

Air pollution – some historical remarks and future challenges

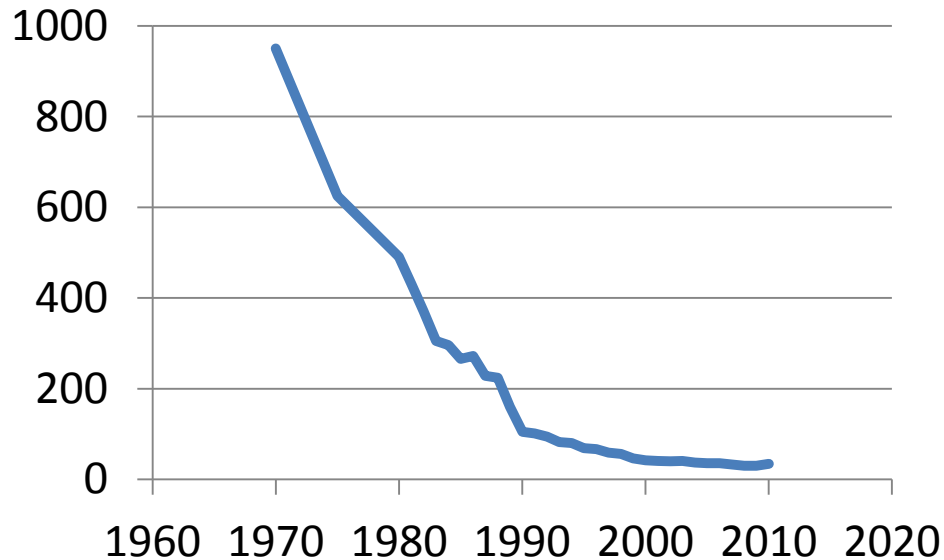
Peringe Grennfelt

IVL Swedish Environmental Research
Institute

San Francisco, 7 May 2013

Successful air pollution policies

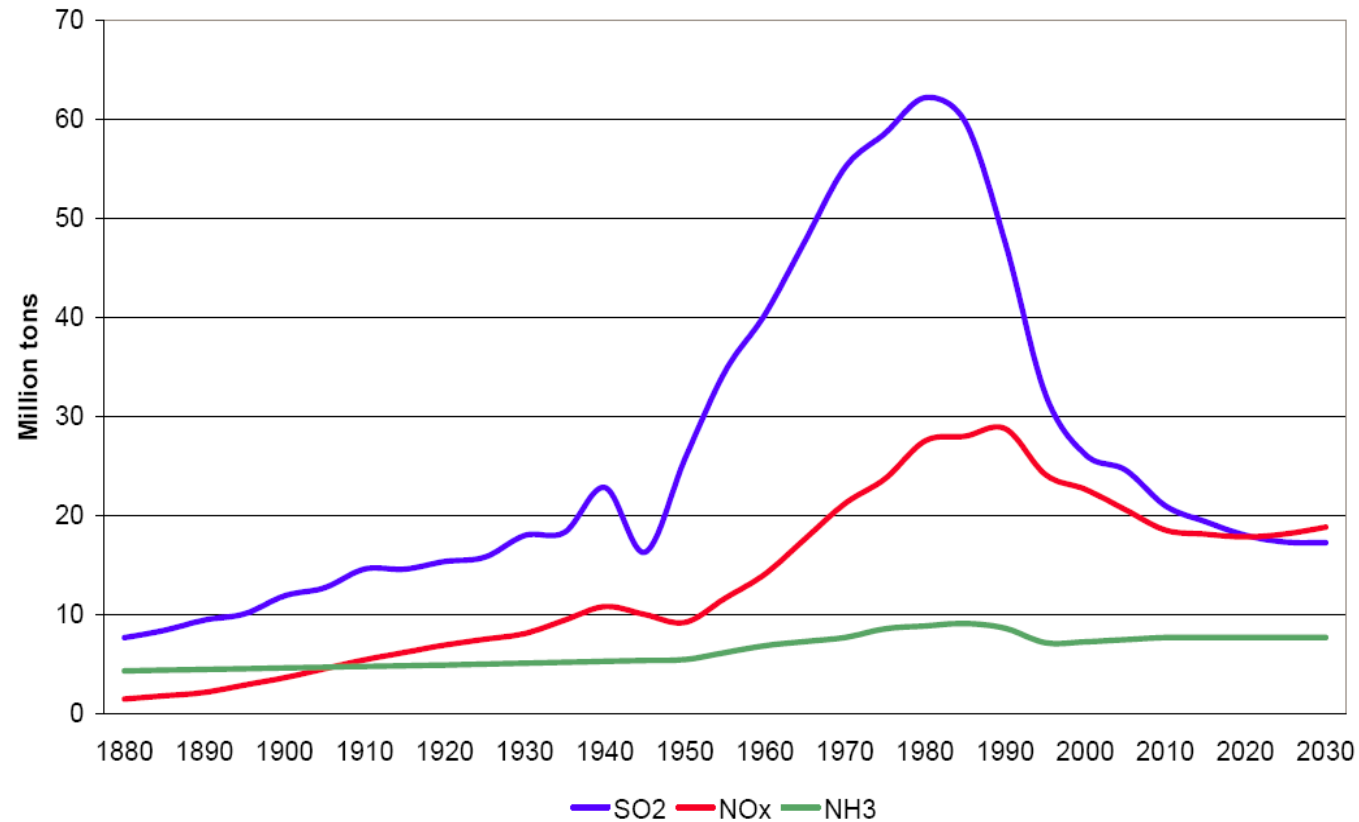
Swedish emissions reduced by 97% since 1970



