

NUCLEAR & HYDROGEN DEVELOPMENT

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WHY IT MATTERS

Many experts predict that carbon-free hydrogen (“green hydrogen”) and new nuclear electricity generation will play a role in decarbonizing the economy. As Virginia works towards a net-zero economy, decision-makers must examine specific nuclear and hydrogen proposals with caution.

New nuclear generation may play a role in achieving our federal and state carbon reduction goals for the electricity sector depending upon a number of variables, including the availability of new transmission lines.¹ However, the U.S. has only placed three new nuclear facilities into service since the 1990s,² and Georgia Power’s recently commissioned Vogtle units 3 and 4, were delivered 7 years late and cost \$35 billion³—possibly the most expensive power plants ever built. The challenges facing nuclear development today are the lengthy development timelines (about 15 years) and accompanying financial risk. Nuclear power will always carry significant safety and security risks that must be managed, along with the burden of storing nuclear waste.

Hydrogen presents different potential and challenges. The federal government estimates that green hydrogen could be used to mitigate up to 25% of global greenhouse gas emissions, particularly in the industrial, chemical, and heavy-duty transportation sectors.⁴ However, nearly all commercially produced hydrogen is currently processed from natural gas; this process produces carbon dioxide and carbon monoxide as byproducts.⁵ By contrast, green hydrogen is produced by using carbon-free electricity.⁶

Production of green hydrogen will require a tremendous amount of carbon-free electricity. The U.S. DOE estimates that “up to 200 GW of new renewable energy sources would be needed by 2030 to support clean hydrogen production.”⁷ It will be difficult for Virginia to achieve our net-zero goals if green hydrogen production is not deployed strategically given the current challenge of decarbonizing the grid while electricity demand increases.

The gas industry is increasingly attempting to justify new polluting gas infrastructure by claiming that it may be used to transport or burn hydrogen in the future.⁸ These claims should be met with extreme skepticism, as existing turbines and pipelines can only utilize and transport lower hydrogen blends;⁹ in other words, they will remain primarily fossil fuel resources.

CURRENT LANDSCAPE

The Virginia Clean Economy Act (VCEA) rewards our existing nuclear and new nuclear and zero-carbon technologies that come online after 2030, by reducing each utility’s renewable portfolio standard (RPS) requirement in proportion to those resources.¹⁰

However, new nuclear technology faces high financial risks due to lengthy development timelines. Small modular reactors (SMRs) have yet to produce electricity for the grid in the U.S., and the only project to receive a license from the Nuclear Regulatory Commission (NRC) was canceled when costs almost tripled.¹¹ To address these financial barriers, the U.S. Department of Energy is offering billions of dollars in financing as a “bridge to bankability.”¹² Congress recently sent legislation to the President that would streamline federal permitting for advanced nuclear, reduce permitting

fees, and strengthen the NRC’s workforce.¹³

Virginia has taken steps to support nuclear, establishing the Power Innovation Fund in 2023 to assist with research and development.¹⁴ In 2024, the General Assembly passed legislation allowing early SMR development costs to be passed onto customers—placing the financial risk on Virginia ratepayers instead of project developers, even if the project never produces electricity.¹⁵

Virginia lawmakers also considered proposals that would allow nuclear projects to avoid a litigated Certificate of Public Convenience and Necessity (CPCN) process at the State Corporation Commission (SCC), and instead proceed via an updated Permit by Rule (PBR) program.¹⁶ New nuclear projects should receive full scrutiny given their inherent safety, environmental, and financial risks.

There have been numerous proposals to add both nuclear and hydrogen to Virginia’s RPS.¹⁷ Nuclear already reduces our utilities’ RPS obligations, so no change is needed. As for green hydrogen, most applications are expected to occur in sectors outside of electricity generation.¹⁸ According to the U.S. Energy Information Administration, further “research, development, and demonstration is needed before hydrogen will qualify for utility-scale power generation.”¹⁹ It takes a tremendous amount of renewable power to produce green hydrogen at scale so its application in the power sector may be extremely limited.²⁰

OPPORTUNITIES

Virginia should approach efforts to speed up or “streamline” permitting around nuclear and hydrogen with extreme caution and a thorough understanding of the risks involved with nuclear development. These risks include but are not limited to:

- lifecycle environmental pollution—including uranium mining, transport, and waste
- operational risks—including accident risk and security
- financial risks—including long timelines and uncertainty around emerging designs.²¹

Ratepayers should be shielded from the financial risks associated with the development of new technologies. If utilities choose to pursue new nuclear or hydrogen investments, they should be required to exhaust the numerous federal funding options available before any additional costs are borne by ratepayers.

Another opportunity to share the financial risk is emerging from the private sector. Earlier this year, Google, Microsoft, and steelmaker Nucor announced an initiative to aggregate their large energy needs to drive investment in new carbon-free, dispatchable generation, including advanced nuclear and clean hydrogen.²² Amazon joined these companies in announcing the development of special rate structures for large customers in North Carolina; these voluntary tariffs are intended to reduce the financial risks of new carbon-free generation investments while meeting corporate goals.²³ More recently, Google entered into an agreement with the Nevada utility NV Energy under which the utility will add roughly 110 MW of geothermal electricity to the grid for Google’s operations over the next six years.²⁴ These large energy users are showing a willingness to come to the table and voluntarily take on additional

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risk to help them achieve their corporate carbon-free goals. Virginia should explore these options with private industry before placing any more risk on ratepayers.

The U.S. DOE characterizes the potential for green hydrogen as a baseload power source as “low,” but there is strong potential to decarbonize other sectors of the economy using green hydrogen.²⁵ Hydrogen should not be included in Virginia’s existing RPS. Instead, green hydrogen should be considered in applications that the U.S. DOE characterizes as having high potential, such as chemical processing and heavy-duty transportation.

ENDNOTES

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TOP TAKEAWAYS

Virginia should keep its focus on proven low-cost technologies like wind, solar, and battery storage.

A thorough permitting process is needed for nuclear technology given the significant safety, environmental, and cost risks. In addition, emerging technologies like SMRs and green hydrogen should exhaust all federal incentives and private-sector opportunities before additional costs are placed on ratepayers.

Virginia should be discerning about what applications are appropriate for green hydrogen, such as chemical processing and heavy-duty transportation. Currently, hydrogen is not appropriate for electricity generation or home heating.

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