King & Spalding
Client Alert

Energy

Field Guide to Clean Hydrogen

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Hydrogen is a key ingredient in any country's future energy plans. In the United States, the hydrogen sector is on the launch pad, ready for lift-off. However, its trajectory hinges on a critical question: what criteria will be used to define the term "clean hydrogen"?

"Clean" is not synonymous with "green" when talking about hydrogen, although the terms have significant overlap and even government officials often use them interchangeably. In broad terms, references to "clean hydrogen" refer to hydrogen produced using zero or low carbon methods. However, there is no consensus on the correct methodology for attributing carbon to hydrogen production, and this has sparked intense debate.

The stakes are high because the "clean hydrogen" label is the key to securing a broad array of federal government benefits and subsidies. The Bipartisan Infrastructure Law (**BIL**) enacted in 2021 and the Inflation Reduction Act of 2022 (the **IRA**) both established multiple clean hydrogen focused incentives. However, neither act provides a complete definition for "clean hydrogen."

Lack of a comprehensive statutory definition for clean hydrogen has left the task to the federal government's administrative agencies. The first comprehensive definition is expected to be issued not by the Department of Energy (**DOE**), but by the Department of the Treasury and the Internal Revenue Service (**IRS**). This is because one of the IRA's key hydrogen tax subsidies specifically requires the issuance of guidance on how to account for carbon intensity by the middle of August 2023.

The imminent issuance of a definition of clean hydrogen for tax purposes has drawn a potentially unprecedented amount of attention and lobbying. What should be a "sleepy issue" has instead "fueled an extraordinarily public advertising blitz aimed at influencing the Biden administration and public opinion."[1] This is an intensely political issue surrounding the federal government's energy policy, yet it rests on the shoulders of tax officials.

This intense debate over carbon accounting highlights an important facet of the clean energy debate: what does it really mean to be "clean",

particularly when accounting for electricity consumption? This is not primarily a "molecules versus electrons" debate, although there is obviously an element of that being introduced from some quarters.[2] Companies devoted solely to hydrogen sit on all sides of this debate.

The forthcoming IRS and Treasury guidance is unlikely to be the final word on what it means to be clean where hydrogen is concerned, but it should provide a sense of direction. The government agencies face a difficult choice. Broad standards for counting carbon intensity of hydrogen production would include indirect emissions and other criteria, thus taking more potential carbon into account and reducing the scope of hydrogen production methods qualifying for tax subsidies. Targeted standards would have the opposite effect: by focusing on the production element, it should increase the potential supply of hydrogen labeled clean. The choice of methodology should not be driven by revenue considerations but rather by what IRS and Treasury believe is in line with Congressional intent for the specific provision in the IRA.

This client alert serves as a field guide to the issues around the definition of clean hydrogen. It does not argue for any particular position, but merely serves as a guide to understanding the problems the federal government faces in trying to provide a workable definition.

HYDROGEN PRIMER

The clean hydrogen concept is not limited to the United States. Governments around the world are actively encouraging the adoption of hydrogen because of its potential for use in a broad range of applications, across virtually all sectors—transportation, commercial, industrial, residential and portable. Its capability as a long-duration energy storage medium is seen as further enabling uptake and use of intermittent renewable energy technologies. Moreover, the potential to export hydrogen could enhance energy security around the globe.

Hydrogen can be produced from a range of resources including fossil fuels, nuclear energy, biomass and renewable energy sources. Hydrogen is often classified into colors based on the method of production. The most common color classifications are Green, Gray, Blue and Pink.[3] Although commonplace, the color scheme is not standardized and generally does not have any legal effect.[4]

Most hydrogen produced today is Gray with Blue hydrogen currently a distant second. Gray hydrogen is commonly used to make ammonia used in fertilizer, in gasoline production and in the manufacture of similar industrial products. It is universally considered not to be low carbon. Green hydrogen production is not expected to exceed 1 percent of total US hydrogen production for 2023. Whereas Gray hydrogen is relatively inexpensive, Green hydrogen is not currently cost competitive and Blue hydrogen sits in between the two in terms of cost per kilogram.[5]

Green and Pink hydrogen are sometimes referred to as "electrolytic" hydrogen because both use electrolyzers to produce hydrogen. Low carbon hydrogen can be produced using electricity generated from renewable resources (e.g., solar, wind and hydro generation) or nuclear power supplied to an electrolyzer which splits water into hydrogen and oxygen. Blue hydrogen can also qualify as low carbon hydrogen depending on the amount of carbon capture involved.

