

The word "GREENPEACE" is written in a bold, white, sans-serif font. The letters are slightly irregular and have a hand-drawn feel. The text is positioned in the upper right quadrant of the slide. Behind the text, there are several thin, white, curved lines that sweep across the slide from left to right, creating a sense of motion or a stylized wave.

GREENPEACE

Air pollution impacts of the proposed Kosovo C lignite plant

Lauri Myllyvirta

energy campaigner

MPol (econ.), BSc (econ.), BSc (env. sci.)

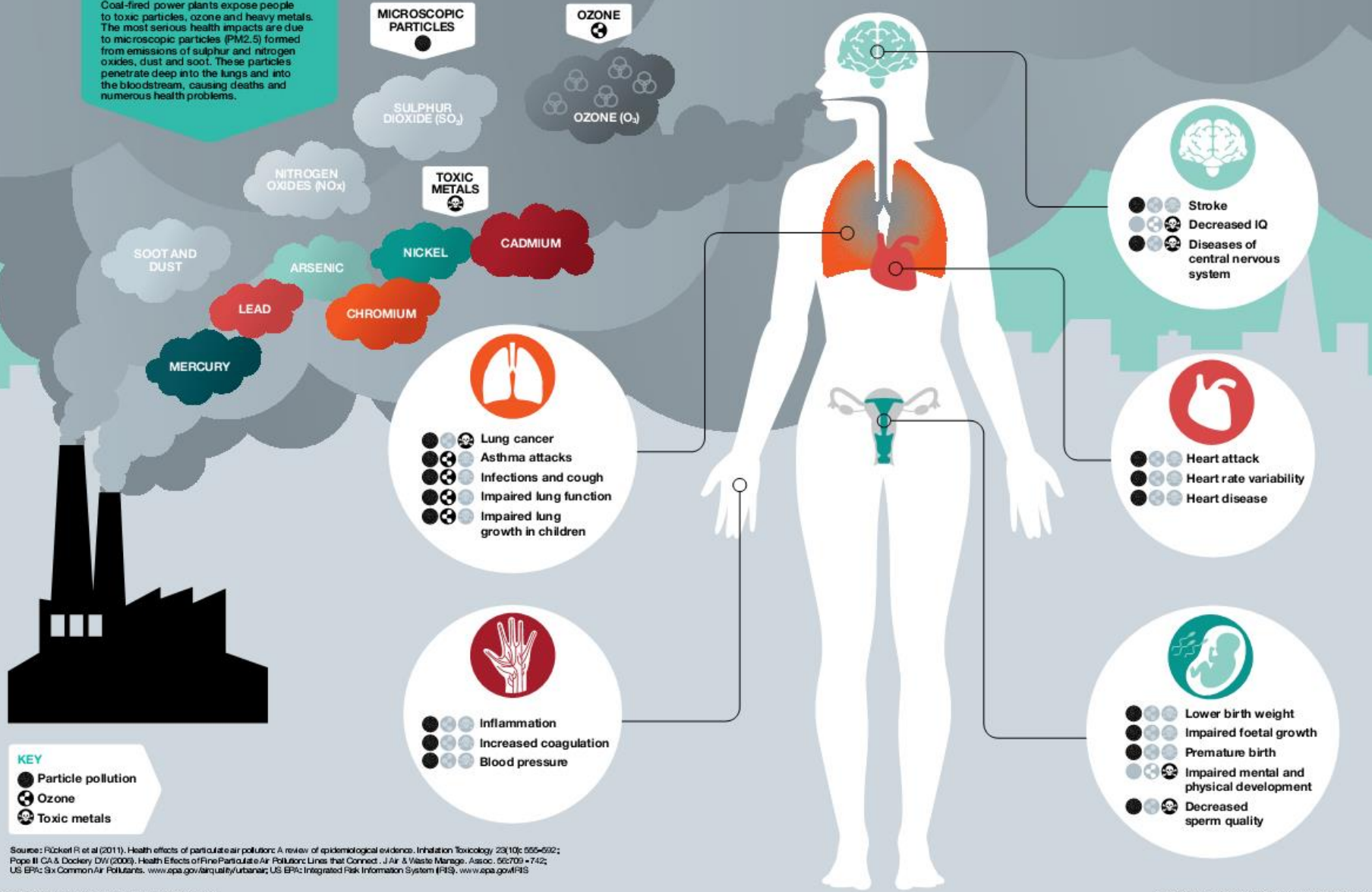
Air pollution – a global killer

- Outdoor air pollution kills 3 million people per year globally¹
- In the EU, people live on average 9 months shorter due to air pollution².

References 1: WHO Global Burden of Disease; 2: EEA Air quality in Europe - 2012 report.

