

## The Pros and Cons of Nuclear Power

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### America is entering a nuclear “renaissance,” but can we afford it?



In the early morning hours of March 28, 1979, the partial meltdown of the reactor core at Three Mile Island near Middletown, Pa., brought the nuclear power industry in America to a standstill.

Even though no one died and there was only a very small release of radioactivity, the public's trust in the industry and in the U.S. Nuclear Regulatory Commission that oversaw it evaporated along with the plans for any additional nuclear plants. (It didn't help that Chernobyl blew up seven years later in the Ukraine, the worst nuclear power plant accident in history, killing some 30 people outright and exposing thousands more to potentially lethal levels of radioactivity.)

“Everyone likes to use Three Mile Island as a milestone,” says Scott Burnell, a spokesman for the Nuclear Regulatory Commission. “It's reasonable to say that from the time of the accident until 2007 the NRC did not receive any applications to start the licensing process [for a new nuclear power plant].”

Yet, the United States is the world's largest producer of nuclear power, with 104 nuclear power plants generating nearly a trillion kilowatt-hours of electricity, almost 20 percent of the total electrical production in the country. About half of those plants were completed and went into operation after Three Mile Island. They were already underway when the accident happened, says Burnell, and plans and approvals kept coming

through the NRC pipeline until 1996.

More than that, the nation stands today on the brink of a nuclear renaissance, according to Shane Johnson, chief operating officer of the Department of Energy's Office of Nuclear Energy. Johnson says both utilities and the companies that build nuclear power plants are showing a great interest.

The push for more nuclear power began in 2005 under the Bush administration, whose energy bill that year included \$18 billion in loan guarantees for the construction of new nuclear power plants. It didn't take long for the industry to take notice.

"In 2005 we knew we were going to get applications [for new nuclear power plants]," says Burnell. "People were telling us ahead of time, 'We're going to send you an application.'"

By the middle of 2007 the applications began rolling in, topping out last year at a total 26 proposed new reactors. As of today 21 of those reactors are still being actively pursued, according to Burnell, with all but three in the Southeast. Outside the South there are reactors planned for upstate New York, Maryland and Michigan.

Pushing this nuclear renaissance along has been a convergence of big ideas and big issues, including the ongoing catastrophe in the Gulf of Mexico, which has reminded everyone of the terrible price to be paid for fossil fuels. Nukes generate virtually no greenhouse gases, making them the darling of many climate change advocates, and garnering the industry some unlikely allies, like Patrick Moore, a co-founder of Greenpeace, who was quoted saying nuclear energy is "the only large-scale, cost-effective energy source that can reduce [greenhouse-gas] emissions while continuing to satisfy a growing demand for power." And finally, the Obama administration has embraced nuclear, pledging to triple the \$18 billion in loan guarantees put in place by the Bush administration to \$54 billion. The expanded program is part of the administration's fiscal year 2011 budget request, which is before Congress now.

Energy Secretary Steven Chu told Congress during his confirmation hearings last year that nuclear power must be in the mix for America's energy future, especially given global warming.

"It's 20 percent of our [total] electricity production today, but it's 70 percent of the carbon-free electricity we produce," said Chu.

The first \$8.3 billion loan guarantee from the Obama administration went to Southern Co.'s Georgia Power in February. The company plans to build two new reactors adjacent to its existing Vogtle 1 and 2 reactors near Augusta, Ga.

A second \$2 billion loan guarantee was announced last month for the Eagle Rock Enrichment Facility to be built near Idaho Falls, Idaho, by AREVA, the French nuclear giant with manufacturing facilities in 43 countries and 75,000 employees worldwide,

including 6,000 in the United States. Eagle Rock will supply uranium enrichment services to power plants in the United States.

Not everyone is buying into the renaissance. Critics of the nuclear industry like Ellen Vancko, a nuclear energy and climate-change analyst for the Union of Concerned Scientists, point to the loan-guarantee program as proof the so-called renaissance is fueled by a \$650 million marketing and lobbying campaign the nuclear industry has undertaken in the past decade.

“The reality is nuclear power can’t move forward without massive public subsidies and tax breaks,” says Vancko. “Wall Street told [the nuclear power industry] they wouldn’t lend them money without loan guarantees. If the taxpayer doesn’t back up the loans, Wall Street won’t give them, it has said that point blank.”

