February 26, 2024

SUBMITTED VIA REGULATIONS.GOV AND USPS

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 Proposed Regulations for Section 45V Credit for Production of Clean Hydrogen

Dear Sir or Madam:

Lake Charles Methanol II, LLC ("LCM" or "our" or "we"), submits this comment letter with respect to the proposed regulations ("Proposed Regulations") from the Department of the Treasury ("Treasury") and the Internal Revenue Service ("IRS") on the credit for the production of clean hydrogen (the "Clean Hydrogen Credit") under section 45V of the Internal Revenue Code of 1986, as amended (the "Code").[1]

As described herein, our comments cover important issues that need to be addressed in the Code section 45V final regulations ("Final Regulations") with respect to (1) determining the lifecycle greenhouse gas ("GHG") emissions rate, and (2) relying on the most recent Greenhouse gases, Regulated Emissions, and Energy use in Transportation model ("GREET") developed by the Department of Energy's ("DOE") Argonne National Laboratory ("ANL").

I. Principal Request for Clarification

For the reasons stated below, LCM requests that Treasury and the IRS, in consultation with DOE, provide functionality in 45VH2 GREET (defined below) to account for carbon oxide co-products generated from methane reforming to the extent that such co-products are captured and actually valorized for productive use in the manufacture of synthetic products like methanol.[2]

[1] 88 Fed. Reg. 89220, Section 45V Credit for Production of Clean Hydrogen; Section 48(a)(15) Election To Treat Clean Hydrogen Production Facilities as Energy Property.

[2] 45VH2 GREET 2023 only models the permanent sequestration of carbon dioxide, as in Class II or Class VI injection wells. 45VH2 GREET 2023 does not model other forms of carbon dioxide utilization (e.g., production of synthetic fuels). U.S. DEPARTMENT OF ENERGY, Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH2 GREET 2023 at 11 n.12, *available at* https://www.energy.gov/sites/default/files/2023-12/greet-manual_2023-12-20.pdf (last visited Feb. 24, 2024).

II. Lake Charles Methanol

A. Clean Hydrogen Facility

LCM plans to build a $3.24 billion clean hydrogen facility near Lake Charles, Louisiana (the "Project").[3] The Project will use autothermal reforming ("ATR") technology with carbon capture and sequestration ("CCS") to produce a mixed stream of clean hydrogen and carbon monoxide from a feedstock of natural gas and renewable natural gas ("RNG"). The stream of clean hydrogen and carbon monoxide will then be used in an integrated synthesis process to (1) generate 3.6 million tons per year of low-carbon methanol[4] and (2) capture and sequester roughly one million tons per year of carbon dioxide.

B. Social and Environmental Justice Benefits

In addition to environmental benefits, LCM will directly advance the Biden administration's environmental-justice objectives by making the $3.24 billion Project investment in the historically disadvantaged Lake Charles community.[5] LCM has developed a comprehensive community benefits plan to ensure the Project implements equitable decision-making and fosters job training and opportunities for those in the Lake Charles community who have been marginalized, underserved, and overburdened by pollution.

The community benefits plan is comprised of four tenets: (1) Community and Labor Engagement; (2) Quality Jobs and Workforce Continuity; (3) Diversity, Equity, Inclusion, and Accessibility; and (4) Justice40 Initiative.[6] Each of these tenets is supported by many components, but some examples of such components include: a community advisory board with regular public and community meetings; job fairs and internships; training and recruiting

---

[3] Lake Charles Methanol II, *available at* https://www.lakecharlesmethanol.com/ (last visited Feb. 19, 2024).

[4] The Project would have 92% fewer carbon emissions as compared to the world's leading methanol producer (as determined under the R&D GREET model discussed below) – approximately 40% of global methanol production is produced from Chinese coal plants. *See* IndexBox, Methanol Production by Country, *available at* https://www.indexbox.io/search/methanol-production-by-country/#:~:text=The%20largest%20methanol%20producers%20in,which%20is%20abundant%20in%20China (last visited Feb. 19, 2024). Chinese coal plants (the world's leading as compared to Chinese coal plants China is the world's leading methanol producer, accounting for approximately 40% of the global production from coal.