The European Union (**EU**) has adopted a detailed set of provisions providing a definitional framework for low or zero carbon hydrogen production, called "renewable fuels of non-biological origin" (**RFNBO**). This framework applies equally to production projects located in the EU as well as export projects selling to the EU seeking to qualify their production for the RFNBO quotas. The EU adopted a "three pillars" approach which focuses on the source of electricity used in the

hydrogen production process (in the EU, the electricity for RFNBO production must be from renewable energy sources). The three pillars are:

1. **Additionality**: requiring that any sources of clean power that supplies an electrolyzer be 'new' so that pre-existing clean electricity supply is not diverted to generate hydrogen;[6]
2. **Regionality**: requiring electrolyzers be located in the same region ("bidding zone" in EU parlance) as the clean electricity supply source to prevent the purchase of clean energy produced in one community while increasing pollution in another community; and
3. **Temporal Matching**: requiring matching of timing of the generation of clean electricity and its consumption by the electrolyzer to the same one-hour period.

The EU approach outlined above is directly binding on EU Member States with no local implementation legislation required. Critically, Green hydrogen generally is excluded from RFNBO status where the grid-transmitted electricity used to produce the hydrogen has benefited from state aid, which includes subsidies, feed-in-tariffs and tax subsidies for the clean electricity generation asset of the type provided by the IRA. Further, Pink hydrogen is not eligible for RFNBO status. A more detailed discussion of the EU approach can be found **here**.

US LEGAL FRAMEWORK

The federal government has a statutory mandate to accelerate the role of hydrogen in the economy. The BIL and IRA established multiple grants, incentives and subsidies intended to support the production of clean hydrogen. The combination of these two pieces of legislation constitutes arguably the most generous government support for hydrogen available anywhere in the world.

The BIL authorizes over $1 trillion for transportation and infrastructure spending, with $550 billion of that going toward new investments and programs. The BIL appropriated approximately $62 billion to the Department of Energy (**DOE**), of which $9.5 billion was explicitly identified for hydrogen focused programs.[7] Hydrogen will also benefit over time from other BIL incentives focused on clean energy/transportation.

The IRA includes tax subsidies for hydrogen production, storage and utilization. The IRA's clean hydrogen production tax credit (**Hydrogen PTC**) of up to $3 per kilogram of hydrogen is the cornerstone of the legislation's hydrogen incentives and is described in more detail below. Other hydrogen related provisions of the IRA are discussed **here**.[8]

The DOE released the U.S. National Clean Hydrogen Strategy and Roadmap (the **Hydrogen Roadmap**) in June 2023. The Hydrogen Roadmap summarizes the current state of hydrogen use in the United States and outlines strategies intended to encourage hydrogen's adoption as an effective decarbonization tool. The DOE estimates that global scaling of clean hydrogen has the potential to generate $2.5 trillion in annual revenues and 30 million jobs globally, along with helping to achieve a 20 percent reduction in global emissions by 2050.

The Hydrogen Roadmap reiterated the DOE's support for its Hydrogen Energy Earthshot, which aims to reduce the cost of clean hydrogen by 80 percent to $1 per kilogram within one decade. The Hydrogen Roadmap is discussed in more detail **here**.

The Hydrogen Roadmap highlights the potential benefits of the Hydrogen PTC in helping to spur hydrogen adoption on a broader scale. For example, breakeven timing for key projects such as green steel production and hydrogen fueled

heavy-duty trucking could be accelerated by more than a decade due to the availability of the maximum $3 per kilogram tax credit. It is difficult to see the Hydrogen Earthshot succeeding without this subsidy's widespread availability.

HYDROGEN PTC

The Hydrogen PTC provides up to $3 for each kilogram of "qualified clean hydrogen." Any hydrogen produced at a qualifying facility that has a carbon intensity rate of 4 kg CO2e per kg of hydrogen or less is statutorily defined as clean hydrogen.[9] The Hydrogen PTC is generally effective for hydrogen produced from facilities placed in service after January 1, 2023 and before January 1, 2033. The credit is available for 10 years from the qualifying placed in service date.[10]

The credit has four tiers of credits available depending on the carbon intensity of the process used to generate the hydrogen. The full $3/kg credit is available for hydrogen whose production results in lifecycle greenhouse gas emissions that fall below 0.45 kilograms CO2e per kg of hydrogen.[11] The credit will be adjusted annually for inflation. The credit is not available for hydrogen production where the production facility also claims the Section 45Q carbon sequestration tax credit, thus forcing producers of Blue hydrogen to choose which tax credit is more economically beneficial.

