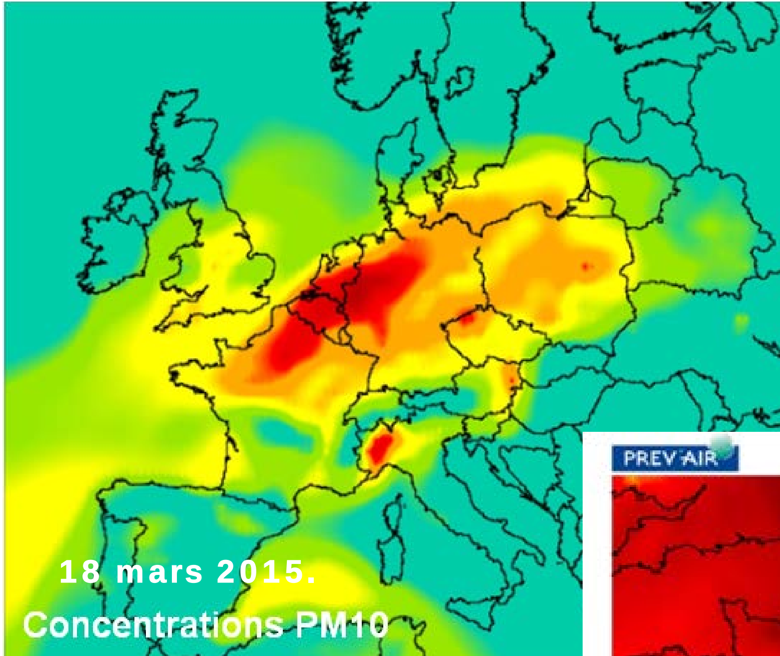
Are remaining PM-health challenges a local issue?

