

How Much Do Renewables Actually Depend on Tax Breaks?

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Climate, Energy

by David Funkhouser | March 16, 2018



A wind farm in Texas, which leads the U.S. in wind energy production. The U.S. produces more megawatt hours of wind energy than any other nation. Photo: U.S. Department of Commerce

Wind and solar energy production are growing faster in the United States than any other source of electricity, and falling prices are making them more competitive with fossil fuel-driven electricity. Meanwhile, natural gas has surpassed coal as the prime fuel for power plants. Those trends helped drive down U.S. greenhouse gas emissions in 2017 to their lowest level since 1991, according to [a report](#) for the Business Council on Sustainable Energy.

That's good news for anyone concerned about climate change. The shift to renewable energy is a key part of the global effort to reduce emissions of carbon dioxide and other earth-warming gases and slow down climate change by reducing our dependence on fossil fuels.

But critics argue that this growth wouldn't be possible without financial support from the government. How much do renewables actually need tax breaks and other subsidies?

The government policies that have helped kick-start renewable power have sparked a complex battle among players in the energy industry, environmental groups and politicians. The debate involves a tangle of state and federal policies: tax credits, low-carbon fuel standards, renewable portfolio standards, depreciation allowances, energy efficiency credits, net metering – the list goes on. Some help consumers and the renewables industry, some bolster fossil fuels.

The debate encompasses a variety of questions: Whom should we subsidize? Which are the most effective ways to encourage cleaner energy, keep prices down and people working, and keep the lights on when we need them? Who will be the winners and losers?

“Your ‘traditional’ energy sources have been receiving subsidies for more than 100 years,” said Alexandra Hobson, external communications director for the [Solar Energy Industries Association](#).

“Solar energy has a solar investment tax credit that was created in 2005 to jump-start the market, and it has been overwhelmingly successful at incentivizing the deployment of both rooftop and utility-scale solar energy in the United States.”



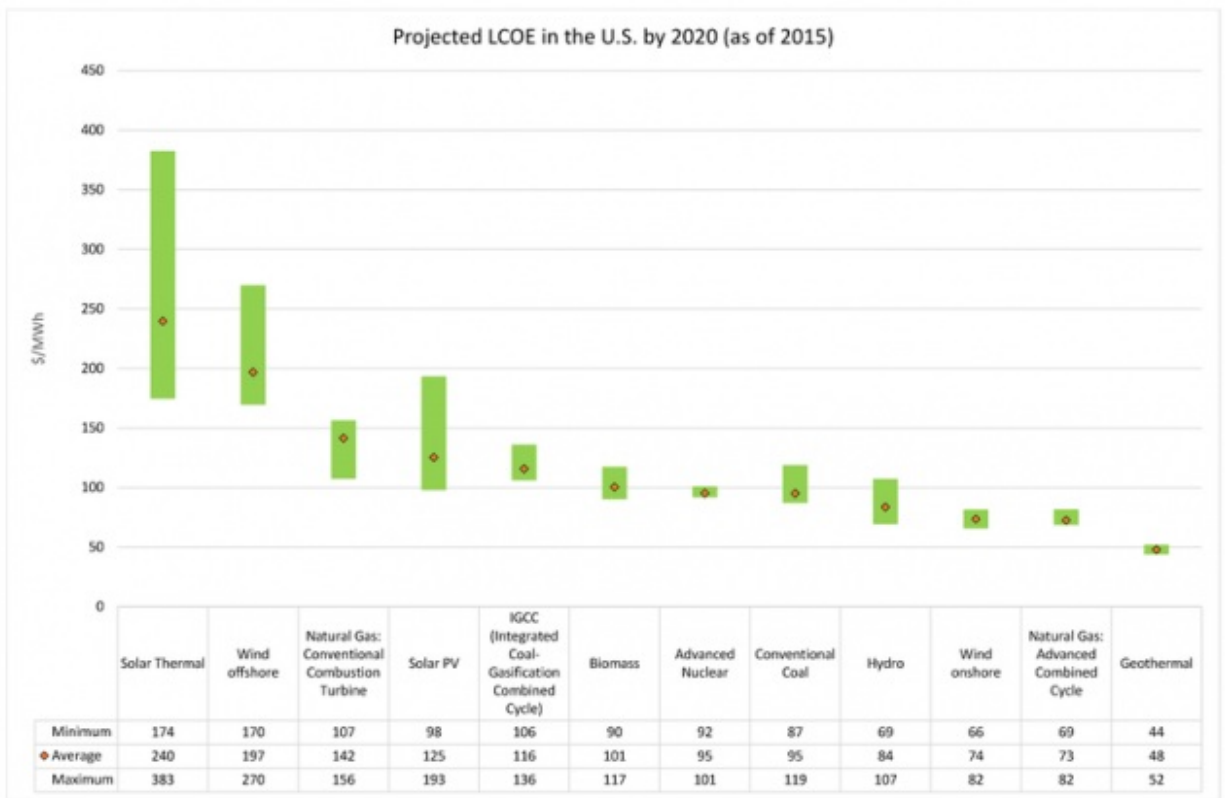
Rooftop solar installations have grown with the help of tax credits for both homeowners and installers. Photo: www.fairfaxcounty.gov

