

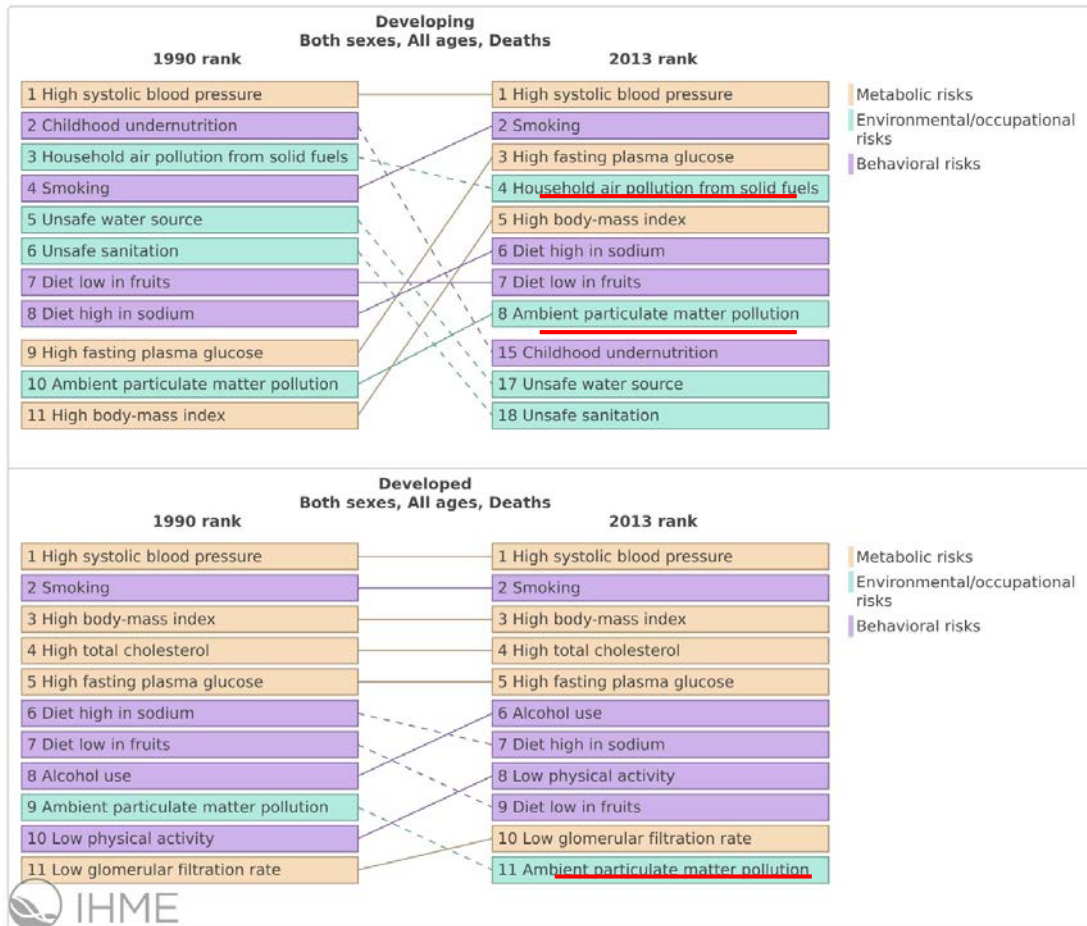
Opportunities for health and climate co-benefits in an urbanizing developing world

