Climate change and air quality mitigations: why should we do it together

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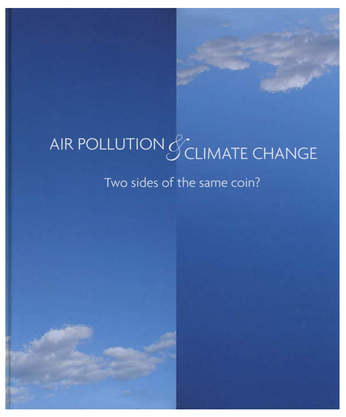
A long-known issue

Swedish Environmental Agency (2009)

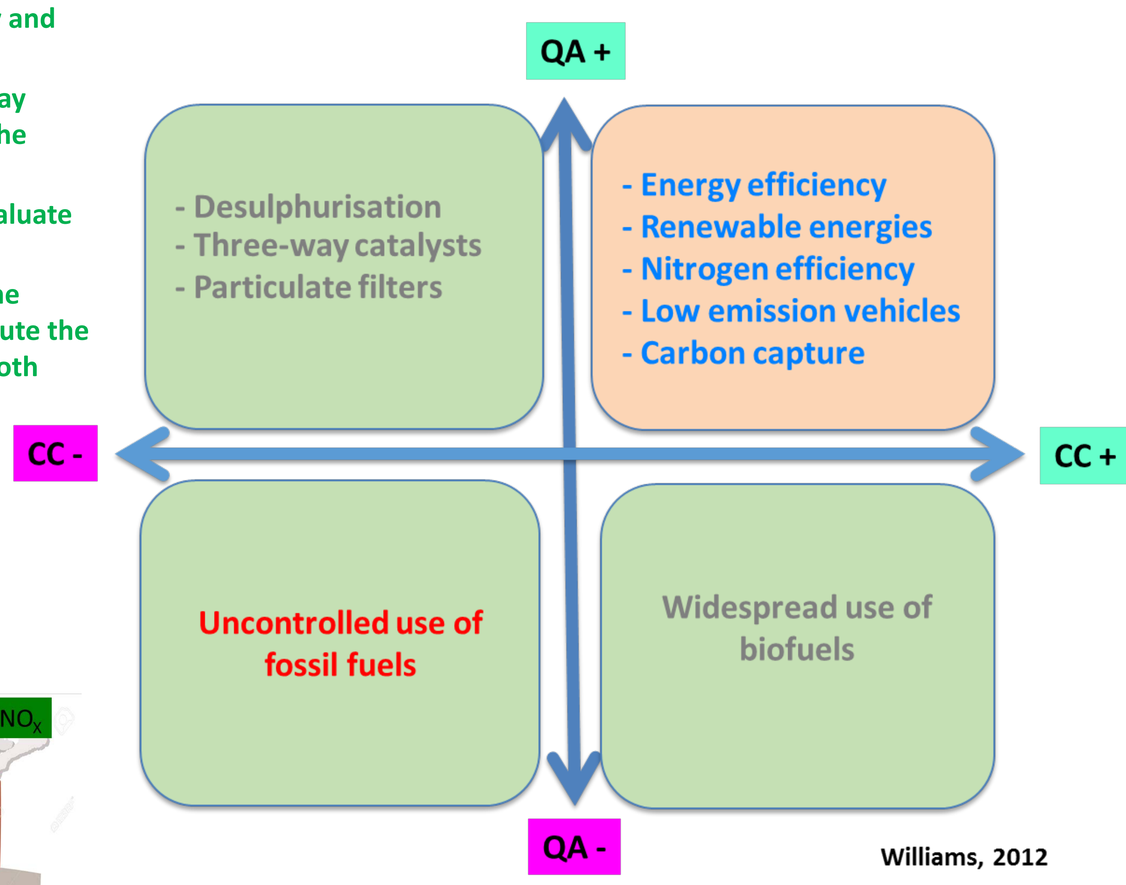


All anthropogenic activities (energy production, transportation, industry, agriculture, waste management) are responsible for the emission of gaseous and particulate pollutants that modify atmospheric composition

The same source injects into the atmosphere both climate forcers and pollutants that are detrimental for human health and the ecosystems

- **Many emission reduction policies provide the opportunity of simultaneously improve air quality and mitigate global warming (*win-win policy options*)**
- **There are however also mitigation options that may provide benefits to one aspect, while worsening the situation in the other (*win-lose policy options*)**
- **An integrated approach is therefore needed to evaluate the air quality-climate policies**
- **Integrated policy options that take into account the feedbacks between air quality and climate constitute the best environmental policy strategies in terms of both social and economic costs**

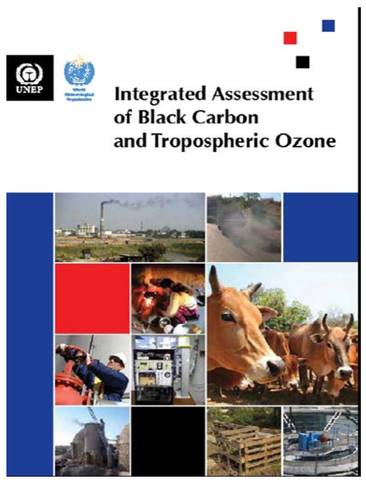
Win-win or win-lose policies?