Causes of Swedish Emission reductions :

- 1970-85: Shift in oil, reinvestments in the industry, nuclear power
- 1985 and onwards energy savings, replacing fossil fuels with renewables

Emissions in Europe 1880 - 2030



Source: IIASA

CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION



UNITED NATIONS ECONOMIC
COMMISSION FOR EUROPE

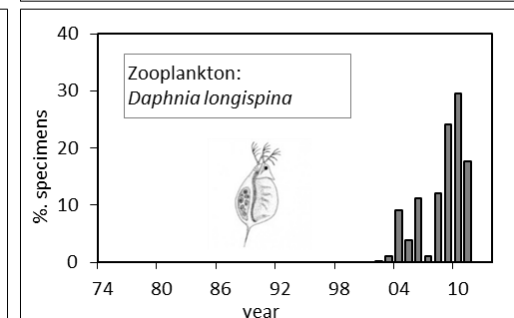
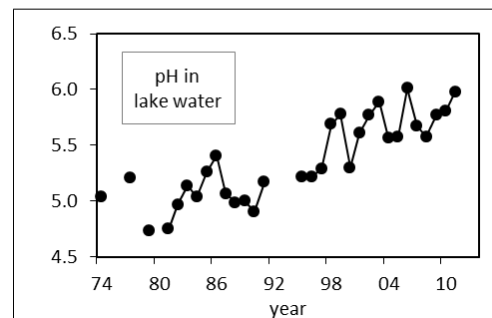
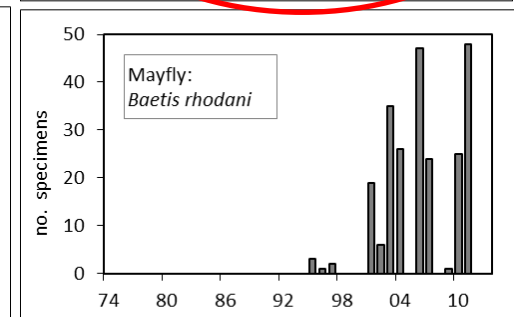
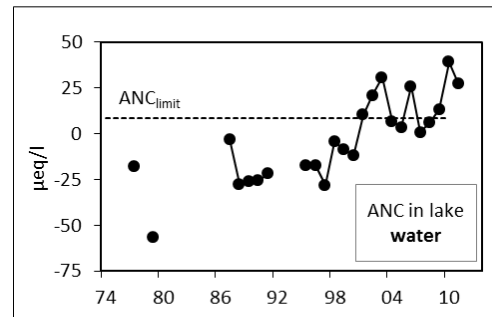
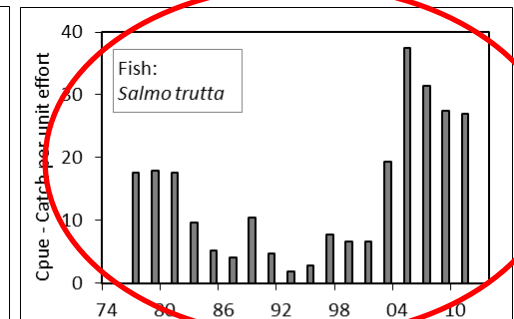
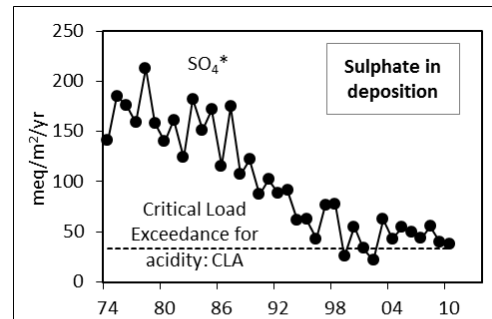