Per Fugelli lecture
Blindern, UiO, December 15., 2015

Kristin Aunan

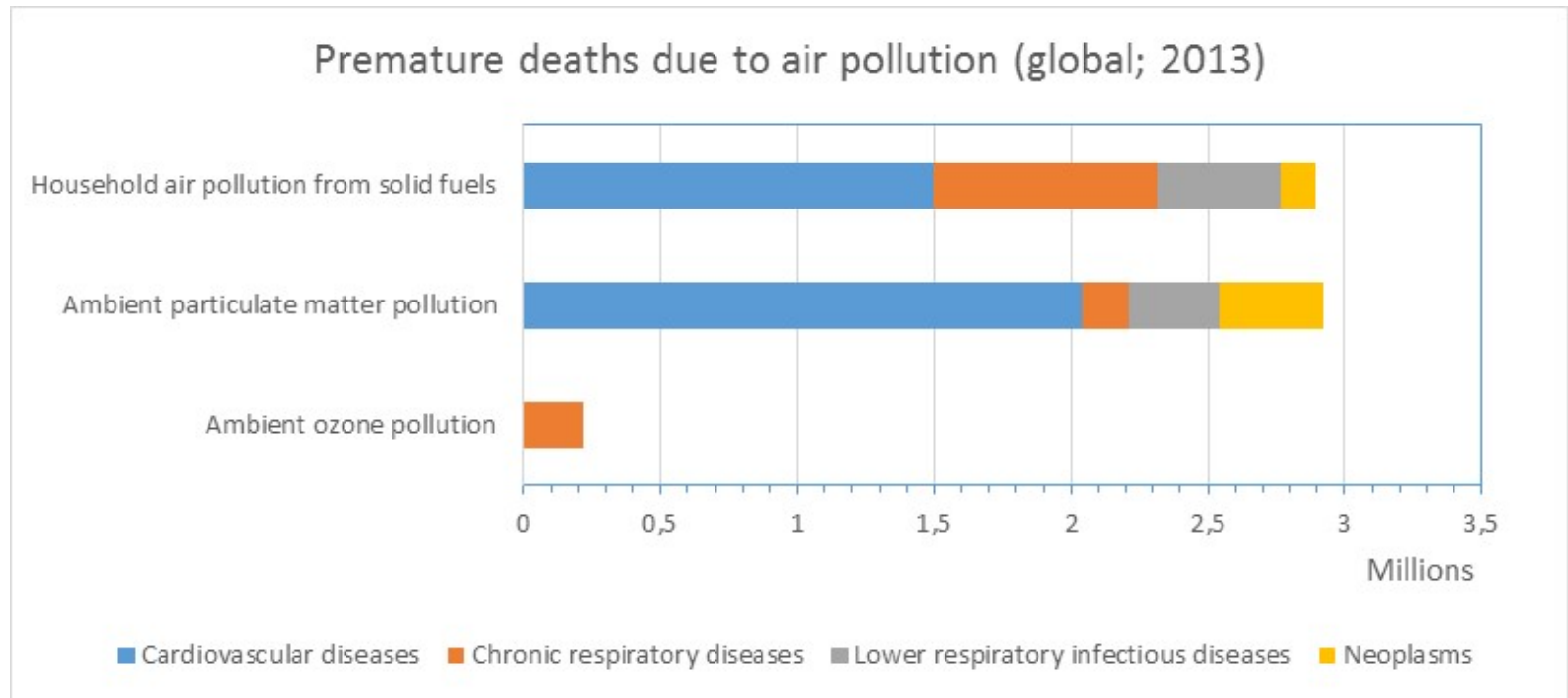
CICERO and Dept of Chemistry University of Oslo

