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American manufacturers need equal access to clean hydrogen to decarbonize their operations.

Commercial and industrial businesses should be allowed to qualify for federal clean hydrogen incentives when using any source of available carbon-free electricity, whether directly connected to the customer or delivered through the power grid. Restricting sources of power to newly-built generation projects would undermine the investment needed to expand the use of clean hydrogen and achieve the Administration's decarbonization goals.

Over the last few decades, America's power system has made enormous progress reducing the air pollution that chokes our communities and contributes to a climate crisis that is already evident in the form of raging wildfires, devastating floods and increasingly destructive and deadly weather. Meanwhile, other sectors of our economy – such as agricultural, heavy industry and long-haul transportation – have increased pollution and are negating the emission reductions being achieved in the power sector. To address the climate crisis, solutions must be deployed right now to reduce pollution in these hard-to-reach agricultural, transportation and industrial applications.

Given the scale of the challenge and the available options, it is clear that hydrogen – the most abundant element in the universe – is an essential piece of the solution to fully powering a clean economy. Hydrogen can be combined with other elements to make clean energy "drop in" fuels for use in existing transportation and industrial uses, as well as feedstock for clean fertilizers that will grow sustainable foods to feed the world. To help make this a reality, the Biden Administration has adopted a Hydrogen Shot goal of reducing the cost of clean hydrogen by 80% to $1 per 1 kilogram in 1 decade. This would create the opportunity for at least a 5-fold increase in clean hydrogen use, a 16% carbon dioxide emission reduction by 2050, and 700,000 jobs by 2030.

The Hydrogen Shot goal is far out of reach using today's technologies. Producing that volume of clean hydrogen using currently-available electrolyzers and renewable power would require 67 gigawatts of fully-utilized electrolyzers using the entire output of all of the wind and solar ever built in the United States. In order to unlock the potential of hydrogen as a mass-market clean energy solution, we need breakthroughs in technology that drive up production efficiency while driving down costs. This will require the acceleration of research, development, demonstration and deployment of hydrogen from a range of clean energy resources, with billions of dollars in associated investments.

To catalyze these advancements in technology, Congress enacted the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA). The IIJA dedicates $8 billion to the creation of regional hydrogen hubs – networks of hydrogen producers, consumers, and local connective infrastructure accelerating the use of hydrogen as a clean energy carrier. This funding will work in tandem with IRA tax credits for clean hydrogen designed to reduce the price difference between clean hydrogen and other more carbon-intensive alternatives. These new programs create a once-in-a-generation opportunity to catalyze the investments needed to innovate and scale new technologies for clean hydrogen production.

The Administration is hard at work implementing these programs, drafting rules that will be used to determine whether a hydrogen production project qualifies for IIJA funding and IRA tax credits. In those proceedings, some are demanding the adoption of restrictive policies that would limit the ability of American manufacturers to decarbonize their operations by using existing carbon-free generators to power hydrogen production facilities. This "additionality" limitation, if adopted, would effectively prohibit customer-sited hydrogen production from qualifying for federal incentives unless it is powered by a newly-constructed wind or solar power plant.

These organizations acknowledge that the qualification criteria for federal incentives is easily met when hydrogen production facilities are directly connected to either a new or existing carbon-free generator, referred to as a "behind-the-meter" configuration. They differentiate hydrogen production facilities located at the end-user's site, arguing that such configuration must be paired with newly-constructed sources of carbon-free electricity – meaning wind turbines and solar panels – to prevent an increase in emissions on the power grid. Supply chain and transmission deliverability issues already are taxing the nation's ability to build wind and solar projects. Limiting grid-connected hydrogen production only to new carbon-free generation would exacerbate these constraints and result in only a fraction of the investment needed to spur the technological improvements required to reach the Administration's goal of accelerating the use of hydrogen as a clean energy source. It also would require large quantities of hydrogen to be transported over long distances, which raises safety concerns and needlessly increases costs. American businesses should not be told they cannot use leverage the existing power grid to transition their operations to using clean hydrogen. Congress clearly never envisioned such a twisted outcome.

