

Air pollution from fossil fuel use accounts for over 5 million extra deaths a year, new modeling study finds

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Air pollution from using fossil fuels in industry, power generation, and transportation accounts for 5.1 million extra deaths a year worldwide,

finds a new modeling study published by *The BMJ*.

This equates to 61% of a total estimated 8.3 million deaths worldwide due to ambient (outdoor) [air pollution](#) from all sources in 2019, which could potentially be avoided by replacing [fossil fuels](#) with clean, renewable energy sources.

These new estimates of fossil fuel-related deaths are larger than most previously reported values suggesting that phasing out fossil fuels might have a greater impact on attributable mortality than previously thought.

Ambient air pollution is the leading environmental health risk factor for illness and death, but few global studies have attributed deaths to specific air pollution sources and their results widely differ.

To address this, an international team of researchers used a new model to estimate all cause and cause-specific deaths due to fossil fuel-related air pollution and to assess potential health benefits from policies that replace fossil fuels with clean, renewable energy sources.

They assessed excess deaths (the number of deaths above that expected during a given time period) using data from the Global Burden of Disease 2019 study, NASA satellite-based [fine particulate matter](#) and population data, and atmospheric chemistry, aerosol, and relative risk modeling for 2019, in four scenarios.

The first scenario assumes that all fossil fuel-related emission sources are phased out. The second and third scenarios assume that 25% and 50% of exposure reductions towards the fossil phase-out are realized. The fourth scenario removes all human-induced (anthropogenic) sources of air pollution, leaving only natural sources such as desert dust and natural wildfires.

The results show that in 2019, 8.3 million deaths worldwide were attributable to fine particles (PM_{2.5}) and ozone (O₃) in ambient air, of which 61% (5.1 million) were linked to fossil fuels. This corresponds to 82% of the maximum number of air pollution deaths that could be averted by controlling all anthropogenic emissions.

Attributable deaths to all sources of ambient air pollution were highest across South and East Asia, particularly in China with 2.44 million per year, followed by India with 2.18 million per year.

Most (52%) of deaths were related to common conditions such as ischemic heart disease (30%), stroke (16%), chronic obstructive lung disease (16%) and diabetes (6%). About 20% were undefined but are likely to be partly linked to [high blood pressure](#) and neurodegenerative disorders such as Alzheimer's and Parkinson's disease.

Phasing out fossil fuels would result in the largest absolute reductions in attributable deaths in South, South East and East Asia, amounting to about 3.85 million annually, equivalent to 80-85% of potentially preventable deaths from all anthropogenic sources of ambient air pollution in these regions.

In [high-income countries](#) that are largely dependent on fossil energy, about 460,000 deaths annually could potentially be prevented by a fossil fuel phase out, representing about 90% of the potentially preventable deaths from all anthropogenic sources of ambient air pollution.

The researchers acknowledge that their new model has led to larger estimates than most previous studies. Reasons for this include taking account of all cause in addition to disease-specific deaths and basing their model solely on studies of [ambient air pollution](#).

As such, they say uncertainty remains, but given the Paris Climate

Agreement's goal of climate neutrality by 2050, "the replacement of fossil fuels by clean, renewable energy sources would have tremendous public health and climate co-benefits."

The forthcoming COP28 climate change negotiations in the United Arab Emirates "offer an opportunity to make substantial progress towards phasing out fossil fuels. The health benefits should be high on the agenda," they conclude.

Phasing out fossil fuels would save millions of lives, say researchers from Finland and Norway in a linked editorial.

However, deaths are only one part of the problem, they note. "Improved air quality would reduce the burden of several major diseases leading to healthier and longer lives, fewer patients requiring admission to hospital and other treatments, and decreasing the burden on health systems worldwide."

They agree that clean [renewable energy sources](#) are needed to replace fossil fuels, but say the effects of switching to alternative technologies must be explored in further research.

As COP28 begins on 30 November, they urge country leaders to commit to an accelerated, just, and equitable phase-out of fossil fuels and say high-income countries must agree to lead the way.

"The benefits of fossil fuel phase-out on global health, in addition to the climate, must be recognized and play a key role in shaping discussions at COP28," they conclude.

More information: Air pollution deaths attributable to fossil fuels: observational and modelling study, *The BMJ* (2023). [DOI: 10.1136/bmj-2023-077784](https://doi.org/10.1136/bmj-2023-077784)

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