

April 10, 2023

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RE: Notice 2022-49 Request for Comments on Certain Energy Generation Incentives – Hydrogen (IRC Section 45V)

Dear Assistant Secretary Batchelder and Mr. Paul:

The undersigned organizations have previously submitted comments urging the Department of the Treasury to mandate additionality (*i.e.*, “new supply”), deliverability, and hourly-matching (the “three-pillars”) in its regulations implementing the 45V clean hydrogen tax credit. The following analysis elaborates on our prior submission to explain that such an additionality mandate is not only supported by the Inflation Reduction Act, but is indeed required in order to effectuate the statute’s purpose in reducing greenhouse gas emissions and to accurately determine whether hydrogen producers meet the threshold to receive the subsidy.

Crucially, the “new supply” additionality pillar is legally necessary for all projects—grid-connected and behind-the-meter. If *existing* clean energy supply powers an electrolyzer behind-the-meter, then that clean energy supply is diverted away from the grid. Fossil electricity will increase to fill some of that gap, and therefore increase the carbon intensity of the entire grid. Treasury’s regulations must account for that potential increase in systemwide grid emissions.

Introduction

Under section 13204 of the Inflation Reduction Act (“IRA”), the Department of the Treasury must issue regulations describing how to measure a hydrogen producer’s lifecycle greenhouse gas (“GHG”) emissions for purposes of determining eligibility for the IRA’s 45V clean hydrogen tax credit. A hydrogen producer’s lifecycle emissions—which include on-site emissions and emissions from generating the electricity used to run the hydrogen facility—determine the value of the production tax credit the producer is qualified to claim. The credit value follows a sliding scale: the lower the lifecycle emissions, the higher the credit.

The calculation of lifecycle emissions is a straightforward exercise for a hydrogen producer with a dedicated **new** clean energy supply and that does not draw power from the grid. But it is more complex for: 1) a hydrogen producer connected to the electricity grid and drawing grid power to produce hydrogen; and 2) a hydrogen producer that diverts *existing* clean energy generation for behind-the-meter use, thereby resulting in more fossil generation and increasing the carbon intensity of the grid.

Hydrogen production requires a significant amount of electricity, and the majority of U.S. power is still supplied by fossil fuel-fired generation. To qualify for the tax credit, a grid-connected hydrogen producer would need to offset the GHG emissions caused by its grid electricity consumption by purchasing clean energy attributes (“CEAs”) or renewable energy credits (“RECs”). Similarly, a behind-the-meter hydrogen

producer must either a) use new behind-the-meter clean energy supply or b) purchase additionality-verified CEAs or RECs that offset the systemwide GHG emissions caused by diverting existing clean energy from the grid.

The text, structure, and purpose of the IRA support the conclusion that only “additional” clean energy generation—clean electricity supply that is either newly installed, or would have been curtailed or retired but for demand from the hydrogen producer—should count toward the calculation of a producer’s lifecycle emissions. Treasury must incorporate a strong “additionality” mandate into its lifecycle GHG accounting regulations promulgated under section 45V for both grid-connected *and* behind-the-meter projects to ensure that any CEAs or RECs used to offset a hydrogen producer’s lifecycle emissions represent new clean electricity supply, and therefore true avoided emissions.

The following is a summary overview of the arguments supporting additionality:

- **Treasury’s lifecycle emissions regulations must consider how grid-connected and behind-the-meter hydrogen production increases the systemwide emissions of the electricity grid.**
 - The IRA defines “lifecycle greenhouse gas emissions” by reference to section 211(o)(1)(H) of the Clean Air Act.
 - The prevailing interpretation of section 211(o)(1)(H) requires Treasury’s lifecycle analysis to consider how electricity demand from hydrogen production increases the carbon intensity of the electricity grid (*i.e.*, systemwide emissions).
- **Under systemwide emissions accounting, grid-connected hydrogen producers can earn 45V tax credits only if they purchase additionality-verified credits to offset the lifecycle emissions of their grid electricity consumption.**
 - Fossil generation is currently a majority of U.S. electricity supply, and the grid average emission rate is 4-5 times higher than the threshold to qualify for section 45V tax credits.
 - A hydrogen producer drawing grid power will increase systemwide power production and, as a result, systemwide grid emissions. The producer’s demand increases aggregate demand for electricity, which means more electricity must come online to fill the resulting supply gap, including additional fossil generation.
 - To address this problem, legislators stated that producers could purchase credits (*e.g.*, RECs or CEAs) to offset their lifecycle emissions and comply with section 45V’s requirements.
- **Under systemwide emissions accounting, behind-the-meter hydrogen producers can earn 45V tax credits if they use additional (“new”) clean energy supply, or purchase valid credits to offset the systemwide emissions caused by diverting existing clean energy from the grid.**
 - A behind-the-meter producer drawing on additional clean energy supply will not increase systemwide grid emissions, and therefore can likely claim section 45V’s tax credit.
 - A behind-the-meter producer that draws on *existing* supply is diverting that supply from the grid. Because fossil generation will fill at least part of the resulting gap, the producer has indirectly increased the carbon intensity of the grid.
 - Therefore, a producer that wishes to draw on existing clean supply to power a behind-the-meter project must purchase additionality-verified credits to offset the resulting systemwide emission increase.
- **An additionality mandate is required to ensure that CEAs/RECs reflect new clean energy generation, and therefore actual avoided emissions that effectuate section 45V’s emission requirements.**