Proponents of an additionality requirement for clean hydrogen production rely on an analysis by researchers at Princeton University, but a closer look at their conclusions reveals the complexity of the question and that the modeling on which they rely does not exclusively support an additionality limitation. The Princeton researchers acknowledge that emissions on the power system are a function of both electricity use, such as by electrolyzers producing clean hydrogen, and emissions regulations, such as cap-and-trade program currently in place in California. However, the study results include increased emissions in California from hydrogen production – even though California has cap-and-trade regulations to prevent increased emissions. Further, the Princeton modeling also reveals that policy incentives such as IRA tax credits are already strong enough in some regions to support construction of sufficient new-build carbon-free electricity to power both consumer demand and hydrogen production even without an additionality limitation. As a result, this study shows that imposing an additionality limit in those regions would not change power system emissions.

The Princeton analysis also does not take into account the Administration's broader climate strategy, which includes adoption in 2024 of new EPA regulations limiting emissions from natural gas and coal-fired power plants. We see upcoming EPA regulation as the most effective method for comprehensive emission reductions (in the absence of legislation adopting an economy-wide carbon policy) and have been studying potential pathways for emissions regulation in the power sector. Our results confirm that adoption of an additionality requirement for clean hydrogen would increase consumer costs without having a material impact on emissions.

To test the effectiveness of these potential regulations, we evaluated a scenario in which natural gas generators are given the option to comply with new emission limits by blending carbon-free hydrogen as a power plant fuel at a proportion sufficient to achieve the mandated emission rate reductions. The hydrogen was required to be produced electrolytically using power from carbon-free electricity sources but was not subject to an additionality requirement. These results show us that expected regulation remains effective at limiting emissions when hydrogen production and blending are included in the power sector.

We then tested the effect of adding an additionality requirement for incremental hydrogen production. Under this policy backdrop, the additionality requirement did not result in a material change in emissions, but did significantly increase the cost of producing the hydrogen – by about 30 cents per kilogram, or about 30% of DOE's Hydrogen Shot goal of $1 per kilogram by 2030. An additionality requirement in the context of clean hydrogen production is therefore at best redundant and unnecessary and at worst actively harmful to the Administration's ability to achieve its goals. (Check out the Appendix below for further discussion of our modeling and comparison to the Princeton claims.)

Debates about the near- and long-term emissions impact of emergent decarbonization technologies are nothing new. In the early days of policymaker consideration of incentives for vehicle or appliance electrification, there were lively arguments about whether charging a car or powering a hot water heater from a fossil-heavy power grid did more harm than good in terms of net emissions. Over time, the growth of EVs and electrified appliances catalyzed by supportive federal and state policies led to the technology improvements needed to increase efficiency and lower costs, while policies in the power sector drove down the emissions intensity of the electricity used to charge our vehicles and power our homes. Powering hydrogen electrolyzers is no different. Our nation will not be able to realize the innovations necessary to expand the production and use of clean hydrogen unless we utilize available carbon-free power from any available carbon-free generator, whether renewable, nuclear, hydro or geothermal.

This is not to say that no rules should apply to hydrogen producers seeking to claim federal incentives in the United States. To the contrary, it is essential that clean hydrogen production be powered only by carbon-free power that is actually available and has not otherwise been committed to another use, such as a state clean energy program or voluntary corporate procurements. Many existing carbon-free generators already have dedicated their output, including clean attributes, to other uses on a long-term basis. Hydrogen producers should not be allowed to claim that their sources of electricity are carbon-free unless they document that to be the case, through the retirement of environmental attribute certificates (EACs), such as renewable energy certificates (RECs). This is how hydrogen producers report their emissions under current industry practices, and it should be how they verify the carbon-intensity of their hydrogen production.

Requiring companies to retire EACs for their sources of electricity will ensure that all carbon-free electricity being used for hydrogen production is incremental to any other clean energy use. Whether existing or new, a generator that already has committed its carbon-free output to other uses like a state RPS program will not have EACs available for clean hydrogen production. This will prompt investments in new sources of clean energy to power hydrogen production while also making it possible for existing generators to support clean hydrogen production to the extent their carbon-free output is otherwise available. By maximizing the sources of carbon-free electricity available for hydrogen production, we can unlock the potential of the IIJA and IRA to jump-start the hydrogen economy and drive the technological innovation needed to reduce harmful air pollution and decarbonize some of the economy's most polluting sectors. Now that's smart policy.