How coal-fired power plants can make you sick

Coal-fired power plants expose people to toxic particles, ozone and heavy metals. The most serious health impacts are due to microscopic particles (PM2.5) formed from emissions of sulphur and nitrogen oxides, dust and soot. These particles penetrate deep into the lungs and into the bloodstream, causing deaths and numerous health problems.



- KEY**
- Particle pollution
 - ⊕ Ozone
 - ☠ Toxic metals

Source: Fubker R et al (2011). Health effects of particulate air pollution: A review of epidemiological evidence. *Inhalation Toxicology* 23(10): 595-632; Pope II CA & Dockery DJ (2006). Health Effects of Fine/Particulate Air Pollution: Lines that Connect. *J Air & Waste Manage. Assoc.* 56:709-742; US EPA: Six Common Air Pollutants. www.epa.gov/airquality/urbanair; US EPA: Integrated Risk Information System (IRIS). www.epa.gov/IRIS

Coal and air pollution in Europe

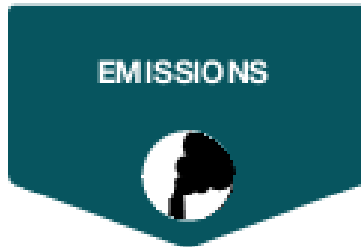
- Coal-fired power plants
 - cause appr. 20,000 deaths per year³
 - are the largest industrial source of emissions of SO₂, NO_x, and many heavy metals⁴

References 3: HEAL 2013: The Unpaid Health Bill - How coal power plants make us sick; 4: E-PRTR emission database.

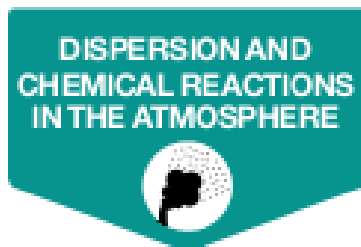
Focus on end-of-pipe: wasted money and opportunity

- OECD: Air pollution health impacts are projected to grow despite improved end-of-pipe controls
- Least-cost air pollution reduction measures should include about 50-50% end-of-pipe measures and investment in cleaner energy sources
 - Even with no value placed on CO₂ savings
 - Applies both in OECD countries and emerging economies

Assessing impacts of Kosovo C: impact pathway approach



EU new emission standards
Operating parameters: WBG
Flue gas volume: Kosovo B values



