February 26, 2024

SUBMITTED ELECTRONICALLY

Mr. Douglas W. O'Donnell
Deputy Commissioner for Services and Enforcement
Internal Revenue Service
CC:PA:LPD:PR (REG-117631-23)
Room 5203
P.O. Box 7604, Ben Franklin Station
Washington, DC 20044

RE: Comments on Section 45V Credit for Production of Clean Hydrogen, Notice of Proposed Rulemaking and Notice of Public Hearing, 88 Fed. Reg. 89220 (Dec. 26, 2023)

Dear Mr. O'Donnell:

HIF Global, LLC ("HIF") respectfully submits these comments to the Department of the Treasury ("Treasury") and the Internal Revenue Service ("IRS") regarding the recently issued proposed regulations that would, in connection with the Inflation Reduction Act of 2022 (the "IRA"), provide rules for producers of clean hydrogen. These comments address the production tax credit for clean hydrogen under section 45V.[1]

The IRA provided for a tax credit for the production of "qualified clean hydrogen." Proposed regulations published in December 2023 offered much-anticipated guidance regarding the section 45V tax credit. However, we are concerned that the proposed regulations, as drafted, threaten to greatly constrain, or even eliminate, the incentive value this credit holds for the clean hydrogen production industry and the resulting environmental benefits.

We recommend that the regulations be modified to:

[1] Unless otherwise noted, all references to "section" are to sections of the current Internal Revenue Code or the Treasury regulations thereunder.

1. adopt a GREET model safe harbor for determining emissions based on a hydrogen production facility's beginning-of-construction date;

2. allow for a portion of eligible energy attribute certificates ("EACs") to be annually matched to enable hydrogen production facilities that cannot meet the strict 100% hourly matching requirement to contribute to our nation's clean energy goals;

3. allow for renewable natural gas and green hydrogen as an allowable heat source for diabatic energy storage processes that contribute to hydrogen production qualifying for the 45V tax credit; and

4. create an exception for taxpayers electing section 6417 elective payment with respect to section 45V tax credits to make such an election on an amended return in the event such section 45V credits are first claimed on such amended return due to verification report completion timing.

The rest of this letter addresses these issues in more detail.

I. About HIF Global, LLC

HIF Global ("HIF") is the world's leading electrofuels ("eFuels") company. HIF is developing projects in the USA and internationally to produce green hydrogen and synthesize it into drop-in, carbon-neutral eFuels. eFuels can be used in existing engines and fuel transportation, storage, and delivery infrastructure without any modifications whatsoever, thereby enabling fossil fuels to remain in the ground and providing a ready market for green hydrogen. HIF's vision is to become the largest eFuels producer in the world, producing 150,000 barrels per day of eFuels by 2035, and supplying fuels to all transportation sectors to meet global goals for greenhouse gas emissions reduction. HIF has already begun producing eFuels at its Haru Oni eFuels facility in southern Chile and has been shortlisted for the Australian Hydrogen HeadStart incentive program for its eFuels project in Tasmania, Australia.

Last year, HIF received initial authorization from the Texas Commission on Environmental Quality to begin construction and operate the world's largest eFuels production facility, located in Matagorda County, Texas, and engineered to commence construction this year. The Matagorda eFuels facility is designed to produce approximately 1.8 gigawatts (up to approximately 300 million kilograms) of electrolytic hydrogen per year and is expected to purchase more than 5 gigawatts of incrementality renewable power capacity under long-term power purchase agreements to supply the facility.

The green hydrogen produced at the Matagorda, Texas facility will subsequently be converted to eFuel and sold under long-term contracts to prominent ocean-going

shipping concerns as a replacement for bunker fuel, which will facilitate compliance with international initiatives to reduce carbon emissions from global transport. HIF may also produce sustainable aviation fuel (eSAF) in a similar manner. HIF will structure its power supply arrangements and operate the Matagorda facility to ensure compliance with the maximum available section 45V tax credit for production of clean hydrogen.

The cost to produce hydrogen and eFuels is dependent on three main factors: (1) the construction cost of the facility; (2) the cost of the electricity supply; and (3) the utilization of the facility. The construction cost of the Matagorda facility is estimated to be more than $7 billion. Development of a power supply strategy to yield the lowest possible cost of production, highest utilization, and best environmental benefit is critically important – and highly challenging.

