Inquinamento atmosferico e particolato fine

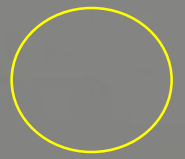
Cosa possono fare le città per migliorare la qualità dell'aria?

P. Thunis, EC-JRC

Novembre 24, 2020

PM ~ 470 ug/m3

Olympic Tower



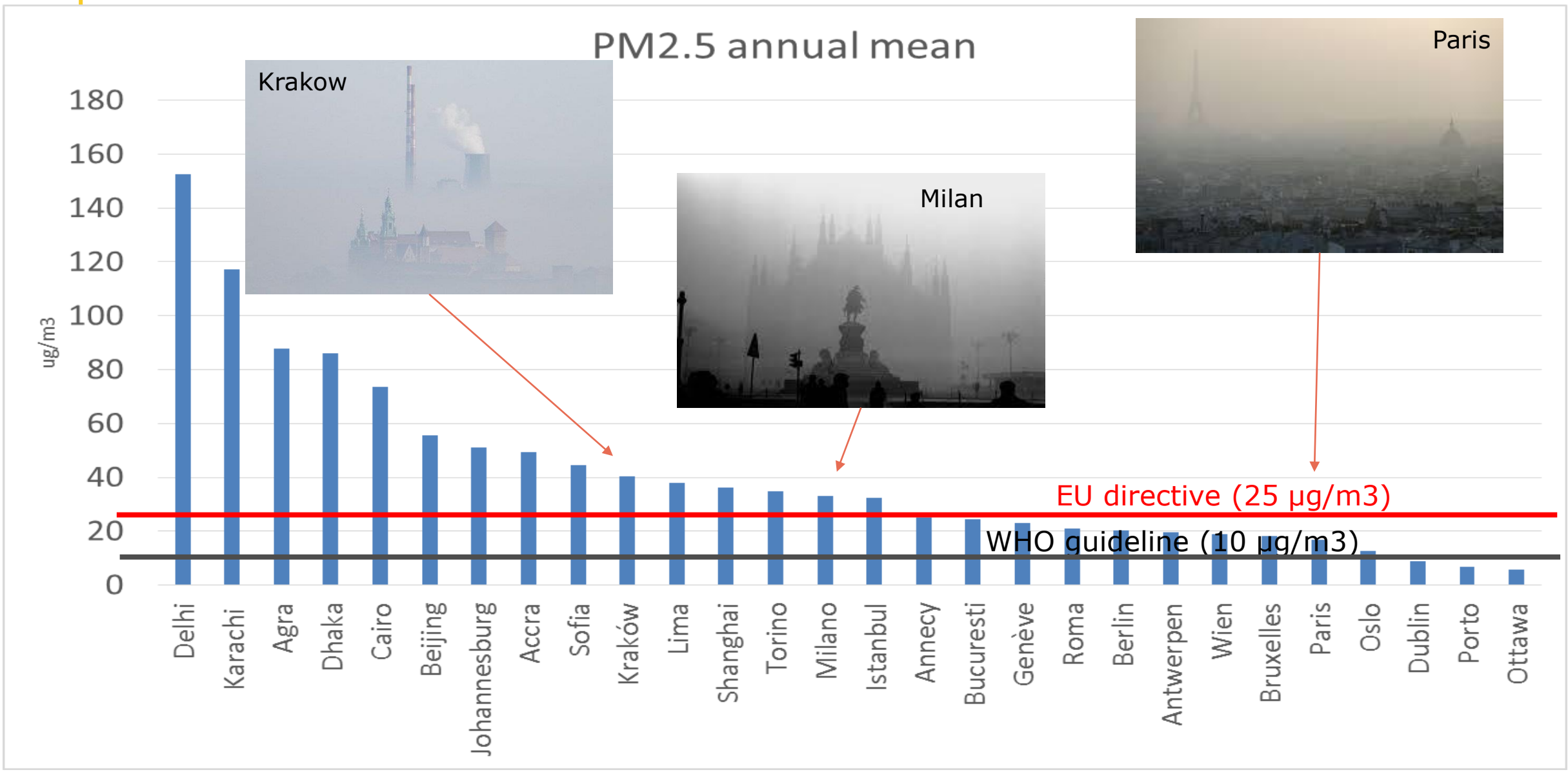
奥运区俯瞰实时图

Source(s): CAS-IAP, Beijing

中国科学院大气物理研究所

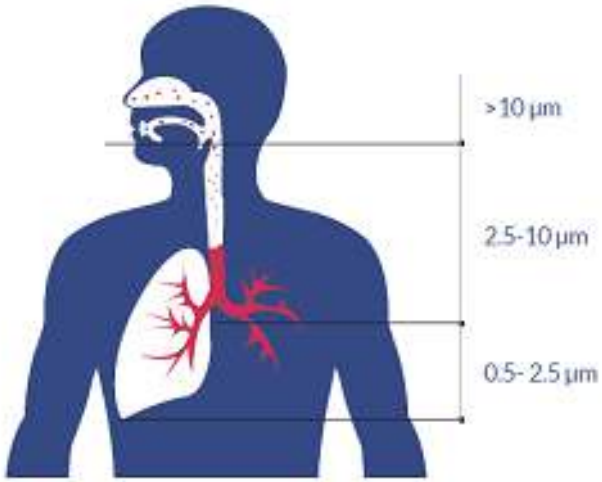

2015-12-15 星期二 10:29:51
Olympic Tower
奥运区俯瞰实时图
东北
中国科学院大气物理研究所
Source(s): CAS-IAP, Beijing

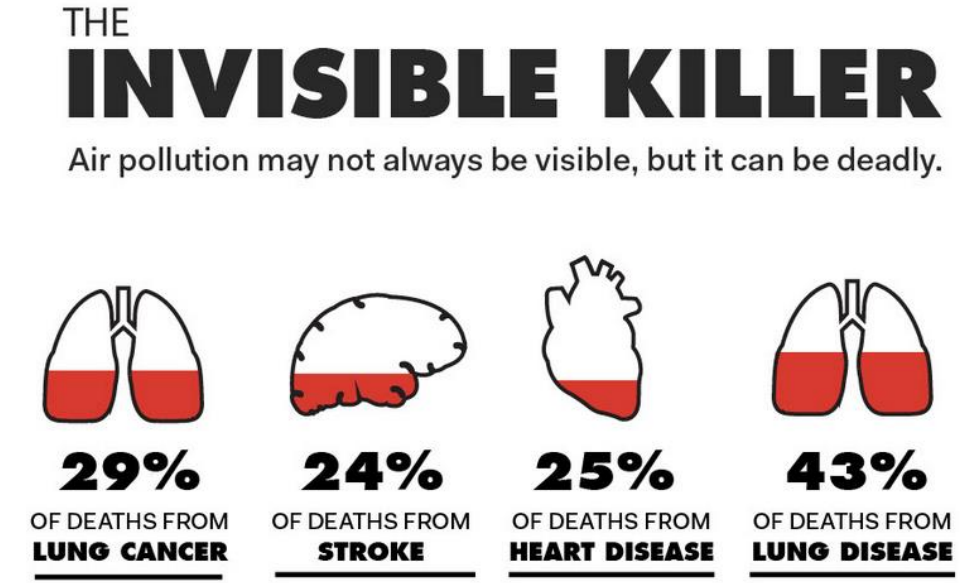
Background


PM2.5 annual mean
ug/m3
180
160
140
120
100
80
60
40
20
0
Krakow
Milan
Paris
EU directive (25 µg/m3)
WHO guideline (10 µg/m3)
Delhi
Karachi
Agra
Dhaka
Cairo
Beijing
Johannesburg
Accra
Sofia
Kraków
Lima
Shanghai
Torino
Milano
Istanbul
Annecy
Bucuresti
Genève
Roma
Berlin
Antwerpen
Wien
Bruxelles
Paris
Oslo
Dublin
Porto
Ottawa