[5] THE WHITE HOUSE, Environmental Justice, *available at* https://www.whitehouse.gov/environmentaljustice/ (last visited Feb. 19, 2024). *See also* WWNO – New Orleans Public Radio, Southwest Louisiana residents grapple with pollution, clean energy during DOE's Lake Charles visit, *available at* https://www.wwno.org/coastal-desk/2023-06-16/southwest-louisiana-residents-grapple-with-pollution-clean-energy-during-does-lake-charles-visit (last visited Feb. 19, 2024).

[6] The Justice40 Initiative pillar is intended to be consistent with the federal Justice40 Initiative. *See* THE WHITE HOUSE, Justice40 A Whole-Of-Government Initiative, *available at* https://www.whitehouse.gov/environmentaljustice/justice40/ (last visited Feb. 19, 2024).

partnerships with local educational institutions and transportation accessibility; and quality job creation, clean-energy enterprise creating and contracting, and minimization of environmental exposure and burdens.

C. Local Economic Benefits

The Project will generate significant economic benefits for the local Lake Charles community. A third-party study on the impacts of the Project found the following benefits for the period covering Project construction and the first five years of active operations:

- $2.9 billion of total economic benefits;
- $1.76 billion in labor income;
- 18,735 well-paying jobs created; and
- $210 million of state and local tax revenue.[7]

III. The Clean Hydrogen Credit – Lifecycle GHG Emissions

A. Code Section 45V – Generally

The Clean Hydrogen Credit generally is available to taxpayers for each kilogram ("kg") of clean hydrogen produced, provided that the lifecycle (well-to-gate) GHG emissions generated in the production of such clean hydrogen is at most 4 kg CO_2e per kg of hydrogen.[8] Provided that threshold is met, the Clean Hydrogen Credit operates on a sliding scale, with incremental reductions in lifecycle GHG emissions in the production of clean hydrogen increasing the amount of the Clean Hydrogen Credit.[9] Accordingly, the Clean Hydrogen Credit reflects a dual purpose by incentivizing (1) the production of clean hydrogen and (2) the reduction of lifecycle GHG emissions in clean hydrogen production.

B. Lifecycle GHG Emissions – Proposed Regulations

The Proposed Regulations define the term "emissions through the point of production (well-to-gate)" to mean the aggregate lifecycle GHG emissions related to hydrogen produced at a hydrogen production facility during the taxable year through the point of production.[10] It includes emissions associated with feedstock growth, gathering, extraction, processing, and delivery to a hydrogen production facility.[11] It also includes the emissions associated with the hydrogen production process, inclusive of the electricity used by the hydrogen production

[7] Impacts of the Lake Charles Methanol II Project, David E. Dismukes, Ph.D. Acadian Consulting Group, Oct. 31, 2023.
[8] I.R.C. §§ 45V(a), (b), and (c)(1)(B).
[9] *Id*.
[10] Prop. Treas. Reg. § 1.45V-1(a)(8)(iii).
[11] *Id*.

facility and any capture and sequestration of carbon dioxide generated by the hydrogen production facility.[12]

The Proposed Regulations provide that GHG emissions will be determined under the most recent 45VH2–GREET model ("45VH2 GREET").[13] 45VH2 GREET allows users to input the quantity of certain valorized co-products (co-products resulting from the hydrogen production process that are productively utilized or sold) and allocates emissions to those co-products (rather than to the hydrogen production) as described in the Guidelines to Determine Well-to-Gate Greenhouse Gas Emissions of Hydrogen Production Pathways using 45VH2 GREET ("45VH2 GREET Manual").[14] To allocate the emissions between the hydrogen produced and the valorized co-products listed in Table 4 of the 45VH2 GREET Manual, the preamble to the Proposed Regulations states:

> 45VH2–GREET allows users to input the quantity of valorized co-products (that is, co-products from the hydrogen production process that are productively utilized or sold) and allocates emissions to those co-products (rather than to the hydrogen production) as described in Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH2–GREET 2023.[15]

