

Air Quality: Why Are European Policies for Climate and Health in a Turning Point?

Health and Environment

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[This document is a one of a series of discussion notes addressing fundamental questions about the global health. Its purpose is to transfer scientific knowledge to the public conversation and decision-making process. The papers are based on the best information available and may be updated as new information comes to light.]

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Photo: Barcelona from Collserola. Wronsky Net / Flickr

The World Health Organisation (WHO) estimates that around 90% of the global population breathes polluted air, and around 7 million premature deaths every year are due to the effects of air pollution. More than 500,000 of these deaths occur in the WHO European Region. Each year, air pollution causes 200,000 new cases of childhood asthma in the European Union (EU). Air pollution is Europe's leading environmental health threat. This policy brief summarizes the **changing regulatory framework** and its scientific background highlighting implications for action in policy and implementation. The upcoming 2022 revision of the EU Ambient Air Quality Directive offers a critical opportunity to integrate the **new WHO Air Quality Guidelines** (AQG) into European law and implementation throughout the EU.

Air pollution is also closely connected with the **climate agenda**. Many sources of greenhouse gas emissions also produce other substances harmful for humans, such as **black carbon, methane and particulate matter**.¹ Meeting climate change mitigation goals can provide near-term, local health benefits through reductions in air pollution. As countries participate in the negotiations at the United Nations Climate Change Conference in Glasgow, United Kingdom (COP26), the mounting evidence demonstrating ancillary health and other co-benefits of climate change mitigation is compelling support for ambitious climate action. Health and other co-benefits can provide considerable cost savings, offsetting mitigation costs ●

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¹ [Health and Climate Impacts](#). Breathelife.

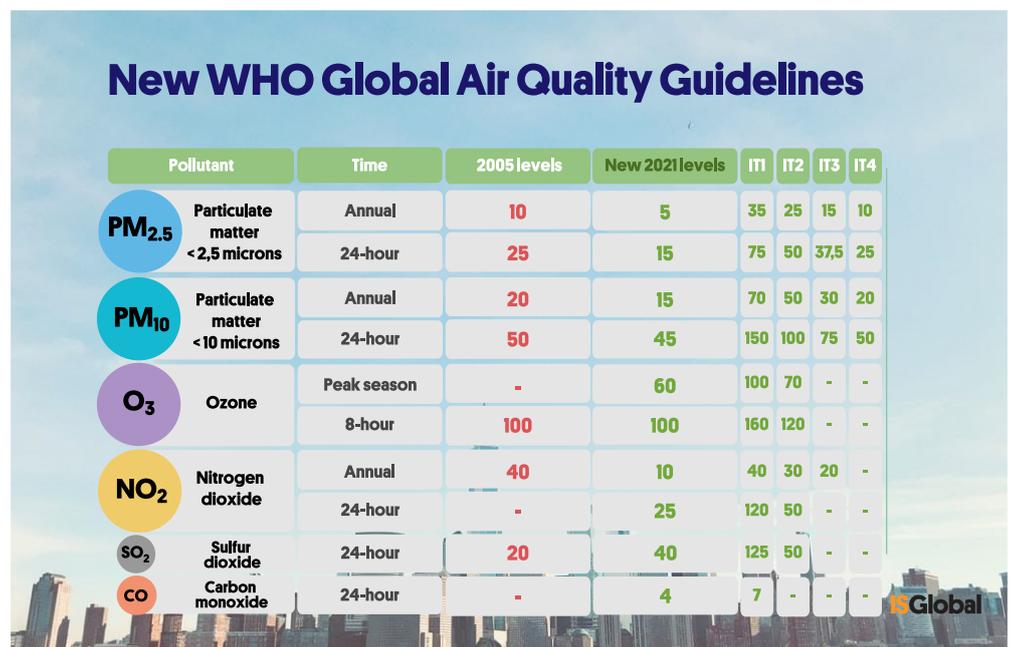
1. Updated WHO Air Quality Guidelines Based on New Scientific Evidence

“Based on an extensive review of newly available scientific evidence, on the 22nd September 2021, the WHO launched its Global Air Quality Guidelines, updating maximum exposure levels for six pollutants.”

Based on an extensive review of newly available scientific evidence, on the 22nd September 2021, the WHO launched its **Global AQGs** (originally from 2005),² **updating maximum exposure levels** for six pollutants – particulate matter (PM), ozone (O₃), nitrogen dioxide (NO₂)

sulfur dioxide (SO₂) and carbon monoxide (CO). These new recommendations aim for a **significant reduction in major pollutants**. Achieving them will require new and far reaching responses, specifically the phase out of fossil fuel use for energy and changes in agricultural practices.

Figure 1. Summary of WHO updated recommended pollutant levels.