379.000 premature deaths in the EU28 ($PM_{2.5}$ 2018)







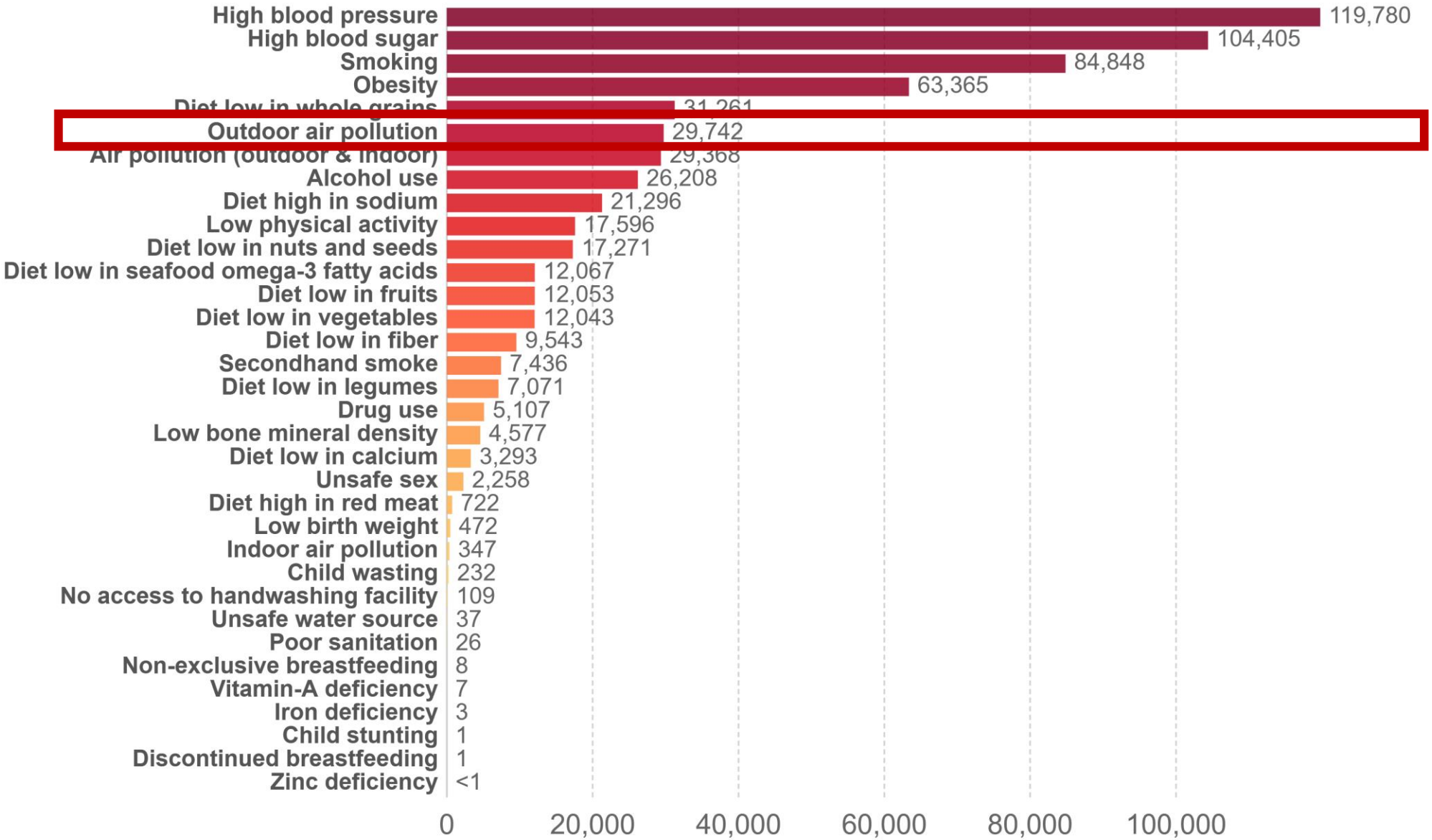


Air pollution is estimated to cause at least € 24 billion per year in direct costs; and €330 billion to € 940 billion per year in indirect costs.

European Commission

Number of deaths by risk factor, Italy, 2017

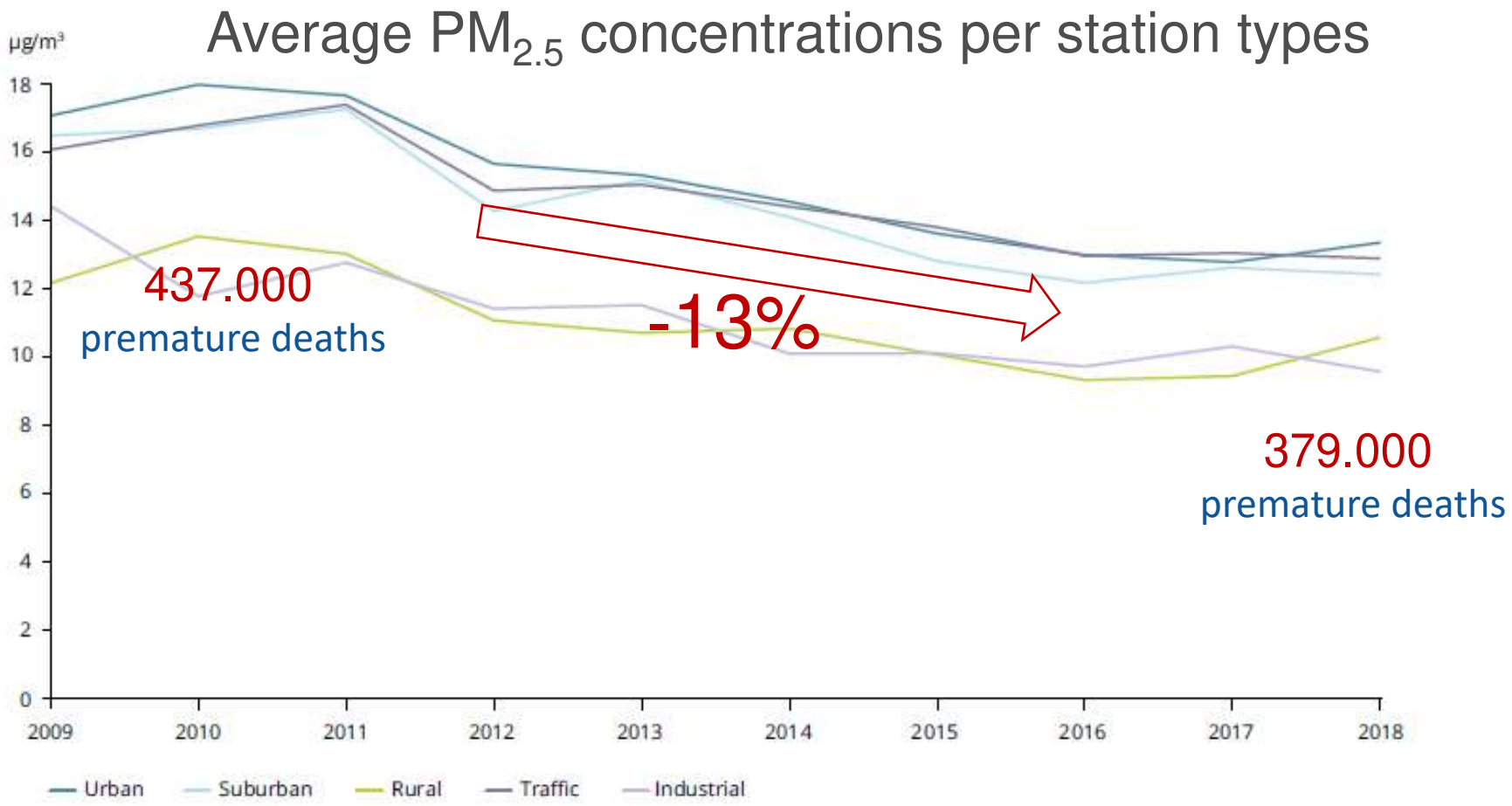
Total annual number of deaths by risk factor, measured across all age groups and both sexes.