The preamble solicits comments on the system-expansion approach, including "whether alternative co-product accounting methods, such as physical allocation (for example, energy allocation or mass allocation) or allocation based on other characteristics, would better ensure well-to-gate carbon intensity of hydrogen production is accurately represented."[16] The 45VH2 GREET Manual also notes that additional co-products may be recognized in future versions of 45VH2 GREET.[17]

The key words in the paragraph quoted above and the 45VH2 GREET Manual are that the current model "allows" (not requires) "certain" (not all) valorized co-products to be input to 45VH2 GREET in order to allocate emissions to those co-products (rather than to hydrogen production). These words are critical because the preamble to the Proposed Regulations provides that the allocation of emissions by system expansion is to be done "if possible." As noted in the preamble to the Proposed Regulations, "This restriction is included within the model to avoid incentivizing the over-production of hydrogen co-products like steam to enable access to a higher tax credit value by artificially reducing the calculated carbon intensity of the

---

[12] *Id.*
[13] Prop. Treas. Reg. § 1.45V-1(a)(8)(i).
[14] 88 Fed. Reg. 89225.
[15] *Id.*
[16] *Id.*
[17] U.S. DEPARTMENT OF ENERGY, Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH2 GREET 2023 at 18, *available at* https://www.energy.gov/sites/default/files/2023-12/greet-manual_2023-12-20.pdf (last visited Feb. 24, 2024).

hydrogen (for example, by combustion of fuel onsite that is unnecessary for hydrogen production)."[18]

It makes sense to restrict the use of system expansion (or any other method of co-product accounting) with respect to valorized carbon oxide co-products because permitting such allocations would otherwise result in taxpayers "artificially reducing the calculated carbon intensity of the hydrogen" production.[19] Accordingly, LCM does not seek system-expansion or physical-allocation treatment for its carbon oxide co-products.

Nonetheless, carbon oxides are co-products when they are utilized downstream, as is the case in the production of methanol – a key basic feedstock for the chemical industry and a high-priority hydrogen-carrier fuel – and should be treated as such within 45VH2 GREET for taxpayers utilizing the ATR or steam methane reforming ("SMR") pathways if the resulting carbon oxides are valorized and used downstream of the hydrogen production.

Despite the fact that 45VH2 GREET contains certain fixed assumptions regarding background data that are not permitted to be changed (even if such assumptions are incorrect), a taxpayer is generally required to determine GHG emissions using 45VH2 GREET.[20] A taxpayer may only file a provisional emissions rate ("PER") petition with the Secretary of the Treasury if (1) the feedstock used in the production of clean hydrogen or (2) the hydrogen production technology, is not included in the most recent 45VH2 GREET model.[21]

C. Proposed Regulations on Lifecycle GHG Emissions – Complete Accounting of Co-Products

1. Treatment of Carbon Oxide Co-Products

Congress intended the Clean Hydrogen Credit to be feedstock and technology neutral, with the only qualification criteria being the overall GHG emissions of the hydrogen produced. Accordingly, the statutory text allows taxpayers to calculate the emissions rates of their hydrogen using the most recent version of the GREET model.[22] The primary and most expansive version of the GREET model is the iterative "R&D GREET" model, which has been updated regularly since its creation in 1996 by ANL. When Code section 45V was enacted, the most recent publicly available version of the model was R&D GREET 2021. Since then, two

[18] 88 Fed. Reg. 89225.
[19] *Id*.
[20] Prop. Treas. Reg. § 1.45V-4(b) and 88 Fed. Reg. 89223-89225.
[21] Prop. Treas. Reg. § 1.45V-4(c)(2)(i).
[22] I.R.C. § 45V(c)(1)(B).

more versions of R&D GREET have been released, with the latest release in October 2023.[23] R&D GREET 2023 is intended to be flexible, allowing users to reduce their calculated emissions by accounting for any co-products resulting from the production processes. For taxpayers like LCM, R&D GREET appropriately allows for the accounting of valorized carbon oxide co-products when calculating the emissions rates of clean hydrogen production facilities, including those using ATR like the Project.