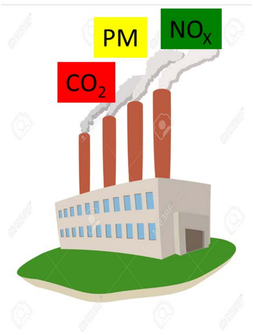
Williams, 2012

AQ – impact on air quality
CC – impact on climate change

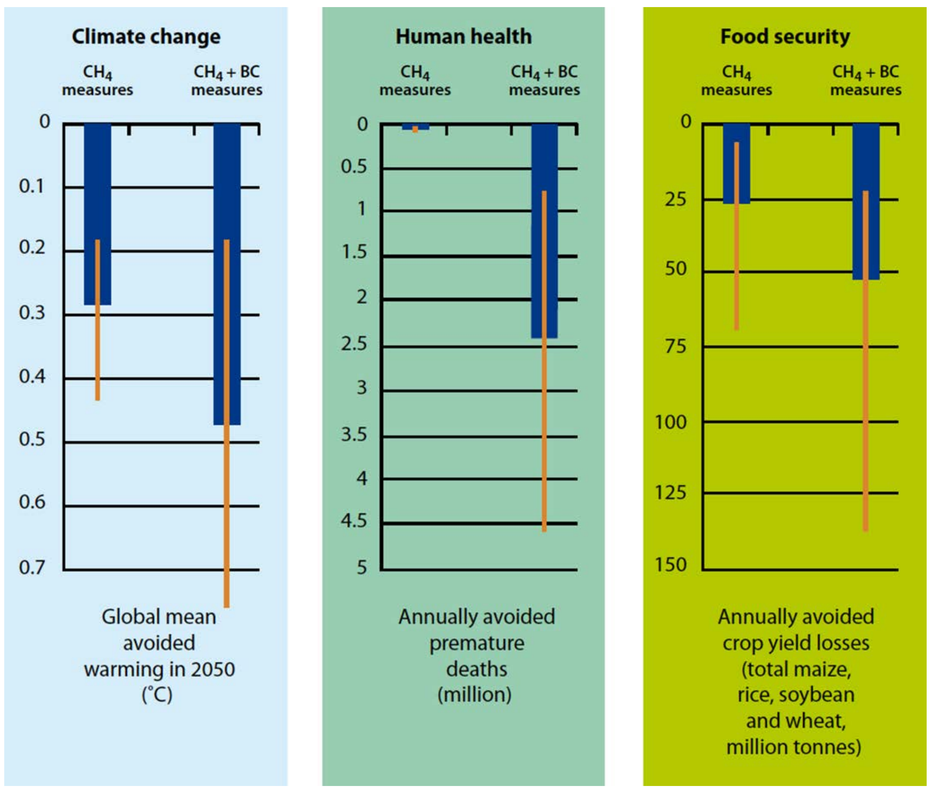
Policy measures



- The study evidenced the policy measures to limit BC and CH_4 that are beneficial both for climate and human health
- A selection was made of 15 measures of emission reduction for which technologies are already available
- Only those measures that are beneficial for both air quality and climate were chosen (*win-win solutions*), excluding those measures that are beneficial for only one of the two phenomena, worsening the other (*win-lose solutions*)

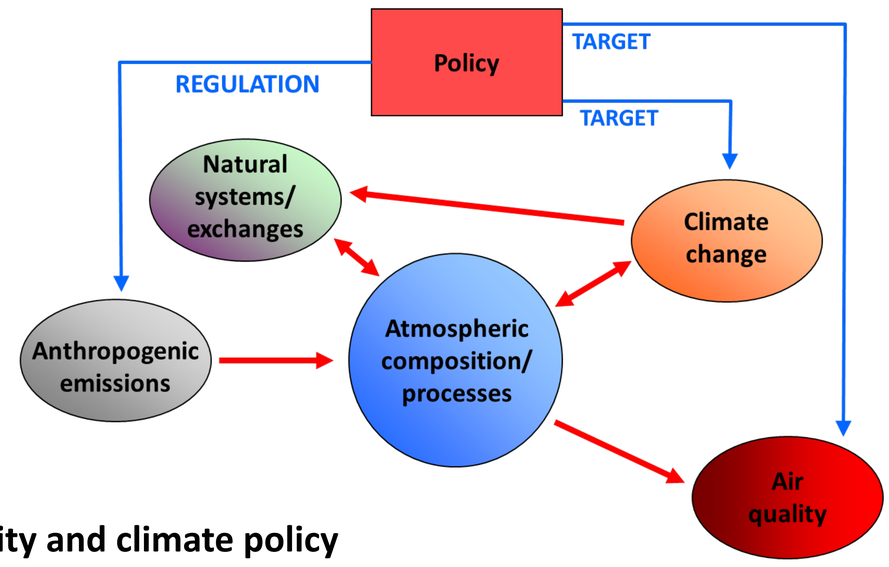


UNEP-WMO Report "Integrated Assessment of Black Carbon and Tropospheric Ozone"