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Appendix

The Administration has set aggressive goals of achieving a 100% carbon-free electric sector by 2035 and an economy-wide goal of net-zero greenhouse gas ("GHG") emissions by 2050.[1] The Inflation Reduction Act (IRA) and Infrastructure Investment and Jobs Act (IIJA) provide important incentives for technology development and deployment in support of these goals, including tax credits for carbon-free electricity generation sources and for the production of hydrogen using zero/low carbon energy, but analysis has consistently shown that these incentives on their own are necessary but not sufficient for achieving the administration's GHG targets.[2] To achieve the Administrations' goals, specific policies that constrain carbon emissions from emitting electric generators are necessary. The Administration has indicated through the publication of the Fall 2022 Unified Agenda of Regulatory and Deregulatory Actions that it intends to implement these constraints through new rules intended to limit emissions from existing and new natural gas and coal-fired power plants promulgated by the Environmental Protection Agency under Sections 111 (b) and (d) of the Clean Air Act, targeting final rules by Summer of 2024.[3] Analysis from NRDC and the Rhodium Group has indicated that these rules are critical to achieving the administrations electric sector emission reduction goals.[4]

As the Administration moves to finalize comprehensive GHG regulations at EPA, it must be careful to avoid piecemeal or single-issue climate-related actions that carry the risk of unintended detrimental consequences in light of its broader regulatory strategy. Placing an additionality requirement on the carbon-free generation used to produce electrolytic hydrogen in claiming the hydrogen production tax credit in the IRA falls squarely into this category of actions that are likely to be redundant and detrimental when arrayed against the full expanse of future policy. Basic economic principles as well as specific power system modeling conducted by Constellation indicate that an additionality

[1] See https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/.

[2] Evergreen Collaborative and National Resource Defense Council, Powering Toward 100 Percent Clean by 2035: A Path to Carbon-Free Electricity After the Inflation Reduction Act, January 2023, at 9 (figure 1) (available at https://collaborative.evergreenaction.com/policy-hub/Powering-Towards-100-Clean-Power.pdf).

[3] Office of Management and Budget, Fall 2022 Unified Agenda of Regulatory and Deregulatory Actions, EPA Statement of Priorities, p. 4 (available at https://www.reginfo.gov/public/jsp/eAgenda/StaticContent/202210/Statement_2000_EPA.pdf).

[4] Evergreen/NRDC at 9; Rhodium Group (John Larsen, Ben King and Maggie Young), Has the Supreme Court Blocked the Path to the 2030 Climate Target?, July 1 2022 (available at https://rhg.com/research/supreme-court-2030-climate-target/).

requirement placed on carbon-free electrolytic hydrogen production, as suggested by analysis from the Andlinger Center for Energy and Environment at Princeton University,[5] is at best redundant and unnecessary and at worst actively harmful to the ability to achieve the Administration's climate goals.

Even analysts that have otherwise advocated for including an additionality requirement in qualifying for the hydrogen PTC generally agree that an additionality requirement is unnecessary if electrolytic hydrogen production occurs in the context of a strong policy constraints on carbon emissions in the electric sector, such as a carbon cap-and-trade or similar policy.[6] As the Princeton researchers put it in their paper:

> A policy mechanism that explicitly prioritizes system-wide emissions reductions, such as a carbon pricing or cap-and-trade program, could help encourage climate-positive outcomes alongside electrolysis deployment by financially disincentivizing electricity consumption in hours when fossil plants are on the margin and directing hydrogen production toward end uses with the greatest overall decarbonization potential. A cap-and-trade program in particular would likely mitigate the need for further hydrogen-specific regulations by ensuring that system-wide emissions cannot increase as a result of electrolysis operation. [Princeton Paper at 12]

The general argument for additionality requirements put forth by its proponents is that, even if a electrolytic hydrogen producer contractually backs its electricity consumption with grid-supplied carbon-free electricity such that its attributional emissions are zero, if the specific resources backing its production already exist or would still be built independent of the hydrogen PTC, the added demand nonetheless will induce incremental emissions elsewhere in the system as emitting resources turn up or are built to supply the incremental increase in total demand resulting from the addition of electrolytic hydrogen production. These incremental emissions are termed consequential emissions. Depending on the specifics of the power system and region, this increase in induced or consequential emissions may be larger than the offsetting reduction in emissions caused by using the resulting hydrogen to displace emitting uses in industry (for example by replacing coking coal used in steelmaking), transport (for example, by replacing diesel or gas

[5] Wilson Ricks, et al, Minimizing Emissions from Grid-Based Hydrogen Production in the United States, 2023 Environ. Res. Lett. 18 014025, January 6 2023 (available at https://iopscience.iop.org/article/10.1088/1748-9326/acacb5/pdf).