For hydrogen reforming, carbon oxide products are essentially interchangeable, with the potential conversion from monoxide to dioxide resulting from the water-gas shift at the end of the production process.[24] This reasoning is consistent with the Proposed Regulations' cross-reference to Code section 45Q with respect to equipment used in "the capture of carbon oxides" – not just carbon dioxide.[25] Indeed, under Code section 45Q captured carbon oxides qualify in general, and the credit is not limited to carbon dioxide.[26] Moreover, both carbon sequestration in secure geologic storage and carbon utilization are recognized pathways under Code section 45Q.[27] With that in mind, references to carbon dioxide with respect to hydrogen reformation should be understood to encompass carbon oxides as a whole.

In June 2023, the DOE released its updated guidance document containing the agency's proposal for a Clean Hydrogen Production Standard ("CHPS"), developed to meet the requirements of the Infrastructure Investment and Jobs Act.[28] The CHPS definition is nearly identical to the definition of clean hydrogen incorporated in Code section 45V and as expanded in the Proposed Regulations.[29] The connection is explicitly noted in the CHPS with the section below:

> The well-to-gate system boundary used to establish the emissions target in the CHPS also aligns with Section 13204 of the 2022 Inflation Reduction Act (IRA), which creates a new 10-year production tax credit (the 45V Credit) for "qualified clean hydrogen"; many commenters also supported this alignment. In the 45V Credit,

[23] U.S. DEPARTMENT OF ENERGY, Office of Scientific and Technical Information, Greenhouse gases, Regulated Emissions, and Energy use in Technologies Model ® (2023 .Net), *available at* https://www.osti.gov/doecode/biblio/113208 (last visited Feb. 20, 2024).
[24] NATIONAL ENERGY TECHNOLOGY LABORATORY, § 6.2.6. Water Gas Shift & Hydrogen Production, *available at* https://netl.doe.gov/research/coal/energy-systems/gasification/gasifipedia/water-gas-shift (last visited Feb. 25, 2024)..
[25] Prop. Treas. Reg. § 1.45V-1(a)(7)(iv).
[26] I.R.C. § 45Q(c)(1)(B).
[27] I.R.C. §§ 45Q(a)(3)(B) and 45Q(a)(4)(B)(ii).
[28] U.S. DEPARTMENT OF ENERGY, Clean Hydrogen Production Standard (CHPS) Guidance, *available at* https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/clean-hydrogen-production-standard-guidance.pdf (last visited Feb. 24, 2024).
[29] *Id*.

> "qualified clean hydrogen" is defined as hydrogen produced "through a process that results in a lifecycle greenhouse gas emissions rate of not greater than 4 kilograms of CO2e per kilogram of hydrogen.[30]

Within the CHPS' discussion of processes that occur downstream of hydrogen production, a footnote explains that "[w]here CO_2 utilization is conducted, the CO_2 may be treated as a co-product of hydrogen production, and the emissions attributed to the hydrogen may be adjusted accordingly."[31] Since carbon dioxide is interchangeable with carbon monoxide within reforming pathways, this explanation supports the conclusion that carbon oxides should be treated as co-products within 45VH2 GREET, reducing the emissions of the hydrogen production process to the extent the carbon oxides are actually valorized for productive use. However, LCM does not seek this treatment for carbon oxides used for the production of methanol for reasons discussed above.

Solution: Adjustment to 45VH2 GREET Interface

Consistent with the well-to-gate approach described in the Proposed Regulations, 45VH2 GREET should be modified such that all valorized carbon oxides that are not emitted during the hydrogen production process are disregarded and treated the same as sequestered carbon for purposes of determining lifecycle GHG emissions. For clarity, to the extent carbon oxides are released directly during hydrogen production, the emissions would still be included in the determination of the taxpayer's carbon intensity. However, Code section 45V requires that lifecycle GHG emissions are calculated solely based on the emissions generated through the point of hydrogen production – not through the lifecycle of the co-products. For integrated facilities like the Project, the carbon oxides generated from methane reforming are captured immediately after their creation and permanently isolated from the atmosphere through the entirety of the hydrogen production process. Accordingly, these valorized carbon oxides intended for subsequent productive utilization should be treated in the same manner as sequestered carbon under 45VH2 GREET and not increase the calculated lifecycle GHG emissions rate of the production process.

