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CC:PA:LPD:PR (REG-117631-23)
Room 5203
Internal Revenue Service
P.O. Box 7604
Ben Franklin Station
Washington, DC 20044

Re: Comments on REG-117631-23, Section 45V Credit for Production of Clean Hydrogen; Section 48(a)(15) Election to Treat Clean Hydrogen Production Facilities as Energy Property

Ladies and Gentlemen:

Tree Energy Solutions B.V. and its affiliates (collectively, "TES") and TotalEnergies ("TotalEnergies") appreciate the opportunity to provide comments on the proposed regulations issued by the Department of the Treasury ("Treasury") and the Internal Revenue Services (the "IRS") with respect to the Section 45V Credit for Production of Clean Hydrogen and Section 48(a)(15) Election to Treat Clean Hydrogen Production Facilities as Energy Property (REG-117631-23), as published in the *Federal Register* on December 26, 2023 (the "Proposed Regulations").

TES is working to democratize access to reliable and affordable green energy through giga-scale projects and accelerate the energy transition in the United States and around the world by leveraging existing global energy infrastructure to provide customers with e-NG (electric natural gas), also known as renewable synthetic methane, which is a green hydrogen-based, drop-in alternative to fossil natural gas. TotalEnergies is a global multi-energy company that produces and markets energies: oil and biofuels, natural gas and green gases, renewables and electricity, with more than 100,000 employees and operations in more than 130 countries. TES US Development LLC, the U.S. subsidiary of Tree Energy Solutions B.V., and TotalEnergies are currently developing a significant project in the U.S. that will use renewable energy to produce green hydrogen and then combine that hydrogen with captured CO2 to make e-NG. e-NG simultaneously solves the challenges associated with both the infrastructure and demand for decarbonized fuels because it can be transported and stored using existing natural gas and LNG infrastructure, and it is a seamless "drop-in" alternative to traditional natural gas.

We are supportive of many aspects of the Proposed Regulations and appreciate the clarity they would provide on several key questions if adopted in their current form. However, we are concerned that certain provisions of the Proposed Regulations will create significant uncertainty with respect to a project's ability to continue to qualify for the Section 45V tax credit (the "45V

Credit") over time. This uncertainty will make it very challenging to finance large-scale, first-mover projects like ours. In addition, we believe that the proposed incrementality rules should be revised to encourage as much minimal-emitting generation as possible to remain in operation for as long as possible. More specifically, we encourage Treasury and the IRS to consider the following changes to the Proposed Regulations:

- In order to eliminate the uncertainty presented by potential changes to the GREET model after a project is financed, built and in operation, *hydrogen projects should be able to claim the 45V Credit based on the lower of the lifecycle greenhouse gas ("GHG") emissions calculated using (i) the GREET model as it existed at the time that construction of the project began and (ii) the then-current GREET model.* There is long-standing precedent for tying renewable energy credits to the date on which construction of a project begins.

- In order to reduce the significant uncertainty and costs associated with an overnight switch to hourly matching on January 1, 2028, and to allow sufficient time for the development of mature systems for the hourly tracking of energy attribute certificates ("EACs") in every region of the U.S., *projects which begin construction prior to January 1, 2030 should be allowed to use monthly matching for the lifetime of the 45V Credit.*

- Because it will be very difficult for first-mover projects to meet the strict incrementality requirements included in the Proposed Regulations, *projects which begin construction before January 1, 2030 should be provided with an exemption from the incrementality requirements.*

- The final Section 45V regulations should be drafted in a way that maximizes the longevity of existing minimal-emitting power generation, and we believe that each of the following proposals would help achieve that goal:

    - *Existing minimal-emitting generation assets which are over 12 years old and are no longer (i) operating under long-term power purchase agreements ("PPAs") or (ii) collecting production tax credits ("PTCs") and which enter into new, long-term PPAs with hydrogen producers should be considered incremental.* Facilities which have outlived their PPAs and PTCs are the most likely to be curtailed or retired, because by the time a project has outlived its PPAs and PTCs, the project developer has already achieved the majority of its anticipated project returns and has little or no incentive to invest additional capital to keep the facility running. Allowing these assets to be considered incremental if they entered into new PPAs with hydrogen producers would provide just such an incentive and thereby keep more renewable generation assets in service and online.