Source: IHME, Global Burden of Disease (GBD)

CC BY

Europe's air quality is slowly improving…



Source(s): EEA Air Quality in Europe (2020)

European Commission

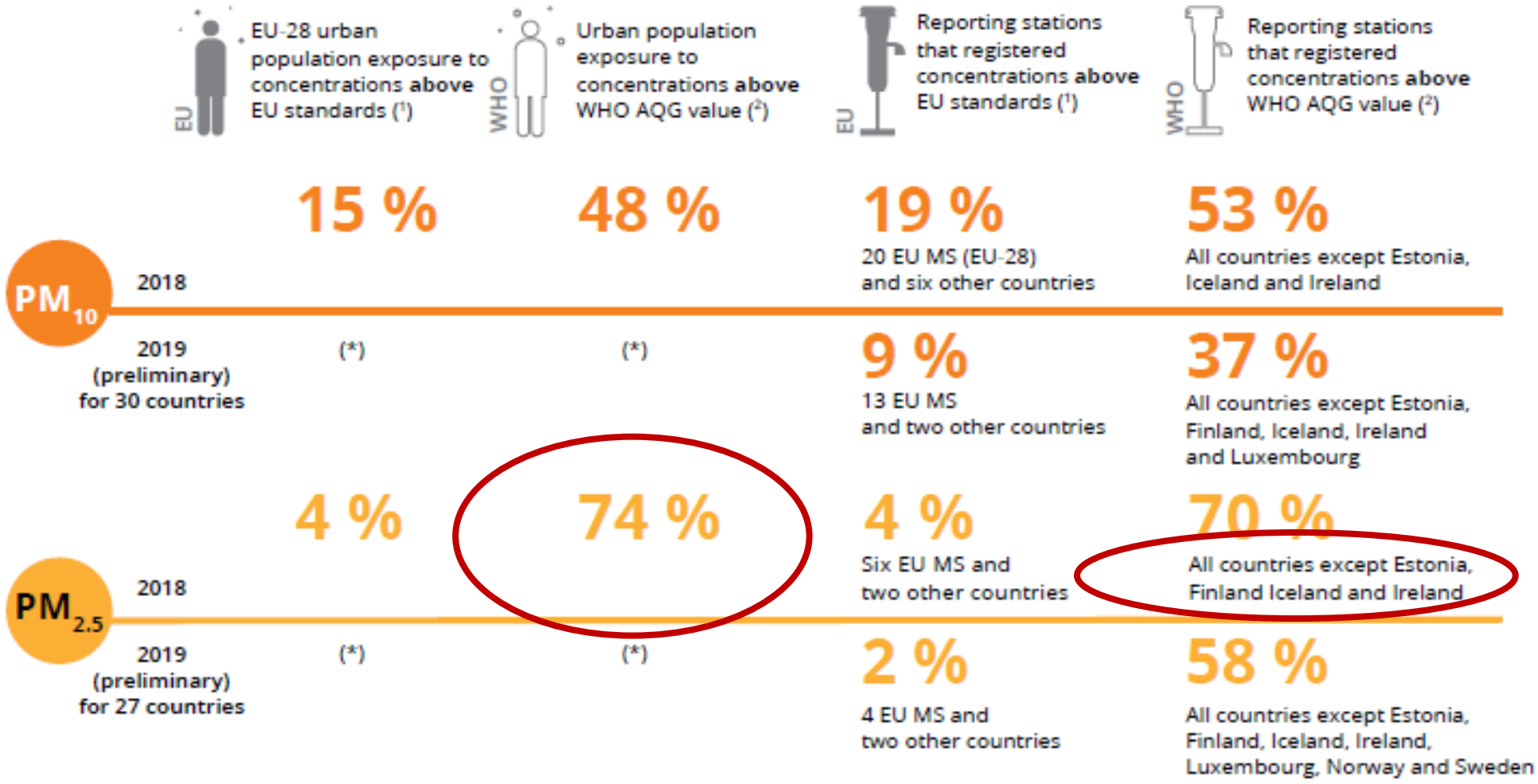
Europe’s air quality is slowly improving…

$PM_{2.5}$	437000 premature deaths	-13%	379000 premature deaths
NO_2	117000 premature deaths	-54%	54000 premature deaths
O_3	15700 premature deaths	+24%	19500 premature deaths

Source(s): EEA Air Quality in Europe (2020)

European Commission

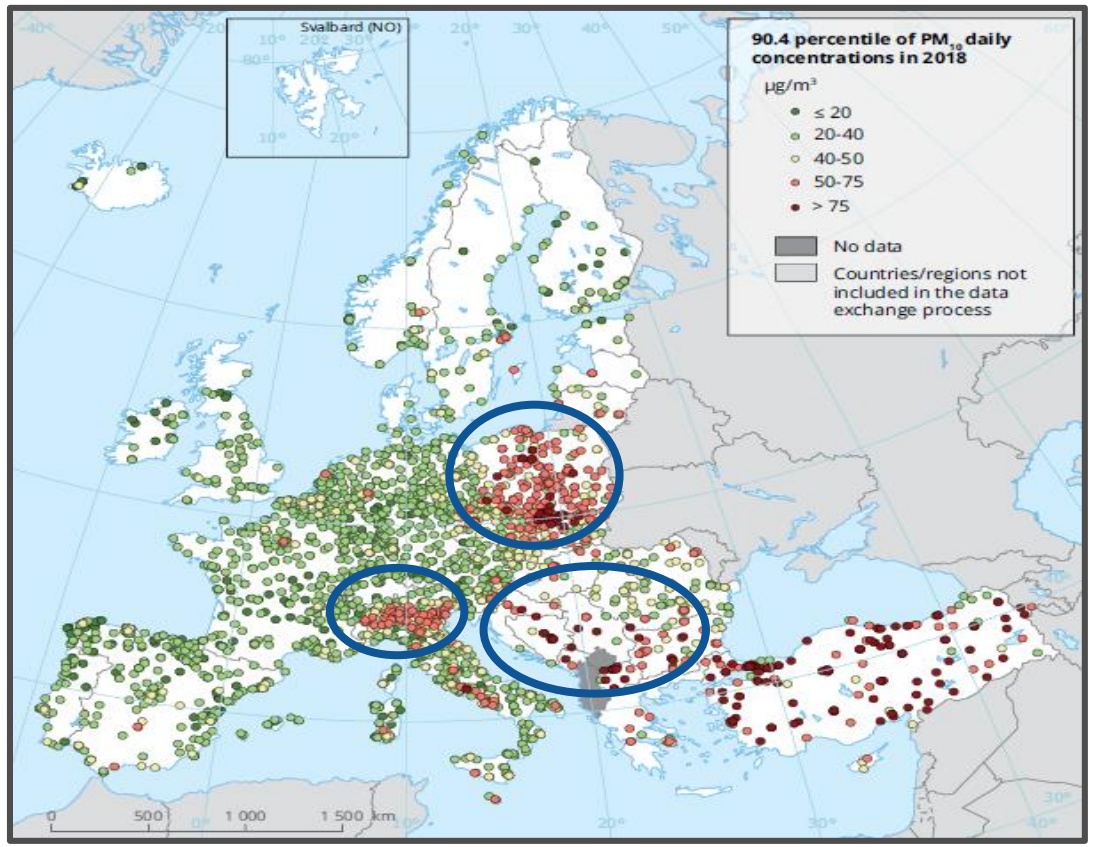
but 2/3 of EU citizens breath polluted air in cities