- Signed 1979, in force 1983
- 51 Parties
- 8 Protocols
- Covers SO₂ , NO_x, VOC, NH₃, PM , HMs, POPs
- Effect based agreements
- Close interaction between science and policy

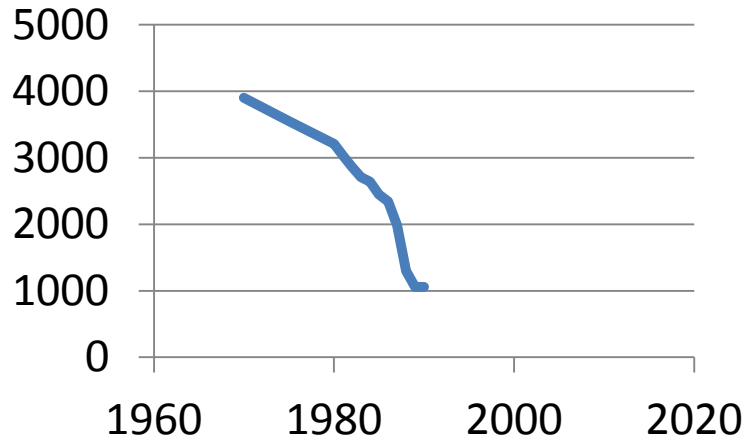


Emission reductions have resulted in ecosystem improvements

Emission control has resulted in substantial improvements in ecosystems, e.g. in the return of salmon in Norwegian rivers.



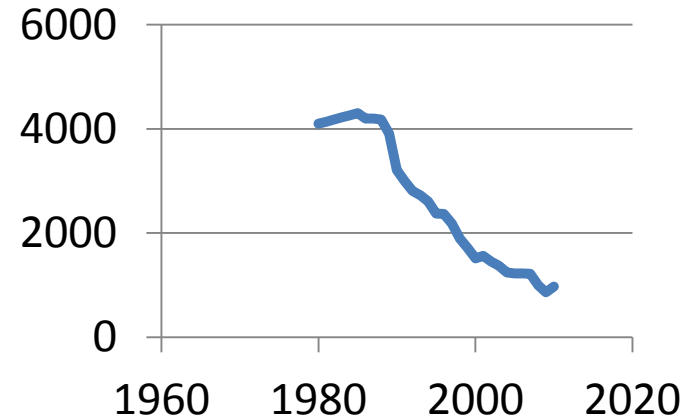
Germany



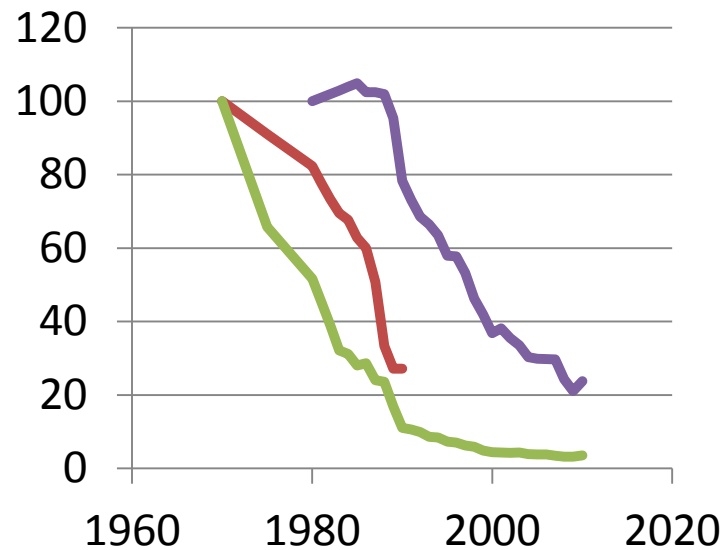
In West Germany the acid rain alarms came around 1980 and most of the control measures were flue gas desulphurization.