HIF, as a leader in the country's rapidly expanding efforts to replace fossil fuels with cleaner alternatives, submits this letter to assist the development of guidance pertaining to the application of the section 45V clean hydrogen production tax credit to the eFuels industry.

II. About eFuels

The transportation sector is one of the largest contributors to U.S. greenhouse gas emissions. According to the *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990–2021* (the national inventory that the U.S. prepares annually under the United Nations Framework Convention on Climate Change), transportation accounted for the largest portion (29%) of total U.S. GHG emissions in 2021. Replacing traditional fossil fuels with eFuels is a vital measure to reduce greenhouse gas emissions in the transportation sector.

eFuels are produced by combining recycled CO_2 (captured from a point source emitter, biogenic sources, or directly from the atmosphere) and hydrogen derived from water electrolysis. With renewable power, such as wind or solar, the electrolysis process separates the molecule of water, obtaining oxygen and hydrogen. The hydrogen is then combined with the captured CO_2 to synthesize eMethanol. eMethanol is an eFuel that can be used as the final product (shipping fuel), or that can be converted into other eFuels, such as eGasoline, eDiesel (for use in cars and trucks), or eSAF (for use in aircraft).

eFuels are chemically equivalent to conventional fossil fuels and are compatible with existing engines and infrastructure. They are referred to as "drop-in" fuels because there are no modifications required for existing infrastructure to use them. Incentivizing the capital-intensive production of green hydrogen based eFuels provides a ready market for green hydrogen without requiring new infrastructure and is a critical step in reducing fossil fuel use.

III. Technical Issues to be Addressed in Final Regulations

a. Provide a 45VH2 GREET Model safe harbor based on a facility's beginning-of-construction date

The proposed regulations provide that the amount of the section 45V tax credit is determined by reference to the life-cycle greenhouse gas emissions rate for all hydrogen produced during the taxable year.[2] The emissions rate is determined under the most recent GREET model – referred to as the 45VH2 GREET model.[3] Therefore, under the proposed regulations, the emissions rate of a qualified hydrogen production facility may be changed (despite continuous production using the same process) if, and to the extent that, the 45VH2 GREET model changes. Such potential variations in the model and the resulting change in the eligible credit amount year-over-year creates significant uncertainty in project financing.

We propose that the final regulations adopt a safe harbor, similar to that provided in other clean energy tax credit provisions, based on the date which a qualified hydrogen facility begins construction. While this proposal would lock in the version of the 45VH2 GREET model in effect as of a facility's beginning-of-construction date, along with the background data and assumptions associated with that year's model, the section 45V credit value would still be calculated annually based on that version of the model. Thus, any emissions with respect to year-to-year modifications in feedstock, electricity consumption, or other foreground data values would be fully accounted for. Therefore, the section 45V tax credit amount would change based on a facility's production process and inputs, but not because of regulatory changes in the 45VH2 GREET model.

Clean hydrogen production relies on nascent technology and requires significant upfront investment. Until the hydrogen industry matures, and costs are reduced through innovation, projects will not be financially viable without reliance on the section 45 tax credits. Allowing taxpayers to rely on the most recent 45VH2 GREET model in place as of the facility's beginning-of-construction date, determined consistently with existing IRS guidance, creates the financial modeling certainty needed for projects to secure requisite funding and be built.

b. Allow for a hybrid hourly/annual EAC matching approach for facilities that begin construction before January 1, 2028

We recognize and support the requests made by other industry participants to grandfather 100% annual matching for the full 10-year section 45V credit term for projects that begin construction before January 1, 2028, and agree that the proposal will

[2] *See* Prop. Treas. Reg. § 1.45V-4(a).
[3] *See* Prop. Treas. Reg. § 1.45V-4(b).

provide the support needed for first-mover projects across the United States. In the case of HIF projects specifically, we can offer an alternative practical proposal to grandfather 20% annual matching for projects that begin construction before January 1, 2028.

The temporal matching rules under the proposed regulations allow for annually matched EACs through December 31, 2027.[4] Thereafter, power represented by an eligible EAC and power consumed by a clean hydrogen production facility must be matched at an hourly level.[5] As proposed, the shift in the temporal matching rules will be immediate, with no grandfather rule provided for facilities that have commenced construction prior to 2028.