Notes:

- Levels in microns (µg/m³).
- 24-hour: 99th percentile (i.e. 3-4 exceedance days per year).
- Peak season: Average of daily maximum 8-h mean O₃ concentration in the six consecutive months with the highest six-month running-average O₃ concentration.

In addition to guideline values, the WHO Global air quality guidelines provide interim targets (IT) for concentrations of PM₁₀ and PM_{2.5} aimed at promoting a gradual shift from high to lower concentrations.

If these interim targets were to be achieved, significant reductions in risks for acute and chronic health effects from air pollution can be expected. Achieving the guideline values, however, should be the ultimate objective.

Ambient (outdoor) air pollution. WHO: [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health)

Source: Infographic made by ISGlobal from WHO Global Air Quality Guidelines 2021.

² New WHO Global Air Quality Guidelines aim to save millions of lives from air pollution. WHO. 22 September 2021.

Box 1. Health risks associated with PM₁₀ and PM_{2.5}.

The health risks associated with particulate matter equal or smaller than 10 and 2.5 microns (µm) in diameter (PM₁₀ and PM_{2.5}, respectively) are of particular public health relevance. Both PM_{2.5} and PM₁₀ are capable of penetrating deep into the lungs, resulting in **cardiovascular and respiratory impacts**, and also affecting **other organs**. PM is primarily generated by fuel combustion in different sectors, including transport, energy, households, industry, and from agriculture. In 2013, outdoor air pollution and particulate matter were classified as carcinogenic by WHO's International Agency for Research on Cancer (IARC)".³

2. The European Union's Commitment to Align its Policy with WHO Standards

“The European Commission presented in September the final step of an open public consultation for a revision of the Ambient Air Quality Directive, proposing six different levels of alignments with WHO targets by 2030 or 2050.”

Air pollution has been one of Europe's main political concerns since the late 1970s. European Union policy on air quality aims to develop and implement appropriate instruments to improve air quality. The main instruments are a series of **Directives** setting ambient air quality standards that provide the current framework for protection from excessive pollution concentrations:

- **Directive 2008/50/EC** on ambient air quality and cleaner air for Europe.
- **Directive 2004/107/EC** relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air (Fourth Daughter Directive).
- **Directive 2015/1480/EC** amending several annexes to Directives 2004/107/EC and 2008/50/EC of the European Parliament and of the Council laying down the rules concerning reference methods, data validation and location of sampling points for the assessment of ambient air quality.

These pollutants are also tackled at source by a set of limits established for polluting devices such as boilers and stoves through the **Ecodesign Directive**, and installations depending on their size through the **Medium Combustion Plant Directive** or the **Industrial Emissions Directive**. Indoor air quality is a growing concern for European legislators and the European

Parliament, calling on the European Commission to put forward legislation.

European legislation on air quality is built on certain principles. The first is that the Member States divide their territories into a number of **zones and agglomerations**. Within these, the Member States should undertake assessments of air pollution levels using measurements, modelling and other empirical techniques – and **report air quality data** to the European Commission accordingly. Where levels are above limit or target values (see **air quality standards**), Member States should prepare an **air quality plan or programme** to address the sources responsible and so ensure compliance with the limit value before the date when the limit value formally enters into force. In addition, information on air quality should be disseminated to the public. The **control of emissions** from mobile sources, improving fuel quality and promoting and integrating environmental protection requirements into the transport and energy sector are part of these aims.

³ New WHO Global Air Quality Guidelines aim to save millions of lives from air pollution. WHO. 22 September 2021.

Box 2. More than 400,000 premature deaths.

Estimates of the health impact of exposure to air pollution indicate that in 2018 **long-term exposure to particulate matter with a diameter of 2.5 µm or less (PM_{2.5})** in Europe (including 41 countries) was responsible for approximately 417,000 premature deaths, while NO₂ caused around 55,000 premature deaths. O₃ is estimated to have caused 20,600 premature deaths in the same geographical area, according to the European Environment Agency (EEA) Report No 9/2020 on air quality in Europe.⁴

The EU limits for pollutants were, in some cases, already significantly higher than the WHO AQG previously in place (from 2005). While only 4% of reporting stations presented PM_{2.5} levels above the EU standards in 2018, this percentage increases to 70% when considering the 2005 WHO guidelines. This **discrepancy** is also present in O₃ (41% vs 96%) reports, according to the EEA Report. Additionally, air pollution from large industrial sites in Europe had an estimated societal cost of €277 billion to €433 billion in 2017, according to a recent analysis by the EEA.⁵

