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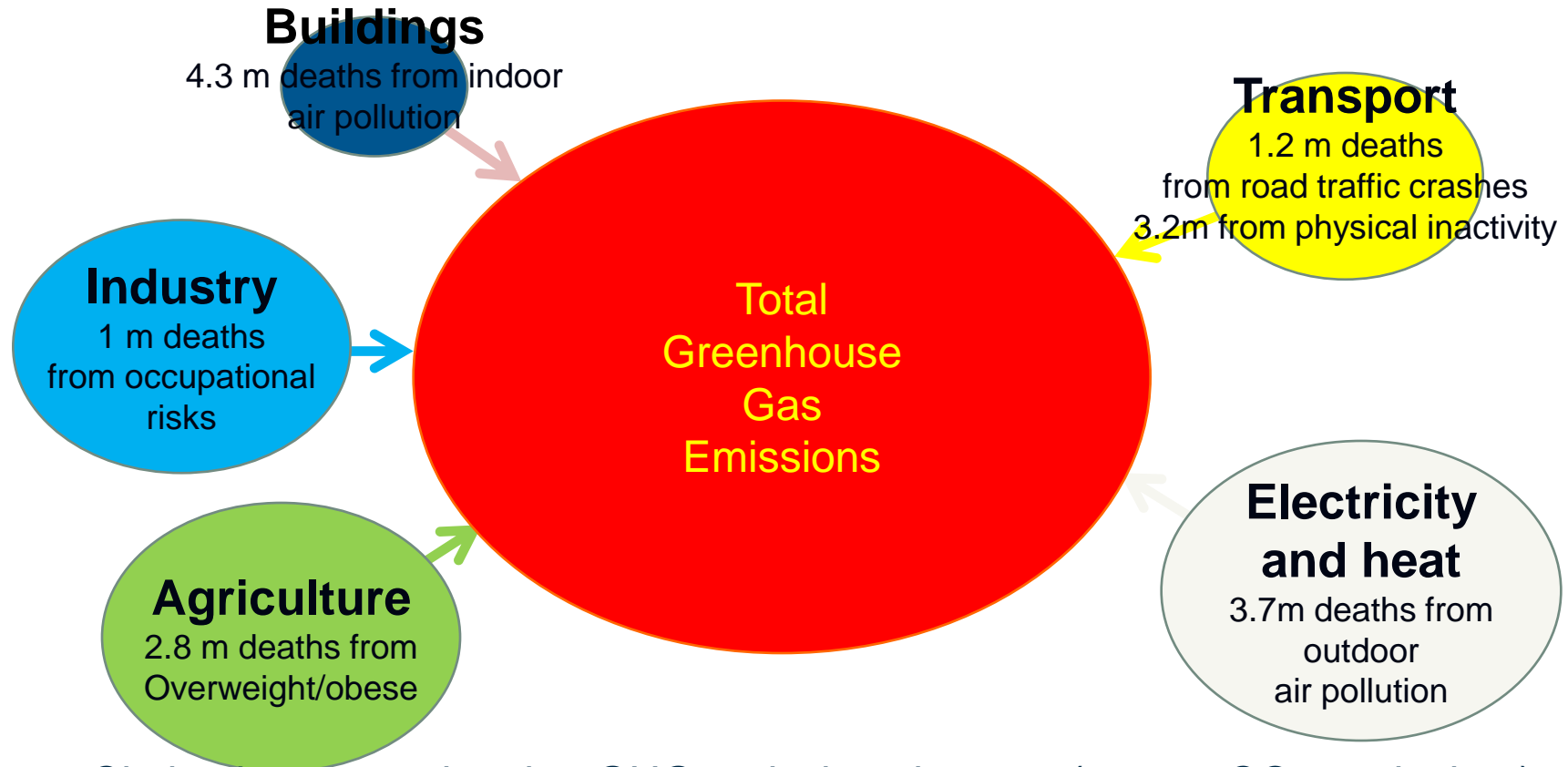
Health benefits of energy efficiency in urban environment

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World Health
Organization

Health impacts of the causes of climate change



Circle size proportional to GHG emissions in 2010 (tonnes CO₂ equivalent). Changes proportional to projections of changes by 2050. *All data from IPCC, 2014.*