EMEP MSC-W atmospheric
chemistry-transport model



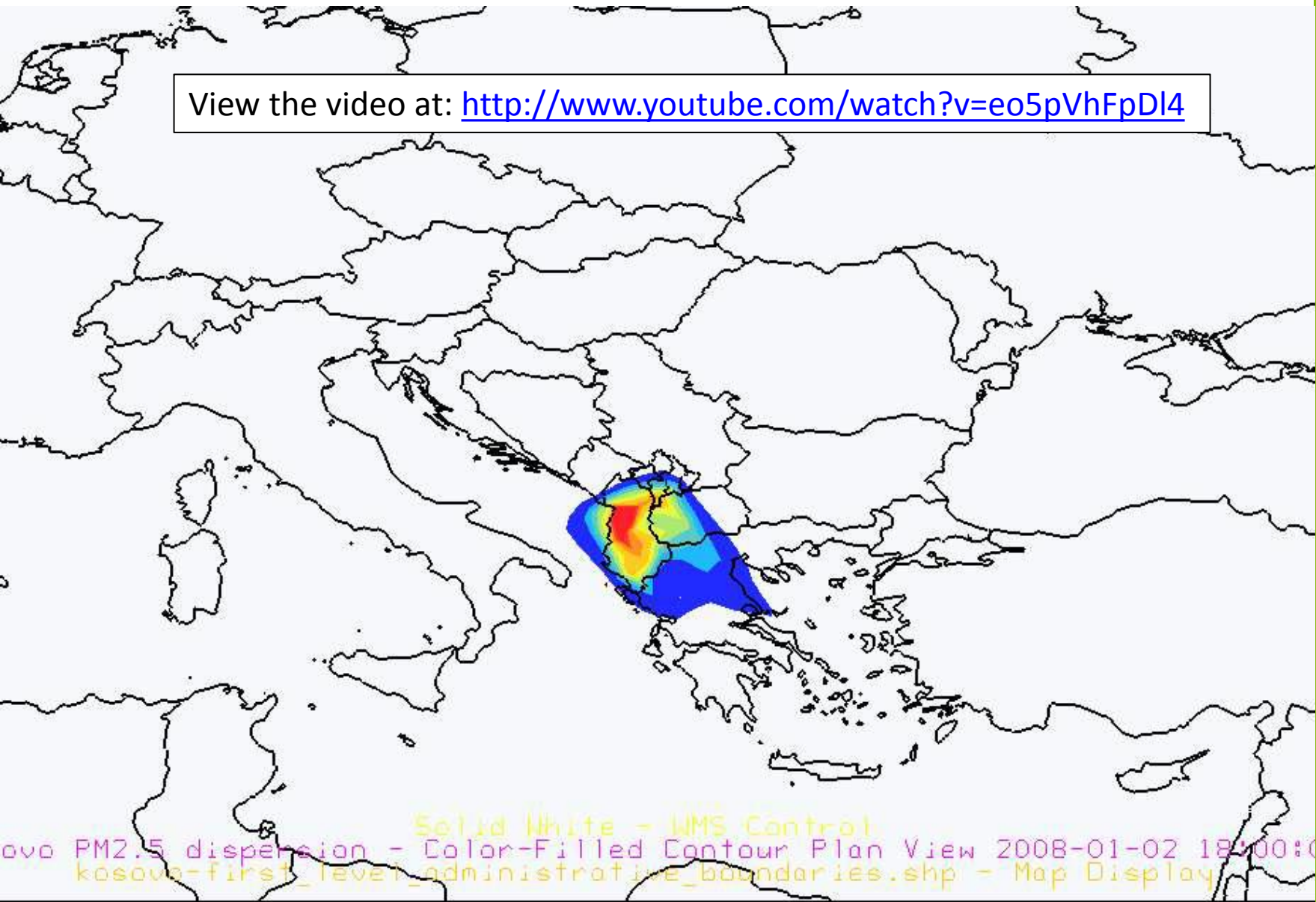
Population data



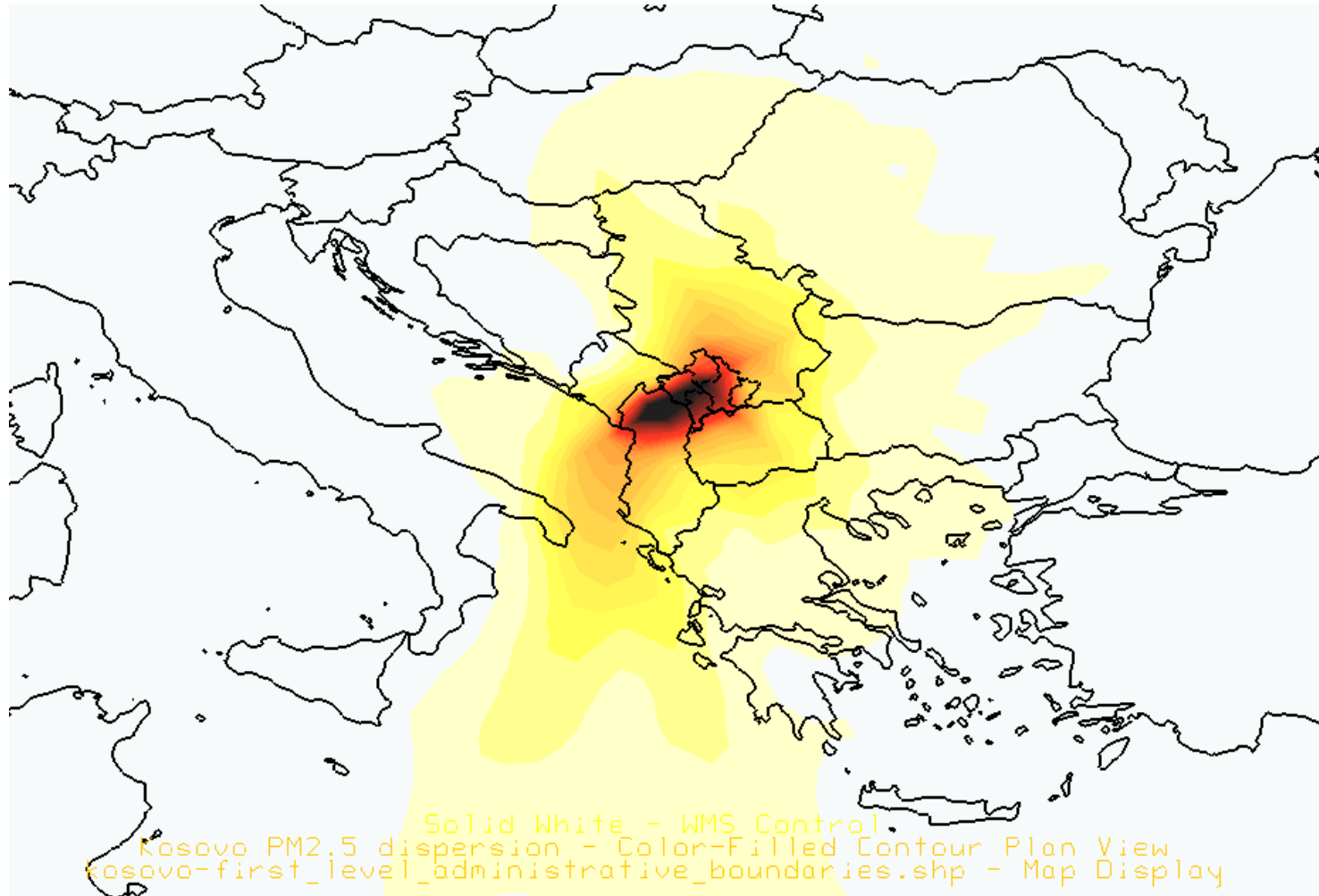
EU NEEDS & Externe results as
used by European Environment
Agency

