

# Air Quality levels and related health burden in Europe



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# Air quality in Europe – 2022 and 2023 reports



**BRIEFING**

## Europe's air quality status 2022

Air pollution is the single largest environmental health risk in Europe, causing cardiovascular and respiratory diseases that lead to the loss of healthy years of life and, in the most serious cases, to premature deaths. This briefing presents the status of concentrations of pollutants in ambient air in 2020 and 2021 by pollutant, in relation to both EU air quality standards and the WHO guidelines, updated in 2021. The assessment shows that exceedances of air quality standards are common across the EU, with concentrations well above the latest WHO recommendations. Nevertheless, in 2020, lockdown measures adopted to minimise the spread of COVID-19 had a temporary impact on emissions of air pollution from road transport and led to improved air quality.

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**WEB REPORT**

## Health impacts of air pollution in Europe, 2022

Air pollution is the largest environmental health risk in Europe. It is a major cause of adverse health effects: for instance, air pollution causes and aggravates respiratory and cardiovascular diseases. Heart disease and stroke are the most common causes of premature deaths attributable to air pollution, followed by lung diseases and lung cancer. This chapter presents the latest estimates of the health impacts of exposure to fine particulate matter, nitrogen dioxide and ozone in terms of morbidity and premature deaths. It also assesses progress towards the EU's zero pollution action plan target to reduce mortality attributable to air pollution.

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## Air quality in Europe 2022



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## Impacts of air pollution on ecosystems

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## Sources and emissions of air pollutants in Europe

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# Air quality in Europe – 2022 and 2023 reports

**BRIEFING**

## Europe's air quality status 2023

Air pollution is the largest environmental health risk in Europe, causing cardiovascular and respiratory diseases that lead to the loss of healthy years of life and, in the worst cases, to preventable deaths. This briefing presents the status of concentrations of pollutants in ambient air in 2021 and 2022 for regulated pollutants, in relation to both EU air quality standards and the 2021 WHO guideline levels. The assessment shows that, in spite of constant improvements, exceedances of air quality standards are common across the EU, with concentrations well above the latest WHO recommendations.

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**WEB REPORT**

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## Air quality in Europe 2022

Air pollution is the largest environmental health risk in Europe and significantly impacts the health of the European population, particularly in urban areas. While emissions of key air pollutants and their concentrations in ambient air have fallen significantly over the past two decades in Europe, air quality remains poor in many areas.