Tackling the causes of climate change can bring health and economic benefits

- Reducing short-lived climate pollutants is expected to save almost 2.5 million lives per year, and avoid 0.5C of warming by 2050
- Energy subsidies, mainly unpaid health bill of air pollution from fossil fuels, estimated at US\$5.3 trillion in 2015 – greater than global health spending
- Revenue from carbon tax consistent with health gains would raise 2% of GDP across largest 20 economies (over US\$ 1 trillion/yr)

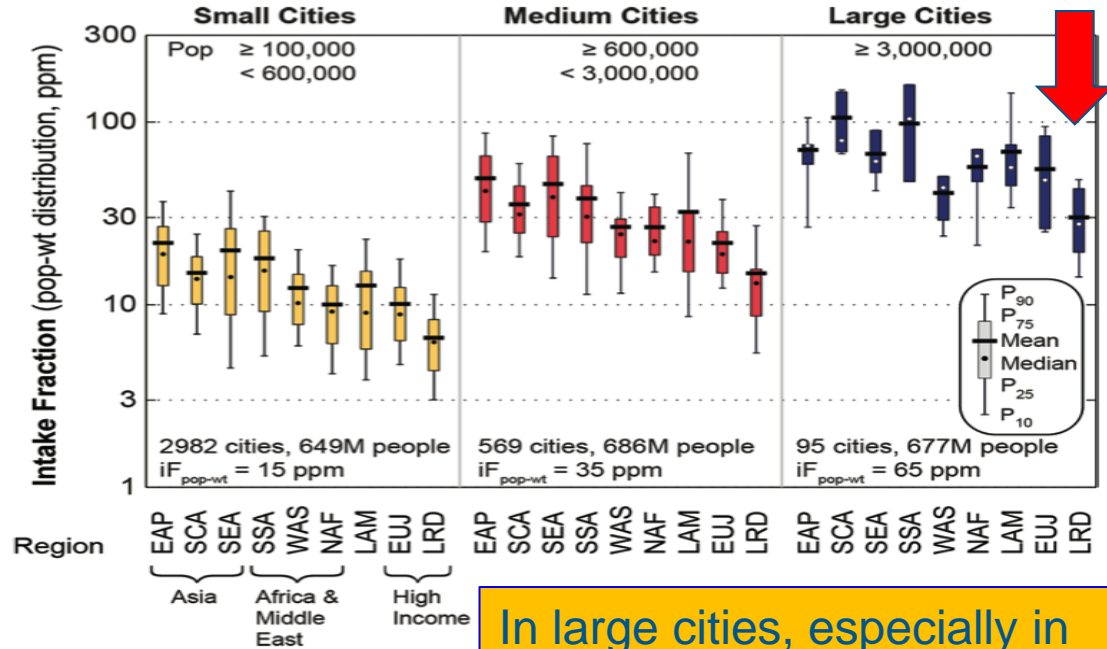


Not all air pollution is equal

Reduced outdoor pollution → health benefits of 2, 7 and 46 \$tCO₂ in EU, China and India respectively

But it matters how much polluted air is breathed in (intake fraction) → pollution on streets by vehicles

Transport reduced emissions have highest social value, >\$100tCO₂ in many cities



In large cities, especially in Asia, a higher fraction of pollutants is inhaled

Apte, J. et al. Global intraurban intake fractions for primary air pollutants from vehicles and other distributed sources, *Env. Sci. Tech.* 2012

- Parry, I. and Heine, D. Getting Energy Prices Right: From Principle to Practice, IMF 2014;
- Creutzig, F. and He, D., Climate Change Mitigation and Co-Benefits of Feasible Transport Demand Policies in Beijing *Transportation Research D* **14**, 120 (2009)

Transport has large health impacts

- Transport greatly affects human health notably through air pollutants and greenhouse gas (GHG) emission, road traffic noise, road crashes and physical inactivity:

People who cycle to work are *about 25% less likely to die* (of any cause) compared with people who do not cycle to work



Image source: V. Collazos,
http://www.who.int/dietphysicalactivity/factsheet_adults/en/

WHO's specialized cancer agency, the International Agency for Research on Cancer (IARC), announced that it has classified outdoor air pollution and one of its major components, particulate matter (PM), as carcinogenic to human beings.

http://www.iarc.fr/en/media-centre/iarcnews/pdf/pr221_E.pdf

About 76 600 jobs could be created if the 56 cities assessed in the study achieved the same modal share of cycling as Copenhagen, the capital of Denmark.