- Congress conditioned the section 45V tax credit on meeting certain lifecycle emission thresholds. For example, the credit’s minimum tier requires that a producer’s actual lifecycle emissions not exceed 4 kg CO_{2e} per kilogram of hydrogen.
 - If a producer purchases a non-additional CEA/REC—that is, a CEA/REC not backed by new clean energy generation—its actual lifecycle emissions remain the same. It has not actually avoided systemwide emissions, because the underlying clean power would have been generated anyway. However, a CEA/REC backed by new, additional clean energy generation represents actual avoided systemwide emissions.
 - An additionality mandate is the only way to ensure that purchased credits represent *actual* avoided emissions, and therefore effectuate section 45V’s emission thresholds.
 - An additionality mandate does not prevent hydrogen producers from drawing on existing grid power or existing behind-the-meter clean supply—the producer simply cannot demand a generous government subsidy for doing so. Unless the producer offsets the resulting grid emissions increase with new clean supply, their lifecycle emissions will exceed section 45V’s required threshold.
- **The IRA’s reference to the Department of Energy’s GREET lifecycle analysis model does not undermine the conclusion that Treasury must measure systemwide emissions related to hydrogen production.**
 - Section 45V refers to the GREET model as a tool that Treasury can use to quantify lifecycle emissions.
 - Treasury cannot simply employ the current version of the GREET model, because that model does not incorporate lifecycle electric grid emissions or account for CEAs/RECs. The statute expressly permits Treasury to modify GREET or adopt a “successor” model to solve these shortcomings.
 - Treasury must modify GREET anyway, and nothing precludes Treasury from including an additionality mandate during that modification.
- **Any accounting regulation that does not include additionality is inherently arbitrary, because it undermines the stated purpose of the IRA.**
 - An animating goal of the IRA is the reduction of planet-warming emissions.
 - An additionality-free accounting regulation would undermine the IRA’s purpose, because it would increase systemwide emissions. Such a regulation would be inherently arbitrary.
- **None of the legal arguments that industry commenters have raised against this interpretation of the IRA withstand scrutiny.**

Although this analysis expressly focuses on additionality, similar considerations also apply to two other elements of the signatories’ proposed “three-pillar” accounting rule: hourly-matching and geographic deliverability.¹ Those pillars are also critical to ensure that any credits purchased to offset lifecycle emissions reflect actual avoided emissions in line with section 45V’s emission requirements.

¹ See Joint Letter on 45V Implementation (Feb 23, 2023), <https://www.nrdc.org/sites/default/files/joint-letter-45v-implementation-20230223.pdf> (outlining the “three pillars” of additionality, temporal matching, and regional matching); see also Constellation, Comment Letter on Proposed Guidance for Clean Hydrogen and Clean Fuel Production Credits (Dec. 12, 2022) (urging Treasury to adopt “temporal and regional matching.”) [hereinafter “Constellation Comment Letter”].

Analysis

I. Statutory background

Section 13204 of the IRA creates a new tax credit for clean hydrogen production (“section 45V”).² Under section 45V(b), hydrogen producers receive an escalating tax credit based on the lifecycle greenhouse gas emissions rate that they achieve when producing clean hydrogen. To access the credit, a hydrogen producer must have a lifecycle emissions footprint of—at most—4 kg CO_{2e} per kilogram of hydrogen.³ From there, the credit operates on a sliding scale—the lower the lifecycle emissions, the higher the credit tier.⁴ The Secretary of the Treasury must promulgate regulations “to carry out the purposes of [section 45V], including regulations or other guidance for determining lifecycle greenhouse gas emissions.”⁵

The IRA defines “lifecycle greenhouse gas emissions” by reference to section 211(o)(1)(H) of the Clean Air Act (“section 211(o)”).⁶ In relevant part, that provision defines lifecycle emissions as “the aggregate quantity of greenhouse gas emissions (including direct emissions and *significant indirect emissions* such as significant emissions from land use changes) . . . related to the full fuel lifecycle, including *all stages of fuel and feedstock production and distribution . . .*.”⁷

The IRA then states that “lifecycle greenhouse gas emissions shall only include emissions through the point of production (well-to-gate), as determined by the most recent [GREET] model,” or by a “successor” model determined by Treasury.⁸ The GREET model is a lifecycle emissions model developed and maintained by Argonne National Laboratory, which is a research center associated with the Department of Energy.

II. A unified reading of the IRA’s references to the Clean Air Act and to GREET demonstrates that the statute mandates an additionality requirement.

The IRA incorporates section 211(o)’s definition of “lifecycle greenhouse gas emissions.”⁹ That definition outlines the type of emissions that Treasury’s lifecycle analysis must capture.¹⁰ More specifically, as described below,¹¹ the section 211(o) definition makes clear that Treasury must consider the systemwide—and not just project-specific—emissions impacts of hydrogen production.¹² As also discussed below, any section 45V accounting scheme that considers systemwide emissions must include an additionality requirement.¹³

Meanwhile, the statute’s reference to GREET describes a tool that Treasury can use to quantify lifecycle emissions. Contrary to industry assertions,¹⁴ the current version of the GREET model (which ignores systemwide grid emissions related to hydrogen production) does not determine the type of emissions

² Pub L. 117-169 § 13204.

³ 26 U.S.C. § 45V(b).

⁴ *Id.*

⁵ 26 U.S.C. § 45V(f).

⁶ 26 U.S.C. § 45V(c)(1)(A).

⁷ 42 U.S.C. § 7545(o)(1)(H) (emphasis added).

⁸ 26 U.S.C. § 45V(c)(1)(B).

⁹ 26 U.S.C. § 45V(c)(1)(A).

¹⁰ Revealingly, Senator Carper’s original version of section 45V only referenced section 211(o) to define lifecycle greenhouse gas emissions. *See* Clean H2 Production Act, S. 1807, 117th Cong. § 2 (2021). The reference to GREET (or a successor model) came later, likely to identify a possible starting point for Treasury’s lifecycle emissions analysis.

¹¹ *See infra* at Part II(a)(i).

¹² *See infra* at Part II(a)(i).

¹³ *See infra* at Part II(a)(ii).

