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# PRATT'S ENERGY LAW REPORT

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**Hydraulic Fracturing Developments**
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# Hydrogen Gets a Lift in Federal Infrastructure Act

***By Laurie B. Purpuro and David L. Wochner****

*The authors review the new hydrogen programs in the Infrastructure Investment and Jobs Act.*

On November 5, 2021, the U.S. House of Representatives passed the Infrastructure Investment and Jobs Act ("IIJA"), a/k/a the "infrastructure package," by a vote of 228 to 206. Six Democrats voted against the bill, but 13 Republicans voted for it, providing the votes needed for it to pass. The Senate had passed the bill on August 10, and President Biden signed the bill into law on November 15.

The bill includes significant programming for hydrogen, including funding to build out new charging and fueling infrastructure that includes hydrogen fuel cells; language directing the Department of Energy ("DOE") to "develop a national strategy and roadmap to facilitate wide-scale production, processing, delivery, storage, and use of clean hydrogen"; funding for research and development ("R&D") related to clean hydrogen manufacturing and recycling; and funding for electrolysis demonstrations and for four regional clean hydrogen hubs to "demonstrate the production, processing, delivery, storage, and end-use of clean hydrogen."

The Department of Transportation ("DOT") and the DOE have begun issuing Requests for Information ("RFI") and holding webinars to outline the path forward for the hydrogen provisions in the bill.

Each of the new hydrogen programs is discussed in more detail below.

## CHARGING AND FUELING INFRASTRUCTURE GRANTS

The bill authorizes $2.5 billion from the Highway Trust Fund over five years for a new grant program for charging and fueling infrastructure as follows:

- $300,000,000 for fiscal year 2022;
- $400,000,000 for fiscal year 2023;
- $500,000,000 for fiscal year 2024;

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- $600,000,000 for fiscal year 2025;
- $700,000,000 for fiscal year 2026.

The Highway Trust Fund is funded mainly by federal gas and diesel taxes. Since the charging and fueling infrastructure grants are funded by the Highway Trust Fund, the program can move forward immediately without going through the appropriations process.

Grants will be for charging and fueling infrastructure, including hydrogen fueling infrastructure, that is publicly accessible along major national highways that the DOT is to designate within 180 days of enactment of the bill (mid-May). The bill requires the DOT to establish a recurring process for updating and redesignating corridors.

The deadline for the DOT to establish the grant program is one year following enactment of the bill (mid-November 2022). Before then, the DOT, along with the DOE, will develop guidance for this new grant program. To assist with guidance development, the Federal Highway Administration ("FHWA") at the DOT issued an RFI, inviting the public to provide comments, noting that they are "especially interested in comments suggesting ways that the guidance could promote equity in the deployment of EV charging infrastructure."

Entities that are eligible to receive grants under this program are:

- States or political subdivisions of states;
- Metropolitan planning organizations;
- Units of local government;
- Special purpose districts or public authorities with a transportation function, including port authorities;
- Indian tribes;
- Territories of the United States;
- Authorities, agencies, or instrumentalities of, or entities owned by, one or more entities described above; and
- A group of entities described above.

The entities listed above are expected to contract with a private entity for the acquisition and installation of publicly accessible hydrogen fueling infrastructure, and other charging and fueling infrastructure, for charging or fueling vehicles.

Grants will be provided to applicants on a competitive basis, and while the DOT will develop guidance for the grant program, the bill outlines some information that should be included in any proposal, including a description of

how the organization seeking a grant has considered public accessibility of the proposed infrastructure; real-time public information about the infrastructure; "payment methods that ensure secure, convenient, fair, and equal access"; information about the applicant's collaboration with stakeholders including auto manufacturers, utilities, infrastructure providers, metro planning organizations, states, fleet managers, and others; the long-term operation and maintenance of the equipment; and an assessment of the estimated emissions reduction expected through the use of the charging or refueling infrastructure using a tool called the Alternative Fuel LifeCycle Environmental and Economic Transportation ("AFLEET").

In selecting grant awardees, the DOT is instructed in the bill to consider to what extent the application would, among other things, meet market demands for fueling infrastructure; provide access to charging or refueling infrastructure in areas of need; accelerate construction of charging or fueling infrastructure that would be unlikely to be completed without federal assistance; deploy charging or hydrogen fueling infrastructure for medium- and heavy-duty vehicles in proximity to intermodal transfer stations; and ensure, to the maximum extent practicable, geographic diversity among grant recipients.

