BRACEWELL

INSIGHTS

# Infrastructure Investment and Jobs Act: Accelerating the Deployment of Hydrogen

November 17, 2021

*By: **Austin T. Lee**, **Brian P. Teaff** **Timothy A. Wilkins***

On November 15, 2021, President Biden signed into law the Infrastructure Investment and Jobs Act (commonly known as the Bipartisan Infrastructure Framework (BIF). The overall package is worth $1 trillion, and advances much of President Biden's economic agenda, ranging from traditional roads and bridges projects to broadband access and investments in energy infrastructure. A significant portion of this funding is directed to the Department of Energy to advance clean energy technologies—including $9.5 billion in funding intended to accelerate the development of clean hydrogen technology across various value chains of the hydrogen economy.

**Summary of BIF Clean Hydrogen Programs**

Recognizing the opportunities for hydrogen to support the clean energy transition, the BIF includes several programs to accelerate clean hydrogen production, transportation and use across multiple regions of the United States and ensure a strategic and thoughtful approach to the buildout and investment in hydrogen infrastructure.

**Regional Clean Hydrogen Hubs**

Under the BIF, $8 billion is being provided to support the development of at least four clean hydrogen hubs across the United States in order to further development with respect to the production, processing, delivery, storage, and end-use of clean hydrogen. The Regional Clean Hydrogen Hubs program includes diversity requirements for feedstock, end-use, and geography. Under the feedstock diversity requirement, there must be at least one hub that can produce hydrogen from fossil fuels, at least one hub for hydrogen produced from renewable energy, and at least one hub for hydrogen produced from nuclear energy. Under the end-use diversity requirement, at least one hub must demonstrate hydrogen use in power generation, at least one hub must demonstrate hydrogen use in the industrial sector, at least one hub must demonstrate hydrogen use in residential and commercial heating, and at least one hub must demonstrate hydrogen use in transportation. Finally, the geographic diversity requirement will result in the location of at least two hubs in regions of the US with the greatest natural gas resources.

Recognizing the value of the Regional Clean Hydrogen Hubs program, Congress has directed the Department of Energy (DOE) to act quickly. DOE is required to solicit proposals for hubs within 180 days of enactment and select at least four regional hubs within one year of the application submission deadline.

**Clean Hydrogen Research and Development Program**
This program re-establishes and expands the DOE's hydrogen office. This will allow the DOE to expand the scope of their hydrogen research and development for the demonstration and commercialization of clean hydrogen production, processing, delivery, and end-use technologies.

**Clean Hydrogen Electrolysis Program**
This program is intended to decrease the cost of clean hydrogen production from electrolyzers. This program authorizes $1 billion for the demonstration, commercialization, and deployment of electrolyzer systems.

**Clean Hydrogen Strategy and Roadmap**
The BIF directs the development of the first US national strategy and roadmap to facilitate a clean hydrogen economy.

**Clean Hydrogen Manufacturing and Recycling**
This program provides $500,000,000 to support a clean hydrogen domestic supply chain. Research, development, and demonstration projects will advance new clean hydrogen production, processing, delivery, and storage, and will use equipment manufacturing technologies to increase the reuse and recycling of hydrogen technologies.

**Clean Hydrogen Production Qualification and Definition**
This section directs the DOE Secretary, in consultation with EPA Administrator and input from stakeholders, to develop a clean hydrogen production carbon intensity standard. Under this standard, the term “clean hydrogen” will mean hydrogen produced with a carbon intensity equal to or less than 2 kilograms of carbon dioxide-equivalent produced at the site of production per kilogram of hydrogen produced (kg-CO2/kg-H2). Notably, this “site of production” analysis for a carbon intensity calculation does not require that carbon intensity impacts from inputs upstream or downstream from the point of production be included in the calculation. The standard is to support clean hydrogen production from a range of sources, including fossil fuels with carbon capture, utilization, and sequestration; hydrogen-carrier fuels (including ethanol and methanol); renewable energy resources, including biomass; and nuclear energy. Additionally, this standard must take technological and economic feasibility into consideration and be adjusted after five years.