[6] See, e.g., Richard Schmalansee and Robert Stavins, Lessons Learned from Three Decades of Experience with Cap and Trade, Review of Environmental Economics and Policy, Winter 2017; U.S. Environmental Protection Agency, Tools of the Trade: A Guide to Designing and Operating a Cap and Trade Program for Pollution Control, June 2003.

powered vehicles with hydrogen fuel cell vehicles), or in the electric sector itself (by displacing natural gas used in combustion turbines). Additionality proponents argue that this potential increase in emissions warrants an additionality restriction for grid-connected electrolytic hydrogen producers that requires that they only contract for electricity supply from resources that would not otherwise have been present without the incremental demand for hydrogen induced by the hydrogen PTC.

First, it is very challenging to identify resources that would not otherwise have been present without the incremental demand for hydrogen. As the Princeton researchers explain:

> This broader definition of additionality is likely difficult if not impossible to enforce, as it requires counterfactual knowledge of which resources would have been developed had the hydrogen producer not made certain procurement choices. [Princeton Paper at 10 (emphasis in original)]

As a simplification, an additionality requirement is generally proposed as a requirement to match new electrolytic load with resources that have been built close in time with the incremental electrolytic load or after a certain date. Unfortunately, this simplification greatly exaggerates the effectiveness of an additionality requirement due to the significant incentives in the IRA to construct new carbon-free generation. The Princeton researchers acknowledge the impact of the IRA incentives in their paper:

> The economic impetus provided by IRA subsidies leads clean electricity penetration in our modeled systems to far exceed levels mandated under current state policies by 2030. In this scenario the market for state-level policy compliance EACs is fully saturated, so simply adding demand for clean electricity attributes does not provide any economic incentive to increase supply. Instead, hydrogen producers are able to pay effectively zero to procure excess clean power from generators that would already have been built. [Princeton Paper at 9 (emphasis in original)]

The result of this simplistic additionality approach is that hydrogen production will be attracted to regions where the cost of additionality compliance is lowest, which can potentially increase system emissions depending on the marginal generation in such regions. For example, significant amounts of new wind, spurred by the IRA incentives, are expected to be developed in Wyoming, where coal generation is expected to remain a large part of the marginal resource mix. Adding a simplistic additionality requirement increases the incentives for hydrogen producers to locate in Wyoming, relative to other regions that have no "excess" carbon-free generation but may have much lower marginal emission rates. Meanwhile, the imposition of the additionality requirement in the carbon-intensive region provides no emissions benefit, as shown in the Princeton researchers' modeling results. Their analysis (Figure 2, below) estimated changes in emissions from electrolytic hydrogen production by comparing the No Requirements scenario to a 100% Hourly Matching scenario that embeds an "additionality" requirement. In the New Mexico and Arizona zone and the Wyoming and Colorado Zone (red circles), power system emissions are roughly the same in both scenarios, meaning that the volume of carbon-free electricity operating in each scenario is the same. The same amount of new wind and solar generation is coming online with or without the additionality