**WEB REPORT**

## Impacts of air pollution on ecosystems

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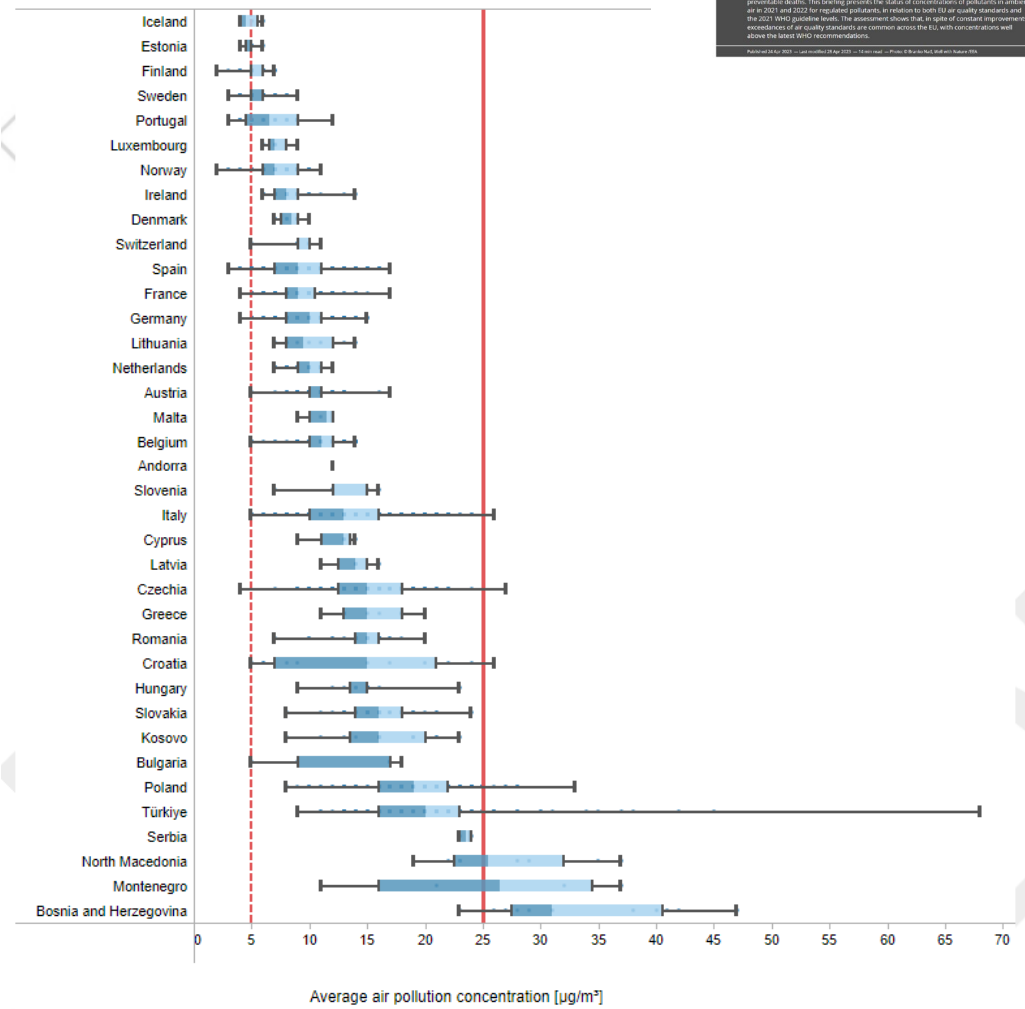
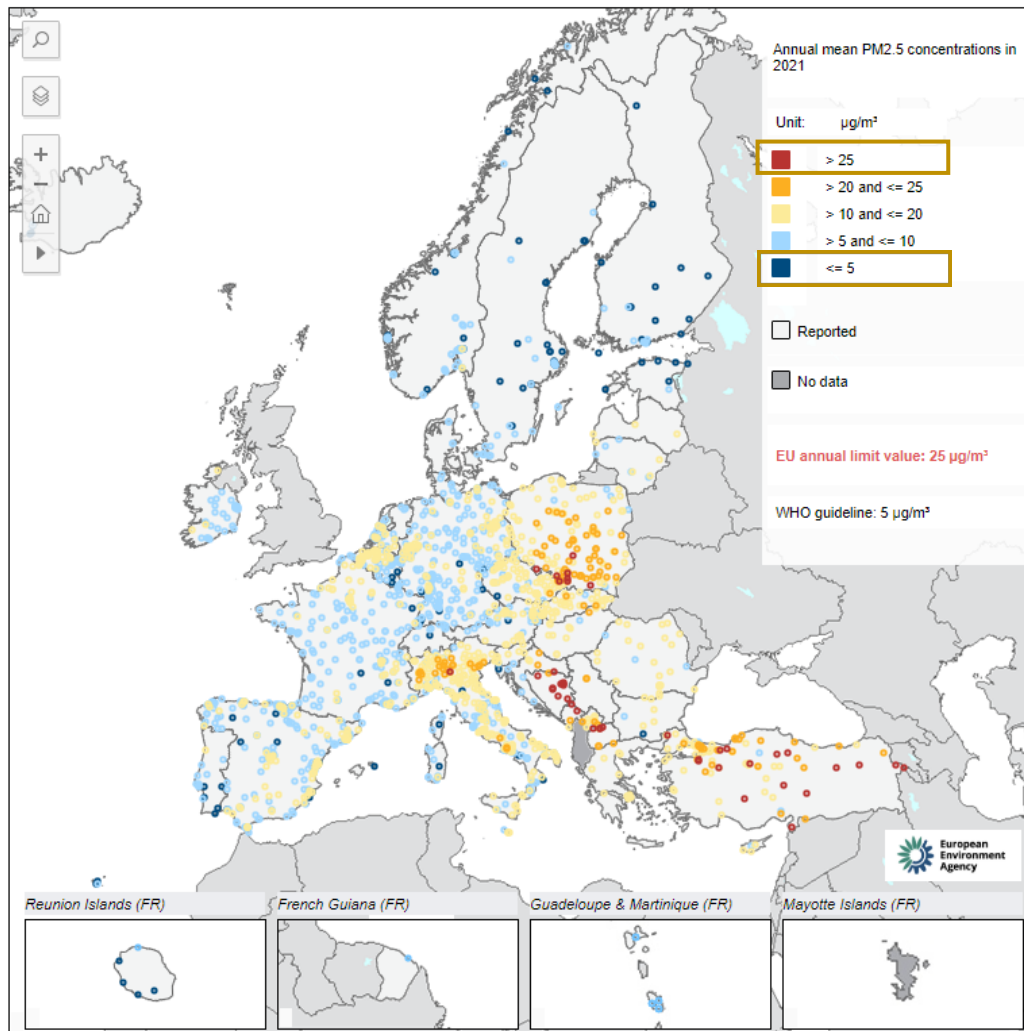
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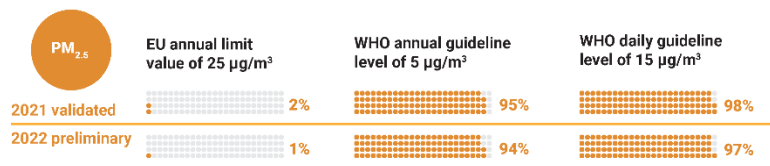
European Environment Agency