The benefits of cycling to health could prevent about 10 000 deaths each year.



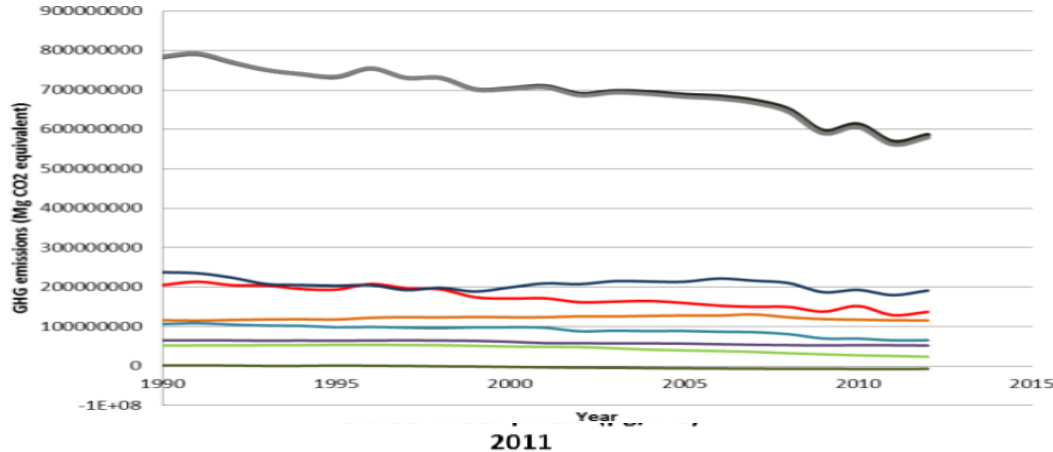
Health opportunities

Key messages:

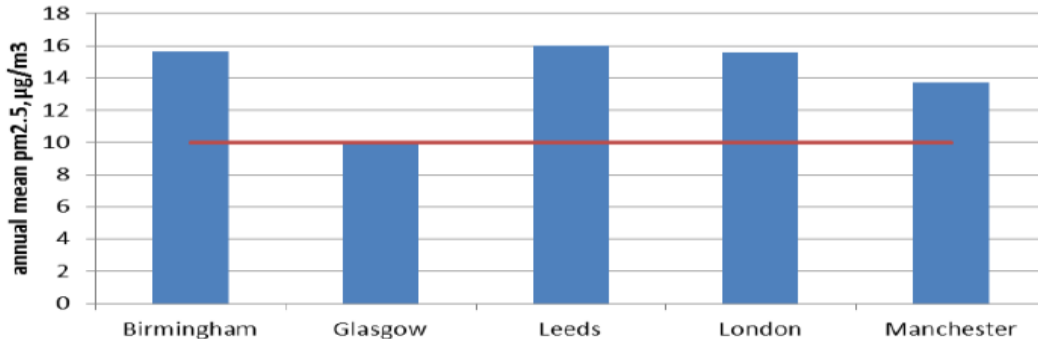
Countries are making significant commitments to cut GHGs – e.g. By 2030, EU countries are committed to cut emissions by 40% compared to 1990 levels

Well-designed policies for GHG emissions could also reduce levels of air pollution to WHO guideline levels

Policies consistent with meeting targets in transport sector would be expected to cut heart disease and stroke by 10-20%, breast cancer by 12-13%, depression and dementia by 5-8%