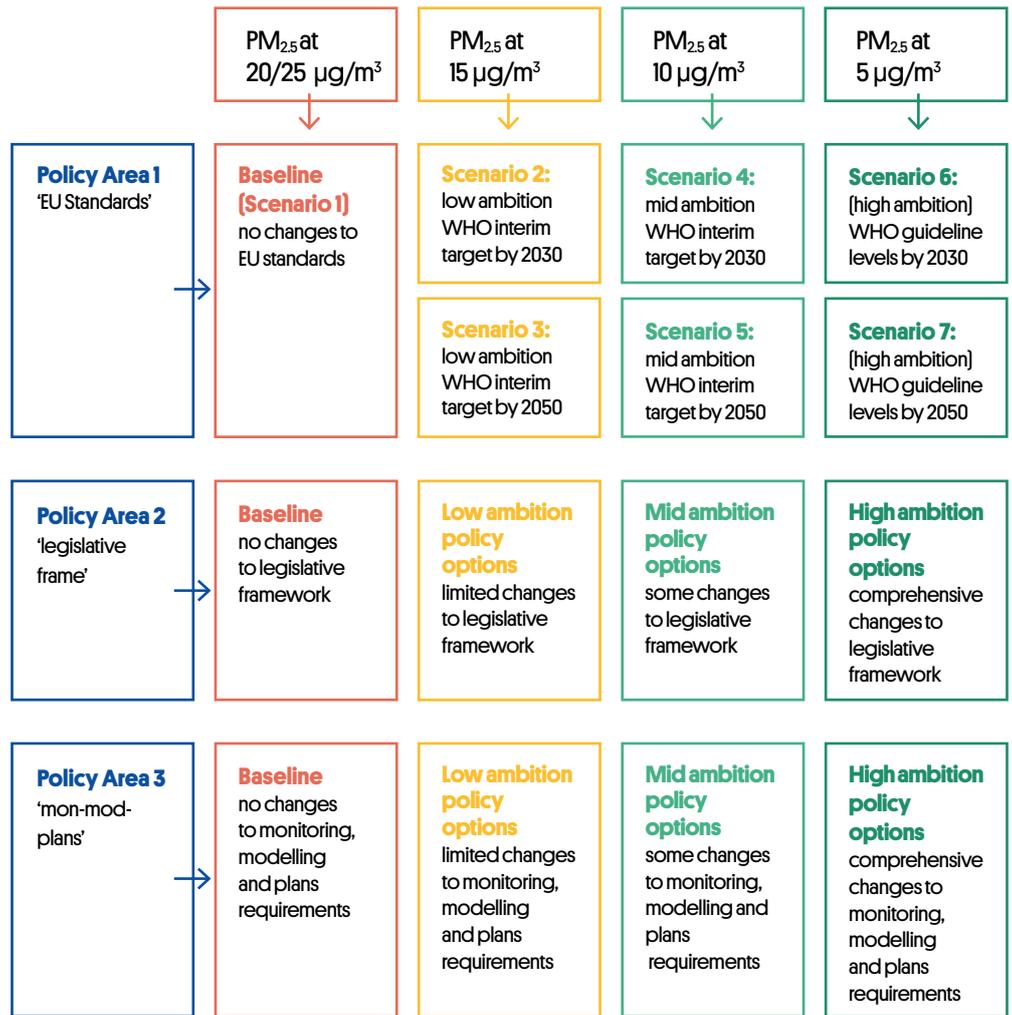
As part of the **European Green Deal's Zero Pollution Action Plan's** objective of improving air quality to reduce the number of premature deaths caused by air pollution by 55%, the EU is **revising these standards** to align them more closely with WHO recommendations. The EU also aims to improve overall EU legislation for clean air, building on the lessons learnt from the 2019 evaluation ('fitness check') of the Ambient Air Quality Directives.

The Commission has published an Inception Impact Assessment, to guide the underpinning work to assess the impacts of a **possible revision of the Ambient Air Quality Directives**, planned for 2022. The European Commission presented in September the final step of an open public consultation for this review, proposing six different levels of alignments with WHO targets (low and medium interim targets and the guidelines levels) by 2030 or 2050 ●

⁴ Air quality in Europe — 2020 report. EEA.

⁵ Counting the costs of industrial pollution. EEA. 29 September 2021.

Figure 2. Definition of scenarios as presented in the Stakeholders meeting 23 September 2021.



Source: Air Quality - revision of EU Rules - 23 September 2021. European Commission Clean Air Unit.

3. ISGlobal Contribution to the Debate: The Urban Planning, Environment and Health Initiative

“It reflects our commitment with the expansion of science, as well as its translation into policies and practices. It contains with the following priorities.”

