

ECONOMY

Governor wants small modular nuclear reactor in Southwest Virginia

Youngkin says state must be “all in” on nuclear energy.



by **Susan Cameron**

October 3, 2022



Gov. Glenn Youngkin presents his energy plan in Lynchburg in October. Photo by Dwayne Yancey.

Want more news from Southwest Virginia? [Sign up for our free daily email newsletter](#). You can also help us [fund more reporting positions](#).

Gov. Glenn Youngkin said Monday that Virginia must be “all in” on nuclear energy and he wants to deploy a small modular nuclear reactor somewhere in Southwest Virginia within 10 years.

Nuclear energy is a big part of the governor’s energy plan, which he unveiled Monday in Lynchburg.

“When it comes to reliability, affordability and when it comes to clean, nothing beats nuclear energy. It is the baseload of all baseloads,” Youngkin said during an event at Delta Star, which makes electrical transformers.

He added: “I want to call our moonshot. Virginia will build a small, modular reactor that will supply baseload demands within the next 10 years.”

Small modular reactors (SMRs) are nuclear fission reactors used for power generation and heat. The power capacity is about a third of traditional nuclear power reactors.

The advantages of SMRs are that they can be constructed in a factory in one location and shipped to the site, which saves money. They require a smaller initial capital investment, have enhanced safety features, are more efficient than earlier designs and can create jobs and boost the economy, proponents say.

But nuclear energy remains a controversial energy source with worries about safety, costs and waste.

So, why build an SMR in Southwest Virginia?

Chelsea Jenkins, the state’s deputy secretary for commerce and trade, said: “Because of geography, history and a talented workforce, Southwest is in a great position. They have always been about energy and will always be about energy.”

Following his speech, Youngkin said that Southwest Virginia has a “talented workforce, and has a feedstock in academia through Virginia Tech.”

“Southwest Virginia has to get a real shot,” he said.

Asked to define Southwest Virginia, Youngkin said when you get to Roanoke, you “start getting into Southwest.”

The governor said there is an opportunity to build a nuclear industry in Virginia.

“We can be the leader in wind, we can get solar, we have an opportunity to be the leaders in small modular reactors – we should grab it and run,” he said.

Longtime Southwest Virginia Delegate Terry Kilgore, R-Gate City, said the SMR would likely be built in the coalfields, which he said include the counties of Lee, Wise, Dickenson, Buchanan, Russell and Tazewell.

The location would likely be a former coal mine site, where there would be plenty of land and it would be isolated, he said.

Kilgore, the House Majority Leader, said he is also “all in” on putting an SMR in Southwest Virginia.

Last week, he heard a presentation on SMRs by a panel of experts who appeared before the Commerce and Energy Committee, and Kilgore said he’s convinced they are clean, safe and reliable.

The delegate said he knows some people “panic” when they hear the word nuclear, but once they “figure out how safe SMRs are, I think Southwest Virginia is going to embrace it. Folks will see it as an opportunity for a big investment in our region and a big tax base. . . . Once they realize all that, they’re going to be very much in support of SMR technologies.”

Southwest Virginia has been a leading provider of energy to the East Coast and Virginia and an SMR would allow the region to remain in the “energy game,” Kilgore said.

An SMR would require a years-long host of approvals, the most important being the Nuclear Regulatory Commission and federal, state and local agencies, including the State Corporation Commission, the Virginia Department of Environmental Quality, the federal Fish and Wildlife Service and the Army Corps of Engineers, Kilgore said.

State Sen. Todd Pillion, R-Washington County, is also an enthusiastic proponent.

“I’m proud to work with a governor who understands the importance of an all of the above energy strategy and Southwest Virginia’s role in meeting Virginia’s need for reliable and affordable energy,” he said. “Gov. Youngkin’s goal to deploy a commercial small modular reactor in SWVA is a cornerstone of the 2022 Energy Plan and further demonstrates our shared commitment to innovation and building upon the region’s legacy — and future — as the energy capital of the commonwealth.”

Another big supporter is Will Payne, managing partner of Coalfield Strategies, the firm leading business development for the Energy DELTA Lab and InvestSWVA, who said an SMR would be a “natural fit.”

“There is significant brownfield land available throughout the region that has been previously disturbed from coal mining,” Payne wrote in an email. “With these locations, the mining activities required significant power and land attributes that are conducive to the deployment of SMRs.”

Currently, the LENOWISCO Planning District Commission is completing a feasibility study of locating SMRs in Southwest Virginia, according to Payne. The commission represents the counties of Lee, Scott and Wise and the city of Norton.

“We’re very excited that Governor Youngkin sees the possibility of SMRs to be a ‘moonshot’ opportunity for Southwest Virginia,” Payne said. “SMRs are the catalyst that the region needs in order to develop into an innovative energy hub.”

There are currently no SMRs in operation in the United States, although in July a reactor designed by an Oregon-based company became the first SMR design certified for use in the U.S. by the Nuclear Regulatory Commission.

POLITICS

Youngkin wants \$10 million for energy research, including small nuclear reactors

Governor has proposed putting such a reactor in Southwest Virginia.



by **Susan Cameron**

October 14, 2022



Gov. Glenn Youngkin in Wise County. Photo courtesy of Earl Neirkirk/Neirkirk Image

Standing on the remains of a coal mine site outside Norton on Friday, Gov. Glenn Youngkin said he will propose \$10 million for research and development of innovative energy technologies, including the small modular nuclear reactor he wants to put in Southwest Virginia.

The 2,000-acre site atop a ridge in Wise County – the backdrop for a news conference held to announce the funding – is an example of the type of land that could be used for future energy projects, he said. Southwest Virginia has 100,000 acres of such land that is ready for development with approval of the right permits, he added.

“The great thing is that we have everything coming together, we have the space and we have commitment – commitment from local government, commitment from state government, commitment from federal government and, oh by the way, an energy-focused workforce that is hungry for new opportunities,” the governor told a crowd of more than 60. Those attending were local and state officials, including Attorney General Jason Miyares, former Gov. George Allen and Del. Terry Kilgore, state Department of Energy employees, U.S. Rep. Morgan Griffith and the media.

The event was held nearly two weeks after Youngkin unveiled an energy plan that he referred to Friday as “our all American, all-of-the-above” energy plan that calls for innovation in energy sources and technology.

The \$10 million would be used to create the Virginia Power Innovation Fund and go toward research and development in innovative technologies, including nuclear, hydrogen, advanced battery storage, carbon capture and others.

Half of the money would be dedicated to promoting the state’s nuclear energy industry by establishing a Virginia Nuclear Innovation Hub. The \$5 million would be focused on “achieving the groundbreaking research necessary to deliver on our moonshot mission to establish the very first small modular reactor right here in Southwest Virginia within the next 10 years,” Youngkin said.

He added that the hub would bring together the state’s nuclear stakeholders, universities, corporate interests and research dollars to develop “new and emerging nuclear technologies for deployment right here in the commonwealth, and we will work with our regional allies to go after more than our fair share. And I have to say, we deserve more than our fair share.”

The money would also go toward grants for higher education to study SMR technology, funding for nuclear workforce development and additional money for site exploration for an SMR, including in Southwest Virginia, according to a news release from the governor’s office.

He called the effort “intergovernmental” and said the state will work with Griffith, R-Salem, to obtain some of the billions in federal funding now available to “reinvigorate America’s energy future.”

The governor said he and Griffith also announced Friday that \$2 million in Virginia’s Abandoned Mine Land Economic Revitalization (AMLER) grant money will go to the Energy DELTA Lab in Southwest Virginia, [which was announced Oct. 4](#). The unique effort will be an “energy technology testbed” that will turn some former coal mining sites into laboratories to promote energy innovation. The first two sites will be in Wise County.

While the governor said [earlier this month](#) that he hopes to deploy the SMR within 10 years, he said Friday he thinks the state can “beat” that time frame. He wants Virginia to be the first state in the nation to deploy one of the reactors, he said.

Asked who would build the reactor, Youngkin said he is being courted by a number of interested prospects, but he did not name any.

Alireza Haghighat, professor and director of Virginia Tech’s Nuclear Engineering Program and co-chair and founder of the Virginia Nuclear Energy Consortium, told Cardinal News that the SMR would most likely be built by a utility because it has the expertise needed.

Haghighat, who attended Friday’s news conference as well as [the announcement of the governor’s energy plan in Lynchburg on Oct. 3](#), said he has been promoting nuclear energy and technology in Virginia since he started at Virginia Tech in 2011.

Youngkin also thanked Speaker of the House Todd Gilbert, who [announced Thursday](#) that he is working with West Virginia Speaker Roger Hanshaw to bring advanced nuclear-powered energy sources, including SMRs, to the rural and economically challenged regions of their states.

Southwest Virginia is in an “incredibly, incredibly well-positioned spot” to lead Virginia’s mission to become the nation’s leader in energy innovation, the governor said.

“So, we are going to turn on the light switch and shine a bright light ... on the endless opportunities that we have as we invest in these emerging technologies right here in Southwest Virginia,” he said. “You know Southwest Virginia, as Delegate Kilgore said, has consistently provided reliable energy that powered America. And we’re going to do it again right here in order to not just power the commonwealth but again to power America.”

© 2023 Cardinal News.

Proudly powered by Newspack by Automattic

OPINION

Youngkin says recycling nuclear waste will be priority for state's nuclear research

He's pushing for a small reactor in Southwest Virginia but isn't pushing to lift the state's ban on mining a uranium deposit in Pittsylvania County.



by **Dwayne Yancey**
November 1, 2022



Gov. Glenn Youngkin speaks in Bristol at the Cardinal News Speaker Series in October 2022. Photo Credit: Earl Neikirk/Neikirk Image.

Gov. Glenn Youngkin wants a small nuclear reactor somewhere in Southwest Virginia – small modular reactors, or SMRs, they’re called.

Right now, that’s an aspirational goal because such small reactors don’t exist, at least on a commercial basis. “A small modular reactor goes on the back of every aircraft carrier and every nuclear submarine,” Youngkin said during a recent interview with Cardinal News. “This whole capability exists – it’s just not one that has been commercialized.”