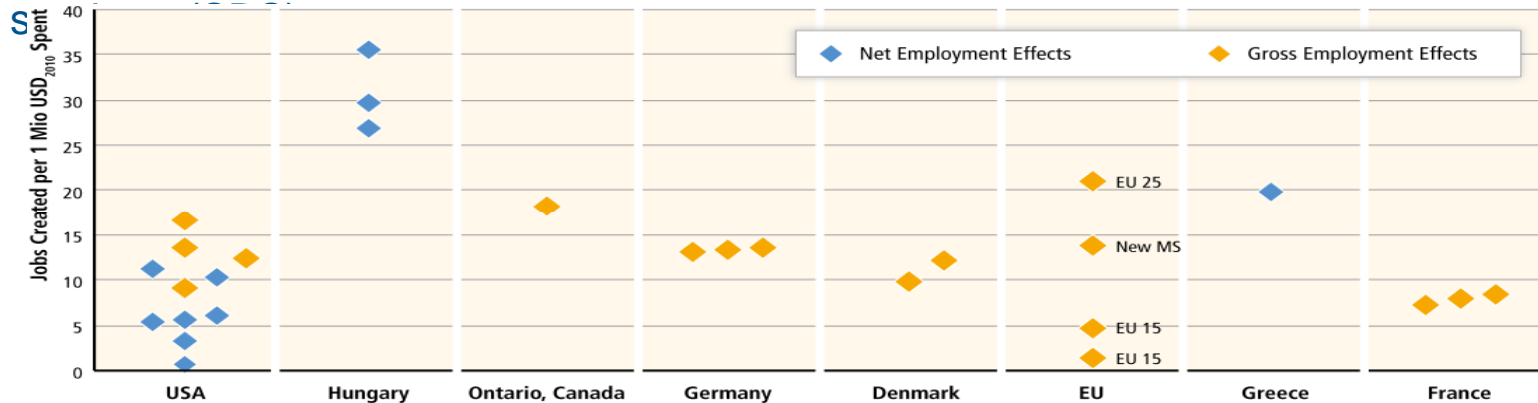


— WHO annual mean pm2.5 guideline values (= 10 µg/m³)



Key message from the Buildings chapter:

- Reduced outdoor pollution (health benefits of 2, 7 and 46 USD₂₀₁₀/tCO₂ in EU, China and India respectively)
- Reduced indoor pollution (by improved cookstoves, cleaner fuels mostly in developing countries)
- Improved indoor environmental conditions (by better insulation, ventilations and heating systems)- results fewer respiratory diseases and reduced sick building



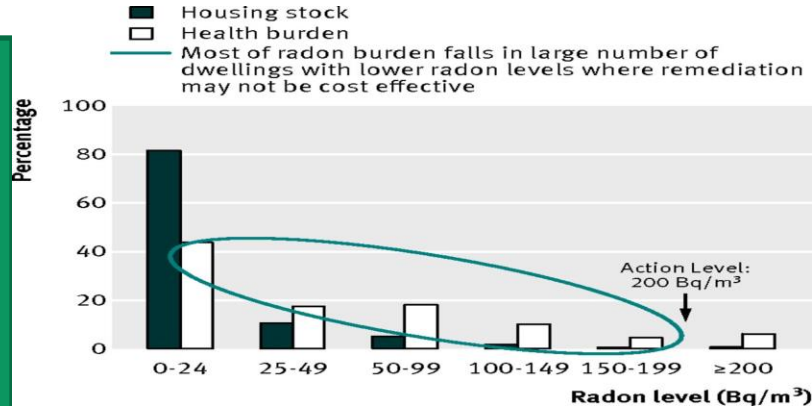
Household energy

Measures to improve household efficiency, listed for a study in the UK, include:

- more house insulation
- better ventilation and heat recovery
- a switch to electric heating
- a reduction in household temperature of 1°C and
- a combination of all the above.

These measures could potentially contribute to a reduction of GHG emissions by up to 36 % compared to the 1990 baseline as calculated for the UK example. Health co-benefits of these measures are mainly due to improved indoor air quality and are expected to be modest.

Source: Wilkinson P et al. Public health benefits of strategies to reduce greenhouse-gas emissions: household energy. Lancet, 2009,. 374(9705):1917–29.



Unless specific remediation is used, reducing the ventilation of dwellings will improve energy efficiency only at the expense of population wide adverse impact on indoor exposure to radon and risk of lung cancer.

Source: Milner J ,Shrubsole C ,Das P ,Jones B ,Ridley I ,Chalabi Z ,et al. Home energy efficiency and radon related risk of lung cancer: modeling study. BMJ 2014;348:f7493

Mitigation policies can result in health benefits when they also

Support slum redevelopment and better environmental design of transport, energy and utility infrastructure

Reduce vulnerability to floods, mud slides and natural disasters

Improve safe drinking-water and sanitation access

Improve indoor air quality



Reduce exposure to heat waves and extreme cold

Prevent vector and pest infestations

Prevent home injuries