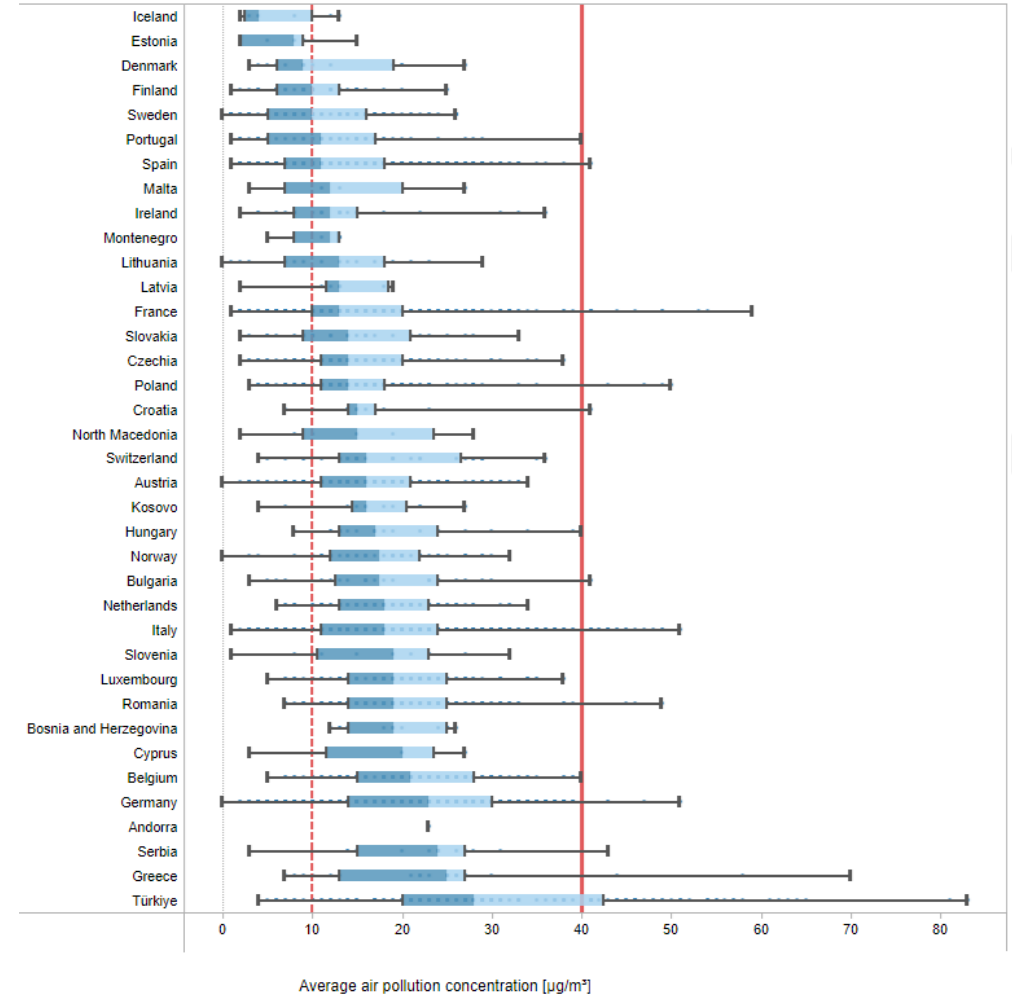
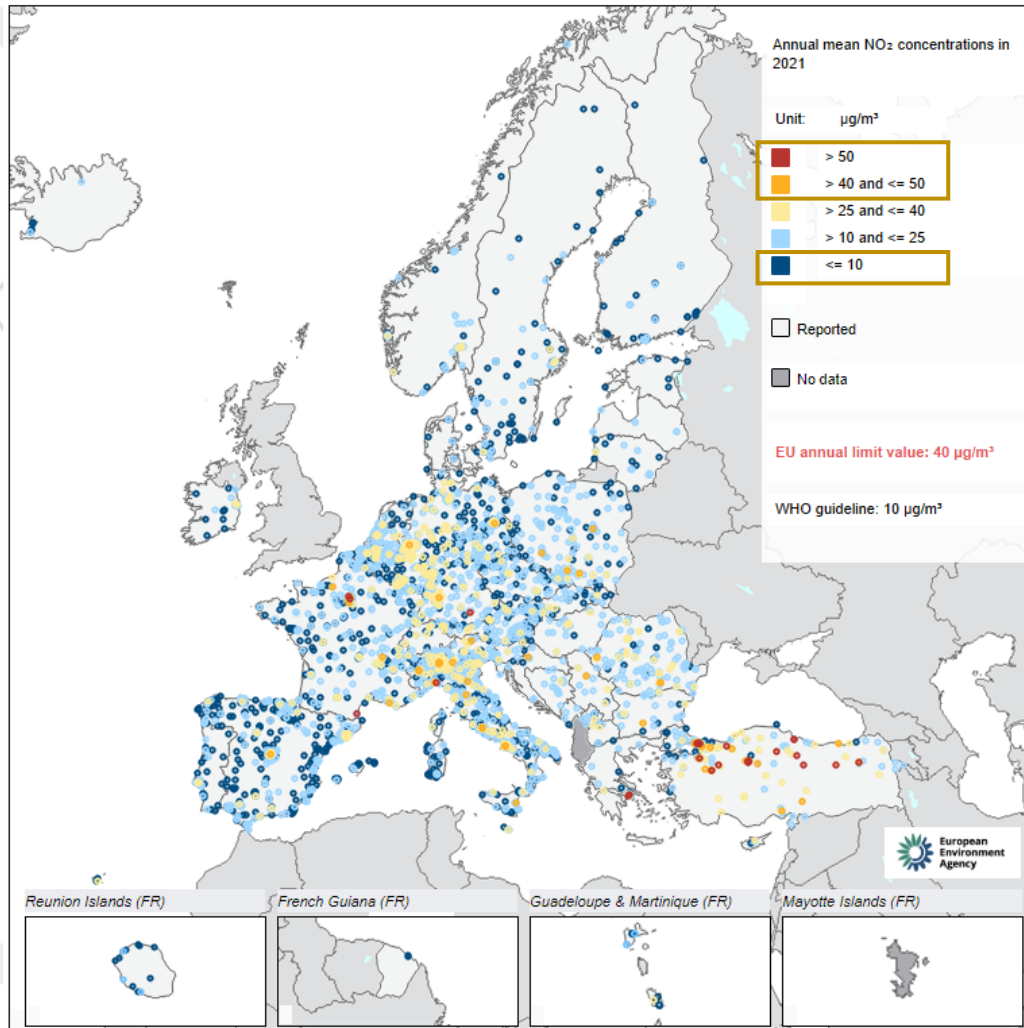
# Annual PM<sub>2.5</sub> means in 2021



