C2ES CENTER FOR CLIMATE AND ENERGY SOLUTIONS

C2ES COMMENTS ON IRC SECTIONS 45Y AND 48E

August 2, 2024

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Room 5203
Internal Revenue Service
P.O. Box 7604
Ben Franklin Station
Washington, D.C. 20044

The Honorable Janet L. Yellen
Secretary of the Treasury
Department of Treasury
1500 Pennsylvania Ave. NW
Washington, D.C. 20220

Re: Section 45Y Clean Electricity Production Credit and Section 48E Clean Electricity Investment Credit (REG-119283-23)

Dear Secretary Yellen,

The Center for Climate Change and Energy Solutions (C2ES) respectfully submits these comments regarding the Section 45Y and 48E proposed regulations. We appreciate Treasury's thoughtful approach to implementation of these new tax incentives in the proposed rules, and many of our comments build on that guidance or seek to clarify some of the provisions. We also respond to several of the questions posed by Treasury and the IRS in the preamble.

Specifically, our comments request Treasury to consider several issues of concern regarding additional capacity, allowing the use of the GREET R&D model to conduct the life cycle analysis, and including clean hydrogen and net zero-emissions combined heat and power ("CHP") property on the list of deemed zero-emissions/categorically non-combustion and gasification technologies. Our responses to questions in the preamble address book and claim, and carbon capture and sequestration.

Introduction

C2ES is an independent, nonprofit, nonpartisan organization working to secure a safe and stable climate by accelerating the global transition to net-zero GHG emissions and a thriving, just, and resilient economy. C2ES works closely with leading companies, including members of the Business Environmental Leadership Council, who own, operate, and invest in a broad variety of clean energy production facilities, including solar, wind, nuclear, hydropower, clean hydrogen, energy storage, and fossil energy facilities incorporating full carbon capture. These companies are setting the pace for the adoption of net-zero GHG emissions electrical generation facilities. Timely and effective guidance on the 45Y and 48E tax credits is necessary to help companies meet their clean energy targets, enhance the competitiveness of domestic industries, and encourage the expeditious decarbonization of the US economy.

C2ES has a keen interest in the successful implementation of these technology-neutral tax credits, which are designed to incentivize the adoption of a diverse set of clean energy technologies by offering financial benefits based on environmental performance rather than the specific technology used. This approach promotes innovation, accelerating the reduction of greenhouse gas emissions, enhancing our nation's energy security, and growing our economy through a diversified energy portfolio.

C2ES believes that the proposed regulations provide helpful substantive guidance with respect to several important issues, including the classification of many types of clean technologies as "categorically non-combustion and gasification technologies" that are deemed to be zero emissions sources of electricity, and the ability to rely on published emissions rates in the year when construction begins. These provisions will provide the certainty that many investors and taxpayers need to proceed with clean electricity projects.

To provide ever greater certainty for stakeholders, and help to realize the full potential of the 45Y and 48E credits in accelerating the clean energy transition, C2ES respectfully requests that final regulations clarify and provide additional guidance with respect to the following issues.

Additional Capacity

Measuring increased capacity

Sections 45Y(b)(1)(C) and 48E(b)(3)(B)(i) provide that a qualified facility includes a new unit or an addition to capacity placed in service after 2024. The proposed regulations provide that the amount of increased electricity generated by a new unit or an addition to capacity is determined by reference to the "nameplate capacity" of the facility (Prop. Reg. 1.45Y-4(c)(3)). The proposed rules provide that nameplate capacity is the maximum electrical generating output in megawatts that the unit of

qualified facility is capable of producing on a steady state basis and during continuous operation under standard conditions, as measured by the manufacturer and consistent with the definition of nameplate capacity provided in 40 CFR 96.202. The proposed regulations also provide that taxpayers should use International Standard Organization conditions, if applicable, to measure the maximum electrical generating output of a unit of qualified facility (Prop. Reg. 1.48E-4(a)(3)(2)).

C2ES recommends that Treasury revise the proposed regulation to provide greater clarification and flexibility regarding the measurement of additional capacity, in several ways. In addition to the proposed computation on the basis of nameplate capacity (i.e., comparing nameplate capacity immediately before and after the addition of new capacity), **we recommend that Treasury and the IRS allow additional flexibility in demonstrating incremental generation**, including through the use of:

- Independent third party engineering studies and/or;
- Actual baseline generation data reported to government and quasi-government agencies such as independent system operators, regional transmission organizations, or other balancing authorities where the generator is connected.