Annual emissions were reduced by more than 2 million tonnes between 1980 and 1990.

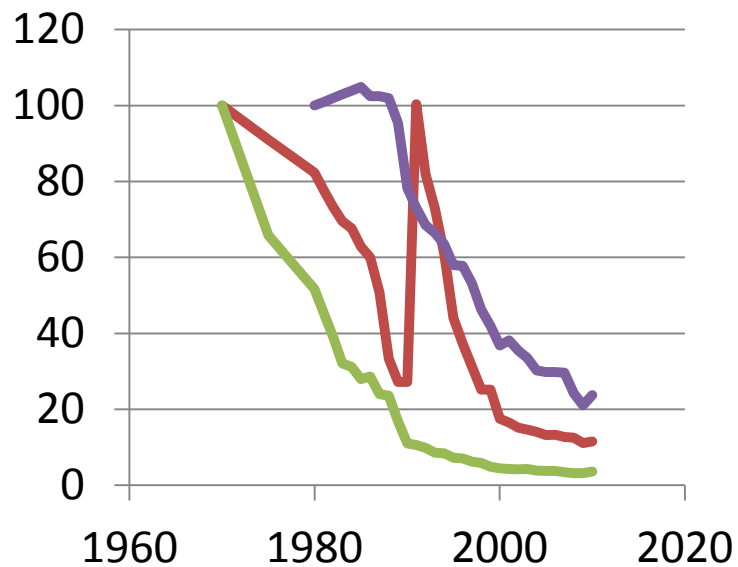
Poland



In Poland emission reductions did not start until 1990 and they were largely associated with shut downs of the Polish heavy industry and later with FGD.

