The growing need for air quality regulations and policies to mitigate indoor environments-associated risks

Air pollution

High-quality air is essential to our health and to the environment. Nevertheless, due to human activities that release harmful pollutants, the overall condition of air has significantly worsened. These activities are notably associated with industrial processes, energy generation, household heating, agricultural practices, and transportation. According to the World Health Organization[1], 91% of the global population experienced air quality below the established standards. The primary culprits among air pollutants include particulate matter (PM2.5 and PM10), nitrogen dioxide (NO2), sulfur dioxide (SO2), carbon monoxide (CO), and ozone (O3).

In the European Union (EU), air pollution stands out as the foremost environmental health concern. According to the WHO report, 4.2 million premature deaths worldwide were linked to air pollution, with 91% of these premature deaths occurring in low- and middle-income countries[2]. Various health issues, such as respiratory diseases (asthma, bronchitis, pneumonia), allergies, disruptions to the central nervous system, cardiovascular complications, circulatory problems and lung cancer, are attributed to air pollution, being vulnerable populations the most affected [3,4].

Beyond its impact on human health, air pollution also harms the environment and ecosystems by contributing to excess nitrogen pollution and acid rain[5]. Additionally, it poses a significant economic burden, resulting in lost workdays and heightened healthcare costs. Consequently, poor air quality has a detrimental effect on our overall quality of life.

Implementing policies and measures to enhance air quality for all EU citizens not only promises improved health outcomes and a healthier environment but also translates into reduced healthcare expenditures for governments. In this sense, these are the expected outcomes of the "clean air package[6]", the EC's initiative to reduce air pollution across the EU by 2030.

Outdoor measures

The fundamental and inherent benefits of establishing legislation, strategies, and policies in the realm of air pollution lie in their preventive measures and requirements to control emissions from sources, enhance air quality, and mitigate adverse health impacts. Current policies are mainly focused on: improving infrastructure and transportation structure, improving energy consumption and industry[7].

[1] https://www.who.int/data/gho/data/themes/air-pollution/who-air-quality-database/2016
[2] https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health
[3] 10.1016/s0013-9351(02)00059-2.
[4] 10.1016/j.jenvman.2010.10.027
[5] 10.1016/j.envpol.2009.11.023
[6] https://www.consilium.europa.eu/en/policies/clean-air/
[7] 10.1007/s40201-021-00744-4

Funded by the European Union

At the international level, the Gothenburg Protocol[8] establishes limits for emissions of various pollutants to control long-range transboundary pollution.

At the European level, the EU's zero pollution vision for 2050[9] is also geared towards addressing air pollution. The EU's comprehensive clean air policy rests on three pillars: setting ambient air quality standards, reducing emissions of air pollutants, and establishing emission standards for key pollution sources. There is also legislation relating to ambient air quality —the air immediately surrounding us—at EU level through Directive 2008/50/EC[10] , commonly known as the "Air Quality Directive." This directive establishes "limit values" that must not be exceeded for different pollutants.

Additionally, WHO released updated Global Air Quality Guidelines[11] in September 2021, encompassing Particulate Matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide, and carbon monoxide. These outdoor guidelines provide thresholds and limits for key air pollutants posing health risks. They serve as an update to the 2005 version, "Air quality guidelines for particulate matter, ozone, nitrogen dioxide, and sulfur dioxide," frequently referenced in discussions regarding air quality targets.

Need for indoor air quality policies

Although governments are increasingly adopting policies on air quality, they are mainly focused outdoors. However, we spend 90% of our lives indoors[12]. And while air quality outdoors is monitored and regulated, that's not the case indoors. The significance of indoor air quality is frequently underestimated, despite it being one of the top five significant public health risks. Surprisingly, the definition of "healthy" indoor air quality remains ambiguous, and state governments often lack comprehensive regulations to address and manage indoor air quality.

Since research studies suggest that indoor air pollutant concentrations are increasing driven by different factors such as the use of chemical substances in household products, inadequate ventilation, warmer temperatures or increased humidity; and consequently, the indoor air quality is being affected, the need for focus also on policies to improve indoor air quality is becoming increasingly evident.

Supporting that, scientific research demonstrates the potential effects of inadequate indoor air quality on health. Some health effects such as the irritation of eyes, nose and throat, headache, fatigue, or dizziness can appear shortly after a single exposure or repeated exposures to a pollutant. Other health effects might appear even several years after exposure has occurred and/ or only after long or repeated periods of exposure, causing respiratory and cardiovascular diseases, as well as cognitive effects or cancer[13].

[8] https://unece.org/gothenburg-protocol
[9] https://environment.ec.europa.eu/strategy/zero-pollution-action-plan_en
[10] https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:152:0001:0044:en:PDF
[11] https://iris.who.int/handle/10665/345329
[12] 10.1016/j.jclepro.2019.01.307
[13] 10.3389/fpubh.2020.00014

Funded by
the European Union

Although there is still a long way to go to raise awareness at local, regional and national levels in order to develop and implement policies on this topic, some initiatives have been carried out to provide policy and decision-makers with the framework to improve indoor air quality.

For example, in 2014, WHO introduced groundbreaking health-based guidelines on clean fuels and technologies for household cooking, heating, and lighting. These guidelines are designed to assist public health policymakers and experts working on energy and resource issues in comprehending and implementing effective approaches to mitigate household air pollution. Through an extensive scientific assessment, these guidelines pinpoint which energy systems can be considered environmentally friendly for health within homes and establish specific emission levels that pose health risks. The guidelines strongly discourage the utilization of unprocessed coal and kerosene as household fuels due to associated health and safety risks. The WHO emphasizes the importance of transitioning from solid, polluting fuels to clean fuels and technologies, particularly in low-income and rural households. To facilitate this transition, the guidelines advocate for the implementation of policies that prioritize substantial health benefits. This initiative addresses the critical need for a shift towards cleaner energy sources to safeguard public health, especially in vulnerable communities relying on traditional and potentially harmful cooking and heating methods.

Conclusions

Setting indoor air quality guidelines provides a foundation for comprehending and mitigating health risks associated with indoor environments. These guidelines play a crucial role in informing the development of standards, regulations, and policies, ensuring that indoor spaces promote safety and well-being. Notably, over 50 organizations, spanning 38 countries, including the World Health Organization (WHO), have collaborated to create IAQ guidelines. However, it's essential to note that these guidelines are non-binding; countries have the autonomy to adopt them into their legislation if they choose to do so. Hence the importance for public authorities to put the focus on indoor air quality, and to address its impacts and associated costs.

To sum put, indoor air quality deserves growing attention in EU. The need for specific policies and measures is evident to enhance the quality of the air we breathe indoors. Acknowledging the importance of indoor air quality in the EU emphasizes the necessity for tailored strategies and initiatives to address and improve indoor air quality, reflecting a commitment to the health and well-being of its residents.

Funded by
the European Union