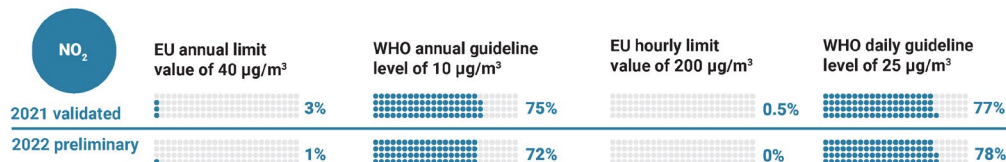
4 EU MS and 4 other reporting countries had concentrations above the EU annual LV



# Annual NO<sub>2</sub> means in 2021



9 EU MS and 2 other reporting countries had concentrations above the EU annual LV



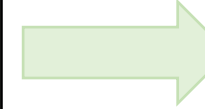
# Health risk assessments in EEA: used methodologies for mortality



|                   | Methodology up to 2021      |                      | Methodology from 2022 onwards |                      |
|-------------------|-----------------------------|----------------------|-------------------------------|----------------------|
|                   | RR per 10µg/m <sup>3</sup>  | C <sub>0</sub>       | RR per 10µg/m <sup>3</sup>    | C <sub>0</sub>       |
| PM <sub>2.5</sub> | 1.062<br>(1.040-1.083)      | 0 µg/m <sup>3</sup>  | 1.08<br>(1.06-1.09)           | 5 µg/m <sup>3</sup>  |
| NO <sub>2</sub>   | 1.055<br>(1.031-1.08)       | 20 µg/m <sup>3</sup> | 1.02<br>(1.01-1.04)           | 10 µg/m <sup>3</sup> |
| O <sub>3</sub>    | 1.0029<br>(1.0014-1.0043)   | 70 µg/m <sup>3</sup> | 1.0043<br>(1.0034 - 1.0052)   | 70 µg/m <sup>3</sup> |
|                   | 2013 HRAPIE recommendations |                      | 2021 WHO AQ guidelines        |                      |

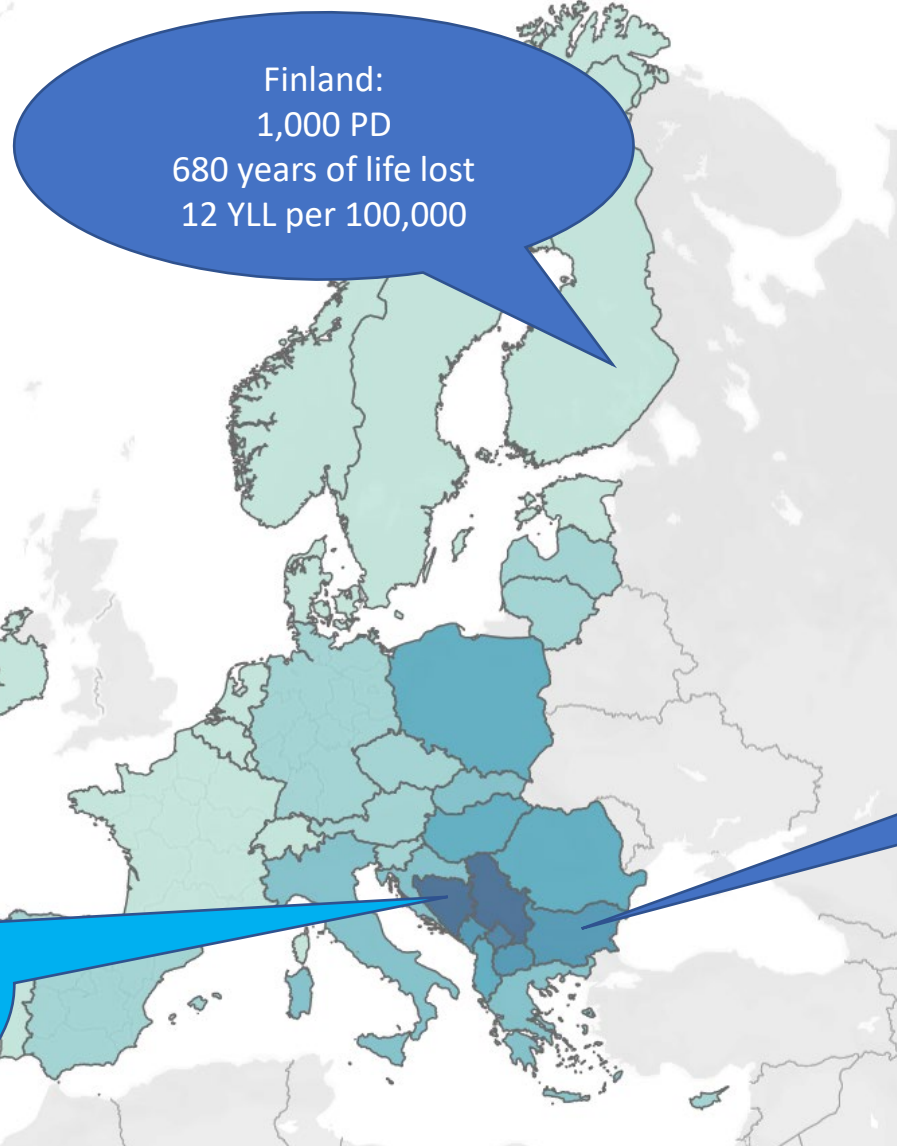
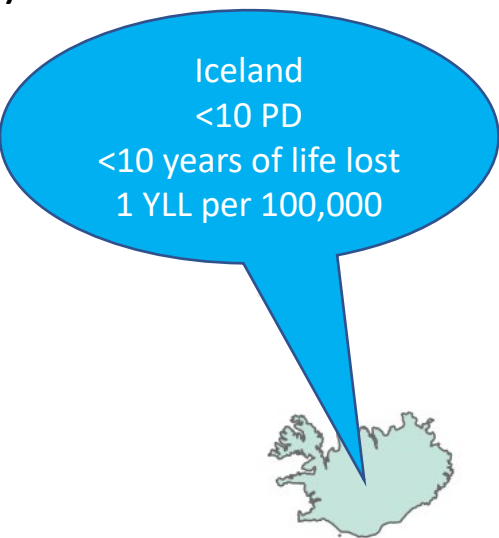


Mortality due to long-term exposure above the WHO recommended air quality guideline levels.