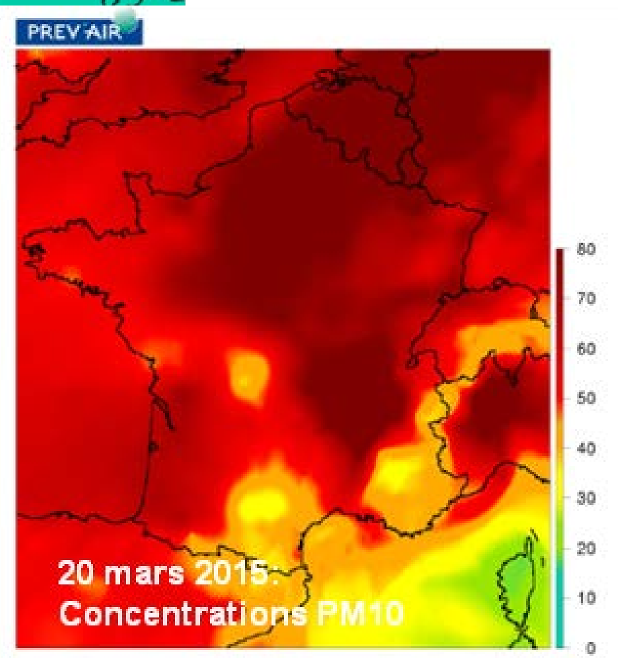


Aphekom/Medina 2012

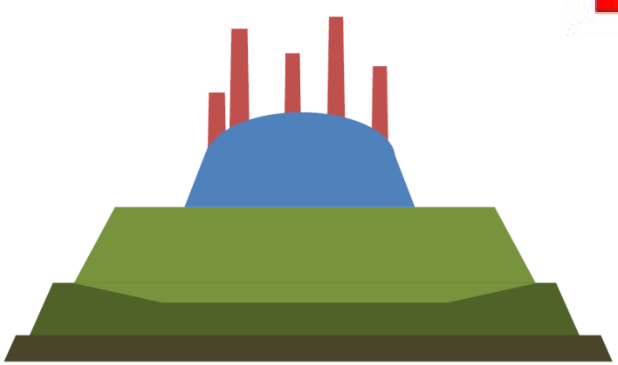
Paris - 18 March 2015

Air quality remains a transboundary issue





Cities cannot meet WHO-AQG values with local policies alone

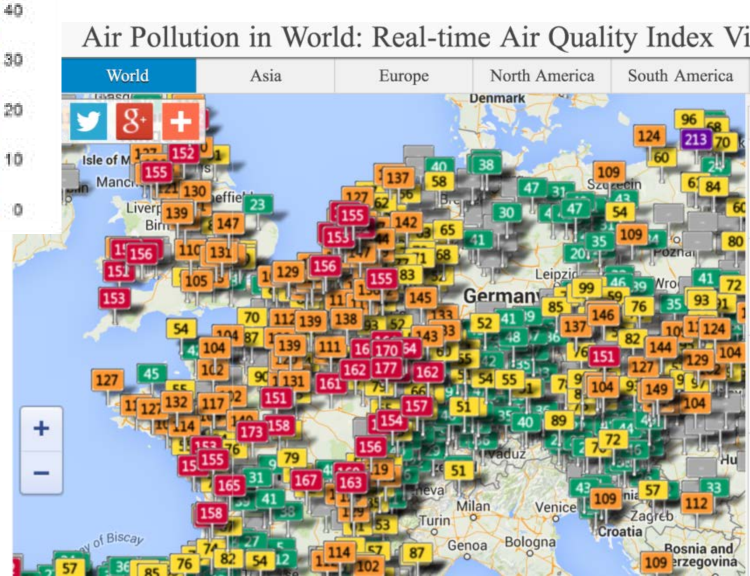


Street

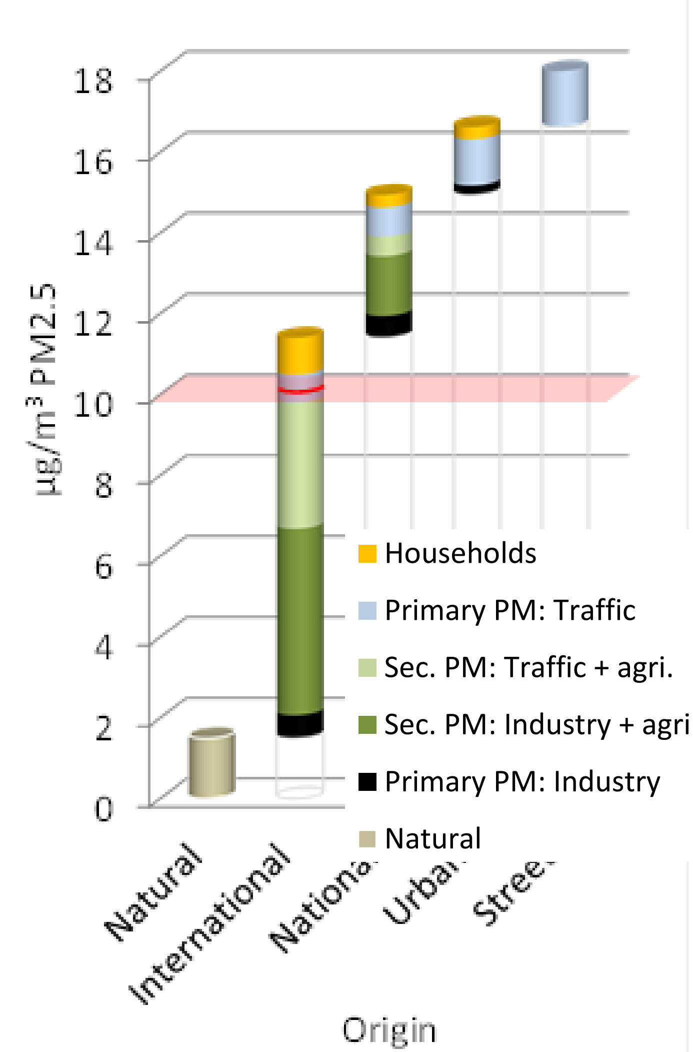
City

National

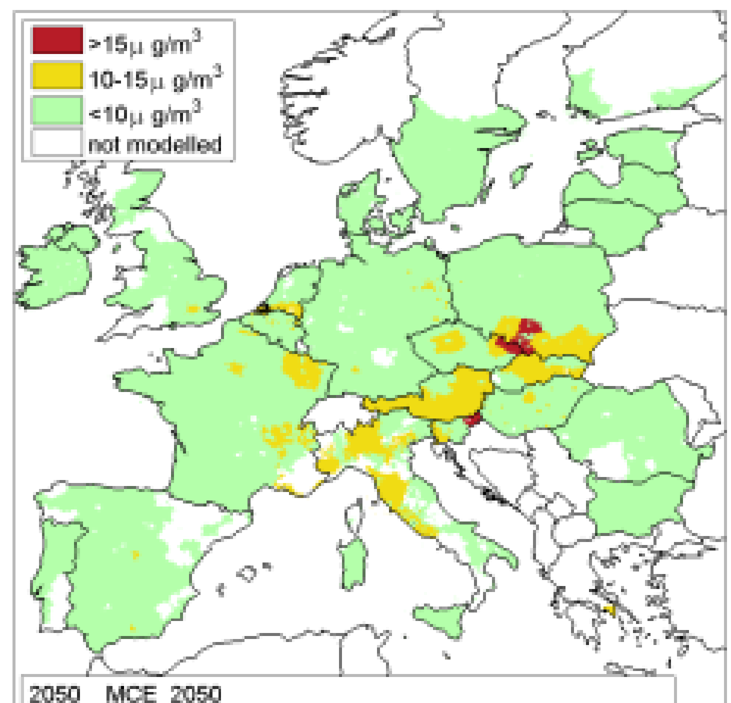
Transboundary
Natural



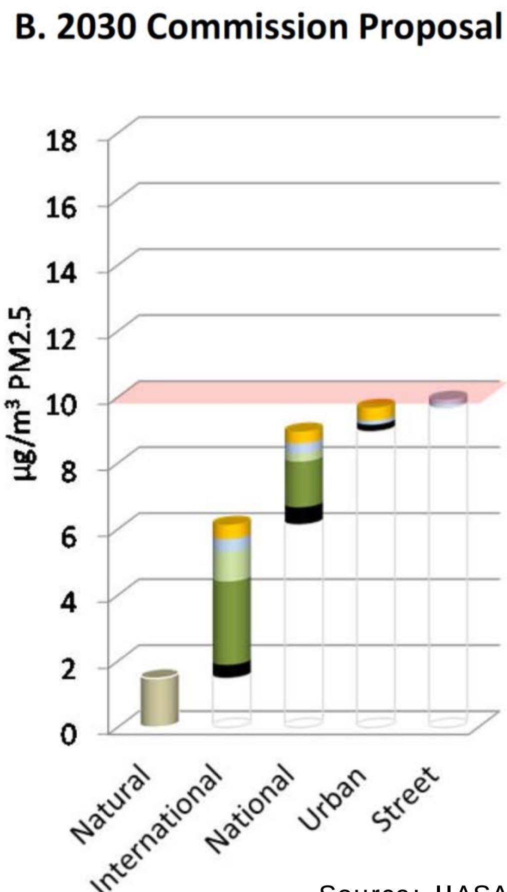
Transboundary co-operation remains important



- **Further European actions remain necessary to reduce background levels**
- **Ammonia emission reduction will contribute to reduced urban PM-exposure**
