

Europe's Air Quality

An updated overview



European Environment Agency



Martin Adams | 16 October 2020

The European Environment Agency (EEA)

The EEA is:

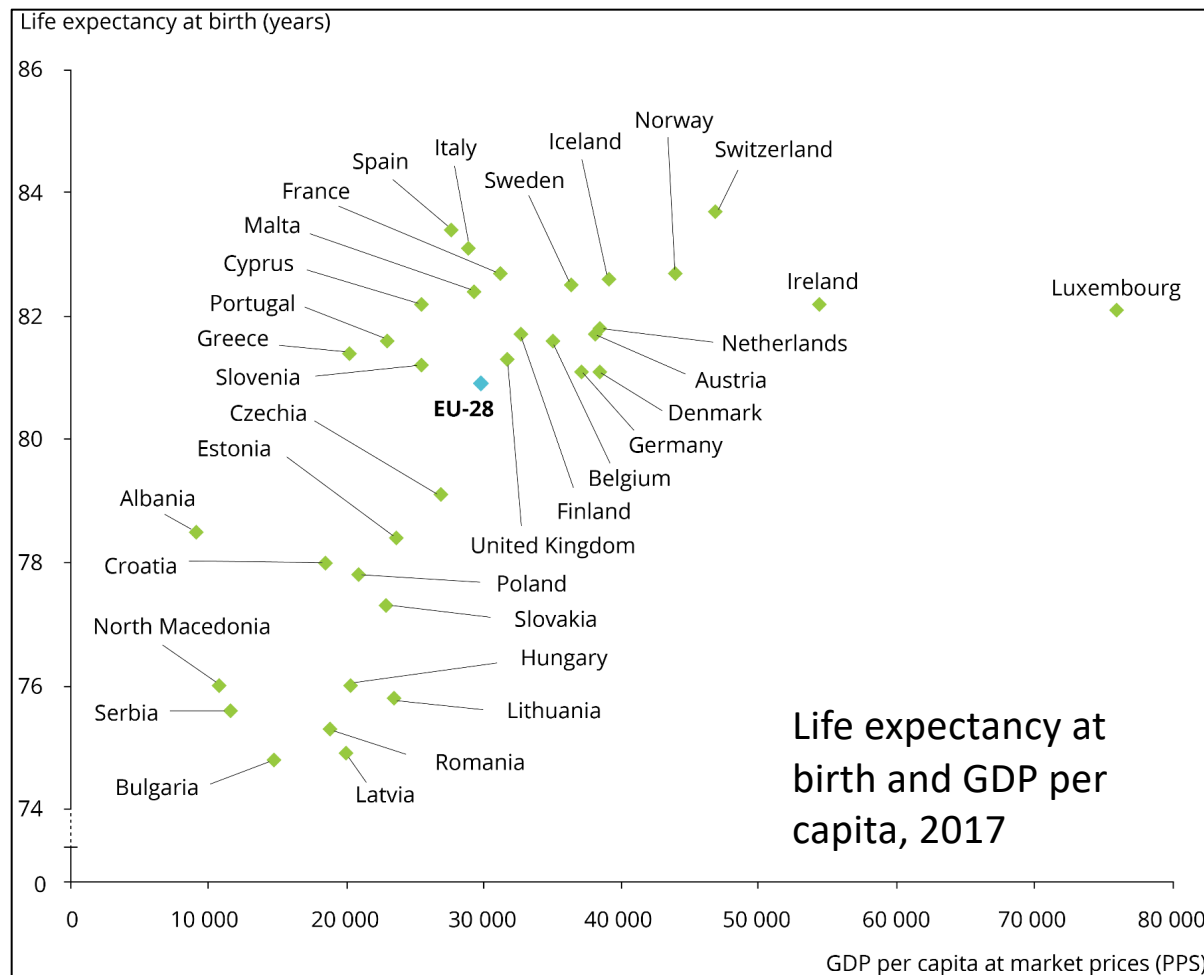
- An independent EU agency
- Analysing, assessing and disseminating information
- An interface between science and policy
- Dependent upon strong country networks to carry out our work

The EEA is not:

- An environmental regulator checking compliance with environmental laws
- Developing or proposing new legislation
- A funding body



Health inequities across Europe



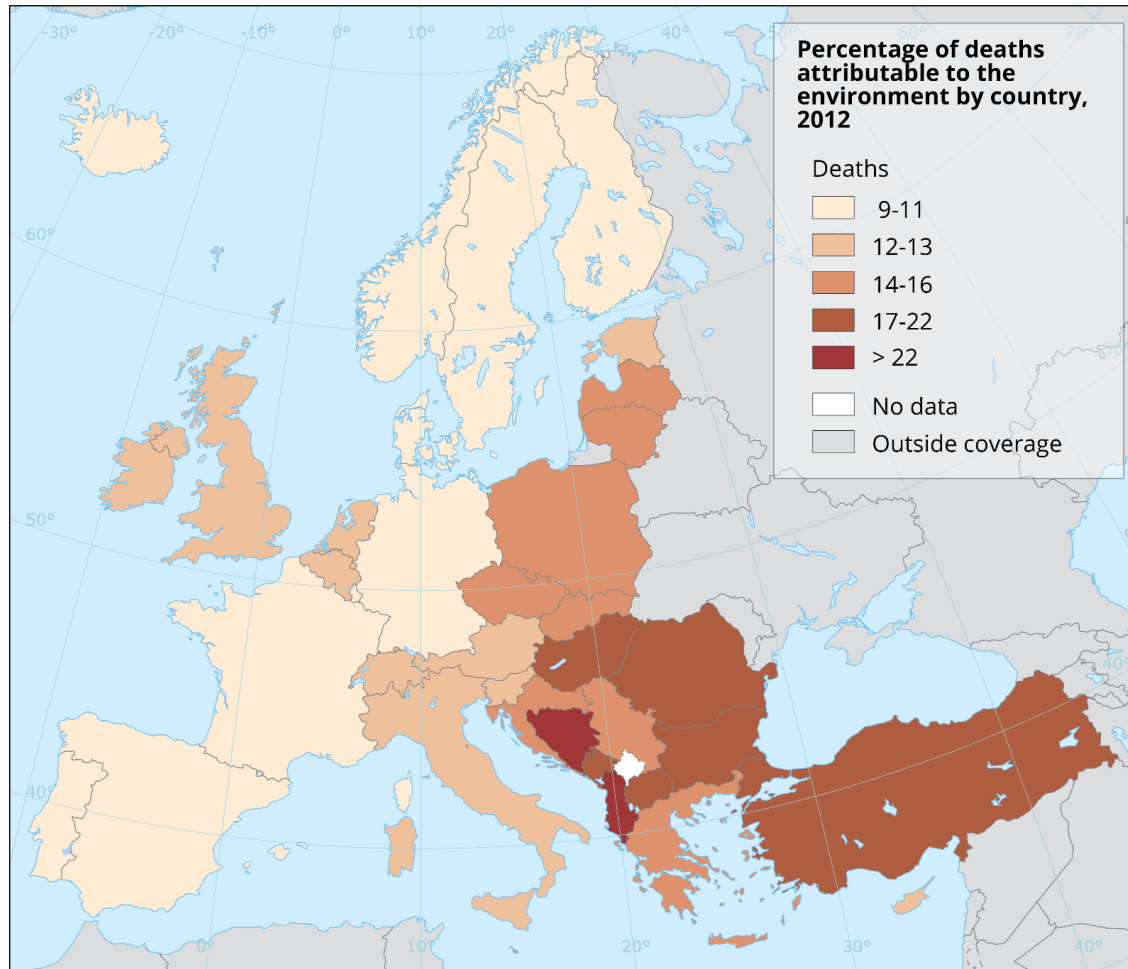
8 years difference in life expectancy across EU Member States

Poorer people live..