For example, data reported to the U.S. Energy Information Administration (EIA) that reflects the actual capacity of the generating unit should be able to be used for a unit's baseline generation or capacity and to determine incremental production of the unit (through multi-year averaging or other reasonable comparisons). Reporting by third parties is recognized as a reliable measure in Section 45Y in cases where electricity is produced for self-use (Section 45Y(a)(1)(A)(ii)(II)) and in Section 45V to establish the production, sale or use of hydrogen (Section 45V(c)(2)(B)(ii)). Reporting to regulators and overseers is commonly considered as a reliable way to ensure the integrity of stakeholder reporting.[1]

[1] With regard to the energy sector, for example, participants in the natural gas market are required to file Form 552 annually with the Federal Energy Regulatory Commission (FERC) (FERC, Form No. 552 - Annual Report of Natural Gas Transactions, (June 20, 2021) *available at* https://www.ferc.gov/industries-data/natural-gas/resources/industry-forms/form-no-552-annual-report-natural-gas. This report includes information on purchases and sales of natural gas, which serves as a critical tool for monitoring market activity and ensuring compliance with federal regulations. *Id.* Similarly, in the energy derivatives market—encompassing natural gas futures, customized oil swaps, and other instruments—there are extensive reporting requirements. These regulations are designed to enhance market transparency, ensure accurate reporting of trading activities, and provide critical information to regulators and stakeholders (*see generally*, Commodity Trading Futures Commission, *available at* https://www.cftc.gov/MarketReports/SwapsReports/index.htm). The Commodity Futures Trading Commission (CFTC) requires commodity traders to report every single swap transaction (17 C.F.R. §§ 43.1–43.99, 45.1–45.99 (2023) or, in the event an exemption or exception to the CTFC's standard rules apply, the applicable exemption. Similar regulatory reporting requirements apply to other segments of the energy industry, such as the Electric Quarterly Reports for electricity sellers, ensuring that stakeholder information is conveyed accurately and transparently.

Allowing this flexibility in determining additional capacity acknowledges that nameplate capacity can be flawed and allows a more accurate measurement taking into account many variables encountered in actual operation. Nameplate capacity is the theoretical maximum output the generating unit can produce. There can be variability between a published nameplate capacity and the unit's actual maximum output. For example, EIA data may list a unit's nameplate capacity as 500 MW, yet the unit may actually report a capacity higher than the listed nameplate capacity for some months in the year.

Additional factors like location, altitude, and ambient conditions can also affect actual capacity compared to a manufacturer-specified generic nameplate capacity. Seasonal variability, including over multi-year scales, can introduce further discrepancies between nameplate capacity and actual output, underscoring the importance of relying on actual, rather than nameplate capacity, to determine an accurate baseline measurement.

Eligible investment

We recommend that the cost of any uprates, upgrades, efficiency, or other improvements that result in additional generation capacity at a facility be considered as eligible investment for the purposes of the Section 48E tax credit. This is consistent with both statutory terms and legislative intent: the relevant provisions do not indicate or require that a substantial part be added to a unit in order to qualify. As a policy matter, any activity that results in additional generating capacity should qualify: new megawatts are new megawatts.

We also request clarification regarding the computation of the eligible investment for incremental production under Section 48E, including when the investment is considered to be a new unit or an addition of capacity. Prop. Reg. 1.48E-4(b)(3)(i) defines a new unit to mean "components of property including any new or replacement integral property added to a facility necessary to increase the capacity of the facility *but not replace the existing capacity of the facility*." Prop. Reg. 1.48E4(b)(3)(ii) defines an addition to capacity to mean "components of property, including any new or replacement integral property added to a facility necessary to increase the capacity of the facility *by replacing, in whole or in part, the existing capacity of the facility*." Additions to capacity require a pro-ration of the investment between additional capacity and total capacity attributable to the investment. This approach is appropriate in situations where replacement of existing capacity is discretionary. However, these definitions do not appear to take into consideration situations where it is necessary to replace old property, i.e., existing capacity, when installing additional capacity. For example, replacing existing property along with additions to capacity may be most economical or necessary to be compatible with new sources of energy. Changes in technological design and specifications may make it difficult or impossible to safely and economically connect existing equipment and new equipment. In such cases, where the entire investment would not occur *but for*

the purpose of increased capacity, the entire amount of the investment should be ITC eligible and not subject to pro-ration. We request that Treasury revise the proposed rules and provide an example allowing this treatment.

Timing of additional investment

We recommend that the regulations provide that a facility may include incremental increases in a facility's output when the upgrades responsible for such increases are placed in service, even if those upgrades are part of a larger overall program of improvement and expansion that has not yet been fully completed.