- **Combined with cost-effective local actions on traffic & wood burning WHO guideline values for PM would become feasible in most parts in Europe**



Around 2030 WHO-AQG-levels are feasible in most places



Source: IIASA

PROVIDED THAT:

EU

1. Euro-6 standards work in reality
2. Climate &Energy targets are met (COP21)
3. Emission-standards domestic wood burning
4. Ammonia reductions as in NL!

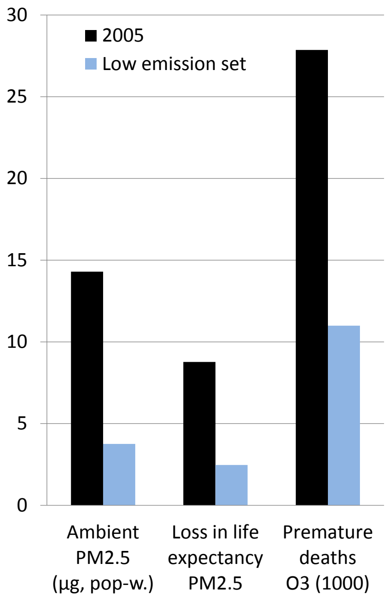
National policy

1. Control on maintenance of Euro-6 vehicles
2. Scrapping of old vehicles/motorcycles
3. Enforce agricultural emission regulation