- live shorter lives
- fewer healthy life-years and have...
- poorer self-perceived health
- more long-term health problems

Source: Eurostat

Deaths linked to environmental pollution



1 in 8 deaths (~13 %) are linked to environmental pollution in Europe

Differences across Europe:
East and West

Pollution is associated with
27 % of deaths in Romania
10 % in Denmark and Sweden

And beyond the EU...
27 % in Bosnia and Herzegovina

Source: WHO (2016)

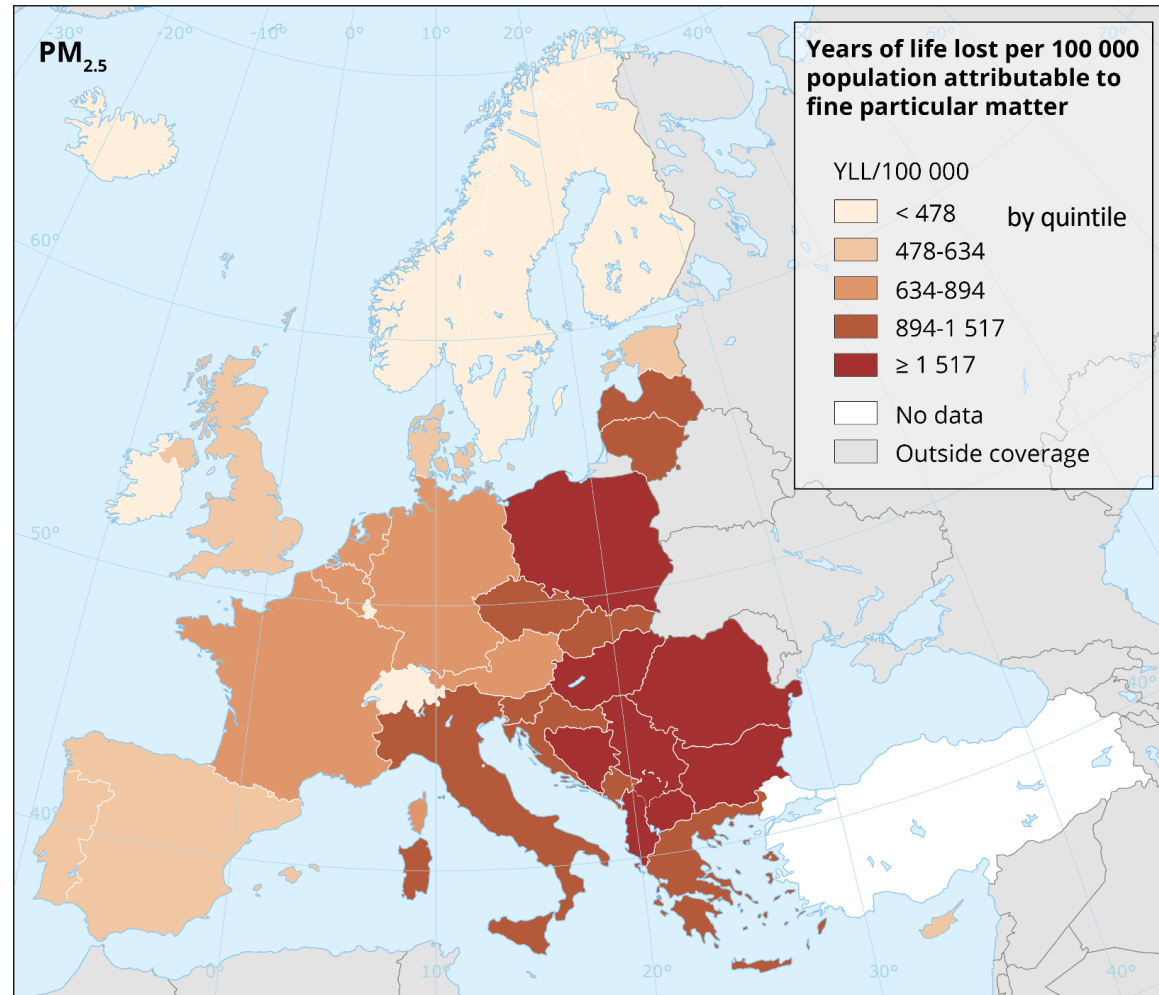
EU: No 1 environmental risk factor – Air pollution

379 000 premature deaths per year in Europe in 2018 from PM_{2.5}

Air pollution is linked to:

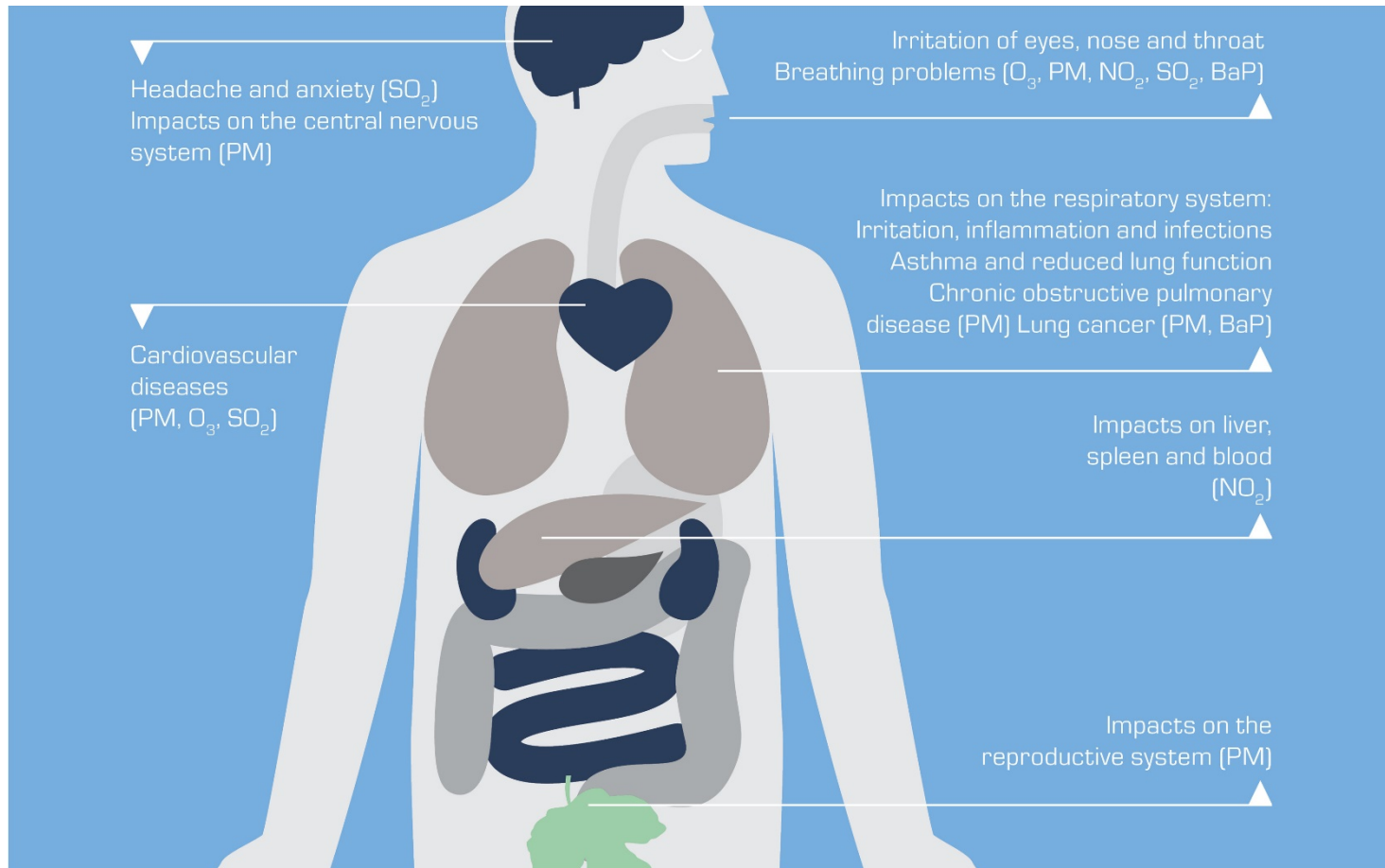
- 17 % of deaths from lung cancer
- 12 % of deaths from ischaemic heart disease
- 11 % of deaths from stroke

