

Blue Hydrogen

Impacts on Public Health, Water, and Climate



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Green

Uses surplus solar & wind to split water into its molecular parts- hydrogen and oxygen.



Pink

Uses nuclear energy to split water into hydrogen and oxygen.



Blue

Uses natural gas to bring together methane & water to produce hydrogen and the by-product carbon dioxide, which is then captured and stored.



Gray

Uses the same methods as blue hydrogen **without effort to capture the carbon by-product.**



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Why does “blue” hydrogen matter?



- Political and industry pressure among powerful stakeholders to bring blue hydrogen into WV
- Some risks of developing blue H₂ in WV include:
 - increased demand for natural gas
 - increased hydraulic fracking processes which use a chemical mix (i.e. PFAS) injected into the ground to fracture the geology and capture methane generating a radioactive waste byproduct
 - required construction of hundreds of miles of pipelines to transport and sequester carbon underground, as existing pipeline systems are inadequate to enclose H₂
 - worsened health, water, climate, and community impacts throughout the lifecycle



Air & Climate Impacts of Blue Hydrogen

- Methane
 - is a potent greenhouse gas
 - released during fracking
 - leaks during the hydrogen production
 - Carbon dioxide capture & storage
 - uses unproven technology
 - would raise electricity costs
 - produces additional pollution from leaks
 - Oil and gas supply chain emissions are much higher than those assumed by the DOE and EPA
 - Carbon footprint → 20% larger than natural gas and coal + 60% larger than diesel oil when used for heat
- ★ *Primary cause of climate change = burning fossil fuels*
- ★ *No new fossil fuel infrastructure can be developed to avoid worst climate impacts*



Environmental Justice Impacts of Blue Hydrogen

- Exacerbated health risks and damages to communities near fracking, i.e. north-central WV and Ohio River Valley
- Increased electric bills and direct pollution risks for the communities where hydrogen production occurs from carbon capture and storage (CCS)
- Localized extreme impacts of fossil fuel infrastructure, from fracking to CCS, in low-income communities and communities of color



Health Impacts of Blue Hydrogen

- More fracking → public exposure to dangerous chemicals
 - proprietary or trade secret
 - known toxic substances, such as PFAS and radioactive waste by-products, that are pumped underground and seep into groundwater
 - not required to be reported by industry on the amount or types of PFAS used
- More fracking → ethane
 - the building blocks of plastic production
 - every stage of plastics lifecycle is hazardous, including transportation of these chemicals
- Higher cancer risks in counties with fracking
 - 100% of counties with fracking (WV, OH, and PA) have >1 in 1 million cancer risk (above EPA Level of Concern for Cancer Risk)
 - less than 8% of other US counties have that same risk level



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Water Impacts of Blue Hydrogen

- More fracking → radioactive waste + hazardous chemicals
 - most often is injected and stored underground or in landfills
 - creates risk of leakage into the watershed
 - can contaminate surface or groundwater in transport accidents and spills
- More hydrocarbon wells → methane infiltration into aquifers
 - further degrades the local watershed and drinking water sources
 - poses a combustion risk
 - precedes the presence of volatile organic compounds in the leakage
- Extensive infrastructure buildout, i.e. pipelines and carbon injection wells
 - causes significant earth disturbance
 - comes with water quality threats, such as stream crossings and erosion



How could blue hydrogen affect West Virginia?



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State of West Virginia Brings Together Major Energy Companies and Leading Energy Technology Firms to Develop a Clean Hydrogen Hub in the Region

Hub Brings Together Producers, End-Users, World-Class Technology Experts, and Necessary Infrastructure to Advance the Production, Use, and Delivery of Hydrogen in Appalachia