The federal tax credit she cites trims the cost of solar by 30 percent. Five million U.S. homes are now powered by solar; that is expected to double with projects now under contract, and many more are in planning stages, [the association reports](#).

Wind power also has benefited from federal tax credits. The U.S. now produces enough wind energy to power about 17.5 million U.S. homes, said [the American Wind Energy Association](#).

From the perspective of cheap energy, the U.S. is doing well. Americans in 2017 devoted [less than 4 percent](#) of their spending on energy, a near-record low. The boom in natural gas and shrinking cost of solar and wind from more efficient technology and scaled-up manufacturing have helped keep prices relatively low.

Taking out subsidies, solar and wind power are now cheaper than electricity generated by coal, nuclear power and even natural gas over the lifetime of a power facility, according to [a 2016 analysis by Lazard Ltd.](#), a financial advisory and asset management firm. Between 2009 and 2016, Lazard said, the cost of solar power in the United States dropped 85 percent, and wind power dropped by 66 percent.



Levelized cost of energy from different sources by 2020, taking into account subsidies. The range of costs reflects different scenarios. Source: U.S. Energy Information Administration; for another view of energy costs, see [a report by Lazard](#) here.

What are the subsidies?

Since the Revenue Act of 1916, the U.S. has used tax incentives and other policies to encourage domestic fossil fuel production. Up to the mid-2000s, oil and natural gas producers benefited the most. That changed when the government decided we needed to start reducing greenhouse gas emissions. Since then, a much larger share of support has gone to improving energy efficiency, encouraging renewable energy and development of alternative-fuel motor vehicles such as fuel-cell and hybrid cars.

Depending on how you define them, the list of subsidies can be quite long. A list of renewable energy support [programs for California](#) residents and businesses includes 212 items, including federal and state-run programs. And policies vary state to state.



Part of the 354 MW Solar Energy Generating Systems parabolic trough solar complex in northern San Bernardino County, California. Photo: U.S. Bureau of Land Management

The most important subsidies for renewables are federal investment tax credits and production tax credits for solar and wind, and state renewable portfolio standards, said Nicholas Steckler, an analyst at [Bloomberg New Energy Finance](#).