- *Because capital spent to repower or uprate an existing renewable generation facility typically benefits, and extends the life of, the entire facility, the entire capacity of an uprated facility, as opposed to only the additional capacity, should be considered incremental, as long as the fair market value of the facility's used property is not greater than 20% of the facility's total value after the uprate.* This is consistent with the long-standing "80/20 rule" which applies to the existing PTC regime for renewable facilities.

- We are supportive of a formulaic approach that would allow curtailed or underutilized renewable generation to be counted as incremental power. However, we believe that the amount of time during which minimal-emitting facilities are operating on the margin, and therefore the amount of time during which additional load is unlikely to cause induced emissions, has been underestimated. *As a result, we propose a default allowance of 10%, and that taxpayers be provided with a means to establish and utilize a higher percentage based on localized, historical data.*

Finally, we believe that the final Section 45V regulations should (i) not require EACs to be adjusted for line losses, as doing so would be unduly burdensome, (ii) permit the use of renewable energy storage, (iii) expand the definition of "qualified verifier" to allow the addition of other accreditation bodies at the discretion of Treasury and the IRS and (iv) include explicit relief for hydrogen producers which (A) are unable to meet the applicable filing deadline due to the actions (or inactions) of a qualified verifier or (B) acquire an erroneous or inaccurate EAC in good faith.

In order for the U.S. green hydrogen industry to achieve critical mass and therefore be in a position to help the U.S. meet its climate goals, first-mover projects must be able to secure financing.

In order for the green hydrogen industry in the U.S. to achieve any meaningful scale, the first green hydrogen projects must be "bankable." To be bankable, these projects need certainty with respect to the 45V Credit. But the Proposed Regulations, if finally adopted in their current form, do not provide that certainty. Green hydrogen projects in the U.S. today are already burdened with all the risks that are inherent in taking a nascent industry to scale. The provisions in the Proposed Regulations relating to the use of the "most recent GREET model" (§§1.45V-1(a)(8)(i), 1.45V-1(a)(8)(ii) and 1.45V-4(b)) compound that risk because *the 45V Credit generated by any particular project could decrease over time, and perhaps be eliminated entirely, even if the project's inputs and processes do not change*. Importantly, these potential decreases in the 45V Credit cannot be accounted for in project models, because both the timing and magnitude of the potential decreases will be unknown at the time project sponsors and lenders are making their final investment decision. This uncertainty will make project sponsors and lenders less willing to go forward with innovative green hydrogen projects. This will hinder the development of the U.S. green hydrogen industry, which is a critical component of the Biden administration's ambitious climate programs.

We agree in principle that it is appropriate for the GREET model to be updated as assumptions are refined and the processes for gathering the relevant data become more sophisticated. We also assume that as the GREET model becomes more precise, and background assumptions are replaced by foreground data, the model could yield higher lifetime GHG emissions for a given project. Again, we believe this is entirely appropriate. However, this presents a significant challenge for financing any particular project. When a project's returns are tied to tax subsidies or credits, the certainty of those subsidies/credits is a *critical* aspect of the financing. While every subsidized project needs to become economically viable on a stand-alone basis over time as credits or subsidies are phased out, the Proposed Regulations, as drafted, would create a situation in which the tax credits generated by a particular project could suddenly decline, or be eliminated altogether, due to an ordinary course revision to the model, even if nothing has changed about the project. This prospect will be difficult for project lenders to accept and will make project financing more expensive and harder to find.

The clear intent of the Inflation Reduction Act, and Section 45V in particular, is to accelerate decarbonization in the U.S., including through encouraging and incentivizing the development of a robust hydrogen economy. The first-mover projects – the ones that are already taking on the most risk – should not be held to the same standard as later projects which have benefitted from the lessons learned by those who were willing to "lean in" and take the lead. But this is, in effect, exactly what the Proposed Regulations would do. By way of example, in 2032, a project that was completed in 2027 would have its GHG emissions calculated in the same way as a project completed in 2032, even though the 2032 project will have benefitted from five additional years of research, technological development and operational experience. This would undermine the basic purpose of Section 45V by *discouraging* and *disincentivizing* the rapid development of green hydrogen projects in the U.S. and potentially encouraging a "wait and see" approach instead.

