

# Domestic heating and its impact on health

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# Burden of disease from joint effects of household and ambient air pollution - new WHO estimates

7 million premature deaths globally attributable to the joint effects of household (HAP) and ambient air pollution (AAP) in 2016

348 000 in Europe (LMIC)

208 000 in Europe (HIC)

233 000 in the Americas (LMIC)

96 000 in the Americas (HIC)

Air pollution causes non-communicable diseases (NCD), mainly stroke, ischaemic heart disease, chronic obstructive pulmonary disease (COPD) and lung cancer

# Burden of disease from ambient and household air pollution - new WHO estimates

## Burden of disease from ambient air pollution, 2016

**4.2 million premature deaths globally**

**82% of these deaths due to NCDs**

By WHO region:

304 000 in Europe (LMIC)

205 000 in Europe (HIC)

164 000 in the Americas (LMIC)

95 000 in Americas (HIC)

## Burden of disease from household air pollution, 2016

**3.8 million premature deaths globally**

**73% of these deaths due to NCDs**

By WHO region:

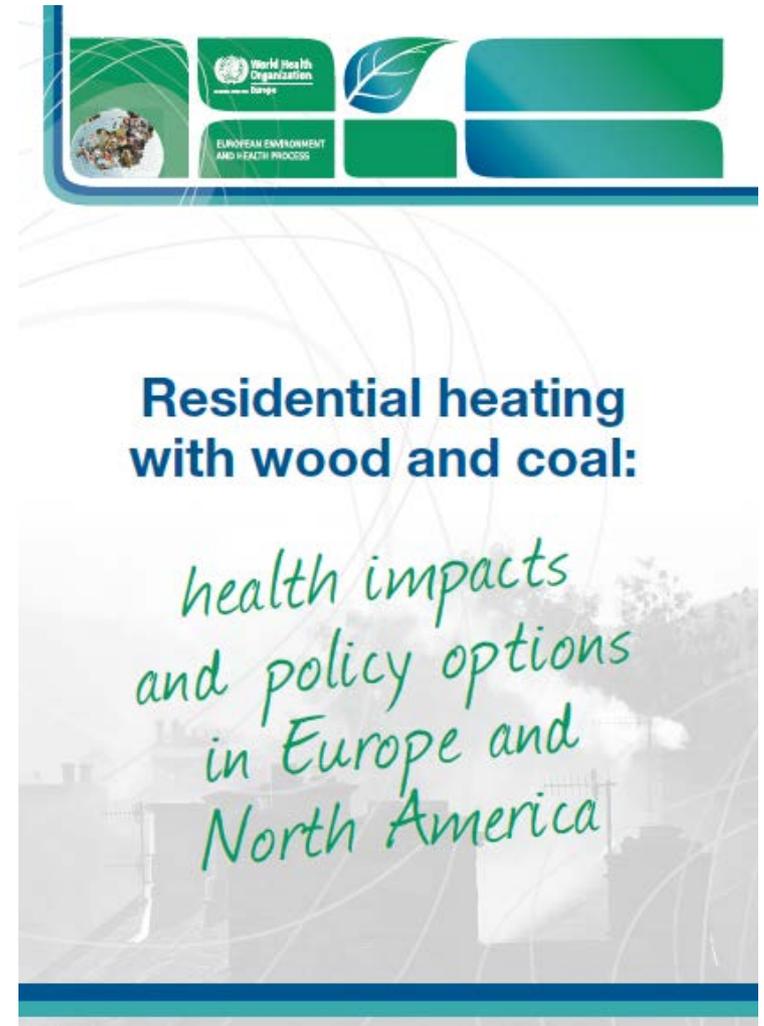
52 000 in Europe (LMIC)

82 000 in the Americas (LMIC)

# Residential heating with wood and coal – a significant source of air pollution

- A significant source of ambient air pollution; contributes also to indoor air pollution, through direct exposure or infiltration from outside
- Affects local- and regional-scale air quality, quantified as PM10, PM2.5, OC and EC/BC
- Contributions from residential wood combustion to PM10 and PM2.5 concentrations during the winter (heating) period range from < 5 % to 40 % of daily means
- The magnitude of the problem varies greatly by geography, prevalence of solid fuel use and the combustion technologies used

