

# Unlocking America's Clean Hydrogen Potential: Navigating Policy, Challenges, and Market Opportunities

## WRITTEN BY

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The U.S. clean hydrogen sector is poised for significant growth, driven in part by its potential to reduce carbon dioxide emissions in hard-to-abate industries such as transportation and chemical production.

The Inflation Reduction Act (IRA) and the Bipartisan Infrastructure Law (BIL) have catalyzed this momentum, providing production tax credits (PTCs) and billions in funding to support clean hydrogen initiatives.

As the industry evolves, addressing foundational regulatory and certification challenges will be crucial for accelerating the key drivers shaping the sector's future: market opportunities, advancements in manufacturing, and essential infrastructure development.

## **Foundational Regulatory Clarity as a Barrier to Growth**

**Navigating regulatory pathways:** One of the most pressing issues for U.S. clean hydrogen developers is the regulatory uncertainty surrounding the Internal Revenue Service (IRS) and Treasury Dept.'s proposed regulations on the IRA Section 45V tax credit for production of qualified clean hydrogen.

Section 45V added new PTCs of up to \$3 per kilogram of hydrogen produced or, alternatively, investment tax credits up to 30%, based on greenhouse gas emissions. While these incentives aim to promote the development of clean hydrogen projects from early-stage development and planning to construction, the IRS Treasury took nearly 16 months to release the proposed rules, leading to significant market uncertainty.

Under the proposed regulations, hydrogen must meet stringent criteria—additionality (or "incrementality"), temporality (hourly time-matching, beginning in 2028), and deliverability (or "market matching")—to qualify for the tax credits. These "3 Pillars" require that hydrogen facilities cannot draw power from a source more than three years older than the hydrogen project, electricity producing hydrogen must be generated within the same hour as the hydrogen, and the electricity source and hydrogen facility must be in the same geographical area, as defined by the Department of Energy (DOE) transmission needs analysis.

Additionally, uncertainty is not limited to the 45V tax credit. The regulatory approach to hydrogen pipeline transport remains ambiguous, with no specific law providing clear federal oversight on the construction, location, or

operational standards for interstate pipelines transporting hydrogen. However, there are existing laws, such as the Natural Gas Act, the Interstate Commerce Act, and the Interstate Commerce Commission Termination Act, that could potentially be interpreted to govern this area. Greater regulatory clarity is necessary to prevent potential hurdles in planning and development.

These rules have sparked concerns among industry stakeholders who argue that they are too restrictive for a nascent industry. The stringent criteria could constrain the scale of projects and increase clean hydrogen costs, potentially stifling market growth.

**Enhancing certification standards and building confidence:** To stimulate demand for low-cost clean hydrogen, the Biden Administration has made \$7 billion available to support seven regional clean hydrogen production hubs across the country. These hubs are networks where facilities and stakeholders collaborate within a specific region to produce, distribute, and use clean hydrogen more effectively, accelerating its development and deployment.

However, off-takers are calling for improved clean hydrogen certification standards due to concerns about the potentially ambiguous nature of hydrogen classifications. Businesses are uneasy about the lack of visibility, guidance, and uniform certification to verify how green any available fuel is. This uncertainty complicates efforts to meet environmental targets and undermines confidence in the fuel's green credentials. Establishing robust certification standards is essential to provide the necessary reassurance and support, thereby boosting confidence in clean hydrogen and accelerating its adoption across various sectors.

## **Driving Factors**

**Unlocking domestic and international market opportunities:** Unlocking the full potential of clean hydrogen depends on tapping into both domestic and international markets. In the U.S. there are promising opportunities to replace gray hydrogen (hydrogen produced using natural gas) across various sectors, including chemicals, metals production, and oil refining. The transportation and utility sectors also are exploring hydrogen as a cleaner alternative to fossil fuels. The federal government's \$1 billion subsidy program aims to connect clean hydrogen producers with users, thereby stimulating both supply and demand.

On the international front, the U.S. has the chance to position itself as a major exporter of clean hydrogen, especially to regions like Europe and Asia. These markets are investing heavily in decarbonization and are prepared to pay a premium for clean hydrogen. The regulatory landscape in Europe, which imposes stricter emissions standards, contrasts with the U.S. approach of providing incentives, creating a favorable environment for U.S. exports. Aligning international standards and navigating regulatory uncertainties will be critical for accessing these global markets.

**Strengthening U.S. manufacturing:** Technological innovation is central to making clean hydrogen a cost-effective and viable energy source. The U.S. government aims to reduce the cost of electrolyzers to between \$250 and \$500 per kW by 2026, a significant step towards decreasing hydrogen production costs. Currently, China dominates the global electrolyzer market, holding 68% of the manufacturing capacity. This situation offers a short-term advantage for developers who can source affordable technology from abroad.

However, sustaining long-term growth requires the development of a robust domestic electrolyzer manufacturing

industry. As technology progresses and production scales up, the cost of clean hydrogen is expected to—and must—decrease. The expansion of low-cost renewable energy sources and the application of tax credits will further drive down costs, making hydrogen more competitive compared to traditional fuels, paving the way for broader adoption.

**Developing essential infrastructure:** Beyond production and demand, the clean hydrogen industry requires substantial investment in supporting infrastructure to ensure efficient, reliable, and sufficient storage and transport. The DOE estimates that between \$2 billion and \$3 billion annually will be needed for hydrogen infrastructure projects through 2030, increasing to \$15 billion to \$20 billion annually by 2050. This infrastructure includes pipelines, storage facilities, and refueling stations, which are essential for efficient hydrogen transportation and distribution.

While current methods can address short-term needs, establishing a comprehensive infrastructure network is vital for sustaining future development. The fragmented nature of the U.S. energy grid poses unique challenges compared to Europe’s more integrated system.

Developing a national hydrogen pipeline network, similar to the proposed European Hydrogen Backbone scheme, could facilitate hydrogen movement and stabilize the market. However, this will require significant political, regulatory, and financial support.

As the clean hydrogen sector advances, overcoming regulatory and certification challenges will be essential to unlocking its full potential. Addressing these foundational issues, seizing market opportunities, and investing in infrastructure will prove pivotal in driving the industry’s strategic expansion and future success.

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