Policy | Michael Kanellos | **August 28, 2009**

2 Comments

Sandia Joins Race for Mini-Reactors

The famed national lab says it is almost done designing a mini-nuke that can be shipped overseas.

The mini-nuclear movement is getting friends in high places.

Sandia National Laboratories said it has designed a small nuclear reactor and is looking for partners to commercialize it and even sell it overseas. The reactor could provide 100 to 300 megawatts worth of heat. More importantly, the factory-built reactor could be completed in two years, far less than the seven years or more that large (3,000 megawatts), conventional reactors take.

Roughly 85 percent of the design is complete. The cost of the reactor could drop to $250 million once in production.

Mini-reactors have traveled from being a fringe topic in the energy world to one that is now being discussed by utilities as a **possible future energy source**. The Sandia announcement brings more heft to the topic because of the reputation and expertise of the labs. Although nuclear contractor **Babcock & Wilcox** said earlier this year that it will make mini-nukes, most of the companies in this market so far are startups. Since utilities are even skittish about working with start-ups on solar projects, the prospect facing the young nukes is a daunting one. In all likelihood, a number of companies will seek an alliance with Sandia.

Sandia's reactor, meanwhile, incorporates some of the more attractive features of the other reactors. The small uranium core will be passively cooled by being sealed in a submerged tank of liquid sodium to cool it. Getting rid of cooling pumps and other equipment reduces the potential for accidents.

The reactor will also hold enough fuel so that it can be sealed for decades, thereby reducing the waste and opportunities for proliferation. As a result, it can also be exported more easily.

Mini-reactors work like standard nuclear reactors: the heat from a radioactive core turns water into steam and the steam cranks a turbine. The advantage is that the mini-reactors are safer and easier to construct because of their smaller size, say proponents. The price of electricity would cost 6 to 9 cents a kilowatt.

"The claim is that the modules will deliver electricity at the same prices" as large nuclear plants, said **Burton Richter**, a Stanford professor of physical sciences and a Nobel laureate.

So who's in the market? **Hyperion Power Generation** was the first to publicly discuss its technology. The company, which licensed technology out of Los Alamos National Labs, wants to build hot tub-sized reactors that can generate about 27 megawatts of power and/or 72 megawatts of heat. The reactors are designed for outlying communities and naval bases, but could be assembled into arrays.

NuScale Power, meanwhile, has made presentations to utilities in the Pacific Northwest about its technology. The company wants to build 45-megawatt modular reactors and then assemble them in arrays to construct plants that can provide 1 gigawatt of power as well as heat. The reactor is passively cooled by a water-filled envelope. VC firm CMEA has invested in the company.

NuScale has a prototype reactor that relies on electricity (rather than nuclear fuel) to heat the water. NuScale currently is preparing its application for design certification. It won't likely submit it to the U.S. Nuclear Regulatory Agency until mid-2011 and it will take about three years for the agency to review it. (There are 104 **commercial nuclear reactors** that exist in the U.S.)