U.S. 'Nuclear Renaissance' Could Displace Coal

PAM KASEY Associated Press Writer — October 5, 2009

CHARLESTON, W.Va. (AP) — On the wall of West Virginia Sen. Dan Foster's office is an old photograph of a whitewashed church in the hills outside Oak Ridge, Tenn.

The Kanawha County Democrat grew up in Oak Ridge, where plutonium was produced for nuclear weapons during World War II.

"In that church from maybe mid-1944 until the spring of 1945 was where they stored the enriched uranium they used in the Hiroshima bomb," Foster said. "Nobody knew it but about three or four people."

Foster co-sponsored a bill in the spring to repeal West Virginia's effective ban on nuclear power in the state.

"I've lived around nuclear energy and nuclear reactors," he said. "I am aware of the changing technology of the newer reactors."

Three of those newer reactors have been proposed in states adjacent to West Virginia.

Part of a U.S. "nuclear renaissance," the reactors would expand the existing Calvert Cliffs nuclear facility in Maryland and North Anna facility in Virginia and establish a new plant in northeastern Pennsylvania.

If licensed soon by the U.S. Nuclear Regulatory Commission, the first could go online as early as 2015.

The bill to repeal West Virginia's ban on nuclear power did not pass.

Whether West Virginia welcomes a nuclear renaissance within its borders or not, the state likely will feel its effects.

"Nuclear power could very well displace a substantial piece of the coal-fired capacity," said Nick Akins, American Electric Power executive vice president for generation.

U.S. power companies stopped ordering nuclear power reactors in the 1970s. Utilities were plagued by cost overruns, and the 1979 the partial core meltdown at Three Mile Island in Pennsylvania undermined public support.

But Foster is part of a growing U.S. movement that sees nuclear power overcoming its challenges.

Today's new Generation III reactors, advocates argue, are designed to be safer. And while the capital cost is still very high, they're cheaper to build than earlier designs.

While permanent waste disposal has not been resolved, many believe that storing waste on site, as U.S. utilities have done for years in anticipation of a consolidated, nationally run waste storage facility, is proving safe.

But beyond those issues, supporters say nuclear power has qualities that uniquely address the challenges of our times.

Unlike coal and, to a smaller extent, natural gas, nuclear power doesn't produce climate-warming emissions.

At the same time, they say, nuclear power can provide more generation capacity more quickly for growing energy demands than cleaner renewable resources are expected to do any time soon.

"Why not build 100 new nuclear power plants during the next 20 years?" U.S. Sen. Lamar Alexander, R-Tenn., proposed in July.

"Nuclear is already our best source for large amounts of cheap, reliable, clean energy," Alexander said. "It provides only 20 percent of our nation's electricity but 70 percent of our carbon-free, pollution-free electricity. It is already far and away our best defense against global warming."

Utilities were one step ahead of Alexander.

The reactors proposed for this region are three of 26 for which the Nuclear Regulatory Commission has received licensure applications during the past two years.

But what would more nuclear power mean for the nation's, and our region's, generation mix?

Of 103 operating nuclear reactors in the U.S., 29 are in this region's PJM Interconnection transmission network. PJM encompasses all or part of 13 states from Illinois to New Jersey, as well as the District of Columbia.

Within PJM, nuclear power provides about 35 percent of the electricity. Coal provides about 55 percent.

In general, nuclear and coal together are considered baseload generation: plants that, because of their low fuel cost and their inability to cycle on and off quickly, run nearly all the time and meet the ongoing minimum of daily and nightly demand.

While the two fuels often are referred to together in that general way, they aren't treated exactly the same in the power market.

That's because nuclear fuel is cheaper -- much cheaper.

"The way this works is that bidding of all units in PJM is based on marginal fuel costs only," said Dominion spokesman Rick Zuercher. Dominion runs the North Anna nuclear facility and is proposing one of the three new reactors in PJM.

All 1,500-plus power generation units in PJM set their price each day for the following day.

Placed in order by price and plotted on a chart, the ranking forms what can be called a "dispatch curve" for electricity.

As demand rises through the day, PJM dispatches the plants in order by price, with some variation because of transmission congestion.

And that is where it becomes clear that not all baseload power is created equal.

"Nuclear fuel costs, which typically average about $5 a megawatt-hour, are a fraction of the cost of coal or gas units --typically on average about $25 to $30 per megawatt-hour for coal," Dominion's Zuercher said.

Wind, hydropower and nuclear dispatch come first, then coal.

And newly constructed nuclear plants will dispatch in that same order, Zuercher said. "The market does not consider capital costs," he added.

Asked whether new nuclear generating units would tend to push coal up the dispatch curve, AEP's Akins said, "I think you can expect coal to reduce as a result. Any time you inject a nuclear power plant into the dispatch stack, some other baseload has to give, and generally that would be coal."

The 4,700 megawatts of new nuclear power proposed in Maryland, Pennsylvania and Virginia is roughly equivalent to the capacity of West Virginia's two largest coal-fired plants and is much closer to east coast demand centers.

Demand could, of course, grow.

"We may need those plants just to stay where we are right now," noted PJM spokesman Ray Dotter.

Offsetting that is the current aggressive push for energy efficiency.

Coal-fired plants dominate the middle of the dispatch curve, both in PJM and nationally.

As new wind generation comes in at the low end, it pushes everything else up the curve. But while wind power is growing quickly, it's still a relatively small part of total generation.

Very little new hydropower is proposed.

Only nuclear power can displace significant quantities of coal-fired generation.

AEP maintains that coal's role is secure.

"AEP believes emphatically that coal does have its place in the mix of the future," Akins said. "You can't go all nuclear, you can't go all coal, you can't go all natural gas or wind or renewables."

The utility has no immediate plans for new nuclear generation, although it may consider it in the coming decade.

Akins emphasized AEP's commitment to clean-coal technologies and noted the company's first-of-a-kind carbon capture and sequestration demonstration at the Mountaineer plant in Mason County.

However, he conceded that even as such a technology improves coal's environmental profile, it will add significant cost.

"My guess is that coal unit pricing would probably go up on the order of ... 40 to 60 percent." he said.

Foster acknowledged that new nuclear power might reduce the demand for fossil fuels.

"It's just hard to slam the door on something that may be changing dramatically and could be having an impact on our future rather than being very dependent on coal and natural gas," he said. "I think everything needs to be on the table at this point for the next generation or two."