We respectfully submit that a simple "grandfathering" principle would resolve this issue and believe that *hydrogen projects should be able to claim the 45V Credit based on the lower of the lifecycle GHG emissions calculated using (i) the GREET model as it existed at the time that construction of the project began and (ii) the then-current GREET model.* With respect to this proposal, we note the following:

- In order to reduce the uncertainty described above as much as possible, the appropriate date to consider is the date on which construction begins, because this is the objectively verifiable date that is closest to when the final investment decision for a project is made.

- There is long standing precedent for tying tax credits for renewable projects to the date on which construction begins, and the IRS has well established rules regarding the beginning of construction.

- The GREET model already includes a feature which allows users to pick the "year of simulation."

First-mover green hydrogen projects should have additional time to meet the temporal matching and incrementality requirements set forth in the Proposed Regulations. Strict enforcement of those requirements, as drafted, will hinder the development of hydrogen projects in the U.S. by, among other things, making U.S.-produced green hydrogen more expensive and therefore less competitive in both domestic and international markets.

In order to unlock the full potential of the clean hydrogen industry in the U.S., Section 45V must be implemented in a way that (i) accelerates the achievement of price parity between green and grey/blue hydrogen and (ii) puts U.S.-produced hydrogen at the forefront of the global hydrogen economy. But strict enforcement of the incrementality and temporal matching requirements, as proposed, will hurt the competitiveness of U.S.-produced green hydrogen both domestically and internationally. Simply put, it will be difficult, if not impossible, for green hydrogen to achieve price parity with domestic grey or blue hydrogen in the near- to medium-term if green hydrogen producers are saddled with costly regulations that do not apply to grey or blue hydrogen. With respect to the global hydrogen economy, by 2030, the European Union is expected to be one of the largest potential markets for green hydrogen and its derivatives, but for buyers based in Europe, the competitiveness of hydrogen produced in the U.S. could deteriorate relative to alternatives (such as hydrogen produced in the E.U. or other regions with sufficient renewable capacity) if the Proposed Regulations are finally adopted in their current form. This is because the Proposed Regulations are more strict than the European Union's Renewable Energy Directive, which do not require hydrogen producers (i) to implement (and incur the costs associated with) hourly matching until January 1, 2030, or (ii) to comply with incrementality requirements for 10 years in some circumstances.

Temporal Matching. With respect to temporal matching, based on our extensive discussions with renewable providers and other participants in the market for renewable energy certificates, we do not believe that the tracking and trading systems required for hourly matching will be available in every region of the U.S. by December 31, 2027. Even in places where hourly tracking systems are or will shortly be available, it will take time for an efficient, liquid market for hourly EACs to develop. In addition, given permitting requirements, supply-chain constraints, and other factors, it is unlikely that any green hydrogen projects which are not already meaningfully under way will be in service by 2028, significantly reducing the intended impact of the proposed transition period. We therefore suggest that the date for the transition to hourly matching should be delayed. Further, in order to de-risk the earliest hydrogen projects, those that begin construction before the transition date should not be required to switch to hourly matching overnight. Temporal matching requirements are not simply an economic issue; they have engineering, technological and design implications. As a result, requiring an abrupt shift to hourly matching on any particular date will, in effect, mean that *all* projects will have to be designed for hourly matching from the outset, significantly increasing their cost.

On the other hand, we acknowledge that allowing a project to use annual matching indefinitely would be too permissive and potentially lead to excessive induced emissions. As a compromise, we suggest that monthly matching would be reasonable, especially when applied to first-mover projects. *We therefore propose that projects which begin construction prior to January*

1, 2030 should be allowed to use monthly matching for the lifetime of the 45V Credit. At a bare minimum, the Proposed Regulations should be modified to not require hourly matching prior to January 1, 2030, in order to align with European regulations and partially alleviate the competitive concerns addressed above.

We further request that the final Section 45V regulations explicitly allow the IRS to postpone, or otherwise mitigate the burden imposed by, the temporal matching requirements if it becomes clear that hydrogen producers will simply be unable to comply with those requirements by the transition date. Finally, we suggest that the final regulations be revised to require, as a condition precedent to the switch to hourly matching, a formal finding by the IRS, in conjunction with the U.S. Department of Energy, that sufficient market procedures and processes are in place in every applicable region to enable compliance with hourly matching. This finding should be subject to notice and comment and include a reasonable implementation period.

