

Continuing to enable nuclear energy: A senator outlines the prospects for new nuclear

BY GEORGE V. VOINOVICH

A recently retired lawmaker assesses the prospects for nuclear energy in the United States.

FOR THE PAST 10 years, I have helped shape U.S. nuclear energy policy, primarily as chairman or ranking member of the Senate Environment and Public Works Committee's Clean Air and Nuclear Safety Subcommittee. I've always said that nuclear is a "three-fer": It provides the reliable, baseload electricity our country demands; it will help us reach our goal of continued improvements in air quality; and it will strengthen our manufacturing base and create well-paying jobs. I am writing this article after having retired from the Senate in December 2010.

I last wrote an article for *Nuclear News* in March 2008 (page 13). I want to provide an update on events that have occurred since that time and to give my perspective on the state of the nuclear renaissance in the United States. In late December 2010, that was a fairly positive picture. The unprecedented events in March at the Fukushima Daiichi nuclear power plant in Japan, however, have colored the environment here in the United States. I'm comforted that the situation at Fukushima Daiichi has not set off hysteria in this country, in spite of some negative articles in the media.

People are evaluating the impact of the event as the facts emerge. The Nuclear Regulatory Commission and utilities are conducting a review of U.S. plants, and it is encouraging that the NRC's initial report concluded that a sequence of events like the Fukushima Daiichi accident was unlikely to occur in the United States. I was pleased that Southern Company announced that Vogtle-3 and -4 in Georgia would continue to go forward, and that SCANA Corporation announced the same for Summer-2 and -3 in South Carolina. In addition, President Obama and Energy Secretary Steven Chu made clear their continued support for nuclear energy in meeting our national energy needs.

The changing national energy picture

I believe that while the accident at Fukushima Daiichi may result in some soul-searching, it is actually the overall environment for energy supply and demand that will likely be the major determinant as to whether organizations move forward with nuclear energy. Prior to 2008, energy demand was projected to increase at least 1 percent per year for the next 25 years, necessitating new energy supplies and enabling a nuclear renaissance. In mid-2008, however, the housing crisis pummeled the economy, and the first decrease in energy demand in decades occurred.

Meanwhile, new shale fracturing techniques have significantly increased U.S. natural gas reserves. In spite of historical price fluctuations in natural gas and the fact that it produces greenhouse gases, necessitating increased costs for carbon capture and sequestration, utilities looking for energy sources in the near term may consider using natural gas.



George V. Voinovich (R., Ohio) was elected to the U.S. Senate in 1998 and retired in December 2010 as Ohio's senior senator. He was chairman of the Senate Environment and Public Works Committee's Subcommittee on Clean Air and Nuclear Safety from 2003 to 2006, and was the ranking member until the end of his term. Before his election to the Senate, he served as the governor of Ohio from 1990 to 1998, and as the mayor of Cleveland from 1979 to 1988.

During the last session of Congress, climate change was extensively debated, but ultimately a price was not placed on carbon, which would have favored solar and wind power. While there was significant interest in renewables, it was recognized that they produce electricity only when conditions are right (approximately 25–30 percent of capacity) and require new transmission corridors to areas where conditions are favorable. Comparing costs for renewables with the cost of building a new baseload unit at an existing nuclear site, wind is at 6.5 cents per kilowatt-hour and solar is at about 15–20 cents, while nuclear is at less than 2 cents. Nuclear power also produces far more high-quality jobs. Given the current focus on our national debt and the fragile state of our economy, I don't see the current Congress renewing the debate on climate change, unless the Environmental Protection Agency implements new environmental regulations. I also think that Congress will limit new subsidies for energy sources in general.

The combination of reduced energy demand, availability of affordable energy supplies, no price on carbon, and high initial financing costs appears to have caused some utilities to either defer or cancel their plans for new nuclear plants. The events at Fukushima Daiichi may have made this decision easier. As a result, I think that coal and nuclear, which have been the backbone of the nation's baseload generating capacity for years, are likely to remain as such for the next several years and beyond. Nonetheless, there may be parts of the country and selected industries where an increasing demand for clean energy needs to be met.

What does all this mean for the renaissance? It will certainly evolve more slowly than had been anticipated just three years ago. I believe that for those utilities and organizations in the United States that are considering nuclear for their clean energy portfolio, the events in Japan ultimately will not change the outcome of their decision-making, although for larger baseload capacity, there could possibly be increased interest in passive reactor designs. I also believe that there could be increased interest in small modular reactors (SMR) to meet incremental growth in energy demand, to replace older coal-fired plants, or for specific applications such as industrial process heat needed by the chemical industry.

