

Romney, Obama surrogates spell out candidates' energy policies

Presidential candidates differ sharply on government involvement in energy R&D and climate change. But both favor more nuclear power and fracking.

As president, former governor Mitt Romney would support basic research on new energy sources but would back away from providing government assistance for commercializing them, according to Linda Stuntz, who represented Romney at an 11 July debate on the candidates' views on energy. "Energy R&D should be done at a very basic level through something like ARPA-E [the Department of Energy's Advanced Research Projects Agency-Energy], which has done a terrific job. It's an apolitical funding mechanism, and it looks outside the box for basic R&D that wouldn't otherwise be supported," said Stuntz, a former deputy secretary of energy in the George H. W. Bush administration. "But subsidizing specific technologies doesn't work; it's been proven to fail. We now have wind and solar industries dependent on subsidies after 20 years."

Speaking for Obama at the debate, which was hosted by the Business Roundtable, Dan Reicher, who served as assistant secretary of energy during the Clinton presidency, defended the Obama administration's support for the development of new energy technologies. "I have to tell you one of our problems with clean energy technologies is that it's hard to get them commercialized," Reicher said. He pointed to the necessity of federal loan guarantees to stimulate construction of the first US commercial nuclear reactors in a generation and to the tens of millions of dollars DOE has awarded in cost-shared grants to utility consortia for carbon capture and storage (CCS) projects. Both examples, he said, indicate that "the government does have an appropriate role to play in commercializing technologies."

Stuntz, who now has a law practice specializing in energy and the environ-

ment, argued that tax dollars ought to not be spent for bringing technologies to the market. She noted that even the best venture capital firms consider that only 50–60% of their investments will be successful. "But we're using taxpayer dollars that people are obliged under penalty of law to contribute to the government," she said, "and we're making bets because people who were elected or career officials at the DOE in

Washington think they can make better bets than people in the private sector whose job that is. That, I think, is where we have a problem."

Scaling up

Reicher countered that ARPA-E can only take things so far in a research lab. Now executive director of an energy policy center at Stanford University, he said that getting technologies "up to the point where plant number one is operating at full scale and a New York investment firm will then step in, that's very hard. There is a reason to be doing this." The \$527 million in loan guarantees lost when the startup solar panel manufacturer Solyndra went bankrupt in 2011 was less than a quarter of the \$2.5 billion that had been

set aside to cover losses by the DOE-administered loan guarantee program, he noted.

Asked to describe how the energy policies of the candidates would differ, Stuntz said, "I don't think you will hear President Romney talking about a million electric vehicles on the road by 2015 when we've sold 17 000 so far in 2011. That is a disconnect from reality and an attempt to impose politically wishful thinking on a market, rather than letting consumers choose and letting business, science, and technology decide what wins out."

Reicher said Romney's energy policy

amounts to a total reliance on domestic drilling for oil and gas to meet the nation's energy needs. Indeed, Stuntz said that new horizontal drilling and hydraulic fracturing (fracking) technologies have so increased domestic oil output that the US is on the verge of becoming the world's third largest oil producer. "We may be self-sufficient in oil by 2020 if this technology is managed," Stuntz declared.

But Reicher questioned whether domestic production really could ramp up enough to meet US demand. Romney's policy, he argued, "doesn't give us the diversity of supply that we need from a security perspective." It also cedes the rapidly developing international market for clean energy technologies to Germany, China, India, and other nations, he contended.

Decarbonizing the climate

On climate change, Stuntz said that Romney "is certainly not a denier, and he certainly thinks there's a role for research. But he certainly thinks that moving forward in some sort of unilateral way will further disadvantage our economy. And in fact, it's only the growth economy that gives us the resources to be able to invest in further technology and better environmental protection."

More R&D will need to be focused on adapting to climate change, she added, "because it looks like no matter what we do, there's a certain amount that the climate is going to change."

The US, Stuntz said, is already "effectively decarbonizing our economy," with DOE estimating that carbon emissions will be below 2005 levels this year and will not increase through 2035. But global coal consumption increased 5% last year, led by a 10% jump in China. "The notion that the US can act unilaterally on carbon emissions and make a material difference in greenhouse gases is not realistic," she said.