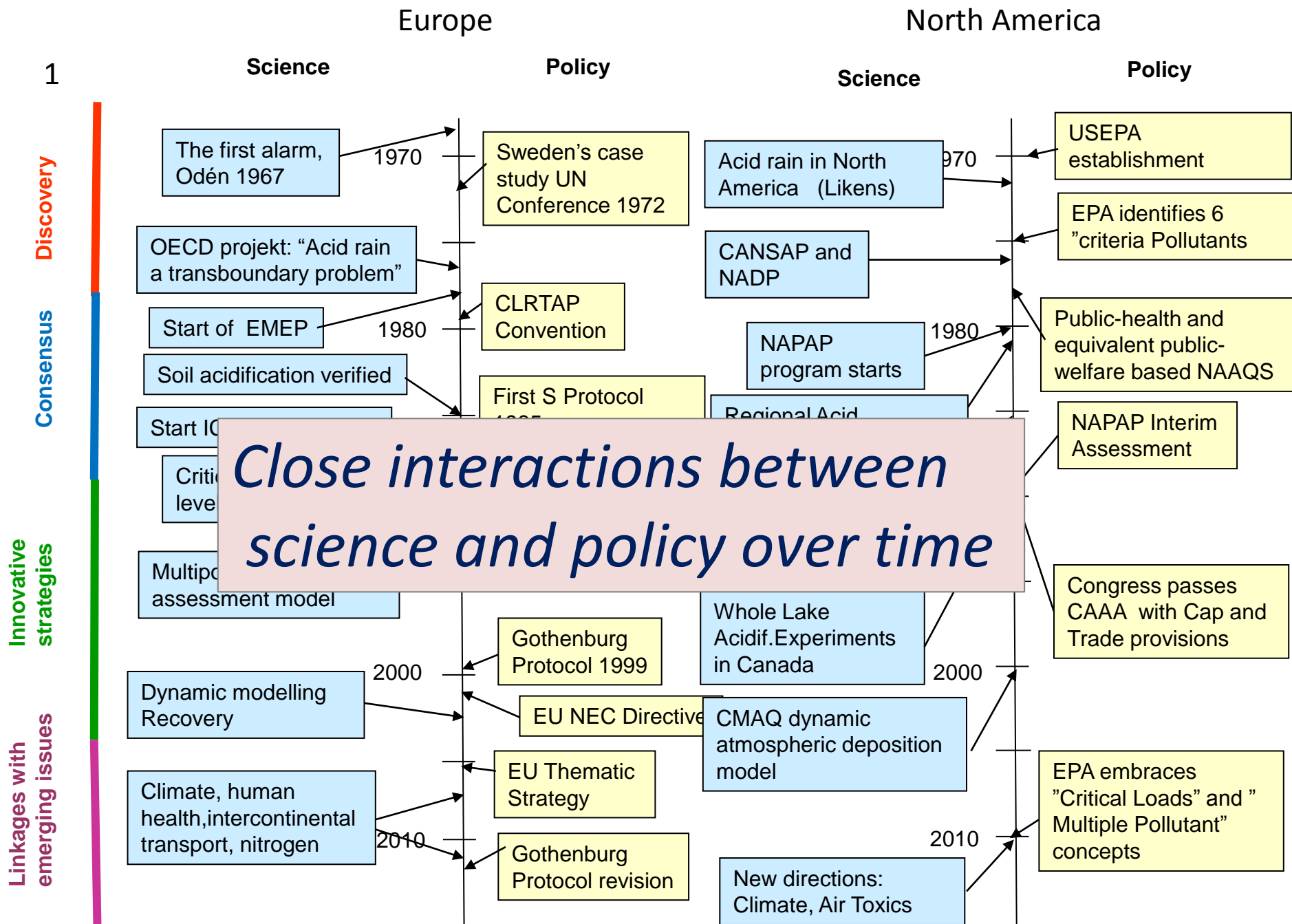


Emission trends 1970-2010 for SO_2 in some European countries



Conclusions

- Early awareness and actions from Sweden were of benefit
- Sweden together with other countries could through research and policy actions set the agenda for the AP strategies and measures in Europe.
- Research proved the continental dimension of the problem and made it possible for Sweden and other Nordic countries to take initiatives in the international CLRTAP negotiations:
 - Critical Loads,
 - Gap Closure and the
 - Multipollutant/multieffect approach



Today – the European Union has taken over much of the AP and CC policy development

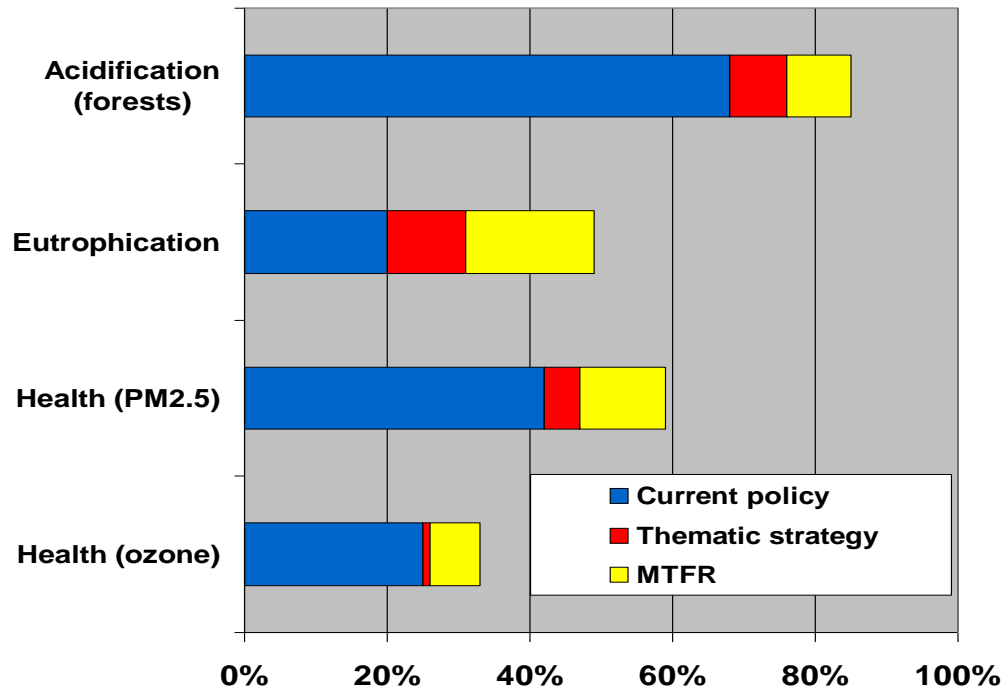
- After 2000 the European Union has become a much stronger actor in European environmental legislation
 - The new Constitution and Lisbon Treaty
 - The expansion of the Union
- Results:
 - Options for being first are reduced
 - Regulations may include all countries



Coordinated air pollution and climate strategies in Europe?

