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Nuclear power inches back into energy spotlight

By Paul Davidson, USA TODAY

The nation's nuclear power industry — stuck in a decades-long deep freeze — is thawing.

Utilities are poised to build a new generation of nuclear plants 30 years after the Three Mile Island accident, whose anniversary was Saturday, halted new reactor applications. The momentum is being driven by growing public acceptance of relatively clean nuclear energy to combat global warming.

Several companies have taken significant steps that will likely lead to completion of four reactors by 2015 to 2018 and up to eight by 2020. All would be built next to existing nuclear plants.

Southern Co. (SO) says it will begin digging an 86-foot-deep crater this June in Vogtle, Ga., to make way for two reactors after recently winning state approval, though it won't pour concrete until it gets a federal license, likely in 2011. At least five power companies have signed contracts with equipment vendors. And Florida and South Carolina residents this year began paying new utility fees to finance planned reactors.

The steps signal that a nuclear renaissance anticipated for several years is finally taking shape. Seventeen companies have sought U.S. federal approval for 26 reactors since late 2007. All have enhanced safety features.

"The resurgence of nuclear energy is underway," says Steve Kerekes of the Nuclear Energy Institute, an industry trade group.

Whether it will yield a flood of new reactors or a trickle will largely depend on the success — or failure — of the initial wave.

Nuclear a 'better option' now?

The industry believes it can avoid the billions in cost overruns and years of delays that marred nuclear construction in the 1970s and 1980s. Licensing has been streamlined. Utilities are seeking firmer costs and schedules. And designs are more detailed.

Still, some hurdles are emerging. Some companies are submitting incomplete applications or seeking design changes at the Nuclear Regulatory Commission (NRC), possibly delaying approval. At least two utilities recently said they're switching to different reactor models because they couldn't receive assurances on costs and the timetable. And since several models are new, problems could emerge as they're built in the USA for the first time. The type of reactor planned for Maryland is being built in Finland, where it's three years behind schedule and $2 billion over budget.

"We're talking about a new generation of technology," says John Reed, CEO of Concentric Energy Advisors. "You have to demonstrate to (lenders) that you can make money with these."

Nuclear plants are hugely expensive, and the credit crisis has all but sealed lenders' wallets. The success of the resurgence also hinges on

companies' ability to obtain financing.

Nuclear officials are taking comfort in some encouraging signals from the Obama administration. During his campaign, then-candidate Barack Obama seemed cool to nuclear energy, saying waste storage concerns must be solved before the nation builds new plants. Although the new administration has said Yucca Mountain northwest of Las Vegas is no longer a storage option for the waste, Energy Secretary Steven Chu told Congress this month that nuclear "has to be" part of "our energy future." Waste, he said, can be stored at reactor sites "for decades."

Unlike power plants fueled by coal and even cleaner natural gas, nuclear reactors emit none of the heat-trapping gases blamed for global warming. Obama strongly favors capping global-warming emissions from fossil fuel plants, which would boost nuclear's prospects. Renewable energy is popular but intermittent.

Today, 104 reactors supply 20% of the nation's electricity. Just to hold that share, all 26 proposed reactors would have to be completed by 2030. And to meet global-warming goals, 42 reactors should be built the next two decades, according to the Electric Power Research Institute. Reed says that's possible if the first wave goes well. A new Gallup Poll shows a record 59% of Americans favor nuclear energy.

Here's the rub: Nuclear reactor costs have doubled in the past three years to as much as about $8 billion, Moody's Investors Service says. They're twice as expensive as coal-fired plants and triple the cost of natural-gas plants. Reactors also are far more complex, taking up to 10 years to license and build vs. a couple of years for gas-fired plants.

Yet, nuclear plants are far less costly to operate, and the fuel, uranium, is cheaper than coal and natural gas. South Carolina Electric & Gas chose nuclear instead of natural gas to meet some of its power needs because it could produce electricity at retail rates of about 8 cents a kilowatt hour vs. about 10 cents with gas. That's after figuring in subsidies such as production tax credits and before adding potential fees on gas plants for emitting CO_2.

"Nuclear came out to be a better option," says Stephen Byrne, nuclear chief for SCE&G, which plans two reactors near Columbia, S.C. "The cost of natural gas fluctuates pretty wildly."

Trying to avoid past mistakes

The industry is recovering from a harrowing past. After the Three Mile Island accident in central Pennsylvania — which led to no deaths or known injuries, but caused a small radiation leak from the plant — the NRC passed sweeping new safety rules. Inspectors forced utilities to rip out pipes and install back-up pumps or generators midconstruction. Since utilities didn't submit designs before building, each reactor was custom built, further burdening the NRC.

Companies built plants so quickly to meet rising power demand that blueprints were only about 20% complete when construction began. Contractors redid work on the fly, causing delays. Double-digit interest rates drove up already swollen costs.