Mortality which could have been avoided if the WHO AQ guideline levels had already been reached in 2020.

# Air pollution is still an important burden of disease...



In 2020, in Europe, concentrations of PM<sub>2.5</sub> above the 2021 WHO air quality guideline level of 5 µg/m<sup>3</sup> were responsible for:

**275,000 premature deaths** (238,000 in EU-27)

**2,773,000 years of life lost** (2,410,000 in EU-27)

**583 years of life lost per 100,000 inhabitants**  
(544 in EU-27)



**NO<sub>2</sub> (>10 µg/m<sup>3</sup>): 64,000 premature deaths**  
(49,000 in EU-27)

**O<sub>3</sub>: 28,000 premature deaths** (24,000 in EU-27)

European Environment Agency



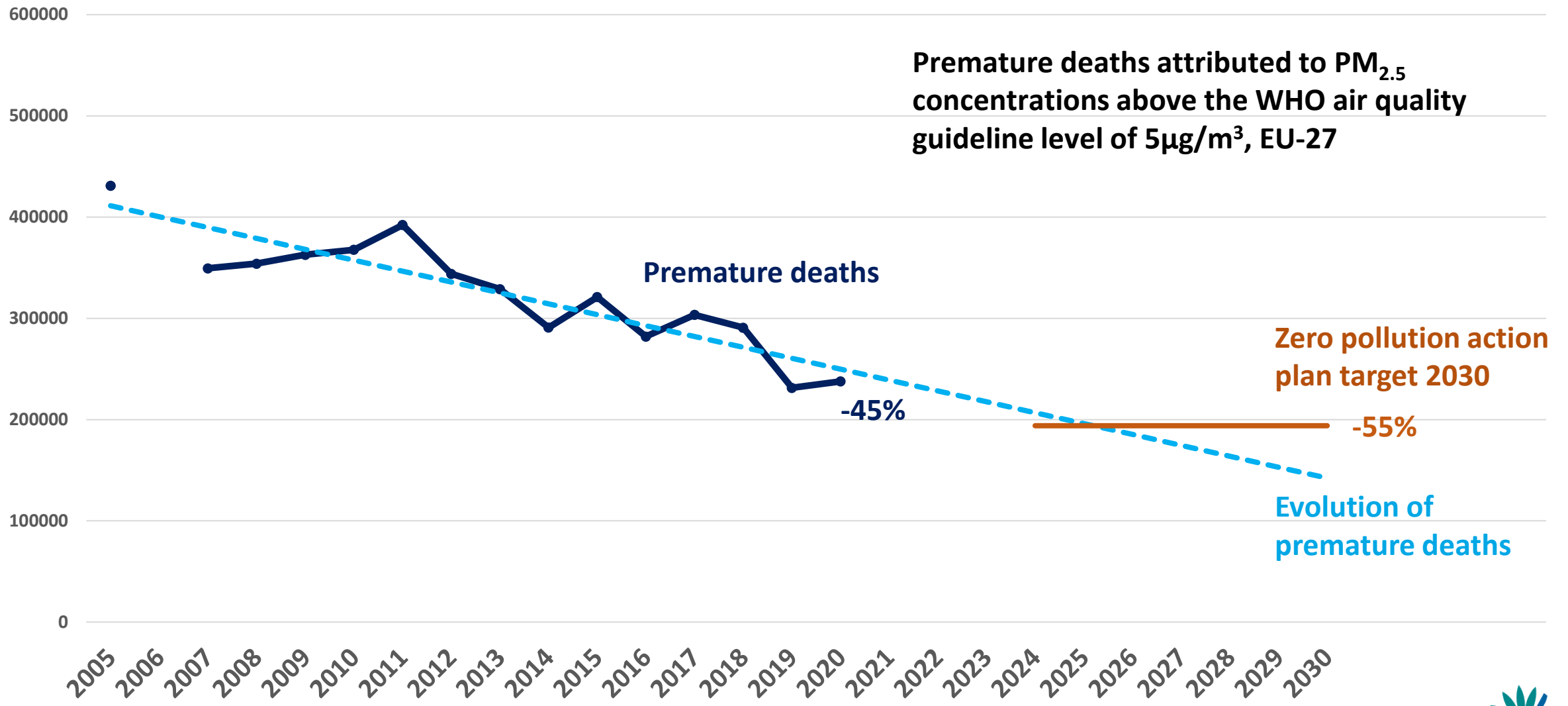
## ... even higher counting for lower concentrations

Results for 2020 of the sensitivity analysis (concentrations above 0 µg/m<sup>3</sup> for PM<sub>2.5</sub> and NO<sub>2</sub> and 20 µg/m<sup>3</sup> for O<sub>3</sub>)