(c.f. 54 000 premature deaths from NO₂; 19 000 from ozone)



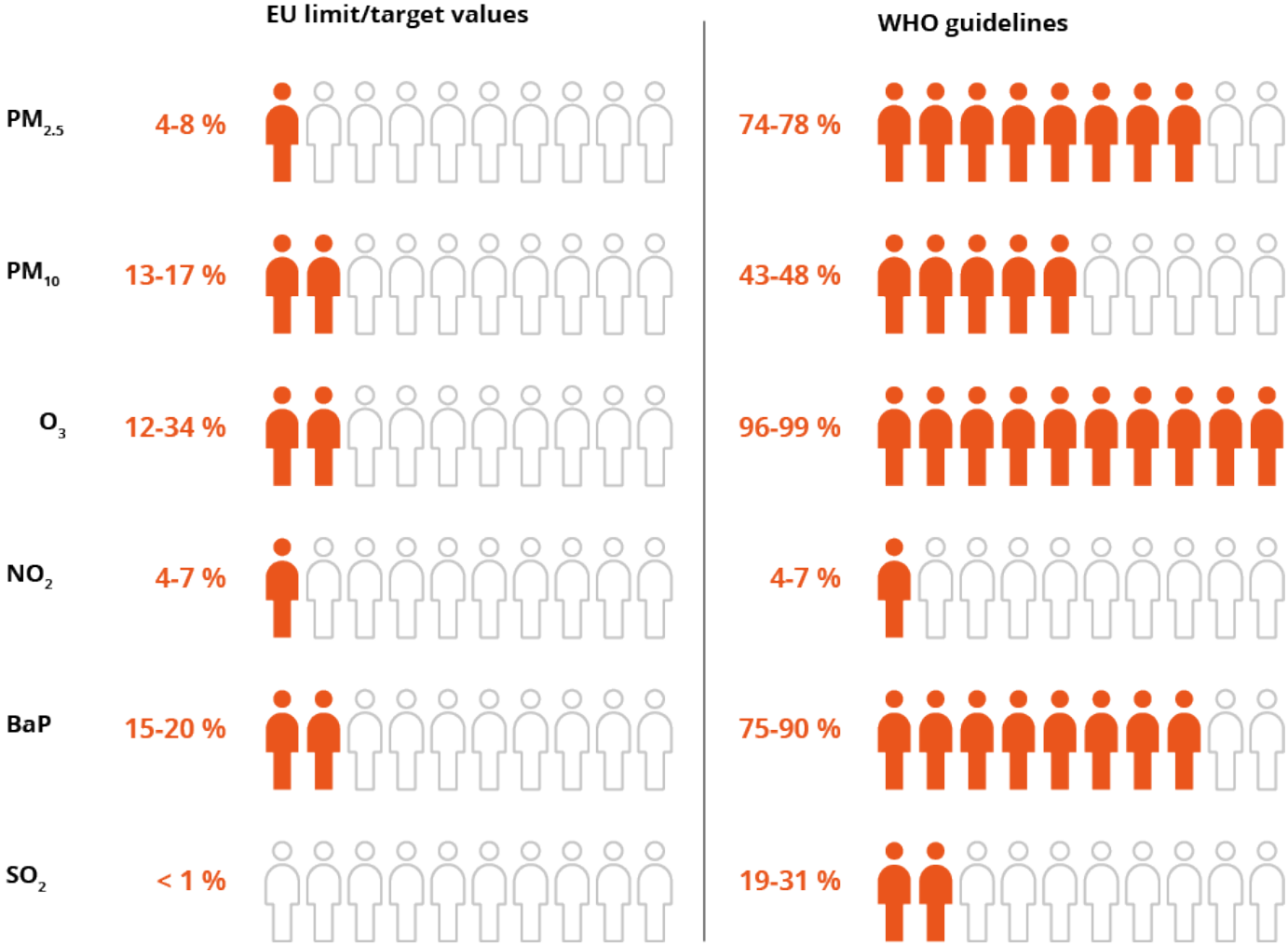
EU: No 1 environmental risk factor – Air pollution

Air pollutants have a serious impact on human health.
Children and the elderly are especially vulnerable.



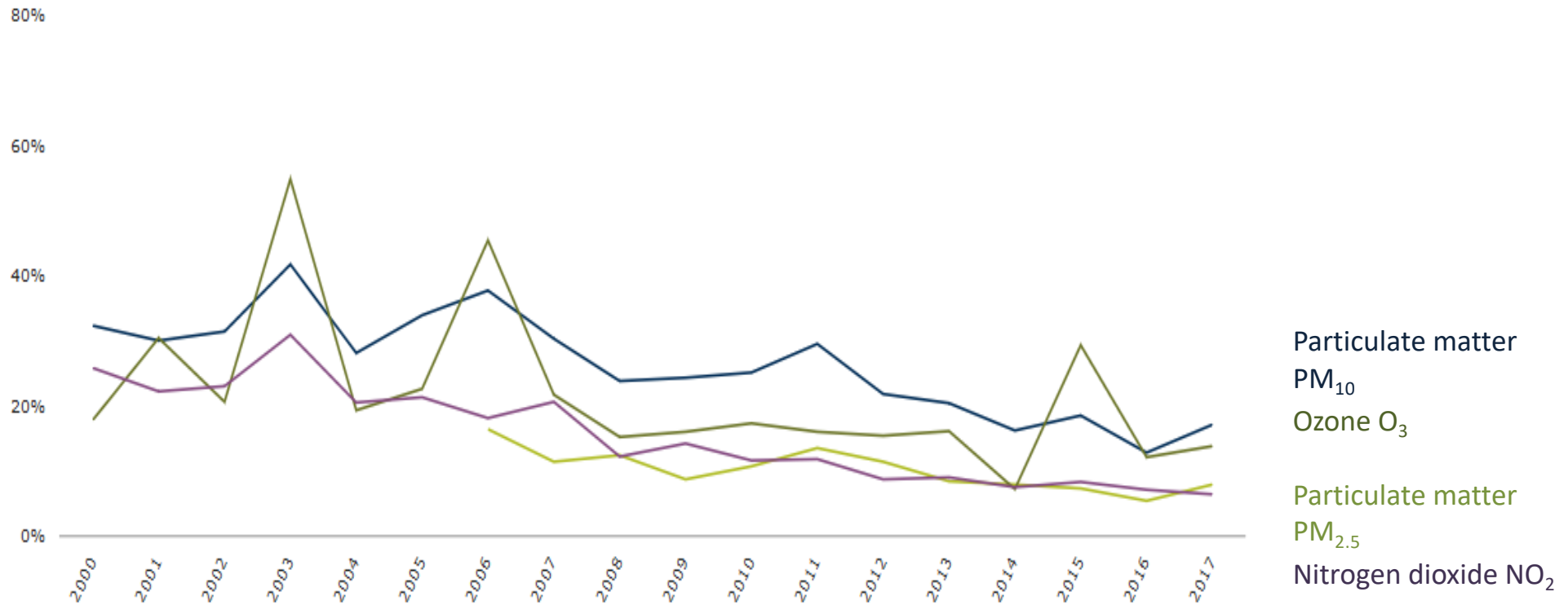
Many Europeans are still exposed to harmful levels of air pollution