¹⁴ *See, e.g.*, Constellation Comment Letter at 11 (arguing that the additionality of the electricity powering a hydrogen electrolyzer is “not part of the GREET-determined emissions rate,” and that therefore Treasury’s regulations should not consider additionality).

that Treasury may include in its accounting regulations. The IRA expressly permits Treasury to adopt its preferred lifecycle analysis model—either GREET or a “successor” model.¹⁵ The GREET reference simply requires that Treasury adopt a predictable, authoritative model that all hydrogen producers can use to calculate “well-to-gate” lifecycle emissions (*i.e.*, emissions through the point of production).¹⁶ It prescribes a quantification tool, not a quantification methodology.¹⁷

This distinction between the Clean Air Act definition and the GREET reference is nuanced but critical. Under basic principles of statutory interpretation, a court (or agency) must give full effect to every provision of a statute.¹⁸ But if the current GREET model—and only that model—defines the scope of the emissions lifecycle analysis, then the IRA’s reference to the Clean Air Act is superfluous. The interpretation advanced here—that the Clean Air Act defines “lifecycle greenhouse gas emissions” and GREET is one of the tools for calculating those emissions—does not have that fatal flaw, and it gives full effect to every provision that Congress passed.

- a. The Clean Air Act definition requires Treasury’s lifecycle analysis to consider actual systemwide emissions from hydrogen production, and therefore imposes an additionality requirement on any credits purchased to offset systemwide emissions.
 - i. *Under the Clean Air Act definition of lifecycle emissions, Treasury must impose an accounting regime that measures systemwide grid emissions.*

Under section 211(o) of the Clean Air Act, lifecycle greenhouse gas emissions include “direct” and “significant indirect” emissions related to the “full fuel lifecycle.”¹⁹ Section 211(o) implements the Renewable Fuel Standard (RFS), which creates procurement quotas for automotive biofuels.²⁰ But the prevailing interpretation of section 211(o)’s reference to “significant indirect” emissions in the biofuel context logically requires Treasury to measure systemwide grid emissions in the hydrogen context.

EPA (which administers section 211(o)) has defined a biofuel’s “significant indirect emissions.”²¹ The agency first acknowledges that an “indirect emissions” calculation should capture upstream activities—such as feedstock production—that are clearly traceable to a specific biofuel’s production.²² Imagine, for example,

¹⁵ 26 U.S.C. § 45V(c)(1)(B); *see also* 26 U.S.C. § 45V(f) (providing the Secretary of the Treasury with authority to issue “regulations or other guidance for determining lifecycle greenhouse gas emissions”).

¹⁶ 26 U.S.C. § 45V(c)(1)(B). The phrase “well to gate” does not seem to appear in any other provision of federal law. Therefore, we must assume that Congress simply intended “well to gate” as a synonym for “through the point of production.” *Id.*

¹⁷ This approach aligns with legislative intent. The current version of GREET does not allow for CEAs and/or RECs. Under a systemwide accounting system, no grid-connected electrolyzer would qualify for section 45V without such credits. Because Congress wanted section 45V to cover at least some grid-connected electrolyzers, it is unlikely that they would have defined “lifecycle greenhouse gas emissions” in a way that precluded those electrolyzers from accessing section 45V in the first place. *See infra* at notes 33-41 and accompanying text.

¹⁸ *See TRW, Inc. v. Andrews*, 534 U.S. 18, 31 (2001) (It is a “cardinal principle” of statutory interpretation that “if it can be prevented, no clause, sentence, or word shall be superfluous, void, or insignificant.”)

¹⁹ 42 U.S.C. § 7545(o)(1)(H). The phrase “full fuel lifecycle” does not directly apply here, because section 45V only refers to “well-to-gate” emissions “through the point of production.” 26 U.S.C. § 45V(c)(1)(B); *see also infra* at Part II(b)(ii). This does not alter the analysis. Hydrogen electrolysis uses electricity as a production input. Therefore, any emissions related to electricity generation—that is, the generation of a critical input for electrolysis—clearly occur before the final “point of production.”

²⁰ *See generally* 42 U.S.C. § 7545(o).

²¹ *See* Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program, 75 Fed. Reg. 14,670, 14,765-67 (Mar. 26, 2010) (also known as the “RFS2 Rule”).

²² *Id.* at 14,765.

a farm that grows corn for the domestic ethanol market. If that farm deforests land to grow corn, then EPA will include the resulting emissions in the lifecycle carbon footprint of the eventual ethanol fuel.

Critically, EPA also counts biofuel-related emissions resulting from “indirect land use changes.”²³ In other words, the agency does not just include the emissions from the farm that grows feedstock. It also considers other land use-related emissions—even those outside the United States—that stem from the first farm’s decision to grow biofuel feedstock. If the farm supplying corn to ethanol producers has stopped growing corn for human consumption, then other farms will expand their operations to fill that market gap, deforesting more land to provide corn for humans. The increase in aggregate demand will lead to more emissions across the entire agricultural system. And EPA will include the resulting emissions in a biofuel’s lifecycle carbon footprint.

By considering indirect emissions under section 211(o), EPA measures how biofuel production causes *systemwide* changes in land use-related emissions. The analysis does not focus exclusively on *project-specific* emissions clearly tied to one biofuel producer. EPA has concluded that the statutory text mandates this approach, because section 211(o) requires the agency to consider “*all stages* of fuel and feedstock production”²⁴ Therefore, the agency cannot legally ignore systemwide increases in land use-related emissions, even if they occur overseas.²⁵

Replace the concept of “indirect *land use* change” with “indirect *power use* change,” and the parallel to hydrogen production becomes clear. Consider a grid-connected hydrogen producer. The decision to draw grid electricity (*i.e.*, a feedstock for hydrogen electrolysis) drives up overall grid demand, and therefore the need for additional electricity supply to “bridge [at least some of] the gap.”²⁶ If most of the gap-filling electricity draws on fossil fuels (per the current U.S. generation mix),²⁷ then the carbon intensity of the power grid will go up. The hydrogen producer will indirectly increase systemwide grid emissions, even if it purchases clean energy attributes from existing clean energy resources to match its grid electricity consumption. Similar logic applies to a behind-the-meter producer. A producer that draws on existing clean energy will divert that energy from the grid, increasing the overall carbon intensity of the grid. The producer will therefore increase systemwide grid emissions, even if they do not directly draw grid power.