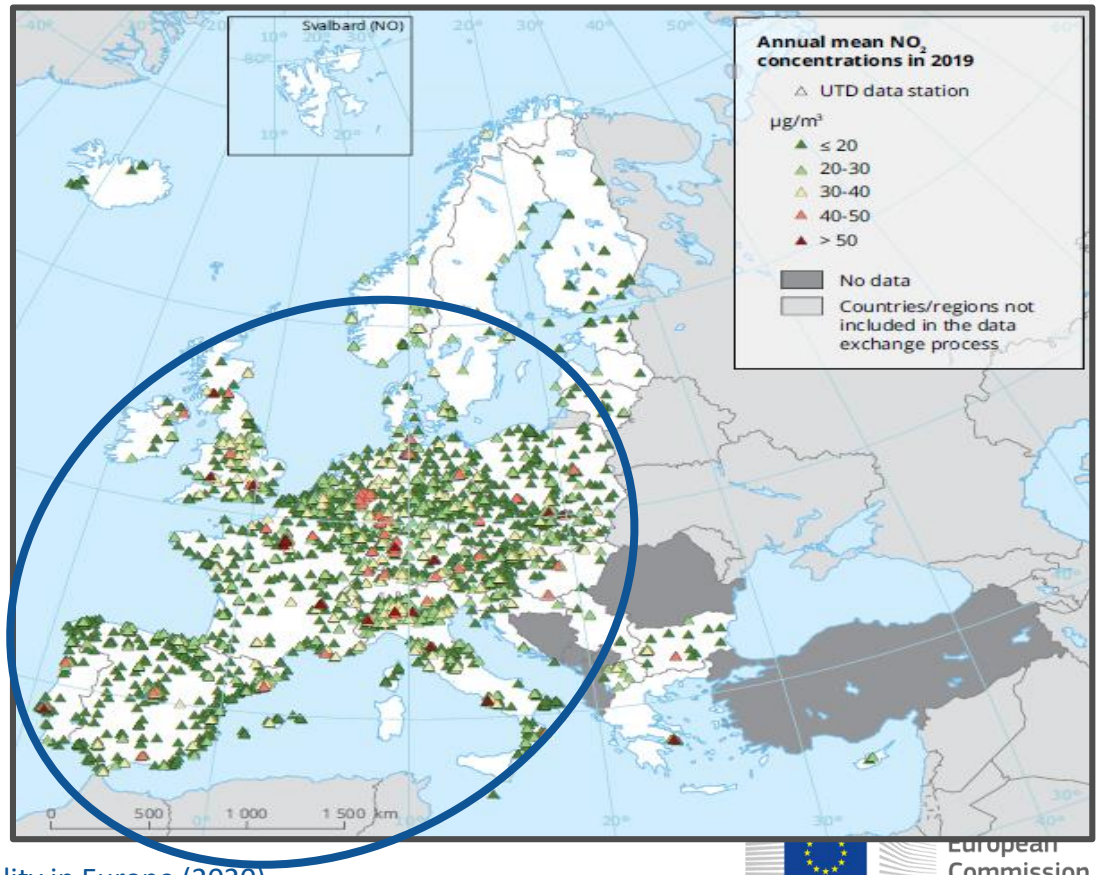
Source(s): EEA Air Quality in Europe (2020)

Different pollutants originate from different sources and lead to different challenges

PM10 exceedances: often linked to fuel combustion (i.e. energy, heating)



NO2 exceedances: often linked to traffic, in more than 130 cities in EU.



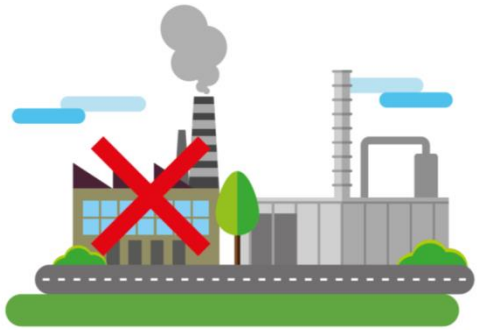
Source(s): EEA Air Quality in Europe (2020)

Improving Air Quality – Effective Measures

Examples for Particulate Matter



Boosting **energy efficiency** by refurbishing buildings



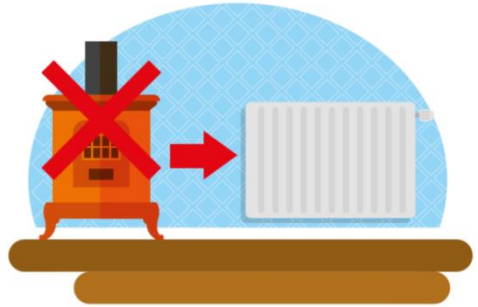
Implementing **cleaner industrial processes**



Reliable, affordable and clean **public transport** such as electric buses and trams and new Euro VI



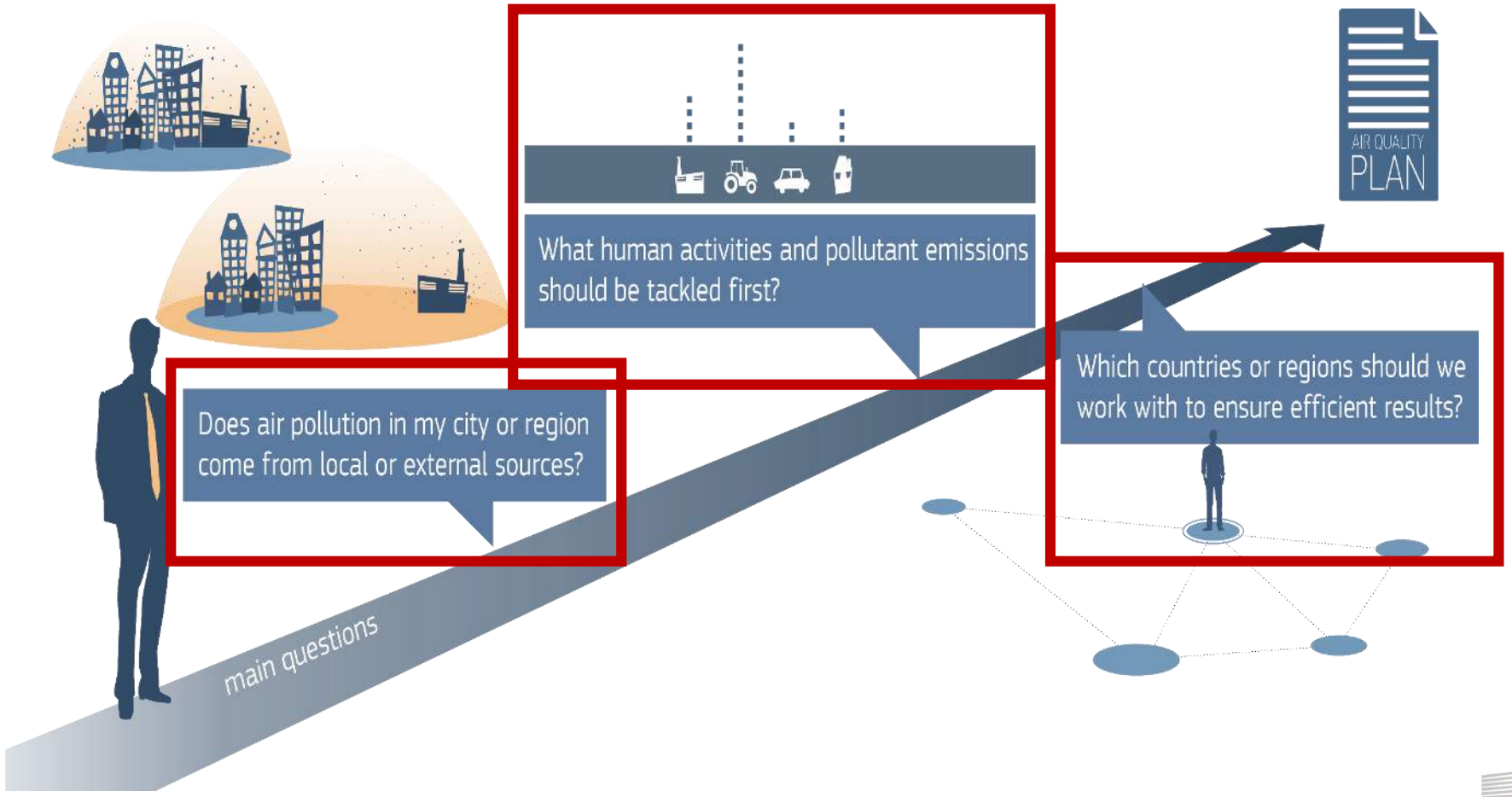
City or district heating, using heat from existing industry or renewable energy sources