That’s what Youngkin is pushing for: He wants Virginia to be the first state to commercialize this technology. We at Cardinal will have more to report on this technology. None of us are nuclear physicists so it’s taking us some time to master the science here so that we can be sure we’re asking the right questions. We are not fans of just popping off a knee-jerk response.

One question, though, doesn’t require a doctorate in nuclear engineering to ask: Will this new nuclear push lead to the state lifting its moratorium on uranium mining? This is not a theoretical question. About 8.5 miles east of Chatham in Pittsylvania County is Cole’s Hill, and beneath Cole’s Hill lies a deposit of uranium that might be worth \$7 billion or more. The reason there’s uranium underground in Pittsylvania County goes back about 200 million years, when dinosaurs roamed the earth and the supercontinent of Pangaea was breaking up, pulled in two different directions by the shifting tectonic plates beneath the earth’s surface. The new continents that came out of that didn’t break off cleanly, though. They had lots of cracks and fissures as well. In North America, one of those ran through the future Pittsylvania County. Geologists know it as the Chatham Fault. They have two different theories about how that happened. One of those is that molten rock flowed into the crack and filled it up. The other is that stuff from deep down below bubbled up into those cracks. Either way, some of that was uranium.

Youngkin on migration and start-ups

Earlier this year, I [wrote a column](#) about the new book by Rep. Ro Khanna, the Democratic congressman from California’s Silicon Valley, about how the nation’s technology sector should be more widely distributed across the country.

I wrote that someone in Southwest or Southside should invite Khanna to come speak about this. What I didn’t realize at the time was that someone would be us. The internet knows no bounds and one of the people who read that column was none other than Khanna himself, who promptly sent word that he’d be delighted to come speak. In June, we hosted Khanna in Blacksburg as [the inaugural speaker](#) of the Cardinal News Speaker Series, with the Roanoke-

That uranium was [discovered in 1979](#) and three years later the state imposed a moratorium on mining the radioactive ore. A legislative effort to overturn the ban in 2013 failed, and so did legal challenges that went all the way to the U.S. Supreme Court. In 2019, the Supreme Court [ruled 6-3](#) that Virginia had the right to ban uranium mining. Yes, I realize I'm taking a long time to get to Youngkin's answer but the context here is important. That court ruling was one of those that defied the usual left vs. right splits. The majority opinion was written by Donald Trump appointee Neil Gorsuch, who essentially took a state's rights approach. Otherwise, the court's liberals and conservatives split both ways – some supporting the mining ban, some opposing. That's a long way of saying Virginia's moratorium has been ruled constitutional – but if Virginia ever wanted to change its mind, it could.

So will it? There are [an estimated 119 million pounds of uranium](#) in Pittsylvania County, said to be “large enough to power every U.S. nuclear reactor for more than two years.” Will a reactor in Southwest Virginia – even a small one, no more than one-third the standard size – eventually drive enough demand that there's another push to dig out that uranium beneath Cole's Hill?

When Youngkin spoke recently in Bristol as part of the Cardinal News Speaker Series – an event co-sponsored by the Bristol Chamber of Commerce, the United Company and the Train Station – we were granted time for an interview with the governor. We had time for four questions, and I used one of those to ask about the uranium moratorium. (Our other three were used for questions on flood relief in Southwest

Blacksburg Technology Council and the Virginia Tech Corporate Research Center as our co-sponsors.

In September, we held the second installment of that speaker series, when Jay Timmons, president and CEO of the National Association of Manufacturers, [spoke in Danville](#) about the future of manufacturing. Our co-sponsors there were American National Bank & Trust Co., Goodyear Tire and Rubber Co. Danville and First Piedmont Corp.

Last week, we held the third part of that Cardinal News Speaker Series, when Gov. Glenn Youngkin joined us in Bristol to talk about economic development. Our co-sponsors there were the Bristol Chamber of Commerce, the United Company and the Train Station. Youngkin used the occasion to drop three pieces of news: [a timeline for distributing the flood relief funds the state has appropriated for Hurley](#) to help the community recover from last year's flooding, that [the Federal Emergency Management Agency has denied a relief request from the Whitewood community in Buchanan County](#) following this summer's flooding, and that [he'd like to see every high school student graduate with either a credential or an associate's degree](#). As part of Youngkin's visit to Bristol, he sat down for an interview with me and two of Cardinal's reporters, business reporter Megan Schnabel and Susan Cameron,

Virginia, on the governor's proposal for every high school student to graduate with a credential or associate degree, and another nuclear-related one. Cardinal's Megan Schnabel has already [written about flood relief](#); stand by for more on the other topics.)

So Youngkin's response to my uranium mining question? He showed no enthusiasm for challenging that ban. In fact, he seemed to suggest that there's quite enough uranium already without digging any more out of the ground. "I think our first focus is to make sure we can develop the nation-leading and world-leading technical capability, which I think we can," he said. "That's a big first step. Associated with that is the recycling opportunity for nuclear fuel. The vast majority, almost 90% or more, of the capacity in enriched uranium is not used. So we can recycle it and use it again – so I think the big steps out of the box are the technical capability to deploy in the next 10 years and on top of that to press forward to recycling opportunities for fuel."

When politicians start talking about science, it's always wise to double check, but [the U.S. Department of Energy](#) confirms that recycling uranium is possible: "Spent nuclear fuel can be recycled to make new fuel and byproducts," the department says on its website. "More than 90% of its potential energy still remains in the fuel, even after five years of operation in a reactor. The United States does not currently recycle spent nuclear fuel but foreign countries, such as France, do." The department goes on to say: "There are also some advanced reactor designs in development that could consume or run on spent nuclear fuel in the future."

our Bristol-based Southwest Virginia reporter. Here are some of the things he had to say that haven't made their way into other stories:

- **Youngkin pays attention to demographic trends.** I've written about this before, but the governor's appearance in Bristol provided new evidence. One of the big trends reshaping Virginia is that since 2013, more people have been moving out of Virginia than are moving in. The state's population is still growing because births outnumber deaths statewide, and that births-over-deaths surplus is enough to make up for the deficit of more people moving out than moving in. Still, this is a worrisome trend: Why are more people moving out than in? The short answer, which I've dealt with in more detail [in other columns](#), is a combination of a) an aging population that's retiring and those retirees moving to warmer, sunnier climates farther South, and b) rising housing prices that are pricing young adults out of Northern Virginia, leading many of those to leave the state altogether, and c) more job opportunities elsewhere. Youngkin talked about these trends in his campaign last year (they didn't have the headline appeal of things like

In fact, [CNBC reported earlier this year](#) that “the energy in nuclear waste could power the U.S. for 100 years, but the technology was never commercialized.” The network quoted Jess Gehin, associate laboratory director at the Idaho National Laboratory, one of the government labs that conducts nuclear research. He said the technology to do this has existed for years but has never been commercialized, largely for political and economic reasons. Nuclear energy began to fall out of favor after the 1979 accident at the Three Mile Island plant in Pennsylvania. That’s the political part. For a long time, other sources of fuel – primarily coal and natural gas – were cheaper. Now the economic picture has changed – renewables are often cheaper, and coal has fallen into disfavor, not just with some politically but with the markets. The political picture has changed, too: Climate change is making nuclear power more politically palatable again in some quarters.

It used to be that energy policy fights pitted the left, which wanted renewables, against the right, which clung tight to fossil fuels. Now some on the right are starting to acknowledge climate change and the advantages of decarbonizing the electric grid, just not on the same scale as the left. Youngkin’s energy plan is a good example of that. He wants to undo Virginia’s Clean Economy Act, but not in a way that previous Republicans might have. [As I’ve written before](#), his energy plan doesn’t tout coal at all. In fact, it acknowledges that coal is now more expensive than other forms of energy. Youngkin doesn’t mock renewables the way, say, Donald Trump does. In fact, he speaks rather warmly and respectfully of renewables – he’s just not convinced renewables can carry the whole load (“wind and solar are great but they can’t replace it

critical race theory) and again earlier this year in a speech at Christopher Newport University. He brought it up again during his main talk in Bristol and yet again during our interview. In fact, his press secretary had already signaled that time was up and the governor was getting ready to leave when he stopped and started to talk about demographics.

“It’s a metric that I follow every day,” he said. “I don’t believe you can have a long-term vibrant economy unless you have a growing economy, which means a growing workforce and a growing population.” (For those who have different economic theories, here’s a good distillation of Youngkin’s for comparison purposes.) “The trends over the past eight years have been horrific,” he said. “People vote with their feet and wallet.” Youngkin, though, did note that there’s been a recent shift: While the statewide numbers still show net out-migration, many rural areas are now seeing more people move in than out – it’s Northern Virginia that is hemorrhaging people. “Southwest Virginia is starting to shift,” Youngkin said. “That’s really exciting to see.” Now, maybe Youngkin was playing to the crowd – I’ve written a lot about these numbers. But these are also numbers he was talking up before I started writing about them, and I think it gives good insight into Youngkin’s

all”), which is what led him to advocate for nuclear energy (and natural gas).

Now, I’m not an engineer – neither is he – so I don’t know whether an all-renewable energy grid is practical and what’s not. What I do know is that this is a big political shift: Here’s a Republican governor from a coal-producing state who is not pushing coal. Instead, he’s pushing “energy innovation,” which is also what Green New Dealers are doing – they just come at it a different way. Youngkin told the Bristol audience that he wants to innovate “across all these technologies – nuclear, hydrogen, carbon capture, battery storage that is dispatchable on demand at a lower cost.” That last phrase is another way of endorsing renewables. If we’re ever going to have an all-green energy grid, it’s going to need exactly that kind of battery storage, because the sun doesn’t always shine and the wind doesn’t always blow and the energy generated when they are isn’t necessarily needed right then, so we need some way to store it. On that score, Youngkin has a lot of overlap with the Green New Dealers, who might well join him at a ribbon-cutting for any utility-scale battery storage. Where Youngkin would differ is his

enthusiasm for nuclear energy, so the question is whether his push for nuclear innovation might lead to trying to commercialize that technology for recycling nuclear waste. From his answer to my question, it sure sounds like that’s what he’s interested in. Nuclear skeptics are pointing to a recent study led by Stanford University that said small modular reactors may produce a disproportionately larger amount of nuclear waste than bigger nuclear plants. For nuclear proponents, that doesn’t matter if the waste can be recycled. In fact, more waste might even be considered an opportunity: More fuel to be recycled.