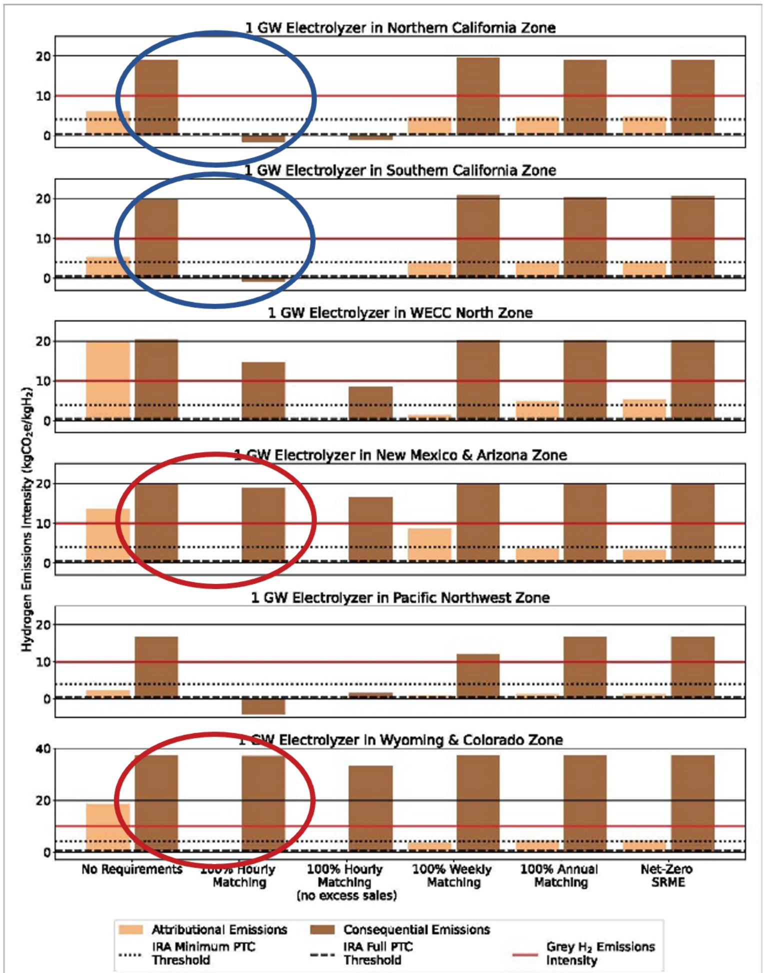


Figure 2. Attributional (left) and consequential (right) emissions rates from grid-based hydrogen production in each model zone (rows top-to-bottom) under a range of policy options (columns left-to-right).

requirement because the IRA incentives are already sufficient to support that investment. Second, this argument for an additionality requirement assumes a highly static and pessimistic view of existing and future carbon policy. That is, it assumes that existing and future new policies are completely ineffective in restricting the degree to which emitting resources will increase their output and thus emissions in response to an increase in total system demand. As the Princeton researchers admit, when such a policy does exist the argument for an additionality requirement no longer holds.

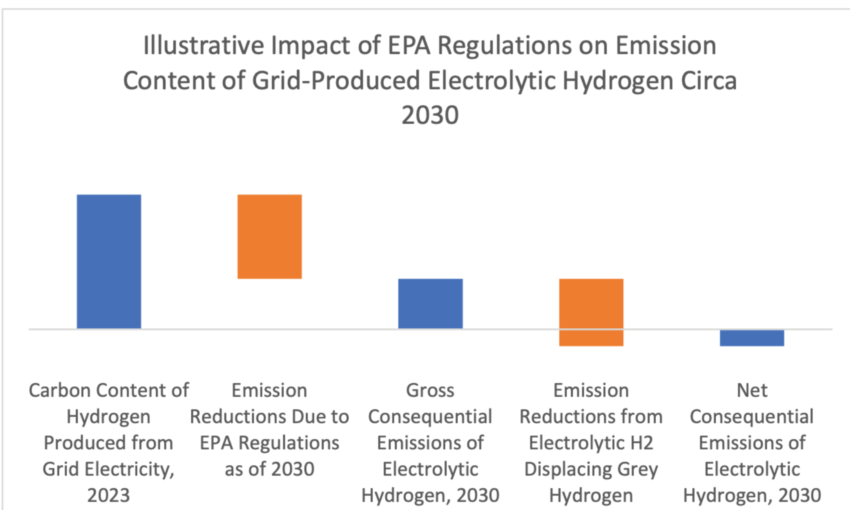
Simple economics demonstrates why this is so. Under a static policy view as described in the Princeton paper, increased demand on the electric system results in marginal resources expanding production to meet demand, which will typically be some combination of natural gas, coal, and new build renewable resources given the current generation portfolio and relative technology costs assuming there are no particular restrictions on emitting generation. While the exact marginal mix will vary by region, the Princeton researchers' modeling suggests that a typical mix dominated by unrestricted gas-fired generation will result in each kilogram of added hydrogen demand inducing incremental generation output with an emission content of about 20 kilograms of carbon dioxide equivalent. Using electrolytic hydrogen to displace grey hydrogen produced from natural gas typically avoids about 10 kilograms of carbon dioxide equivalents per kg of hydrogen used, so the net consequential emissions of electrolytic hydrogen per kilograms in this example is 20 kilograms less the 10 kilograms of avoided emissions, or 10 kilograms. However, in regions with an existing policy addressing carbon emissions from electric generation such as California and the RGGI region, that policy will also mitigate the emissions impacts of increased load for electrolytic hydrogen.