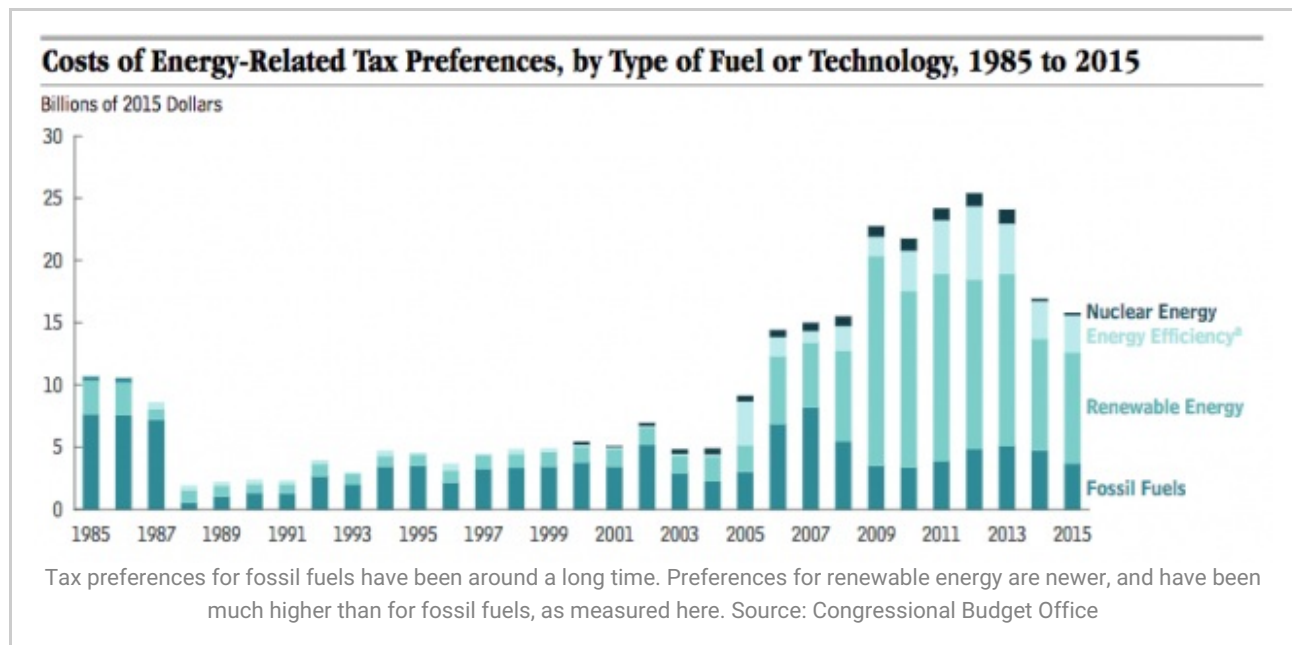
The [tax credits for renewables](#) allow utility developers and homeowners to take 30 percent of the cost of a solar, wind or fuel cell project off their taxes. A 10 percent credit applies to other technologies such as geothermal and combined heat and power systems. Currently, most of the credits are scheduled to decrease and disappear by 2022.

Many states now require that a certain percentage of their electricity has to come from renewable sources, usually by a certain date. These "[renewable portfolio standards](#)" vary: New York and California aim for 50 percent by 2030; Vermont targets 75 percent by 2032. Thirteen states have no standard.

Electrical utilities buy the power they need on a wholesale market. But they cannot distinguish where the electrons flowing across their power lines come from. To ensure they meet the state's renewable standards, they buy "certificates" from producers pumping out electricity from solar farms, wind turbines, hydropower or biomass generators that add up to the required percentage of megawatt hours. These "certificates" are an additional source of revenue for the renewable energy producers. In states like California and New York, that "has a huge impact on generation sources," Steckler said.

For fossil fuels, subsidies include tax exemptions and deductions, depletion allowances (tax deductions to make up for depleting non-infinite deposits) and accelerated depreciation allowances on energy supply equipment. The government also provides access to resources through leases for drilling or coal mining on public lands. Coal production gets assistance for pollution controls, and the Department of Energy funds both research and development and loan programs. (Department of Energy funding also goes to renewable energy projects and research into carbon sequestration.)