The "credit stacking" concept is critical to understanding the full benefits of the Hydrogen PTC. The IRA explicitly permits taxpayers to claim clean electricity production tax credits for renewable and nuclear energy while also claiming the Hydrogen PTC from the use of that electricity.[12] Stacking significantly increases the value of the available subsidies for clean hydrogen. As noted above, tax or other subsidies for the generation of grid-transmitted electricity used to create clean hydrogen generally preclude that hydrogen from qualifying as clean hydrogen under the EU's RFNBO standard. Any hydrogen production in the United States using grid power for all or part of the hydrogen production process is likely to be treated as non-clean hydrogen under the EU's standard. However, the Hydrogen PTC by itself is not an impermissible subsidy.

The IRA's definition of carbon intensity (i.e., lifecycle greenhouse gas emissions associated with hydrogen production) is incomplete. The Hydrogen PTC's statutory definition conveys an air of scientific precision by referring to the Argonne National Laboratory's GREET Model.[13] However, in its notice of proposed rulemaking for the Hydrogen PTC (the **Notice**), the IRS solicited comments on a number of key issues that illustrate the ambiguities inherent in the statutory definition and the need for a compressive definition.[14] Relevant questions raised by the Notice include:

- which specific steps and emissions should be included within the well-to-gate system boundary;
- to what extent should the DOE's CHPS (defined below) be taken into account for tax purposes;
- what granularity of time matching (that is, annual, hourly, or other) of energy inputs should be required; and
- should indirect book accounting factors that reduce a taxpayer's effective greenhouse gas emissions (also known as a book and claim system) when calculating the Hydrogen PTC?

The Notice generated significant attention from industry groups, individual industry participants, coalitions of state legislators and even environmental groups. Although most of the attention has focused on clarifying the rules for Green hydrogen, the answers to some of those questions could impact all hydrogen production in the United States, no matter the color.[15]

THE HARD PROBLEM

The IRS and Treasury face a difficult job in defining carbon intensity for Hydrogen PTC purposes. This issue has drawn broad attention and commentary, which is highly unusual if not unprecedented. Both sides naturally claim that their position is consistent with Congressional intent. Any definition promulgated by the IRS and Treasury will likely upset a large and vocal set of constituents.

The technical issues involved are outside of the IRS' and Treasury's areas of expertise. While the Section 45Q tax credit for CCS requires a lifecycle assessment report, this report is to be reviewed by the IRS and DOE, in consultation with the Environmental Protection Agency.[16] Perhaps the IRS and Treasury can similarly defer to the expertise of the DOE in making these difficult judgements, but that would mean DOE willingly accepts the role as final arbiter on this controversial issue.

The DOE faces its own pressures on developing a regulatory definition for clean hydrogen. The DOE adopted the same framework in its initial Clean Hydrogen Production Standard (**CHPS**) specifically to align with the Hydrogen PTC.[17] The Hydrogen Roadmap illustrates the need for plentiful and cheap clean hydrogen to promote rapid adoption and achieve the DOE's goals.

The definitional problem is potentially larger than just clarifying when electrolytic hydrogen is also clean hydrogen. While attention has been focused on that issue, an overly expansive view of carbon intensity could also trickle down to qualification issues for all four Hydrogen PTC tiers. This could result in fewer hydrogen production projects, reducing hydrogen supply in the United States and potentially neutering the intent behind the hydrogen provisions of the BIL and IRA.