ISGlobal’s Urban Planning, Environment and Health Initiative is ISGlobal’s most distinctive contribution to this debate. It reflects our **commitment with the expansion of science**, as well as its **translation into policies and practices**. It contains with the following **priorities**:

- **To strengthen the knowledge** in the field of exposure, health effects, mechanisms, and health impact assessment of air pollution, natural environment, noise, temperature and active transportation, particularly in global contexts where little research has been conducted previously, with the aim to improve healthy and sustainable urban living.
- **To boost the transdisciplinary area** of active transportation and health, including physical activity and air pollution, and their interactions.
- **To develop novel exposure assessment/epidemiological/statistical methodologies** applied to air pollution, green space, physical activity, temperature, noise, and active transportation research.
- **To evaluate the impact of policies and plans**, including local interventions in urban environments and global and national climate change mitigation goals on air pollution levels and their corresponding impacts on health.

ISGlobal has **participated in the review of the WHO Guidelines** and is supportive⁶ of the new levels.⁷ Alignment between the EU standards and the new WHO guidelines is necessary, but will be challenging. For example, cities are hotbeds of air pollution, and many of the EU cities exceed even current guidelines. Principal sources of air pollution include: fossil fuel combustion, agriculture, motorized traffic, home heating and cooking, indoor biomass combustion, ports, airports and industry.

The ISGlobal Ranking of Cities project aims at **estimating the health impacts of urban and transport planning in 1,000 European cities**. We evaluate environmental exposures related to urban and transport planning for cities in more than 30 European countries and establish city rankings with the results.

Additionally, AIRLAB was launched in 2019 through ISGlobal’s Climate and Health programme. AIRLAB’s aims at **disentangling the role of air composition in human health** and its analyses include not only the physical properties of particles (from coarse to ultrafine particles), but their chemical (metals, non-metals, etc.) and microbial (bacteria, fungi and viruses) composition ●

⁶ Implementing the New WHO Air Quality Guidelines Can Prevent Millions of Premature Deaths and Many More Cases of Disease. Mark J Nieuwenhuijsen. ISGlobal. 22 September 2021.

⁷ New World Health Organisation (WHO) Air Quality Guidelines Endorsed by Over 100 Scientific Societies. ISGlobal. 22 September 2021.

4. The Way Forward

“Europe urgently needs to replace fossil fuels with renewable energy sources with the fewest tradeoffs for health, energy poverty, and ecosystems.”

Europe urgently needs to **replace fossil fuels with renewable energy sources** with the fewest tradeoffs for health, energy poverty, and ecosystems. In urban environments, **reducing motorized private transport** and **increasing active transport** should be prioritised. Providing **more green spaces** should also be a priority to simultaneously adapt to climate change and improve health. There are many solutions available for reducing air pollution, and a variety of measures can be implemented depending on the characteristics of each city. The following are examples of action identified in our [Interactive Report: 5 Keys to Healthier Cities](#):

- **Designing cities for pedestrians and cyclists** Cities designed for people—with green areas and clearly delimited spaces—make urban journeys safer and easier, as well as more enjoyable and healthy.
- **Reducing motorised traffic** Cities constructed primarily to facilitate cars generate pollution and promote unhealthy lifestyles.

- **Making public transport the backbone** Improving the public transport system and promoting its use greatly reduces air pollution by decreasing private vehicle use and lowering emissions.
 - **Increasing connected greenspace** to facilitate active travel and improve the availability and quality of public space •
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5. Recommendations: Health as a Fundamental Aspect of Urban and Transport Policies

“Cities and governments should align EU standards to Air Quality Values in 2030 in the upcoming legislative review.”

Based on the current legislative agenda from the [Zero Pollution Action Plan](#) and the new WHO AQG, cities and governments should:

- 1. Align EU standards to AQG values in 2030** (Scenario 6 of the Policy Area 1 and necessary changes in Policy Areas 2 and 3 to ensure compliance) in the upcoming legislative review.
- 2. Reduce premature deaths caused by air pollution** (currently 55% by 2030 according to the Action Plan) and long-term perspective (2050).
- 3. Include the new 2030 targets in the National Air Pollution Control Programmes.**
- 4. Ensure that the 100 climate-neutral and smart cities by 2030 part of the European Missions are fully aligned with the WHO AQG** with sufficient funding to achieve “cleaner air, safer transport and less congestion to citizens”.

5. Ensure that air pollution health co-benefits are integrated into the climate change agenda.

6. Use a holistic approach to urban planning and mobility, including health objectives and covering active mobility in related European and national policies ●

TO LEARN MORE

- [5 Keys to Healthier Cities](#). ISGlobal.
- [What Are the Health Effects of Air Pollution?](#) ISGlobal.
- [ISGlobal Ranking of Cities](#). ISGlobal.
- [Redrawing Barcelona. From Cerdà to Superblocks. The quest for a new urban model](#). ISGlobal
- [Air Quality and Health](#). ISGlobal.
- [Climate change, air pollution, and allergic respiratory diseases: a call to action for health professionals](#). ISGlobal. 24 June 2020.

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