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Attention: REG–119283–23

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

RE: Hydropower Provisions in the Section 45Y Clean Electricity Production Credit and Section 48E Clean Electricity Investment Credit Rules

The following nineteen non-profit organizations and businesses respectfully submit these comments regarding the hydropower provisions in the proposed rule implementing the section 45Y Clean Electricity Production Credit and section 48E Clean Electricity Investment Credit: Tell The Dam Truth, Alabama Rivers Alliance, Black Warrior Riverkeeper, Cahaba Riverkeeper, Columbia Riverkeeper, Earthjustice, Environmental Stewardship, Friends of Merrymeeting Bay, Gallatin Wildlife Association, Grand Riverkeeper Labrador, Great Basin Water Network, Last Tree Laws, Legal Rights for the Salish Sea, Living Rivers & Colorado Riverkeeper, Milwaukee Riverkeeper, Patagonia, Save The World's Rivers, Stoecker Ecological, and Three Rivers Waterkeeper.[1]

The section 45Y and section 48E tax credits (collectively the "Clean Electricity Tax Credits") will play a pivotal role in implementing the Inflation Reduction Act and accelerating the transition to clean energy. The non-profit organizations and businesses submitting these comments support many aspects of the proposed rule. However, the proposed rule improperly includes hydropower facilities in the list of zero-emissions facilities that qualify for the Clean Electricity Tax Credits. Because generating electricity at hydropower facilities directly results in significant amounts of greenhouse gas pollution, the Treasury Department and Internal Revenue Service (IRS) should modify the final rule so that hydropower facilities are not qualifying facilities for the section 45Y credit and the section 48E credit.

I. Background

The Inflation Reduction Act's tax credits present an extraordinary opportunity to reduce pollution and protect communities. The emissions reduction potential of the Inflation Reduction Act gives the Unites States a chance to meet its commitments to reduce greenhouse gas pollution 50% by 2030 and to maintain a habitable climate. To achieve this potential, the Treasury Department and the IRS must implement the Inflation Reduction Act's tax credits in a manner

[1] 89 Fed. Reg. 47,792 (June 3, 2024).

that prioritizes emissions reductions and does not enable polluting infrastructure to claim tax credits that are inconsistent with the broader legislative intent.

The Inflation Reduction Act created two new technology-neutral tax credits for facilities that generate electricity with a greenhouse gas emissions rate that is "not greater than zero": the section 45Y Clean Electricity Production Credit and the section 48E Clean Electricity Investment Credit.[2] These two new Clean Electricity Tax Credits will replace the existing, technology-specific Production Tax Credit (PTC) that is typically claimed by wind facilities and the existing, technology-specific Investment Tax Credit (ITC) that is typically claimed by solar facilities. The Inflation Reduction Act's statutory text clearly states these new Clean Electricity Tax Credits are only available to electricity generation facilities that emit zero greenhouse gas pollution.[3] The Treasury Department and IRS's implementing regulations must ensure zero means zero.

Section 45Y creates a new technology-neutral PTC, and section 48E creates a new technology-neutral ITC. Both tax credits are available for electricity generating facilities placed in service after December 31, 2024, and "for which the greenhouse gas emissions rate is not greater than zero."[4] The section 45Y credit is provided on a kilowatt-hour basis, reflecting actual energy production.[5] The section 48E credit is available on the basis of actual investment in qualified facilities and energy storage technologies.[6] A qualified facility can claim either the section 45Y credit or the section 48E credit, but not both credits.[7]

To access either credit, the taxpayer must demonstrate that its facilities meet these standards, including that the facility has a "greenhouse gas emissions rate" of "not greater than zero."[8] Section 45Y provides the standard for determining a facility's greenhouse gas emissions rate, which is defined as "the amount of greenhouse gases emitted into the atmosphere by a facility in the production of electricity, expressed as grams of CO_2e per KWh."[9] Section 48E refers to this same section 45Y definition.[10]

II. The Treasury Department and the IRS should not categorize hydropower facilities as qualified, zero-emissions facilities that are eligible for the section 45Y and section 48E credits.