BROAD DEFINITION

A broad definition of carbon intensity includes direct and indirect emissions. Supporters of this approach argue that the IRA's overarching goal is reducing greenhouse gas emissions. Thus, they argue that any definition that would not lead to an appreciable decrease in emissions, or could potentially increase emissions, is contrary to Congressional intent.[18] An EU "three pillars" type approach is the most popular solution proposed by stakeholders focused on minimizing carbon emissions associated with hydrogen production as their prime directive. Under a strict implementation of this approach an existing renewable or nuclear facility could not install an electrolyzer and produce hydrogen qualifying for the Hydrogen PTC as this would violate the additionality requirement. A newly installed electrolyzer looking to use "front of the meter" power would need to have the IRS and Treasury define its "region" to enable satisfaction of the regionality requirement.[19] That front of the meter electrolyzer would also need reliable and timely reporting to match hourly consumption of grid power used for electrolysis with the hourly power generation from a new renewable facility.[20]

Proponents argue the three pillars approach avoids diverting existing clean electricity supply from the grid to make hydrogen, with the result that grid demand must be met by other resources likely to generate carbon emissions. If renewable electricity is consumed in hydrogen production, the theory goes, the energy sources used to replace this diverted electricity will have a potentially higher emissions profile.

The broad definition of clean hydrogen addresses concerns raised by many commentators that a targeted definition of carbon intensity is mere "greenwashing". It also helps to some extent align the United States with the EU, a large complementary market. The Hydrogen Roadmap argues that consistent international methods for lifecycle analysis will be required as markets for international hydrogen trade further develop.[21] However, as noted above the EU may

prevent imported hydrogen that has benefitted from subsidies aimed at the renewable electricity generation components in its jurisdiction of production from qualifying as RFNBO even if it otherwise satisfies the EU's technical standard for clean hydrogen. As noted above, the Hydrogen PTC itself does not create an impermissible subsidy for EU purposes, only the use of subsidized grid power.

Adopting the EU's three pillars into the US system may require some adjustments. The Hydrogen PTC is effective for all of 2023 and imposing strict limits retroactively or even with a short time frame for implementation seems punitive. Some accommodation likely needs to be made for hydro and nuclear power as well.

The IRS and Treasury will need to adopt a comprehensive yet flexible compliance scheme to enable taxpayers to substantiate their tax credit claims. A three pillars approach will be easier to satisfy for newly built renewable energy co-located behind the meter. Moving beyond this niche situation creates many practical difficulties, especially if establishing compliance with each of the three pillars is required for any taxable years in the near future.[22] It should be noted that some grandfathering would ideally be required anyway for facilities placed in service during 2023 or perhaps even 2024 because investment decisions were very likely made in the absence of any guidance mandating the three pillars approach.

TARGETED ACCOUNTING

The targeted accounting argument focuses on the Hydrogen PTC's narrow language as the basis for its position. The statutory language is silent about the carbon intensity model taking into account a wider emissions scope outside of the hydrogen production process itself. Equally as important for this argument is the view that Congressional intent for the Hydrogen PTC sits within the broader IRA hydrogen framework, evidencing a desire to deliver for hydrogen the same growth opportunity previously afforded to renewables, battery energy storage, and electric vehicles.[23] Thus, advocates of this approach argue that adopting a three pillars type system would be contrary to Congressional intent.

The targeted carbon intensity accounting standard could permit the use of renewable energy credits/certificates (**RECs**) without any additionality restrictions. RECs represent the production of a specific quantity of carbon-free electricity produced by a party. RECs can be transferred to another party as an effective offset for their carbon emissions.[24] This is essentially the book and claim system about which the Notice specifically inquires.[25]

A generous implementation of the targeted approach would provide a wide field for hydrogen production eligible for the Hydrogen PTC. Developers of behind the meter hydrogen production facilities could couple renewables or nuclear with a hydrogen production facility installed behind the meter at any time without regard to any additionality requirement. Facilities in front of the meter could match RECs with their grid-supplied electricity use on an annual basis. This would ease some of the compliance burdens associated with any carbon intensity framework and increase the number of facilities that can qualify for the Hydrogen PTC, thereby potentially increasing hydrogen supply in the United States.

Targeted definition proponents argue that adopting the three pillars requirement would be counterproductive at best. The three pillars would have "intensely negative and compounding effects".[26] These requirements would dramatically slow down projects and increase costs significantly for those that proceed. Further, even the EU model has phase in elements with a 36-month lookback (or more) for additionality testing in some cases and some effective dates ranging from January 1, 2028 to January 1, 2038.

The targeted definition argument has technical appeal if the IRA's green energy related provisions are examined together. The additionality requirement alone may effectively preclude electrolytic hydrogen generated by hydropower or nuclear sources. However, the IRA specifically contemplates the Hydrogen PTC stacking on top of the clean nuclear

production tax credit.[27] Placing a new nuclear facility in service before the Hydrogen PTC's expiry (January 1, 2033) seems to be a practical impossibility.

