

Air quality and health in US will improve from other nations' actions to slow climate change

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The USA will benefit from improved air quality in the future, through actions to reduce greenhouse gas (GHG) emissions both domestically and globally.

That is the primary finding of new research led by the University of

North Carolina at Chapel Hill (UNC), published today in the journal *Environmental Research Letters*. It comes following the decision by President Donald Trump to withdraw the USA from the 2015 Paris Accord on climate change, which commits its signatories to actively work on reducing their GHG emissions.

The study examined the benefits of global and domestic GHG mitigation on US air quality and human [health](#) in 2050, comparing a scenario with no global action to reduce GHGs with an aggressive scenario that significantly slows climate change. The GHG reduction scenario emphasizes energy efficiency and shifts energy production and use away from highly polluting forms toward cleaner sources with less air pollution.

The study then quantified the [health benefits](#) of global GHG reductions, and for the first time separated those into contributions from foreign vs. domestic GHG mitigation. It showed that the health benefits to the US of reducing GHG emissions are significant, and in monetary terms would exceed the costs of reducing GHGs.

Exposure to fine particulate matter (PM_{2.5}) and ozone (O₃) is associated with both human morbidity (e.g. hospitalisations, emergency department visits, school absences, and asthma-related health effects) and premature deaths.

Lead author Dr Jason West, from UNC, said: "PM_{2.5} and O₃ have long enough lifetimes in the atmosphere to transport intercontinentally, which suggests that emissions from one source region can affect air quality and human health in multiple receptor regions.

"To explore the long-term effects of a global GHG mitigation strategy, we used dynamical downscaling from global simulations to predict the changes in air quality and related premature deaths."

Co-lead author Dr Yuqiang Zhang said: "We found that the global GHG mitigation scenario reduces air pollution-related deaths in the US by 16,000 deaths in 2050 for PM2.5-related mortality, and 8,000 deaths a year for O3-related respiratory mortality."

The team's results show that foreign GHG mitigation - i.e. other countries implementing policies to reduce greenhouse gas emissions (such as the 2015 Paris Agreement) - contributed 15 per cent of the total PM2.5-related and 62 per cent of the total O3-related deaths avoided. Dr Zhang said: "Our results show that the US can gain significantly greater co-benefits for [air quality](#) and [human health](#), especially for ozone, by working together with other countries to combat global [climate change](#)."

"Previous studies that estimated the health benefits of GHG reductions typically focused locally or nationally, and therefore missed the benefits from foreign reductions."

Dr West added: "In monetary terms, we found that the benefits for avoided deaths from ozone and PM2.5 were roughly \$137 per ton CO2 at high valuation, and \$45 at low valuation, of which 31% are from foreign GHG reductions. These benefits are likely greater than the cost of reducing GHGs in 2050."

More information: 'Co-benefits of global, domestic, and sectoral greenhouse gas mitigation for US air quality and human health in 2050' *Environmental Research Letters* (2017). [DOI: 10.1088/1748-9326/aa8f76](https://doi.org/10.1088/1748-9326/aa8f76)

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