Continuing dialog with other nations, further research, and adaptation "are all useful activities," Reicher concurred. "But the difference is that this administration says we do need a binding international agreement. We need to all step up and reduce emissions planetwide," he said. In the meantime,



Dan Reicher



Linda Stuntz

ROYAL DUTCH SHELL

"there are a whole set of things that we can do now to get going, putting technologies into place and helping countries begin to make the changes that ultimately this binding agreement is going to require." He noted that the Obama administration has been holding meetings with officials from developing nations concerning available clean energy technologies and the financing of their deployment.

Stuntz said that any attempt to persuade China or India not to build new coal power plants without CCS technology would be naive. "If you insist on new coal plants with CCS, there will be no new coal plants because it's not competitive," she said. In the US, utility executives complain that "every time they look at [CCS] it's more expensive, and every time the price of natural gas goes down, it's less cost competitive.

Both candidates favor growth in nuclear energy, and both support loan guarantees to back the initial deployment of advanced reactors. Stuntz said Romney would take steps to lower the cost of building new plants, "whether that means modular reactors that can be approved and rolled out in more cookie-cutter fashion ... or whether that means smaller reactors."

The Obama administration's support for nuclear power is evident from the \$7 billion loan guarantee from DOE to back construction of two new reactors at an existing nuclear power plant in Georgia, Reicher noted. "There's serious money going into small modular reactors and serious policy work going on in how to reform the licensing process" at the Nuclear Regulatory Commission to expedite approval.

Both candidates support fracking, but Stuntz said Romney believes that the environmental issues associated with the technology "are being overstated by some opponents." Although there are serious environmental questions associated with fracking, she said, "they can be handled like any other technological challenge." Reicher said Obama has "stepped right up; he's backing shale gas" but has insisted that drillers be more transparent about the composition of the fluids used and about developing standards to limit the toxic substances released in the process. "The last thing we need," Reicher said, "is to have a problem occur in a fracking operation and remove public support for this technology, when we are staring at a massive natural gas resource."

David Kramer

Despite gloomy economy, signs good for billion-dollar US telescope

The LSST will produce vast amounts of data, address important questions, and nudge astronomy toward the mega-collaborations typical of high-energy physics.

The hundreds of scientists and engineers involved in the Large Synoptic Survey Telescope (LSST) breathed a collective sigh of relief on 18 July, when the National Science Board gave the project its blessing. The project was the top priority in the 2010 astronomy and astrophysics decadal survey. And last year, says LSST director Tony Tyson, an independent design review "found no faults with the project. [The reviewers] said we were ready to cut metal."

"We can call this the end of the beginning," says Nigel Sharp, who oversees the project at NSF. The National Science Board's approval means that NSF can ask Congress for money for the LSST. NSF is funding the telescope, site infrastructure, and data system, and the Department of Energy is building the camera. Of the total estimated \$665 million construction tab, 70% is from NSF, 24% is from DOE, and 6% is from private donors. NSF's fiscal year 2014 budget request to Congress won't be public until next February, but if funding for the LSST is included—and then appropriated—construction would begin that year, and operation could commence in 2021.

The 8.4-m LSST will image large swaths of sky with unrivaled depth and detail as it scans the visible sky every

few days from its site in Cerro Pachón, Chile. Over its 10-year lifetime, the LSST will generate more than 100 petabytes of data on 20 billion objects. The four broad science thrusts of the telescope are cosmology, the structure of the Milky Way, the structure of our solar system, and the variable universe. Two big goals are studying dark energy and cataloging near-Earth objects. "One thing about massive amounts of data," says Sharp, "is that you get enough of rare things that you get a sample you can study. This ... opens up a new parameter space by viewing objects over time. History shows that any time you open up parameter space you find things you weren't expecting."

Technical advances

The wide, deep, fast sky survey is possible thanks to the confluence of technical advances in three areas: microelectronics, computation, and large aspherical optics fabrication. Chips can squeeze in more transistors, and silicon CCD cameras can pack more pixels. The LSST camera gives an "unprecedented wide and crisp image," says Tyson. The LSST will image the sky in six wavelengths from UV to near-IR (0.3–1.1 μm), taking pairs of 15-second exposures and reading out the camera's 3.2 billion



Casting the primary mirror (outer 8.4-m dish) and tertiary mirror (inner 5-m dish) out of a single piece of glass saves money and reduces alignment problems for the Large Synoptic Survey Telescope.

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