The proposed regulations adopt a transition period that demonstrates an understanding of the near impossibility of imposing a 100% hourly matching requirement today. In response to Treasury's and the IRS's request for comments on the appropriate duration of the transition rule to hourly matching, we propose that the final regulations ease the transition period by lessening the stringent 100% hourly requirement and instead move toward a hybrid hourly/annual matching approach.

We propose, for projects that begin construction before January 1, 2028, that 20% of the eligible EACs considered in computing a clean hydrogen production facility's greenhouse gas emissions rate could be annually matched. In other words, out of five megawatt hours of energy used to produce hydrogen, four megawatt hours of energy would generate EACs that are hourly matched to energy used to produce clean hydrogen and one megawatt hour of electricity would generating an EAC that may be annually matched to energy used to produce clean hydrogen.

For the foreseeable future, the intermittency of renewable energy sources, coupled with the high cost of energy storage, will lead clean hydrogen producers to curtail hydrogen production to comply with 100% hourly matching requirements. HIF tested its power supply portfolio[6] for the cost of hourly matching and found that 80% hourly matching can be economically achieved. Increasing hourly matching from 80% to 90% or higher doubles the variable hydrogen production cost per kilogram of incremental hydrogen produced, such that the operator is incentivized to curtail hydrogen production. In the situation where the hydrogen facility is only operating at 80% of its capacity, the total cost of the hydrogen increases materially to cover the return of and return on capital invested for 100% of the capacity. HIF also tested the power portfolio of 80% hourly matching and 20% annual matching against the 2023 ERCOT

[4] *See* Prop. Treas. Reg. § 1.45V-4(d)(2)(iii)(D).
[5] *See* Prop. Treas. Reg. § 1.45V-4(d)(2)(iii)(E).
[6] The data produced by HIF's simulated power portfolio, for costs and emissions, are based on many assumptions. There can be no certainty that actual performance will match the data which is provided for example purposes only.

grid to assess the impact on CO_2 emissions and found that HIF's hydrogen operations would have reduced CO_2 emissions in ERCOT even with 20% annual matching.

The table below, with example data from HIF's simulated power portfolio, shows ***a doubling in the variable hydrogen production cost*** to achieve 90% hourly matching versus 80% hourly matching, due to the increased renewable power and electricity storage capacity needed to achieve the higher hourly matching percentage. The cost to achieve 100% hourly matching would be similarly prohibitive. The variable cost analysis concludes that the facility is most likely to be curtailed at approximately 80% of production.

2030 HIF potential portfolio example	80% hourly 0% annual	90% hourly 0% annual	80% hourly 20% annual
		INCREMENTAL	
Renewable capacity, GW	5.6	0.6	5.5
Storage capacity, GW	0	0.4	0
Hydrogen production, million kg	217	28	270
Power cost, $/MWh	$41	$98	$41
Power cost, $/kg	$2.34	$5.47	$2.32
Variable hydrogen production cost, $/kg	$2.73	$5.47	$2.64

As proposed, the hourly matching requirement under the proposed regulations of the tax credit increases the cost of hydrogen production. Modifying the proposed regulations in the final guidance to allow for annual matching to cover limited periods of intermittency when hourly-matched EACs may not be available or economically viable would incentivize more hydrogen production at a lower cost and would provide greater certainty for capital providers to finance hydrogen facility construction.

Furthermore, allowing for annual matching to cover 20% of the hydrogen production is not expected to increase CO_2 emissions across the ERCOT grid in Texas. The table below contains data from HIF's simulated power portfolio as if it had been added to ERCOT power production and CO_2 emissions that actually occurred in 2023.

HIF's power portfolio is expected to have approximately 3.5 million MWh of excess incrementality power (renewable electricity supply in excess of the Matagorda eFuels facility electricity demand in hours with high wind or solar production) and 3.1 million MWh of power deficit. During the 3.5 million MWh of excess incrementality power, approximately 3.4 million MWh of natural gas fired power and 0.017 million MWh of coal fired power ***would be displaced***, thereby reducing CO_2 emissions by approximately 1,900 million metric tons of CO_2. During the 3.1 million MWh of deficit, the HIF portfolio would need to utilize power from the ERCOT grid and balance with

annually matched EACs. Based on the simulation of 2023, ERCOT grid utilization would have required an estimated 3.1 million MWh of natural gas fired power which would have emitted approximately 1,650 million metric tons of CO_2. In total, annual CO_2 emissions in ERCOT would have ***decreased*** by approximately 222 million metric tons as a result of the HIF Matagorda eFuels facility had it been operational in 2023 and operating with 80% hourly matched and 20% annually matched renewable power generated by its power contracted under power purchase agreements and meeting the requirements for incrementality.