Share of the EU urban population exposed to air pollutant concentrations above EU and WHO reference values in 2016 - 2018

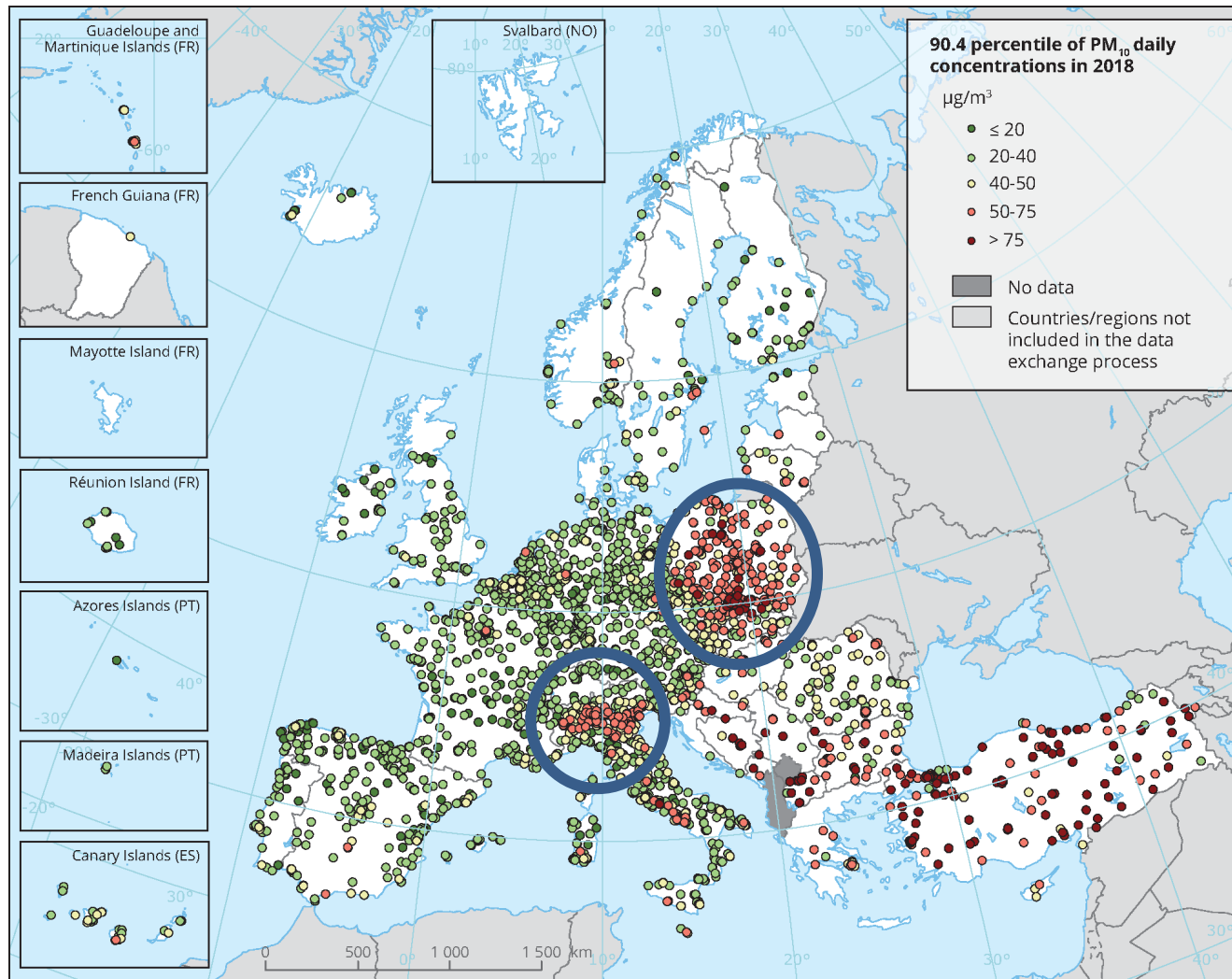


Source: EEA Air Quality in Europe – 2020 report (forthcoming)

EU urban population exposed to air pollutant concentrations above selected EU limit and target values



Particulate matter (PM₁₀) concentrations systematically exceed EU standards across large parts of Europe



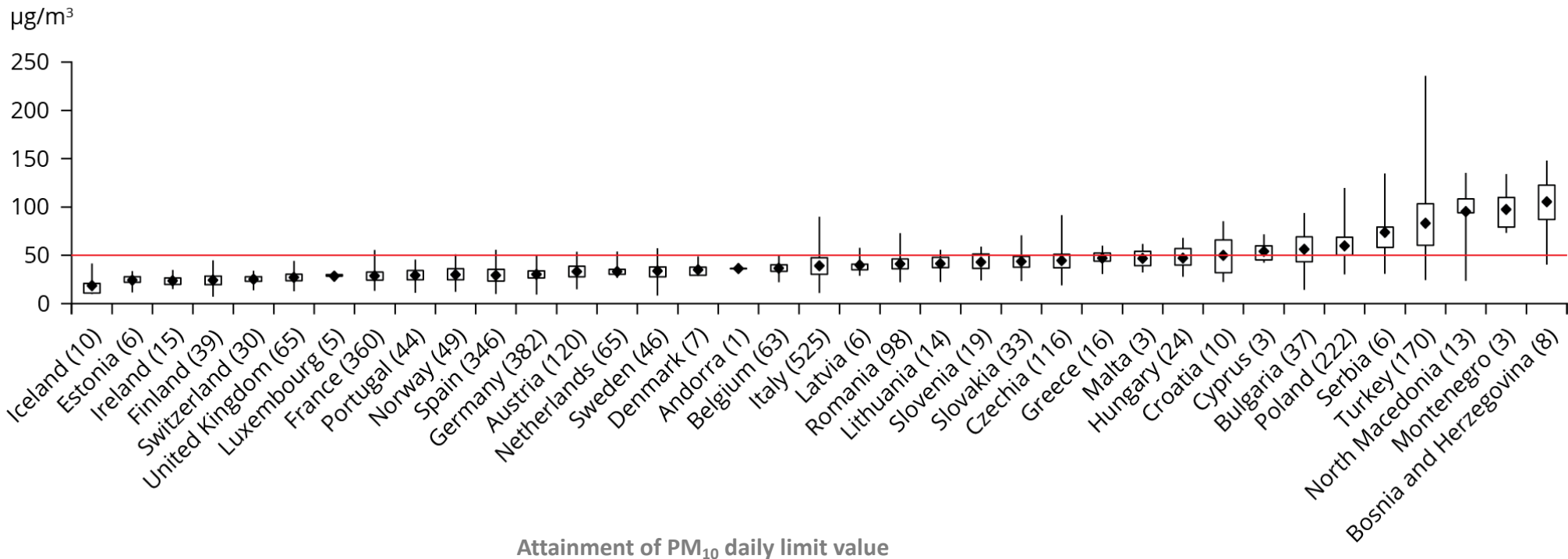
Reference data: ©ESRI | ©EuroGeographics

- There remain persistent exceedances of the 2005 EU air quality standard for PM₁₀.
- In 2018, 20 Member States reported exceedances – 19 % of reporting stations.
- Fine PM contributes most to premature deaths from air pollution in Europe – around 400 000 each year.

