

# Clean Hydrogen and West Virginia

June 2024

This Science and Technology Note considers opportunities and challenges associated with efforts to develop a clean hydrogen industry in West Virginia.

## West Virginia's Hydrogen Opportunity

Hydrogen gas, currently used primarily in [fertilizer production and refining](#), is [produced mostly \(95%\)](#) from natural gas in the United States. Clean hydrogen (produced with [emissions below a given level](#)) has the potential to [reduce emissions](#) in hard-to-abate industries like [cement, steel, and chemicals](#). Federal initiatives such as the [45V Clean Hydrogen Production Tax Credit](#), the [45Q Carbon Capture and Sequestration Tax Credit](#), and regional hydrogen hubs seek to spur clean hydrogen development via investment and financial incentives.

West Virginia's abundant, low-cost natural gas resources and infrastructure (see [hydrogen blending](#)) contributed to its selection at the center of the [Appalachian Regional Clean Hydrogen Hub \(ARCH2\)](#). This initiative, headquartered in Morgantown, seeks to create a local clean hydrogen production, transportation, and storage ecosystem. ARCH2 is [expected to cost \\$6 billion total](#), with \$5 billion from the private sector and nearly \$1 billion in federal investment. ARCH2 is projected to create

## Research Highlights

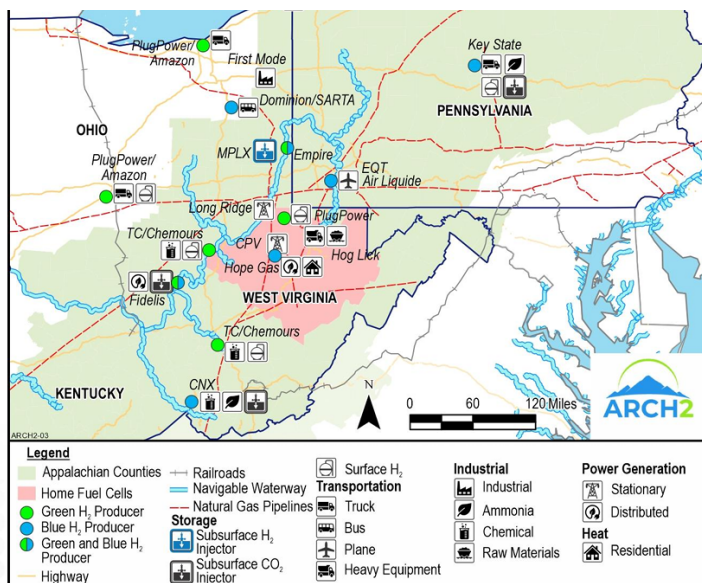
- West Virginia is a part of the Appalachian Region Clean Hydrogen Hub (ARCH2), directing federal funds to developing a clean hydrogen industry, which could bring jobs and investment to the state. A state taskforce is investigating the government's role in promoting a local hydrogen industry.
- Community opposition to ARCH2 is in part based on carbon capture technologies being unproven at scale and fears that climate and economic benefits may fail to materialize.
- Policy options include establishing hydrogen workforce programs and tax incentives or taking no immediate legislative action.

3,000 permanent and 18,000 construction jobs and is a [partnership between](#) national labs, universities, and over 40 natural gas, oil, and manufacturing companies. ARCH2 plans to produce clean hydrogen primarily by capturing and storing carbon emissions from hydrogen produced from natural gas (sometimes called "blue" hydrogen production). West Virginia has the potential to receive further economic benefits from a local clean hydrogen industry. The 45V Clean Hydrogen Tax Credit could cost the federal government [up to \\$786 billion over ten years](#), dwarfing the roughly \$1 billion federal investment in ARCH2.

West Virginia nodes in the new hydrogen network have been [announced](#) in Belle, Follansbee, North Point Pleasant, Washington (near Parkersburg), and Fairmont (see map). Fidelis New Energy has [announced](#) a hydrogen production and carbon capture project. The [Mountaineer GigaSystem](#) will produce hydrogen to power an adjacent data center in Mason County and will provide an estimated 800 full-time and 4,200 construction jobs.

## ARCH2: Technical, Economic, and Environmental Concerns

West Virginia communities have reservations about planned hydrogen development. A [letter](#) from the Ohio River Valley Institute signed by more than 50 Appalachian community and environmental groups urged federal regulators to [pause ARCH2 until their](#)



Source: [DOE](#). Map of proposed phase one ARCH2 projects.

[concerns are addressed](#). Objections revolve around a lack of transparency and the overall economic and environmental feasibility of the projects. A senior researcher at the Ohio River Valley Institute [warned at a recent ARCH2 “listening session”](#) that using hydrogen for power and natural gas blending applications could raise utility prices and taxes for Appalachian ratepayers. There are concerns that there is not sufficient demand for clean hydrogen and that promised jobs may fail to materialize. Finally, hydrogen is [flammable](#) and odorless, making production, transportation, and use [potentially dangerous](#).