Congress knew about EPA’s interpretation of section 211(o) when it drafted the IRA.²⁸ By incorporating section 211(o) into the IRA, Congress blessed EPA’s interpretation of that provision, and ordered Treasury to apply EPA’s logic to hydrogen production.²⁹ Thus, Treasury must evaluate the lifecycle greenhouse gas emissions of hydrogen production on a *systemwide*—rather than project-specific—basis. Just as EPA must consider the systemwide land use emissions stemming from production of a biofuel feedstock (*e.g.*, corn), Treasury must consider systemwide power grid emissions stemming from production of a hydrogen feedstock (*e.g.*, electrons).

²³ *Id.*

²⁴ *Id.* at 14,766 (emphasis added).

²⁵ *Id.*

²⁶ See Rachel Fakhry, NRDC, *Success of IRA Hydrogen Tax Credit Hinges on IRS and DOE* (December 8, 2022), <https://www.nrdc.org/experts/rachel-fakhry/success-ira-hydrogen-ptc-hinges-irs-and-doe>.

²⁷ See Energy Information Admin., *Short-Term Energy Outlook* 1 (Feb. 2023), https://www.eia.gov/outlooks/steo/pdf/steo_full.pdf (fossil fuels accounted for 59% of national electricity generation in 2022, compared to 22% for renewables and 19% for nuclear).

²⁸ *Lorillard v. Pons*, 434 U.S. 575, 581 (1978) (Congress is “presumptively aware” of an existing administrative interpretation of a statutory provision when it incorporates that provision, by reference, into a new law).

²⁹ *Id.*

To be sure, industry commenters insist that Treasury’s regulations may not consider systemwide grid emissions.³⁰ But their arguments eerily resemble industry comments that EPA rejected in 2010 when interpreting section 211(o). In 2010, commenters argued that EPA could not consider systemwide land use changes that stemmed from biofuel production, because they were not tied to a specific biofuel project.³¹ Here, hydrogen producers make an analogous argument—that Treasury may not consider systemwide grid emissions, because they do not tie to a specific hydrogen electrolysis project.³² EPA rejected commenters’ arguments then, and Treasury should reject the same arguments now.

ii. Under a systemwide accounting scheme, an additional mandate ensures that grid-connected producers comply with section 45V’s emission thresholds.

Congress structured the 45V credit to reward hydrogen production processes with low lifecycle emissions.³³ Lower lifecycle emissions mean a larger tax credit. But under the systemwide accounting scheme discussed above, no electrolyzer drawing average grid power would qualify for the 45V credit.³⁴ The actual lifecycle emissions rates of grid-connected electrolyzers would be up to 4-5 times higher than even the minimum statutory threshold of 4 kg CO_{2e} per kilogram of hydrogen.³⁵

Therefore, the only way for grid-connected producers to qualify for section 45V is to offset their emissions by purchasing clean generation credits from elsewhere.³⁶ Indeed, the legislative history makes clear that Congress wanted to allow grid-connected producers to offset their emissions with CEAs or RECs.³⁷ But a grid-connected producer may not simply purchase *any* renewable credit to comply with section 45V. The renewable credits must be additional (*i.e.*, represent new clean energy supply) for two related reasons.

First, an additionality requirement flows from the emission thresholds outlined in section 45V.³⁸ Section 45V establishes actual lifecycle emission thresholds for hydrogen producers.³⁹ A producer that draws

³⁰ See, e.g., Constellation Comment Letter at 11.

³¹ *Id.* at 14,766.

³² See, e.g., Constellation Comment Letter at 11.

³³ 26 U.S.C. § 45V(b).

³⁴ See Wilson Ricks et al., *Minimizing emissions from grid-based hydrogen production in the United States*, 2023 Environ. Res. Lett. at 2 (2023) (“Using the current average U.S. generation mix, embodied emissions from grid-connected electrolysis would be far too high to meet statutory requirements for even the minimum PTC.”); Jay Bartlett & Alan Krupnick, Resources for the Future, *Decarbonized Hydrogen in the US Power and Industrial Sectors: Identifying and Incentivizing Opportunities to Lower Emissions* 7 (2020) (“If average grid power had been used for electrolysis, the CO₂ emissions intensity would be more than twice that of SMR because of the inefficiency in the additional step of energy conversion.”).

³⁵ See Ricks, *supra* note 34 at 5 (noting that—without an additionality requirement for grid-connected electrolyzers—attributable emission intensities for hydrogen production could reach 20 kg CO_{2e} per kilogram of hydrogen, compared to the minimum section 45V threshold of 4 kg CO_{2e} per kilogram of hydrogen).

³⁶ *Id.* (“If the use of clean electricity cannot be reliably established, it may be impossible for grid-connected electrolysis to meet the statutory requirements for the 45V PTC.”).

³⁷ The legislators that drafted section 45V expressly stated that “lifecycle greenhouse gas emissions” should include “indirect book accounting factors” such as renewable energy credits. See 168 Cong. Rec. at S4165-6 (Aug. 6, 2022) (colloquy between Senators Wyden and Carper). CEAs or RECs allow a producer to offset their emissions by supporting clean energy somewhere else, and therefore are necessary for grid-connected electrolyzers to satisfy section 45V’s requirements. This strongly suggests that Congress intended for grid-connected electrolyzers that met the IRA’s emissions thresholds to also access the section 45V credit. See *also infra* at notes 49-52 and accompanying text.

³⁸ 26 U.S.C. § 45V(b).