Some tax breaks are not unique to the fossil fuel industry, or have overlapping policy objectives. Should we count federal home heating oil assistance for the poor as a “subsidy” for the fossil fuel industry? Can we put a price on the military alliances that help protect foreign sources of oil? The calculations get very murky.



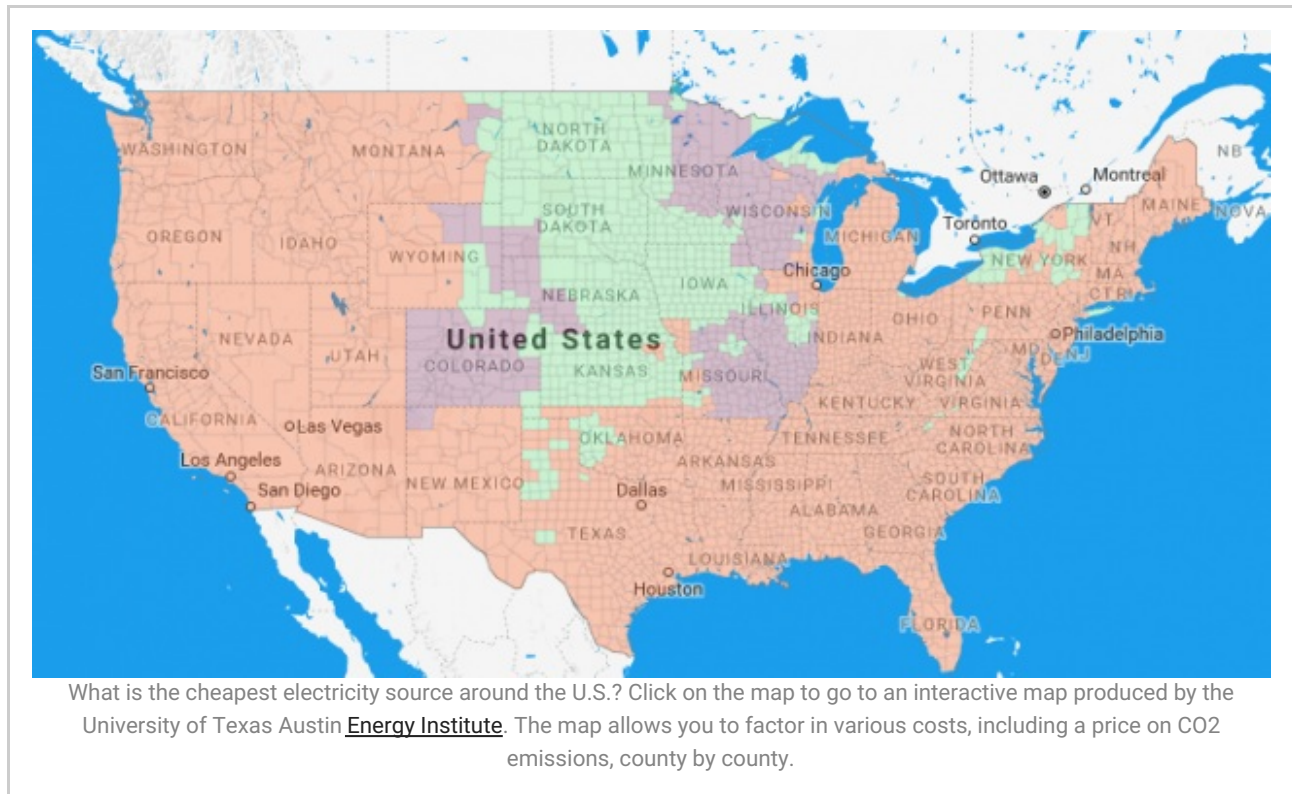
Who gets how much?