Air pollution – a major yet *preventable* cause of global ill health



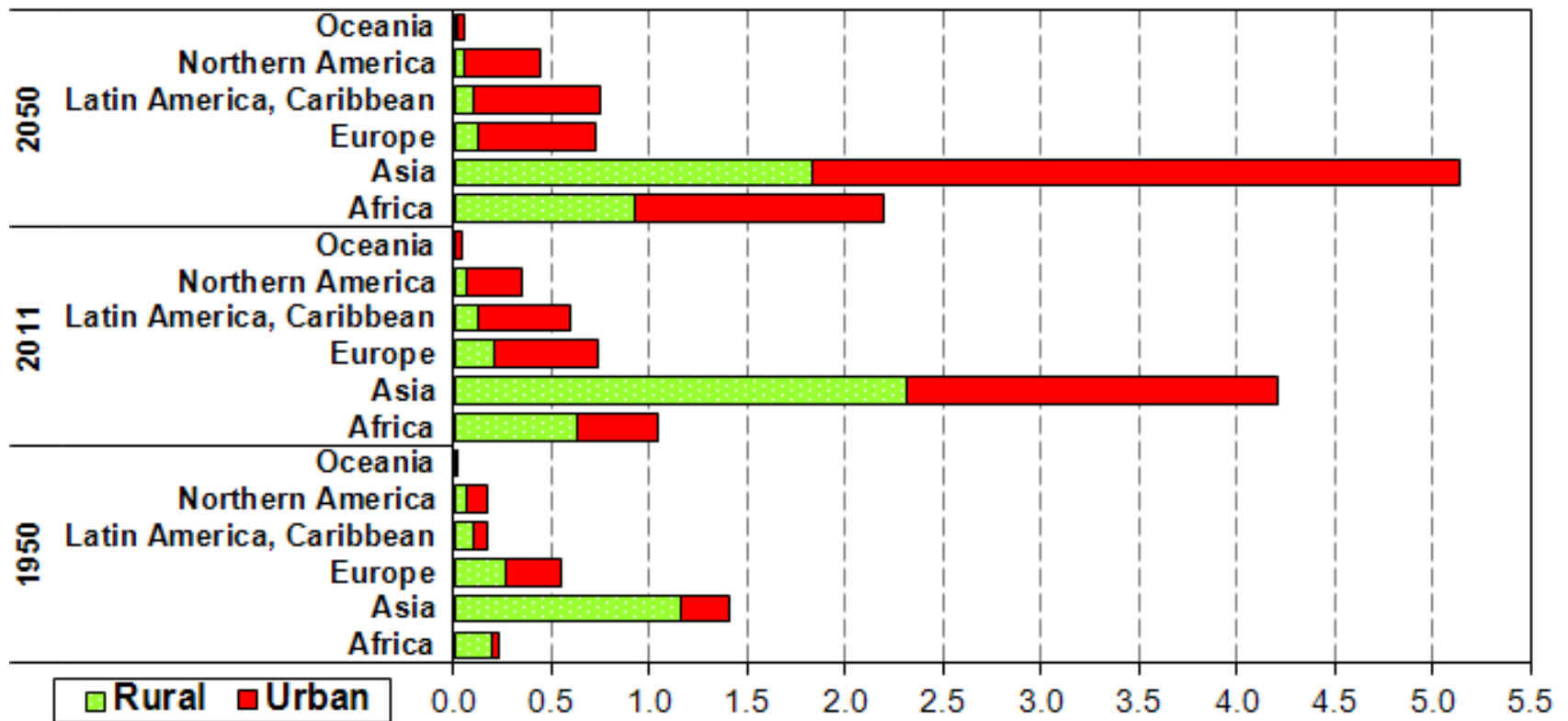
- Developing countries 2013: 5.4 million deaths (2nd largest risk factor)
- Developed countries 2013: 0.6 million deaths

Global Burden of Disease 2013: Deaths due to air pollution exposure



Half the world's population will live in Asian and African cities in 2050

Rural and Urban population by major regions, 1950, 2011 and 2050 (billions)



China's massive urbanization – net impact on exposure?

