

US could cut per capita greenhouse emissions 90% by 2050, says report

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Offshore wind farm in the North Sea off the coast of Belgium. Credit: Hans Hillewaert / Creative Commons

As the Paris climate summit approaches, a new study shows in detail that it is technologically and economically feasible for the United States to sharply reduce greenhouse gas emissions in line with the international goal of limiting global warming to 2 degrees Celsius or less. The report says it is possible to revamp the energy system in a way that reduces per capita carbon dioxide emissions from 17 tons per person currently to 1.7 tons in 2050, while still providing all the services people expect, from

driving to air conditioning.

The two-volume report is from the Deep Decarbonization Pathways Project. The project is led by the Sustainable Development Solutions Network, a United Nations-sponsored initiative whose secretariat is at Columbia University's Earth Institute, and the Institute for Sustainable Development and International Relations. The analysis itself was conducted by the San Francisco-based consulting firm Energy and Environmental Economics Inc., in collaboration with researchers at Lawrence Berkeley National Laboratory and Pacific Northwest National Laboratory.

The first volume describes the technology requirements and costs of different options for reducing emissions. An update of a study released last year, it lays out in detail the changes in the U.S. energy system needed year by year to meet the target, looking at every piece of energy infrastructure—from power plants and pipelines to cars and water heaters—in every sector and every region of the U.S.

The report says this can be done using only existing technology, assuming continued incremental improvements but no fundamental breakthroughs, and without premature retirement of current infrastructure, at a net cost equivalent to about 1 percent of Gross Domestic Product in 2050.



An electric car charging station in Amsterdam. Credit: Wikimedia Commons

The report finds multiple technology pathways capable of reaching the target, presenting choices that can be made based on innovation, competition and public preference. Passenger cars, for example, could be switched to battery-powered electric vehicles or fuel-cell vehicles. Low-carbon electricity could be provided by renewable energy, nuclear power, or carbon capture and storage. The authors looked closely at the reliability of a power grid with high levels of intermittent wind and solar energy, using a sophisticated model of the electric system's operation in every hour in every region.

"I think our work throws down a gauntlet to those who claim that decarbonization of the U.S. energy system is impractical and out of reach," said report lead author Jim Williams, chief scientist at Energy and Environmental Economics and director of the Deep Decarbonization Pathways Project. "Arguments that the U.S. can't achieve this technologically or economically don't hold water."

Williams said, "The challenges are often not what people think. The public has been conditioned to think of climate policy in terms of costs, burdens, loss of services. But if we get it right, we will create a high-tech [energy system](#) that is much more in sync with a 21st century economy, and there will be many more economic winners than losers."

The second volume provides a roadmap for what policy makers at the national, state and local levels need to do to enable a low carbon transition. It describes how businesses and whole regions could benefit in an energy economy where the dominant mode shifts from purchasing fossil fuel, with historically volatile prices, to investment in efficient,

low carbon hardware, with predictable costs.

The U.S. study is part of a series by the Deep Decarbonization Pathways Project, an international collaboration of research teams from the world's 16 highest-emitting countries. This year it has issued country-specific strategies for deep decarbonization also in Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, South Africa, South Korea and the United Kingdom.

"The DDPP has taken an essential step in low-carbon energy policy, and the work of the U.S. team points the way forward for the Paris summit," said Earth Institute Director Jeffrey Sachs. "Happily, the U.S. government has also endorsed the idea of preparing deep decarbonization pathways as a critical tool for achieving the transformation to low-carbon [energy](#) systems worldwide."

In September, a joint statement on climate change cooperation by President Obama and President Xi Jinping of China stressed "the importance of formulating and making available mid-century strategies for the transition to low-carbon economies."

More information: The US Deep Decarbonization Pathways Project: usddpp.org/

Provided by Earth Institute, Columbia University

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