The report prepared by the Joint  
WHO/UNECE Long range Transboundary  
Air Pollution Convention  
Task Force on Health Aspects of Air  
Pollution



# Impact of residential wood combustion on PM2.5 in ambient air

Europe has the highest proportion of outdoor PM2.5 emissions attributable to household heating with solid fuels (data for 2010):

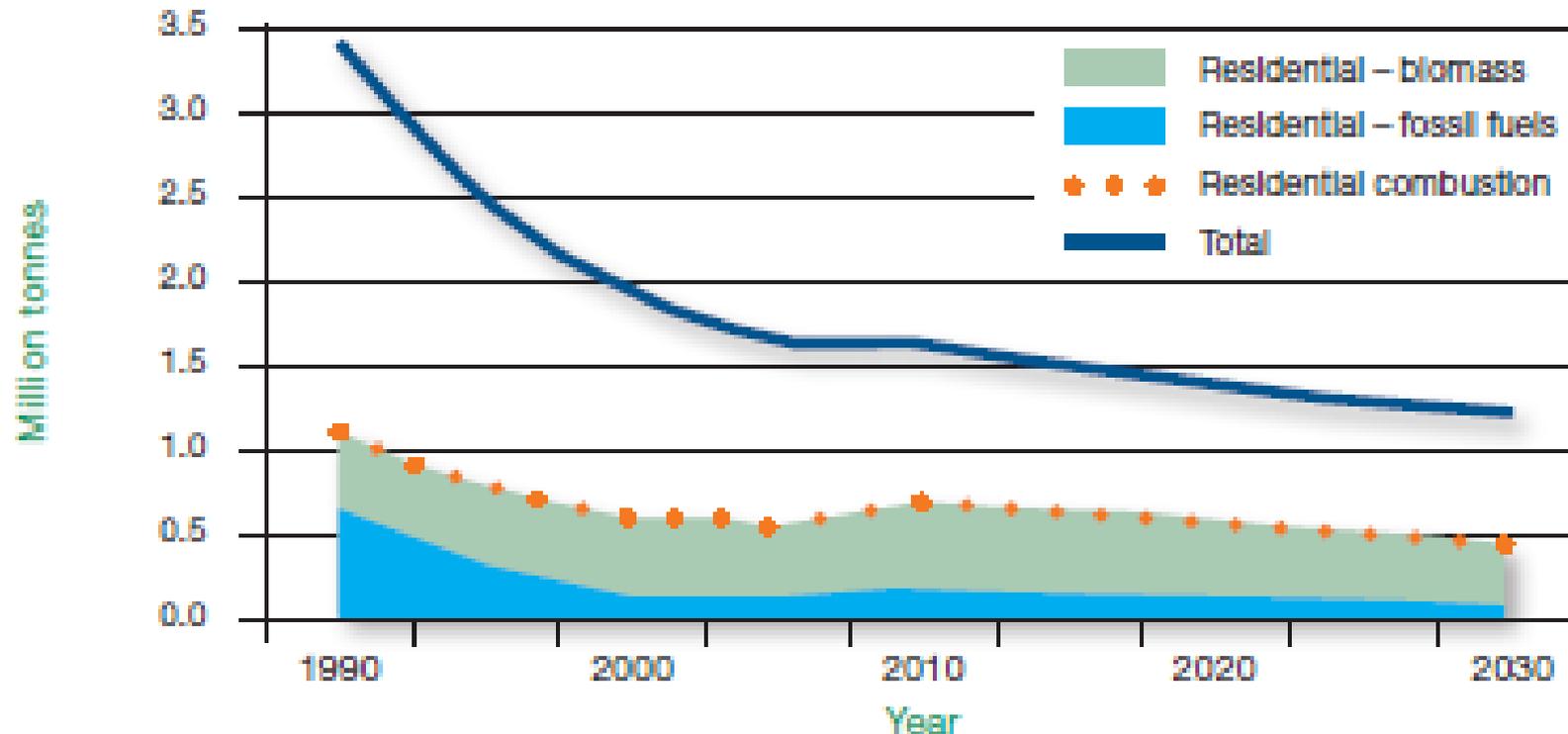
21%	in central Europe
12%	in western Europe
13%	in eastern Europe