The Congressional Budget Office estimates that energy-related tax preferences in the U.S. cost \$18.4 billion in 2016. Nearly \$11 billion went toward renewable energy, \$2.7 billion for energy efficiency and electricity transmission, and \$4.6 billion for fossil fuels, the budget office said. The estimates do not include every program that affects the energy supply, such as research programs, tax breaks that apply more broadly to industry like depletion allowances, or the value of leasing on federal lands for coal, gas and oil extraction.

A different analysis comes from a group called Oil Change International, which advocates for clean energy. Using a more inclusive set of government incentives, they said the U.S. provides more than \$20 billion in fossil fuel subsidies alone each year.

Globally, the International Energy Agency said that fossil-fuel consumption subsidies – those directed at consumers and electricity providers to dampen prices – dropped to \$260 billion in 2016. The number does not include supports for production. Worldwide subsidies for renewable energy in power generation amounted to \$140 billion in 2016, the agency said.

But what about impacts on climate and human health? A [2017 paper](#) in the journal *World Development* estimated that when “external costs” such as air pollution and warming climate were included, subsidies for fossil fuels cost the world more than \$5 trillion in 2015.



Do subsidies work?

Opponents of subsidies for renewables argue that the lost tax revenue far outweighs the benefits. Because solar and wind are intermittent power sources, they make it more complicated to maintain a steady supply of electricity that meets demand that varies hour to hour. Your home solar panels may be sending power back to the grid, but it may not be needed right now, so it's wasted. Energy storage technology, though improving, still has a way to go to relieve that problem.

The [Institute for Energy Research](#), a non-profit organization dedicated to free market principles, contends that an increasing share of solar power will harm the electricity grid's reliability and impose additional costs on the system. It also argues that tax subsidies for wind power should end, since the cost of that energy is now competitive with natural gas.

By some measures, policies intended to increase the U.S. domestic fossil fuel supply have succeeded. The U.S. has become [the world's leading producer of oil and gas](#) and is now a net exporter of energy. But the Congressional Budget Office said the impact of the fossil fuel tax breaks has been marginal, and that tax supports in recent decades cost the U.S. far more than the value of the additional oil and gas produced.

For renewables, where the intent of subsidies was to encourage the development of the technology and expansion of the industry, “renewable energy has benefited greatly in deployment and maturity, and reduction in cost ... from subsidies,” Bloomberg's Steckler said.

The Congressional Budget Office concluded that some technologies, particularly wind-generated electricity, “have been responsive to subsidies.” However, the agency also cited a [National Academies of Science, Engineering and Medicine study](#) that found that the cost to reduce a ton of CO2 using tax credits far exceeded the estimated benefit.

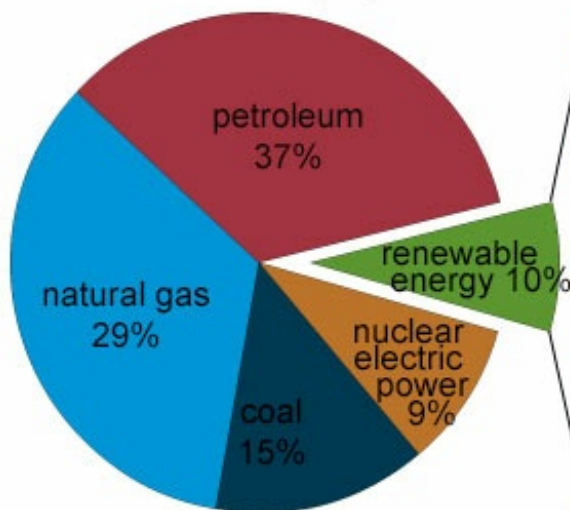
But that also depends on how you measure that benefit. Wind and solar energy may be saving us tens of billions of dollars or more in air quality and climate benefits, said scientists in a [study published in Nature](#) in 2017.

The [National Academies study](#) found that energy subsidies can be counterproductive: By lowering the price of energy, or increasing efficiency, they may actually encourage more energy use and increase emissions. And, the study added, development of renewable energy “may have happened anyway because of state requirements.”