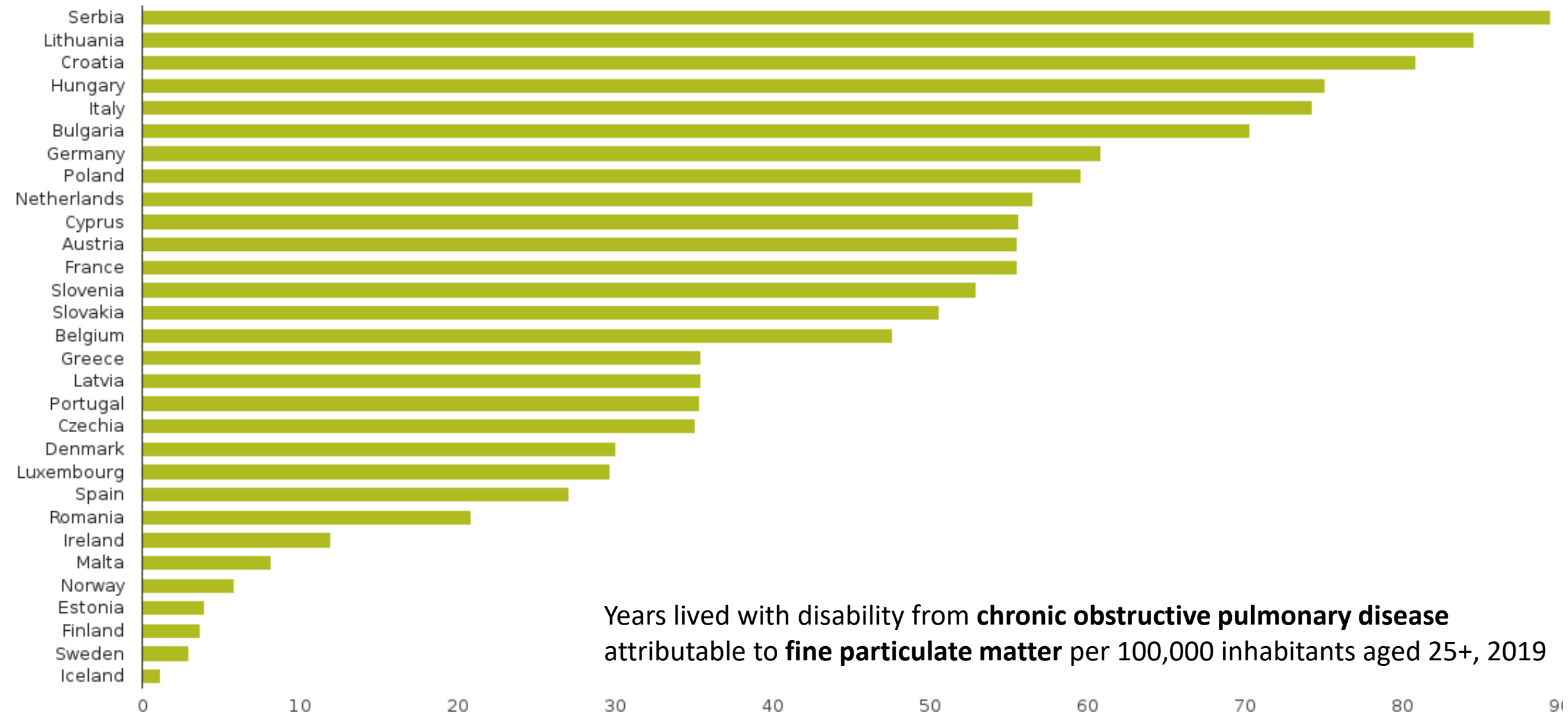
| Geographical scope    | Pollutant         | Premature deaths (main scenario) | Additional premature deaths | Total premature deaths |
|-----------------------|-------------------|----------------------------------|-----------------------------|------------------------|
| EU-27                 | PM <sub>2.5</sub> | 238,000                          | <b>174,000</b>              | <b>412,000</b>         |
|                       | NO <sub>2</sub>   | 49,000                           | <b>87,000</b>               | <b>136,000</b>         |
|                       | O <sub>3</sub>    | 24,000                           | <b>83,000</b>               | <b>107,000</b>         |
| 40 European countries | PM <sub>2.5</sub> | 275,000                          | <b>188,000</b>              | <b>463,000</b>         |
| 41 European countries | NO <sub>2</sub>   | 64,000                           | <b>102,000</b>              | <b>166,000</b>         |
|                       | O <sub>3</sub>    | 28,000                           | <b>96,000</b>               | <b>124,000</b>         |