Compounding the problem: The NRC first issued a license to build a reactor, then a separate license to operate it. Utilities that completed plants had to wait for an operating license before they could sell electricity and recoup their investments.

Nationwide, state regulators denied utilities' petitions to recover $18 billion in cost overruns. Some went bankrupt.

Under new rules, power companies can apply for one license to both build and operate a nuclear reactor, streamlining the review. Designs must be approved separately before construction begins. And power companies are using just five blueprints. Regulators hope they'll churn out cookie-cutter versions of each design. Yet, even as they seek licenses, only two of the five designs have been certified.

"They're putting the cart before the horse," NRC Commissioner Gregory Jaczko says. "They should get the design done" before applying for a license. Also, he says, some reactor makers are proposing extensive modifications to their designs. Westinghouse, for instance, wants to make about 100 changes to its AP1000 reactor, says Vice President Ed Cummins. He says they're largely minor.

Other key challenges:

•**On time, within budget** To avoid cost overruns, power companies want to lock in prices and put the onus on equipment vendors to pay added fees if a project is delayed. Vendors are reluctant to set prices because the reactors lack a track record, and it's impossible to predict the cost of labor and materials when construction starts in a few years.

NRG (NRG), an independent power producer that's building two reactors in Texas, has signed a contract with Toshiba that nails down most costs, says Steven Winn, CEO of the NRG unit building the plant. That's possible, he says, because Toshiba owns 12% of the venture and has already built four of the same model units, called an ABWR, in Japan.

Others are having mixed success at locking in terms. Exelon, for instance, recently said it was no longer going to use a General Electric Hitachi reactor because GE (GE) couldn't sufficiently guarantee fixed prices and a firm schedule. "We have to be careful and pragmatic" about risks, says GE Vice President Danny Roderick.

•**Elusive financing.** With lenders hesitant to take chances on nuclear energy, 10 companies seek a total of $93 billion in federal loan guarantees for new nuclear plants. But only $18.5 billion is available — enough to finance three or four projects.

NEI President Marvin Fertel told Congress this month that independent power producers would likely abandon projects if the entire $93 billion is not funded, slowing the nuclear revival.

Bill Wicker, spokesman for the Senate Energy committee, says guarantees are meant to bankroll only the maiden versions of new models. No more than another $18 billion is likely to be funded, he says. "It's not like a bottomless cup of coffee."

Loan guarantees are less critical for regulated utilities, such as Southern and SCE&G, that have state clearances to recover some of their costs from ratepayers before construction is completed. In Florida, Progress Energy (PGN) customers began paying an extra $14.53 a month in January to finance two reactors. Missouri is among states considering such cost-recovery legislation, but lawmakers are divided. Ameren says it won't build a new reactor without it. "You'd get laughed off Wall Street," says Senior Vice President Richard Mark.

•**Avoiding construction snafus.** Manufacturers are trying to avoid the missteps of the first construction era. Three-dimensional computer images tell engineers precisely where pipes should go. GE and Westinghouse say 70% to 80% of their designs will be done before they break ground. And makers are increasingly building modular parts in the factory, cutting costs and minimizing mistakes on site. Westinghouse says 30% of its AP1000 reactor is modular.

Still, "When you're building (a new model) for the first time, yes, there's risk," says Jone-Lin Wang of Cambridge Energy Research Associates.

The delays and cost overruns plaguing Areva's EPR unit in Finland were partly related to concrete that failed inspection. "We're quite confident we're learning from" the Finnish experience, says Michael Wallace, chairman of UniStar, the Constellation Energy (CEG) unit building an EPR in Lusby, Md.

•**Tight supplies.** Only one company, Japan Steel Works, builds the 600-ton steel forgings used to make reactor vessels. It can make only five or six a year. Southern, SCE&G, NRG and Constellation have spent tens of millions of dollars reserving such items. Those building reactors after the front-runners could face bottlenecks, Standard & Poor's says. But Japan Steel Works has said it's expanding its capacity by about a third, while others are entering the market. In the U.S., factories to make nuclear parts are being built in Virginia, Louisiana, Indiana and Tennessee.

•**Fewer workers.** New reactors are likely to strain a pool of nuclear workers depleted by the construction hiatus. About 100,000 new workers would be needed to build and staff the 26 proposed reactors. Meantime, 35% of the current workforce is eligible to retire in five years.

The NEI notes utilities have teamed with community colleges to train workers. Still, a likely shortage of specialized workers, such as nuclear welders, could drive up wages and construction costs, says consultant Steve Rus of Black & Veatch.

Overall, Reed says the risk of delays and cost overruns is "far less" now. Yet, some companies are waiting before deciding to build. In Texas, Luminant says it will monitor the status of natural gas prices and carbon caps. Ameren wants to see if the first plants are successful. That's why the utility didn't want "to be in that first wave of plants," says Ameren nuclear executive Scott Bond.

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