The proposed rule categorically declares that all types of hydropower facilities are eligible for both the section 45Y and section 48E Clean Electricity Tax Credits.[11] However,

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[2] Inflation Reduction Act of 2022, Pub. L. No. 117-169, §§ 13701, 13702, 136 Stat. 1818, 1982–97 (2022).
[3] 26 U.S.C. §§ 45Y(b)(1)(A)(iii), 48E(b)(3)(A)(iii).
[4] *Id.* § 45Y(b)(1)(A) (parenthetical omitted), *see also id.* § 48E(b)(3)(A).
[5] *Id.* § 45Y(a)(1).
[6] *Id.* § 48E(a)(1).
[7] *See* 89 Fed. Reg. at 47,829, 47,838.
[8] 26 U.S.C. §§ 45Y(b)(1)(A)(iii), 48E(b)(3)(A)(iii).
[9] *Id.* § 45Y(b)(2)(a).
[10] *Id.* § 48E(b)(3)(B)(ii).
[11] 89 Fed. Reg. at 47,802, 47,832.

generating electricity at hydropower facilities directly causes greenhouse gas pollution. Moreover, many hydropower facilities emit very large amounts of greenhouse gas pollution, in quantities similar to or greater than the emissions from coal- and gas-fired power plants. As a result, the Treasury Department and the IRS should not categorize hydropower facilities as zero-emissions facilities that qualify for the Clean Electricity Tax Credits.

Proposed rule § 1.45Y-5(c)(2) lists eight types of facilities that are "Non-C&G Facilities with a greenhouse gas emissions rate that is not greater than zero."[12] One of the eight categories of facilities is "Hydropower (including retrofits that add electricity production to non-powered dams, conduit hydropower, hydropower using new impoundments, and hydropower using diversions such as a penstock or channel)."[13] Thus, all hydropower facilities would be considered zero-emissions facilities under the proposed rule and would qualify to receive both the section 45Y and section 48E credits.[14]

This proposal to classify all hydropower facilities as zero-emissions facilities for the Clean Electricity Tax Credits is flawed, and the Treasury Department and IRS should remove hydropower from the list of Non-Combustion and Gasification (Non-C&G) Facilities with greenhouse gas emissions not greater than zero in Rule § 1.45Y-5(c)(2). The best available science demonstrates that dams, reservoirs, and hydropower facilities emit significant amounts of greenhouse gases. In 2022, Earthjustice submitted a petition that is pending before the U.S. Environmental Protection Agency (EPA) requesting that EPA initiate a rulemaking to add dams and reservoirs as a source category under the Greenhouse Gas Reporting Program.[15] The EPA rulemaking petition cites numerous scientific studies—including studies funded and completed by the EPA as well as other federally funded research—indicating that dams and reservoirs across the United States emit significant amounts of greenhouse gases. Moreover, some hydropower facilities emit greenhouse gases at levels greater than the emissions from coal-fired and gas-fired power plants producing the same amount of electricity. For example, the scientific studies show that the following three hydropower facilities emit large amounts of greenhouse gases:

- Lake Mead and Hoover Dam: Lake Mead and Hoover Dam emit greenhouse gases in amounts equal to that of a coal-fired power plant producing the same amount of electricity. The total reservoir emissions are approximately 9.2 million metric tons of carbon dioxide equivalent (CO_2e) per year.[16]

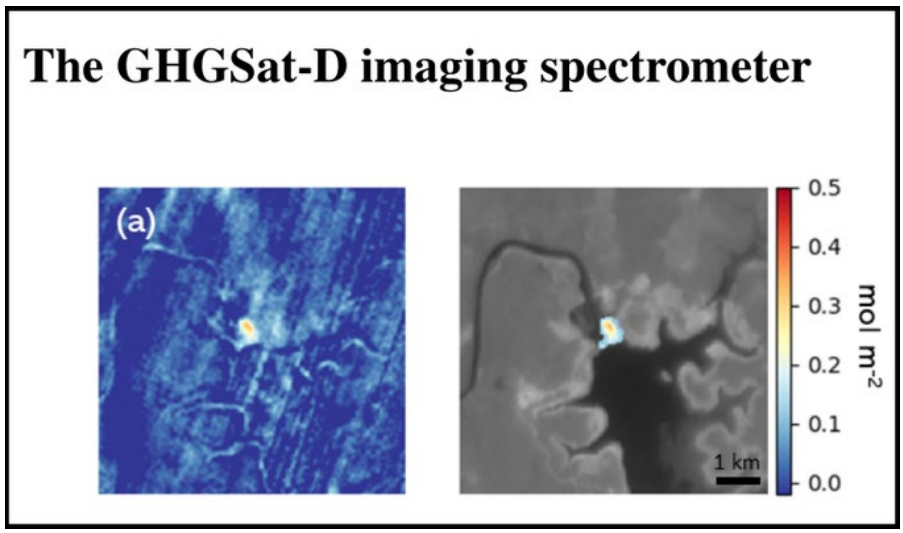
- Lake Whitney and Whitney Dam: In Texas, Whitney Dam and Lake Whitney emit six times more CO_2e than a coal-fired power plant producing the same amount of electricity.