Dispersion of PM2.5 from the Kosovo C power plant - video

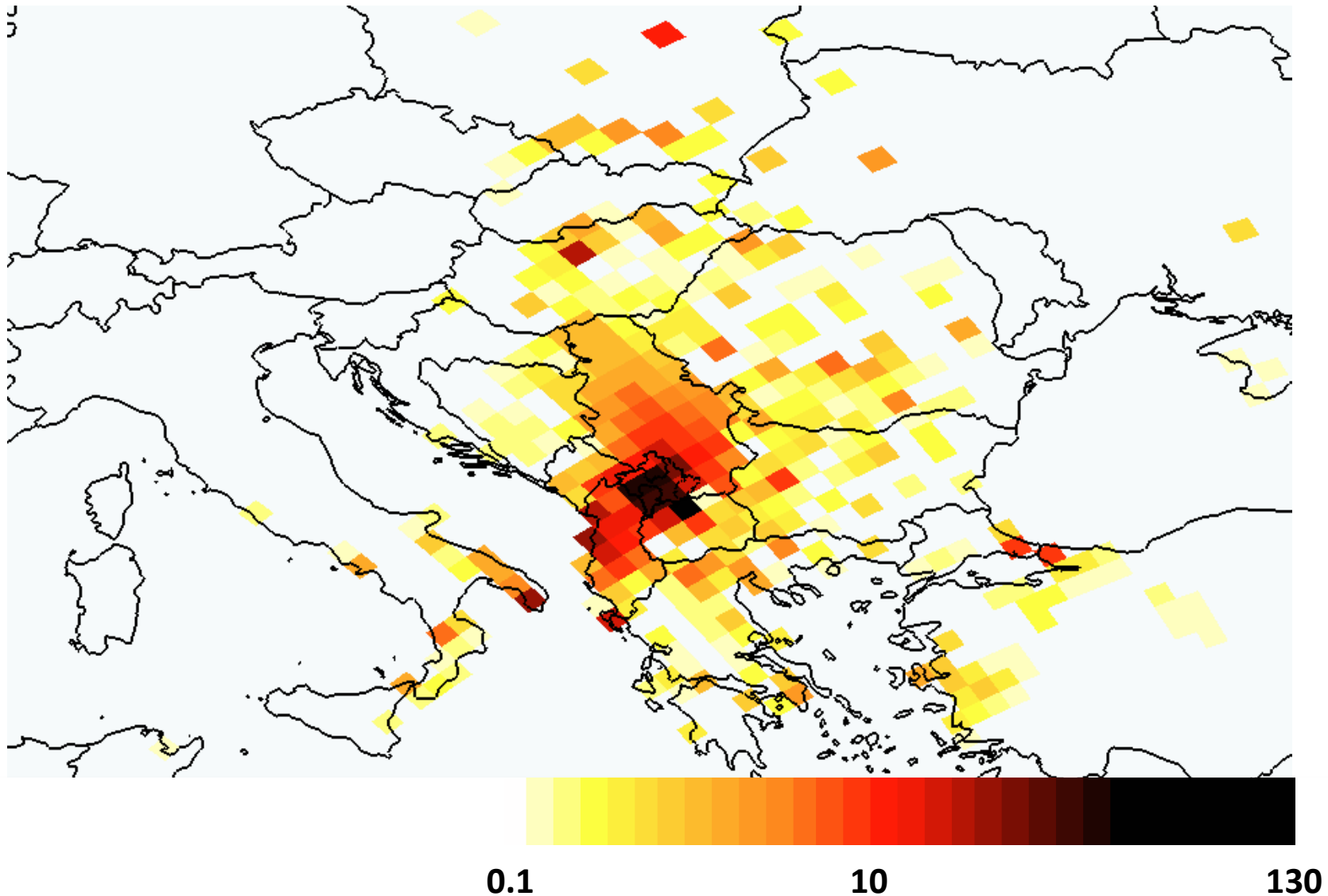
View the video at: <http://www.youtube.com/watch?v=eo5pVhFpDI4>