Global outlook for nuclear power

The global energy picture is also dynamic, but certainly affects the U.S. nuclear industry because of the potential for the United States to export its products and services. Starting several years ago, many countries had reached the same conclusion—that nuclear energy was a safe, cost-effective, solution to their increasing clean-energy demand. Globally, there were 61 plants in various stages of construction in 14 countries, and 149 more were planned or proposed in 29 countries. Several countries were moving forward aggressively with building new nuclear plants—most notably China, with 24 reactors under construction.

Today, the accident at Fukushima Daiichi has caused many countries to review their plans. Germany, which was previously divided in its views, made the stunning announcement in May that it will shut down eight reactors this year and all 17 of its reactors by 2022; Italy has voted to abandon its new nuclear program; and the

European Union is planning stress tests for the reactors in Europe.

Nonetheless, countries with large nuclear industries, such as France and the United Kingdom, remain committed to nuclear energy. Notably, Japan is not planning to shut down its existing plants and has not abandoned nuclear as an option to meet its future energy needs, although it is conducting a comprehensive review of its energy policies. Countries with growing economies and energy demand, such as South Korea, are continuing with their plans. China, although it has suspended approvals for new projects pending a safety review, still needs additional clean-energy capacity, which I believe will ultimately result in its resuming to build.

Enabling the continuing renaissance

It would be easy to put plans for nuclear plants in the United States on hold until the events at Fukushima Daiichi are sorted out, which may take several years. I believe, however, that this would be a critical mistake for us, since other countries will likely continue to move forward. There is still a window of opportunity for the United States to regain its global leadership in nuclear power based on the high-quality services and products we can provide. If we allow ourselves to wait, these other countries will move on without us.

Last session I introduced a comprehensive nuclear bill, the Enabling the Nuclear Renaissance Act (S. 3618, which can be found at <http://thomas.loc.gov/>), to provide my vision for moving the nuclear industry forward. The bill had titles to provide substantial financial incentives, speed the development of SMRs, improve the NRC's licensing process, fund workforce education, and establish an independent government corporation to manage used nuclear fuel. Although the bill was not enacted last session, it represents a broad look at what we can do today.

There is significant potential for future growth in SMRs because they are much more affordable and are scalable to the needs of the end user. SMRs have potential applications in rural areas, where the transmission infrastructure is weak; for the replacement of aging fossil plants; and for providing process heat for specialized military or industrial uses. The Tennessee Valley Authority has stated its intent to license several SMRs. They represent an emerging market and a real opportunity for U.S. technology. I think we need a more aggressive approach to developing SMRs, in terms of a public-private partnership, than we've had up to this point.

From my meetings with Secretary Chu, I know that he is very supportive of SMRs. The Department of Energy requested budget authority to establish a new SMR program office, but Congress did not include it in the final fiscal year 2011 appropriations bill. In its FY 2012 request, the DOE requested nearly \$100 million, including \$67 million for cost-sharing development with industry. Both the House and the Senate introduced legislation to develop SMRs in the last congressional session. The bill I introduced would have funded an accelerated SMR deployment program at \$100 million per year for 10 years. I am hopeful that Congress will support Secretary Chu's request for SMRs.

Regulatory stability

In our respective roles on the Clean Air and Nuclear Safety Subcommittee, Sen. Tom Carper (D., Del.) and I held numerous hearings on the challenges facing the NRC in the new licensing process. I'm quite pleased that an independent review by the Bipartisan Policy Center (a think tank that promotes bipartisanship by developing "principled solutions through rigorous analysis, reasoned negotiation, and respectful dialogue") in April 2010 concluded that the first round of reviews had been conducted well and cooperatively by both the NRC and industry. But the review also identified the need for greatly improved efficiencies for the next round. Both the NRC and industry need to take an aggressive approach to implementing these efficiencies.

Having talented people is important for the quality of safety regulation. Senator Carper and I helped confirm three new commissioners to bring the NRC up to its full complement of five mem-

bers. We also worked to enhance the NRC's workforce, and we helped secure funding to consolidate employees in a new building on the NRC site in Rockville, Md., thereby improving collaboration and communication on safety issues. Thanks in part to actions like these, the agency has been rated the "Best Place to Work in the Federal Government" for the past few years by the Partnership for Public Service.