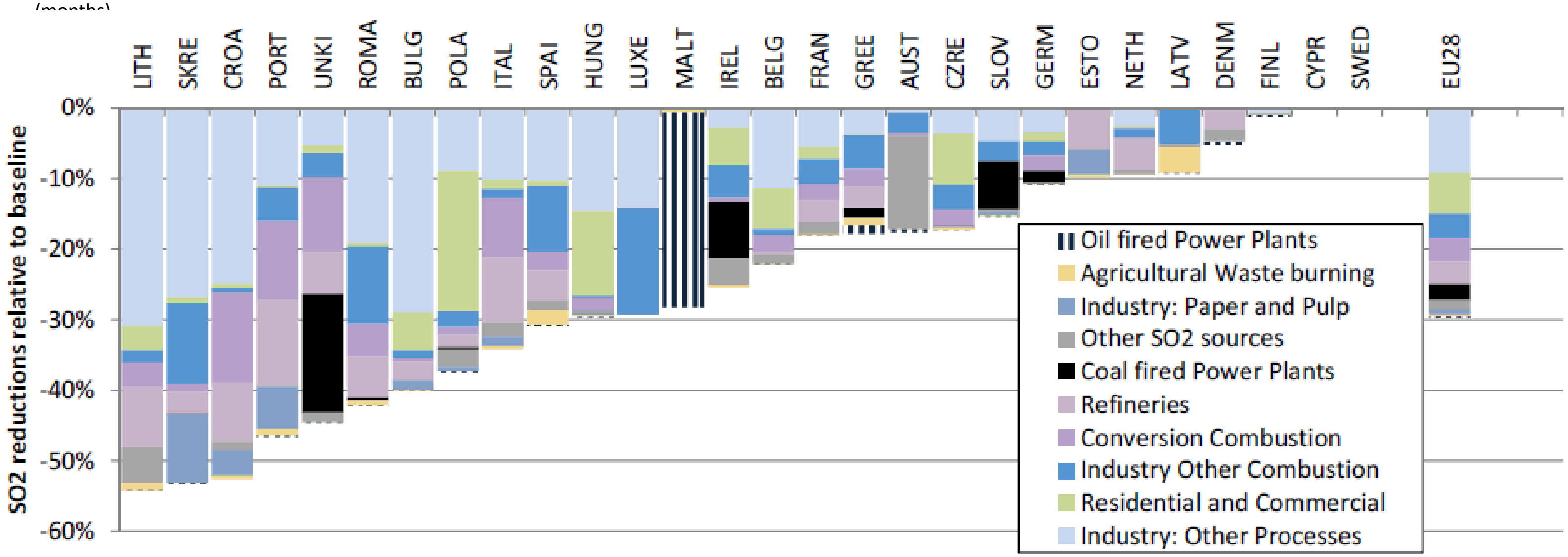
Local measures

1. Low emission zones; speed limits
2. Stimulate electric vehicles
3. Healthy city design – walking/cycling

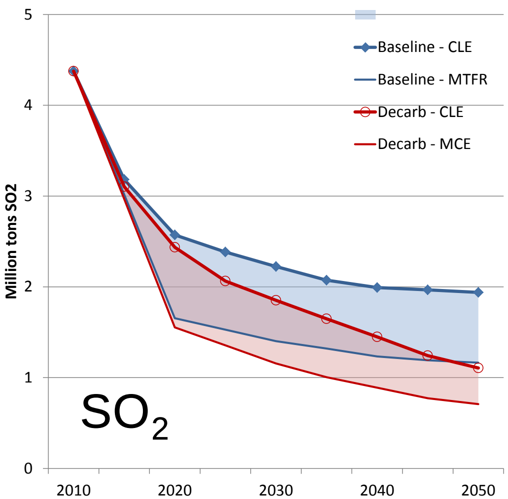
There are many remaining technological options to improve environmental quality)

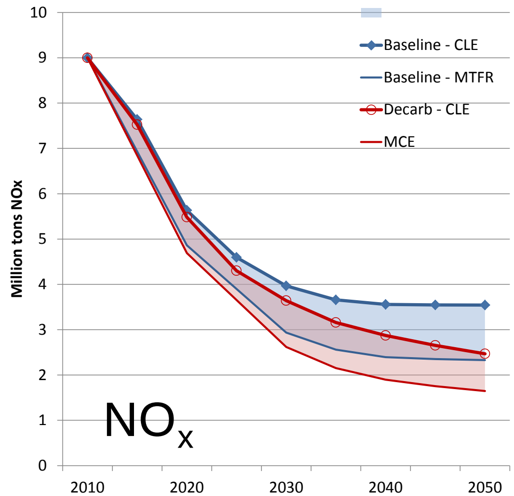


- Transboundary and local measures
- Co-benefits from climate policy
- Technology (and financial?) transfers
- HM/POP co-benefits from primary PM-reduction (and vice versa)



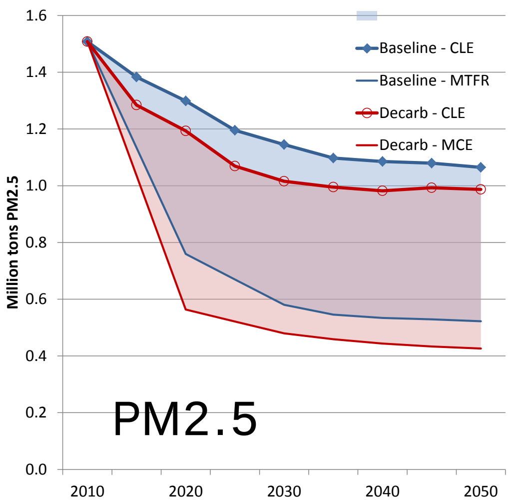
Climate policy and healthy diets would entail large co-benefits for air quality

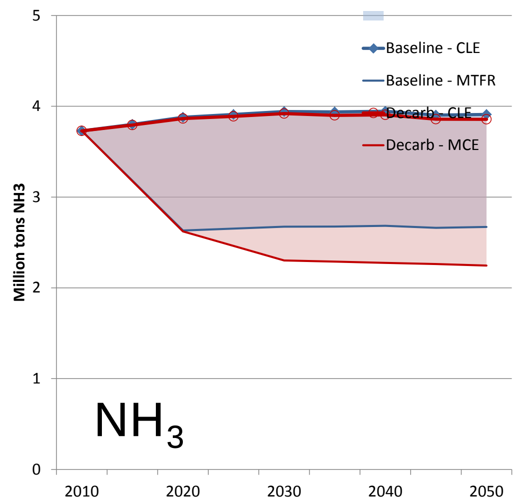


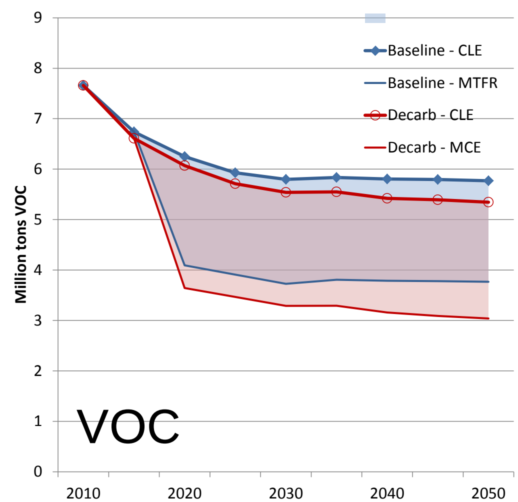


Further ~ 50% emission reductions from:

- decarbonisation (only SO_2 and NO_x)
- Healthy diets (NH_3)
- Further air pollution controls