2000-2010:

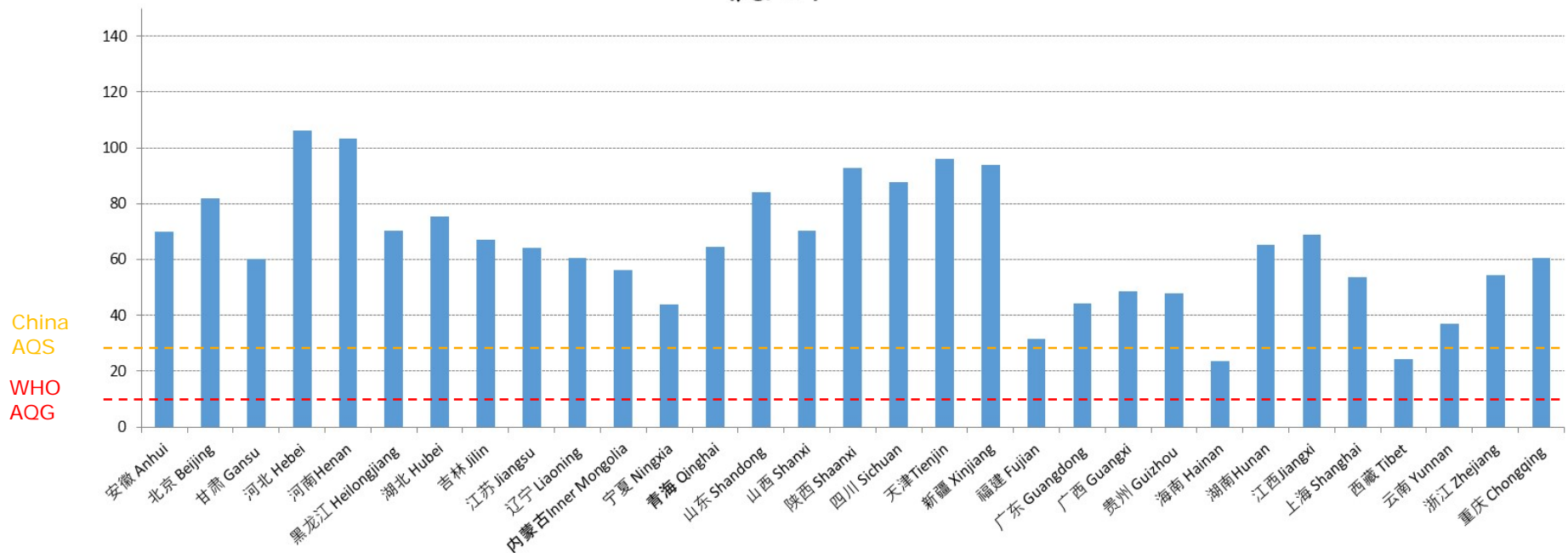
- 261 million internal migrants, of which
- 138 million were rural-urban migrants