This corresponds to average population-weighted PM2.5 concentrations of 1.7, 3.4 and 1.4  $\mu\text{g}/\text{m}^3$ , respectively

In North America, 8% of the total ambient PM2.5 comes from household heating with solid fuels (1.1  $\mu\text{g}/\text{m}^3$ )

WHO, 2015

# Emissions of PM2.5 from residential sources in the EU-28, 1990–2030

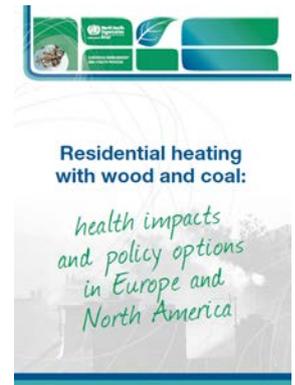


Notes: EU-28 is countries belonging to the EU after July 2013; current legislation scenario as in Amann et al. (2014), using the Greenhouse Gas and Air Pollution Interactions and Synergies (GAINS) model (Amann et al., 2011).

Source: reproduced with permission from the International Institute for Applied Systems Analysis (IIASA).

WHO, 2015

# Health effects of solid fuel heating emissions

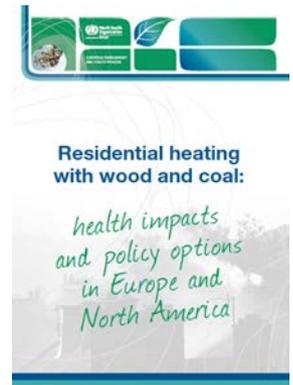


- Both short-term and long-term exposures to wood and coal smoke are harmful to health
- Emissions contain a range of particulate and gaseous pollutants, including products of incomplete combustion
  - PM2.5, BC, OC
  - CO, NO<sub>x</sub>, PAHs, SO<sub>2</sub>, VOCs
- Respiratory problems are a common concern associated with exposure to wood smoke
- Studies suggest that exposure to wood and coal smoke may also harm cardiovascular health

# Residential heating contribution to outdoor PM<sub>2.5</sub> and burden of disease, selected regions, 1990 and 2010

Region	PM <sub>2.5</sub> from residential heating (%)		PM <sub>2.5</sub> from residential heating (µg/m <sup>3</sup> )		Premature deaths/year		Disability-adjusted life-years (DALYs)/year	
	1990	2010	1990	2010	1990	2010	1990	2010
Central Europe	11.1	21.1	3.5	3.4	18 000	20 000	370 000	340 000
Eastern Europe	9.6	13.1	2.0	1.4	24 000	21 000	480 000	410 000
Western Europe	5.4	11.8	1.3	1.7	17 000	20 000	280 000	290 000
High-income North America	4.6	8.3	0.9	1.1	7 500	9 200	140 000	160 000
Central Asia	9.9	8.3	2.4	1.6	5 500	4 200	180 000	110 000
Global	3.0	3.1	0.9	0.7	120 000	110 000	2 800 000	2 200 000

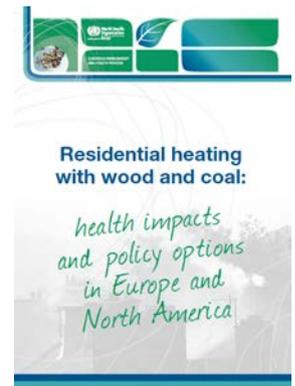
WHO, 2015



# Interventions to decrease emissions and improve air quality

- Fuel switching (away from coal and other solid fuels)
- Use of more efficient heating technologies (such as certified fireplaces or pellet stoves)
- Heater and wood stove exchanges
- District heating
- Filters to reduce health effects from indoor air pollution
- Educational campaigns as a tool to reduce emissions from residential solid fuel heaters

# Regulatory and voluntary measures to reduce emissions and health impacts of household combustion



- Regulatory emissions limits
- “No burn” days (regulatory and voluntary)
- Heater exchange regulations
- Information campaigns, especially to increase knowledge about the energy efficiency of heating options
- Better coherence between climate, energy and air quality policies



# Thank you for your attention

<http://www.euro.who.int/en/health-topics/environment-and-health>