Opponents point out that carbon capture and storage (CCS) technologies have not yet been demonstrated at the [scale](#) or [efficiency](#) required for ARCH2 plans and that CCS could [induce more frequent earthquakes](#). Hydrogen delivery and CCS will require [costly](#) pipeline construction. Some studies suggest that, without efficient carbon capture, blue hydrogen may have [a worse overall environmental impact](#) than natural gas. In 2022, Institutional Shareholder Services [noted](#) a “[significant risk of stranded assets](#) for blue hydrogen investments” due to predicted cost decreases in hydrogen produced via other means. ARCH2 addresses some community questions and concerns [on their website](#).

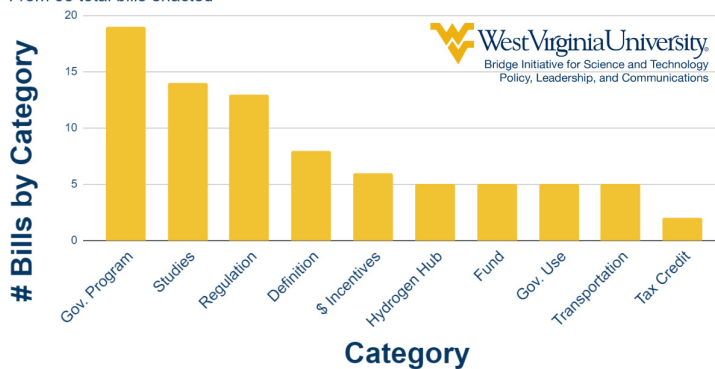
## Existing West Virginia Policy

In 2023, the legislature passed the [Hydrogen Power Task Force Act \(HB 2814\)](#). This established task force is to study the economics, workforce, tax incentives, sources of hydrogen energy, and more. The task force is to consist of representatives from utilities, fossil fuel companies, hydrogen manufacturing, environmental organizations, the Public Service Commission, and officials from the Department of Environmental Protection and the Department of Economic Development. The act required the task force deliver recommendations to the legislature by July 2024. As of June 2024, no task force appointments had been publicly announced.

[HB 4491](#) (passed in 2022) introduced a number of CCS regulations, such as requiring permits, establishing state responsibility for monitoring storage sites, and requiring storage facilities to obtain consent from pore space owners. [SB 162](#) passed in 2023 and allowed the state Department of Natural Resources director to lease state lands (excluding state parks) for carbon sequestration and storage applications.

## State Hydrogen Bills Enacted by Category, 2023-24

From 38 total bills enacted



Source: WVU Bridge Initiative, data: [NCSL](#). All bills listed, categories [defined here](#).

## Possible Benefits for West Virginians

Becoming a leader in the hydrogen industry could contribute to West Virginia’s economy and identity as an all-of-the-above energy state. The hydrogen fuel cell industry could [create 675,000 new jobs](#) in the US by 2035. Workforce training initiatives could prepare an [industry workforce](#) in construction, manufacturing, technical support, and more. Existing industries in West Virginia like chemical, pharmaceutical and [steel](#) companies could become hydrogen consumers. Further benefits could include increased government and citizen income from leasing land for CCS. West Virginia could also benefit from actions by elected officials to address community concerns about ARCH2’s impact on their local economy and environment.

## Other State Hydrogen Policies and West Virginia Policy Options

In 2023 and 2024, [38 hydrogen-related bills became law](#). Half of those establish government programs to study, promote, and fund hydrogen development (see figure). Five allocate funds to subsidize hydrogen and other energy research and development; [Virginia’s Power Innovation Fund](#) is one example. [Tennessee](#) explicitly defines “clean” energy sources for public utilities and includes hydrogen. Maryland created an [energy storage commission](#) to encourage an energy storage market and deployment in the state.

Policy options for West Virginia include establishing hydrogen workforce development programs and tax incentives or taking no action regarding hydrogen at this time.

This Legislative Science & Technology Note was written by Ryan Nesselrodt, PhD, West Virginia Science & Technology Policy Fellow on behalf of West Virginia University’s Bridge Initiative for Science and Technology Policy, Leadership, and Communications. The Bridge Initiative provides nonpartisan research information to members of the West Virginia Legislature upon request. This Science and Technology Legislative Note is intended for informational purposes and does not indicate support or opposition to a particular bill or policy approach. Please see <https://scitechpolicy.wvu.edu/> or contact [scitechpolicy@mail.wvu.edu](mailto:scitechpolicy@mail.wvu.edu) for more information.