Clarification of additional capacity and the 80/20 rule

Finally, **we request that Treasury provide further clarification in final regulations regarding when the "Expansion of Facility; Incremental Production" rules apply and when the "Retrofit of an Existing Facility (80/20 Rule) applies.** Treasury should clarify that the 80/20 rule applies in cases where a facility is retrofitted with capital improvements constituting at least 80% of the value of the retrofitted facility but does not require an increase in capacity. In contrast, the expanded facility/incremental production rules apply where improvements are made that result in increased capacity and there is no minimum percentage of value requirement. As discussed above, such improvements may not necessarily constitute capital improvements as long as capacity is increased. This issue is particularly important for nuclear restarts where the high legacy value of the restarted facility will make it impossible to meet the 80/20 rule.

<u>Combustion and Gasification Life Cycle Analysis</u>

Section 45Y provides that, in the case of a facility that produces electricity through combustion and gasification (C&G), net greenhouse gas emissions must be measured according to a lifecycle analysis (LCA) that is consistent with section 211(o)(1)(H) of the Clean Air Act. The proposed regulations provide guidance about the scope of an appropriate LCA, including the starting and ending boundaries, the baseline, offsets and offsetting activities, the principles for including and excluding emissions, and the treatment of alternative fates and avoided emissions (Prop. Reg. 1.45Y-5(d)). The preamble seeks comment on various aspects of the LCA process, including whether there is "an existing model or suite of models … capable of completing an LCA consistent with" the statutory LCA requirements (89 Fed. Reg. 47808).

C2ES supports the general approach taken by the proposed regulations, which requires that a C&G LCA take into account direct emissions, significant indirect emissions, emissions associated with market-mediated changes in related commodity markets, emissions from feedstock generation or extraction, emissions consequences of increased production of feedstocks, emissions at all stages of

fuel and feedstock production and distribution, and emissions associated with distribution, delivery, and use of feedstocks to and by a C&G facility.

However, while establishing a sound framework, the proposed regulations do not provide sufficient detail to provide taxpayers the certainty they need when planning projects. The process to determine greenhouse gas emissions should be transparent, stable and predictable, and the proposed regulations leave many LCA questions unanswered. While the Secretary's annual table setting forth greenhouse gas emissions rates for types or categories of facilities will be the official standard, taxpayers should have enough insight into the allowable methodology to be able to estimate emissions levels with reasonable accuracy.

Accordingly, **we recommend that the proposed regulations be revised to adopt an approach along the same lines as has been taken with respect to two other Inflation Reduction Act tax credit provisions that also rely on life cycle analysis**, the Section 40B sustainable aviation fuel credit and the Section 45V hydrogen credit. In each case, taxpayers may, in conducting an LCA, rely on appropriate versions of the Department of Energy Argonne Laboratory's The Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model.[2]

In this case, the appropriate version is the GREET R&D model (or a successor). Using a known methodology like the R&D GREET model would have several advantages. The R&D GREET model is sophisticated and well understood, and it is designed to evaluate emissions outputs of various energy sector technologies. Methodological consistency is important to avoid unintended market effects, particularly where credited products under 45Y/48E, 40B, and 45V have overlapping accounting boundaries (e.g., RNG lifecycle emissions are relevant under all four). Using an existing GREET model would assist Treasury and the IRS in timely providing final rules for taxpayers by the time Sections 45Y and 48E take effect and allow for efficiencies going forward as the R&D GREET model is already regularly updated. Accordingly, the regulations should expressly provide that 2023 R&D GREET model (or a successor) is an allowable LCA methodology under Sections 45Y and 48E. This will make the LCA process clearer, more certain, and more effective, consistent with congressional intent to encourage the deployment of zero-emission technologies.

[2] 45VH2-GREET is the model that has been adopted by the U.S. Department of the Treasury to determine emissions rates for purposes of the Clean Hydrogen Production Tax Credit under Title 26 of the U.S. Code, Section 45V. 40BSAF-GREET is the model that has been adopted by the U.S. Department of the Treasury to calculate the emissions reduction percentages under the Sustainable Aviation Fuel Credit, § 40B(e)(2) of the Inflation Reduction Act. See https://www.energy.gov/eere/greet for additional information on the GREET model.