[CNBC reports](#) that one of the main obstacles to recycling nuclear fuel is that we don’t have a supply chain for reprocessing it for use in the kind of small reactors Youngkin envisions – only Russia does. (France recycles its nuclear fuel by putting it back into big reactors, CNBC says.) “Private companies commercializing fast reactor technology are pushing for domestic fuel supply chains to be developed,” [CNBC reports](#), and cites two companies that are doing just that. For a governor who is focused on jobs

business mind to know what he’s looking at, numbers-wise.

- **Youngkin doesn’t believe the state should invest in startups.** Youngkin wants more startups in Virginia – 10,000 more over the next four-years. “Innovation in Virginia from a business startup standpoint went to sleep during 2013 to 2021,” he said. He also acknowledged that finding capital is a problem for many startups. “Capital is a big challenge in Virginia; it hasn’t been formed like it has in other places,” he said. So should the state make up for that? That was a question one member of the audience had. Youngkin’s response: No. He said that wasn’t government’s role, or something government is likely to be very good at. “There’s a line there I’m very careful not to cross,” he said.

– as well as a small nuclear reactor to help supply baseload power – the prospect of creating a whole supply chain around the recycling of nuclear fuel probably sounds like a win-win.

Now, none of that may reassure people who don't like the very idea of anything nuclear – as a big fan of the HBO series “Chernobyl,” I get that – but it does suggest that the push for a small modular reactor in Southwest Virginia will not necessarily lead to a push to mine uranium in Pittsylvania County.

© 2023 Cardinal News.

Proudly powered by Newspack by Automattic

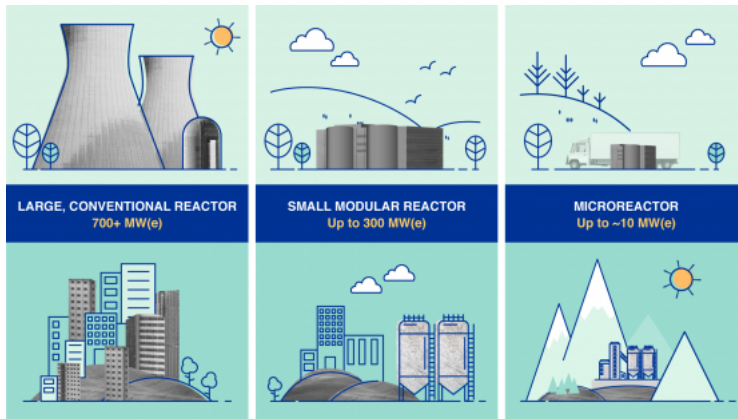
ECONOMY

Experts say Virginia is capable of building a small modular nuclear reactor today if approvals were in place. Here's how.

Small modular nuclear reactors are about a third of the size of typical reactors. There are no SMRs operating in the U.S., but experts say Virginia is equipped to build one if approvals go through.



by **Susan Cameron**
November 28, 2022



Types of nuclear reactors. Gov. Glenn Youngkin wants Virginia to build a small modular reactor in Southwest Virginia. Courtesy of U.S. Department of Energy.

First of a two-part series.

It would likely take a decade to place a small modular nuclear reactor in Southwest Virginia as Gov. Glenn Youngkin has proposed, but nuclear experts say the technology is there to build one today if the approvals were in place.

No small modular reactor — about a third the size of a traditional nuclear reactor — currently exists in the U.S., although a few states, including Tennessee, are working toward building one. Youngkin vowed in October that Virginia will be the first state to deploy a commercial small modular reactor, and he wants to put it in Southwest Virginia.

A number of small modular reactor designs are in the works, but Oregon-based NuScale Power is the first and only company whose design has been approved by the U.S. Nuclear Regulatory Commission. In late July, the NRC approved a final rule to fully certify the design, and publishing that rule is in its final stages.

The NuScale design is a pressurized water reactor. Because it's based on technology used in most of the traditional reactors in this country, a smaller version could be constructed now, said Rex Geveden, president and CEO of BWX Technologies in Lynchburg, and Alireza Haghghat, a professor and director of the Nuclear Engineering Department at Virginia Tech.

Geveden said the NuScale design is “very standard.”

The power, power generation, power conversion systems and fuel are basically the same as what are used in nuclear reactors today. The differences are the added safety features and the scale, he said.

“We could start construction today if it was a NuScale design,” he said.

In early October, the governor rolled out a new energy plan that focuses on a mix of energies, including nuclear, and he announced a plan to establish a commercial SMR in Southwest Virginia to generate electricity. No site has been chosen, but the plan is to locate it on a former coal mining site.

Several proponents of small modular reactors — known as SMRs — have pointed to the use of nuclear reactors in the military, which they said proves they are safe and reliable. But there are detractors who say the technology is new and not proven.

So, is the technology really new?

Yes and no, Geveden said.

The reactors used on submarines and aircraft carriers “haven’t been historically called small modular reactors, but ... they’re really the same thing because we build those at BWXT in our plants and our factories ... so they are factory-built nuclear reactors and they’re on that scale.”

Power the news that works for you
and our community. **GIVE NOW**



BWXT, one of the world’s largest nuclear manufacturing and engineering companies, was involved with another company in designing an SMR, called mPower, but terminated the project in 2018 because “additional interest in the program did not materialize,” and the company decided to focus on other areas.

Geveden was on a panel of nuclear experts who provided information about SMRs to the state House Commerce and Energy Committee during an energy summit earlier this fall.

Also invited to be on that panel was Keith Faulkner, president and dean of the Appalachian School of Law in Grundy. Faulkner is now a lawyer, but he operated nuclear power plants aboard submarines while in the U.S. Navy.

He said the meeting was held in Virginia Beach, and he pointed out to the committee that just 15 miles away in Norfolk, there were a dozen or more SMRs aboard submarines and surface ships.

His message — the Navy has been using the technology since the 1950s and it is “proven and safe.”

Keith Faulkner. Courtesy of Faulkner.

“This is not a new technology, although most people believe it to be,” he said.

What is an SMR?

SMRs are smaller, simpler versions of traditional, large nuclear reactors, and there are a number of types. Generally, they would produce about a third of the power of the big reactors built in the 1970s-1990s.

Traditional reactors produce about 1,000 megawatts of electricity, while SMRs would produce 50-300 megawatts.



Rex Geveden. Courtesy of BWX Technologies.

To put it in perspective, Geveden said at peak power, two traditional reactors could easily power the city of Richmond, while one 300 megawatt SMR could power Roanoke.

Like traditional reactors, SMRs would use nuclear fission technology to harness the thermal energy this produces to generate electricity.

Their smaller size results in several advantages, advocates say. A main selling point is they can be built in a factory and then shipped by truck or rail to the site, sometimes called “plug and play,” which results in a savings of both time and money.

They can also be located on a site that could never accommodate a large reactor, and units can be added incrementally to meet increasing demand.

Supporters of the small reactors also point to increased safety measures, which rely on “passive and inherent” features, including low power and operating pressure.

“This means that in such cases no human intervention or external power or force is required to shut down systems, because passive systems rely on physical phenomena, such as natural circulation, convection, gravity and self-pressurization. These increased safety margins, in some cases, eliminate or significantly lower the potential for unsafe releases or radioactivity to the environment and the public in case of an accident,” according to the International Atomic Energy Agency’s (IAEA) website.

Some SMRs would also use “accident-tolerant fuels” that can’t melt down in a reactor accident because they can withstand such high temperatures, Geveden said.

“You wouldn’t have to have pumps that are driven by electricity or diesel or anything to keep them cool. They use natural convection, condensation and evaporation to handle the cooling in the case of a loss of power or some other kind of an accident,” he said.

According to the IAEA, the small reactors have reduced fuel requirements and may require less frequent refueling, every three to seven years, while it’s one and two years for conventional plants.

The NuScale design and a few other SMRs use the sort of enriched uranium fuel found in today’s reactors, according to the NRC. The advanced designs would use different types of fuels, including graphite-encased “pebbles” or fuel particles within the liquid coolant itself.

As for how much waste would be involved, the NRC spokesperson said the current designs would result in “quantities of spent fuel and other waste products that the NRC is familiar with.”

Geveden summed up the benefits of SMRs as “they’re smaller, they’re factory-manufactured and they’re safer.”

BWXT is involved with development of an SMR in Canada. It is currently working with Ontario Power Generation on a boiling water reactor and the plan is to have it on the grid by 2028, he said.

In 2019 and 2020, BWXT also performed engineering work for NuScale to help the company design manufacturing processes for its reactor components.

Asked whether there are disadvantages to SMRs, Geveden said they are too expensive.

“The economics of nuclear power have got to improve,” he said.

The only small modular reactor design approved in the U.S. is this one by NuScale. Courtesy of Nuclear Regulatory Commission.

But, locally and across the nation, there are concerns about SMRs beyond costs. Environmental groups question whether they are safe and there are particular worries about fuel and waste.

As for the development of SMRs in other countries, Russia [launched the first floating nuclear power plant](#) that produces energy from two SMRs in 2020, and more are coming, according to IAEA. It’s stationed at Pevek in northeast Russia and supplies heat and power to the Arctic town. Greenpeace has called it a “floating Cherynobyl.”

Other SMRs are being built or are in the licensing stage in Argentina, China, and South Korea. More than 70 SMR designs are being developed around the world.

In the United States, there are two active applications under consideration by the NRC – the Kairos project at a site in Oak Ridge, Tennessee, and one by Abilene Christian University in Texas. The university wants to build a molten salt research reactor on campus so it can research molten-salt technology and provide educational opportunities in nuclear science and engineering, according to the NRC.

Others are in pre-application status.

What's next?

If the Virginia effort moves forward, those involved face years of seeking approvals for design certifications and licenses from the NRC. Legal challenges could lengthen the process.

A utility or other company seeking an NRC license can take one of two paths. The “Part 50” path has two separate applications, the first for a construction permit and the other for an operating license once construction starts, according to a spokesperson for the NRC.