Referring again to the Princeton researchers' findings (Figure 2 above), we note increased emissions in California (blue circles) from the addition of electrolyzer load in the "No Requirements" case. The state's cap-and-trade program should not allow such an increase to system emissions; either the study did not represent the totality of California's cap-and-trade program or the Princeton researchers have discovered a flaw in the California regulations that needs to be corrected. Either way, the study shows us the importance of ensuring compliance with California's existing emissions caps but, given this incongruity, does not prove the relative impact of imposing an additionality requirement on clean hydrogen production.

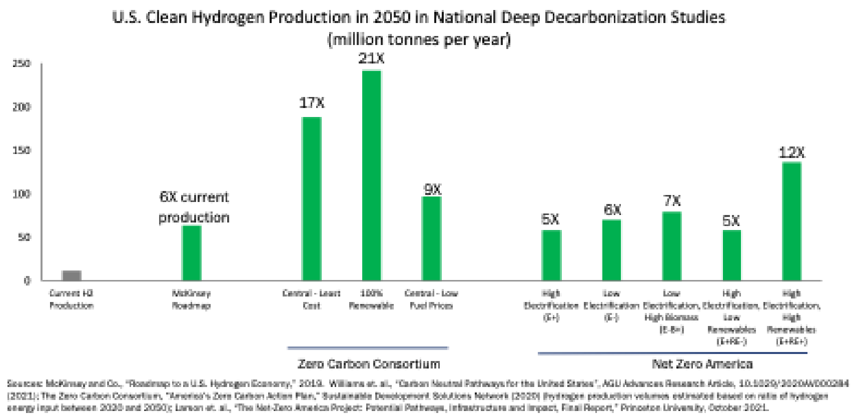
The focus on carbon emissions regulation expands to the national stage this year and next year as EPA proposes and finalizes its regulations on carbon emissions from new and existing generators.

While the specifics have not been determined, a strong EPA policy that addresses both new and existing fossil generation will require that existing generators reduce their emission rate by a substantial amount (likely 50% or more). Requirements for new generators will likely be even more stringent. In addition, rather than install carbon control equipment such as carbon capture and sequestration, many emitting generators will likely retire or reduce their runtime and therefore their emissions. The overall effect of such a policy is to lower the emission rate of fossil generation that remains on the system. Combined with expected renewable growth from incentives in the IRA, these changes will act to dramatically lower the marginal emission rate of grid electricity in all regions of the country.

As a result, when incremental electrolytic hydrogen is added to the system the marginal emission rate of resources that expand production in response is likely to be far lower than the value estimated in static policy analyses such as the Princeton paper. The result, which is illustrated in the figure below, is that the net consequential emissions of electrolytic hydrogen (with no additionality requirements) are likely to be zero or negative as we look forward, not positive as suggested by advocates of an additionality requirement.



This dynamic illustrates the key role that hydrogen plays not just in the electric sector but in decarbonizing other sectors of the economy in support of the Administration's 2050 economy-wide goal: with a strong, broad electric-sector carbon policy, such as EPA emission regulation, hydrogen production can be ramped up with minimal emission impact in the electric sector, and then utilized to decarbonize other sectors of the economy that are much more difficult to decarbonize than the electric sector, resulting in significant economy-wide net emission reductions for each increment of hydrogen production added to the system. Numerous studies have documented the critical role that greatly expanded electrolytic hydrogen production is likely to play in achieving a net-zero economy by 2050 by helping to decarbonize such sectors as transportation (road, marine, and air), steelmaking, fertilizer, and chemicals/plastics. A range of recent studies have found that clean hydrogen production must expand by between 5 and 20 times present non-clean (grey) hydrogen production levels to achieve a net-zero economy by 2050.