Additions to the list of "Categorically Non-Combustion and Gasification Facilities"

Hydrogen

The proposed regulations did not include hydrogen on the list of "categorically non-combustion and gasification" technologies that were deemed to be zero emissions. **C2ES requests Treasury amend this list to include electrolytic hydrogen where the hydrogen is produced exclusively using electricity from a deemed zero emissions energy facility co-located with the hydrogen facility and used to power a fuel cell.** This could include electrolytic hydrogen produced using wind, solar, nuclear, or any other zero carbon energy sources.

This approach is consistent with the discussion in the preamble to the proposed regulations that acknowledges hydrogen produced with co-located solar and wind facilities would not be considered a combustion and gasification facility because "the input energy source was not produced through a transformation of one energy source into another using combustion or gasification." Co-located hydrogen therefore should be characterized as "categorically non-combustion and gasification technology" and not subject to a life cycle analysis. If the co-located input energy source is included on the list of categorically non-combustion and gasification facilities and has been deemed to be zero emissions, then hydrogen produced using that input should also be deemed to be zero emissions. This would be consistent with the inclusion of waste to energy property ("WERP") on the deemed list as long as the original source of energy producing the waste is also on the list.

CHP property

Similarly, **CHP property that derives its energy from facilities on the "categorically non-combustion and gasification" list should also be included on that list.** This could include co-located sources of energy. This would also be consistent with the rationale to include WERP on the list.

Conclusion

C2ES appreciates the opportunity to provide these comments. Please contact Brad Townsend at townsendb@c2es.org with any questions or for further discussion.

APPENDIX: SELECTED RESPONSES TO TREASURY QUESTIONS IN THE PROPOSED REGULATIONS

4(a)(6): How can the final regulations reflect and mitigate indirect emissions effects from the diversion of biogas, RNG, or fugitive methane from potential future productive uses? What other new uses of biogas, RNG, or fugitive methane could be affected in the future if more gas from new capture and productive use of methane from these sources is used in the electricity production process?

Answer: With respect to the second question: Sustainable Aviation Fuel and Clean Hydrogen are critical fuel/energy carriers for "hard-to-abate" sectors of the economy. Under the 40B Sustainable Aviation Fuel Credit, ethanol and SAF production facilities may claim LCA credit for RNG use. Under the 40B Sustainable Aviation Fuel Credit, 40BSAF-GREET 2024 enables users to take credit for the use of directly supplied RNG, provided that the supplied RNG is sourced from landfill gas and constitutes the first productive use of that gas. The use of natural gas, per this Argonne National Lab study, contributes 78.9% of greenhouse gas emissions associated with the refining stage of ethanol. For some SAF/ethanol producers, substituting natural gas with RNG will be critical in reducing the lifecycle value of their fuel products.

Under the 45V Hydrogen Production Tax Credit, the 45VH2-GREET 2023 LCA model also allows users to model hydrogen production from RNG that is derived from LFG, which is generated from municipal solid waste (MSW) decomposition in landfills. RNG must be consumed via "direct use" and consumption of the RNG must represent the first productive use of methane from the landfill source.

4(a)(11): What counterfactual assumptions and data should be used to assess the net greenhouse gas emissions of facilities that rely on biogas, RNG, or fugitive methane (for example, venting, flaring, or other practice)? Is venting an appropriate counterfactual assumption in some cases? If not, what other factors should be considered?

Answer: The EPA is required under the Clean Air Act to begin New Source Performance Standards for landfills by August 2024. Meanwhile, states may surpass the federal emission regulations set by the EPA, including rules requiring the installation of gas collection and control equipment, energy recovery devices, and/or treatment and processing systems to reduce their methane emissions. Venting is not an appropriate counterfactual where mandatory law or regulation requires the capture of biogas, RNG, or fugitive methane resulting from the relevant source.

4(e)(1): What factors should be considered in deciding how to create and maintain LCA baseline scenarios?

Answer: LCA baseline scenarios should include an assessment of relevant laws and regulations, as is standard practice for the generation of carbon credits which depend on an accurate assessment of an intervention compared to a baseline/counterfactual scenario. For example, where relevant laws and regulations require a landfill to capture biogas, a baseline scenario of venting should not be permitted, regardless of previous compliance with that law.

Carbon Capture and Sequestration

5(3): Should carbon capture and sequestration that occurs in production of a fuel that is used by a facility to produce electricity be taken into account, and if so, how should such use of CCS be assessed in an LCA?

Answer: It depends on whether the CCS is taking place as part of the facility, or if the fuel is a feedstock for the facility.