Promoting substitution of old, dirty **stoves and boilers** with clean models, and banning **dirty fuels for household heating/cooking**

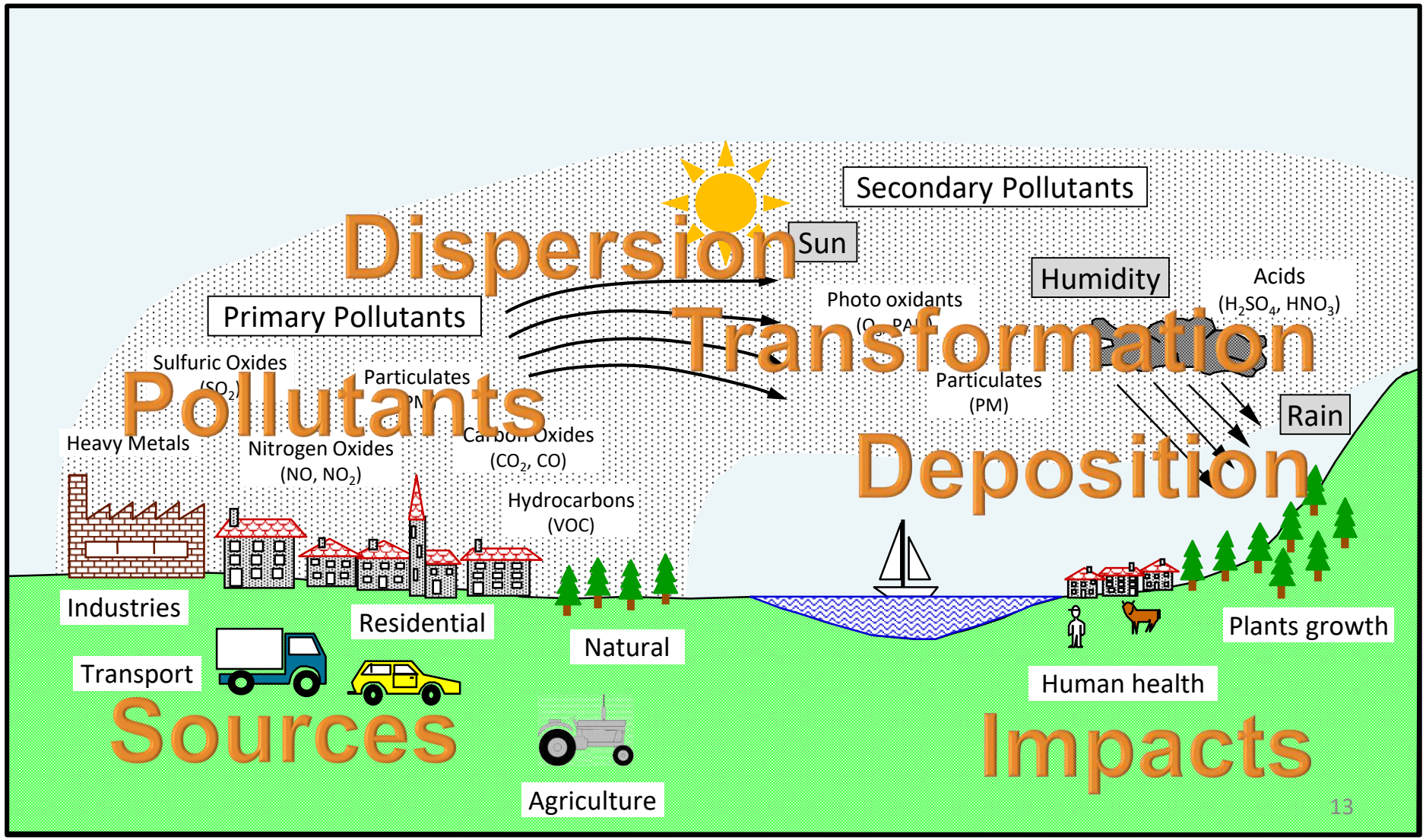
European Commission

A tool to support the design of air quality plans



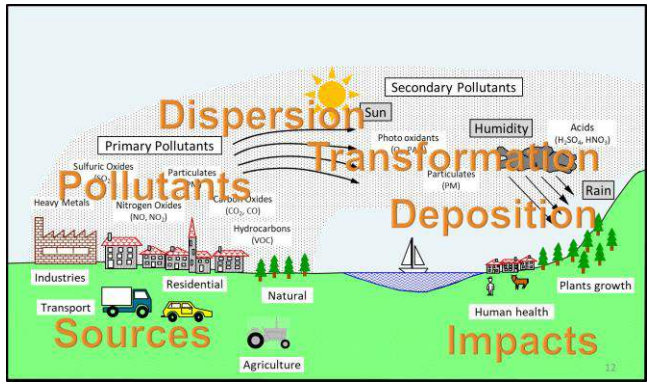
European Commission

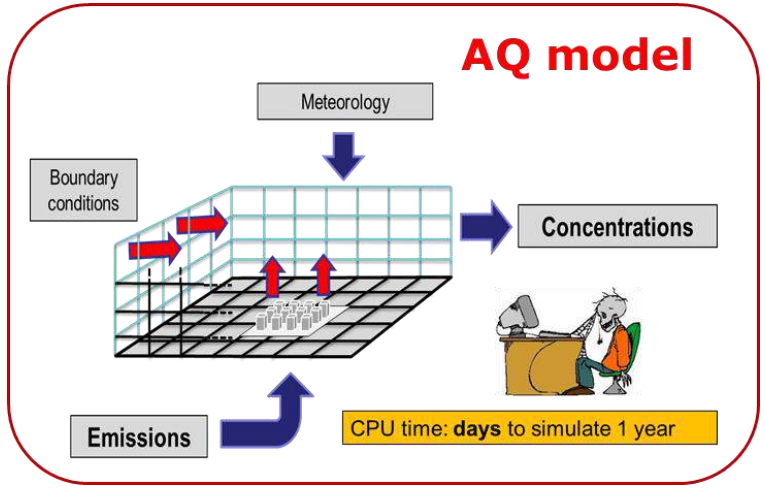
Air Quality is a complex issue

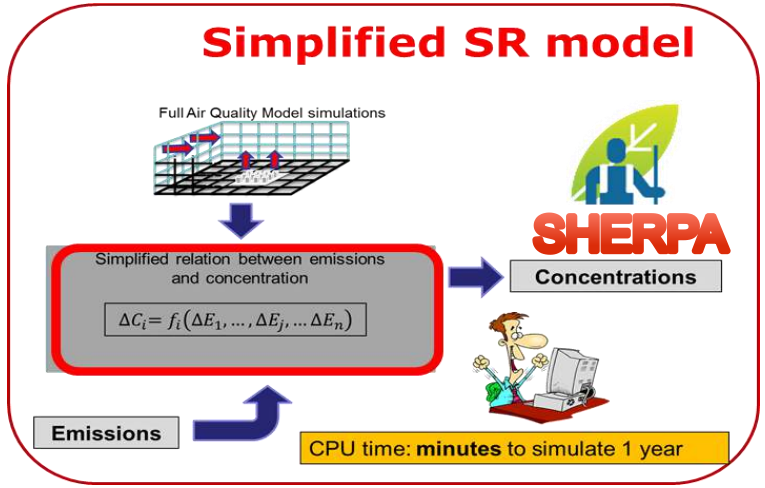


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Main challenges and dedicated tools







