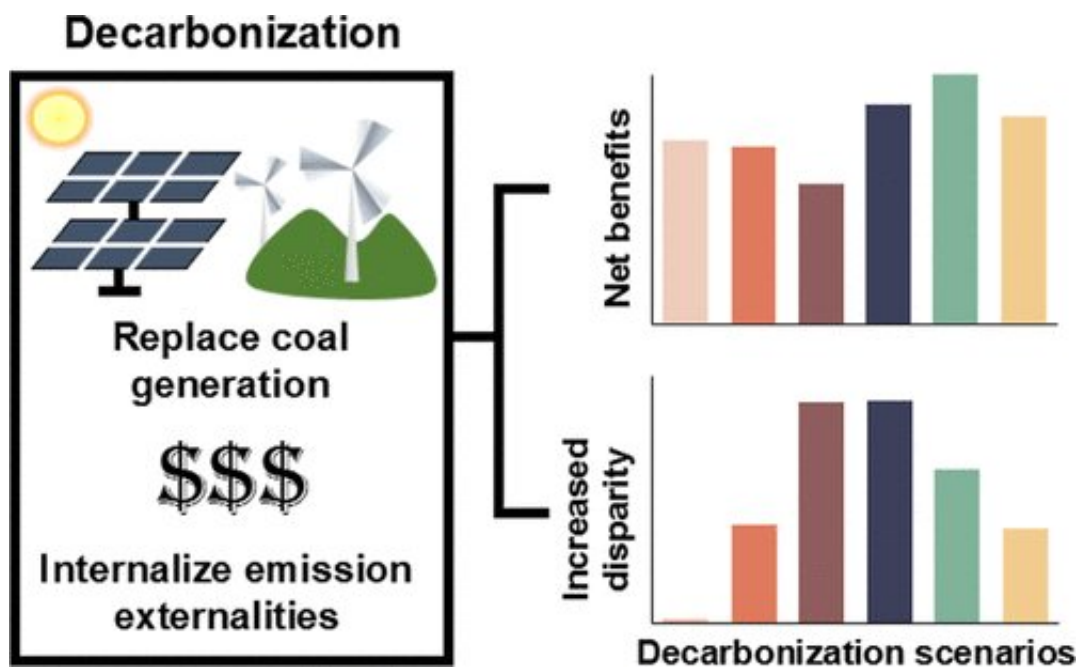


Cutting coal has huge health benefits—but environmental justice issues remain

September 13 2022, by Matt Shipman



Credit: *Environmental Science & Technology* (2022). DOI: 10.1021/acs.est.2c00881

A new study drawing on data from Texas and surrounding states finds that the most common strategies for reducing greenhouse gas emissions from power generation also produce enough health benefits to completely offset the cost of these "decarbonization" efforts. However, the study found that while Black and low-income communities also benefit, they still face higher levels of air pollution and related health effects.

"Other researchers have also examined health benefits associated with decarbonization," says Jeremiah Johnson, an associate professor of environmental engineering at North Carolina State University and co-author of a paper on the work. "We wanted to expand on that work in two ways."

"First, we wanted to look at issues related to [environmental justice](#) and equity. Second, we wanted to look closely at how health benefits associated with decarbonization can inform operational decisions in the power sector. If we can determine which specific plants are having the greatest impact on [human health](#), and when, then [power systems](#) can modify [power generation](#) at those plants to reduce human health impacts."

"In terms of environmental justice, it is well established that some people suffer more from the effects of air pollution than others, and we wanted to explore whether decarbonization efforts might make things better or worse for the communities who suffer the most," says Qian Luo, a Ph.D. student at NC State and first author of the paper.

The researchers evaluated the impacts of six decarbonization strategies. Three of the strategies involved using different power generation methods to replace [coal-fired power plants](#): solar power, wind power and natural gas. Two of the strategies involved implementing "carbon taxes" at different levels—effectively increasing the costs of electricity generation based on the amount of carbon dioxide that power plants emit. The sixth strategy involved requiring power plant operators to include the economic costs of health effects caused by emissions in their decision-making. The carbon tax and health damages strategies would significantly increase the expense of coal power, indirectly encouraging a shift to power generation that produces fewer emissions.

The researchers drew on power generation data from across Texas, as

well as health data from Texas and other states affected by air emissions from Texas's power plants. The data was fed into an integrated suite of new and existing computational models to better understand the health effects of the various decarbonization strategies at the local level.

"We were able to assess health impacts at the census tract level, which is fairly granular—each tract represents between 1,200 and 8,000 people," Luo says. "Specifically, we drew on established studies to determine the extent to which air pollution was contributing to mortality numbers in each tract."

By calculating the number of deaths associated with the relevant air pollution, the researchers were able to determine the monetized benefits of reducing that air pollution. This was done using the "value of a statistical life," which is used by the federal government to perform cost-benefit analyses.

The researchers found that all six decarbonization strategies reduced [adverse health effects](#) from air pollution more than enough to offset the cost of implementing the strategy.

However, while there were health benefits across the board, some areas still suffered from more air pollution than others. These areas tended to be low-income areas or neighborhoods with large Black populations.

"While there are health benefits under every decarbonization scenario—which is good—there is still a significant environmental justice gap," says Fernando Garcia-Menendez, co-author of the paper and an assistant professor of environmental engineering at NC State.

"For example, the gap between Black neighborhoods and other neighborhoods either stays the same or gets worse. In other words, while Black neighborhoods benefit from decarbonization, they don't benefit as much as other neighborhoods. And the same holds true for low-income

neighborhoods across all races."

The findings were also sufficiently precise, pointing to specific emissions from specific plants at specific times, to inform operation decisions that could reduce human health impacts even if the plants are not taken completely offline.

"The take-away message here is very simple: reducing coal power generation has significant, immediate [health benefits](#)," Johnson says. "And all of the techniques under consideration for reducing coal power generation produce meaningful benefits."

The paper is published in the journal *Environmental Science & Technology*.

More information: Qian Luo et al, Diverse Pathways for Power Sector Decarbonization in Texas Yield Health Cobenefits but Fail to Alleviate Air Pollution Exposure Inequities, *Environmental Science & Technology* (2022). [DOI: 10.1021/acs.est.2c00881](https://doi.org/10.1021/acs.est.2c00881)

Provided by North Carolina State University

Citation: Cutting coal has huge health benefits—but environmental justice issues remain (2022, September 13) retrieved 4 May 2024 from <https://phys.org/news/2022-09-coal-huge-health-benefitsbut-environmental.html>

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