The 45VH2 GREET interface assumes any carbon oxides not captured and sequestered are emitted within the well-to-gate system boundary. The 45VH2 GREET Manual cites a 2015 Environmental Protection Agency ("EPA") study on hydrogen production at a refinery for the justification for its treatment of carbon oxides.[32] In the refinery example, it is true that the

[30] *Id*. at 2.
[31] *Id*. at 3.
[32] U.S. DEPARTMENT OF ENERGY, Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH2 GREET 2023 at 8 n.5, *available at* https://www.energy.gov/sites/default/files/2023-12/greet-manual_2023-12-20.pdf (last visited Feb. 24, 2024) (citing

carbon oxides produced in association with hydrogen production for use in petroleum refining are returned to the burner and emitted within the well-to-gate system boundary. However, the same 2015 EPA study states very clearly that not all SMR/ATR production processes result in carbon oxide emissions.[33] In fact, other production processes sell or use the carbon oxides that are produced in the production of hydrogen, as is the case when carbon oxides are used to make methanol downstream of the hydrogen production process.[34]

Based on this study, 45VH2 GREET simply assumes, incorrectly, that all such industrial facilities will release their carbon oxides inside the hydrogen production gate. A simple fix to the carbon balance calculation can be made to the interface and easily rectify this incorrect assumption without triggering an allocation of emissions to the carbon oxides that would artificially reduce the carbon intensity of the hydrogen. To accomplish this objective, the input parameter for "Sequestered CO2" within 45VH2 GREET should simply be re-labeled to "Sequestered and/or Valorized carbon oxides as CO2e" to allow taxpayers to take into account any valorized carbon oxides and prevent the calculation from incorrectly assuming that all non-sequestered carbon is necessarily emitted. Alternatively, the interface calculator could simply add a separate input for "Valorized carbon oxides as CO2e," which would also address the issue.

2. Background and Foreground Data

We understand that certain fixed assumptions are required for 45VH2 GREET, in particular, with respect to information that cannot be independently verified. However, the new 45VH2 GREET includes a fixed assumption that precludes the Project's carbon oxide from being recognized as a valorized co-product, treating it instead as emitted, regardless of the actual end use of the co-product. The 45VH2 GREET Manual notes that the model "assumes that any carbon-containing impurities in the gas stream will be eventually converted by the end user(s) to form CO_2 emissions, and accounts for these CO_2 emissions in the well-to-gate GHG emissions of hydrogen production."[35]

Accordingly, with respect to the Project, the 45VH2 GREET Manual indicates that the carbon oxides within LCM's output stream will be categorized under 45VH2 GREET as an impurity that will emit all of its component carbon oxides, even though this is actually not the case. In fact, within the well-to-gate scope required by Code section 45V any emissions related to the combustion of carbon oxides are accounted for, but emissions should not be assigned to carbon oxides that are valorized and not combusted. As a result of the 45VH2 GREET assumption, applying the Proposed Regulations would result in the Project having an improperly inflated

---

U.S. ENVIRONMENTAL PROTECTION AGENCY, Chapter 5.1: Petroleum Refining, In: AP 42, Compilation of Air Pollutant Emissions Factors, Volume 1, 5th Edition (2015)).

[33] *Id.*

[34] *Id.*

[35] *Id.* at 8.