For example, if a biomass with carbon removal and storage (BiCRS) facility uses gasification with CCS to convert biomass to H2 + CO2, and sequesters the CO2 and uses the H2 to produce electricity, then the CCS should be assessed when evaluating the greenhouse gas emissions rate for the electricity production. If biomass is combusted to produce electricity, and CO2 is sequestered (bioenergy with carbon capture and sequestration, or BECCS), the CCS should be assessed. If biogenically derived synfuels or renewable natural gas is combusted using oxy-fuel combustion combined with CCS to produce electricity, CCS should be assessed.

Alternatively, if a hydrogen-fired power plant buys hydrogen from another company, the carbon intensity of that purchased fuel should be accounted for in the facility's LCA, regardless of how it was generated (e.g. kg CO2/kg H2 and kg H2/KWh to get to kg CO2/kWh). Hydrogen can be produced from processes that involve CCS (such as natural gas steam methane reform, or gasification of biomass), but the entities producing that hydrogen would claim any carbon removal credits, so they should not be accounted for in the electricity generating facility that purchases the hydrogen.

5(1): What requirements should apply to substantiate and verify that carbon dioxide is stored or utilized?

Answer: Requirements for substantiating and verifying carbon storage or utilization should be consistent with the methods used for 45Q, which requires obtaining approval for an MRV plan from the EPA, and reporting carbon oxide storage or utilization through the Greenhouse Gas

Reporting Program (GHGRP). This is the fairest and most streamlined way to balance the climate benefit of different tax credits, and account for tons of carbon removed, whether claimed for 45Y or 45Q.

Treasury should consider requiring third party verification to substantiate and verify the storage or utilization of carbon dioxide. The current 45Q regulations, finalized in 2021, and the EPA's carbon oxide capture regulations (Subpart PP for capturing entities and Subpart RR for storing entities of 40 CFR part 98) allow taxpayers to self-report their captured and stored/utilized carbon oxides. It is worth noting that it is not clear reading how closely the EPA regulates or audits those reports.

5(2): What enforcement mechanisms or regulatory regimes should be used to identify leakage of stored carbon dioxide, and how should such leakages be taken into account in determining compliance with sections 45Y and 48E (are existing recapture provisions under 45Q sufficient)?

Answer: Sections 45Y, 48E and 45Q should be aligned on enforcement and regulatory regimes. The final 45Q regulations use reported data from the EPA's GHGRP and include a 3-year lookback rule. Publicly accessible tools for tracking GHGRP reporting to promote accountability and transparency.

Book and Claim

(f) How broadly available and reliable are existing electronic tracking systems and verification protocols and practices for biogas, RNG, or fugitive methane certificates in book and claim systems? What developments may be required, if any, before such systems are appropriate for use with biogas or RNG certificates used to claim the Clean Electricity Tax Credits ?

Answer: Currently electronic tracking systems and verification protocols, as well as the standards that underlie the book and claim systems, are under development or still nascent. C2ES is helping to spearhead the Advanced and Indirect Mitigation Platform (aimplatform.org) to develop a standard methodology by which companies can make use of book and claim systems to invest technologies and fuels (i.e., SAF, RNG, etc) that reduce emissions in their value chains. There is still a need to develop standardized book and claim approaches, as well as tracking and verification systems that are widely recognized. Support for such standards and standardized approaches in this guidance would provide greater confidence and certainty around their use, which would help spur companies to make the necessary investments in technologies (i.e., RNG and fugitive methane reduction certificates).

Developing a standardized approach for book and claim systems for new fuels is important to avoid double counting of the use of the environmental attributes as they apply to Scope 1 and Scope 2 emissions. Doing so will also ensure transparency with various parties claiming the attribute as is

currently allowed under Scope 3 emissions inventory reporting. Similar to the longstanding application of renewable energy certificates (RECs), where only one party can claim the use of renewable energy in one's Scope 2 emissions inventory, here, book and claim systems need to be developed to ensure the appropriate application of the environmental attribute, or credit, associated with the use of new fuels.

The AIM Platform is currently developing a methodology that will encompass book and claim systems for such new technologies, by crafting criteria--with stakeholder input-- for how companies can claim emissions reductions from the use of new technologies, which will better enable investments to reduce emissions in their value chains (see the draft criteria at https://aimplatform.org/criteria). The AIM Platform is also engaging with various industry efforts working on sustainable aviation fuels, zero emissions trucking, zero emissions maritime fuels, sustainable steel, and lower carbon chemicals initiatives to ensure that the criteria can apply to multiple sectors that need market mechanisms (such as book and claim systems) to demonstrate the delivery of technologies to end users when the physical delivery of the product is not co-located with the end use.