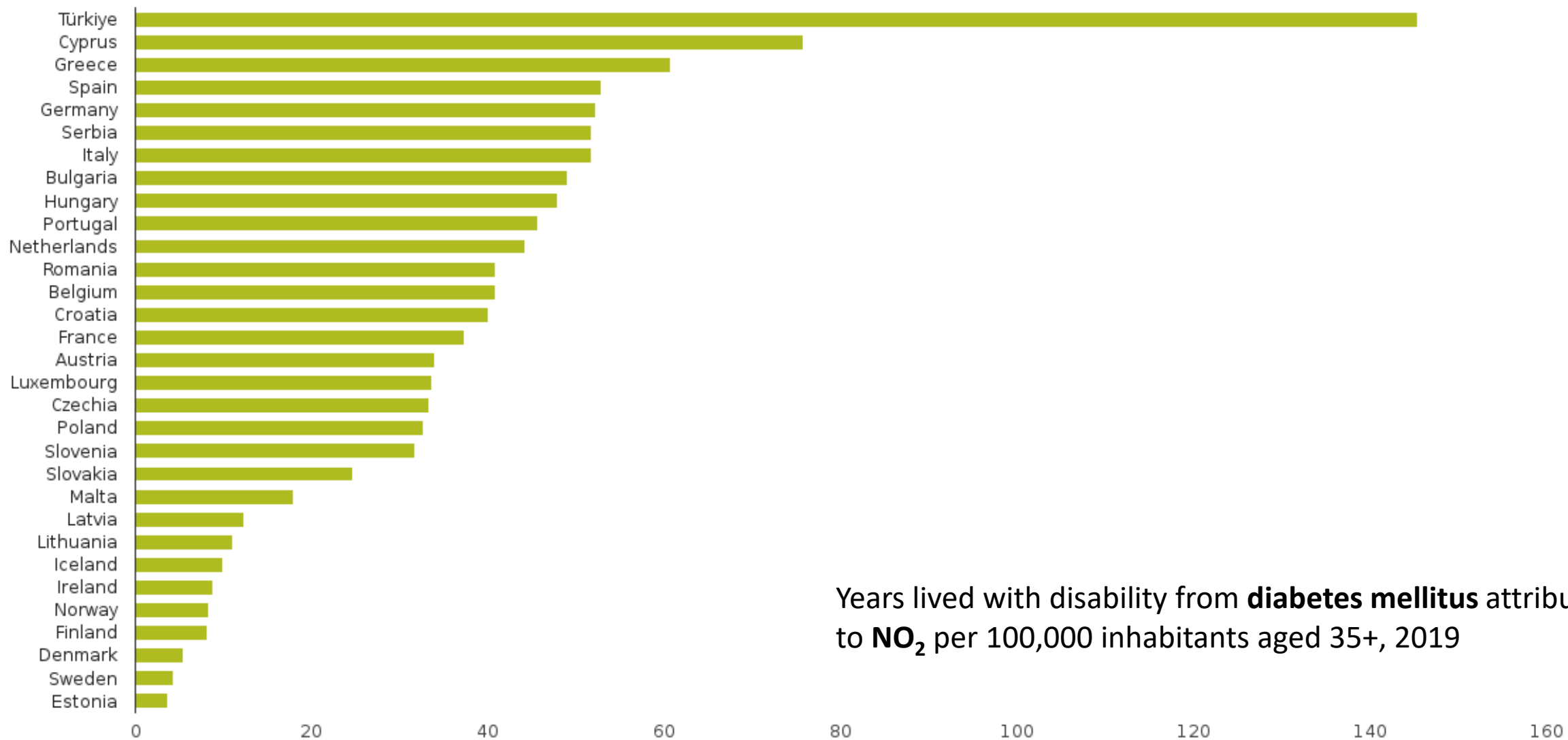


# Nevertheless, situation has improved



# Air pollution also represents a burden due to morbidity

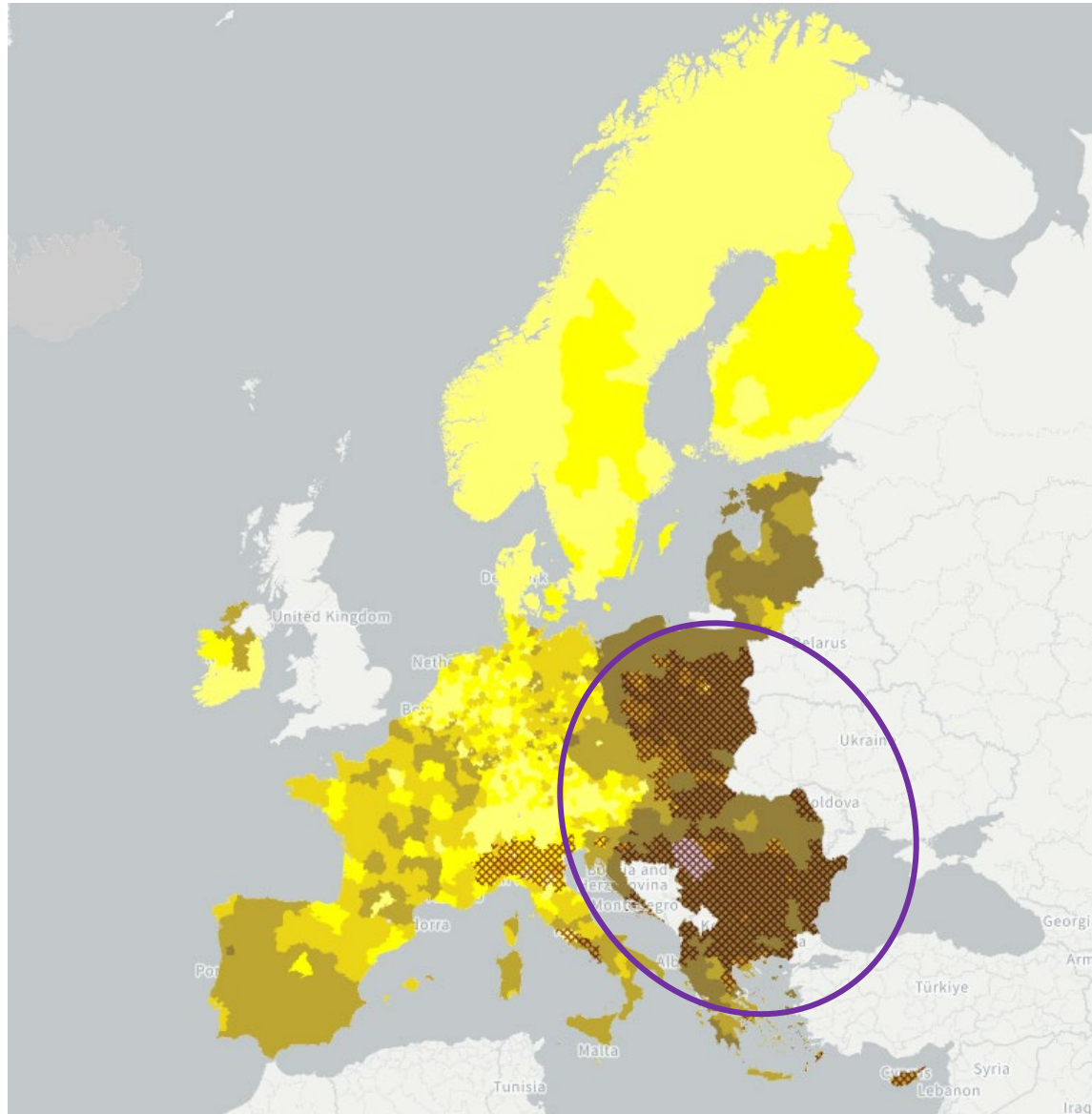




Years lived with disability from **diabetes mellitus** attributable to **NO<sub>2</sub>** per 100,000 inhabitants aged 35+, 2019



# Unequal impact across Europe




## PM<sub>2.5</sub> vs GDP per capita


PM<sub>2.5</sub> Population weighted average  $\mu\text{g}/\text{m}^3$  (2020)


 Most polluted 20%


GDP per capita, Euro latest year available