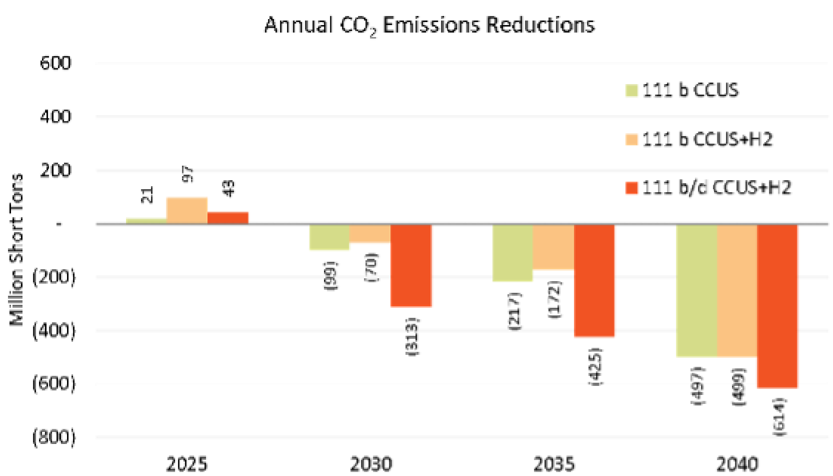


Allowing carbon-free electrolytic hydrogen to scale quickly while supported by the hydrogen production tax credit is critical to this strategy and, as the illustration shows, the presence of strong, broad EPA regulation on electric sector carbon emissions allows hydrogen production to grow with zero or negative net consequential emissions. Under such a policy backdrop, an additionality requirement is unnecessary and likely to only slow down and add cost to hydrogen production, potentially imperiling the Administration's goals.

Constellation's own modeling of potential EPA new and existing power plant emission standards confirms the illustrative analysis discussed above. Constellation has modeled a range of potential EPA emission standard policies that are consistent with achieving the administration's carbon reduction goals.[7] In particular, Constellation has modeled a policy that combines a 111 (b) standard for new natural gas plants beginning in 2030 that mandates 90% GHG emission reductions relative to an uncontrolled plant, and a 111 (d) standard for existing coal that mandates 50% GHG emission reductions, with an alternative option to comply by restricting annual plant capacity factor to 15% or less, beginning in 2030. Under the base policy scenario, generators were allowed to comply by installing carbon capture and sequestration systems ("CCS"), meeting the capacity factor exemption, or retiring. This base policy scenario achieved power sector emission reductions of 69% below 2005 levels by 2030 and 91% by 2040.

[7] This analysis was conducted using energy system modeling from ICF's Integrated Planning Model (IPM®). The assumptions and scenarios were specified by Constellation.

To test the impact of electrolytic hydrogen production against this policy backdrop, Constellation added a second policy scenario where natural gas generators were also given the option of complying by blending carbon-free hydrogen as a power plant fuel at a proportion sufficient to achieve the mandated emission rate reductions. Existing combustion turbine and combined cycle units could retrofit to 50%, 75%, or 100% hydrogen by volume and were subject to a 50% emissions reduction standard. New units had to meet a 90% emissions reduction standard and so had only a 100% hydrogen option. The hydrogen was required to be produced electrolytically using power from carbon-free electricity sources but was not subject to an additionality requirement. From 2030 onward, this scenario resulted in similar levels of emission reductions to the scenario where hydrogen blending did not occur, as summarized in the chart below. We also tested a scenario where carbon emissions from existing gas units were also regulated under similar standards and compliance timeline as existing coal.compliance timeline as existing coal.



Emissions Reductions from 2005 level

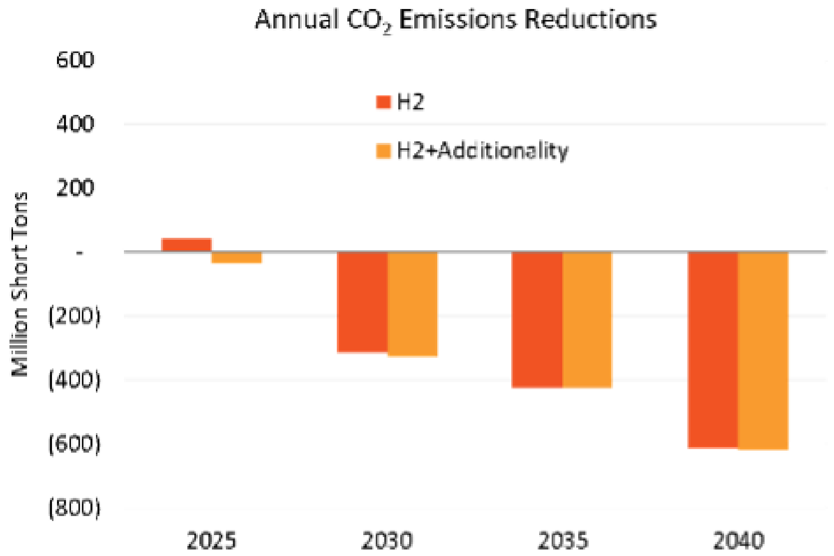
	2025	2030	2035	2040
111 b CCUS	-49%	-69%	-76%	-91%
111 b CCUS+H2	-46%	-68%	-74%	-91%
111 b/d CCUS+H2	-48%	-77%	-84%	-96%

