

In a warming world, could air conditioning make things worse?

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As climate change continues to push summer temperatures ever higher, the increased use of air conditioning in buildings could add to the problems of a warming world by further degrading air quality and

compounding the toll of air pollution on human health, according to a new study.

Writing today (July 3, 2018) in a special [climate change](#) issue of the journal *PLOS Medicine*, a team of researchers from the University of Wisconsin-Madison forecasts as many as a thousand additional deaths annually in the Eastern United States alone due to elevated levels of air pollution driven by the increased use of fossil fuels to cool the buildings where humans live and work.

"What we found is that air pollution will get worse," explains David Abel, the lead author of the new report and a UW-Madison graduate student in the Nelson Institute for Environmental Studies' Center for Sustainability and the Global Environment. "There are consequences for adapting to future climate change."

The analysis combines projections from five different models to forecast increased summer energy use in a warmer world and how that would affect power consumption from fossil fuels, air quality and, consequently, human health just a few decades into the future.

In hot summer weather, and as heat waves are projected to increase in frequency and intensity with climate change, there is no question that [air conditioning](#) does and will save lives, says Jonathan Patz, a senior author of the study and a UW-Madison professor of environmental studies and population health sciences.

However, he cautions that if the increased use of air conditioning due to climate change depends on power derived from fossil fuels, there will be an air quality and human health tradeoff. "We're trading problems," says Patz, an expert on climate change and human health. "Heat waves are increasing and increasing in intensity. We will have more cooling demand requiring more electricity. But if our nation continues to rely on

coal-fired power plants for some of our electricity, each time we turn on the air conditioning we'll be fouling the air, causing more sickness and even deaths."

Another senior author of the new *PLOS Medicine* report, [air quality](#) expert Tracey Holloway, a UW-Madison professor of environmental studies as well as atmospheric and oceanic sciences, says the study adds to our understanding of the effects of adapting to climate change by simulating the scope of fossil fuel use to cool buildings under future [climate change scenarios](#). Buildings, she notes, are the biggest energy sinks in the United States, responsible for more than 60 percent of power demand in the Eastern United States, the geographic scope of the study. Air conditioning, she says, is a significant component of that electrical demand.

"Air quality is a big issue for public health," she explains, noting that increases in ground-level ozone and fine particulate matter in the air—byproducts of burning [fossil fuels](#) and known hazards to [human health](#)—will be one result of adding to fossil-fuel power consumption.

The study forecasts an additional 13,000 human deaths annually caused by higher summer levels of fine particulate matter and 3,000 caused by ozone in the Eastern U.S. by mid-century. Most of those deaths will be attributable to natural processes like atmospheric chemistry and natural emissions, which are affected by rising temperatures. However, about 1,000 of those deaths each year would occur because of increased air conditioning powered by fossil fuel. "Climate change is here and we're going to need to adapt," says Abel. "But air conditioning and the way we use energy is going to provide a feedback that will exacerbate air pollution as temperatures continue to get warmer."

The results of the new study, according to the Wisconsin team, underscore the need to change to more sustainable sources of energy

such as wind and solar power, and to deploy more energy-efficient air conditioning equipment. "The answer is clean energy," says Abel. "That is something we can control that will help both [climate](#) change and future [air pollution](#). If we change nothing, both are going to get worse."

Provided by University of Wisconsin-Madison

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