Not everyone understands this, but the nuclear industry needs the NRC to be an effective and credible regulator. It is clear from the oil disaster in the Gulf of Mexico that an entire industry suffers greatly when there is not a strong safety culture, which is something engendered by the NRC every day. I can tell you from my interactions with foreign officials that most countries in the world consider the U.S. NRC the "gold standard."

Financing

While a new nuclear plant is a clear choice for clean energy when it's operating, getting one built requires a major capital outlay (on the order of \$10 billion—a "bet-the-company" proposition) that is possible for only a handful of large utilities in the United States. The loan guarantee provision in the Energy Policy Act of 2005 has proven to make the difference for companies in deciding whether or not to build. The guarantees are needed most in merchant markets, where construction costs are recovered only after plants produce electricity, and to a lesser degree in regulated markets that allow the recovery of costs during plant construction.

Currently, \$18.5 billion in loan guarantee authority has been approved by Congress. So far, Southern Company has received an \$8.3-billion loan guarantee for two reactors at the Vogtle site in Georgia, and the DOE is reviewing loan applications for several additional units. I was encouraged that President Obama called for the expansion of nuclear power in his State of the Union speeches in 2010 and 2011, supporting his goal of having 80 percent of America's electricity being produced by clean energy sources by 2035, and that his FY 2011 and 2012 budgets increased the loan authority by \$36 billion, to \$54.5 billion. Although both the House and Senate Appropriations Committees passed bills last session to increase the loan authority, the increase was not included in the final appropriations bill.

As a member of the Senate Appropriations Committee, I found that it is not widely understood that 1 percent of the loan authority must be appropriated to meet the scoring rules of the Congressional Budget Office. The president's budgets have not included the \$360 million needed for the \$36 billion in new loan authority. This lack of funding creates an onerous hurdle in that Congress must take \$360 million from other programs to fund the loan authority. Compounding the problem, the \$360 million will be retained by the government and not actually spent (unless a utility ends up defaulting on a loan).

People need to understand that the loan guarantee program actually brings money into the Treasury! In addition to the \$360 million mentioned above, the government charges loan applicants a credit subsidy as a reserve in case of loan default. Unfortunately, the lengthy loan application reviews and the amount of the credit subsidy are unreasonable and have been problems since the inception of the program. The Office of Management and Budget (OMB) has been establishing initial credit subsidy amounts ranging from 2 percent to nearly 12 percent. This can mean up to \$1 billion in additional costs, which stifles investment and growth. Last year, Constellation Energy decided not to continue in a partnership to build a plant in Maryland, citing the cost of the credit subsidy (although its former partner, Electricité de France, is continuing to pursue it). I've met with Secretary Chu and authored several letters with other senators to the OMB and the DOE urging changes to the credit subsidy methodology and to the review process to make it more timely and transparent.

In my opinion, the loan review process, credit subsidy, and appropriations scoring are the biggest hindrances to the construction

of large nuclear reactors. We need to work with the administration and the Congressional Budget Office to address these issues.

Workforce and manufacturing infrastructure

We should continue to build the workforce and manufacturing infrastructure. I've hosted several roundtables at Ohio State University to review and assess the challenges for nuclear energy. The strength of the roundtables was that their diverse membership represented the views of many nuclear stakeholders, rather than a single stakeholder group with limited parochial interests. A final report was issued in October 2010 identifying challenges in the areas of supply and infrastructure, financing, regulation, and workforce, and providing 30 recommendations to address them (<http://ohioworkforcecoalition.org/2010/10/22/ohio-nuclear-workforce-roundtable-final-report/>). The report has been forwarded to Ohio Gov. John Kasich, Secretary Chu, and the NRC commissioners for their consideration.

One of the recommendations of the report called for the DOE and industry to jointly develop and implement an enterprise study of the nuclear energy workforce needs of the nation. This would include an assessment of the numbers of people and skills required to address our aging nuclear workforce and enable a nuclear renaissance, as well as the current capacity to develop these skills in our high schools, vocational schools, and colleges and universities. To help build our human capital, I worked with my colleagues on the Senate Appropriations Committee to successfully provide \$15 million in the appropriations bills in each of the last several years for federal university funding for the DOE, the National Nuclear Security Administration, and the NRC. I agree with President Obama and Secretary Chu that a skilled, innovative workforce is the way America can compete successfully in the global market.