- EU attempt in 2007 for a combined CC and AP strategy failed
- Instead EU went away with a climate strategy without considering possible co-benefits with air pollution.
- Calculations showed that the climate strategy by 2020 will result in decreased emissions to a value of 20 bn € per year.
- Present air pollution strategies are taking into account the EU Climate change strategies but not the opposite.

The European union is not meeting EU 2020 targets on protection of health and ecosystems



gap-closure from 2000 - 2020.
Source: IIASA

Future air pollution improvements need new technologies and behavioral changes

Future air pollution improvements need new technologies and behavioral changes

SLCP – an option for slowing down global warming?



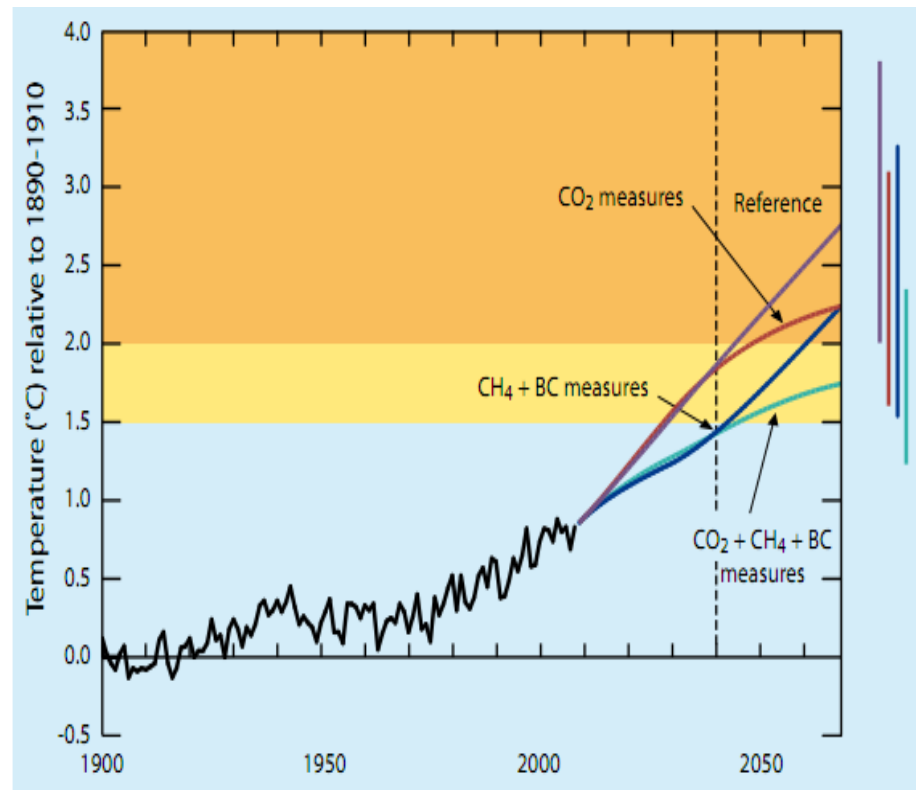
The idea behind SLCP policies

- A fast reduction in emissions of black carbon and methane may give substantial climate benefits over the next 20-40 years

SLCP policies can't replace CO2 measures!!!