GHG emissions rate. Given that there are reasonable ways to monitor, measure, and verify the valorized carbon oxide co-products that are not emitted inside the well-to-gate scope, a taxpayer should not be forced to suffer the economic consequences from a decreased Clean Hydrogen Credit, or the loss of the credit entirely, that results from an arbitrarily increased GHG emissions rate. Furthermore, any assumption concerning the eventual emissions of co-products, including valorized carbon oxides, not directly released during the hydrogen production process is reliant on a "cradle-to-grave" co-product analysis that is misaligned with the well-to-gate emissions scope required under Code section 45V.[36]

The incorrect assumption concerning carbon impurities should be addressed by updating 45VH2 GREET to allow taxpayers to account for any valorized carbon oxide co-products through the approach described in the section above, "Solution: Adjustment to 45VH2 GREET Interface." Moreover, valorization and proper accounting of co-products, including carbon monoxide, should not require a pure product stream.[37] The 45VH2 GREET Manual supports this approach, noting that "[i]n practice, hydrogen production facilities are likely to produce gas streams that are not 100% hydrogen."[38] Requiring hydrogen producers to divide and purify component materials from their output gas streams to substantiate valorization would be inefficient for processes like the Project's that require combined gas streams for subsequent methanol production. Such an unnecessary mandate for valorization would reduce the efficiency of integrated facilities and increase emissions through duplicative equipment that would separate the gas stream for valorization, only to reconstitute it later for the production of synthetic products.

The amount of co-product carbon oxide gasses in a hydrogen producer's output streams can be measured accurately through a mass-balance approach, direct measurement, or other similar analysis. Under each method of analysis, the model would retain the ability to differentiate between the mass of carbon oxides that are actually valorized in the gas stream versus the mass of any gasses that are directly emitted during production. Thus, the updated model could ensure that output carbon oxides are accounted for as co-products only to the extent that they are captured and measurable in the gas stream, and any unaccounted-for gas that was not sequestered would be correctly deemed to be directly emitted. Such a modification to the model

---

[36] I.R.C. § 45V(c)(1)(B).

[37] LCM provided an extensive comment letter pursuant to the request for comments pursuant to IRS Notice 2022-58,
2022-47 I.R.B. 483 (Nov. 21, 2022), *available at* https://www.regulations.gov/comment/IRS-2022-0029-0204 (last visited Feb. 25, 2024). In its comment letter, LCM requested that the Treasury and the IRS provide guidance that clarifies that a taxpayer does not have to produce a pure stream of hydrogen in order to qualify for the Code section 45V tax credit. The Proposed Regulations do not include such a clarification in the context of the production of clean hydrogen in a syngas stream: (1) from an auto thermal reformer, (2) using natural gas as a feedstock, and (3) in an integrated project using the syngas to produce methanol.

[38] U.S. DEPARTMENT OF ENERGY, Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH2 GREET 2023 at 8 and 18 Table 4, *available at* https://www.energy.gov/sites/default/files/2023-12/greet-manual_2023-12-20.pdf (last visited Feb. 24, 2024).

would enable 45VH2 GREET to calculate properly the lifecycle GHG emissions rate of integrated clean hydrogen facilities like the Project.

A separate important consideration is the 45VH2 GREET treatment of natural gas transmission distance with respect to with respect to CO2e emissions. 45VH2 GREET includes a background data assumption about natural gas transmission distance that is based on a U.S. average of 680 miles.[39] The model translates this distance assumption into GHG emissions using mileage-based emissions factors.[40] The sourcing of natural gas supply, and the miles of transmission from the source of supply to the hydrogen production facility, is a measurable, verifiable data input that users should be encouraged to adjust according to their actual natural gas transmission distance. Natural gas supply contracts and natural gas pipeline capacity reservations provide accurate data for demonstrating and verifying natural gas transmission distance. Encouraging users to input actual natural gas transmission distance will incentivize producers to procure natural gas closer to their hydrogen production to reduce GHG emissions. The R&D GREET model already contains this functionality. The Final Regulations should clarify that hydrogen producers with measurable, verifiable mileage data should input that data in place of the default mileage assumption.