Note: All policy runs depicted include a 111(d) on coal requiring a 50% emissions reduction and a 111(b) on natural gas requiring a 90% reduction. Runs that include a 111(d) on natural gas require a 50% reduction. All are applied at the unit level.

These results validate the simple economic dynamic discussed earlier: when policy exists that limits the emissions of fossil generators, the incremental impact of electrolytic hydrogen production on net consequential emissions is minimized. In this analysis, the emission reductions of utilizing carbon-free electrolytic hydrogen to substitute for natural gas in power generation combine with additional carbon-free generation from renewable builds incented for electrolyzer supply and the low-carbon baseload power supplied by new NGCC build not seen in other runs. Together these effects offset the emissions impact of adding electrolyzer demand to the system.

This result is actually quite conservative because many potential uses for hydrogen outside the electric sector have significantly higher carbon reduction potential than displacing natural gas as a power plant fuel. For example, when displacing natural gas utilized in in power generation, hydrogen abates about 7 kg of CO2e per kg of hydrogen consumed, but when displacing grey hydrogen produced from natural gas (which is widely used in fertilizer and chemicals production today) the abatement rate is about 10 kg CO2e, and potential future uses such as long-haul road and marine transport (13 to 14 kg CO2e abated per kg of H2 consumed), coal-fired industrial heat (12 kg CO2e per kg H2 consumed), and steelmaking (32 kg CO2e per kg H2 consumed) offer even higher abatement rates.[8]

Constellation also specifically tested the effect of adding an additionality requirement for incremental hydrogen production to the EPA regulations with hydrogen blending scenario. Under this policy backdrop the additionality requirement did not result in a material change in emissions from the hydrogen blending scenario with no such requirement:



Note: These runs include a 111(d) on coal requiring a 50% emissions reduction, a 111(b) on natural gas requiring a 90% reduction, and a 111(d) on natural gas requiring a 50% reduction. All are applied at the unit level.

[8] Rocky Mountain Institute, Hydrogen's Decarbonization Impact for Industry, January 2020, at 4 (available at https://rmi.org/insight/hydrogens-decarbonization-impact-for-industry/).

The only material impact of adding the additionality requirement was to raise the cost of production of carbon-free electrolytic hydrogen by about 30 cents per kilogram, or about 30% of the Department of Energy's long-term goal for carbon-free electrolytic hydrogen production costs.[9] This cost increase is driven by the restrictions that an additionality requirement imposes on both the type and location of generation resources that may be utilized to supply hydrogen production.

The location restrictions are potentially problematic given hydrogen's high transport costs which makes it most efficient to locate hydrogen production close to industrial consumers, which may be infeasible in many instances if hydrogen production can only be located in the same regions as new build carbon-free generation due to an additionality requirement. Further, it is also quite likely that an additionality requirement would greatly reduce the pace at which carbon-free electrolytic hydrogen is deployed. Thus, an additionality requirement on hydrogen production offers no emission reduction benefits while potential impeding the ability to achieve the Administration's carbon goals.

Given the Administration's commitment to addressing power sector emissions using the EPA's authority under the Clean Air Act, the prudent course of action in implementing the hydrogen PTC is to avoid an additionality requirement that could potentially complicate or undermine the Administration's long-term GHG reduction goals. The explicit provisions contemplated in the text of the Inflation Reduction Act, namely that to qualify for the full hydrogen PTC producers of electrolytic hydrogen utilize carbon-free electricity but without any particular discriminatory restrictions relating to whether the electricity comes from a new or existing resource or is otherwise "additional," are more than sufficient to ensure that electrolytic hydrogen production will lead to economy-wide emission reductions when viewed in the context of future policy.

[9] See https://www.energy.gov/eere/fuelcells/hydrogen-shot.