

Weighing the financial risks of nuclear power

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Enticed by the gleam of government subsidies, many companies are rushing to invest in nuclear power, expecting that new technology and safer reactors will make them as good an investment as other types of power plants.

A new study appearing in the April 1 issue of the journal *Environmental Science and Technology* notes, however, that the country's history of unexpected cost overruns when building nuclear plants should sound a cautionary note for power companies that nuclear power may not be financially attractive.

"For energy security and carbon emission concerns, nuclear power is very much back on the national and international agenda," said study co-author Dan Kammen, UC Berkeley professor of energy and resources and of public policy. "To evaluate nuclear power's future, it is critical that we understand what the costs and the risks of this technology have been. To this point, it has been very difficult to obtain an accurate set of costs from the U. S. fleet of nuclear power plants."

The study, conducted by a research team from Georgetown University, Stanford University and UC Berkeley, analyzes the costs of electricity from existing U.S. nuclear reactors and discusses the possibility for cost "surprises" in new energy technologies, including next-generation nuclear power.

What they found was a range of electricity costs, from 3 cents per kilowatt hour to nearly 14 cents per kilowatt hour, with the higher costs

attributed to such problems as poor plant operation or unanticipated security costs.

"In the long term, whether these plants are 4 cents or 8 cents per kilowatt hour, they are still a good deal, if you think carbon is an issue," Kammen said, referring to the carbon dioxide emissions from oil, coal and gas-fueled power plants that exacerbate global warming. "If the argument is that cost really needs to be important, then I'm not sure nuclear competes that well."

Some politicians also tout the increased security benefits of having domestic sources of energy, but this doesn't translate into decreased risk for investors, the study notes.

"In a deregulated electricity environment, investors will increasingly share the financial risks of underperformance of generation assets," said co-author Nathan Hultman, assistant professor of science, technology and international affairs at Georgetown University in Washington, D.C., and a visiting fellow at the James Martin Institute for Science and Civilization at the University of Oxford. "We don't have a good way of forecasting these risks yet, but looking at the historical data can be one way to understand the possibilities and scenarios for the future."

No new nuclear power plants have been built in the United States in 29 years, in part because they've proved to be poor investments, producing far more expensive electricity than originally promised. In 2005, about 19 percent of U.S. electricity generation was produced by 104 nuclear reactors.

The Energy Policy Act of 2005 and the Advanced Energy Initiative of 2006 sought to change that, offering financial incentives for new plant construction that employs new reactor and new safe-operating technologies. Current nuclear plant operators have given notice that they

intend to apply for approval of 27 new "generation III+" reactors.

But Kammen points out that in the past, when U.S. companies have introduced new technologies, they've run into unexpected costs that have kept electricity prices high. France, on the other hand, standardized the design of its nuclear power plants and encountered fewer cost surprises.

"Some U.S. plants were really well done, and they happen to be the older ones," he said. "If we can learn the lessons from those plants, which are often simplicity of design and standardization of design, then I think nuclear could make a comeback."

New and safer technologies are essential to making nuclear power more acceptable, he said, but "we need to optimize a few designs, we don't need a proliferation of types of plants, because we have proven we are not good at managing them."

The answer to the increased riskiness is not more government subsidization, he added, but more savvy investment decisions by the companies interested in nuclear power.

The project leader for the study was Jon Koomey, a staff scientist at Lawrence Berkeley National Laboratory and a consulting professor in the department of civil and environmental engineering at Stanford University. Additional aspects of this large study will be published later this year in *Environmental Research Letters*, an open-access journal published by the London-based Institute of Physics.

Source: UC Berkeley

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