

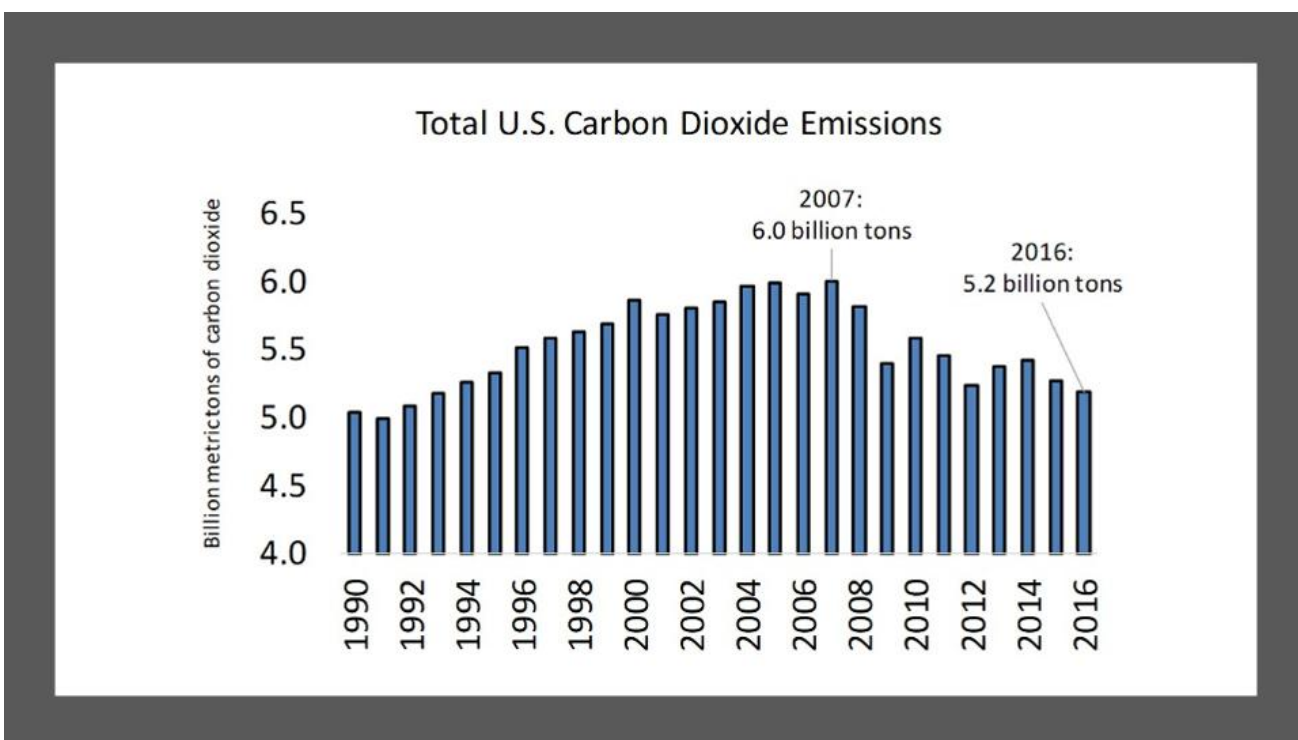
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Policies Should Address Global Climate Change By Incenting Innovation



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Policy



US Emissions U.S. ENERGY INFORMATION ADMINISTRATION

Amidst all of the rhetoric and dire predictions surrounding global climate change, it is easy to lose one's perspective. But, we will not successfully minimize the risks created by global climate change without perspective.

Fundamental to this perspective, U.S. greenhouse gas (GHG) emissions have been declining for more than a decade. As visualized in the above figure, total U.S. carbon

dioxide emissions peaked in 2007 and has declined nearly 14 percent through 2016. According to [Berkeley Earth](#), the largest contributor to this decline is the “transition from coal to natural gas for electricity generation”. Increased use of fuel economy cars and electricity generated from wind turbines have also contributed.