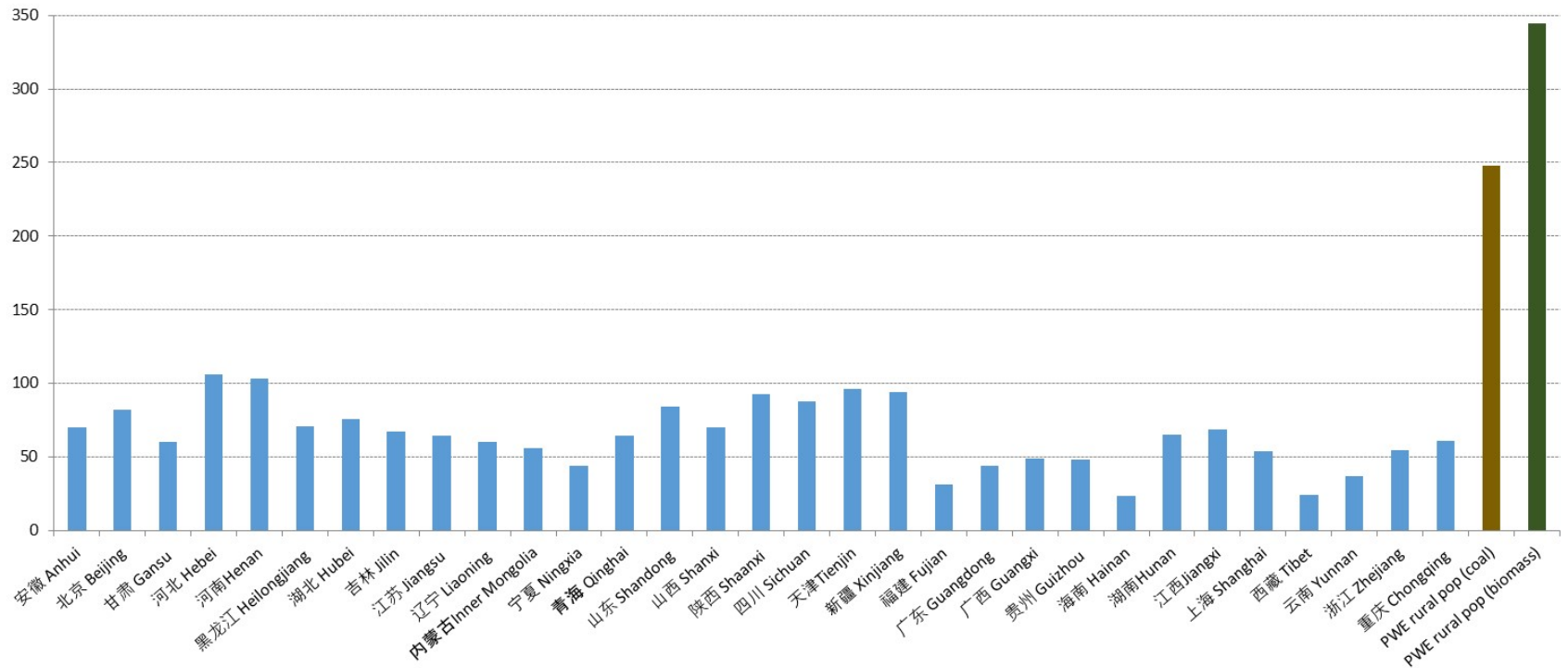
Annual PM_{2.5} in Chinese cities 2013

(5 of 74 byer comply with China's AQS)

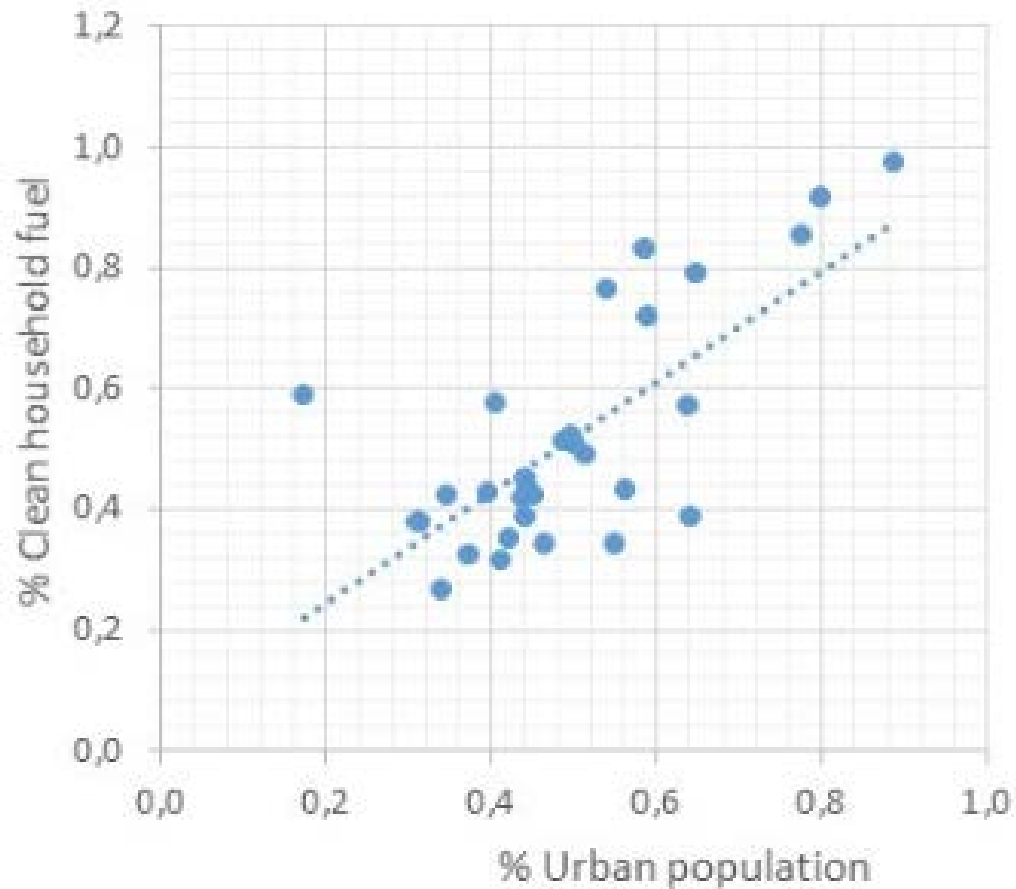
Annual mean PM_{2.5} concentration in 2013 at 482 national urban monitoring sites (µg/m³)