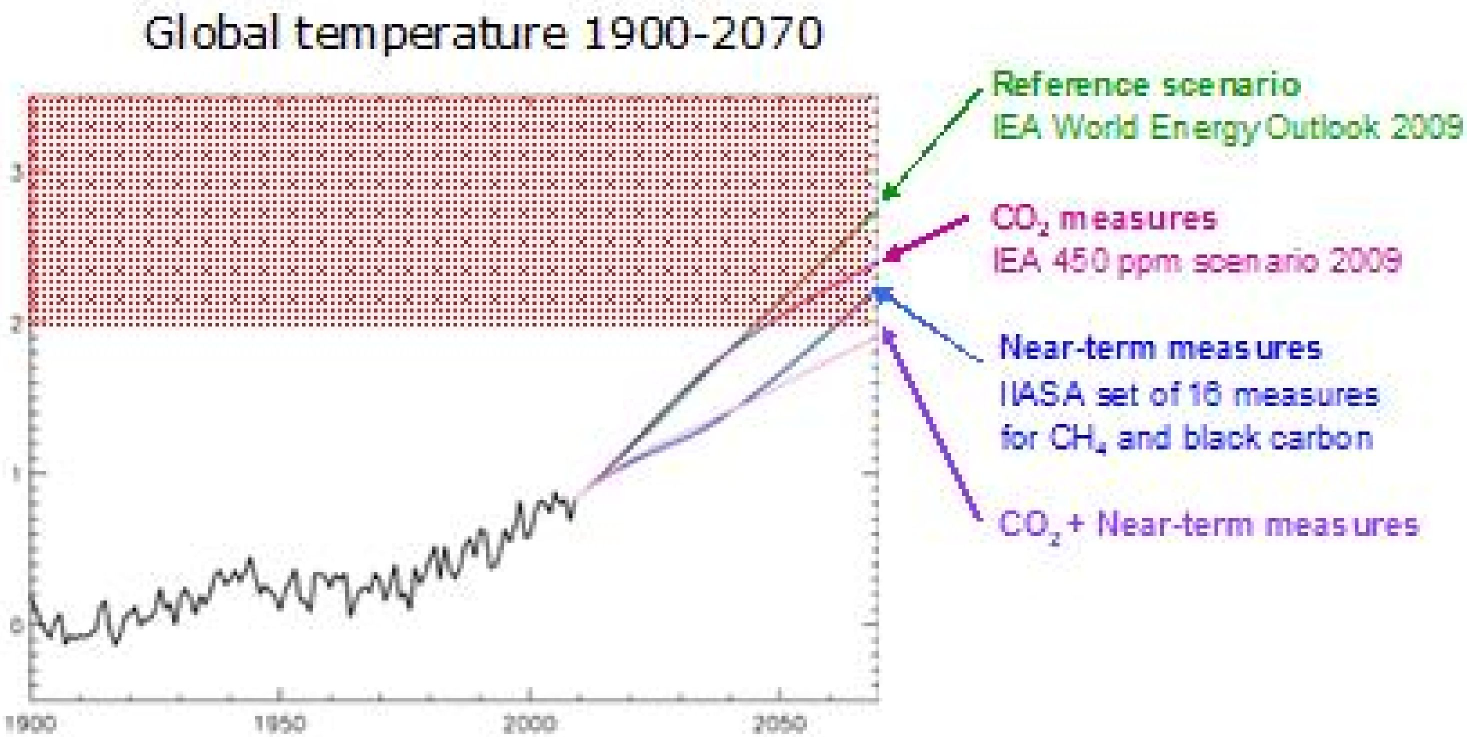




Blue: BAU baseline, Red: climate policy + healthy diet scenario

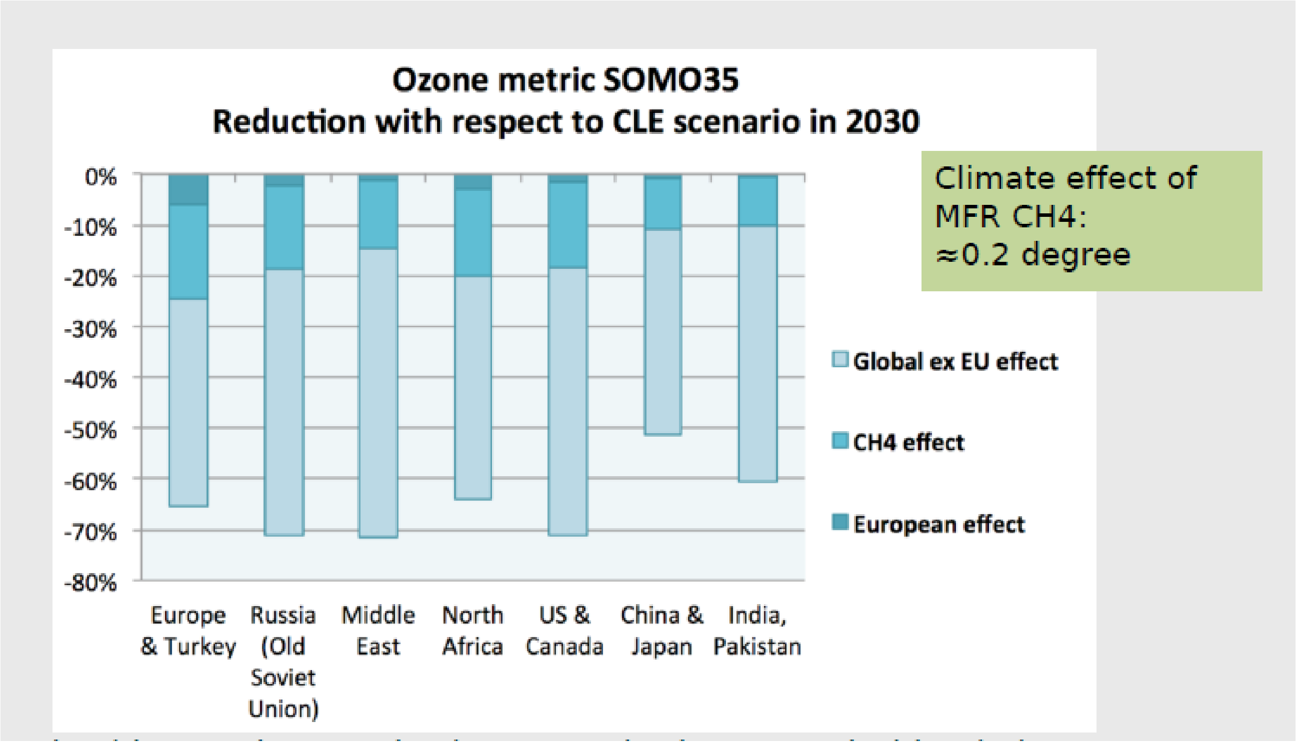
Air pollution measures could reduce the rate of temperature increase

Together with aggressive CO_2 strategies, they