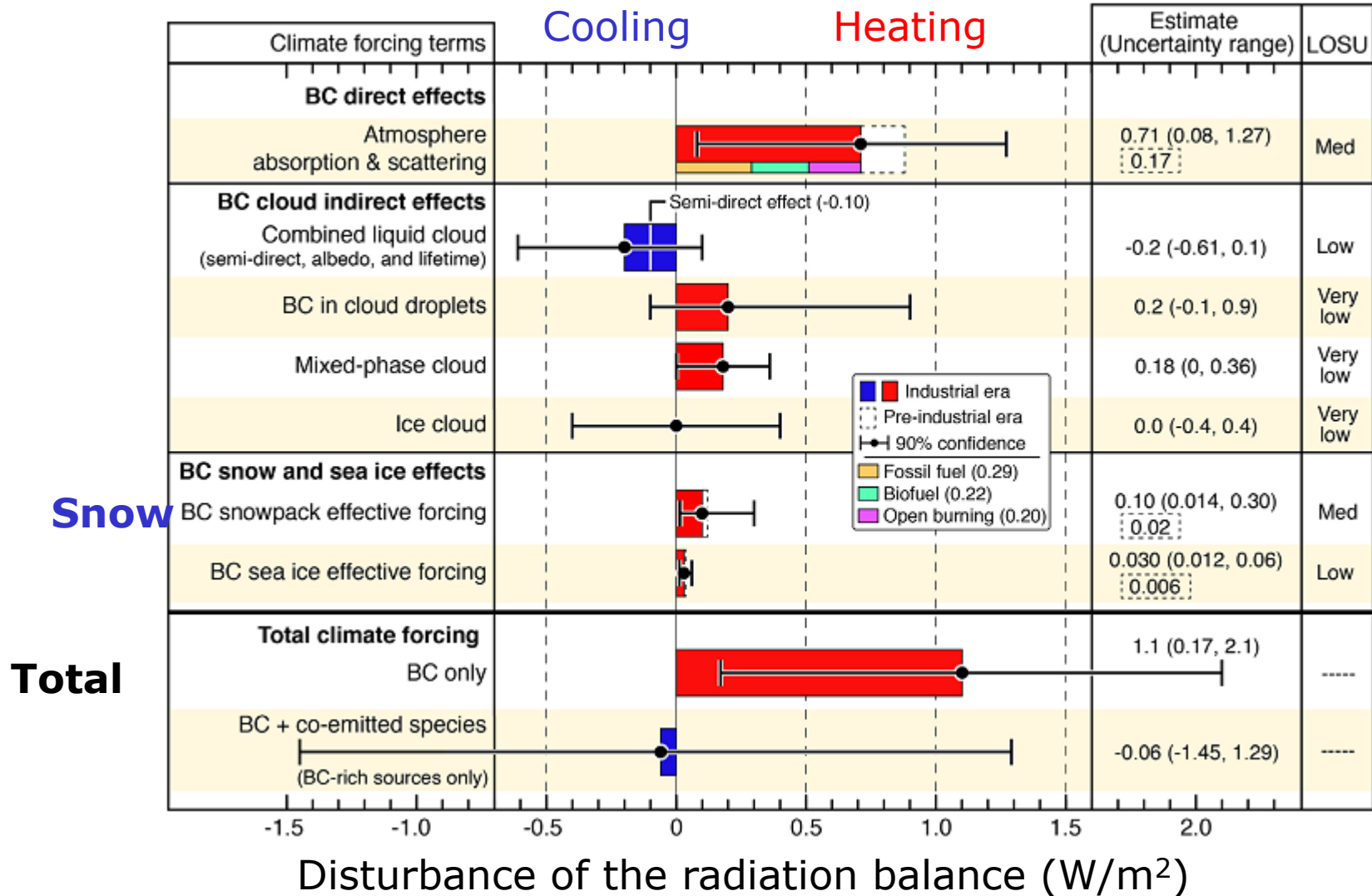
**UNEP-BC/O3 Report & Science Paper
Shindell et al, 2012**

0.5°C Reduction by 2050 BC+Methane+Ozone



Influence on climate from soot – Bond mfl JGR 2013

Global climate forcing of black carbon and co-emitted species in the industrial era (1750 - 2005)