Increase in average PM2.5 caused by Kosovo C emissions



Life years lost due to emissions from the Kosovo C power plant



Estimated health impacts per year

- assuming compliance with EU air emission standards

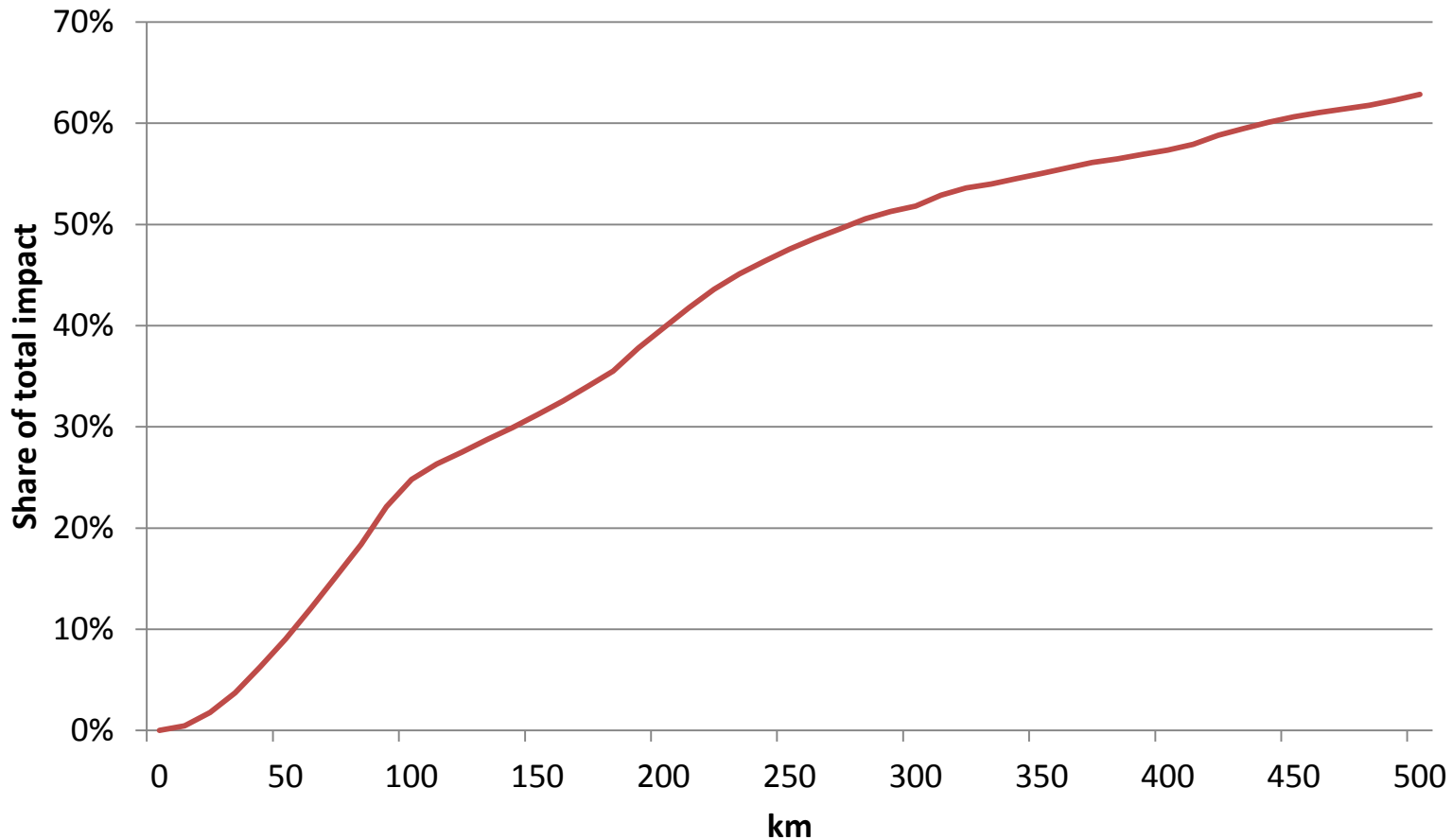
Deaths	42 cases*
Asthma attacks children	810 cases
Asthma attacks adults	5200 cases
Lower respiratory symptoms children	90 person-yrs
Lower respiratory symptoms adults	130 person-yrs
Sickness days	120 person-yrs
Work loss days	50 worker-yrs
IQ loss (mercury)	240 IQ points

1700 deaths over plant lifetime

*95% confidence interval: 13-73

25% of the impact takes place within 100km from the plant

Cumulative impact by distance from plant



Valuing the costs to society

Lost life year	€ 125,000	per year*
Asthma medication use	€ 1	per day
Minor sickness	€ 42	per day
Sickness	€ 97	per day
Lost working day	€ 398	per day
Hospital admission	€ 2,346	per case

*Using “medium” valuation for loss of life – EEA high valuation would be 55% higher.