Simulation of potential HIF Matagorda eFuels facility power requirements against actual 2023 ERCOT	HIF power surplus	HIF power deficit	Net CO_2 reduction
Total MWh HIF power surplus and deficit over a year	3,457,673	3,061,598	
Natural gas generation, MWh (displaced) / added	(3,437,586)	3,061,598	
Coal generation, MWh (displaced) / added	(16,779)	-	
Change in CO_2 emissions, million metric tons**	(1,875)	1,653	**(222)**

*** CO_2 emissions calculated using 45VH2-GREET emission factors of electricity generation in Table 3 of the Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH2-GREET 2023, Dec. 2023; Natural gas = 0.54 kgCO2e/kWhe, Coal = 1.1 kgCO2e/kWhe.*

c. Green hydrogen sold for ultimate use in an energy storage process that supplies power for green hydrogen electrolysis should qualify for 45V

Energy storage is critical to achieving a high level of hourly EAC matching and reducing grid power utilized in the electrolysis process – in particular, long-duration energy storage with 12+ hours of storage capability. HIF's review of long-duration storage technologies indicates that most such technologies either under development or ostensibly commercially available are not viable for HIF's use case. Common issues include poor economics in scaling storage duration beyond 20 hours, immaturity of the technology (*e.g.*, limited in-the-field operating experience), and lack of manufacturing capacity at scale. Pumped hydro storage, a commercially proven form of long-duration energy storage, is not practical in ERCOT due to limited suitable topography. However, HIF's has determined that compressed air energy storage ("CAES") represents a proven, financeable solution for long-term energy storage.

There are two forms of CAES – diabatic and adiabatic. Diabatic CAES ("D-CAES") relies on an outside fuel source, historically natural gas, to generate heat during the process. Adiabatic CAES ("A-CAES") recovers and stores waste heat from compression and does not rely on an outside fuel input. D-CAES process uses available electricity to compress air into a salt cavern, creating potential energy. In a green hydrogen supply application, the electricity used to compress the air would have an

hourly-matched EAC from a resource meeting the incrementality and geographic correlation standards, thus satisfying each of the so-called "three pillars." When the stored energy is needed, the released air is expanded to drive a turbine and generate electricity. As the air expands, it naturally gets cooler. With the addition of heat between expansion stages, the D-CAES technology can achieve conversion efficiency that rivals the most efficient natural gas generation technology.

D-CAES suppliers are currently developing combustors capable of firing hydrogen to provide the heat input needed for the D-CAES power generation process. Such an approach allows for both the elimination of carbon emissions from the D-CAES process (due to the substitution of hydrogen for the traditional fossil fuel feedstock) and the ability to achieve muti-day storage duration at low incremental cost. We are concerned, however, that the proposed regulations would unintentionally preclude the use of such beneficial technology through a sweeping anti-abuse rule.

The proposed regulations include an anti-abuse rule that disallows the section 45V tax credit if the primary purpose of the production and sale or use of clean hydrogen is to obtain the credit in a manner that is wasteful, such as the production of qualified clean hydrogen that the taxpayer knows will be vented, flared, or used to produce hydrogen.[7]

We suggest future guidance state explicitly that qualified clean hydrogen produced and sold ultimately to be used in an energy storage process that supplies power for future green hydrogen electrolysis does not run afoul of the anti-abuse rule. The D-CAES process is not a wasteful use of clean hydrogen – in fact, the opposite is true. Producing clean hydrogen for use in energy storage creates demand for green hydrogen and supports the overall conversion of EACs into green hydrogen.

HIF believes that its combination of scale, access to a deep base of attractively priced wind and solar development projects, and proximity to salt caverns suitable for low cost long-duration CAES, make the Matagorda facility an ideal location to install energy storage capability. Burning a limited amount of hydrogen, as an element of an economically attractive long-duration storage process, offers the potential to achieve a lower cost of producing hydrogen overall. In this regard, HIF urges Treasury to reconsider its outright prohibition on the use of hydrogen "to make more hydrogen." HIF understands the legitimacy of Treasury's and the IRS's concerns regarding wasteful use of clean hydrogen, driven by the value of the tax credit. However, in the application that HIF envisions, the hydrogen is clearly being put to a productive use by enabling a cleaner and lower cost energy storage solution.

