

US counties could gain \$1 million in annual health benefits from a power plant carbon standard

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Nearly all U.S. regions stand to gain economic benefits from power plant carbon standards that set moderately stringent emission targets and allow a high level of compliance flexibility, according to a new study by scientists from Harvard T.H. Chan School of Public Health, Syracuse University, Resources for the Future, and the Harvard Forest, Harvard University as a project of the Science Policy Exchange.

The study was published today, June 7, 2016, in the open access journal *PLOS ONE*. The authors report large national net benefits of approximately \$33 billion per year for the power plant carbon standard in the study, based on estimated costs of \$17 billion per year and projected benefits of \$29 billion for a subset of [health](#) co-benefits, and \$21 billion for climate benefits.

While other studies have analyzed total national costs and benefits of power plant carbon standards, this is the first study of its kind to break down the costs and benefits by sub region for the entire U.S.

"We found that the health benefits would outweigh the estimated costs of the carbon standard in our study for 13 out of 14 power sector regions within five years of implementation—even though we only looked at a subset of the total benefits," said lead author Jonathan Buonocore, Research Associate and Program Leader at the Center for Health and the Global Environment at Harvard Chan School.

"With the full range of climate, health, and ecosystem benefits taken into account, we would expect that the net benefits would be even larger and that the benefits would outweigh costs in all regions within a year or two of implementation," added co-author Dallas Burtraw, Darius Gaskins Senior Fellow at Resources for the Future.

Power plant carbon standards are aimed at curbing carbon dioxide emissions from the power sector to help address climate change. Depending on how the standards are designed, emissions of secondary pollutants such as sulfur dioxide, nitrogen oxides, and particulate matter may also be reduced as a co-benefit of the policy—leading to improved air quality and associated health benefits such as fewer premature deaths, heart attacks, and hospitalizations from respiratory and cardiovascular impacts.

The study analyzed the anticipated health co-benefits of a power plant carbon standard that would achieve a 35% reduction in carbon dioxide emissions by 2020 through cleaner fuels, energy efficiency, emissions trading, and other measures. In a previous study, the researchers projected that approximately 3,500 premature deaths and hundreds of heart attacks and hospitalizations would be avoided in the U.S. each year as a result of this carbon standard. In this new study, the researchers calculated the economic value of those health co-benefits for the nation as a whole by county. Then they compared those benefits to costs that they projected for 14 commonly used power grid regions to estimate net benefits by region.

The researchers found that the benefits would be widespread and, before accounting for costs, most counties would receive more than \$1 million in health co-benefits annually from the carbon standard in the study. Counties in the Northeast and Southwest U.S. are projected to gain the largest health co-benefits. The Mid-Atlantic, Ohio River Valley, and South-Central regions of the U.S. are projected to gain the largest health

co-benefits per capita (these regions correspond to the power grid regions PJME, PJMC, MISO, SERCC, SERCD, and ERCOT).

The researchers then used three different sets of economic assumptions to estimate the cost of the carbon standard for each of the 14 regions. The results show that the highest costs of \$1.5 to \$3.6 billion per year are projected for the Midwest (MISO and SERCG), Mid-Atlantic (PJME), and Southeast (SERCC and SERCSE) regions under the central cost case. Those same regions also have among the greatest benefits, ranging from \$1.7 billion to \$5.6 billion. The largest net benefits occur in the Central Mid-Atlantic region (PJMC).

"Our results suggest that net economic benefits from power plant carbon standards tend to be greatest in highly populated areas near or downwind from coal-fired [power plants](#) that experience a shift to cleaner sources with the standards," said co-author Charles Driscoll, University Professor of Civil and Environmental Engineering, Syracuse University.

The power [plant carbon](#) standards analyzed in this study are similar to, but not the same as, the Clean Power Plan introduced by the U.S. Environmental Protection Agency (EPA) on August 3, 2015. The standard in the study would achieve a 35% reduction in [carbon dioxide emissions](#) from the power sector from 2005 levels by 2020. The costs and benefits were calculated as the difference from a business-as-usual case based on 2013 energy demand projections from the U.S. Department of Energy and Energy Information Administration. The U.S. EPA Clean Power Plan aims to achieve a 32% reduction from 2005 levels by 2030 and uses a business as usual case with updated energy demand, natural gas prices, and renewable and energy efficiency assumptions.

More information: Jonathan J. Buonocore et al, An Analysis of Costs and Health Co-Benefits for a U.S. Power Plant Carbon Standard, *PLOS*

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