Based on European Environment Agency 2011: Revealing the costs of air pollution from industrial facilities in Europe. <http://www.eea.europa.eu/publications/cost-of-air-pollution>

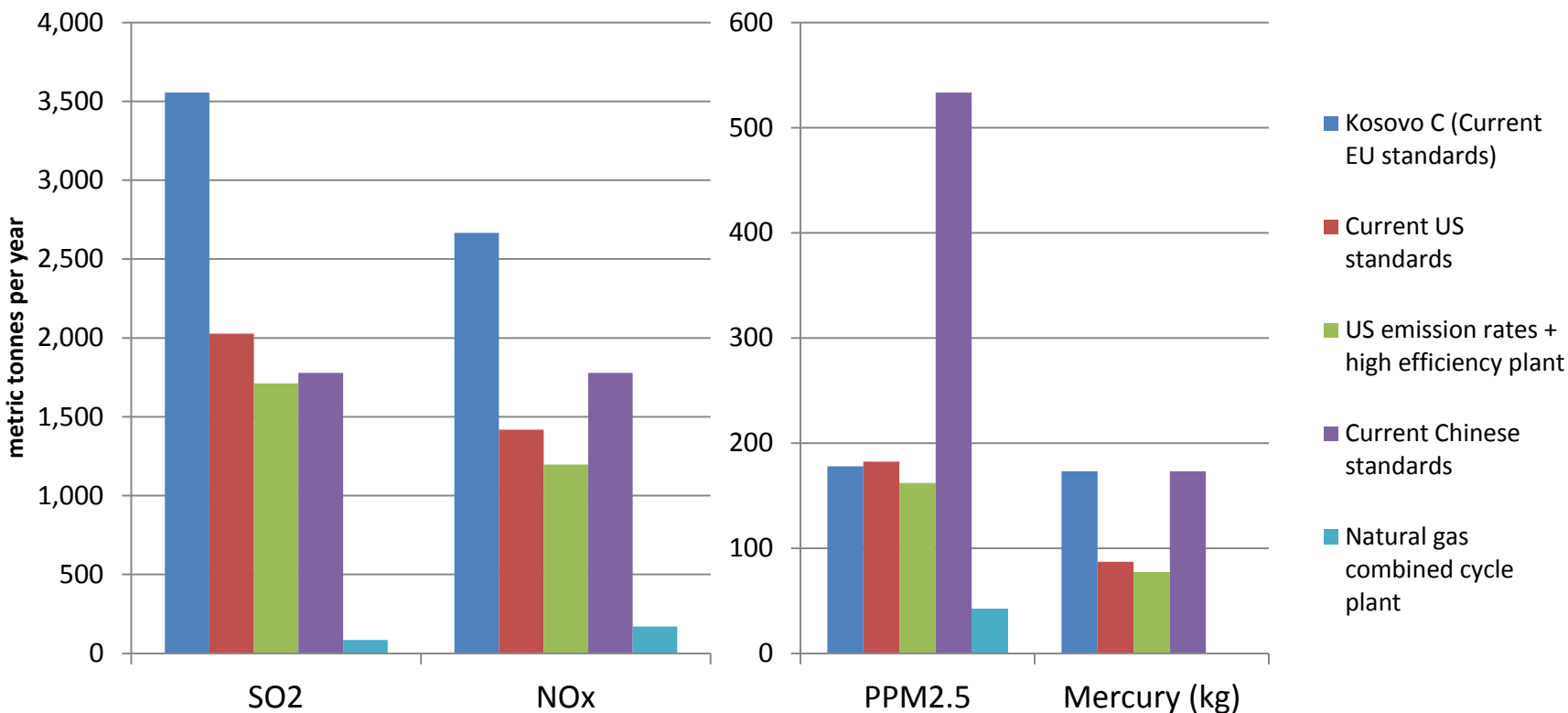
Costs to society

- 70 million EUR for each year of operation*
 - 95% confidence interval: 20-130 million EUR
- 3,000 million EUR in health costs over plant lifetime*
 - Double the initial investment

*Conservatively assuming long term discount rate equals GDP per capita growth rate. (Value of life, health care costs and WTP increase in line with GDP.)