The second “Part 52” path includes design certification for vendors.

“Certification means the design cannot be legally challenged in later licensing review. Part 52 also provides a single application and review of a Combined License that covers both construction and authorization to operate a new reactor,” the NRC said.

“Part 52” also includes an early site permit, which can resolve environmental and other issues so a parcel of land can be considered suitable as a site for an SMR, the NRC said.

Regardless of the path taken, reviews for permits and licenses examine safety and environmental issues, and there are several opportunities for public input, the NRC spokesperson said.

Beyond NRC approval, an SMR project must also gain approvals from the state in areas such as water intake and discharge and public utility commission actions.

While the regulatory process is underway, the necessary workforce would have to be trained to operate the reactor.

It appears no one knows at this point how many workers would be needed for an SMR, but Geveden with BWXT said since large reactors require thousands of employees, it makes sense that an SMR would require hundreds.

Faulkner, president of the Appalachian School of Law, said that although local workers don't have nuclear-related training, the region has a “very technically competent workforce here – I think the workforce is ready, willing and able to be retrained to operate plants like this.”

The training could be handled through the state's community colleges, he said. Currently, nuclear-related technician courses are taught at Central Virginia Community College in conjunction with Framatome, a nuclear reactor business in Lynchburg, and the same could be done here, Faulkner added.

If an SMR is deployed in Southwest Virginia, Geveden told Cardinal News it's likely his company would be involved in building components of it.

“We are sitting atop the supply chain in a very good spot,” he said.

Several nuclear experts have said an SMR would have to be operated by a utility because only they have the expertise needed.

Asked whether a utility such as Dominion or Appalachian Power would operate an SMR, the governor said nothing has been determined.

“All of them are in discussion and I think that part of this is also a recognition that we have a huge proportion of our power stack already in nuclear run by Dominion. There are capabilities there that we have to rely on and embrace and so there will be a natural decision in this, but none of those decisions have been made yet,” he said.

Dominion operates two nuclear power plants in Virginia, in Louisa County and Surry County. Although Appalachian Power has no nuclear assets in Virginia, its parent company, American Electric Power, owns and operates a nuclear plant in Michigan.

Dominion plans to have an SMR as a supply-side option starting in December 2032, according to the 2022 update of its 2020 integrated resource plan.

“Starting in 2034, the company assumed that one 285 MW SMR could be built per year,” the plan states.

Coming Tuesday: Why Virginia? Why Southwest Virginia? Critics say they've been left out.

ECONOMY

Why Youngkin and nuclear proponents say now is the time to bring a small modular nuclear reactor to Southwest Virginia

Youngkin and other nuclear proponents say Southwest Virginia's abundant abandoned coal mine land and the need for jobs and economic development make the region an ideal spot for a small modular nuclear reactor. Critics say they've been left out of the discussion.



by **Susan Cameron**
November 29, 2022



Gov. Glenn Youngkin presents his energy plan in Lynchburg in October. Photo by Dwayne Yancey.

Second part of a two-part series. Read part 1, [*Experts say Virginia is capable of building a small modular nuclear reactor today if approvals were in place. Here's how.*](#)

Virginia has a long and successful history with nuclear energy and nuclear assets that make it ideally suited to launch a small modular nuclear reactor to generate baseload electricity, nuclear experts and state officials have said in recent weeks.

Their remarks followed the announcement Oct. 3 by Gov. Glenn Youngkin that he wants to deploy the nation's first commercial SMR on a site somewhere in Southwest Virginia within 10 years.

Since then, environmental groups and some residents have begun to ask questions about the plan and say they've been left out of the process.

Alireza Haghghat, a professor and director of the Nuclear Engineering Department at Virginia Tech and a big supporter of the governor's plan, said Virginia has one of the strongest nuclear industries in the nation.

The state has two nuclear power plants, each with two nuclear reactors, North Anna in Louisa County and Surry in Surry County. Both are operated by Dominion Energy. (*Disclosure: Dominion is one of our donors but donors have no say in news decisions; [see our policy](#)*).

Virginia's nuclear reactors have operated safely for more than 40 years, according to the Virginia Nuclear Energy Consortium (VNEC).

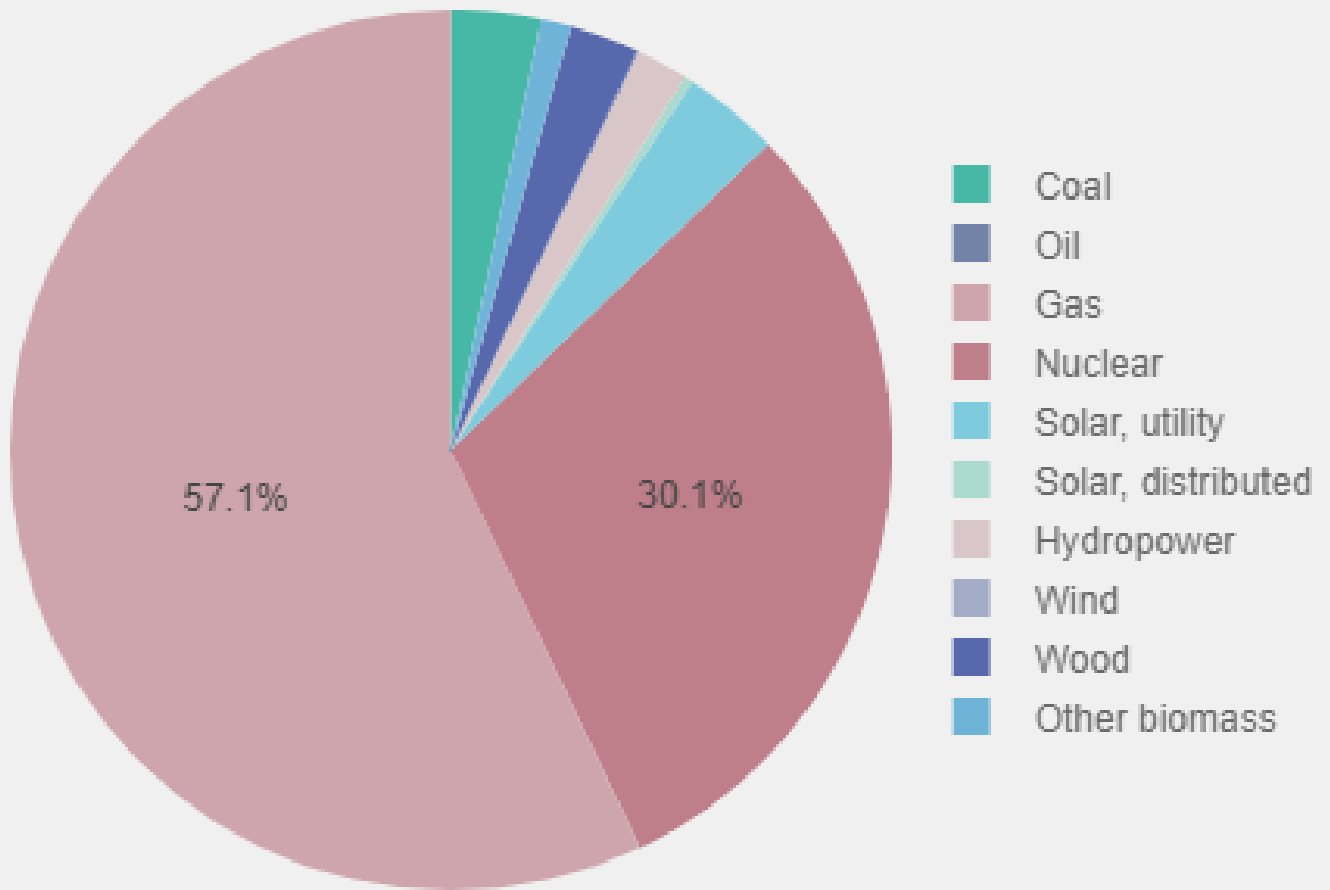
The state also has a license to build another traditional reactor, according to the U.S. Nuclear Regulatory Commission (NRC).

About 30 percent of Virginia's power is nuclear, though the state is far from the top of the list of states with the highest amount of electricity generated by nuclear power. According to the NRC, Virginia is 12th on that list, with Illinois being the top state and Tennessee coming in eighth.



Alireza Haghghat. Courtesy of Virginia Tech.

Virginia 2021 Electricity Generation by Fuel Type



Source: U.S. Energy Information Administration

Sources of Virginia's power. Courtesy of U.S. Energy Information Administration.

Virginia also has some of the largest nuclear-related businesses. There is a nuclear hub in Lynchburg that includes BWX Technologies, one of the largest nuclear manufacturing and engineering companies across the globe; Framatome, also considered a leading nuclear company in the world; and NovaTech, which provides design, engineering and manufacturing for nuclear organizations.

Other nuclear-related businesses include Lightbridge Corp. and Bechtel Corp., in Reston, and Virginia Dominion Energy in Richmond.

Virginia's nuclear industry. Courtesy of the Virginia Nuclear Energy Consortium Authority.

Haghighat, who is also a founding chair of the VNEC, said the state's nuclear industry "serves both commercial, defense and manufacturing in the state and beyond. Actually, the (nuclear) companies in Virginia not only serve their state, they are global companies."

Virginia is also home to Newport News Shipbuilding, and there are six universities plus community colleges that have nuclear-related training.

Rex Geveden, president and CEO of BWXT, said there is a "big nuclear footprint across the state of Virginia" that's stronger than most states.

He pointed to Newport News Shipbuilding, which he said integrates the nuclear reactors that BWXT makes into submarines and aircraft carriers.

In addition to the major nuclear businesses, he noted that the state has a couple of large uranium deposits that could be sourced for fuel if the state reverses its moratorium on uranium mining.

April Wade, executive director of the VNEC, said the "projected growth of the nuclear industry, combined with Virginia's existing industry leadership — in terms of both expertise and infrastructure — positions the commonwealth as a prime location for the first domestic SMR. Southwest Virginia's existing energy infrastructure, developing energy workforce, and long legacy and knowledge in the energy industry makes it an ideal location for such a project."

Rex Geveden. Courtesy of BWX Technologies.