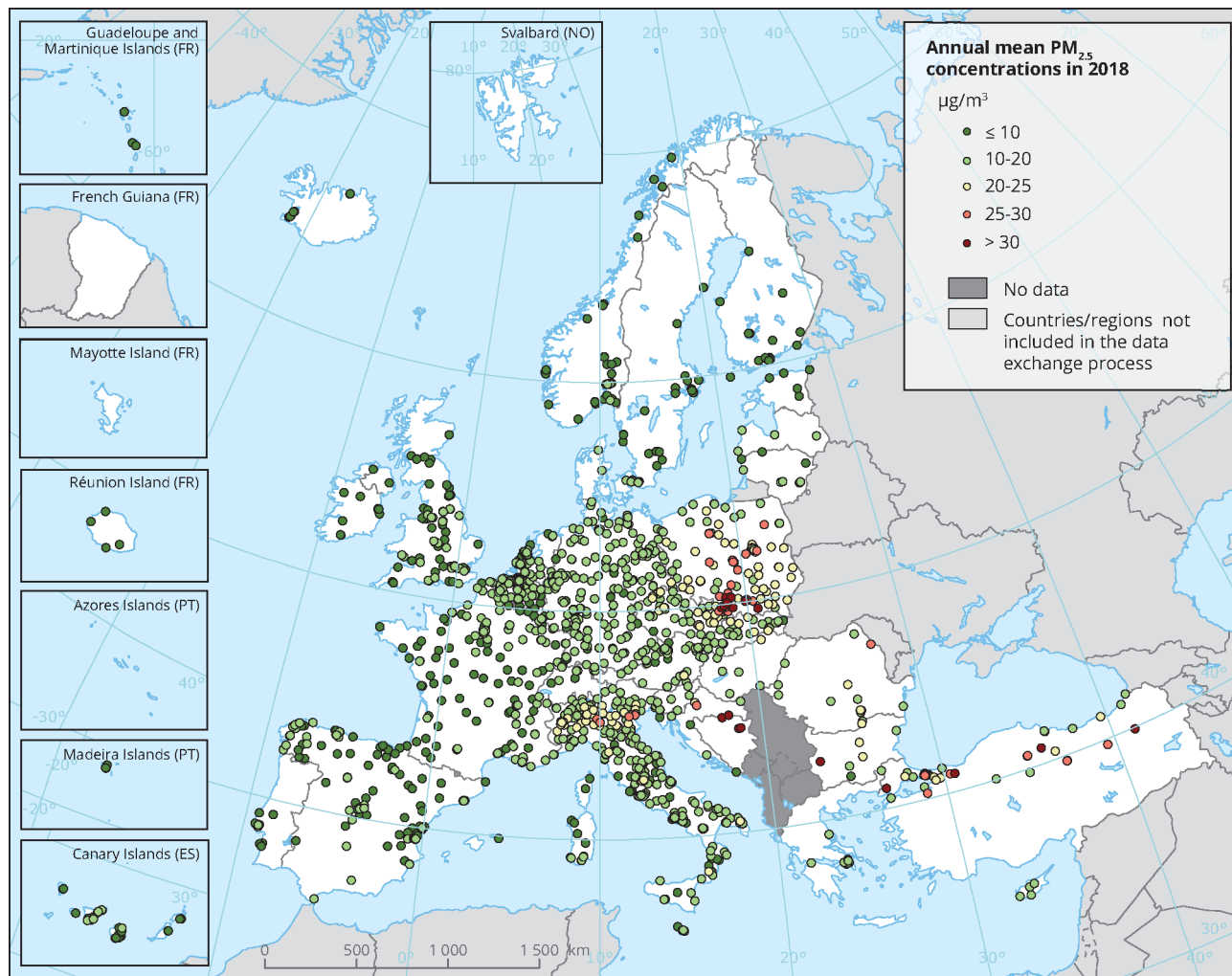
Air quality status – particulate matter PM₁₀, 2018

PM₁₀ concentrations in relation to the daily limit value in 2018

Concentration (ug/m³)



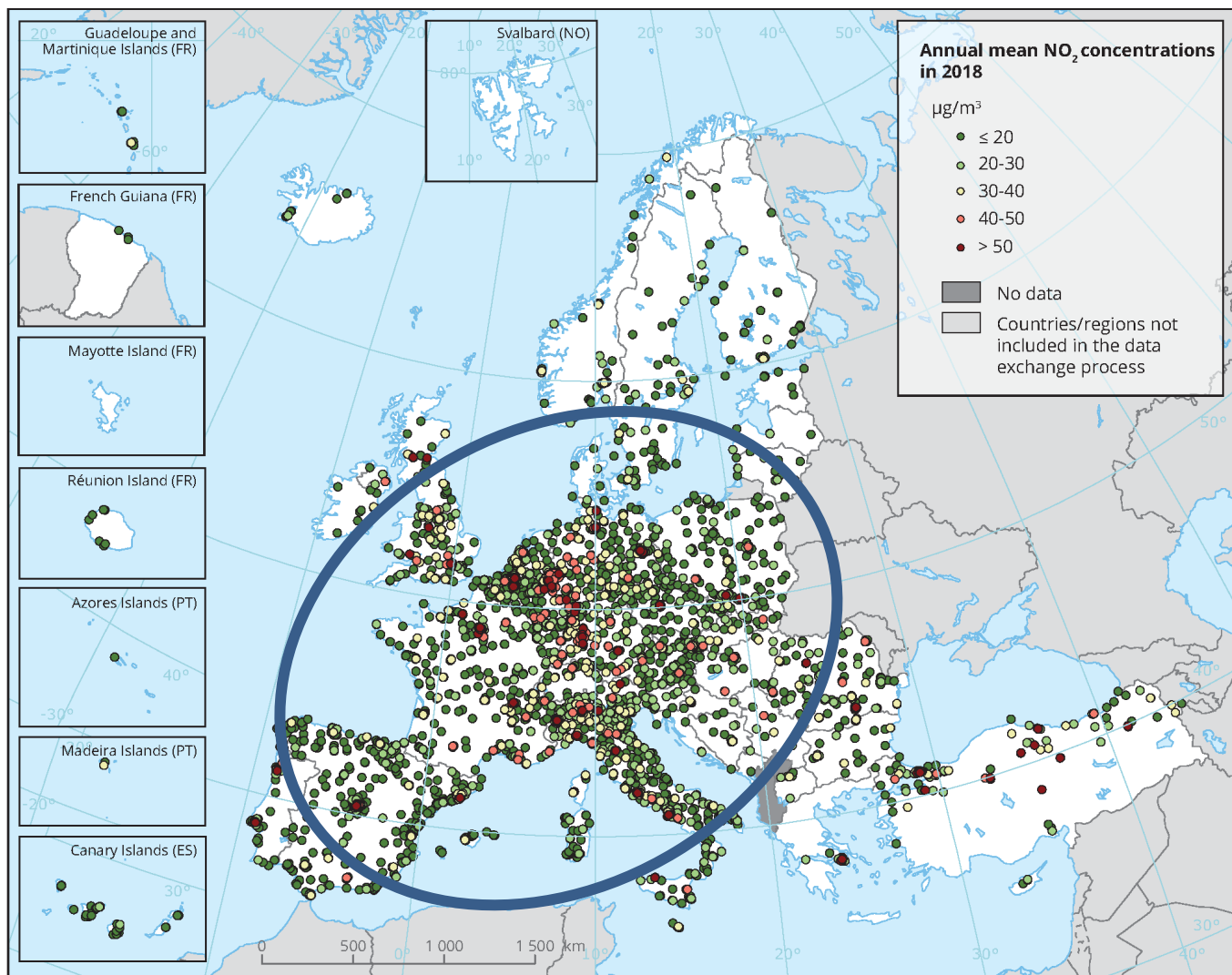
Particulate matter (PM_{2.5}) concentrations