Incrementality. *With respect to incrementality, we suggest that the Proposed Regulations be revised to provide for an exemption from the incrementality requirements for projects that begin construction before January 1, 2030.* We respectfully submit that a permanent exemption for projects which begin construction before January 1, 2030 would not be inappropriate because it would help reduce costs for the leading-edge U.S. hydrogen projects, provide those projects with a competitive *advantage* relative to hydrogen produced in the E.U., and enhance overall project certainty, which, as explained above, will have positive impacts on project financing.

The concept of "incremental" power in the Proposed Regulations should be expanded in order to incentivize the maximum longevity of existing minimal-emitting power generation. Keeping existing minimal-emitting assets that have outlived their original "project lifetime" in service and on the grid would benefit all power consumers as well as the environment, and would have little to no downside.

We believe it should be the policy of the U.S. to keep as much minimal-emitting power generation in service as possible, for as long as possible. The Section 45V regulations present a real opportunity to implement such a policy. As noted in the commentary to the Proposed Regulations, significant quantities of minimal-emitting generation in the U.S. are frequently curtailed or at risk of retirement. Maximizing the amount of minimal-emitting generation that is considered incremental could provide minimal-emitting generation assets which are "marginal" (i.e., operating on merchant basis, frequently curtailed or at risk of retirement) with new life and allow them to continue producing low-carbon power beyond their initially anticipated project lifetime, which would benefit all consumers and the environment.

To that end, we respectfully submit the following:

Curtailment and avoided retirement. Treasury and the IRS accurately identified several challenges associated with allowing power which (i) would otherwise be curtailed or (ii) is generated by an asset that is at risk of retirement to be considered incremental. Many of these challenges arise from the fact that curtailments are unpredictable and often short-lived, and that

determining which assets would have retired absent new load requires a counterfactual analysis. In lieu of developing an elaborate system for tracking curtailments or engaging in complicated counterfactual exercises, we suggest the following as a reasonable proxy: *any minimal-emitting generation asset which is over 12 years old and is no longer (i) operating under long-term PPAs and (ii) collecting PTCs should be considered "likely to retire" and counted as incremental.*

We base this proposal on the fact that assets which have outlived their PPAs and PTCs are the most likely to be curtailed or retired, because by the time a project has outlived its PPAs and PTCs, the project developer has already achieved the majority of its anticipated project returns and has little or no incentive to invest additional capital to keep the facility running, or to even improve its efficiency or productive capacity. Allowing these assets to be considered incremental if they entered into new PPAs with hydrogen producers would provide just such an incentive, and therefore help keep more renewable generation assets in service and online. It could also meaningfully reduce an obstacle to additional renewable development in the U.S. because renewable developers, having secured new, long-term PPAs for their older assets, would be more willing and able to dedicate capital to new projects. These outcomes would= benefit everyone while helping the U.S. meet its climate goals. It is the consummate "win-win" situation.

Uprates. Capital spent to repower or uprate an existing renewable generation facility typically benefits, and extends the life of, the entire facility. In other words, uprate investments are not simply bolt-on projects. *As a result, we believe that the entire capacity of an uprated facility, as opposed to only the additional capacity, should be considered incremental for purposes of Section 45V, as long as the fair market value of the facility's used property is not greater than 20% of the facility's total value after the uprate.* We note that this proposal is consistent with the existing PTC regime for renewable facilities and the so-called 80/20 rule, whereby a repowered facility qualifies as a "newly built" asset if the fair market value of the used property does not exceed 20% of the total project value.