Upcoming workshop on air pollution strategies

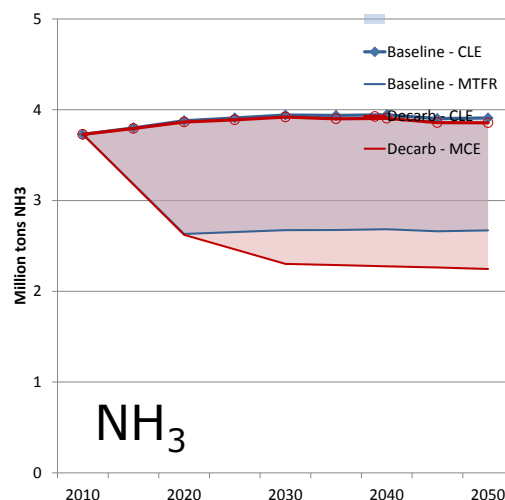
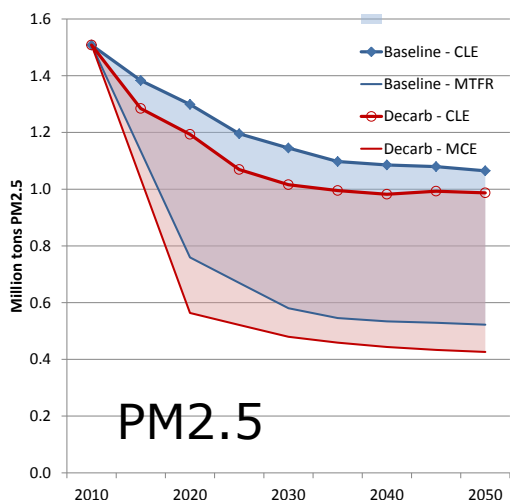
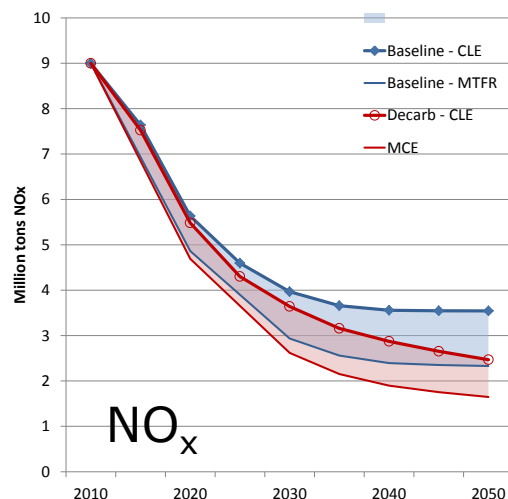
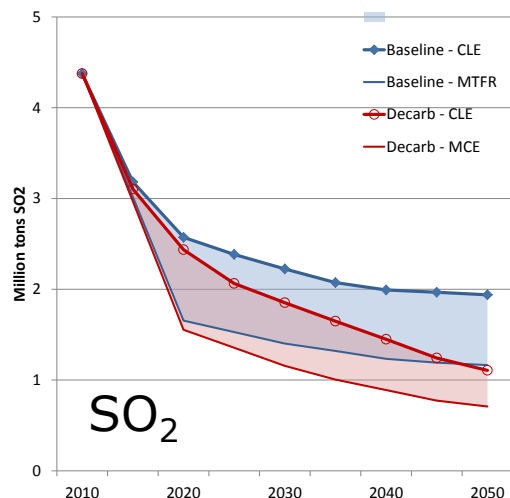
- There is a need for further development of coordinated policies on air pollution and climate change.
- One step in order to further outline options and possibilities are now taken by the Swedish EPA and IVL in organizing an international workshop 24-26 June.
 - Coordinated AP and CC policies incl. SLCP
 - Global governance in air pollution control
 - Effects-based control strategies
 - Nitrogen
 - <http://www.saltsjobaden5.ivl.se/>

Thank you



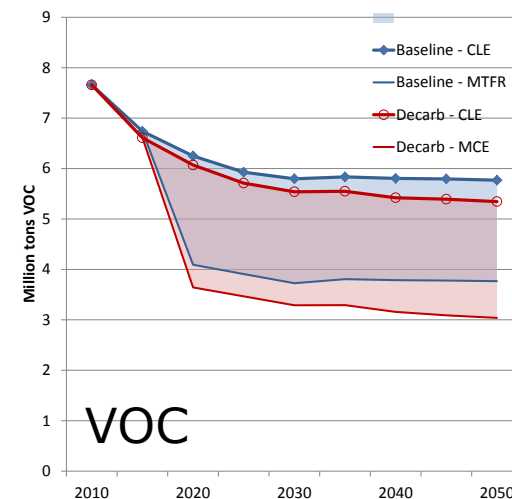
Outlook to 2050

Amann et al. 2013



Further emission reductions only from:

- decarbonisation (only SO₂ and NO_x),
- further air pollution controls (could cut emissions by ~half).



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

Utlevererad volym av oljeprodukter och förnybara drivmedel