- 6 Member States reporting above annual limit value
- Equivalent to 4 % of reporting stations
- Estonia, Finland, Iceland and Ireland below the WHO Air Quality Guidelines

Reference data: ©ESRI | ©EuroGeographics

Nitrogen dioxide (NO₂) harms the respiratory and cardiovascular systems



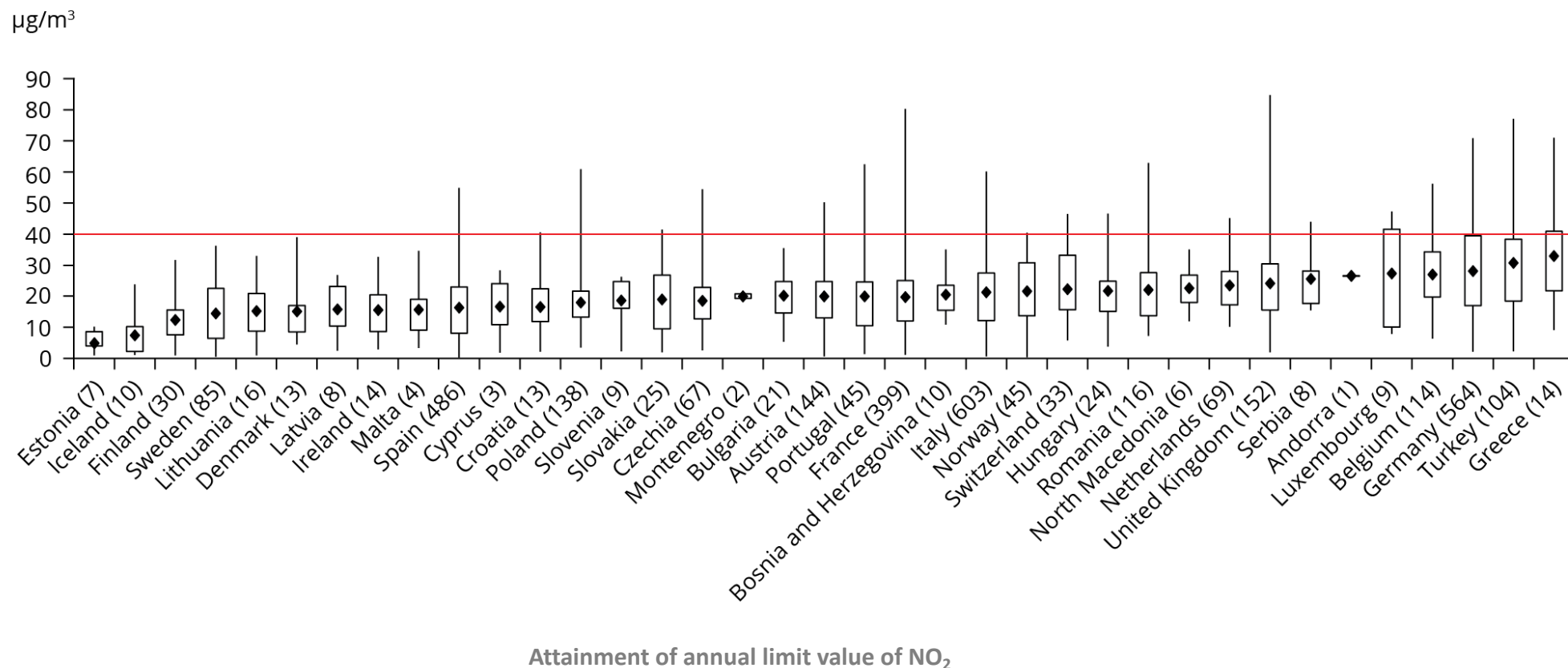
- Exceedances of the EU air quality standard for NO₂ remain widespread.
- In 2018, 16 Member States reported exceedances.
- On average, around 60% of NO₂ in cities comes from road traffic, especially diesel vehicles. In some cities it is much higher – 80% or more.

Reference data: ©ESRI | ©EuroGeographics

Air quality status – nitrogen dioxide (NO₂), 2018

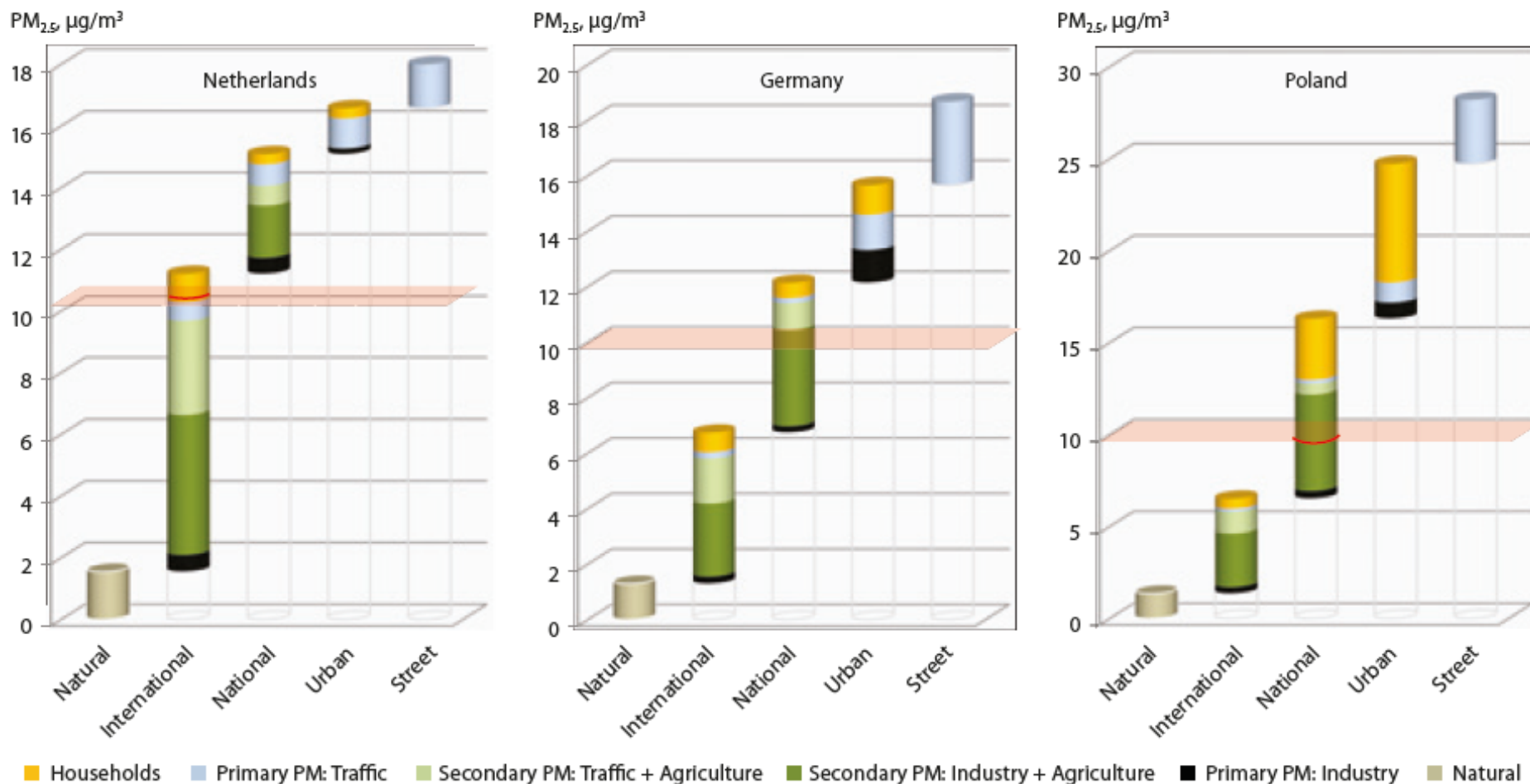
NO₂ concentrations in relation to the annual limit value in 2018