Why locate the SMR in Southwest Virginia?

Ask the governor or other state officials why they want to build an SMR in Southwest Virginia and you get two reasons – the abundant availability of abandoned coal mine land and the need for jobs and economic development for an area significantly impacted by the downturn in the coal industry.

Geveden said that Southwest Virginia residents would benefit because nuclear plant-related jobs provide high-paying, secure jobs that last for decades. According to the VNEC, nuclear energy facilities pay 36 percent more than average salaries in the local area.

As for a site, there are 100,000 acres of former coal mine land in Southwest Virginia. This land is perfect for an SMR, according to Will Clear, deputy director of the Virginia Department of Energy, because the needed infrastructure is already there.

“Coal is a very energy-intensive operation so there is a pretty robust transmission and distribution network of electric lines” left behind when a site is abandoned, he said.

Clean water is also plentiful, he added.

“Most of these underground mines fill up with water and the water is extremely clean due to the geology,” Clear said.

Another factor in Southwest Virginia’s favor is the cost of land, which is relatively cheap compared to other areas of the state, he added.

The Department of Energy will be involved in selection of a site because it has an “exhaustive” inventory of all the former coal mine sites so it’s aware of any issues that would prevent a site from being used for an SMR, he said.

During an Oct. 26 appearance in Bristol, Youngkin said there has been an “enormous amount of work” done toward bringing an SMR to the region.

In an interview with Cardinal News, the governor was asked to elaborate on those efforts, but he offered no specifics.

“What’s been happening behind the scenes is a number of organizations have already been thinking about the future of nuclear energy, particularly in Virginia, and that includes the Virginia Nuclear

Association, and it includes a collaboration of efforts in order to bring up funding for site development.”

He pointed to the academic emphasis on nuclear power in the state and businesses like BWXT and Framatome. He added that there are “tremendous capabilities” with Naval Station Norfolk and Newport News Shipbuilding.

How a small modular reactor works. Courtesy of U.S. Department of Energy.

Why now?

Four factors have converged to make it the right time to rely more on nuclear energy, according to Geveden with BWXT.

The first is the invasion earlier this year of Ukraine by Russia, which led the U.S. to think more about national security, a big part of which is energy security, he said.

Russia controls the natural gas pipeline into Europe and “could create economic coercion by trying to withhold that energy source,” Geveden said.

“So, I think the globe is thinking a lot more about energy security right now and nuclear should be a centerpiece of an energy security policy because of its availability, because of its stability, because of the ability to run a local grid off of it and not have to import natural gas or oil or any other kind of thing to power it,” he said.

The second factor is the move toward decarbonization of the power grid, which has become more of a mainstream priority, according to Geveden.

He and Haghighat agree that if the state wants a clean energy grid, nuclear power needs to be the baseload component.

The need for “dispatchable power” is the third factor, he said.

In the case of renewables like solar and wind, “the sun goes down, the wind doesn’t always blow or certainly doesn’t blow predictably, and so utility customers have to have the belief that when they flip on that light switch, the lights are going to come on,” he said.

The final factor is that the “political demonization,” and fear of nuclear energy, have lessened so public opinion seems to be changing, according to Geveden.

“It feels to me like the time is now for nuclear, and there are a number of converging forces that I think lead many people to the conclusion,” Geveden said. “By the way, all you have to do is look at the investment capital formation around the nuclear industry to see that’s true.”

Funding

To make the SMR happen, Youngkin has said he will work with U.S. Rep. Morgan Griffith, R-9th, to leverage available federal funding.

Recent federal legislation signed into law included money for clean energy projects, including SMRs.

The 2021 Infrastructure and Jobs Act had \$2.5 billion earmarked for advanced nuclear through the Department of Energy's Advanced Reactor Demonstration Program.

The 2022 Inflation Reduction Act included tax credits for production and investment for advanced reactors. The credits are based on the kilowatt base rate, but energy communities, including coal communities, receive an additional 10 percent credit, according to Griffith's office.

Also, since 2018, the DOE has had a multi-year cost-shared funding opportunity to support innovative, domestic, nuclear industry-driven concepts that have high potential to improve the economic outlook for nuclear power in the U.S.

"This funding opportunity will enable the development of existing, new, and next-generation reactor designs, including SMR technologies," the DOE states on its website.

Will Payne, managing partner of Coalfield Strategies, the firm leading business development of the Energy DELTA Lab and InvestSWVA, said competition for the federal funding will be intense.

"Highly competitive doesn't begin to describe accessing the federal dollars, but Virginia has gone from 0 to 60 in a blink of an eye, so I feel confident that a combination of these funding opportunities with traditional incentives along with state and federal funding geared toward R&D and deployment put Virginia in a competitive position," he said.

Eleven days after his SMR announcement, the governor followed up with a visit to Norton, where he said he will seek \$10 million for research and development of innovative energy technologies. Half of that money would be used to establish a nuclear innovation hub and fund the research necessary to establish an SMR in Southwest Virginia.

Questions and concerns

One person who has a lot of questions about the governor's push for an SMR is Robert Kell, the new economy program manager at Appalachian Voices, an environmental agency. And he says he's not the only one.

"We were taken by surprise when the governor showed up in our backyard," he said. "We have an office in Norton, and he made this huge announcement without inviting any of the nonprofit folks, environmental justice folks, economic development folks. He showed up on a mine site with just politicians behind him telling us what he was going to do for our region and sort of told us we're just

going to accept it, so we don't have an official stance on SMR technology. We just have a bunch of questions.”

Kell wants to know how safe SMRs are given that they are new, what happens to the waste streams and whether former coal mine land is suitable as a site. And he wants to know why Youngkin hasn't spoken to any local citizens, economic development officials or environmental groups.

Kell said he hears regularly from local residents who say they are concerned and some who say they're going to fight it.

Likewise, Sharon Fisher, president of The Clinch Coalition, said the agency is hearing from residents who have an “overwhelming sense of concern that Southwest Virginians are not being given a meaningful seat at the table as SMR projects are being planned for our communities. Residents of the coalfields have for generations been asked to disproportionately bear the social and environmental costs of energy development. Learning about plans to locate reactors in our region through news reports and surprise visits by elected officials is a troubling sign that we are once again being excluded from complex decisions that will affect our people for generations to come.”

She added that it's difficult for the organization to develop a position on the proposed SMR because it lacks the basic information necessary to weigh the costs and benefits.

To help educate local residents, Appalachian Voices has organized a panel of nuclear experts that will be held at 2 p.m. on Dec. 15.

The virtual event will be open to anyone interested and information about how to register will be announced soon. (Update: [Here's the registration link](#)).

The panel will consist of Cale Jaffe, director of the Environmental Law and Community Engagement Clinic at the University of Virginia School of Law; David Schlissel, director of resource planning analysis for the Institute for Energy Economics and Financial Analysis; and Edwin Lyman, a physicist and director of nuclear power safety with the Union of Concerned Scientists.

OPINION

The complicated politics of nuclear power

Feelings about nuclear energy generally split along left-right lines. But while Gov. Glenn Youngkin is pushing nuclear energy in Virginia, it's left-of-center governments that are now pushing small nuclear reactors internationally and a conservative state legislator in Southwest Virginia who opposes them.



by **Dwayne Yancey**
December 5, 2022



The Russian small modular reactor is aboard the barge Akademik Lomonosov. Courtesy of Elena Dider.

When Gov. Glenn Youngkin proposed that a small nuclear reactor be built in Southwest Virginia, that proposal seemed to come out of nowhere. It certainly wasn't something he campaigned on.

The push to build such small portable reactors – the technical term is “small modular reactor,” or SMR – is pretty widespread, though. Cardinal's Susan Cameron reported on this in her [two-part series about this technology](#). There's already an SMR in operation in Russia – [a floating one](#) on a ship anchored off

the Arctic coastal town of Pevek. Critics have dubbed this a “floating Chernobyl,” “Chernobyl on ice” and a “nuclear Titanic.” However, the fact that this plant is something small enough that you can put it on a ship helps convey some sense of scale. Other SMRs are under construction in Argentina and China, [according to Power Technology](#), and there are plans for others in, well, lots of places.

Poland has signed a contract with an American company to build SMRs. Forbes [reported in May](#) that South Korea plans to build SMRs throughout Asia. Canada has announced plans for SMRs. Just to our south, the Tennessee Valley Authority is also making plans for SMRs. Nuclear energy fell out of favor for a long time – if the accident at Three Mile Island in 1979 didn’t scare the bejeebers out of some people, the accident at Chernobyl in 1986 sure did. Now we seem poised for a new era of nuclear energy, and not just with small reactors, either. “A combination of new nuclear technology, the quest to decarbonize and an increasing desire for energy independence following Russia’s invasion of Ukraine has reversed nuclear power’s fortunes,” says [a report by the World Economic Forum](#). “More than **50 nuclear reactors are under construction** around the world, almost half of them in China and India. And countries like [Japan have reversed planned nuclear phase-outs](#), bringing nine reactors back on line, with a total of 30 due to restart by 2030.”

Now I do not claim to be a nuclear expert. My nuclear experience is limited to learning the periodic table of elements back in Mrs. Early’s chemistry class at Montevideo High School and watching the HBO miniseries [“Chernobyl”](#) (which I highly recommend, whatever your views on nuclear energy might be).

So don’t look to me to pronounce some learned opinion on whether an SMR in Southwest Virginia is a good idea or a bad idea. What I do profess is some expertise in politics and that’s what I will focus on today: the politics of nuclear energy.

It will not surprise you to learn that Americans are politically polarized over nuclear energy the way they are most other things. [A Gallup Poll earlier this year](#) found Americans almost evenly split – 51% in favor, 47% against. What’s more interesting, though (or maybe more predictable), is how they split: 60% of Republicans are in favor of nuclear energy, only 39% of Democrats are.

That left-right split is generally true around the world, which a) helps explain why this nuclear proposal is coming from a Republican governor, and b) makes the exceptions so interesting.