3. Opportunities to Petition GHG Emissions Rates

We appreciate that it is difficult to promulgate rules that universally apply to all taxpayers, especially in the case of a complex tax credit such as the Clean Hydrogen Credit. Accordingly, where applying 45VH2 GREET would lead to materially incorrect GHG emissions rates, it is reasonable to permit a taxpayer to petition the Secretary of the Treasury with respect to its GHG emissions rates. In the case of the Project as discussed above, 45VH2 GREET (1) is not set up to account for its valorized co-products, and (2) requires calculating GHG emissions on the incorrect assumption that the Project's co-products are not valorized and are instead emitted in the well-to-gate. However, under the Proposed Regulations, LCM would not be permitted to request an alternative determination of its GHG emissions rate because its feedstocks (natural gas and RNG) and hydrogen production technology (ATR of natural gas with CCS) are both "included" in 45VH2 GREET.[41]

Accordingly and in addition to the co-product solution described above, the Final Regulations should allow a taxpayer to file a petition for a PER in the case where the feedstock and hydrogen production technology are covered but the application of that technology is not (for instance, to utilize co-products such as carbon oxides to produce methanol) and results in an emissions rate that is materially different.

---

[39] *Id.* at 17 and n.27.
[40] *Id.*, at 16-17.
[41] Prop. Treas. Reg. § 1.45V-4(c)(2)(i).

To ensure that the PER process supports the development of innovative technologies and approaches to hydrogen production, the Final Regulations should provide reasonable timeframes by which taxpayers can expect a response to a request for an emissions value from the DOE, which is the predicate to the PER petition. The process should also include protocols for taxpayers to respond to any follow-on inquiries from the DOE or submit supplemental information without having to restart the application process and timeframe. Importantly, the Final Regulations should provide an appeals process for taxpayers to resolve disputes regarding emissions values or the PER process.

IV. The Clean Hydrogen Credit - Reliance on 45VH2 GREET

Under the Proposed Regulations, taxpayers would be required to calculate the annual GHG emissions rate of the hydrogen produced using the latest version of 45VH2 GREET publicly available on the first day of the taxable year for which the credit is claimed.[42] Notwithstanding this requirement, if an updated 45VH2 GREET model is made publicly available during the taxable year, the taxpayer would be permitted to elect to calculate its annual emissions using the more recent version of the model. Similarly, a taxpayer that has received – or has submitted a petition for a PER – would be required instead to use the 45VH2 GREET model if its hydrogen production pathway is added to the model during the taxable year for which the credit is claimed.

The DOE user manual notes that 45VH2 GREET is expected to be updated on an approximately annual basis.[43] These changes are expected to add new hydrogen-production technologies and possibly alter the fixed background data to reflect current estimates and other modifications to GREET tools maintained by ANL.[44] Updates to dependency file data could substantially modify the default assumptions for project inputs, such as upstream methane loss rates and the emissions associated with power generation from specific generator types or regional electricity grids.

Regular updates to 45VH2 GREET will ensure that the model can properly account for new process developments and technologies in the burgeoning hydrogen sector. However, the uncertainty associated with annual adjustments to the model or established background data parameters significantly hinders taxpayers' ability to make project cost estimates and long-term economic projections. The process of designing, financing, and constructing capital-intensive hydrogen facilities takes several years. Attracting investment to these multi-billion dollar projects will be significantly more difficult, if possible at all, where the taxpayer must

[42] Prop. Treas. Reg. § 1.45V-1(a)(8)(ii).
[43] U.S. DEPARTMENT OF ENERGY, Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH2 GREET 2023 at 7, *available at* https://www.energy.gov/sites/default/files/2023-12/greet-manual_2023-12-20.pdf (last visited Feb. 24, 2024).
[44] *Id*. at 25.

rely on an annually revised emissions model and corresponding fluctuations in the Clean Hydrogen Credit.

Such unpredictable shifts in 45VH2 GREET are inconsistent with Congress' longstanding reliance on the beginning-of-construction date with respect to energy tax credits, including Code section 45V. Fundamental to Clean Hydrogen Credit eligibility, as well as prevailing-wage and apprenticeship requirements, is the date on which construction began on the facility.[45] Locking in these components at the time when the project begins significant construction efforts provides taxpayers with the necessary certainty to make long-term investments in clean-energy projects. In contrast, the 45VH2 GREET model, as proposed, will continue to be modified regularly throughout the taxpayer's planning, construction, and operation of the hydrogen facility. Without certainty concerning the emissions model used to determine the annual credit value once the facility is placed in service, the taxpayer will have no way of knowing if its hydrogen production process will remain economically viable throughout the facility's lifespan and the 10-year term of the production tax credit. Moreover, the predictability of the resulting annual cash flows from the production process will be determinative of whether the project can achieve a final investment decision at the outset.