GDP per capita


 Very high (top 20%)

 High (60-80%)

 Average (40-60%)

 Low (20-40%)

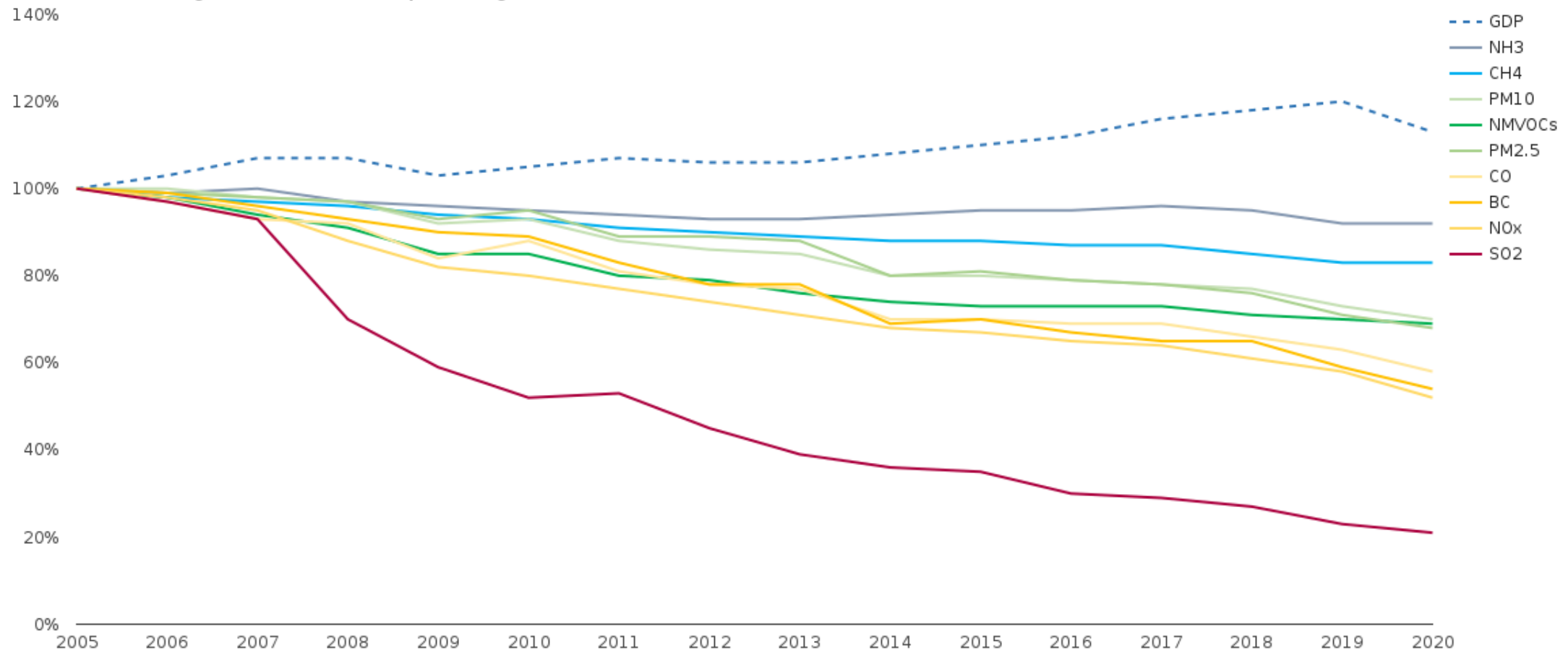
 Very low (0-20%)

 No data



# Improvements are the result of effective measures and policies

Chart — 2005-2020 Trends in EU-27 emissions of NH<sub>3</sub>, CH<sub>4</sub>, primary PM<sub>10</sub>, NMVOCs, primary PM<sub>2.5</sub>, CO, BC, NO<sub>x</sub> and SO<sub>2</sub>, as percentages of 2005 levels, set against EU-27 GDP as a percentage of 2005 GDP



# Thank you



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