Kosovo C: Far from best practice

Comparing emission standards

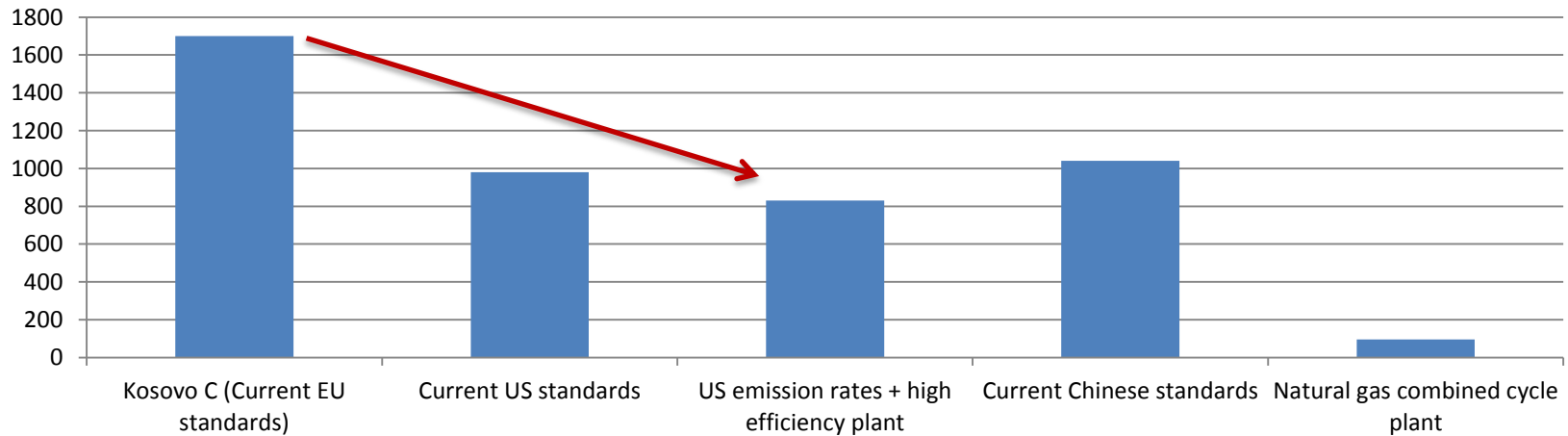


Emission limits suggested by World Bank would allow almost twice as high acid gas emissions as current U.S. and Chinese standards

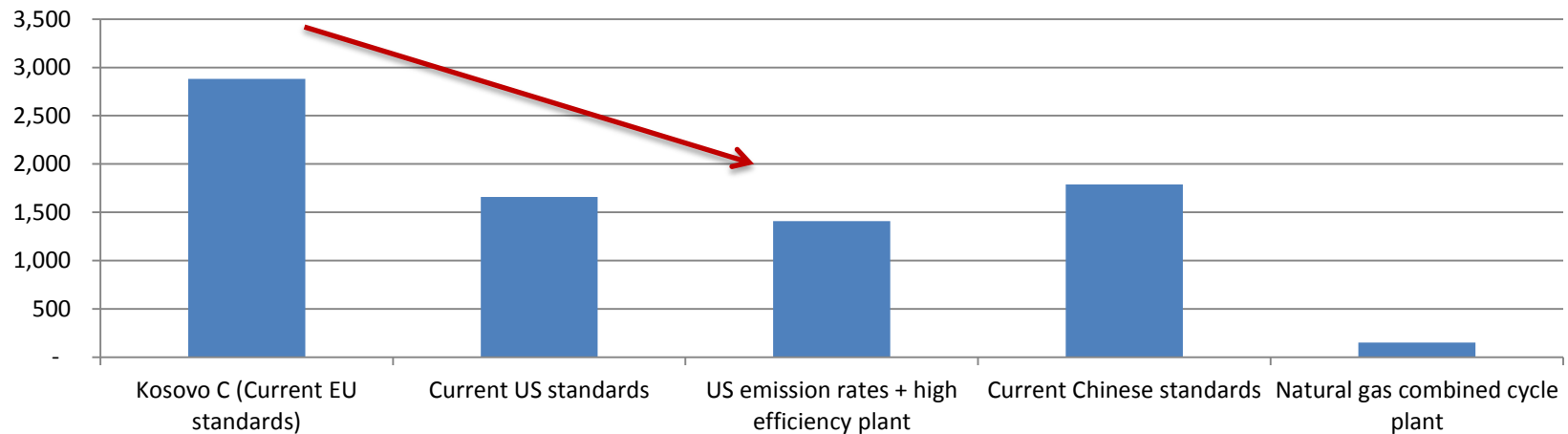
Emissions calculated assuming 38% thermal efficiency (LHV net), based on World Bank Kosovo generation options study, and 420 Nm³/GJ flue gas volume.