Emission abatement

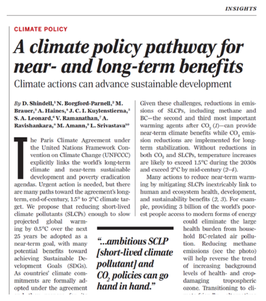
- It is not possible to unequivocally separate the anthropogenic emissions in two distinct categories: atmospheric pollutants and climate-active species
- Several species affect both air quality and climate
- Still, these two environmental challenges are viewed as separate issues, which are dealt with by different science communities and within different policy frameworks



Air quality and climate policy

Effects of atmospheric pollutants

	Compound	Lifetime	Health effects	Ecosystem effects	Climate effects
Long-lived compounds	Carbon dioxide (CO_2)	centuries	NO		warming
	Nitrous oxide (N_2O)	120 years	NO	NO	warming
	CFC and HFC	years to centuries	NO	NO	warming
Short-lived compounds	Methane (CH_4)	8 years			warming
	Carbon monoxide (CO)	2 months			warming
	Ozone (O_3)	1 month			warming
	Sulphur dioxide (SO_2)	1 week			cooling
	Nitrogen oxides (NO_X)	1 week			cooling
	Ammonia (NH_3)	1 week			cooling
	Black carbon (BC)	1 week			warming
	Volatile organics (VOC)	highly variable			warming


INSIGHTS

CLIMATE POLICY

A climate policy pathway for near- and long-term benefits

Climate actions can advance sustainable development

By D. Shindell,[1]* N. Borgford-Parnell,[1] M. Brauer,[2] A. Haines,[3] J. C. I. Kuylenstierna,[4] S. A. Leonard,[5] V. Ramanathan,[5] A. Ravishankara,[6] M. Amann,[7] L. Srivastava[8]*

The Paris Climate Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) explicitly links the world's long-term climate and near-term sustainable development and poverty eradication agendas. Urgent action is needed, but there are many paths toward the agreement's long-term, end-of-century, 1.5° to 2°C climate target. We propose that reducing short-lived climate pollutants (SLCPs) enough to slow projected global warming by 0.5°C over the next 25 years be adopted as a near-term goal, with many potential benefits toward achieving Sustainable Development Goals (SDGs). As countries' climate commitments are formally adopted under the agreement

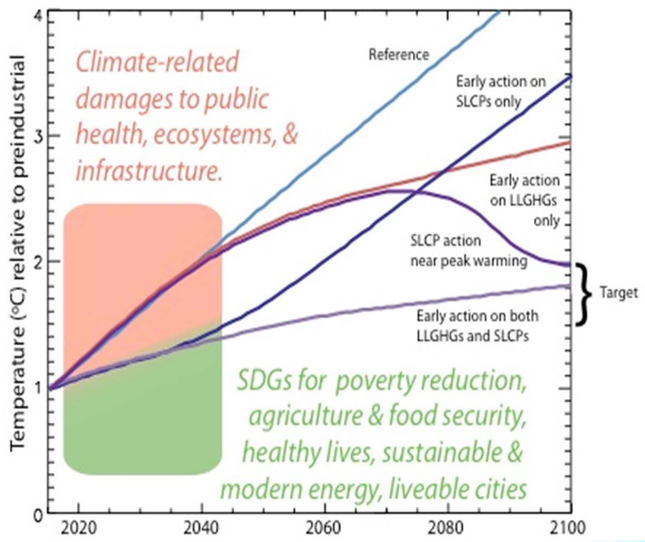
Given these challenges, reductions in emissions of SLCPs, including methane and BC—the second and third most important warming agents after CO_2 (1)—can provide near-term climate benefits while CO_2 emission reductions are implemented for long-term stabilization. Without reductions in both CO_2 and SLCPs, temperature increases are likely to exceed 1.5°C during the 2030s and exceed 2°C by mid-century (2–4).

Many actions to reduce near-term warming by mitigating SLCPs inextricably link to human and ecosystem health, development, and sustainability benefits (2, 3). For example, providing 3 billion of the world's poorest people access to modern forms of energy could eliminate the large health burden from household BC-related air pollution. Reducing methane emissions (see the photo) will help reverse the trend of increasing background levels of health- and crop-damaging tropospheric ozone. Transitioning to cli-

"...ambitious SCLP [short-lived climate pollutant] and CO_2 policies can go hand in hand."

http://science.sciencemag.org/ on May 4, 2017

"Multiple Benefits Pathway " by Dr Drew Shindell and & CCAC SAP



SLCP mitigation could happen late – and still help to achieve Paris targets

Late SLCP mitigation would compromise attainment of many SDGs, due to:

- Air pollution impacts
- Impacts of cumulative warming

The 'Multiple Benefits Pathway' attempts to limit the rate of temperature rise and other impacts on health and ecosystems