[12] *Id.* at 47,832.
[13] *Id.*
[14] *Id.* at 47,832, 47,836–37.
[15] Petition from Michael Hiatt, Earthjustice et al. to Michael Regan, EPA (Mar. 21, 2022), https://tellthedamtruth.com/epa-petition/.
[16] *Id.* at 11.

The total reservoir emissions equal about 884,000 metric tons of CO_2e per year.[17]

- Kentucky Lake: Kentucky Lake is the largest reservoir in the eastern United States, and it emits approximately 80% as much CO_2e as a natural gas-fired power plant producing the same amount of electricity. The total reservoir emissions equal about 1.4 million metric tons of CO_2e per year.[18]

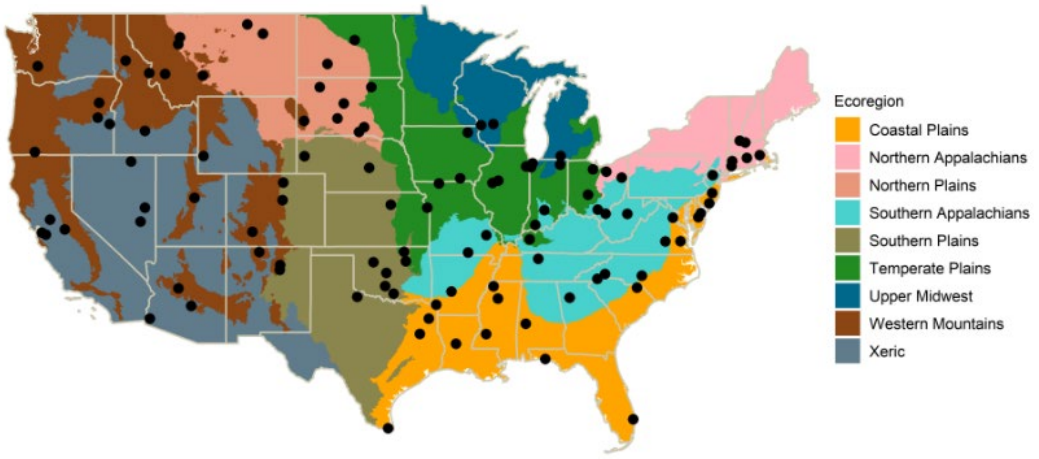
In addition to the scientific studies discussed in the EPA petition, a 2021 report documenting methane emissions detected by satellite observations confirms the large methane emissions from dams and reservoirs.[19] The GHGSat-D satellite measures surface-level methane plumes from industrial and commercial facilities, including oil and gas facilities, power generation, coal mining, waste management, and the agricultural sector.[20] The report provided six examples of the satellite's methane observations, and one example was from a hydropower facility in Cameroon. The satellite imagery below shows the methane plume the satellite observed at the hydropower facility, and this methane plume was similar to the emissions the satellite observed at a coal mine and at oil and gas facilities.[21]



Other federal agencies also recognize that dams, reservoirs, and hydropower facilities emit greenhouse gases and these agencies are actively studying these emissions. EPA, for

[17] *Id.*
[18] *Id.*
[19] Dylan Jervis et al., *The GHGSat-D imaging spectrometer*, 14 Atmospheric Measurement Techs. 2127 (2021), https://amt.copernicus.org/articles/14/2127/2021/.
[20] *Id.* at 2127.
[21] *Id.* at 2137.

example, is currently conducting a survey of greenhouse gas pollution from 108 reservoirs in 41 states, at the locations shown in the following map.[22]