Concentration (ug/m³)



Recognising the importance of regional and international transboundary air pollution

Contributions to PM_{2.5} exposure in cities
in the Netherlands, Germany and Poland in 2009.



Source: Kieseewetter and Amann, 2014

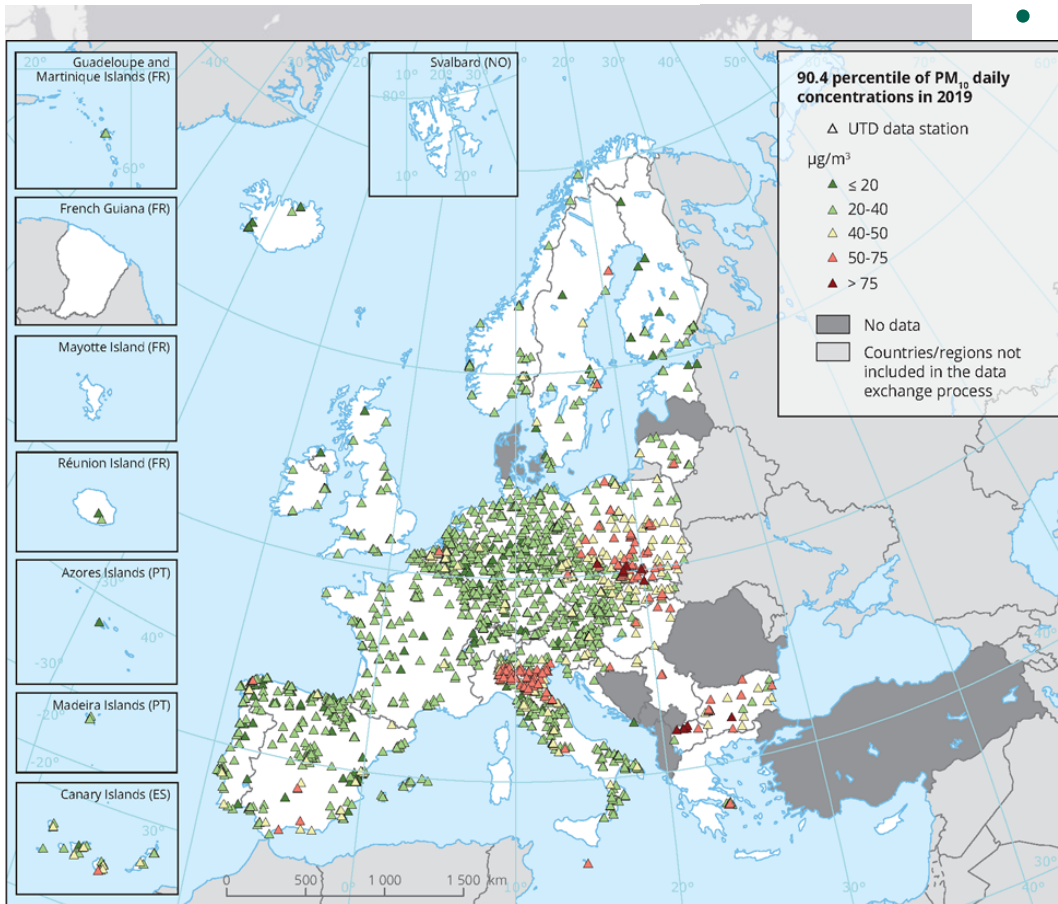
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European Air Quality Index – citizen access to information



European Air Quality Index



- The European Air Quality Index shows the real-time air quality situation across Europe's cities and regions

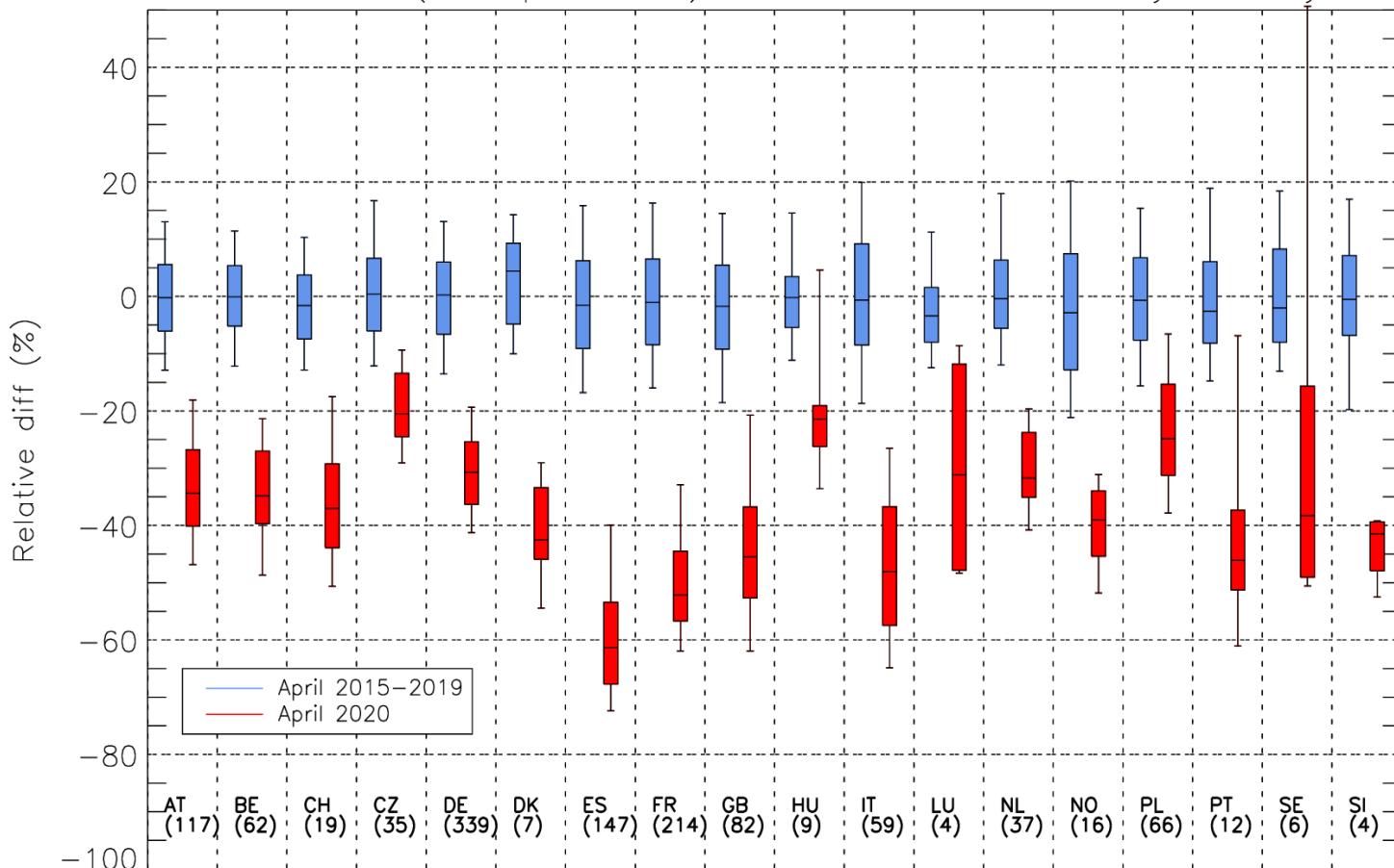
Data is reported every hour by Member States and other EEA member countries, complemented by Copernicus atmospheric monitoring forecasts

