

Science for Environment Policy

Integrated pollution, climate and energy access policies needed to meet WHO PM_{2.5} limits

A new study finds that meeting WHO Air Quality Guidelines (AQG) on particulate emissions by 2030, thereby improving global human health, will require a combination of stringent policies on air pollution, climate change and access to clean cooking fuels.

Outdoor and household air pollution has been estimated to be among the leading global causes of poor health and premature death. Increasing awareness of these effects has led to legislated [air pollution](#) policies in many countries. However, recent studies have estimated that up to 80% of the global population are still exposed to ambient air pollution exceeding WHO AQG amounts. The AQG allows for no more than 10 micrograms per cubic metre ($\mu\text{g}/\text{m}^3$) of particulate matter smaller than 2.5 μm (PM_{2.5}).

Emissions from cooking stoves are a major component of global particulate matter in developing countries, like those in Africa and South Asia, where they account for over 50% of emissions from human sources. This has led to efforts such as the UN's Sustainable Energy for All¹ and Global Alliance for Clean Cookstoves² campaigns, which aim to replace older cooking stove technology with cleaner burning modern alternatives and fuels.

Recently, research has focused on the public health and climate co-benefits of improved access to modern cooking fuels and stoves in developing countries. However, there has been limited assessment of global policy impacts and their co-benefits that include behaviour of regulated entities, atmospheric transport chemistry, climate science and health effects. To address this limitation, researchers used high-resolution modelling techniques and datasets to estimate global air pollution concentrations and its human health impacts by 2030. They analysed five scenarios, detailed in the Global Energy Assessment (GEA)³, incorporating different air pollution legislation, climate change, and access to clean energy for stoves policies.

The study found that, by 2030, all current and planned air quality legislation would be inadequate to meet WHO AQG PM_{2.5} levels, with global population-weighted average anthropogenic PM_{2.5} concentrations rising to 34 $\mu\text{g}/\text{m}^3$ compared to 26 $\mu\text{g}/\text{m}^3$ in 2005, despite a slight decline in primary PM_{2.5} emissions of around 2%. However, under this scenario health effects were expected to be improved over a scenario where only 2005 legislation remained in place.

Significant health improvements were predicted, as a result of reduced PM_{2.5} levels, under a scenario where current and planned air quality legislation were coupled with increased clean energy access. Even greater health improvements were predicted under a scenario capable of meeting the WHO AQG PM_{2.5} targets; this required more stringent pollution policies than currently proposed, supplemented with enhanced energy access and climate change policies.

In addition, the study suggests that the direct costs of outdoor air pollution control can be significantly reduced through the co-benefits of combining policies with different overall objectives and motives, but with related atmospheric pollution controls– for example policies aimed at reducing emissions to stem future global warming could also improve air quality.

The results highlight that the greatest improvements in air quality and human health are seen only through combinations of both atmospheric pollution legislation and related policies. It also strongly suggests that multiple benefits, including cost savings, can be obtained through identification and selection of complimentary policies with different overall objectives.

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1. www.sustainableenergyforall.org

2. www.cleancookstoves.org

3. <http://www.iiasa.ac.at/web/home/research/Flagship-Projects/Global-Energy-Assessment/Home-GEA.en.html>