³⁹ This conclusion follows from the IRA’s text. The default reading of the emission thresholds in section 45V is that they represent actual (*i.e.*, real-world) lifecycle emissions. There is no statutory text or legislative history that contradicts this default reading. Therefore, any accounting scheme for a hydrogen producer’s lifecycle emissions must capture that producer’s actual, real-world emissions in order to comply with the IRA.

grid average power is driving real, systemwide emission increases.⁴⁰ Therefore, any credits purchased to offset those increases must represent equally real avoided emissions.⁴¹ If a hydrogen producer purchases a credit that merely represents *existing* clean energy generation, then the producer is not avoiding actual systemwide emissions. The clean power that the credit represents would have been generated anyway, and it does not make the grid any cleaner than it already was.

Therefore, unless the producer is required to purchase additionality-verified credits, the producer has not actually complied with section 45V's requirement to lower systemwide lifecycle emissions below (at least) 4 kg CO_{2e} per kilogram of hydrogen.⁴² On the contrary, the producer's actual lifecycle emissions likely remain closer to 20 kg CO_{2e} per kilogram of hydrogen.⁴³ Put simply, an additionality mandate effectuates section 45V's ironclad emissions thresholds.⁴⁴

Second, an additionality requirement makes section 45V workable and administrable for grid-connected producers. A producer that purchases a non-additional credit cannot prove that the credit represents actual avoided emissions. Moreover, it is impossible for hydrogen producers to prove that any individual electrons that they draw from the bulk transmission system come from clean sources.⁴⁵ By purchasing additionality-verified clean energy credits, producers can prove conclusively that clean energy—and only clean energy—is powering their electrolyzers. This will allow grid-connected producers to qualify for section 45V, and to confidently predict that they will qualify in future years, leading to robust industry growth.

In sum, the IRA's incorporation of section 211(o) of the Clean Air Act means that Treasury must promulgate accounting regulations that measure a hydrogen producer's systemwide emissions footprint. Under that regime, grid-connected producers can only access section 45V by purchasing CEAs and/or RECs. An additionality requirement ensures that those credits reflect real-world avoided emissions, and it is therefore essential to guarantee compliance with section 45V's emission thresholds. Under Treasury guidelines requiring additionality, a hydrogen producer is still free to draw on existing grid power—it simply cannot demand a generous government subsidy for doing so. Unless the producer offsets the resulting grid emissions increase with new clean supply, their lifecycle emissions will exceed section 45V's required threshold.

iii. Under a systemwide accounting scheme, an additionality mandate ensures that behind-the-meter producers comply with section 45V's emission thresholds.

The same logic discussed above for grid-connected producers also applies to behind-the-meter producers.

Under a systemwide accounting scheme, a behind-the-meter hydrogen producer has two options for receiving the section 45V credit. First, it can generate hydrogen behind-the-meter using new clean energy

⁴⁰ See Ricks, *supra* note 34 at 5.

⁴¹ 26 U.S.C. § 45V(b). Because the emission thresholds in section 45V represent actual emissions, any credits purchased to meet those thresholds must represent actual avoided emissions.

⁴² 26 U.S.C. § 45V(b).

⁴³ See Ricks, *supra* note 34 at 5.

⁴⁴ To be sure, there may be other ways to ensure that clean energy credits reflect actual avoided emissions. If another policy mechanism could achieve the same goal, it may be permissible for Treasury to adopt that mechanism instead of an additionality requirement. But there is no record support for an alternative mechanism, and no industry commenter has proposed one.

⁴⁵ *Id.* at 2 (“[I]t is physically impossible to reliably track flows of power between individual producers and consumers in the bulk electricity system, making verification of clean electricity inputs for grid-connected hydrogen producers a significant challenge.”)

supply. Second, it can divert existing clean energy supply from the grid, while purchasing additionality-verified credits to offset the resulting increase in systemwide emissions.

For behind-the-meter producers that take the second option, an additionality mandate serves the same purpose as it does for grid-connected producers. Namely, it ensures that the producer's actual systemwide emissions fall below section 45V's emission thresholds, and allows the producer to prove the cleanliness of the electricity powering an electrolyzer.

Critically, the additionality mandate does not depend on whether a hydrogen producer is connected to the grid. It applies equally to grid-connected and behind-the-meter producers. And it must. Otherwise, the concrete emission thresholds in section 45V would be meaningless, and Treasury would pay out billions of dollars to subsidize an increase in GHG emissions.

- b. The GREET reference prescribes the tool for Treasury's lifecycle emissions analysis, but it does not dictate the scope of that analysis.
 - i. *Nothing in the text or structure of the statute's reference to GREET states that the current GREET model prescribes Treasury's lifecycle emissions analysis.*

We now turn to the IRA's reference to GREET. Put simply, the current version of GREET does not dictate the type of lifecycle emissions analysis that Treasury may adopt. Instead, the GREET reference simply states that any quantitative analysis of lifecycle emissions must come from GREET or a "successor" model.⁴⁶ The precise contours of the lifecycle analysis itself are up to Treasury (subject to the fixed definition of "lifecycle greenhouse gas emissions" in section 211(o)). The text, structure, and history of section 45V confirm this approach.

First, nothing in the text of section 45V suggests that the current version of the GREET model should dictate Treasury's lifecycle analysis regulations. On the contrary, the text makes clear that Treasury may either adopt the current version of GREET or a "successor" model that the agency identifies.⁴⁷ Indeed, Treasury could publish guidelines that require revisions to GREET (in consultation with expert sister agencies), and then propose the modified GREET as its "successor" model. Put differently, it cannot be the case that the current version of GREET establishes the only acceptable lifecycle emissions analysis, because the IRA explicitly empowers Treasury to—at any time—adopt a different or supplemental lifecycle analysis model.

Second, any other interpretation of the GREET reference would render other statutory provisions superfluous. If Congress wanted the current GREET model to determine a hydrogen producer's lifecycle emissions, then there would have been no reason to reference the Clean Air Act at all. On commenters' proposed reading, the GREET model is a plug-and-play solution for lifecycle emissions analysis. But this approach would violate the "cardinal principle" of statutory interpretation that "if it can be prevented, no clause, sentence or word shall be superfluous, void, or insignificant."⁴⁸ The only way to give the Clean Air Act definition meaning is to consider GREET as one possible tool for measuring lifecycle emissions (as defined by section 211(o)), rather than as a standalone definition of lifecycle emissions.