Exposure is higher for rural families dependent on solid fuels



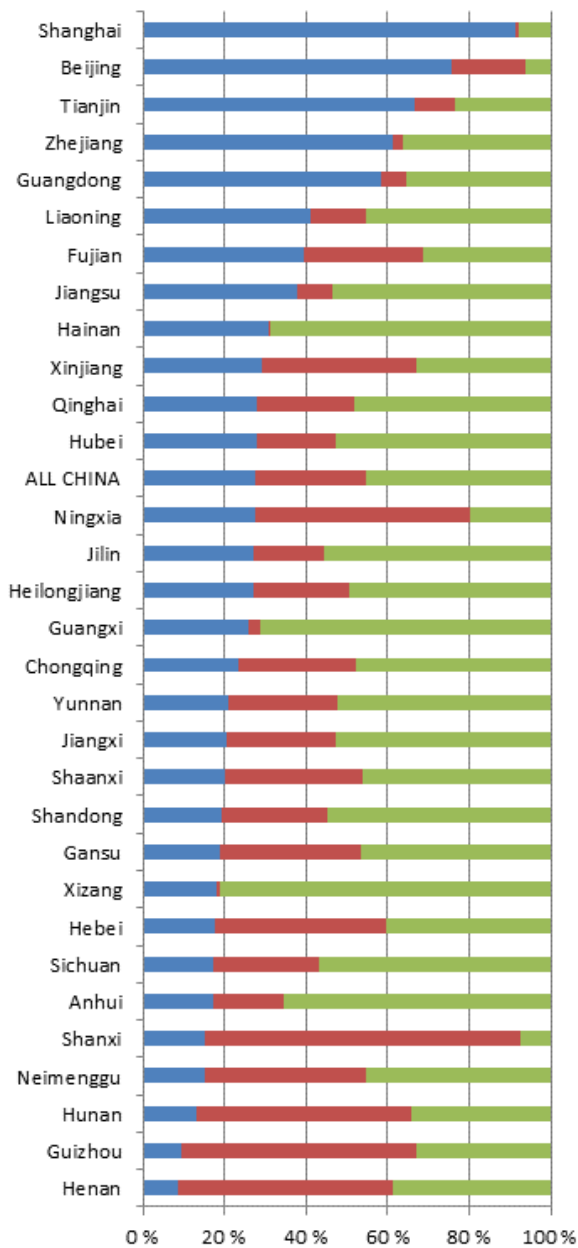
% urban population vs. % of households using clean cooking fuels (2010)