A continuing renaissance will still require the United States to develop its industrial nuclear manufacturing capability and supplier network—from the steam generators and reactor vessel heads to the thousands of valves, pumps, heat exchangers, and other parts used in a nuclear plant. I believe that we need to encourage this capability, or foreign companies that are building new plants will move in to fill the void. To help U.S. manufacturers and suppliers compete, I championed an initiative with my colleagues on the Appropriations Committee for a \$2-million appropriation that established the Nuclear Fabrication Consortium at the Edison Welding Institute in Columbus, Ohio (<http://nuclearfabrication.org/>). The consortium's purpose is to independently develop fabrication approaches and data that support the reestablishment of a vibrant U.S. nuclear industry.

Managing used nuclear fuel

Since the Nuclear Waste Policy Act was signed into law in 1982, political issues have continued to influence the development of a repository for used fuel. The situation was brought to a dramatic head by the Obama administration, which submitted an FY 2011 budget to Congress that zeroed out funding for the Yucca Mountain repository in Nevada. This came in spite of the law designating the Yucca Mountain site to be developed as the nation's repository, with \$8 billion having been invested and \$22 billion having been paid into the Nuclear Waste Fund by nuclear utilities (as of 2010). In addition, NRC Chairman Gregory Jaczko directed the NRC staff to shut down its review of the license application for the repository, apparently without issuing a safety evaluation or keeping the other commissioners fully informed, even though court cases were pending to direct the NRC to complete the license review. He was criticized heavily this year in congressional hearings, and although he was found not to have violated any laws, the process gives the appearance that the NRC—which should be an independent safety commission—has been politicized.

It is obvious that this administration does not want to go forward with Yucca Mountain and won't fund it even if the court

forces the NRC to complete the review. People need to understand that there are additional costs for this decision. Utilities are currently suing the federal government to recover their costs for on-site storage of used fuel and waste while the repository is delayed. It is estimated that roughly \$400 million in federal liability is accruing each year, and the ultimate cost could be in the range of \$50 billion.

Given this seemingly intractable situation, I believe that we need to take positive action today to move the Nuclear Waste Fund and the fees paid by nuclear utilities out of the federal budget. In my Enabling the Nuclear Renaissance bill, I had proposed an independent government corporation that would use these funds to manage our nation's used nuclear fuel. The Obama administration established the Blue Ribbon Commission on America's Nuclear Future to review our long-term approach to storing used fuel and waste, and this concept is included in the commission's June 2011 draft report.

Framework for the future

In December 2010, Senator Carper and I cochaired the New Millennium Nuclear Energy Summit in Washington, D.C. This national-level summit, which was cohosted by Idaho National Laboratory and Third Way (a think-tank organization that "creates and advances moderate policy and political ideas," including a clean energy program), brought together Idaho Sens. Mike Crapo and Jim Risch and Rep. Mike Simpson, White House Energy Advisor Carol Browner, Energy Secretary Chu, NRC Chairman Jaczko, and key national players from industry and the financial community to develop a common strategic understanding and vision for continuing the nuclear renaissance (www.thirdway.org/publications/370). I believe that this forum is currently the best single venue for bringing together all of these diverse, essential interests in a meaningful way.

A common characteristic of countries that are successfully meeting the energy demands of their growing economies is that their governments and industry are aligned in their support. Given that commerce is increasingly global and that restoring energy security is vital to our interests, we must act now to meet the challenge. I believe that we should reassess the traditional roles of the government and the private sector in order to provide a level playing field. Examples of revised roles could include creating a government-industry council to address barriers to nuclear energy and establishing a self-funded, independent agency to manage the government's interests in public-private partnerships, technology development, and long-term financing support for clean-energy projects.

Working groups were established at the summit to provide comprehensive recommendations in the areas of government-industry partnerships, financing of major projects, rebuilding nuclear industrial infrastructure, and new technologies. Reports from the working groups are expected this summer. I am encouraged by the progress I've seen, and believe that these groups will help forge our path forward.

Looking to the future

As the debate on our nation's energy future continues in the 112th Congress, I believe that the discourse needs to be guided by a full assessment of the symbiotic relationship that exists between our nation's energy demand and our environmental policy, the true costs of our choices of energy sources and policies, and the impact on jobs and the economy. At the same time, we need an honest debate on the role of government in encouraging the development of new energy sources, as well as on the limits of incentives and regulation, and we must avoid becoming mired in partisan agendas for something so important to our mutual interests. After we have weighed these parameters as objectively as possible, I believe we will be in a much better position to decide how to best allocate our limited resources for the good of the country. ■