As a result, Vancko fears the American taxpayer could end up saddled with a bill rivaling the cost of the bank bailout if a nuclear plant has a meltdown or there are massive cost overruns building new plants.

And unlike the Gulf, where President Obama is promising to make BP pay no matter what the cost of stopping the leak and cleaning up in its aftermath, the nuclear industry is protected by a 1957 law, the Price-Anderson Act, which limits the liability for all reactors in the country to about \$10 billion.

Vancko says the 1957 law was designed to help a fledgling industry that couldn’t get insurance against accidents in the private marketplace because the risks at the time were so high. And even though in America the track record of the mature industry, except for Three Mile Island, is good, the protection of the Price-Anderson Act remains.

“It’s another example of a subsidy the government provides to make a technology appear viable,” says Vancko. “Loan guarantees and tax incentives create a so-called renaissance, but the renaissance will only occur if the risks are shifted to somebody else.”

With a single reactor now costing roughly \$10 billion to build, even the massive subsidies being pushed by the Obama administration won’t go far, says Vancko. She says when the \$18 billion loan guarantee program was first implemented by the Bush administration four years ago, it was expected to be enough to fund four new nuclear power plants. But it’s now clear it will only be enough for two. Hence the proposed tripling of the loan guarantee pool by the Obama administration.

Then, says Vancko, there’s the ongoing effort to tack \$9 billion in nuclear power plant loan guarantees onto a pending emergency war-funding bill being considered by the House Appropriations Committee. Vancko says the tactic shows just how far some people are willing to go to help out the nuclear power industry.

“What do you do if costs keep escalating wildly? Keep adding to the pot,” she says.

While he declined to respond directly to Vancko’s criticisms, Johnson insists the loan-guarantee program is a temporary measure to restart an industry that has been essentially dormant for 30 years.

“The loan guarantees are seen as necessary at this point to show the private sector can construct and begin operation of these new facilities,” says Johnson. “It’s not seen as something that will go on in perpetuity.”

And it shouldn’t be overlooked, says Johnson, that the companies committing to new nuclear power plants are putting themselves in financial peril, given the “rather expensive” cost of those plants.

“The loan guarantees really are there just to backstop [the companies] in the event, for reasons outside the company’s control, something changes the conditions and they can’t go forward,” says Johnson. “Again [the loan guarantees] are only seen for the first few power plants, not something that will continue on indefinitely.”

In Connecticut, about 55 percent of the electrical power generated in the state last year came from the Millstone nuclear power plant in Waterford near New London, the biggest power plant in New England. But no one sees any new nukes for the state coming any time soon. First of all, siting a new plant would be a huge problem. And secondly, there’s little incentive for legislators to encourage new nukes in a deregulated market like Connecticut’s because ratepayers wouldn’t benefit from the relatively low-cost power nukes can produce.

That’s because under the rules of the state’s deregulated market, Millstone can charge the same for its power as a power plant fueled by natural gas, the most expensive source of power, according to Rep. Vicki Nardello, (D-Prospect), chairman of the state energy and technology committee. In fact, Nardello is coming off a losing battle in this year’s legislative session to impose a windfall-profits tax on Millstone. Because it can essentially charge natural-gas prices for its cheaper nuclear-fueled power, Millstone is making a killing, says Nardello.

Dominion Resources, the Virginia-based company that owns Millstone, is publicly traded but isn’t required to release financial data for individual units of the company like Millstone. So Nardello hired a consulting firm based in Portland, Ore., to figure out just how much Millstone is making by analyzing its Form 10-K, an annual report required by the Securities and Exchange Commission summarizing a public company’s financial performance.

The analysis by McCullough Research showed Dominion made \$440 million in 2009 before taxes, yielding a 57-percent rate of return on investment and a return on equity of 115 percent, fantastic numbers by any measure. The windfall-profits tax would have

limited Dominion to a 20-percent return on equity — still double what the utilities get — and would have taxed one-half of any income above that number, says Nardello. She says the state would have received some \$400 million annually from the tax, had it been signed into law. But it didn't even come close.