It is also necessary to understand the actual risks global climate change poses. As [Bjorn Lomborg](#) has eloquently argued, “yes, global warming is real and human-caused”, but claims that climate change will lead to the end of the world are unsupported. “The UN’s Intergovernmental Panel on Climate Change estimates that by the 2070s, the total effects of climate change, including on ecosystems, will be equivalent to a reduction in average income of 0.2 to 2.0 percent. By then, each person on the planet will be 300 to 500 percent richer.”

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Put differently, the IPCC’s results do not support the current “call to panic” (as if panic is ever an effective response to emergencies). The IPCC’s results demonstrate that global climate change imposes costs that need to be managed. By definition, effective management will also account for the benefits enabled by cheap, reliable energy. Cheap reliable energy improves our material well-being, enables us to live longer healthier lives, and empowers us to become better stewards of our environment.

Panicked responses, on the other hand, will impose large unacceptable costs that will be borne by the poor, particularly the poor living in low-income countries. These costs arise because, while there have been impressive technological improvements with regards to alternative energy sources, currently global energy needs cannot be met by these power sources.

The current constraints arise because alternative technologies like solar and wind power are “non-dispatchable technologies”. Solar power produces energy when the sun shines and does not produce energy at night or on cloudy days. Similar constraints apply to wind power. Since there is no effective means for storing the energy produced when the sun is shining or the wind is blowing, these power sources

energy produced when the sun is shining or the wind is blowing, these power sources cannot be turned on and off as needed – they are not dispatchable. Several problems consequently arise.

Due to the non-dispatchability of alternative technologies, claims that they are now cost competitive only tell half of the story. The levelized cost of energy (LCOE) is typically used to compare the costs of different electricity generation technologies. Based on the most recent LCOE calculations, onshore wind power and solar power are competitive with natural gas. But, due to their lack of dispatchability, other costs arise.

Additional energy capacity, based on fossil fuels or nuclear power, are necessary to back-up alternative technologies because they do not generate sufficient energy when the sun is not shining, or the wind is not blowing. Traditional energy sources run less efficiently when their output needs to be increased and decreased in response to the unpredictable output of alternative energy sources. These additional expenses add to the costs associated with alternative energies.

Then there is the problem of balancing the energy grid. On sunny and windy days, alternative technologies could produce too much energy. If not handled properly, this excess energy can damage the electricity grid. Managing this excess generation has led to some bizarre outcomes, such as [California needing to pay neighboring states](#) to consume the excess electricity California's alternative energy infrastructure has generated.

Advances in battery storage or major upgrades to the national grid are necessary to address these problems, but the battery technology is still insufficient and the grid infrastructure that is needed to carry solar power from the southwest, or wind from the plains, to the places where people live does not yet exist.

It is also unclear that wind and solar power are the most effective solution. Wind and solar power have admirable features, but there are also concerns regarding these technologies. For instance, based on current technologies, [some industry analysts](#) estimate that powering the U.S. economy with solar would require 7.2 million acres of

solar panels, or the entire area of Maryland and Delaware.

Once these issues are considered, it is clear that alternative energy sources are currently too expensive and technologically incapable of powering the U.S. economy. With this background, several policy priorities make sense.

First, since the technology is lacking, global climate change policies need to incent innovations. To be most effective, these policies should be technologically neutral focusing on the goal of incenting the development of cheap reliable low- or zero-emission energy, regardless of the source.

One policy option would replace current technology-specific tax credits and subsidies with **broad-based tax rate reductions** available for companies/investors that developed lower- or zero-emission technologies. These marginal tax rate reductions would increase the after-tax rate of return from investing in low- or zero-emission technologies, creating a strong positive incentive that would attract more investment and help alleviate the current technological constraints.

Utility regulations are also outdated and often an obstruction to modernizing the national grid that could improve the viability of alternative technologies. Utility regulatory reform that opens the grid up to greater competition could materially improve the financial viability of the technologies that currently exist.

Finally, as Presidential candidate Cory Booker has correctly noted, “**nuclear has to be part of the blend**”. Nuclear power is a carbon free, safe, and reliable power source that, with effective regulatory reforms, could be an important part of the solution.

Addressing global climate change is not a binary choice, and positioning it as such is dangerous. Continued progress toward reducing GHG emissions while still promoting global prosperity is possible. Achieving this goal requires policies that are based on sound facts, not catchy slogans.

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