In keeping with the overall design of the Code section 45V credit, taxpayers should be permitted to elect to use, throughout the duration of the 10-year credit period, the version of 45VH2 GREET (including the underlying dependency file containing the data and assumptions relevant to that version) that is publicly available on the first day of the taxable year for which the construction of the hydrogen facility began. While this proposed modification would lock in the version of the entire 45VH2 GREET model for the entire 10-year period, the credit value would still be redetermined on an annual basis, thereby fully accounting for the emissions effects of any year-to-year modifications in the taxpayer's feedstock, electricity consumption, or other foreground-data values.

To ensure that the Clean Hydrogen Credit achieves its intended clean-energy and climate objectives, the Treasury Department and the IRS should provide in the Final Regulations that taxpayers may rely on the 45VH2 GREET model (including the related dependency file), which relates to the taxable year in which the construction of the hydrogen facility begins and apply such model for the duration of the 10-year credit period. Such long-term certainty for taxpayers, while maintaining the proposed annual emissions certification requirements, will ensure the viability of critical investments in transformative hydrogen projects.

[45] I.R.C. §§ 45V(c)(3) and (e)(2).

V. Renewable Natural Gas

LCM will be a large consumer of RNG to mitigate the carbon intensity of its hydrogen production. To realize the anticipated emissions benefits of RNG at such a large scale, LCM recommends that the Final Regulations address the following issues related to RNG:

- The "First Productive Use" restriction provided in the Proposed Regulations should be eliminated. This restriction, which in effect is an incrementality requirement, is far more restrictive than the incrementality requirement contained in the Proposed Regulations with respect to electricity used in the production of clean hydrogen, does not reflect the realities of bringing RNG facilities into production, and would undermine the goals of Code section 45V.
- Additional pathways beyond landfill gas must be included in the Final Regulations. By excluding non-landfill RNG-based hydrogen pathways, the Proposed Regulations effectively force projects to assess the lifecycle emissions through the PER process. However, the Proposed Regulations provide that the PER process "will not address other hydrogen production pathways using biogas and RNG until after the final regulations are issued."[46] Including other feedstocks such as biogas from the anaerobic digestion of animal waste, wastewater sludge, and municipal solid waste (MSW), the Final Regulations would reduce the risk of unintended consequences, such economic disparities in the development of the RNG market, and improve the review of RNG pathways and the efficiency of the verification process.

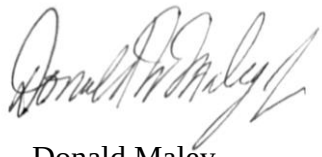
VI. Conclusion

Whether LCM is able to move forward with the Project depends in large part on whether, and to what extent, the Final Regulations for the Clean Hydrogen Credit reflect the reasonable requests made herein. If changes are not made, LCM will be in an unenviable position: the Project's lifecycle GHG emissions will be improperly inflated because 45VH2 GREET precludes the appropriate accounting of valorized carbon oxides and treats carbon oxides contained in the hydrogen stream as though they were emitted, despite the fact that no such emissions occur within the well-to-gate scope required by Code section 45V. Moreover, we will have no way to request a redetermination of the Project's lifecycle GHG emissions rate because its feedstock and hydrogen-production technology are already described within 45V GREET, and we will assume the risk that future 45VH2 GREET adjustments will not significantly hinder project costs and long-term economic projections. Accordingly, we urge Treasury and the IRS to implement appropriate changes to the Proposed Regulations, as described above, when promulgating the Final Regulations for the Clean Hydrogen Credit.

[46] 88 Fed. Reg. at 89240.

Thank you for considering LCM's views and recommendations. If you have any questions or would like to discuss the foregoing in greater detail, please contact me at dmaley@lakecharlesmethanol.com or (646) 206-4263.

Sincerely,



Donald Maley
President & CEO