increase chances to stay below the 2° target

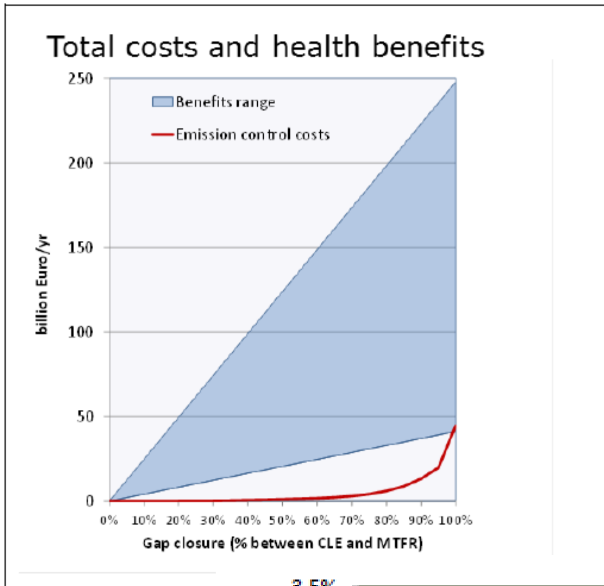


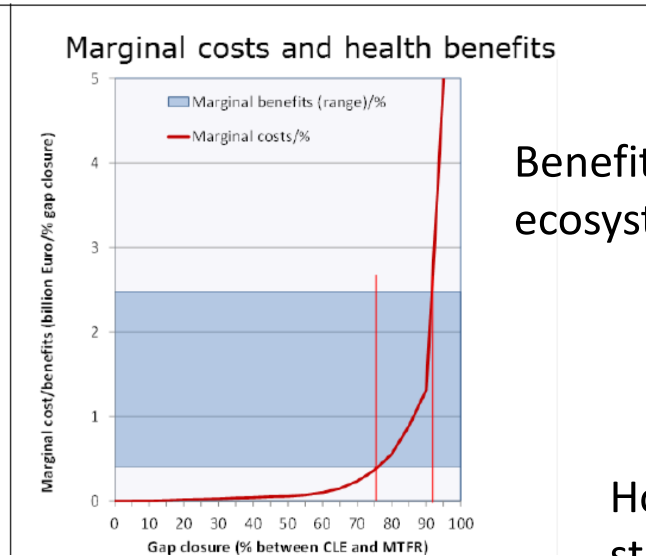
Source: UNEP Black Carbon Assessment, forthcoming 2011

Hemispheric cooperation indispensable to reduce ozone damage to health and vegetation