Although the Hydrogen PTC is focused on "clean" hydrogen, other hydrogen friendly provisions of the IRA are not. The investment tax credit for hydrogen storage and credits for fuel cell vehicles are hydrogen source agnostic. Thus, a taxpayer could claim the storage investment tax credit for units that only hold Gray hydrogen. A fleet of FCEV heavy trucks or similar equipment could operate solely on cheap Gray hydrogen and still qualify for credits. Thus, not all hydrogen related tax credits introduced by the IRA require emissions reductions. The CEO of the Fuel Cell and Hydrogen Energy Association has argued in an article that the Tax Code provides tax incentives to other energy solutions relying on grid electricity such as heat pumps and charging for battery electric vehicles without a demand for those incentives to reduce emissions.[28]

Senator Joe Manchin of West Virginia, a key vote in adopting the BIL and the IRA, has recently come out in favor of the targeted accounting approach. He secured an amendment to the Senate version of the fiscal 2024 appropriations bill that would reaffirm "Congress's intent to keep the hydrogen production tax credit free of agency-created requirements that would kneecap the emerging hydrogen industry."[29] As with floor statements, this amendment may have little, if any, effect on the final text of the IRS and Treasury guidance. Congressional statements about past legislation are rarely, if ever, given much weight by courts in evaluating Congressional intent.

MIDDLE GROUND?

The American Clean Power Association (**ACP**) recently proposed a potential middle ground. It does not reject the three pillars approach but calls for a graduated implementation of its requirements. The ACP proposal acknowledges the difficulties immediate adoption of the three pillars may cause, including the risk that it could diminish development of early green hydrogen production.[30]

The ACP approach may appeal to the IRS and Treasury as a path of least resistance. However, any compromise from rapid implementation of the three pillars approach is unlikely to satisfy expansive accounting proponents.

The ACP approach helpfully spelled out its differences with the EU three pillars standard. The ACP characterized their approach as more flexible for first-mover projects while being more restrictive in other areas. Under additionality, the ACP approach generally treats a clean energy project as new if it is placed in service no earlier than 36 months prior to the electrolyzer becoming operational.[31] Under regionality, the ACP proposal requires electricity be drawn from a project that is physically located in the same "electrical balancing authority" or the clean energy project must be physically delivered into the same electrical balancing authority if not so co-located.[32] Temporal matching is grandfathered, with projects that begin construction before January 1, 2029 eligible for the full Hydrogen PTC with annual matching for the life of the tax credit.[33]

The middle ground faces many of the same technical issues as the expansive position. Congressional intent in enacting the Hydrogen PTC is difficult to divine based on the language alone. As noted above, floor statements by members of Congress rarely carry weight with courts when interpreting the law. The IRA's green energy provisions evidence a broad intent to reduce emissions but, it could be argued, accelerating hydrogen adoption is in line with other green provisions such as federally enacted incentives for battery electric vehicles.

The ACP's additionality requirement may pose the most difficult implementation issue, particularly for Pink hydrogen. The ACP approach does not address nuclear projects. It strongly encourages the building of additional renewable

facilities in a short time frame to address the additionality pillar. Excluding Pink hydrogen (and hydro) from additionality constraints could address this potential issue.

The middle ground also faces many of the same technical issues as the broad accounting standard. However, it may represent an effective compromise for the IRS and Treasury to ensure over time the reduction of emissions associated with electricity used for hydrogen production while also hopefully not discouraging hydrogen supply in the United States by limiting the Clean Hydrogen PTC too drastically in its early years.

CONCLUSION

Any choice made by the IRS and Treasury will have significant consequences for the global hydrogen sector. It will also receive a lot of attention. Predictions are difficult to make, especially about the future, but it seems likely that whatever definition methodology is chosen will receive significant criticism from one or perhaps even all sides of this debate. Still the IRS and Treasury must choose some path and they must choose it soon.

The definition ultimately chosen by the IRS and Treasury may be challenged in the courts. However, in situations like the delegation of authority under the Hydrogen PTC to write regulations, the government has broad latitude in writing guidance. Regulations of this type are rarely challenged and even more rarely overturned. Congress can always amend the Hydrogen PTC if it is unhappy with the result, but that is even less likely. The definitional path chosen by the government is likely to be the one we all live with for the foreseeable future.