Awardees may use a portion of grant funds for operating assistance for the first five years of operation following installation, while the facility transitions to operate independently.

## COMMUNITY GRANTS

Fifty percent of the funding above will be used for community grants, which will be capped at $15 million each, and the federal share shall not exceed 15 percent of the total project. These grants will be provided to government entities listed above to fill in the gaps in charging and fueling infrastructure. Community grants can be used to locate charging and fueling infrastructure on public spaces, including public roads, buildings, parking facilities, public schools, and public parks. The legislation directs the secretary of transportation to give priority consideration to projects in rural areas, low- and moderate-income neighborhoods, and communities with a low ratio of private parking spaces to households or a high ratio of multiunit dwellings to single-family homes.

## APPALACHIAN REGIONAL ENERGY HUBS

The IIJA gives the Appalachian Regional Commission the authority to provide grants, technical assistance, and other funding to individuals or entities in the Appalachian region for a variety of energy-related projects, including establishment of a regional energy hub in the Appalachian region for natural gas and natural gas liquids including hydrogen produced from the steam methane

reforming of natural gas feedstocks. Senator Manchin (D-WV), chair of the Energy and Natural Resources Committee, is very supportive of hydrogen, and this provision would support production of hydrogen from natural gas reforming, a process that currently produces over 90 percent of U.S. hydrogen.

Generally, grants will be capped at 50 percent of the cost of the project. But grants for projects or activities carried out in a county with a distressed county designation will be capped at 80 percent. For those in a county for which an at-risk county designation is in effect, funds will be capped at 70 percent of the project cost. The bill provides $5 million per year from 2022 through 2026 for this program.

**CLEAN HYDROGEN RESEARCH AND DEVELOPMENT PROGRAM**

The bill expands the existing hydrogen program at the DOE, setting a number of goals for the department, including demonstrating and commercializing technologies for the use of clean hydrogen in the transportation, utility, industrial, commercial, and residential sectors; and demonstrating a standard of clean hydrogen production in those sectors by 2040. The bill also addresses the use of hydrogen to enhance sources of fossil fuels with carbon capture, utilization, and sequestration; renewable fuels; biofuels; and nuclear energy.

The DOE is directed to work with the private sector to develop a schedule of hydrogen cost goals and accelerate the production of clean hydrogen from a number of energy sources, including fossil fuels with carbon capture, utilization, and sequestration; renewable biomass; hydrogen-carrier fuels like ethanol and methanol; and nuclear energy. In addition, the bill directs the DOE to work with the private sector to advance the use of clean hydrogen for commercial, industrial, and residential electric power generation and in industrial applications including steelmaking, cement, chemical feedstocks, and process heat.

The hydrogen R&D program will also focus on the safe and efficient delivery of hydrogen or hydrogen carrier fuels, including transmission by pipelines, tanks, and other distribution methods. In addition, the program is to advance the convenient and economic refueling of vehicles, locomotives, maritime vessels, and planes.

The list of priorities for the hydrogen R&D program includes the storage of hydrogen or hydrogen-carrier fuels; the development of safe, durable, affordable, and efficient fuel cells; and the development of appropriate, uniform codes and standards for the safe and consistent deployment and commercialization of clean hydrogen production, processing, delivery, and end-use technologies.

Within 180 days of enactment of the IIJA, the DOE is directed to establish a timeline for challenge targets that the program will aim to address.

The bill provides $500 million in appropriations, split evenly over five years from 2022 through 2026.

**REGIONAL CLEAN HYDROGEN HUBS**

A much-discussed new program in IIJA is the Clean Hydrogen Hubs program. The bill includes $8 billion in appropriations, divided evenly over five years from 2022 through 2026 ($1.6 billion/year for five years).

The Clean Hydrogen Hubs program will be administered by the DOE and is described in the bill as a network of clean hydrogen producers, potential clean hydrogen consumers, and connective infrastructure located in close proximity.

The bill authorizes the secretary of energy to establish this program, which will support a minimum of four regional clean hydrogen hubs. These hubs are to help the DOE achieve goals they will set for meeting established challenges in order to accelerate deployment of a hydrogen economy. In addition, the DOE will choose hubs that ultimately can be developed into a national clean hydrogen network.

Within 180 days of IIJA's enactment (mid-May), the DOE will solicit proposals for the clean hydrogen hubs. And within one year after the deadline for the submission of proposals, the DOE is directed to select at least four regional clean hydrogen hubs.