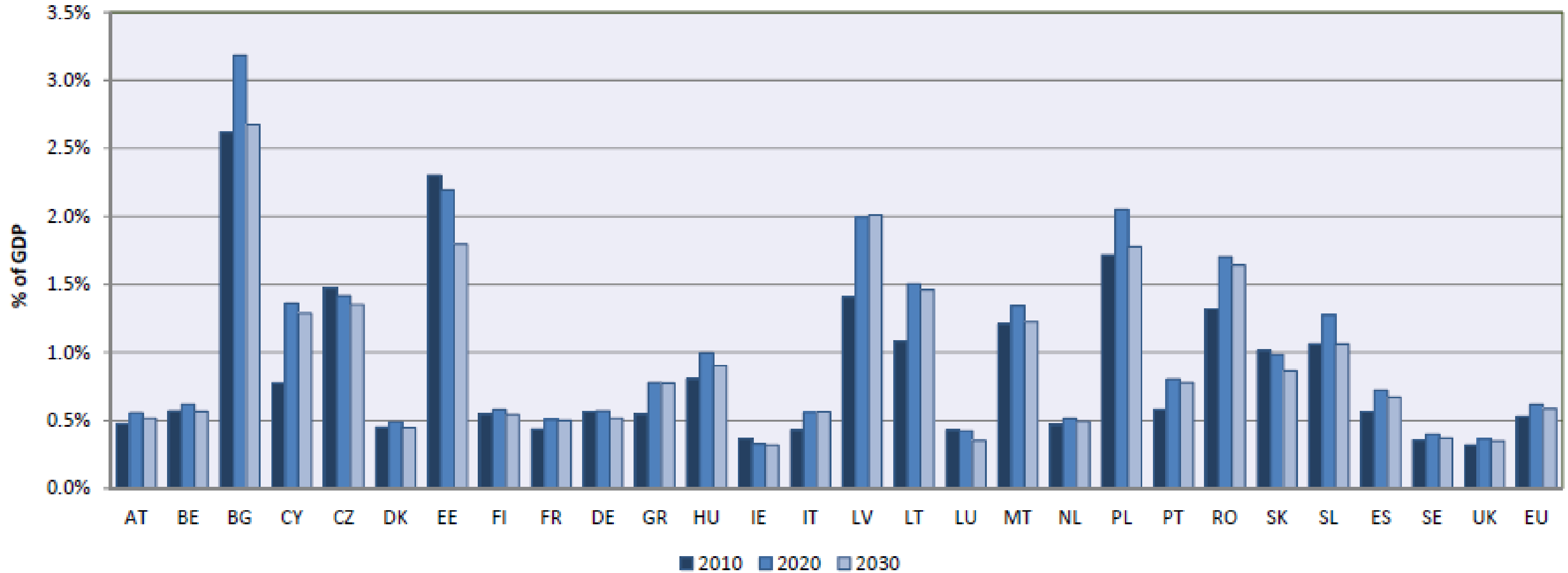
Cost-effective options are available and will not harm the economy





Benefits for crops, materials and ecosystem services not included

How to create win-win solutions to stimulate ratification?



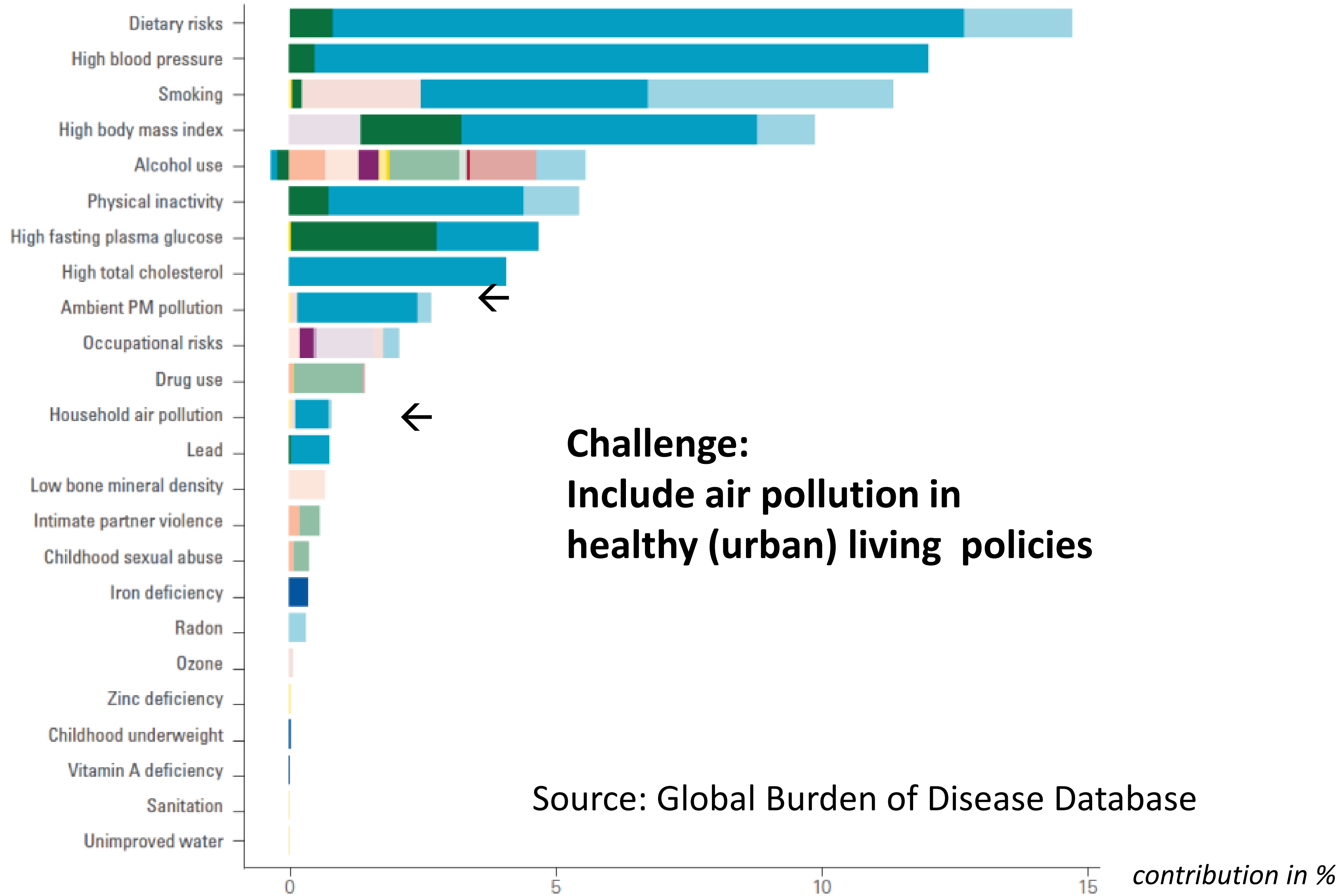
Are we sure?

