



President Biden signed into law the Inflation Reduction Act (the Act) on August 16, 2022, which, among other things, uses the tax code to slow the effects of climate change by significantly investing in clean energy and reducing greenhouse gas emissions by 40% by 2030.

Key players in the energy space are already familiar with tax credits for traditional clean energy technologies such as wind and solar, which are the centerpiece of the climate and energy portions of the new law. But, in addition to supporting those technologies, the Act also includes incentives for clean hydrogen, building on existing efforts under the bipartisan Infrastructure Investment and Jobs Act (IIJA), passed in 2021. The tax credits are intended to encourage production and development of clean hydrogen technology and allow hydrogen manufacturers to play a significant role in decarbonizing the transportation, manufacturing, and electricity sectors.

The Act's Clean Hydrogen Incentives

The Act adds a new production tax credit for clean hydrogen produced after December 31, 2022. The production tax credits are calculated by multiplying an applicable percentage of \$0.60 (adjusted for inflation)—which is based on the life cycle greenhouse gas emissions of the facility—by the number of kilograms (kg) of "qualified clean hydrogen" a firm produces at a "qualified clean hydrogen facility" during each taxable year in a 10-year period, beginning on the date the facility was originally placed in service.

Alternatively, taxpayers may elect to claim the investment tax credit under Section 48(a) of the Internal Revenue Code (IRC) in lieu of the new production tax credit for investments in a "qualified clean hydrogen facility." The base credit is 6% multiplied by the investment in the qualified clean hydrogen facility, multiplied by an applicable percentage, which is 100% if the life cycle greenhouse gas emissions rate is less than 0.45 kg of carbon dioxide equivalent (CO₂e) per kg of hydrogen. The applicable percentages are adjusted downward based on the life cycle greenhouse gas emissions rate.

The applicable production tax credit percentages and investment tax percentages based on a facility's life cycle greenhouse gas emissions are set forth below:

| Life cycle Greenhouse Gas Emissions | Applicable PTC Percentage | Applicable ITC Percentage |
|--|----------------------------------|----------------------------------|
| Not greater than 4 kg of CO ₂ e/kg and not less than 2.5 kg of CO ₂ e/kg | 20% | 1.2% |
| Less than 2.5 kg of CO ₂ e/kg and not less than 1.5 kg of CO ₂ e/kg | 25% | 1.5% |
| Less than 1.5 kg of CO ₂ e/kg and not less than 0.45 kg of CO ₂ e/kg | 33.4% | 2.0% |
| Less than 0.45 kg of CO ₂ e/kg | 100% | 6.0% |

To jump-start manufacturing, a qualified clean hydrogen facility can qualify for *five times* the tax credit available under the law if construction of the facility begins before 60 days after the date that the Internal Revenue Service (IRS) publishes guidance implementing the clean hydrogen tax credit. If the facility begins construction after the IRS publishes guidance, then the taxpayer must meet labor, prevailing wage, and apprenticeship requirements in order to receive the multiplier. As a result, clean hydrogen could receive incentives as high as \$3.00 per kg of hydrogen produced.

Significantly, the Act includes a "direct pay option" by which taxpayers may elect to receive direct pay for tax credits established through clean hydrogen facilities pursuant to Section 45V. This is significant because such "direct pay options" have generally only been available to certain taxpayers, such as tax-exempt entities, state and local governments, and tribal governments, among others. However, with respect to tax credits established through clean hydrogen facilities, the Act extends direct pay to all taxpayers. The Act also authorizes taxpayers, alternatively, to monetize tax credits by transferring them to an unrelated third party.

What Are "Life Cycle Greenhouse Gas Emissions"?

The term "life cycle greenhouse gas emissions" has the same meaning as that under the federal Clean Air Act (CAA), 42 U.S.C. § 7545(o)(1), which means that manufacturers of qualified clean hydrogen will need to be well-versed in the U.S. Environmental Protection Agency's (EPA) rules, methodology, and practice for

calculating life cycle greenhouse gas emissions. The Act provides that life cycle greenhouse gas emissions only include emissions through the point of production, as determined by Argonne National Laboratory's Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies Model (GREET Model).

What Is "Qualified Clean Hydrogen"?

The law defines "qualified clean hydrogen" as "hydrogen which is produced through a process that results in a life cycle greenhouse gas emissions rate of not greater than 4 kg of CO₂e per kg of hydrogen." Clean hydrogen is typically manufactured using a process known as electrolysis, which is particularly energy intensive.