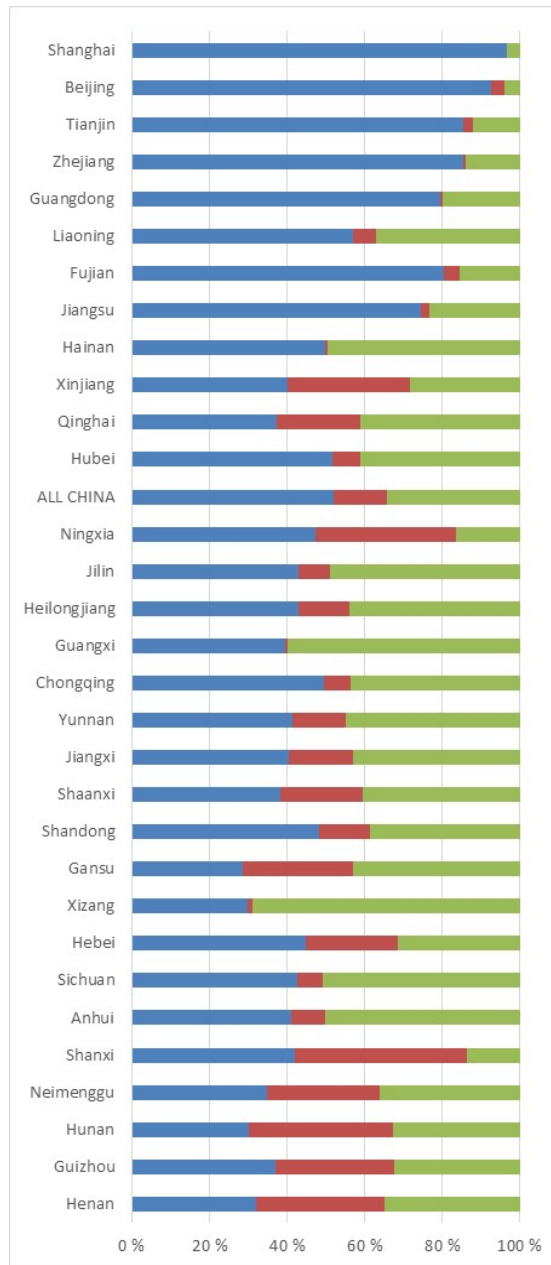
Data from China Census 2010

The Chinese household fuel transition

2000



2010



- 145 million fewer coal users
- 110 million fewer biomass users

Data from China Census 2010

Urbanization may have alleviated PM_{2.5} exposure in China (2000-2010)

- Higher population exposure to ambient air pollution (which lately has been worsening)
- Lower population exposure to smoke from cooking stoves (not necessarily for the urban poor – double burden)
- Urbanization probably more important for fuel switch than targeted programs like coal bans and biogas programs

(Aunan & Wang, 2014)

'Improved stoves' for the rural— a dead end road?

New guidelines from WHO (2014): Large improvements needed to get health benefits (d-r flattens) (need gas/electricity?)

4.3 Recommendation 1: Emission rate targets

Scoping question 1: What device and fuel emission rates are required to meet WHO (annual average) air quality guidelines and interim target-1 (IT-1) for PM_{2.5} and the (24-hour average) air quality guideline for CO?

Recommendation	Emission rate targets		Strength of recommendation
Emission rates from household fuel combustion should not exceed the following emission rate targets (ERTs) for PM _{2.5} and CO.	PM _{2.5} (unvented)	0.23 (mg/min)	Strong
	PM _{2.5} (vented)	0.80 (mg/min)	
	CO (unvented)	0.16 (g/min)	
	CO (vented)	0.59 (g/min)	

Climate-change and air-pollution links

- CO₂ and the main air pollutants often have the same sources: co-benefits of mitigation (health, crops..)
- Air pollutants cause climate disturbance
- Some air pollutants affect the lifetimes of GHGs; global warming can increase air pollution



A closer collaboration between the health and environmental community is needed to *harvest co-benefits* and *confront the dilemmas*

Establishing

- the health effects of decoupling economic growth and emissions of GHG and air pollutants
- the distributional impacts of climate/air pollution policies (winners and losers)
- knowledge that can promote creation of healthy, equitable, and low-carbon cities