Finally, the legislative history of section 45V suggests that Congress did not lock Treasury into using the current GREET model. During a colloquy on the Senate floor, Senators Wyden and Carper agreed that Treasury's regulations must permit "book accounting factors [*e.g.*, renewable energy credits] . . . that reduce

⁴⁶ 26 U.S.C. § 45V(c)(1)(B).

⁴⁷ *Id.*

⁴⁸ See *TRW Inc. v. Andrews*, 534 U.S. 18, 31 (2001).

effective greenhouse gas emissions.”⁴⁹ The legislators agreed that grid-connected hydrogen producers should be able to purchase renewable energy credits that offset their grid electricity consumption.⁵⁰ But GREET currently does not consider such credits.⁵¹ And without those credits, no current grid-connected hydrogen producer can qualify for section 45V.⁵² Congress would not extend a subsidy to grid-connected producers, and then deny it in the same breath. The more reasonable conclusion is that the current GREET model does not prescribe the contours of Treasury’s lifecycle emissions analysis.

- ii. *The GREET reference slightly narrows the prevailing interpretation of section 211(o), but it does not alter section 211(o)’s requirement to measure lifecycle emissions on a systemwide basis.*

In its reference to the GREET model, Congress slightly narrowed section 211(o)’s definition of “lifecycle greenhouse gas emissions.” But this small alteration does not undermine the conclusion that Treasury must calculate the systemwide grid emissions that result from hydrogen production.

EPA’s interpretation of section 211(o) includes emissions that occur downstream of fuel production, such as distribution and consumption-related emissions.⁵³ Congress modified this approach in the IRA, stating that producers should calculate the lifecycle emissions for hydrogen “through the point of *production* (well-to-gate).”⁵⁴ Therefore, Treasury’s lifecycle accounting regulations must include certain pre-production emissions (*e.g.*, those generated to produce power for electrolyzers), but not post-production emissions (*e.g.*, those stemming from subsequent hydrogen consumption).⁵⁵

Congress’s decision to slightly narrow section 211(o) does not undermine the conclusion that Treasury’s regulations must consider systemwide grid emissions related to hydrogen electrolysis. Nothing in the text of the IRA requires excluding any other elements of section 211(o)’s definition of lifecycle greenhouse gas emissions, including its reference to systemwide emissions from feedstock production. And under basic principles of statutory interpretation, Congress’s decision to establish just one express limitation presumptively implies that it wanted the rest of the section 211(o) definition to remain untouched.⁵⁶ Here, there is no legislative history that undermines that presumption.

III. Any accounting regulation that lacks an additionality component is unlawful, because it would undercut an animating purpose of section 45V and the IRA.

- a. *A central purpose of both section 45V and the IRA is the reduction of greenhouse gas emissions through subsidized clean energy deployment.*

The text and legislative history of the IRA (and section 45V) show that Congress passed the law to reduce nationwide greenhouse gas emissions by subsidizing clean energy deployment. Congress did not want to promote the hydrogen industry for its own sake. It wanted to promote low-carbon hydrogen that would reduce overall greenhouse gas emissions.

⁴⁹ See 168 Cong. Rec. at S4165-66.

⁵⁰ *Id.*

⁵¹ See Amgad Elgowainy et al., Argonne Nat. Lab., *Hydrogen Life-Cycle Analysis in Support of Clean Hydrogen Production* at 7, 11-14 (Oct. 2022).

⁵² See *supra* at note 34.

⁵³ See 75 Fed. Reg. at 14,677.

⁵⁴ 26 U.S.C. § 45V(c)(1)(B) (emphasis added).

⁵⁵ *Cf.* 75 Fed. Reg. at 14,801 (distinguishing between emissions related to biofuel production and those related to eventual biofuel combustion).

⁵⁶ See *TRW, Inc.*, 534 U.S. at 28 (when Congress provides a specific exception to a general rule, courts should not imply additional exceptions without clear evidence of legislative intent).

Consider the precise structure of the 45V tax credit. For a lifecycle greenhouse gas emissions rate below 0.45 kg CO_{2e} per kilogram of hydrogen, the credit is \$3 per kilogram of hydrogen.⁵⁷ If the lifecycle emissions rate is between 0.45 and 1.5 kg CO_{2e} per kilogram of hydrogen, then the credit drops by two-thirds to \$1 per kilogram.⁵⁸ And after two more step-down tiers, the credit is unavailable if the lifecycle greenhouse gas emissions rate is above 4 kg CO_{2e} per kilogram of hydrogen.⁵⁹ Thus, Congress explicitly designed a tax credit regime to incentivize low-carbon hydrogen deployment. The steep step-down from \$3 to \$1 (and then to \$0) shows that Congress did not want to promote *all* hydrogen production. On the contrary, the legislature put a thumb on the scale in favor of the *cleanest* hydrogen production.

The legislative history of section 45V and the IRA also demonstrates that greenhouse gas reductions were a core legislative purpose. The hydrogen production tax credit in the IRA draws almost word-for-word from the Build Back Better Act,⁶⁰ which repeatedly references climate change in its legislative history.⁶¹ When the IRA passed the House, then-Chairman Neal emphasized that the “legislative intent” of the statute’s clean energy tax credits—including section 45V—was to “unleas[h] clean energy deployment, in line with President Biden’s pledge of a 50-52 percent reduction” in net emissions by 2030.⁶² The original drafter of section 45V described the hydrogen production credit as one that would “promote clean energy [and] fight climate change.”⁶³ And during the bill’s signing ceremony, President Biden referred to the IRA as the “biggest step forward on climate ever.”⁶⁴

b. An accounting regulation without an additionality component would be unlawful, because it would undermine the emission reduction goals of the IRA and section 45V.