Health benefits of stricter air emission standards

Deaths over 40 years



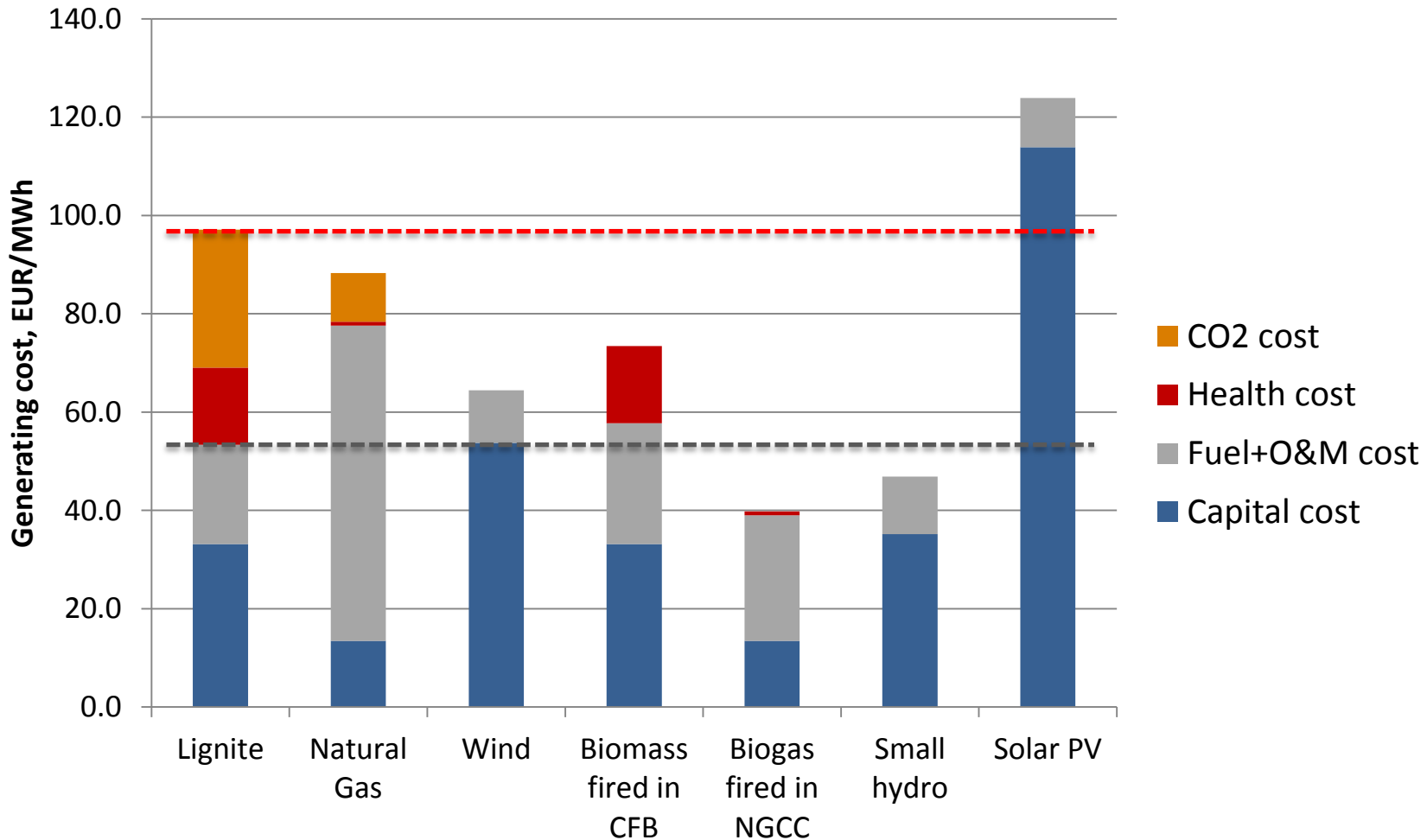
Health cost over 40 years (MEUR)



Health benefits of stricter air emission standards

- Kosovo C could not be built, as proposed, legally in the U.S. or in China
- Meeting Chinese emission standards would reduce health impacts by 40%, save 700 lives and a billion euros over plant lifetime
- U.S. emission rates and state of the art thermal efficiency would reduce health impacts by appr. 50%, saving more than the initial capital cost in health costs

Lignite – competitive only when costs to society are ignored



Generating costs and assumptions: World Bank: Development and Evaluation of Power Supply Options for Kosovo; except solar capital cost BNEF projection for 2015; Wind capital cost EWEA; CO2 price IEA WEO 2012 450ppm scenario – levelized BRICS CO2 price over plant lifetime (EUR27.5/tCO2).

Conclusions

- Lignite causes very significant negative health impacts even with highest standards.
- Impacts of Kosovo C are made much worse by low standards required by World Bank.
- The project would lock Kosovo into the power generation option with worst health and climate impacts for two generations
- Alternative power generation options are economically competitive, especially when costs to the society are factored in

Thank you!

lauri.myllyvirta@greenpeace.org