The bill mandates that the hubs will have diverse feedstocks for the production of hydrogen: at least one hub shall demonstrate clean hydrogen production from fossil fuels; at least one will demonstrate clean hydrogen production from renewable energy; and at least one will demonstrate clean hydrogen production from nuclear energy.

The bill also mandates diversity in the end use of the hydrogen produced by the hubs. At least one hub will demonstrate the end-use of clean hydrogen in the each of the following sectors: electric power generation; industrial, residential, and commercial heating; and transportation.

Finally, the bill urges the secretary of energy, to the maximum extent possible, to select regional hubs in geographically diverse areas of the country where the hubs use energy resources abundant in those regions. The secretary is strongly encouraged to locate two hubs in areas of the United States with the greatest natural gas resources.

On December 8, 2021, the DOE's Hydrogen and Fuel Cell Technologies Office ("HFTO") held a webinar to discuss both its recently completed Hydrogen Shot RFI related to the agency's goal of getting to $1 per one kilogram of hydrogen in one decade (also referred to as 111), as well as its general approach on the Regional Clean Hydrogen Hubs. In particular the

HFTO noted that it will be launching "H2 Matchmaker," a new voluntary tool to facilitate the development of teams to "compete" in the $8 billion Regional Clean Hydrogen Hubs initiative. The goal of this tool is to "increase regional hydrogen project awareness and opportunities; foster partnerships and catalyze investments; and promote regional business development opportunities."

The tool is an interactive map, to be updated weekly, based on self-identification of hydrogen activities (including, e.g., hydrogen producers, consumers, transporters, and infrastructure operators). To be featured on the map, a stakeholder must fill out an online form.[1] The HFTO noted that all information submitted via the form will be publicly available, including contact information, details about the hydrogen activity at the site, and projections for future activities. Thus, stakeholders should not submit any confidential information.

## NATIONAL CLEAN HYDROGEN STRATEGY AND ROADMAP

The IIJA requires the DOE to develop a National Clean Hydrogen Strategy and Roadmap to help direct the agency's efforts to accelerate wide-scale production, processing, delivery, storage, and use of clean hydrogen. The DOE is instructed to provide the National Clean Hydrogen Strategy and Roadmap to Congress within 180 days of IIJA's enactment and update it every three years after that.

The bill directs the DOE to focus on developing a standard of hydrogen production, including interim goals; clean hydrogen production and use from natural gas, coal, renewable energy sources, nuclear energy, and biomass; and identifying potential barriers, pathways, and opportunities to transition to a clean hydrogen economy. The roadmap also will address economic opportunities for the production, processing, transport, storage, and use of clean hydrogen that exist in major U.S. shale natural-gas producing regions and merchant nuclear power plants operating in deregulated markets. In addition, the roadmap will tackle environmental risks associated with potential deployment of clean hydrogen technologies in those regions and ways to mitigate those risks.

## ELECTROLYSIS R&D

The IIJA creates a new DOE Clean Hydrogen Electrolysis Program focused on improving the efficiency, durability, and economics around hydrogen production using electrolyzers. The bill gives the DOE 90 days from enactment of the bill to establish the program, which, like many DOE programs, will fund R&D, demonstration, commercial applications, and deployment. The bill

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[1] https://www.energy.gov/eere/fuelcells/h2-matchmaker.

provides $1 billion in appropriations, divided evenly over five years, for grants and cooperative agreements, eligibility for which is to be determined by the secretary of energy.

The main goal of this program will be to reduce the cost of hydrogen production through electrolysis to less than $2/kilogram of hydrogen by 2026, an interim step on the way to the agency's Hydrogen Shot 111 goal, discussed above. And the bill directs the DOE to focus the program's work on improving the cost and efficiency of a variety of different electrolyzer technologies; production of domestic manufacturing of electrolyzers at a high volume; clean hydrogen storage technologies; technologies that integrate hydrogen production with clean hydrogen storage and transportation or stationary systems; and systems that combine hydrogen production with renewable or nuclear power generation.

## CLEAN HYDROGEN MANUFACTURING AND RECYCLING

Domestic clean energy manufacturing is a priority for the administration and Congress. To advance domestic manufacturing of clean hydrogen, the infrastructure bill authorizes the secretary of energy to award multi-year grants and enter into cooperative agreements, or other agreements for research, development, and demonstration projects to advance equipment manufacturing for clean hydrogen production, processing, delivery, storage, and use. Eligibility for funding and agreements is left to the DOE.

