



SUSTAINABILITY

Presidential Candidates Give Voters Big Choices on Energy Plans

From Trump to Sanders, the 2016 White House hopefuls emphasize different strategies, from wind power to oil drilling. As Super Tuesday primaries loom, here is a comparison

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By Natalie Jacewicz on February 25, 2016



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[Editor's note: this story was updated on Feb. 26, 2016, to compare nuclear plants to solar farms rather than wind farms.]

The U.S. presidential campaign is picking up energy. Candidates are heading into their first big test of national appeal, the March 1 Super Tuesday primaries and caucuses, with contests in Texas, Oklahoma, Massachusetts, Virginia, Alabama and seven other states. As the political heat increases, candidates' contrasting plans for actual energy use are worth voter attention. Some want to power the U.S. with wind, solar, water and geothermal energy, renewable sources that pump little or no carbon into our warming world. Others also draw on "clean energy," which includes renewables, but adds carbon-free but nonrenewable energy sources like nuclear power. And several would-be residents of the White House endorse traditional energy sources that include fossil fuels like coal, oil and natural gas.

Here's a rundown of how candidates propose to power 21st-century America, followed by some scientific evaluation of the schemes:

Marco Rubio: He wants to expand fossil fuel production by approving the Keystone XL Pipeline, lift the 1970s ban on crude oil exports and repeal Pres. Barack Obama's Clean Power Plan (a set of reduced carbon-emission goals for each state, which is currently in legal limbo because the Supreme Court is considering whether it is constitutional or not), plus other regulatory rollbacks. Rubio says he will remove "red tape" for developing new energy technology but claims closing coal plants will cost consumers money.

John Kasich: His plans are similar to Rubio's, plus he would allow states to regulate fracking for natural gas without federal oversight (if they meet unspecified "quality benchmarks"), increase energy production on federal land and pursue energy conservation measures

Ted Cruz: He promises to pursue all energy forms and embrace “the bountiful resources in this land—from oil to natural gas to ethanol.” Cruz says he will approve the Keystone pipeline and allow the private sector to further develop infrastructure.

Ben Carson: He has no formal energy plan but his Web site says he supports using all types of energy and reducing federal involvement

Hillary Clinton: Her goals are to lower greenhouse gas emissions to 70 percent of 2005 levels by installing 500 million solar panels as well as rebuild infrastructure to minimize wasted electricity, end tax credits for fossil fuels and defend the Clean Power Plan. Clinton would utilize clean energy such as nuclear power and has said she opposes Keystone.

Bernie Sanders: He wants to move energy use away from fossil fuels, block Keystone, ban fracking for natural gas and institute a tax on carbon emissions. Sanders emphasizes renewables like wind, solar, and geothermal technologies, and plans a moratorium on nuclear plant license renewals.

Donald Trump: He seems to be sitting this one out, with no reference to energy policies on his Web site. Past remarks suggest he would favor greater use of fossil fuels.

Because candidates differ in the way they plan to use renewable energy—from very little to a goal of complete reliance—it is important to understand the feasibility of their claims. Can we generate enough renewable energy to power the entire country, for instance? How much will it burn our pocketbooks to stop burning coal? Scientists who research these issues emphasize that whereas many things may be technically possible, realizing those goals depends on the social and political desires of voters.

All of America’s 50 states do have enough wind, water, heat and sun to keep the lights on and the fridge cold, says Mark Jacobson, a civil and environmental engineer at Stanford University. “It’s technically and economically possible,” he says. Jacobson published a map of renewability recipes for each state, independent of any campaign. He created the map along with Mark Delucchi, a transportation expert at the University of California, Berkeley,

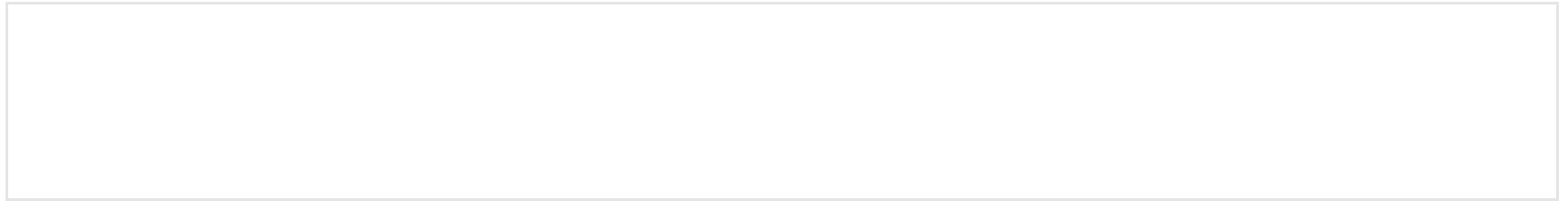
and several other researchers. Sanders' energy plan relies on this map. But turning the map into reality is not just about science, Jacobson says: "Whether it's socially and politically possible really depends on people's willpower."

For example, although a nuclear plant's energy generation is largely uninterrupted, a solar farm might only run 25 percent of the time, according to Dan Reicher, executive director of the Steyer–Taylor Center for Energy Policy and Finance, also at Stanford. Reicher has worked on energy policy for both Bill Clinton and Obama, and he's volunteering for Hillary Clinton's campaign. The run-time difference means that roughly four solar farms would need to be built for every one nuclear plant closed down. Doing this quickly, Reicher says, would be extremely costly.

The country could make greater use of renewable energy by building a national grid, according to Alexander MacDonald, a meteorologist and recently retired director of the National Oceanic and Atmospheric Administration's Earth System Research Laboratory. His team's recent study shows that if the entire electrical grid were connected across the U.S., there would always be some place in the country with enough wind, sun, or other power source to generate electricity, and the energy could be transferred to other locations as needed. This grid, which includes nuclear and natural gas, would require no advances in storage or grid capacity technologies, MacDonald claims, and would lower carbon emissions to 20 percent of 1990 levels.

MacDonald argues that private contractors could take out loans to build the grid and make money off the cheap electricity it generates, avoiding sticking consumers with the bill on tax day. (Toll roads are often bankrolled in this way.) The federal government has only one critical role, according to MacDonald: Lay out a blueprint to coordinate the grid's construction. If the government gets more involved financially, though, then consumers might foot some of the construction bill through taxes.

Jacobson, Reicher and MacDonald agree that a national transition away from fossil fuels will at least require political support, if not financial backing, from the feds. That means the next chief executive will have something important to say about it.



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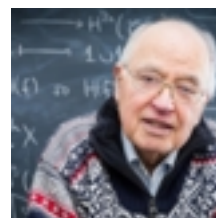
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