Globally, France is an obvious exception. After the 1973 “oil shock,” France went in big on nuclear energy. Today, France is more dependent on nuclear energy than any other country in the world, with [69% of its power](#) coming from nuclear plants. This heavy investment in nuclear energy played to French pride and a French sense of independence. French political parties have been somewhat fluid over

the years but there has been a general left-right consensus that nuclear energy is an important national priority. Not until the Green Party came along in 1984 was there any significant voice against nuclear power, [according to a paper](#) published by Oxford Academic.

Another interesting exception comes just to our north – in Canada, specifically with the government of Prime Minister Justin Trudeau. Trudeau is the leader of the Liberal Party (Canadians keep their party names simple and straightforward), so the equivalent of an American Democrat. Trudeau has also come down on the side of nuclear power. In November, his government effectively declared nuclear power to be clean power, making it eligible for certain tax credits for clean energy. Whether nuclear power is clean energy has been a subject of philosophical debate – it's not a fossil fuel so it helps decarbonize the power grid; it also produces nuclear waste, which isn't exactly green.

More importantly, the Canadian government [announced plans](#) to build a small modular reactor in Ontario (on the grounds of an existing large-scale nuclear plant); site preparation began last week. BWX Technologies, based in Lynchburg, is the company working with the Canadians on that project. For those curious about such things, the Canadian news site [CP24](#) reports the SMR is expected to employ 2,300 during planning and construction and 200 people when operational. This isn't all that the Canadians have planned. Four provinces – Alberta, New Brunswick, Ontario, Saskatchewan – have joined together to issue “[A Strategic Plan for the Deployment of Small Modular Reactors](#)” that calls for four SMRs in the prairie province of Saskatchewan after the one in Ontario is working.

That plan they issued called for making Canada “a global SMR technology hub” with a goal of capturing “a significant share of the supply chain opportunities.” For what it's worth, all those provinces have conservative governments, so that fits the more traditional paradigm.

Still, the Trudeau government's enthusiasm for SMRs shows how in Canada there is at least some support on the left for nuclear energy.

Polls in Canada are less useful. One survey found that 56% of Canadians believed their nation should increase its reliance on nuclear energy; that survey was also commissioned by the Canadian Nuclear Association. A competing survey by an environmental group found that 62% thought it was wrong to pursue small modular reactors. I file both of these surveys under the heading of “you get what you pay for.” I place more emphasis on the polls that really matter: Canadians, who tend to be more left-leaning than Americans are (they have national health insurance, for instance), have three times now elected a Liberal Party government that has endorsed nuclear energy. Not that Canadians have much choice. The rival Conservative Party endorses nuclear. So does the National Democratic Party, a liberal party to the left of the liberals, and perhaps more akin to our Bernie Sanders Democrats. The [NDP platform](#) declares that “nuclear power has an incomparable capacity to broadly replace fossil fuels” and endorses a reactor-

building program. Only the Green Party there opposes nuclear, and the Greens took just 2.3% of the vote in the last federal election, winning just two seats in parliament. If Canadians were anti-nuclear, they could have voted Green and they didn't, so they must not feel particularly strongly about it. (Faced with potential energy shortages because of the war in Ukraine, the Green Party in Belgium has [decided](#) to support keeping that country's two reactors open.)

Another left-of-center government promoting nuclear energy is our own – the Biden administration.

The Democrats' so-called climate bill – officially the Inflation Reduction Act – that passed this summer contains numerous provisions promoting nuclear energy. More recently, Biden's special presidential envoy for climate, John Kerry, has been one of the chief proponents. In November, Kerry made [two announcements](#) that haven't gotten much attention. First, he announced that the United States will partner with Ukraine on a pilot program to build a "secure and safe small modular nuclear reactor" in Ukraine. Second, he announced plans to help Europeans – particularly in central and eastern Europe – convert coal-fired plants to small modular reactors. These two announcements came in conjunction with the United Nations Climate Change Conference in Egypt and were supposed to underscore the U.S. commitment to reducing carbon emissions. That shows the complicated politics of nuclear: The renaissance of nuclear energy is being driven partly by environmental concerns, which some would certainly find ironic at best. One big-name proponent of nuclear energy is Bill Gates, who has coupled his support for nuclear power with concern about climate change: "If we're serious about solving climate change, and quite frankly we have to be, the first thing we should do is keep safe reactors operating," [he said last year](#). "Even then, just maintaining that status quo is not enough. We need more nuclear power to zero out emissions in America and to prevent a climate disaster."

Meanwhile, CNBC [recently reported](#) that a lot of the investment money in nuclear power is coming from an unlikely source — venture capitalists in Silicon Valley who historically have been aligned with the tech industry and are generally regarded as, well, definitely not conservatives. CNBC says at least part of their interest is driven by the prospect of small reactors taking hold.

All these exceptions to ideological orthodoxy have come on the left, but there are some on the right, too. I mentioned that the Gallup Poll found 60% of Republicans in favor – but it also found 37% opposed. One of those Republicans who opposes nuclear power – at least in Southwest Virginia – is Del. Marie March, R-Floyd County. She recently posted on Facebook: "Youngkin wants nuclear micro reactors to be placed in SWVA coal mines. I am very concerned about this new technology and prefer that SWVA isn't used as the lab rat. For too long NOVA harvests our taxes and our land. Now they want to use us to harvest power. Right now a Nuclear power plant is being targeted in Ukraine to be bombed. Look at the impact of a nuclear meltdown on generations of people and the ecosystem. We don't need Geiger counters in SWVA!"

March's concern about coal country effectively being used as a sort of "sacrifice zone" to generate energy for urban areas isn't that different from what some liberal groups might say. Of course, she goes on to say her preferred solution is hydroelectric power – although that would involve flooding land. That highlights one of the conundrums of any preferred energy solution: There are downsides to each of them. Solar energy is great – free power from the sun! – but some in Southside are chafing at the amount of land being converted from agricultural uses into solar facilities. In any case, March stands as a conservative voice against Youngkin's nuclear proposal.

Now, none of this is meant to make a case one way or another on the wisdom of splitting atoms and whether some of that should be done in Southwest Virginia. It is meant to put the proposed SMR in Southwest Virginia in a global context and to show that the politics of nuclear are not always clear-cut. We in Virginia will get to see this play out in the General Assembly (and perhaps beyond). Youngkin has proposed \$10 million to go toward research and development of innovative energy technologies, with half of that devoted to nuclear research. That may be exactly what we should expect of a conservative governor. Meanwhile, the liberal government in Canada has invested **more than \$18 million** toward its own nuclear research. Who would have thought that Glenn Youngkin and Justin Trudeau had so much in common, or that Marie March would wind up aligned with Greenpeace?

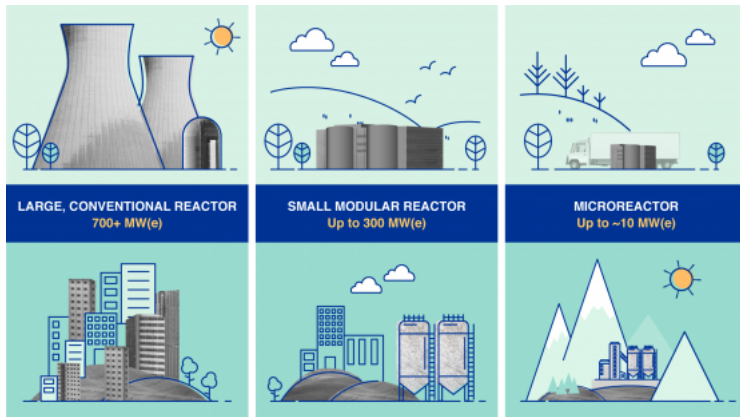
ECONOMY

Dominion Energy plans to deploy small modular nuclear reactors statewide by 2032

The Richmond based utility is evaluating several sites in Southwest Virginia, including retired fossil fuel plants and former coal mines. Appalachian Power Company says it's also looking at the new nuclear technology.



by **Markus Schmidt**
December 15, 2022



Types of nuclear reactors. Gov. Glenn Youngkin wants Virginia to build a small modular reactor in Southwest Virginia. Courtesy of U.S. Department of Energy.

Want more news from Southwest and Southside? [Sign up for our free daily email newsletter.](#) We have a weekly weather email now, too.

When Gov. Glenn Youngkin rolled out his energy plan in October, stating that Virginia must be “all in” on nuclear energy and that he [wants to deploy](#) a small modular nuclear reactor (SMR) somewhere in Southwest Virginia within 10 years, Dominion Energy, the state’s largest utility company, was already one step ahead of the game.

“In our own planning process, we have already been evaluating various technologies and sites across the commonwealth, and we envision that we could be in a position to place the first SMR in service within the decade,” Todd Flowers, Dominion’s director of business development, said in an interview with Cardinal News on Tuesday.

(Disclosure: Dominion is one of our donors but donors have no say in news decisions; [see our policy.](#))

While Dominion has not publicly disclosed any potential sites in Southwest Virginia, it considers the region as an “ideal location,” given the access to the area’s electric power transmission system and the ability to “transition the local fossil fuel workforce that has provided energy for decades” to support SMR deployment, Flowers said.

Meanwhile, Appalachian Power Company is also considering advanced nuclear technology on its path to meet its goal of net zero carbon dioxide emissions by 2045. The company has formed an internal team that is studying SMR options, the utility told Cardinal News in a statement Wednesday.

Dominion, however, is further ahead in its efforts than their competitor from Southwest Virginia. The utility currently serves the most densely populated metropolitan areas of the commonwealth, including Richmond, Hampton Roads, Charlottesville and Northern Virginia. But it also owns land in Tazewell County, where it is studying hydroelectric pump storage, and Wise County, the location of the Virginia Hybrid Energy Center, a power station in St. Paul that burns waste coal.

“We are looking in Southwest Virginia, and we certainly are looking at other facilities that either have operating fossil fuel plants or fossil fuels plants to be retired,” Flowers said, adding that Dominion also has excess land at the company’s existing nuclear facilities – North Anna Power Station in Louisa County

and Surry Power Station in Surry County – that could be potential locations for SMRs. He said that an SMR could serve as a substitute for the third conventional reactor that has been licensed for North Anna but hasn't been built.

“We are looking at multiple options across the commonwealth, and given the siting flexibility and the small footprint of SMRs, we believe there is a lot of opportunity to place these in several different locations across the state,” Flowers said, adding that more than one unit could be deployed to the same location due to a single unit's small footprint.