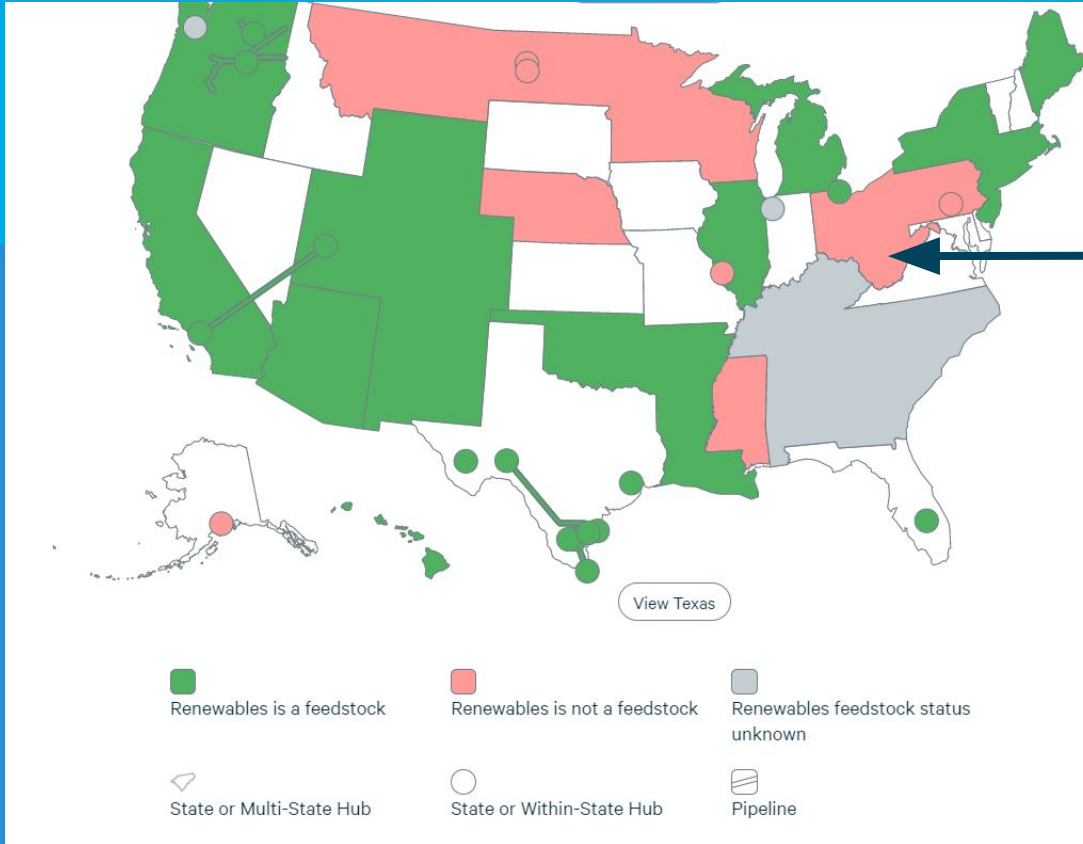
September 28, 2022 10:22 AM Eastern Daylight Time

CHARLESTON, W. Va.--(BUSINESS WIRE)--The State of West Virginia, EQT Corporation, the nation's largest natural gas producer, Battelle and GTI Energy, both with deep expertise executing clean energy programs for the federal government, and Allegheny Science & Technology (AST), a leading West Virginia energy technology consulting firm, have collaborated to establish a Regional Clean Hydrogen Hub in the Appalachian region, the Appalachian Regional Clean Hydrogen Hub (ARCH2).



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IIJA Hydrogen Hubs Program



The Appalachian
Regional Clean
Hydrogen Hub
(ARCH2)



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The Appalachian Regional Clean Hydrogen Hub

- ARCH2 State partners: WV, OH, PA, KY
- Feedstocks: fossil fuels + CCS
- Proposed end uses: industry, transportation, power, residential/commercial heating
- Application progress: Concept paper submitted + encourage notification

No DOE hydrogen hub will be announced until fall '23, but WV is preparing for it...

- Nucor Steel Mill to be located in Mason County likely to have connections to proposed hub (Sen. Capito's press release on [WV Hydrogen Hub Working Group](#))
- SB 161 and 162 passed in 2023 session opening pore space for CO2 sequestration (Sen. Capito [press release](#))



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How should decision makers engage with hydrogen?



- Consider impacts to our health, water, climate, and communities, especially life cycle impacts
- Increase protections for our communities, i.e. fracking is exempt from many regulations
- Support public health initiatives, such as the classification of fracking chemicals and waste as hazardous waste
- Enable a just economic transition that creates safe, sustainable jobs in renewable energy



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Questions?

www.wvrivers.org/hydrogen



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