Formulaic approach. Curtailed or underutilized renewable generation is nothing more than a wasted opportunity, and as noted above, it serves as a significant drag on new development. As a result, we are supportive of the proposed formulaic approach, whereby a certain percentage of hourly generation from minimal-emitting generation facilities would be deemed incremental. However, we believe that the percentage of time during which minimal-emitting facilities are operating on the margin, and therefore additional load is unlikely to cause induced emissions, is higher than 5%. First, the 5% estimate proposed by Treasury and the IRS considered only periods of negative power prices. However, data shows that curtailments also occur at times when power prices are $0 or nominally positive. Further, the proposed allowance of 5% was based on a simple average across all generation nodes, whereas a focus on generation nodes with higher renewable supply would likely lead to a higher percentage. Finally, as noted by Treasury and the IRS, the curtailment rate has been growing by approximately 1% per year and is expected to continue growing in the future. *As a result, we propose a default allowance of 10%, and that taxpayers be provided with a means to establish and utilize a higher percentage based on localized, historical data.*

Other comments

EACs and line losses. Treasury and the IRS requested comment on whether EACs should be adjusted to account for transmission and line losses. We believe that doing so would be extremely burdensome for providers of EACs to calculate and track, and for the IRS to validate. By way of example, a renewable generation facility would not be able to simply submit EACs to the appropriate registry based on the information listed in the proposed definition of "eligible EAC" (all of which the producer knows at the time the EAC is generated). Instead, each EAC would need to be custom-tailored for the ultimate purchaser of the EAC – *after* the EAC has been submitted to the registry – by identifying the ultimate purchaser of the EAC and deducting the theoretical line losses associated with delivery of the power covered by the EAC to the purchaser of it. We respectfully submit that the time and effort required to complete this exercise for *every* EAC significantly outweighs any benefits that would be achieved.

Renewable energy storage. By requiring that electricity be "generated" in the same hour that it is used to produce hydrogen, proposed §1.45V-4(d)(3)(ii) does not appear to allow for the storage of renewable electricity by either the generator or the hydrogen producer. It is not obvious why renewable energy that is produced in one hour, stored in a battery, and then consumed later should be treated any differently than renewable energy that is produced and consumed in the same hour. We therefore suggest that the final regulations require that the electricity represented by an EAC is "generated *or delivered from* storage" in the same hour that it is used to produce hydrogen. This revision would permit, for example, a renewable generation facility with verifiable storage capacity to "overproduce" renewable power at times when generation capacity exceeds demand, store that renewable power, and then deliver it to the grid when needed. This would expand the supply of EACs, leading to a more liquid EAC market. It would have the added benefits of encouraging the development of energy storage technologies and providing an incentive for renewable power facilities to add storage to their facilities, which would enhance overall grid reliability.

Definition of "qualified verifier". We respectfully submit that proposed §1.45V-5(h) unnecessarily restricts the potential pool of qualified verifiers by only including two bodies which are authorized to accredit qualified verifiers – the American National Standards Institute National Accreditation Board and the California Air Resources Board. We therefore propose that the definition of "qualified verifier" should explicitly permit the addition of other accreditation organizations at the discretion of Treasury and the IRS pursuant to clearly defined criteria, which would provide potential accreditation organizations with clarity on how they could become recognized accreditors of qualified verifiers under the Section 45V regulations.

Filing deadline. Proposed §1.45V-1(c) provides that "the Section 45V credit is properly claimed with respect to the taxable year of production and is subject to the general period of limitations for filing a claim for credit or refund under section 6511 and other applicable provisions of the Code," notwithstanding delays in the verification process. We respectfully submit that because the required verification process is new and untested, there should be an explicit process for accommodating hydrogen producers who are unable to file (or amend) their returns by the

applicable deadline due to the actions (or inactions) of the qualified verifier. We believe that such an explicit accommodation would be appropriate for several years to allow the verification process to mature.

Errors in EACs. We believe that hydrogen producers should be able to rely on the information contained in the EACs acquired by them in good faith from a qualified EAC registry or accounting system and should not be held accountable for errors or inaccuracies in such information after the fact. For example, under proposed §1.45V-4(d)(2)(v), a qualified EAC registry or accounting system is required to verify that the underlying attributes of each EAC are claimed and retired only once. Hydrogen producers have no way to audit the compliance of EAC registries with the applicable requirements, so if a qualified EAC registry fails to comply, a good faith acquiror of an EAC should not be punished or penalized.

We appreciate the opportunity to provide comments regarding REG-117631-23. If you have any questions regarding this submission, please contact Cynthia Walker at clw@tes-h2.com or Karine Boisssy-Rousseau at karine.boissy-rousseau@totalenergies.com.

Sincerely,

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