[7] *See* Prop. Treas. Reg. § 1.45V-2(b)(2).

d. Eliminate discrepancy between section 45V verification report timing requirements and section 6417 elective payment registration requirements

A taxpayer claiming a section 45V tax credit must timely file a verification report.[8] To be considered timely, the verification report must be signed and dated by either (1) the taxpayer's Federal income tax return due date for the taxable year during which the hydrogen undergoing verification is produced or (2) if the credit is first claimed on an amended return, the date on which the amended return is filed.[9] The preamble to the proposed section 45V regulations indicates that if verification occurs after the extended return filing deadline for the taxable year in which the hydrogen was produced, a taxpayer would need to file an amended return to claim the section 45V credit for such hydrogen.[10]

Under section 6417(d)(3)(A)(i)(II)[11], a taxpayer making an elective-payment election with respect to section 45V tax credits must do so by the return filing deadline (including extensions) for the taxable year for which the election is made. A valid registration number is required to make a section 6417 elective-payment election.[12] The registration number must be received before the due date for the original tax return on which the credit is claimed.[13] Under the current proposed regulations to section 6417, no elective-payment election may be made or revised on an amended return or by filing an administrative adjustment request.[14]

Based on the forgoing, the time frames for section 45V verification and the elective-payment registration process may not overlap, as illustrated by the following hypothetical example:

> A calendar-year taxpayer places a qualified clean hydrogen production facility in service on December 1, 2023, and begins producing qualified clean hydrogen that year. The taxpayer completes the section 6417 pre-filing registration process on the IRS electronic portal. Due to processing delays during the portal's first year of operation, the taxpayer receives its registration number on November 15, 2024. The verification report for the 2023 qualified clean hydrogen begins after December 31, 2023, and is completed by November 1, 2024. The taxpayer's original tax return for section 45V credit claimed on the

[8] *See* Prop. Treas. Reg. § 1.45V-5(k).
[9] *See id*.
[10] *See* 88 Fed. Reg. 89220, 89224.
[11] Section 6417 authorizes direct pay for Section 45V credits for non-tax exempt taxpayers and provides rules for claiming a direct cash payment.
[12] *See* Prop. Treas. Reg. § 1.6417-2(b)(2).
[13] *See* Prop. Treas. Reg. § 1.6417-2(b)(1)(ii).
[14] *See id*.

hydrogen produced in 2023 is due April 15, 2024 (extended to October 15, 2024). Therefore, the taxpayer did not receive its registration number in time for the original tax return and verification was not complete by the extended due date. While the taxpayer could file an amended tax return to claim section 45V tax credits with respect to the hydrogen produced in 2023, it is precluded from making an elective-payment election with respect to such section 45V credits.

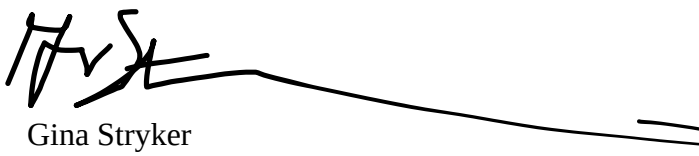
The qualified clean hydrogen facility continues to produce qualified clean hydrogen in 2024. The taxpayer completes the section 6417 pre-filing registration process on the IRS electronic portal on December 15, 2024, and receives its registration number on April 15, 2025. The verification report for the 2024 qualified clean hydrogen begins after December 31, 2024, and is completed by November 1, 2025. While the taxpayer received the registration number in time for the original return, the verification was not completed by the extended due date for the 2024 taxable year during which the hydrogen was produced supporting the section 45V credit. The taxpayer could file an amended return and claim the section 45V credit but is precluded from making an elective-payment election with respect to such credits.

The above example illustrates the timing discrepancy created under the current section 45V and section 6417 proposed regulations. We suggest future guidance correct this discrepancy by allowing taxpayers making a section 6417 election with respect to section 45V tax credits to do so on an amended return in the event that such section 45V credit is first claimed on an amended return (due to inability to complete the verification report by the filing deadline (including extensions) of the applicable tax year).

Conclusion

We appreciate the opportunity to provide these comments. Please do not hesitate to contact me if you have questions or we can provide any additional information.

Sincerely,



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