Congress made clear that the IRA was a climate bill.⁶⁵ One of its central goals was to reduce emissions. And the clarity of Congress’s intent is important for two reasons.

First, as noted above, section 45V requires Treasury to issue regulations that “carry out the purposes of this section.”⁶⁶ But if Treasury were to promulgate an accounting regulation without an additionality requirement, it would entirely undermine the purpose of section 45V. A grid-connected or behind-the-meter hydrogen project’s actual emissions could exceed section 45V’s lifecycle emissions thresholds, but then receive tax subsidies based on little more than poorly verified clean energy credits that do not reflect an increase in overall clean electricity generation.⁶⁷ Treasury would disburse billions of dollars in exchange for avoided emissions that exist only on paper. It is simply implausible that Congress intended that result when it passed the avowedly pro-climate change mitigation IRA.

⁵⁷ 26 U.S.C. § 45V(b).

⁵⁸ *Id.*

⁵⁹ *Id.*

⁶⁰ See 168 Cong. Rec. at H7664 (Aug. 12, 2022) (statement of Representative Neal) (“Many provisions of Subtitle D [the clean energy subtitle of the IRA] remain substantially similar to those that the House developed and passed [in the Build Back Better Act].”).

⁶¹ See H. Rept. 117-130 at 3-4 (2021) (“The climate crisis is displacing families, upending local economies, and endangering our national security.”); *id.* at 4 (“[W]e face a catastrophic climate crisis that threatens life as we know it.”); *id.* at 5 (“The climate crisis is an existential threat that must be handled immediately The Build Back Better Act will provide comprehensive investments, including clean energy and transportation tax credits, to help us reduce our carbon footprint.”)

⁶² *Id.*

⁶³ 168 Cong. Rec. S4165-03, S4165 (statement of Senator Carper).

⁶⁴ Remarks By President Biden at Signing of H.R. 5376, the Inflation Reduction Act of 2022, 2022 WL 3367985, at *3.

⁶⁵ See *supra* at Part III(a).

⁶⁶ 26 U.S.C. § 45V(f).

⁶⁷ See *supra* at note 35.

Second, regulations that fundamentally undermine an animating purpose of their enabling statute are inherently arbitrary. Even when a statutory provision confers general regulatory authority, a rule promulgated under that provision must reflect Congress’ “general intent.”⁶⁸ EPA agreed when it chose to count systemwide land use-related emissions stemming from biofuel production under section 211(o). There, the agency noted that the purpose of the RFS was to “achieve some reduction in [greenhouse gas] emissions in order to help address climate change.”⁶⁹ A reading of section 211(o) that excluded indirect international land use changes would “essentially undermine the purpose of the provision” and would therefore be “arbitrary interpretation of the broadly phrased text used by Congress.”⁷⁰

The same principle applies here. A central purpose of the IRA is the reduction of greenhouse gas emissions. Treasury may not promulgate regulations that undermine that expressly stated (and structurally implied) goal.⁷¹ Because an additionality-free regulation would do just that, Treasury has no authority to issue one.

IV. Industry commenters’ arguments against an additionality requirement are unavailing.

Commenters to Treasury have raised several arguments against an additionality requirement. None of them is persuasive.

First, commenters note that an additionality requirement does not expressly appear in the text of section 45V.⁷² But as discussed above, an additionality requirement inheres within section 45V’s emission thresholds and its incorporation of section 211(o) of the Clean Air Act,⁷³ which industry commenters consistently ignore.⁷⁴

Second, commenters argue that the emissions profile of the broader electricity grid cannot fall within Treasury’s accounting scheme, because grid emissions are “not part of [an electrolyzer’s] GREET-determined emissions rate.”⁷⁵ But as discussed above, this interpretation would render the express adoption of the Section 211(o) definition superfluous. The commenters’ position treats the current GREET model’s inability to account for grid-wide emissions as trumping Congress’s incorporation of section 211(o)’s requirement for systemwide emissions accounting. Commenters therefore elide both section 211(o) and Treasury’s authority to modify or succeed the current GREET model. Ironically, at least one industry commenter repeatedly cites

⁶⁸ See *U.S. v. Haggard Apparel Co.*, 526 U.S. 380, 392-93; cf. *Michigan v. EPA*, 576 U.S. 743, 751 (2015) (EPA decision to exclude cost when considering whether a power plant regulation was “appropriate and necessary” strayed “far beyond” the bounds of reasonable statutory interpretation).

⁶⁹ See 75 Fed. Reg. at 14,766.

⁷⁰ *Id.*

⁷¹ Cf. *Ragsdale v. Wolverine World Wide*, 535 U.S. 81, 95 (2002) (striking down a penal regulation under the Family Medical Leave Act because it was, inter alia, “inconsistent with Congress’ [remedial] intent.”); *NationsBank of North Carolina v. Variable Annuity Life Ins.*, 513 U.S. 251, 257 (1995) (a regulation only receives “controlling weight” if it fills a statutory gap in a manner consistent with the legislature’s “revealed design”).

⁷² See Constellation Comment Letter at 11; Plug Power, Comment Letter on Proposed Guidance for Clean Hydrogen and Clean Fuel Production Credits at 11-12 (Dec. 2, 2022) [hereinafter “Plug Power Comment Letter”]. *But cf.* NextEra Energy, Comment Letter on Proposed Guidance for Clean Hydrogen and Clean Fuel Production Credits at 10 (Dec. 2, 2022) (discouraging additionality on policy grounds, but not suggesting Treasury may not adopt an additionality requirement) [hereinafter “NextEra Comment Letter”].

⁷³ See *supra* at Part II(a).

⁷⁴ See, e.g., Plug Power Comment Letter at 4-5 (citing section 45V’s reference to GREET, but failing to even mention its reference to section 211(o)).