[1] Maxine Joselow, The Advertising Blitz Behind Biden's Hydrogen Tax Credits, The Washington Post (July 21, 2023), https://www.washingtonpost.com/politics/2023/07/21/advertising-blitz-behind-bidens-hydrogen-tax-credits/
[2] The phrase "electrons versus molecules" is often used to describe the difference between battery/electric only proponents (electrons) and hydrogen proponents (the H2 "molecule").
[3] "Green" refers to hydrogen that was created by extracting hydrogen from water through the process of electrolysis with electricity from renewable sources or similarly ultra-low carbon means. Green hydrogen can be produced using increasingly diverse means, including photobiological, photoelectrochemical and solar thermochemical processes. "Gray" refers to hydrogen produced through steam methane reforming, a high-temperature process in which steam reacts with a hydrocarbon fuel to produce hydrogen. "Blue" refers to hydrogen produced using steam methane reforming combined with carbon capture and sequestration (CCS) to materially reduce the carbon emissions associated with Gray hydrogen by capturing and permanently storing CO2 underground. "Pink" refers to hydrogen that was derived through electricity produced by nuclear energy. Other colors are sometimes used, including black, brown, gold, orange, turquoise and white hydrogen.
[4] Germany has adopted definitions for Green and Blue hydrogen at the ministerial ordinance level.
[5] Green hydrogen can be six times more expensive than Gray hydrogen while Blue hydrogen's cost is closer to the cost of Green hydrogen than Gray hydrogen.
[6] The EU also requires as part of this additionality test that clean power sources transmitting electricity to an electrolyzer through the grid must not have received any state support. However, we do not believe that this same requirement has been proposed by any stakeholder in the debate surrounding the U.S. interpretation of these "three pillars."
[7] The BIL appropriated $1 billion for a clean hydrogen electrolysis program, $500 million for clean hydrogen manufacturing and recycling research and development, and $8 billion for a regional clean hydrogen hubs program.
[8] The IRA also indirectly encourages hydrogen's growth in other provisions and programs, including (1) grants and loans for automakers to make clean vehicles, (2) the tax credit for sustainable aviation fuel, which could be produced using hydrogen; (3) grants to reduce emissions at ports, which could include using hydrogen to reduce maritime emissions; and (4) tax credits for clean electricity production which may be powered by clean hydrogen.
[9] IRC § 45V(c)(2)(A).
[10] IRC § 45V(c)(3).
[11] IRC § 45V(b). The tax credit tiers are: $3 for under 0.45 kilograms CO2e per kg of H2, $1 for CO2e per kg of H2 between 0.45 and under 1.5, $0.75 for CO2e per kg of H2 between 0.45 and under 1.5, and $0.60 for CO2e per kg of H2 between 4 and 2.5. These tiers assume that the prevailing wage and apprenticeship requirements introduced by the IRA are met. IRC § 45V(e)(2)(B). The tax credit tiers are only 1/5 of the amounts set forth in the preceding sentence if those requirements are not met.
[12] IRC §§ 45(e)(13) (production tax credit for electricity produced from certain renewable sources such as solar and wind), 45U(c)(2) (production tax credit for nuclear power production).
[13] Section 45V provides that the term "lifecycle greenhouse gas emissions" has the same meaning as that given by section 211(o)(1)(H) of the Clean Air Act as in effect on the date of the IRA's enactment. IRC § 45V(c)(1). Further, Section 45V specifically references the GREET model is to be applied "well-to-gate," meaning through the point of production only. The EU uses a broader "well-to-wheel" methodology, measuring all emissions related to production, processing, distribution, and use.
[14] I.R.S. Notice 2022-58, 2022-47 IRB 483.
[15] The CO2e concept is used in other sections of the Internal Revenue Code enacted by the IRA, including Section 45Y – the Clean Electricity Production Tax Credit scheduled to supersede the Section 45 Production Tax Credit for facilities placed in service after December 31, 2024.
[16] Treas. Reg. §1.45Q-4(c)(6).
[17] https://www.hydrogen.energy.gov/pdfs/clean-hydrogen-production-standard-guidance.pdf.
[18] See, e.g., National Resources Defense Council (NRDC) Letter (Apr. 10, 2023), https://www.nrdc.org/sites/default/files/2023-04/nrdc-catf-memo-ira-45v-legal-necessity-3-pillars-20230410.pdf ("The text, structure, and purpose of the IRA support the conclusion that only 'additional' clean energy generation . . . should count toward the calculation of a producer's lifecycle emissions."). Other groups weighed in with similar positions. Caucus of State Environmental Legislators, https://www.ncelenviro.org/app/uploads/2023/06/State-Legislative-Sign-On-Letter-re_-IRA-45V-Clean-Hydrogen-Tax-Credit-Revised.pdf; Joint Letter from Clean Air Task Force, et.al (Feb. 23, 2023), https://cdn.catf.us/wp-content/uploads/2023/02/23171218/joint-letter-45v-implementation.pdf.
[19] In describing the source of the electricity, "behind the meter" refers to a direct feed from the electricity generation to the electrolyzer, and "front of the meter" involves connection to the electrical grid.
[20] As in the EU, this may make hydrogen production powered by some solar and wind projects uneconomic as it significantly limits the amount of hydrogen that can be produced.
[21] The Hydrogen Roadmap states that the United States will "foster transparency and rigor in the analyses of emissions across the value chain of hydrogen, including potential indirect impacts, from multiple pathways." Hydrogen Roadmap at 37.
[22] It should be noted that the statutory language in the Clean Hydrogen PTC focuses solely on when the hydrogen production facility, for example the electrolyzer and related equipment, is placed in service, and is silent as to the vintage of the electricity feed.
[23] Frank Wolak, Double Standard for Clean Hydrogen Could Render Tax Credit Ineffective (June 5, 2023), https://www.realclearenergy.org/articles/2023/06/05/double_standard_for_clean_hydrogen_could_render_tax_credit_ineffective_903691.html.
[24] Some states require use of EACs to comply with state mandates in certain circumstances.
[25] Floor statements made by Senator Carper and Senator Wyden while debating the IRA reference use of a book and claim system. 168 Cong. Rec. S4165 (Aug. 6, 2022). Although supportive, floor statements are rarely given much weight by the courts. NLRB. v. SW Gen., Inc., 580 U.S. 288, 307 (2017) (In discussing the impact of contradictory floor statements by Senators on a particular topic, the Court stated, "This is a good example of why floor statements by individual legislators rank among the least illuminating forms of legislative history.")