The legislation directs the DOE to prioritize grants and agreements for clean hydrogen equipment manufacturing projects that increase efficiency and cost-effectiveness of the manufacturing process. In addition, priority consideration is to be given to grants that support domestic materials and components supply chains; identify and incorporate nonhazardous alternative materials for components and devices; operate in partnership with tribal energy development organizations, Indian Tribes, Tribal organizations, Native Hawaiian community-based organizations, or territories or freely associated states; and are located in economically distressed areas of the major natural gas-producing regions of the United States.

The bill also establishes a recycling, research, development, and demonstration program focused on hydrogen recycling, through which the DOE is authorized to award multi-year grants, and enter into contracts, cooperative agreements, or any other agreements.

The program goal is to develop innovative and practical approaches to increase the reuse and recycling of clean hydrogen technologies, including by:

- Reducing costs of recovering raw materials from components, systems such as electrolyzers and fuel cells;

- Minimizing environmental impacts from the recovery and disposal processes;
- Addressing any barriers to the research, development, demonstration, and commercialization of technologies and processes for the disassembly and recycling of devices used for clean hydrogen production, processing, delivery, storage, and use;
- Developing alternative materials, designs, manufacturing processes, and other aspects of clean hydrogen technologies;
- Developing alternative disassembly and resource recovery processes that enable efficient, cost-effective, and environmentally responsible disassembly of, and resource recovery from, clean hydrogen technologies; and
- Developing strategies to increase consumer acceptance of, and participation in, the recycling of fuel cells.

## CLEAN HYDROGEN PRODUCTION QUALIFICATIONS

The IIJA authorizes the secretary of energy, after consulting with the administrator of the Environmental Protection Agency, and with input from stakeholders, including industry, to develop an initial standard for the carbon intensity of clean hydrogen production that shall apply to DOE clean hydrogen activities.

Clean hydrogen is defined in the infrastructure bill as "hydrogen produced with a carbon intensity equal to or less than two kilograms of carbon dioxide-equivalent produced at the production site per kilogram of hydrogen produced."

Within five years after the initial standard is developed, the secretary of energy, after consultation with the administrator of the Environmental Protection Agency along with input from stakeholders, including industry, shall determine whether the definition of clean hydrogen should be adjusted below the standard included above. The secretary of energy is given the authority to change the definition, if it is determined that the standard should be changed.

The standard shall apply to clean hydrogen production from renewable; fossil fuel with carbon capture, utilization, and sequestration technologies; nuclear; and other fuel sources.

## CLEAN SCHOOL BUSES AND FERRIES

This program, which will be administered by the Environmental Protection Agency ("EPA"), will provide grants and rebates for the replacement of existing school buses with clean and zero-emissions school buses, including hydrogen-

fueled school buses. Priority will be given to replacement in areas that are rural, low-income, Bureau of Indian Affairs-funded, and high need. The EPA has the discretion to determine whether the funding will be through a grant, a rebate, or a combination, and up to 100 percent of the replacement costs can be awarded.

Within 120 days of the bill's enactment, the EPA will develop an education and outreach program to promote and explain the award program, including workforce development and apprenticeship programs. Under this program, the DOE and the Energy Information Agency are directed to modify some existing surveys, analyses, and modeling systems to incorporate hydrogen. Funding is provided at $1 billion each year from 2022 through 2026.

The bill also establishes a pilot program at the DOT to provide grants for the purchase of electric or low-emitting ferries, including those fueled by hydrogen. At least one grant must go to a ferry service that serves the state with the largest number of Marine Highway System miles. (A little searching turns up Alaska as the state with most Marine Highway miles.) At least one grant must go to a bi-state ferry service with an aging fleet and whose development of zero- and low-emission, power-source ferries will propose to advance the state of the technology toward increasing the range and capacity of zero-emission power-source ferries. The clean ferry program is funded at $250 million divided evenly over five years from 2022 through 2026.

## PORT INFRASTRUCTURE DEVELOPMENT PROGRAM

The bill provides the existing DOT Port Infrastructure Development Program with $2,250,000,000, to remain available until September 30, 2036, and directs the DOT to provide port development grants to projects that improve resiliency of ports to address sea-level rise, flooding, extreme weather events, earthquakes, and tsunami inundation, as well as projects that reduce or eliminate port-related criteria pollutant or greenhouse gas emissions, including projects for hydrogen refueling infrastructure, for drayage, and medium- or heavy-duty trucks and locomotives that service the port and related grid upgrades. This is a significant amount of money and will add to federal efforts to decarbonize the marine industry.