- **NO2:** do we under/overestimate direct NO2 impacts; how to avoid double counting of NO2 and PM2.5 (or BC) impacts?
- **Ozone:** do we significantly underestimate health damage when we don't include long term exposure to low concentrations?
- **BC:** do we underestimate health impacts if we assume that BC has the same risk factor as other PM2.5 species?
- **NH3**: Here is a potential 'regret' recommendation if we are not sure that ammonium-nitrate and ammonium-sulfate won't follow the 'sea-salt' example
- **Healthy cities**: Where would you put your money if you are responsible for health in your city: focus on air quality or on getting more exercise, on healthy diets, smoking bans, ...

→ Research agenda

Coherent health policy - more efficient and good for the environment

Loss of disability adjusted life years by risk factor, EU & EFTA, 2010



Challenge:
Include air pollution in healthy (urban) living policies

Source: Global Burden of Disease Database

Keeping the infrastructure is vital

POLICYFORUM

ATMOSPHERIC SCIENCE

From Acid Rain to Climate Change

Updated air pollution science and policies address human health, ecosystem effects, and climate change in Europe.

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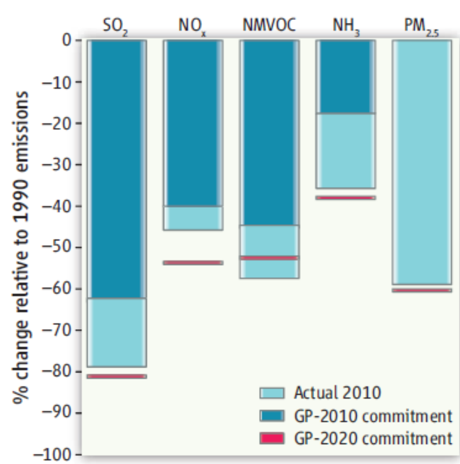
The Convention on Long-Range Transboundary Air Pollution (CLRTAP) under the United Nations Economic Commission for Europe (UNECE) was established in 1979 to control damage to ecosystems and cultural heritage from acid rain, initially in Europe (*1*). Extended by eight protocols, most recently the Gothenburg Protocol (GP) signed in 1999, it has been key for developing cross-border air pollution control strategies over the UNECE region, which includes the United States and Canada. We describe how recent amendments to the GP reflect improved scientific knowledge on pollution, environmental relations, and links between regional air pollution and global climate change.

Policy Lessons from CLRTAP

Substantial emissions reductions have been achieved under CLRTAP (see the chart). Air quality has improved, and deposition of acidifying (fig. S1) and eutrophying (fig. S2) compounds in excess of critical loads (*2*, *3*) has been widely reduced. The largest reductions can be seen for sulfur dioxide: Since 1990, several European countries have reduced emissions by close to 80%. Sulfur deposi-

science and end with further requests to scientists. Scientists are present in negotiation meetings, and policy-makers participate in scientific meetings and thus can make sure that the science remains focused on the needs of the policy process.

Science played a major role in establishing CLRTAP, substantiated through the European Monitoring and Evaluation Programme (EMEP) and the Working Group on Effects (WGE). In the early stages, the main



environmental objectives were used to calculate an economically efficient distribution of effort between countries. The science-policy dialogue became intense in the 1990s, in particular through the Task Force on Integrated Assessment Modelling (TFIAM) and the Working Group on Strategies and Review (WGSR). It was the science that convinced policy-makers that a focus on individual pollutants was leading to suboptimal solutions and that a multipollutant, multieffect approach would be more cost-effective.

The GP, which entered into force in 2005, marked a new approach, scientifically supported and economically justified. Compared with previous international commitments on improving air quality, which contained flat rate reductions for separate pollutants, this effects-based approach identified an optimal allocation of targets among countries to reduce several damaging pollutants simultaneously, leading to considerably lower costs. Each country agreed on emission ceilings to be met for the key pollutants, while retaining some flexibility in how these were to be attained (*5*). The GP, with its target year 2010, has formed the basis for both international (e.g., European Union) and national policies