⁷⁵ See Constellation Comment Letter at 11; cf. NextEra Comment Letter at 2 (urging Treasury to adopt GREET to “qualify projects”); Plug Power Comment Letter at 4-5 (stating that the IRA defines lifecycle emissions as those captured by the “most recent” GREET model, but ignoring both the Clean Air Act definition and the “successor model” language in the same statutory provision).

the canon against superfluity in its letter to Treasury.⁷⁶ That canon undermines—rather than supports—the commenters’ position.

Third, commenters note that hydrogen producers may stack the 45V credit with the 45U production tax credit for legacy nuclear generators.⁷⁷ Therefore, the commenters argue, Congress could not have intended an additionality requirement, because it allowed hydrogen producers to claim the 45V credit even when they drew on existing nuclear reactors to power their electrolyzers.⁷⁸

Congress’s decision to stack the 45U and 45V credits does not undermine the case for an additionality mandate. Indeed, a producer drawing on a nuclear reactor claiming 45U could still satisfy an additionality requirement. The reactors could produce additional clean electricity (*i.e.*, above their traditional baseline) to power grid-connected and/or behind-the-meter electrolyzers. Hydrogen-induced electricity demand could extend the lifecycle of nuclear reactors that would otherwise shut down without IRA support.⁷⁹ And the producer could still purchase verified credits from additional, hourly matched clean electricity to offset the lifecycle emissions of diverting nuclear power from the grid. In essence, a producer that stacks the 45V and 45U credits could still effectively draw on new clean electricity supply.

Fourth, commenters suggest that an additionality requirement would not be a “rational or feasible means” for implementing the IRA, because it will “impair the efficiency of producing clean hydrogen.”⁸⁰ As the signatories have argued elsewhere, commenters are simply wrong that an additionality requirement will render the clean hydrogen industry “dead on arrival.”⁸¹ Moreover, commenters fail to explain why their position is consistent with Congress’s stated purpose to reduce greenhouse gas emissions, or the IRA’s explicit incorporation of section 211(o) of the Clean Air Act. Without an additionality requirement, electrolyzed hydrogen production would increase systemwide emissions while receiving billions in government subsidies.⁸² Given the legislative history of the IRA, it is unlikely that Congress intended this result.

Fifth, commenters suggest that the technology required to implement the “three pillars”—especially hourly matching—is not yet available. They argue that any requirement to adopt such technology is impractical, and therefore arbitrary.⁸³ Commenters are mistaken. As an initial matter, the required technology for implementing the “three pillars”—additionality, geographic deliverability, and hourly matching—is available and sophisticated.⁸⁴

Moreover, even if the technology were not yet available, there is nothing inherently arbitrary about a technology-forcing regulation. In the context of environmental regulations that *require* (and do not merely, as here, *encourage*) the adoption of certain technologies, the D.C. Circuit has held that an agency “may base a standard or mandate on future technology when there exists a rational connection between the regulatory

⁷⁶ See *id.* at 11 n.34.

⁷⁷ See *id.* at 12; see also 26 U.S.C. § 45U(c)(2) (citing 26 U.S.C. § 45(e)(13)(A)).

⁷⁸ See 26 U.S.C. § 45U(c)(2) (citing 26 U.S.C. § 45(e)(13)(A)).

⁷⁹ See, e.g., John Larsen et al., *A Turning Point for US Climate Progress: Assessing the Climate and Clean Energy Provisions in the Inflation Reduction Act*, Rhodium Group (Aug. 12, 2022), <https://rhg.com/research/climate-clean-energy-inflation-reduction-act/> (noting that the IRA will prevent the retirement of 10-20 GW of nuclear-generated electricity by 2030).

⁸⁰ See Constellation Comment Letter at 13-14; see also NextEra Comment Letter at 10.

⁸¹ See Joint Letter on 45V Implementation (Feb 23, 2023), <https://www.nrdc.org/sites/default/files/joint-letter-45v-implementation-20230223.pdf>.

⁸² See *supra* at note 35.

⁸³ See, e.g., Plug Power Comment Letter at 5.

⁸⁴ See Joint Letter on 45V Implementation (Feb 23, 2023), <https://www.nrdc.org/sites/default/files/joint-letter-45v-implementation-20230223.pdf>.

target and the presumed innovation.”⁸⁵ Unless there are “theoretical objections” to a technology’s viability, an agency need only give “plausible reasons for its belief that the industry” will be able to adopt the technology within the time frame provided by the regulation.⁸⁶ Thus, even if the relevant technology for the “three pillars” were not yet available, Treasury would be well within its authority to require that technology over a reasonable timeframe.

Sixth, some commenters suggest that an additionality mandate is not required for producers that rely on behind-the-meter generation. This is incorrect. As discussed above, such producers will almost always increase systemwide grid emissions if they divert existing clean energy supply from the grid. Fossil electricity will increase to fill at least some of the gap, driving up the entire grid’s emissions. Therefore, behind-the-meter producers may only claim the section 45V credit if they rely on additional behind-the-meter supply, or purchase additionality-verified credits to offset their lifecycle emissions.

Conclusion

Treasury must mandate “additionality” in its lifecycle GHG accounting regulations implementing the section 45V clean hydrogen tax credit to ensure that hydrogen producers’ lifecycle emissions are truly offset by new clean electricity supply. The text, structure, and purpose of the IRA support such a mandate to prevent the clean hydrogen tax credit from having the perverse effect of actually *increasing* GHG emissions—clearly the opposite of what Congress intended in passing the most significant climate legislation in U.S. history.

Sincerely,

Clean Air Task Force

Natural Resources Defense Council

⁸⁵ See *Am. Petrol. Inst. v. E.P.A.*, 706 F.3d 474, 480 (D.C. Cir. 2013) (collecting cases).

⁸⁶ See *Nat. Petrochemical & Refiners Ass’n v. E.P.A.*, 287 F.3d 1130, 1144 (D.C. Cir. 2002) (quoting *Nat. Res. Defense Council v. E.P.A.*, 655 F.2d 318, 333 (D.C. Cir. 1981)).