EPA explains that it is conducting this study because "[g]reenhouse gases, carbon dioxide and methane are produced through the natural decomposition of organic matter in nearly all aquatic ecosystems, including reservoirs."[23] EPA states that reservoirs "are human-made systems, usually created for hydroelectricity or water supply via the construction of a dam," and the agency must report such anthropogenic emissions under the United Nations Framework Convention on Climate Change.[24] As another example of other federal agencies' work on this issue, in May 2024, the U.S. Department of Energy's Water Power Technologies Office hosted a summit discussion with several agencies, industry, and environmental organizations regarding greenhouse gas emissions from hydropower facilities.[25]

The Treasury Department and the IRS briefly acknowledge in the proposed rule that multiple components of hydropower facilities emit greenhouse gases—but the proposal brushes aside these emissions as unrelated to the "fundamental transformation of electricity needed to produce electricity in a hydropower facility."[26] Specifically, the proposed rule recognizes that "[h]ydropower facilities may release greenhouse gas emissions from the hydropower reservoir due to diffusion at the water surface or due to ebullition, and from degassing when water passes through a pump house or turbine."[27] But the proposed rule then claims these emissions are

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[22] *Research on Emissions from U.S. Reservoirs*, EPA, https://www.epa.gov/air-research/research-emissions-us-reservoirs (last visited July 31, 2024).
[23] *Id.*
[24] *Id.* (emphasis added).
[25] *Hydropower Environmental and Industry Research and Development Summits and Talks*, U.S. Dep't of Energy, Water Power Techs. Off., https://www.energy.gov/eere/water/hydropower-environmental-and-industry-research-and-development-summits-and-talks (last visited July 31, 2024).
[26] 89 Fed. Reg. at 47,802.
[27] *Id.*

unrelated to the production of electricity for the Clean Electricity Tax Credits because they "are not created by the fundamental transformation of potential energy in flowing water into electricity, but rather from processes that are not fundamental to the transformation of potential energy into electricity."[28]

This rationale for ignoring all greenhouse gas emissions from hydropower facilities for the Clean Electricity Tax Credits is flawed. The proposed rule notes that a hydropower facility generates electricity by capturing the "gravitational potential energy" from flowing water "with a turbine which spins a rotor within a generator to produce electricity."[29] In addition to the turbine and rotor, the dam and reservoir are also interconnected components of hydropower facilities, which are required to generate electricity. Without the water stored in the reservoir and without the dam that creates the reservoir, the turbine and the rotor at a hydropower facility would be unable to produce electricity. In other words, the dam and reservoir at hydropower facilities are necessary to create and capture the gravitational potential energy from flowing water, and thus the emissions from these hydropower facility components are part of "the process that transforms the input energy source into electricity."[30] Consequently, the greenhouse gas emissions from the dam and reservoir are inherently part of the "fundamental transformation of electricity" at a hydropower facility. The Clean Electricity Tax Credits should therefore incorporate and count these emissions.

The proposed rule points to solar photovoltaic technologies as an illustrative example of where the Treasury Department and the IRS will draw the line regarding what types of emissions result from the "fundamental transformation" of energy, and are thus attributed to a Non-C&G Facility for the Clean Electricity Tax Credits.[31] This example is instructive on why the proposed rule's treatment of hydropower is flawed and why the Treasury Department and the IRS should modify the hydropower provisions of the final rule. The proposed rule explains that the "fundamental transformation of input energy" for solar photovoltaic technologies uses the photovoltaic effect and involves no mechanical energy or chemical reactions.[32] The example acknowledges that the operation of a solar photovoltaic facility may result in a "small but non-zero amount of emissions," but "these emissions exclusively occur due to ongoing maintenance (for example, the washing of solar panels), preventative maintenance (for example, the periodic replacement of electrical equipment such as inverters), and a minimal amount of project management (for example, inverter standby mode at night)."[33] The proposed rule declares that these operations and maintenance-related emissions "do not occur directly due to the production of electricity," and therefore solar photovoltaic facilities qualify as zero-emissions facilities for the Clean Electricity Tax Credits.[34]

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[28] *Id.*
[29] *Id.*
[30] *See id.* at 47,831 (Rule § 1.45Y-5(b)(6), defining the term "[g]reenhouse gases emitted into the atmosphere by a facility in the production of electricity").
[31] *Id.* at 47,832.
[32] *Id.*
[33] *Id.*
[34] *Id.*