[26] The Road to Clean Hydrogen: Getting the Rules Right, Plug Power Inc (July 19, 2023), https://www.plugpower.com/the-road-to-clean-hydrogen-getting-the-rules-right-report-emphasizes-impacts-to-climate-goals-under-consideration-for-the-hydrogen-ptc/?utm_source=rss&utm_medium=rss&utm_campaign=the-road-to-clean-hydrogen-getting-the-rules-right-report-emphasizes-impacts-to-climate-goals-under-consideration-for-the-hydrogen-ptc.
[27] IRC § 45U(c)(2).
[28] Frank Wolak, Double Standard for Clean Hydrogen Could Render Tax Credit Ineffective (June 5, 2023) (characterizing the broad accounting argument as an arbitrary requirement that discriminates against hydrogen production), https://www.realclearenergy.org/articles/2023/06/05/double_standard_for_clean_hydrogen_could_render_tax_credit_ineffective_903691.html.
[29] Adopted amendments to the Financial Services and General Government fiscal year 2024 appropriations bill, https://www.appropriations.senate.gov/imo/media/doc/fy24_fsgg_managers_amendment.pdf.
[30] ACP Green Hydrogen Framework, American Clean Power (June 2023), https://cleanpower.org/wp-content/uploads/2023/06/ACP_GreenHydrogenFramework_Explanation.pdf.
[31] The ACP proposal has three options for satisfying additionality: 1) “new” is defined by reference to the 36-month lookback period, 2) an existing facility can qualify as “new” if it satisfies the 80/20 repowering rule (a tax rule used to define when reconditioned property can be considered new), and 3) facilities that draw power from renewable projects experiencing persistent congestion.
[32] The ACP proposal to use planning authorities is roughly analogous to the EU proposal’s use of bidding zones (which roughly track European country borders).
[33] The EU proposal transitions from annual to hourly in 2030, whereas the ACP proposal would not require that transition until 2032 and provides a ten-year grandfather period.