That means, as a practical matter for purposes of qualifying a clean hydrogen manufacturing facility for the production tax credits, the facility will need to be powered by renewable energy (which likewise will qualify for the production tax credits or investment tax credits under the law). Additional requirements for qualified clean hydrogen include that the clean hydrogen be manufactured in the United States "in the ordinary course of a trade or business of the taxpayer" for sale or use, and that the production be verified by an unrelated party.

What Is a "Qualified Clean Hydrogen Facility"?

A "qualified clean hydrogen production facility" must meet the following criteria:

- The facility must be owned by the taxpayer claiming the production tax credits or investment tax credit;
- The facility must produce qualified clean hydrogen; and
- The construction of the facility must begin before January 1, 2033.

Importantly, a taxpayer may not claim tax credits for clean hydrogen at any facility which includes carbon capture and sequestration equipment for which a credit is allowed under Section 45Q of the tax code.

Clean Hydrogen Under the Infrastructure Investment and Jobs Act

The Act builds on incentives for hydrogen manufacturing established in the IIJA, signed by President Biden on November 15, 2021.^[1]

The IIJA is intended, in part, "to advance research and development to demonstrate and commercialize the use of clean hydrogen in the transportation, utility, industrial, commercial, and residential sectors" and "to demonstrate a standard of clean hydrogen production in the transportation, utility, industrial, commercial, and residential sectors by 2040." The program focuses on "factors that are common to the development of hydrogen infrastructure and the supply of vehicle and electric power for critical consumer and commercial applications," and, notably, contemplates "widespread use of distributed [hydrogen] electricity generation and storage." The IIJA includes \$8 billion for regional clean hydrogen hubs that will create jobs to expand use of clean hydrogen in the industrial sector; \$1 billion for a clean hydrogen electrolysis program to reduce costs of hydrogen produced from clean electricity; and \$500 million for clean hydrogen manufacturing and recycling initiatives to support equipment manufacturing and strong domestic supply chains.

Hydrogen Manufacturing in the United States

Hydrogen manufacturing is already booming in the United States. As of 2020, the U.S. hydrogen economy was expected to "lead to an estimated \$750 billion per year in revenue and a cumulative 3.4 million jobs," and the industry has recently seen a surge in investment in large-scale hydrogen projects in multiple regions. Such investments include hydrogen production, storage, and end use in: (1) turbines through the \$1 billion Advanced

Clean Energy Storage project in Utah, (2) a 5 megawatts (MW) electrolyzer project planned in Washington state, (3) a 20 MW electrolyzer plant to produce hydrogen from solar power in Florida, and (4) first-of-a kind nuclear-to-hydrogen projects in multiple states. [2]

Illinois recently established a Hydrogen Economy Task Force composed of state elected officials and agency representatives.[3] The task force is scheduled to report by December 1, 2022, its progress as it pertains to, among other tasks: (1) establishing a plan to create, support, develop, or partner with a hydrogen hub in the state; (2) determine how to maximize federal financial incentives to support hub development; and (3) identify opportunities to integrate hydrogen in the transportation, energy, industrial, agricultural, and other sectors.

Permitting and Development Issues

The benefits and tax credits established by the Act are a significant step forward in the development of clean hydrogen in the United States. However, in addition to tax incentives, developers also need regulatory and permitting certainty for clean hydrogen manufacturing facilities.

The Federal Energy Regulatory Commission (FERC), the Pipeline and Hazardous Materials Safety Administration (PHMSA), the U.S. Department of Energy (DOE), and the EPA, as well as their state and local counterparts, will likely have a role to play in evaluating the siting, construction, and operation of clean hydrogen manufacturing facilities. A clear permitting pathway at the local, state, and federal levels is essential to ensure that developers have the regulatory certainty needed to unlock the benefits of the Act for the clean hydrogen manufacturing sector.

Conclusion

The Biden administration has adopted an "all of the above" clean energy strategy to reduce greenhouse gas emissions, which includes significant incentives for developing clean hydrogen infrastructure in the United States. Energy companies and investors should carefully review IRS and DOE guidance implementing the clean hydrogen provisions of both the Act and the IJA to ensure they are able to take full advantage of those incentives when implementing their hydrogen infrastructure projects. And, developers should continue to play an active role in the development of any new regulatory regime to address the siting and location of clean hydrogen manufacturing facilities and related infrastructure.

Endnotes

[1] 42 U.S.C. § 16151 et seq.

[2] U.S. Dep't of Energy, Department of Energy [Hydrogen Program Plan](#) at 4 (Nov. 2020) (hereinafter "DOE Hydrogen Program Plan").

[3] 20 Ill. Comp. Stat. § 4122.

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