**Additional Programs Providing Support for Hydrogen**
In addition to the hydrogen programs above, the BIF also provides significant spending for several initiatives that may benefit and support hydrogen and fuel cell development. These initiatives include:

- Congestion Mitigation and Air Quality Improvement Program,
- Grants for charging and fueling infrastructure,
- Transportation Electrification,
- Low or No Emission Vehicle Program,

- Department of Energy Loans,
- Grid Infrastructure, Resiliency, and Reliability Grant Program,
- Technologies to enhance grid flexibility, and
- Energy Storage.

**Implementation: Considerations for Hydrogen Infrastructure Projects**

As the Department of Energy begins to implement the clean hydrogen programs under the BIF, there are a number of takeaways to consider, including the various options for structuring these clean hydrogen projects and how to ensure that any hydrogen produced qualifies as "clean hydrogen."

**Project Structures**

Hydrogen projects involve an interdependent combination of infrastructure, processes and technologies that are used to produce, capture, transport, store and/or utilize hydrogen. As such, any hydrogen project will require a tailored set of contractual arrangements between the various project participants, which allow for the integration of these processes and address the various risks that each participant is exposed to by virtue of its participation in the project. Additionally, each project structure will need to take into consideration the goals of a potentially diverse set of investors who can range from tax equity investors and sponsoring governmental agencies to the base project owners and their capital providers. While many of these arrangements will utilize common equity level joint venture structures to bind project participants, additional aspects (both at the project level and based on the nature of the hydrogen economy as it sits today) will need to be addressed.

At the project level, each project will present a myriad of issues that participants and their legal counsel will need to address and structure around. Many of these considerations will be unique to the project itself and will be driven by the profile of the specific participants in the project, the investment goals of those financing or investing in the project, the geographic area where operations will take place, or the different operational processes within the hydrogen value chain that the project will involve. This will require developing project structures that balance and allocate risks associated with process-specific operational and reliability issues (such as intermittency of a gas processing plant or industrial facility) and regulatory compliance requirements (such as infrastructure and facility qualifications with respect to tax credits and other regulatory based incentives) with the underlying assumptions on which the project was underwritten. It also will be important to work with legal counsel and other advisors who have experience working with governmental entities, as numerous state law and political concerns will have to be addressed.

On a more general level, despite the recent momentum that we have seen for hydrogen, the hydrogen sector's role in the current energy transition is still in its infancy. This is especially true in the United States where legislation and other governmental incentives are just now starting to become a reality. Governmental entities (especially those that oversee centralized infrastructure such as ports, transit authorities, and airport and highway systems) offer unique opportunities for the hydrogen sector to build out projects that have the scale that is necessary to support the economics required by underwriters and investors.

Further, obtaining investor support and governmental funding from incentives offered under current (and future) legislation, as well as garnering the support of local communities impacted by planned hydrogen projects, will likely require a more concerted effort and collaboration by project participants with both governmental entities and other sustainability-focused stakeholders. As such, in many instances project participants may form (or partner with) a non-profit entity to garner support for hydrogen projects and to interface with governmental authorities or other non-profits and community representatives in which the projects are planned to be located. In addition, while the BIF does not create a new category of tax-exempt private activity bonds specifically for hydrogen projects (as it does for certain carbon capture facilities), the increased interaction between the private and public sectors may nevertheless invite financing opportunities to reduce the cost of project capital.

**Qualified "Clean Hydrogen"**

Qualification for many of the opportunities provided by the BIF will depend on whether an activity involves "clean hydrogen," defined as "hydrogen produced with a carbon intensity equal to or less than 2 kilograms of carbon dioxide-equivalent produced at the site of production per kilogram of hydrogen produced." Within six months after enactment of the BIF, the Department of Energy, in consultation with EPA, is directed to establish a "standard" for measuring that carbon intensity in the context of hydrogen production. Nuances in terms of what carbon or other GHG emissions will be included in the carbon intensity calculation, along with the possible availability of any qualifying offsets or mitigation (e.g., blue hydrogen production involving carbon capture and sequestration) will be determinative as to eligibility under the legislation. Companies considering participating in clean hydrogen projects that may be eligible for benefits under the legislation should inventory the existing and potential technologies and attributes of their hydrogen production efforts and closely track and participate to the extent possible in the development of the DOE standard to better help ensure their eligibility.

These considerations are just the start. As the hydrogen economy expands, so too will the project and development considerations, ranging from transportation services, financing, and end use regulation.