Reference data: ©ESRI | ©EuroGeographics



Short-term impacts of COVID-19 lock-down measures

Mean diff (obs-predicted) in no2 at all stations by country



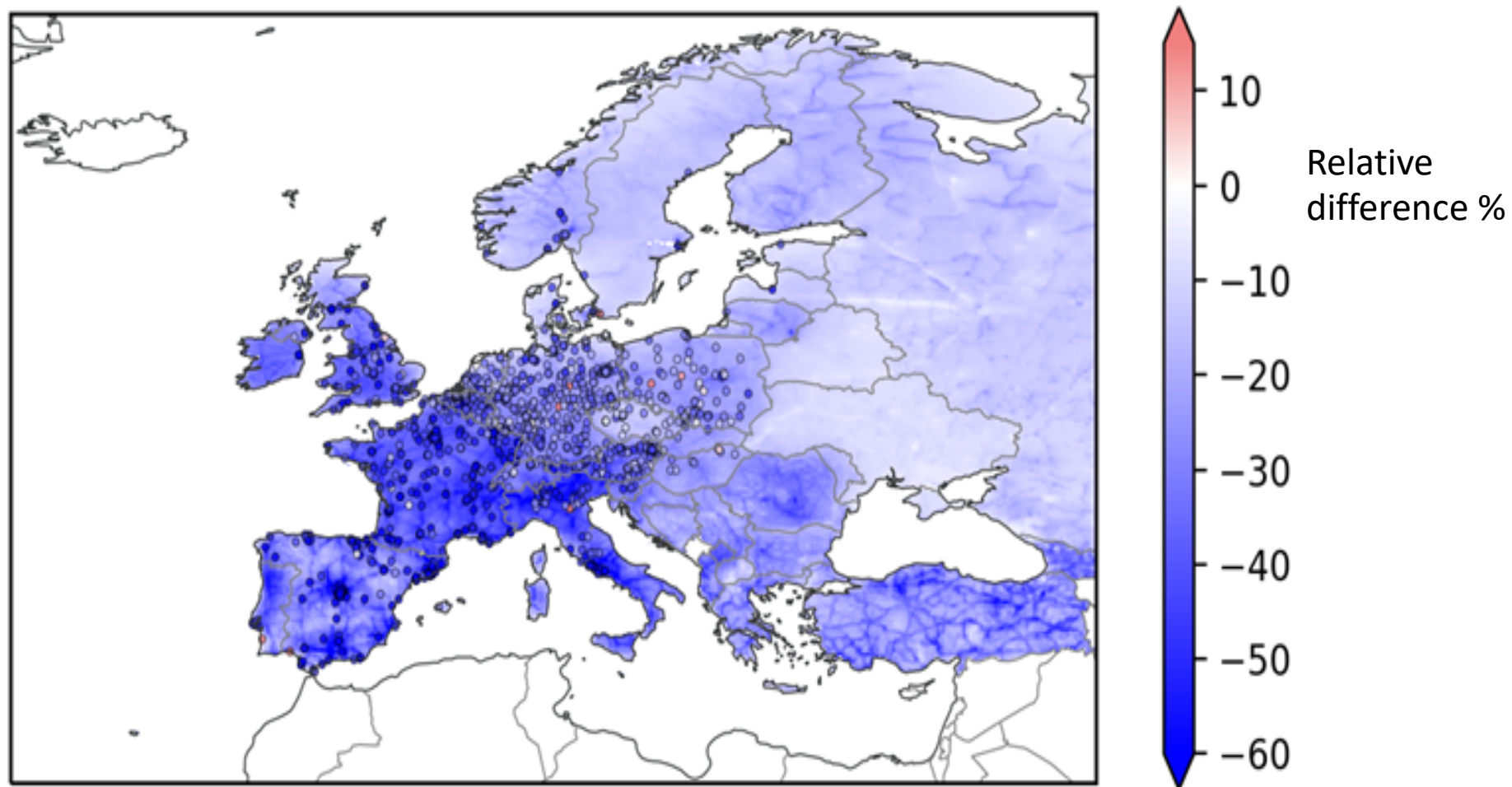
Reductions in emissions and air pollutants concentrations

Possible effects of air pollution on vulnerability and COVID-19 susceptibility

Possible role of air pollution in spreading the SARS-CoV-2 coronavirus

Short-term impacts of COVID-19 lock-down measures

April – 2020 Modelling nitrogen dioxide (NO_2) concentrations



Air pollution – explaining successes & toward the future

1. Policies are working: Air quality has improved as a direct result of past and current policies, & technological improvements.
2. However, air pollution remains responsible for more than 400 000 premature deaths in Europe each year. It continues to harm vegetation and ecosystems.
3. Effective air quality policies require action and coordination at different scales: pan-European, national and local/city levels.
4. Integrated/systemic solutions must increasingly be found to move toward air quality consistent with the WHO AQ guidelines, and achieve the EU's 2050 vision of “living well within the limits of the planet”.



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Thank you

eea.europa.eu/air

[**martin.adams@eea.europa.eu**](mailto:martin.adams@eea.europa.eu)

Comparison of selected air quality standards ($\mu\text{g}/\text{m}^3$)

Pollutant	Period	EU	WHO	U.S.
PM _{2.5}	annual	25	10	12 ^a
PM ₁₀	daily	50 (35)	50 (99P)	150 (1) ^b
	annual	40 (0)	20 (0)	-
O ₃	max. daily 8-hr average	120 (25) ^a	100 (0)	140 (3) ^a
NO ₂	annual	40 (0)	40 (0)	100 (0)
SO ₂	daily	125 (3)	20 (0)	-
BaP	annual	1 (0)	0.12 (0) ^c	-

Numbers in brackets indicate the permissible number of exceedances

a. Averaged over three years

b. Not to be exceeded more than once per year on average over 3 years

c. WHO estimated reference level

99P: 99th percentile