In contrast to this solar example, most of the emissions at a hydropower facility are directly related to producing electricity at the facility (although operations and maintenance activities at hydropower facilities also emit greenhouse gases). For example, the reservoir is one of the primary sources of emissions at a hydropower facility, and reservoirs emit greenhouse gases due to the decomposition of organic matter through diffusion and ebullition.[35] Reservoirs are necessary and interconnected components of hydropower facilities because diverting and storing a river or stream's natural flows is necessary to capture the "gravitational potential energy" from flowing water with a turbine.[36] As noted above, without the reservoir, it is not possible to generate electricity at a hydropower facility. These reservoir emissions are thus fundamentally different than the more indirect types of emissions that result from operations and maintenance activities in the solar example. As a result, the Clean Electricity Tax Credits should not treat reservoir emissions at a hydropower facility the same as the operations and maintenance-related emissions at a solar photovoltaic facility. Instead, the Clean Electricity Tax Credits should classify reservoir emissions as emissions that are directly related to the "fundamental transformation of electricity" at a hydropower facility.[37]

The proposed rule's shortcomings are perhaps most evident in its treatment of emissions from hydropower turbines. Discharging water through a turbine at a hydropower facility emits greenhouse gases due to degassing of the methane-rich water from the oxygen-depleted depths of the reservoir, and these emissions occur due to the rapid drop in hydrostatic pressure when water exits the turbine.[38] These turbine emissions are significant and can be 80–95% of reservoir surface emissions.[39] The proposed rule explains that the "turbine which spins a rotor within a generator to produce electricity" is how a hydropower facility captures and converts the potential energy of flowing water into electricity.[40] The proposed rule separately acknowledges that emissions occur "from degassing when water passes through a pump house or turbine."[41] Yet the proposed rule concludes that these greenhouse gas emissions from operating the turbine "are not fundamental to the transformation of potential energy into electricity."[42] This conclusion is incorrect. Even under the proposed rule's framework, which only considers emissions resulting from the "fundamental transformation of electricity," the emissions from a hydropower facility's turbines should fall within the scope of emissions attributed to a Non-C&G Facility. The proposed rule defines the relevant greenhouse gas emissions as emissions "that directly occur from the process that transforms the input energy source into electricity."[43] The emissions from a hydropower facility's turbines are emissions that directly occur from the process of generating electricity at the hydropower facility, and thus the Clean Electricity Tax Credits should not exclude these emissions.

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[35] *See, e.g.*, *All-Res Greenhouse Gas Tool*, Tell The Dam Truth, https://tellthedamtruth.com/all-reservoir-greenhouse-gas-model/ (last visited July 31, 2024).
[36] *See* 89 Fed. Reg. at 47,802.
[37] *See id.*
[38] *All-Res Greenhouse Gas Tool*, Tell The Dam Truth, *supra*.
[39] *Id.*
[40] 89 Fed. Reg. at 47,802.
[41] *Id.*
[42] *Id.*
[43] *Id.* at 47,831.

Finally, the proposed rule's analysis and classification of hydropower demonstrates the overarching problems in attempting to distinguish between greenhouse gas emissions that result from the "fundamental transformation of electricity" and a facility's other greenhouse gas emissions. Regardless of where the Treasury Department and the IRS ultimately draw that line in this rulemaking, it is undisputed that a hydropower facility as a whole can emit significant amounts of greenhouse gas pollution. The federal government should therefore not subsidize and incentivize hydropower facilities when it knows that these facilities are responsible for emitting large amounts of greenhouse gases. The Clean Electricity Tax Credits present an unparalleled opportunity to incentivize clean energy. But if the Treasury Department and the IRS finalize the proposal and categorize hydropower as a qualified, zero-emissions resource, it will knowingly encourage development of a "clean" resource that can result in as much or more greenhouse gas pollution than burning fossil fuels for electricity. Given the imperative to promptly reduce greenhouse gas pollution, the United States cannot afford to make ill-informed and mistaken decisions regarding hydropower's role in a zero-carbon future.

For these reasons, the following non-profit organizations and businesses urge the Treasury Department and the IRS to promptly finalize the rule and remove hydropower facilities from the list of Non-C&G Facilities that qualify for the Clean Electricity Tax Credits. Thank you for considering these comments.

Tell The Dam Truth

Alabama Rivers Alliance

Black Warrior Riverkeeper

Cahaba Riverkeeper

Columbia Riverkeeper

Earthjustice

Environmental Stewardship

Friends of Merrymeeting Bay

Gallatin Wildlife Association

Grand Riverkeeper Labrador

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