"The windfall-profits tax passed through the Energy and Technology Committee and was referred to the Finance Committee," says Nardello. "It was very heavily lobbied at the Finance Committee by Millstone and PSE&G. The Finance Committee refused to take it up."

PSE&G is the New Jersey-based Public Service Enterprise Group, which owns the Bridgeport Harbor Generating Station, a coal-fired power plant.

Dan Weekley, Dominion's managing director for the Northeast, says both Nardello and McCullough Research are way off-base. He points out that Nardello has tried to pass a windfall-profits tax for the past five or six years without success.

"We are surprised she is still pursuing this matter," says Weekley. "There have been a number of neutral entities that have spoken against these type of proposals. When it comes to a windfall-profits tax there is no evidence it would provide any benefit to the state of Connecticut or ratepayers. Actually the evidence indicates it will hurt ratepayers because all taxes eventually make their way back to ratepayers."

As for McCullough Research, Weekley says Managing Partner Robert McCullough is basically making things up when it comes to Millstone's financials, because he doesn't know the power plant's debt load or even how much it's getting for its power. And in fact, says Weekley, Millstone is not selling at the highest prices the market will bear, but rather is selling its power into contracts that stretch far into the future.

"We don't believe Mr. McCullough has all the information," says Weekley. "He's providing estimates and industry averages to get to his number. Because we are a publicly traded company all the information he's looking for is confidential. One cannot say these are facts. Those are his estimates and they're absolutely wrong."

One of the side effects of the nuclear renaissance that is already being felt, according to the DOE's Shane Johnson, is the "re-industrialization" of the nation, with companies like Westinghouse and Northrop Grumman placing orders for the components of nuclear power plants they plan to build. These parts, such as the main reactor vessels, are known as "ultra-large forgings," and can take several years to manufacture. The forging presses used for the largest reactors can accept hot steel ingots weighing up to 600 tons apiece.

"The United States no longer has the capability to manufacture ultra-large forgings," says Johnson. "We can do smaller forgings but we don't have the facilities any longer required for reactor vessels and vessel heads."

There's adequate capacity for these gigantic forgings in France and Japan, however, to support the projected needs for the U.S. nuclear industry over the next 10 to 20 years, according to Johnson. Whether the country ultimately regains the manufacturing ability to forge reactor vessels here at home will depend on the marketplace, he says.

"This is an economic decision companies will have to make, to invest in the United States or continue to rely on offshore manufacturing," says Johnson.

The future of nukes in America hinges on a much bigger problem than our inability to stamp out reactor vessels from hot 600-ton ingots of steel, however, and that's the absence of a plan for long-term storage of nuclear waste. By long-term we mean not hundreds, but thousands of years.

Right now, all nuclear waste in this country is being stored on-site at the nuclear power plants that generate it. First the spent fuel rods, which continue to generate heat long after the chain reaction that allows them to produce power is shut off, are placed in large concrete-and-steel pools of water measuring some 40 feet deep, 80 feet wide and 60 feet long.

After several years in the cooling pools, the spent rods have cooled enough to allow them to be moved to dry casks, very large concrete-and-steel canisters weighing more than 40 tons fully loaded, which are placed in steel-reinforced concrete bunkers about 20 feet high, 10 feet wide and 20 feet deep. The NRC's Burnell says the agency believes the combination of cooling pools and dry casks can be used to safely store the spent rods for up to 60 years beyond the operating life of a reactor.

But we still need long-term storage. And it won't be at Nevada's Yucca Mountain, long the presumptive destination for the nation's nuclear waste. The Obama administration recently backed away from the site in Senate Majority Leader Harry Reid's home state after 20 years of scientific analysis and heated debate, at a cost of more than \$13.5 billion.

On Jan. 29, Secretary Chu announced the formation of a Blue Ribbon Commission co-chaired by former Congressman Lee Hamilton and former National Security Advisor Brent Scowcroft to figure out what to do about long-term storage, now that Yucca Mountain is out of the picture. The commission will produce an interim report within 18 months and a final report within 24 months.

Vancko of the Union of Concerned Scientists is not impressed: "It's unclear what the [alternative to Yucca Mountain] would be, but meanwhile, without being able to resolve this waste issue that's going to be with us for tens of thousands of years, folks are saying, 'Don't worry we'll figure it out. Let's build more plants.'"

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