The utility's plan aligns well with that of the Youngkin administration, which is asking the General Assembly for \$10 million in the upcoming budget to create the Virginia Power Innovation Fund for research and development of innovative energy technologies – including nuclear, hydrogen, carbon capture and utilization, and battery storage.



Gov. Glenn Youngkin speaks at the roll-out of his energy plan in Lynchburg. Photo by Dwayne Yancey.

Youngkin also announced that \$5 million of this funding would advance the goal laid out in the recently released “[all-of-the-above](#)” [Virginia Energy Plan](#), to grow Virginia's nuclear energy industry by establishing a Virginia Nuclear Innovation Hub. These funds would include grants for higher education institutions to study SMR technology, funding for nuclear workforce development, and additional money for SMR site exploration, including in Southwest Virginia.

“With technologies like carbon capture and utilization, and resources like critical minerals, hydrogen, and nuclear, we will make Virginia the epicenter for reliable and affordable energy innovation,” Youngkin said during an event at a reclaimed mine site in Norton, in the heart of Southwest Virginia's coalfield region, which his administration considers “an example of a possible location for an SMR or other energy facility,” according to a news release. “Southwest Virginia includes hundreds of similar locations ready for development as potential energy and economic development sites,” the statement said.

**Power the news that works for you
and our community.**

News Match

CARDINAL NEWS
LOCAL BY FORT-LAUDERDALES NEWS

GIVE NOW

Flowers said this week that Dominion has reviewed Youngkin's Virginia Energy Plan, including the governor's vision of having SMRs in the commonwealth in service within a decade, and has been communicating with the administration. But the company's exploration of new SMR technologies predates Youngkin's interest in the subject, and Dominion envisions that any new power generation facility it will build and operate will be part of its own regulated utility.

“In 2022, for the first time in the company’s history, we included SMRs as an available resource in our strategic planning process,” Flowers said, referring to an [updated version](#) of Dominion’s Integrated Resource Plan, which is usually released once a year and provides the road map of the latest technologies that may be deployed in the future.

“We are a public utility with an obligation to serve our customers and to ensure that we produce energy to meet the load requirements of our customers. If you truly want to get to a zero-carbon grid, we think that nuclear has got to be a part of the solution,” Flowers said.

According to the updated Integrated Resource Plan, Dominion anticipates SMRs “could be a feasible supply-side resource as soon as the early 2030s,” and the company has thus included SMRs as a “supply-side option starting in December 2032” in all alternative plans. The plan also states that Dominion assumes that one 285-megawatts SMR facility could be built per year. “For some light-water SMR designs that utilize current nuclear fuel technologies with an available supply chain, the commercial availability may be even sooner,” the plan states.

SMRs are a new class of nuclear fission reactors that are smaller than conventional nuclear reactors. Unlike the latter, which on average generate about 1 gigawatt of power per plant, small modular reactors can produce up to 1,000 megawatts, but typically around 300 megawatts.

The term SMR refers to the unit’s size, capacity and modular construction, not to the reactor type and the nuclear process that is applied. In essence, SMRs function much like their much bigger counterparts, but are smaller and more compact. Each unit can be built at a factory, to be shipped, commissioned and operated at a separate site.

“When you fabricate these modules in that factory setting you allow for those components to be built and constructed in a very controlled environment, and these components can be replicated almost in an assembly line fashion, so the cost of fabrication goes way down,” Flowers said, without disclosing the latter.

“We’re working with the SMR vendors to kind of finalize and fine-tune those cost estimates. But we do anticipate that SMRs will be economically advantageous when compared to other zero-carbon technologies that can deliver around-the-clock energy,” Flowers said.

According to the International Atomic Energy Agency, there are [only four SMRs](#) currently under construction worldwide – one in Argentina, one in China, and two in Russia. Each of Russia’s reactors generates less than 75 megawatts. Canada recently started site preparation for an SMR in Ontario.

Because of their small footprint – one SMR requires about 50 acres of land – they provide for more site flexibility, allowing them to be operated at previously used locations such as retired fossil fuel plants, existing nuclear sites or other industrial areas.

“They are certainly reliable and the only source today of zero-carbon electricity where you can provide energy around the clock,” Flowers said. “If you look at other zero-carbon technologies, like solar energy, you really need to overbuild those facilities, because the sun doesn’t shine 24-7.”

For example, in order for a solar power plant to generate 300 megawatts – the average amount created by one SMR – it would require a facility with a footprint of about 3,000 acres, Flowers said.

“But you also need to factor in that the capacity factor for solar energy is only about 25 percent, so it’s only generating electricity 25 percent of the time,” Flowers added. “If you really want to produce energy around the clock, you may need to build not 300 megawatts of solar, but 1.2 gigawatts of solar, so those 3,000 acres may be 12,000 acres,” he said. “The footprint is just tremendous in comparison to SMRs. And the biggest advantage of SMRs is what I’d call energy density, the amount of energy that’s generated on a very small footprint.”

Del. Terry Kilgore, R-Scott County, the House Majority Leader, in October heard a presentation on SMRs by a panel of experts who appeared before the Commerce and Energy Committee. And earlier this month, he toured Dominion’s North Anna Power Station in Louisa County. These experiences left him convinced that SMRs are clean, safe and reliable.

○

“I think that SMRs are going to be the future,” Kilgore said in a phone interview Wednesday. “The federal government is going to fund a lot of the research in this area going forward, and I think it’s going to be proven safe.”

Kilgore also highlighted the “many economic opportunities” that he hopes will benefit the region because of SMR technology, especially in the manufacturing area. “A lot of the materials are going to have to be manufactured, like building some of the machinery, and hopefully that will be done in Southwest Virginia,” Kilgore said.

Del. Israel O’Quinn, R-Washington County, underscored that both Dominion and Appalachian Power are exploring to deploy SMRs across Southwest Virginia.

“Ultimately, I think that’s a good thing. Appalachian is already here, they are the incumbent provider in most of Southwest Virginia, and certainly Dominion does have a large investment in Virginia City, so I think the fact that they are both interested is good, especially as it relates to the goals and objectives that the governor has laid out.”

O’Quinn said he, too, believes that SMRs will be a safe and efficient way to generate zero-carbon electricity.

“These things have been used on naval watercraft since the 1950s, people in Hampton Roads drive by them every single day, and an SMR can be shut down much faster than a larger nuclear plant, but still has the capability of powering a lot of homes and businesses,” O’Quinn said. “It’s a very interesting technology, zero emission, and I think it’s probably the way of the future, and this is where energy is headed in the long term.”

But not every lawmaker from Southwest Virginia is convinced that SMRs will be the right fit for the region. Del. Marie March, R-Floyd County, last month expressed her concern with the new technology.

“I prefer that SWVA isn’t used as the lab rat,” March wrote on her Facebook page. “For too long NOVA (Northern Virginia) harvests our taxes and our land. Now they want to use us to harvest power. Right now a Nuclear power plant is being targeted in Ukraine to be bombed.

Look at the impact of a nuclear meltdown on generations of people and the ecosystem. We don’t need Geiger counters in SWVA!”

And on Thursday at 2.p.m., the nonprofits Appalachian Citizens’ Law Center and Appalachian Voices, which both have been critical of plans to deploy SMRs in Appalachia without seeking public input, will be hosting a [virtual panel discussion](#) about this issue.

The panel includes Cale Jaffe, the director of the Environmental Law and Community Engagement Clinic at the University of Virginia School of Law; David Schlissel, director of Resource Planning Analysis for the Institute for Energy Economics and Financial Analysis; Edwin Lyman, a physicist and Director of Nuclear Power Safety with the Union of Concerned Scientists; and Mary Cromer, Deputy Director at Appalachian Citizens’ Law Center.

According to a news release, the panel “will discuss the safety, financial and political outlook of developing a small modular nuclear reactor in Virginia’s coalfield region.”

But Flowers said SMR technology is considered safe, has no negative environmental impact, and that the amount of nuclear fuel produced by a single unit is expected to be similar to that of Dominion’s existing facilities, where fuel is stored on site.

“Today we manage used nuclear fuel very effectively, in fact I’d say nuclear power operations is really the only technology that captures 100 percent of its waste stream,” Flowers said. “If you take Surry and North Anna as an example, we are safely storing a relatively small amount of used nuclear fuel from decades of power generation on a very small footprint. We can manage the nuclear fuel from SMRs in the same manner.”

Flowers also hailed the opportunities for job creation in Southwest Virginia once SMRs are being deployed. Depending on the technology, for a single unit Dominion anticipates the full-time staffing to be about 100 personnel – a number that would double with two SMRs at a single site.

“There are a lot of different types of roles – welders, machinists, electricians, instrumentation and control specialists, operation staff, security personnel,” Flowers said. “A lot of those jobs are similar to the same roles that you’d have in a traditional coal fired plant. That allows us to transition to a nuclear workforce utilizing staffing that may have come from the coal producing industry.”

Flowers said that instead of recruiting employees from outside the state, Dominion plans to collaborate with community colleges and universities in Virginia to train the workforce that will operate the SMRs.

“Given the timeframe of deployment, we have a decade before we anticipate the first SMR being placed in service, and we are already discussing strategically how do we partner with the community colleges of Southwest Virginia to develop that workforce, such that when these facilities do come online, there is a workforce that we can lean on,” Flowers said.

Shannon Blevins, Vice Chancellor for Administration, Government Relations, and Strategic Initiatives at UVA Wise, said that as with all economic development projects in Southwest Virginia, UVA Wise and its community college partners “stand ready to assist” with the talent needs of the employers in the region. “We work to understand those needs and then collaborate on a strategy to assist them with developing talent pipelines,” Blevins said in an email.

Kristen Westover, the president of Mountain Empire Community College in Wise County and the vice chair of the SWVA Energy Research and Development Authority, said that she, too, has been “paying close attention to what it will take to educate a workforce” around nuclear energy and SMRs.

“MECC currently has an Energy Technology degree program with numerous specializations within it, including HVAC, solar and electricity. A specialization in nuclear energy could be offered in the same manner,” Westover said.