Screening for High Emission Reduction Potentials on Air quality



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journal homepage: www.elsevier.com/locate/jenvman

Research article

On the design and assessment of regional air quality plans: The SHERPA approach

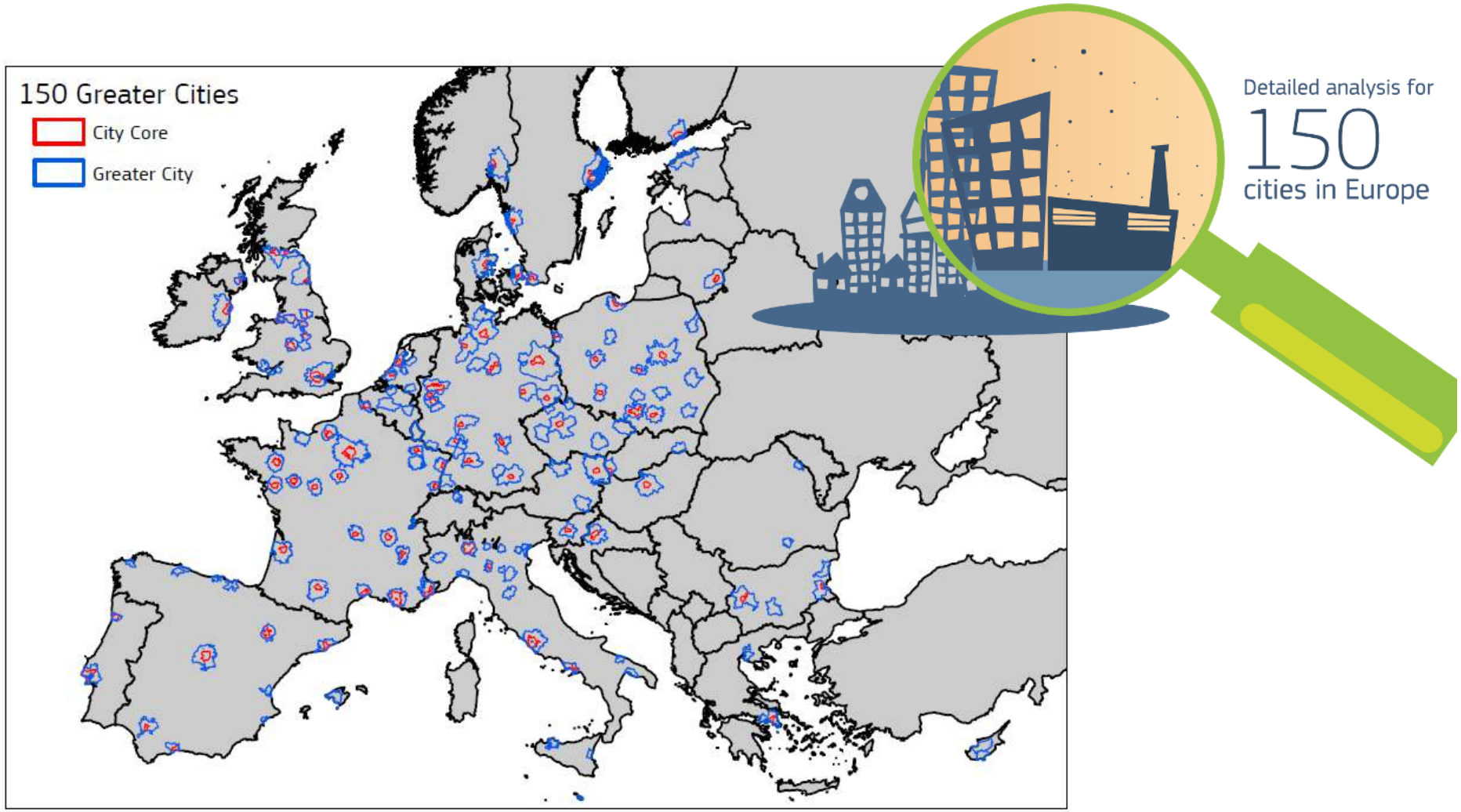
P. Thunis [a, *], B. Degraeuwe [a], E. Pisoni [a], F. Ferrari [b], A. Clappier [c]

[a] European Commission, Directorate for Energy, Transport and Climate, Ispra, Italy
[b] TerrAria srl, Via M. Gioia 132 20125 Milan, Italy
[c] Université de Strasbourg, Laboratoire Image Ville Environnement, Strasbourg, France

European Commission

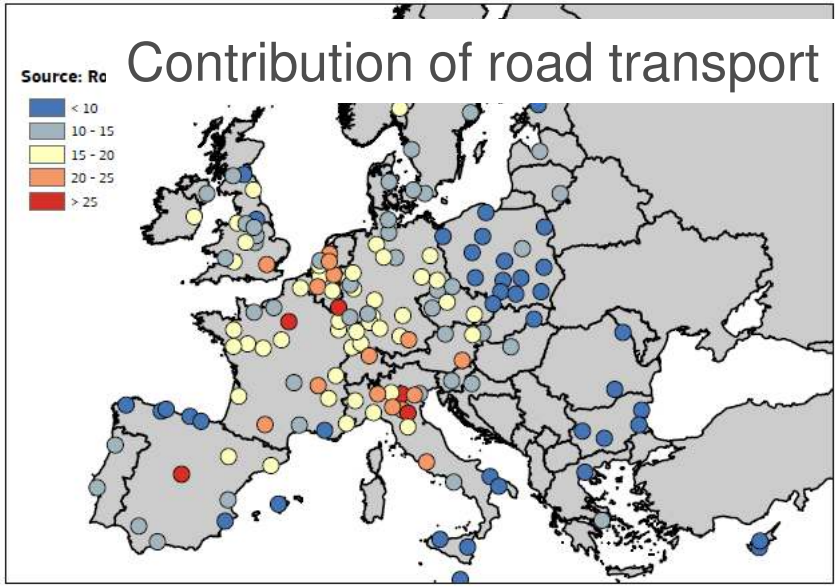
Mapping the source of PM2.5 in the EU (Urban Air Quality Atlas, JRC-C05)