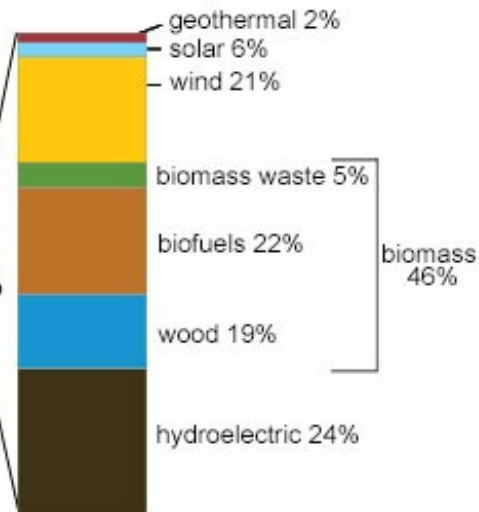
Even those state requirements can be counter-productive when it comes to cutting emissions, Steckler contended. For instance, if a state has a renewable portfolio standard highly focused on solar and wind, it might be missing out on an opportunity for a big carbon reduction by converting from coal to gas-fired power plants. Or, it could be shutting out another technology that is cheaper and more effective, like retrofitting old dams to produce hydropower.

U.S. energy consumption by energy source, 2016

Total = 97.4 quadrillion
British thermal units (Btu)



Total = 10.2 quadrillion Btu



Note: Sum of components may not equal 100% because of independent rounding.

Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 1.3 and 10.1, April 2017, preliminary data



What now?

If the ultimate goal is to drastically trim carbon emissions, the United States (and the world) still faces big challenges. While solar and wind power are adding more megawatts to the electricity grid than other sources, all renewables combined – including hydropower and

biomass – still made up just 18 percent of U.S. electricity generation and 10 percent of overall energy consumption in 2017. Nuclear power provides 9 percent of overall energy production. Fossil fuels – natural gas, oil and coal – account for about 81 percent.

“The growth [in wind and solar energy] is going to continue,” said Jason Bordoff, founding director of the Center on Global Energy Policy at Columbia and a member of the Earth Institute faculty. “It’s going to continue despite policy changes this administration has put into place, because the market forces are pretty powerful.” But, he added: “Twenty years from now...they will still be a relatively small portion of the energy mix.”

A conversion to cleaner energy faces tough obstacles – complex pricing issues, a need for better storage technology, an inadequate grid. Just consider how we will switch the fuel that now powers hundreds of millions of motor vehicles. As things stand, it’s not happening fast enough to meet climate goals set by the world’s nations in Paris in 2015.

Some point to a carbon tax as the only way to meet those goals. The tax would be a fee imposed on burning carbon-based fuels – coal, oil and gas – at the point of extraction or shipment. The tax would attempt to reflect the potential environmental cost of emitting more CO₂. Producers would be free to pass any of that cost forward to consumers, depending on market conditions. Rebates or reductions in other taxes could offset the added cost to consumers.

The study from the National Academies of Science and the Congressional Budget Office analysis both conclude that the most efficient way to reduce emissions of greenhouse gases and achieve climate-change objectives is to put a price on fossil fuels that reflects the damage they are causing.

In the aftermath of passing a major tax reform package, Congress and the administration are unlikely to consider the carbon tax issue anytime soon. And while people are concerned about climate change, it has not yet become an urgent issue for most Americans.

“I think that will change,” Bordoff said. “When the political urgency to address climate change becomes more acute, people will look to the policy solutions, and the economic efficiency of reducing emissions ... by pricing carbon will become attractive.”



The 30 megawatt Block Island Wind Farm is the first commercial offshore wind farm in the United States, located 3.8 miles from Block Island, Rhode Island in the Atlantic Ocean. Photo: David Funkhouser

Further reading and resources:
