



FOCUS ON HYDROGEN: U.S. ENERGY CHALLENGES AND OPPORTUNITIES

Against the background of a global surge in interest in hydrogen over the past year, the U.S. is now beginning to take active steps to develop the framework for a future hydrogen market across the country. In this briefing, we examine the current impediments to developing a hydrogen economy in the U.S. and potential legislative 'fixes'.

BACKGROUND

The past twelve months have seen a marked acceleration in the worldwide recognition of the immense potential for hydrogen for automotive and industrial applications and energy generation. Asian and European markets have already started to formulate robust, top-down regulatory structures that will prioritize the shift towards carbon neutrality and, as a result, these regions are looking actively to incentivize investment in and development of hydrogen infrastructure.

The U.S. market for hydrogen is considerably less developed, due in part to the U.S. federal system and large political and cultural divides across the country regarding clean energy and the reduction of greenhouse gases. Recently, however, federal, state and private actors have begun to make a concerted push to develop the necessary regulations, policies, and incentives to encourage the development of projects and infrastructure that may allow the U.S. to develop a robust hydrogen market in the future.

CURRENT IMPEDIMENTS

There are two major impediments to the growth of the hydrogen economy in the U.S.:

1. The U.S. does not have a regulatory framework that would allow for the simultaneous development of each critical element of a hydrogen market.
2. There is no economic imperative to transition to a hydrogen economy.

Regulatory framework

There is no overarching federal or state regulatory or policy road map for developing clean hydrogen projects and infrastructure in the U.S. At the federal level, neither the Natural Gas Act nor the Interstate Commerce Act provides a clear framework for hydrogen projects. The resulting regulatory vacuum and uncertainty makes it difficult to simultaneously develop and

Key issues

- Although the U.S. hydrogen market is considerably less developed compared to other regions, recently there has been a push to develop the necessary regulations, policies and incentives to spur growth.
- Two core impediments to the growth of the hydrogen economy in the U.S. are the lack of a regulatory framework and an economic imperative to transition to a hydrogen economy.
- In order to create a viable hydrogen ecosystem in the U.S., clear, robust legislation is required, and hydrogen technology must be included in President Biden's infrastructure plan.

connect upstream, midstream, and downstream projects for the creation of an entire hydrogen value chain.

Economic drivers

The current cost of clean hydrogen, in terms of production, transportation, storage, and end use is prohibitively high compared with natural gas, which can also be used for many (but not all) of the same applications as hydrogen.

In contrast with clean hydrogen, the natural gas economy is well-established with comprehensive regulations. Natural gas is abundant, and its production, transportation, storage and use are comparatively cheap. Clean hydrogen is not currently an economically competitive fuel source, and it will not become competitive without massive investment in hydrogen infrastructure incentivized by the federal government and individual states.

LEGISLATIVE FIXES

In order to create a viable, sustainable, and competitive hydrogen ecosystem in the U.S., the following two legislative fixes must be put in place:

1. Clear, robust legislation that provides a regulatory framework for the development of infrastructure for the production, transportation, and storage of clean hydrogen.
2. Hydrogen technology to be included in President Biden's infrastructure plan.

Legislation for a hydrogen economy

New, hydrogen-specific legislation must be passed in order to ensure that a hydrogen economy is regulated in a cohesive, comprehensive manner. Additionally, ultimate regulatory authority must be vested in an agency with relevant experience and expertise in the regulation of both pipelines and renewable energy more generally, e.g. the Federal Energy Regulatory Commission. Centralized regulatory authority will streamline the decision-making process and allow for easier adoption and implementation of rules, which will minimize both regulatory hurdles and barriers to entry.

In addition to the measures mentioned above, the legislation must not only passively create the regulatory framework for clean hydrogen projects to exist, it must also proactively incentivize the adoption of clean hydrogen as a fuel source for automotive, industrial and energy applications. This will require the political willingness to move towards carbon neutrality at the federal and state levels by advancing tax credits and other financial incentives in order to make clean hydrogen economically competitive, similar to the boost such tax credits gave to the wind and solar industries.

Financial aids could go directly to producers or go farther down in the chain to suppliers and service providers (for hydrogen pipeline construction, storage, investment in gigawatt scale electrolyzer production, etc) in order to reduce CAPEX and OPEX of clean hydrogen production, or both.

One proposed first step is the Clean Energy Hydrogen Innovation Act (the **Clean Hydrogen Act**). The Clean Hydrogen Act would expand the scope of hydrogen projects that are eligible for loan guarantees from the Department of Energy Loan Programs Office to finance hydrogen-related projects in the areas of production, delivery, infrastructure, storage, fuel cells, and midstream and downstream uses, including industrial and residential applications and

power projects. It would also require the Secretary of Energy to submit a report outlining the status of projects granted loan guarantees, the statutory and regulatory barriers to the expansion of hydrogen infrastructure, the commercialization of hydrogen, and recommendations to expand hydrogen infrastructure and advance hydrogen technologies, among other things.

Passage of the Clean Hydrogen Act is by no means certain, and it does not go far enough to make hydrogen an economic imperative. If passed, however, the Act would signal the first concrete steps at the federal level to establish and incentivize hydrogen infrastructure and regulation in the U.S.

President Biden's infrastructure plan

On March 31, the Biden Administration formally presented its infrastructure plan, the American Jobs Plan, which specifically includes clean hydrogen projects designed to advance the Administration's goals to promote clean energy and create jobs.

The American Jobs Plan seeks funding to invest \$15 billion in demonstration projects for climate research and development priorities intended to strengthen U.S. technological leadership in these areas in global markets, including 15 decarbonized hydrogen projects in distressed communities with a new production tax credit.

This type of executive support for clean hydrogen innovation, alongside robust legislation, will play a key role in hydrogen's marketability as a source of clean energy and the bankability of hydrogen-related infrastructure projects. Although the funding of demonstration projects alone will not greatly advance the development of a U.S. hydrogen economy in the near term, the Biden Administration's willingness to advance tax credits and consider other financial incentives, such as Master Limited Partnerships used in the oil and gas sector, would play the most significant role in making clean hydrogen economically competitive.

If the Biden infrastructure plan, which is lofty in ambition, can help bridge the political and cultural gap in the U.S. and help unite the federal government and states to tackle the challenges posed by climate change, it could lead to future legislation that will be needed to regulate and incentivize the large investments necessary to develop clean hydrogen projects and infrastructure. Until then, hydrogen in the U.S. will move forward in fits and starts with projects developed by a mix of environmentally conscious companies, utilities, financial investors and states who may be able to create regional clean hydrogen economies.

ABOUT

Focus on Hydrogen is a Clifford Chance briefing series covering hydrogen-related developments globally. 1.008 is the standard atomic weight of hydrogen.

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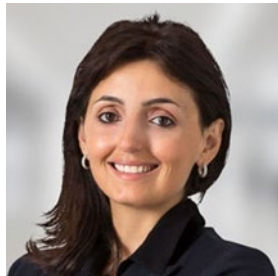
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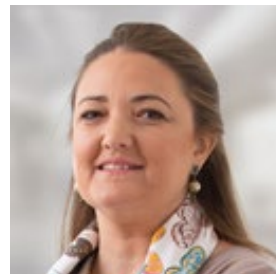
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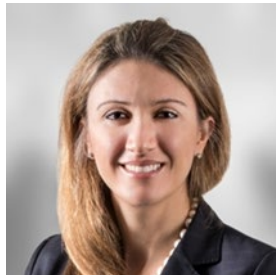
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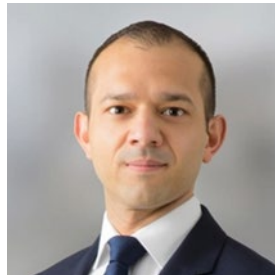
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