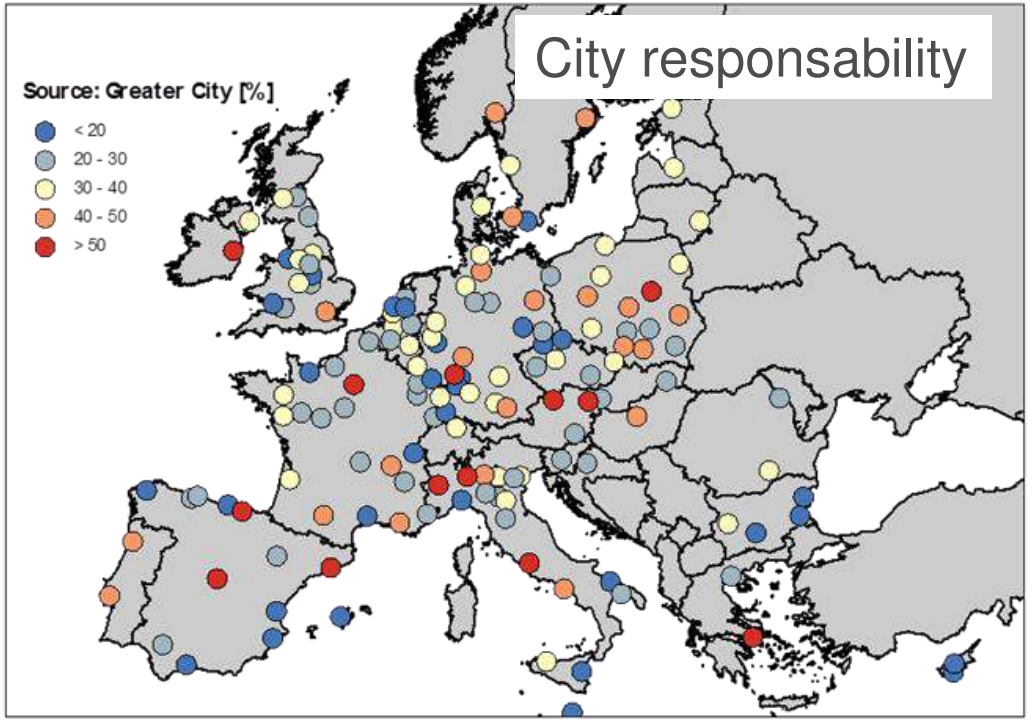


European Commission

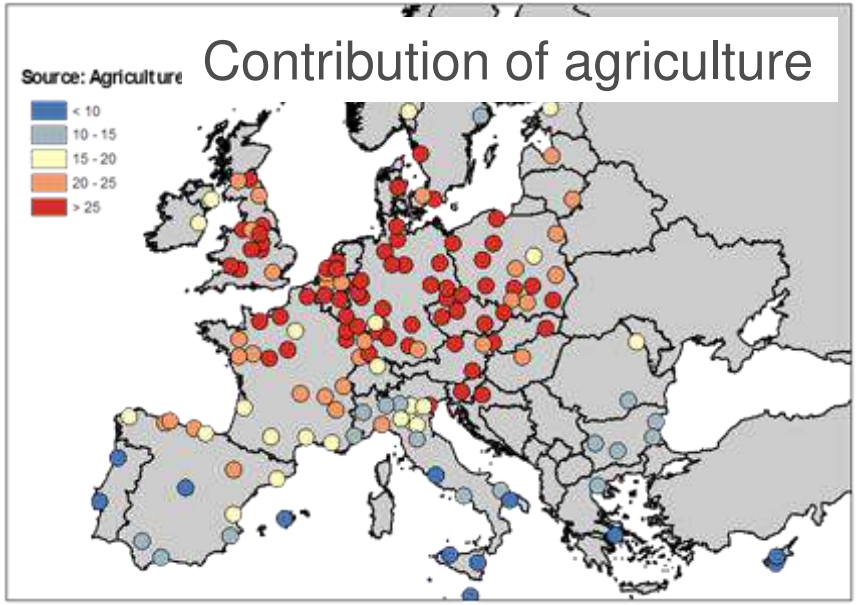
Overview maps



Contribution of road transport



City responsability



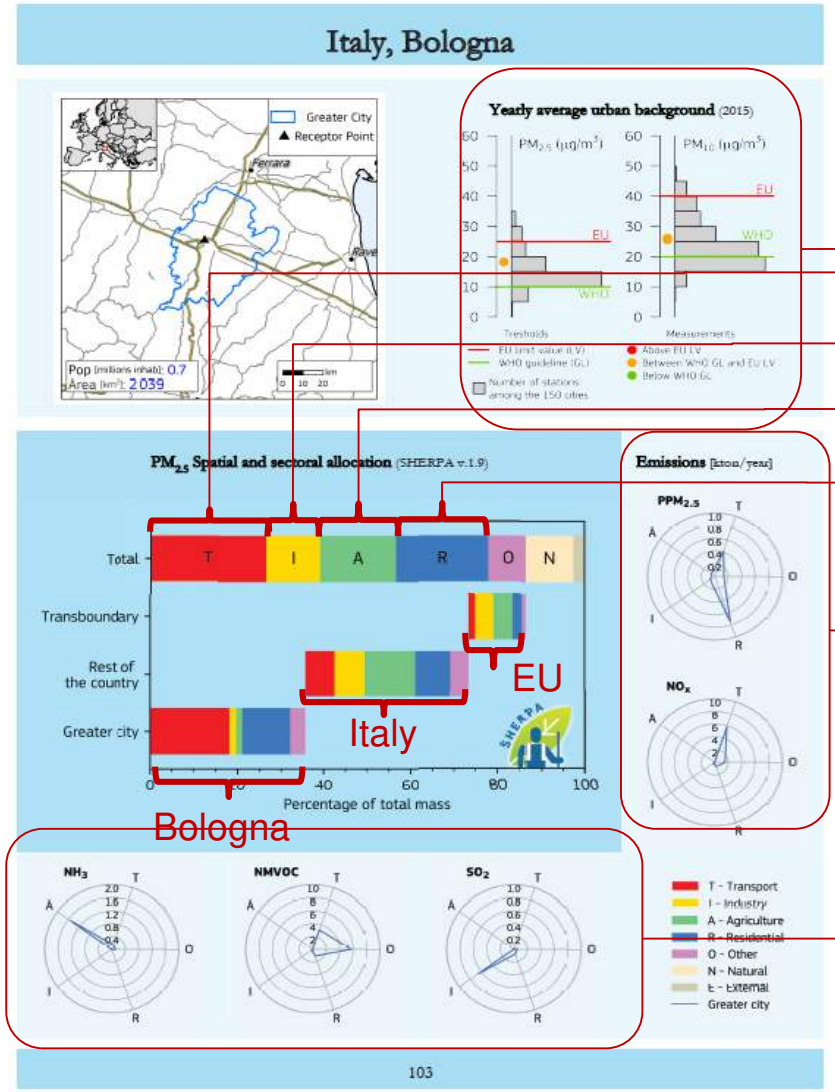
Contribution of agriculture



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Mapping the source of PM2.5 in the EU (Urban Air Quality Atlas, JRC-C05)





Measurements

Transport

Industry

Agriculture

Residential

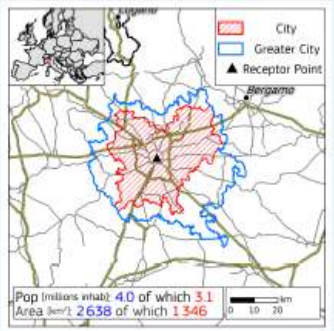
Emissions

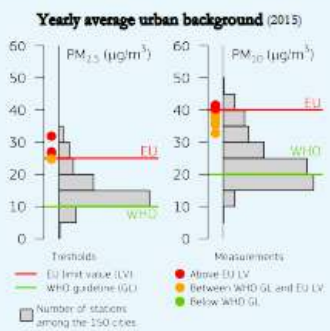
Information for additional cities & regions can be produced with the JRC SHERPA air quality integrated tool (freely available)