As with other emerging technologies, such as unmanned aerial systems, cybersecurity and smart-farming, the college is working with experts and existing and potential employers in the field to determine and build a curriculum that meets the needs of the industry and employers within the nuclear industry, Westover said.

“We then work with local K-12 systems and employers to educate a trained workforce to support the industry,” she added. “Colleges and universities recognize that SMRs and nuclear technology require a strong STEM foundation, and we will continue to work with our regional K-12 partners to ensure that students have the necessary STEM essentials to be able to enter post-secondary educational programs and compete in the workforce in these emerging technologies.”

And Adam Hutchinson, the president of Virginia Highlands Community College, said he was already aware of Dominion’s initiative regarding SMRs.

“We agree with Governor Youngkin and Delegates Kilgore and O’Quinn that Southwest Virginia is an excellent candidate for this type of energy technology, given our strong history of energy innovation, the region’s cohesive focus on economic development, and a talented workforce,” Hutchinson said.

Virginia Highlands, along with its neighboring community colleges, already provides post-secondary education and training in many of the applicable fields, such as industrial maintenance, automation, electrical systems and welding, Hutchinson said. “Our colleges are ready to develop and deploy new programs to meet the emerging workforce demands of this technology.”

Whether it’s nuclear, hydrogen, clean coal, wind, solar or some yet-unknown technology, the energy industry recognizes the economic development opportunity in Southwest Virginia, Hutchinson added.

“There’s widespread support and collaboration on these initiatives, and the stakeholders – businesses, legislators, educators, investors, et cetera – are working together to make sure these opportunities are safe, sustainable, and profitable for the entire region. We look forward to being a part of what comes next,” Hutchinson said.

Susan Cameron contributed to this report.

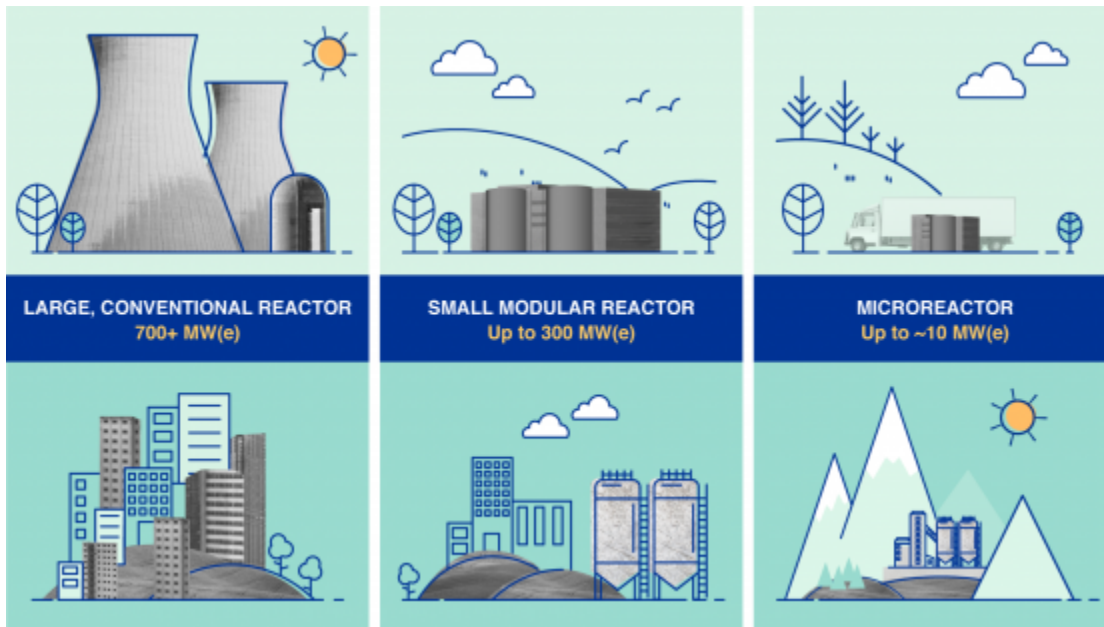
ECONOMY

Panelists debate small modular nuclear reactors: Unsafe and unnecessary or another path to a carbon-free economy

Panelists debated the SMR that Gov. Youngkin has proposed for Southwest Virginia Thursday. Some residents and environmental agencies say they've been left out of the discussion and SMRs are unproven technology, others argue it's the best way to go carbon-free.



by **Susan Cameron**
 December 16, 2022



Types of nuclear reactors. Gov. Glenn Youngkin wants Virginia to build a small modular reactor in Southwest Virginia. Courtesy of U.S. Department of Energy.

The politics, safety and costs associated with developing small modular nuclear reactors like the one proposed for Southwest Virginia were the topics discussed by three experts on the environment and nuclear energy during a virtual panel discussion Thursday.

The panel was hosted by Appalachian Voices, an environmental group, and Appalachian Citizens' Law Center, and drew 156 viewers.

It was organized to help educate local residents about small modular reactors after Gov. Glenn Youngkin announced in October his plan to place one on a former coal mine site somewhere in Southwest Virginia to generate carbon-free electricity within 10 years. (Both Dominion Energy and Appalachian Power have [expressed interest](#) in developing such a reactor, with Dominion's plans further along.)

An SMR is a compact reactor that can generate up to 300 megawatts of power. Large, traditional reactors typically generate around 1,000 megawatts of power.

Youngkin and other proponents of SMRs say the coalfields are the perfect place for one because of the availability of former coal mine land that already has the power infrastructure and clean water needed.

The small reactor has also been touted as a way to draw jobs and economic development to an area devastated by the downturn of the coal industry in recent years.

But some residents and environmental agencies have said they've been left out of the process and SMRs are unproven technology about which there are too many questions.

The speakers included Cale Jaffe, director of the Environmental Law and Community Engagement Clinic at the University of Virginia School of Law; David Schlissel, director of resource planning analysis for the Institute for Energy Economics and Financial Analysis; and Edwin Lyman, a physicist and director of nuclear power safety for the Union of Concerned Scientists.

No SMR has been built in the U.S., and the governor said he wants Virginia to be the first state to deploy a commercial SMR.

But Schlissel said during the panel discussion that there are "sometimes in life and in the world when you don't want to be first."

Whether nuclear or not, first-time design projects normally experience serious delays, cost overruns and problems during construction and the first years of operation, he said.

Schlissel pointed to several nuclear projects underway that have experienced severe cost overruns and lengthy delays.

The Fading Promise of Low-Cost Power from SMRs

The estimated price of power from the SMR that NuScale wants to build for utilities in Utah has nearly doubled this year from \$58 per MWh to the range of \$90-\$100/MWh because of what it says is a "shocking" new construction cost estimate.

Category	Price Range
Current target price	\$58/MWh
Anticipated new target price range	\$120-\$130/MWh
Anticipated target price range with \$30 IRA tax subsidy	\$90-\$100/MWh

IRA nuclear subsidies: \$30

Sources: IEEFA, Community Power Board meetings

The estimated power prices are \$90-\$100/MWh despite (1) a \$30/MWh nuclear subsidy in the Inflation Reduction Act and (2) a \$1.4 billion subsidy from the Department of Energy

Zoom Webinar interface elements: Recording LIVE, Facebook, Live Transcription (Closed Captioning) has been enabled, Who can see this transcript? Recording on, 02:38, 11:34 AM, Next slide, Click to add notes, David Schissel, Audio Settings, Chat (20), Raise Hand, Q&A, Live Transcript, Leave.

A screenshot of David Schissel's presentation.

The nuclear power industry's claim that SMRs will be less expensive and quicker to build are "pure speculation as nothing is certain about the actual cost, commercial operation dates, operating performance and reliability of any SMR designs," he said.

He also said that power generated by an SMR would be expensive and costs are going to increase over the decade it would take to build it.

The U.S. is "pretty far along" in its transition from coal and natural gas to renewables, Schissel said, in large part because of the development of advanced inverter power controls that have enabled standalone wind and solar resources to respond almost instantaneously.

So, power plants won't be needed in 10-15 years when SMRs would be available, he said.

"We won't need large baseload plants like SMRs to run 24/7," he said.

The grid will be able to handle the integration of intermittent resources with battery storage and offshore wind, Schlissel said.

Lyman addressed the safety of SMRs, which he said he's most concerned about.

One thing that sets nuclear energy apart from other low carbon technologies is the potential for a "catastrophic accident that could lead to large scale radiological contamination of the environment, massive economic damages and the potential for significant human health impacts," Lyman said.

According to nuclear industry estimates, there is about a 1% risk that a reactor in this country will experience a core melt accident like the nuclear disaster in Fukushima, Japan, following a major earthquake in 2011, he added.

A nuclear plant can have internal risks like a pipe breaking, or external threats like hurricanes, earthquakes and terrorist or military attacks like what is happening in Ukraine, he said.

Proponents of SMRs say they have safety advantages over the current nuclear reactors, but Lyman said that is misleading.

He claimed that one obstacle to having safer nuclear power is the NRC itself, which he said has no new requirements that the new reactors like SMRs would have to be safer than traditional reactors. The agency doesn't want to "cast doubt on the existing fleet by saying we need something that's safer," Lyman added.

Jaffe spoke about the politics of SMRs, saying they could help "melt the political polarization" of climate change "by having us not talk about whether climate change is a problem that we need to deal with. But having complete debates on climate change solutions and moving from talking about the problem to talking about some solutions."

He added that those concerned about SMRs might consider whether they want to "pick a fight" and oppose SMRs or continue moving forward with renewables and let the issue develop over time.

“It’s not a question of whether we should build as much wind and as much solar and as much battery storage as fast we can – absolutely, do not slow that down one iota,” Jaffe said. “The question is, do we pick a fight? Do we divert our own resources to opposing SMRs rather than saying, ‘let that develop if it’s going to develop, we’re going to keep moving on renewables’? Have the whole decarbonization team together.”

After the panel discussion, organizers said there remains a “great debate about the costs ratepayers will bear to build SMR technology and unknown risks to communities. The panel made it clear, we should be investing in renewable and distributive technologies that are available now, not a decade from now, and move the state to a carbon free economy and lower costs to ratepayers.”

© 2023 Cardinal News.

Proudly powered by Newspack by Automattic