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School of Energy Resources
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Hydrogen Energy
Research Center

Hydrogen Development with CCS in Wyoming

Research Brief

Why Hydrogen?

Hydrogen is one of the most versatile and abundant elements on the planet, rendering it a source of potentially limitless energy. Hydrogen has a diverse and promising range of potential applications in a net-zero energy economy, both as a fuel and as an energy carrier to increase efficiencies of other energy resources used by the electric grid.

Wyoming has significant potential to play a leading role in clean hydrogen deployment, particularly through the production of blue hydrogen, a low-carbon form of hydrogen production where hydrogen is produced from natural gas or coal and the resulting CO₂ emissions are captured and stored.

This paper provides an overview of existing and developing applications for hydrogen, a description of existing hydrogen production methods (aka the “Hydrogen Rainbow”), and the increasing demands and incentives for hydrogen deployment. Additionally, the paper analyzes funding provisions in the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA) that aim to accelerate development of the hydrogen industry.

It further analyzes the geographic, economic, legal, and regulatory features that render Wyoming a particularly well-suited location for a blue hydrogen economy. The paper concludes with a brief summary of policy opportunities for the State of Wyoming to fulfill its potential as a global “hydrogen headwaters” through blue hydrogen deployment.

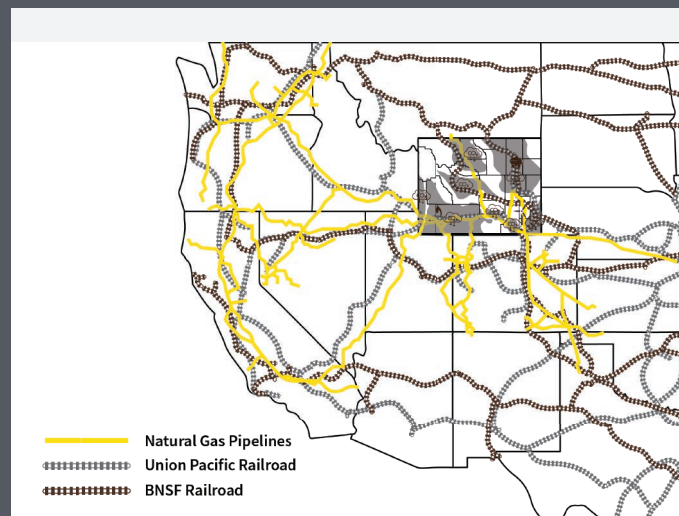


Figure 1: Rail and pipeline infrastructure connecting CO₂ storage reservoirs with high demand markets. *Illustration by Christine Reed, SER*

What The Study Found

Wyoming is a natural fit for the deployment of hydrogen technologies, and blue hydrogen is key to unlocking this potential. The state possesses abundant reserves of natural gas needed for hydrogen feedstock and significant subsurface storage potential, as well as the policy, infrastructure, and trained workforce required to implement hydrogen production with carbon capture and storage (CCS) safely, efficiently, and within a straightforward legal framework.

Projects already underway are intended to capitalize on synergies between Wyoming's natural gas supply, its associated existing infrastructure and the State's potential for widespread CCS deployment.



Figure 2: A non-exhaustive depiction of the hydrogen rainbow. As new production pathways develop, they are assigned new colors in the spectrum.

Why It's Important

Efforts to grow clean hydrogen production in the United States are already underway with the support of landmark policy incentives under the Biden Administration. The Infrastructure Investment and Jobs Act (IIJA) and Inflation Reduction Act (IRA), passed in 2021 and 2022 respectively, have energized ambitions for domestic production with attractive financial incentives to encourage industry growth before 2032.

With significant federal funding available for appropriation in support of low-carbon technology development, Wyoming can and should be a leader in expanding a hydrogen industry with opportunities to diversify its energy economy, integrate existing fossil fuel resources into a clean energy strategy, and strengthen opportunities for skilled workers and long-term employment in the state.

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