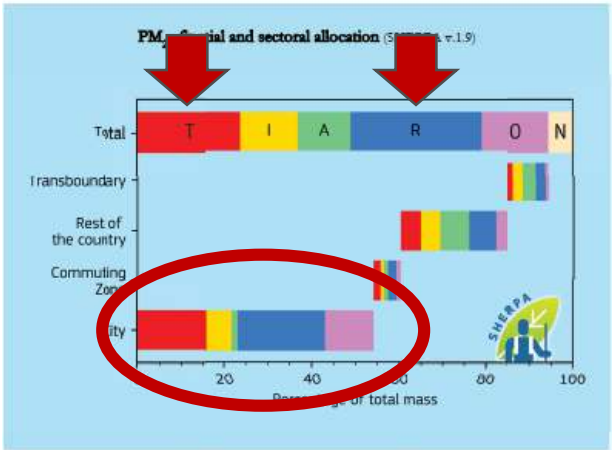
SHERPA

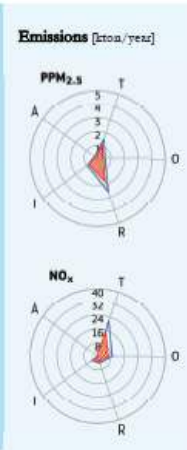
European Commission

Italy, Milan





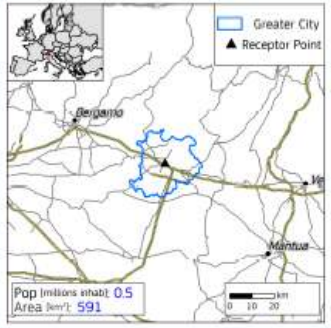


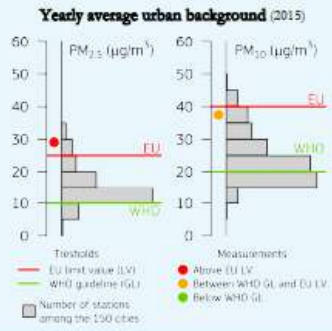


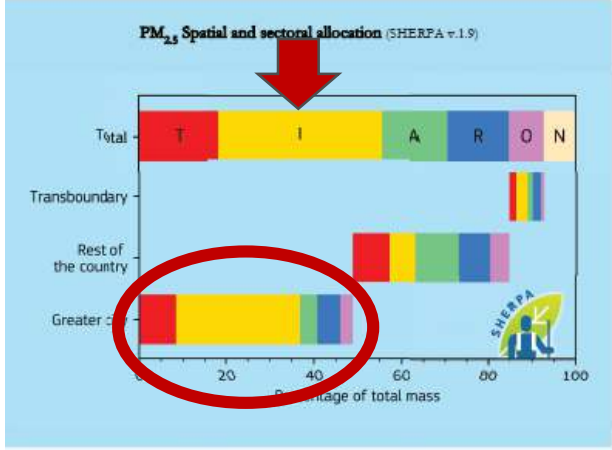


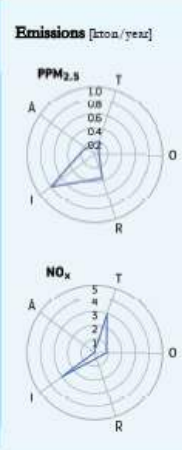
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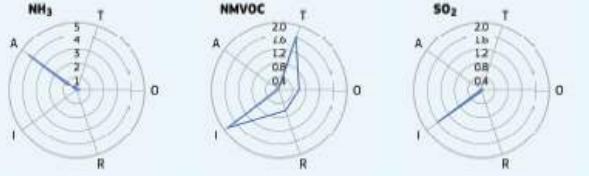
Italy, Brescia





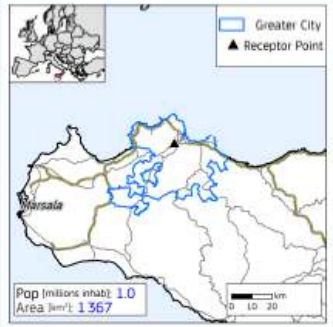


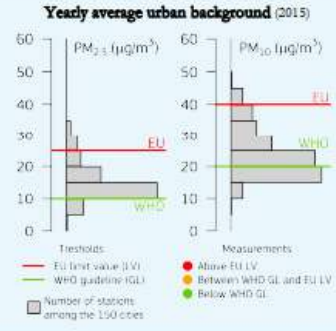


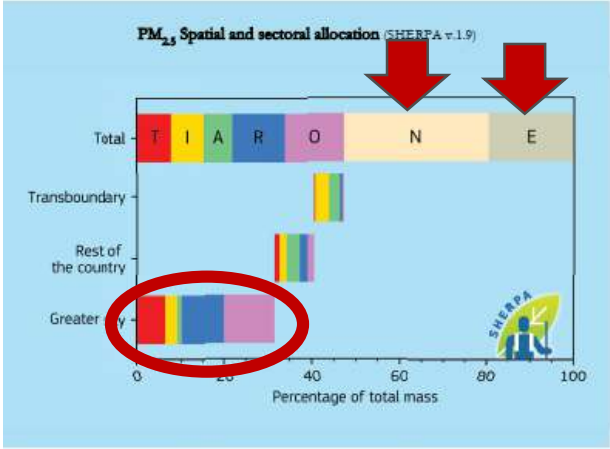


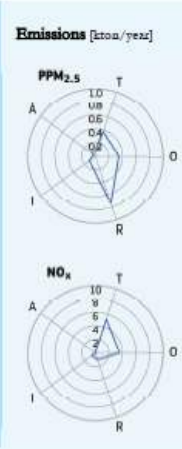
104

Italy, Palermo











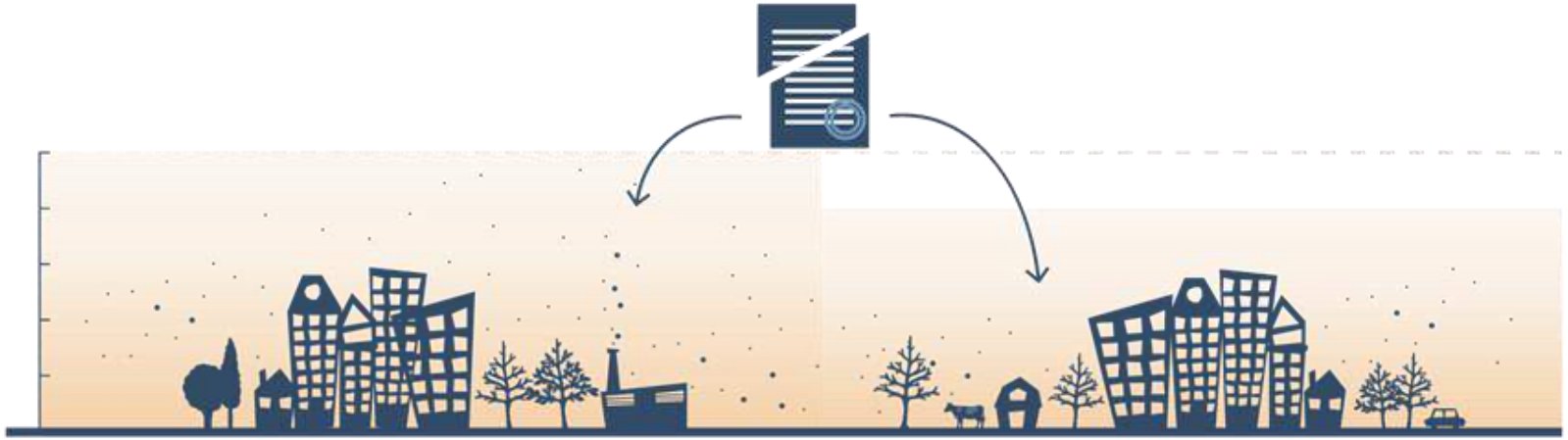
112

European Commission

Mapping the source of PM2.5 in the EU (Urban Air Quality Atlas, JRC-C05)



Air quality plans (sectors, scales) should be city specific



European Commission

Mapping the source of PM2.5 in the EU (Urban Air Quality Atlas, JRC-C05)



Local actions at the city scale are an effective means of improving air quality.



European Commission

Mapping the source of PM2.5 in the EU (Urban Air Quality Atlas, JRC-C05)



Sectoral measures addressing agriculture at country or EU scale would have a clear benefit on urban air quality.



European Commission

Available documents and tools

- The urban Air Quality PM2.5 Atlas is available at:

https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/urban-pm25-atlas-air-quality-european-cities

- The SHERPA Air Quality integrated tool is available at:

http://aqm.jrc.ec.europa.eu/sherpa.aspx

European Commission

Grazie

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