BIOMASS POWER ASSOCIATION

August 3, 2020

Internal Revenue Service
CC:PA:LPD:PR (REG-112339-19), Room 5203
P.O. Box 7604
Ben Franklin Station
Washington, DC 20044

Re: REG- REG-112339-19 (Proposed Regulations on Credit for Carbon Oxide Sequestration)

To Whom It May Concern:

We provide herein the comments of the Biomass Power Association in response to the Notice of Proposed Rulemaking, Credit for Carbon Oxide Sequestration[1], issued June 2, 2020 (the "**Proposed Regulations**"). We appreciate the work of staff at the Department of the Treasury and Internal Revenue Service ("**IRS**") (hereinafter collectively referred to as "**Treasury**") to produce the Proposed Regulations. In the interest of brevity, we limit our comments to a single issue, namely, how the capture and utilization of qualified carbon oxides are measured both for meeting the threshold amount under Section 45Q(d)(2)(A) and the computation of the credit under 45Q(f)(5)(B).

By way of background, BPA was founded in 1999 to provide a national voice for the biomass power sector. Our members use biogenic materials, described in Section 45 of the Code as "open-loop biomass," to produce grid-delivered electricity. This form of energy provides a range of carbon benefits depending upon the source of the particular feedstock and, of particular relevance here, the full lifecycle of the energy taking into account all greenhouse gas emissions. Central to the carbon benefits of sustainably sourced biomass is the basic concept, widely recognized across the world, that while carbon is released through combustion, that carbon is treated by various international protocols as being "fully accounted for by the uptake of the carbon during the growth of the feedstock" (see DOE, EIA Emissions of Greenhouse Gases in the United States at p. 60). As described by EPA, "the scientific and technical foundation for accounting for biogenic CO2 emissions" is fundamentally different than the release of carbon from fossil reserves such as coal seams, oil and gas deposits and peatlands (Inventory of US Greenhouse Gas Emissions and Sinks[2]). For that reason, while the molecular weight of a ton of biogenically-derived carbon is no different from a fossil-based ton of carbon,

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[1] 85 Fed. Reg. 34,050 (June 2, 2020) https://www.federalregister.gov/documents/2020/06/02/2020-11907/credit-for-carbon-oxide-sequestration

[2] https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks

the amount of carbon is adjusted and expressed on an "equivalence basis" (or "CO2e") to reflect the actual net carbon emissions after taking into account the unique aspects of biogenic emissions and the full lifecycle impacts of biogenic carbon. As set forth below, this "equivalence" approach is precisely how EPA has implemented Section 211 of the Clean Air Act—the same statute that Treasury must implement here—for almost a decade. Failure to adopt such an approach will have far reaching policy implications and render the program inaccessible for many taxpayers.

I. The Plain Language of 45Q Mandates the Measurement of "Qualified Carbon Oxides" Based on "Carbon Dioxide Equivalence" and Not Simply "Carbon Oxides"

In the initial comment period for the Draft Rule, Treasury received various comments on whether 45Q credits are only limited to carbon oxides or are available for the capture of other greenhouse gases. To be sure, 45Q is abundantly clear that only the capture of carbon oxides qualifies for credits under 45Q. However, the ***measurement*** of carbon oxides, when utilized in accordance with Section 45Q(f)(5)(A), is based on the results of a lifecycle analysis. In particular, section 45Q(f)(5)(B)(i) provides that the amount utilized:

> "shall be equal to the metric tons of qualified carbon oxide which the taxpayer demonstrates, ***based upon an analysis of lifecycle greenhouse gas emissions*** and subject to such requirements as the Secretary, in consultation with the Secretary of Energy and the Administrator of the Environmental Protection Agency, determines appropriate, were—
> (I) captured and permanently isolated from the atmosphere, or
> (II) displaced from being emitted into the atmosphere, through use of a process described [in section 45Q(f)(5)(A)]." (emphasis added)

Section 45Q(f)(5)(B)(ii) defines "lifecycle greenhouse gas emissions" by incorporating by reference the definition of such term from section 211(o)(1) of the Clean Air Act (substituting the word "product" for the word "fuel" each place it appears in the definition). As a result, lifecycle greenhouse gas emissions for purposes of section 45Q means:

> "the ***aggregate quantity*** of greenhouse gas emissions (including direct emissions and significant indirect emissions such as significant emissions from land use changes), as determined by the Administrator [of the EPA], related to the ***full [product] lifecycle***, including all stages of [product] and feedstock production and distribution, from feedstock generation or extraction through the distribution and delivery and use of the finished [product] to the ultimate consumer, where the ***mass values for all greenhouse gases are adjusted to account for their relative global warming potential***." (emphasis added)

Because an LCA performed in accordance with 45Q(f)(5) must include "the aggregate quantity of greenhouse gas emissions," this means that not only are carbon oxides counted, but all GHG emissions with a Global Warming Potential (GWP). Also, when the carbon oxides are "captured," the LCA must account for the "full product lifecycle" including the environmental consequences of capturing non-carbon oxide GHG emissions (such as methane, etc.) as a consequence of making the product.

Finally, Section 211 specifically uses the phrase "mass values for all greenhouse gases adjusted to account for their relative global warming potential." Adjusting for the GWP necessarily requires that the resulting tons of carbon oxides under 45(f)(5) is in tons of carbon dioxide equivalence ("CO2e"). As noted by EPA, "the calculation of the amount of GHG emissions should be based on the amount of GHG pollutant emitted in tons per year, weighted by the global warming potential (GWP) of the particular GHG pollutant, normalized to the GWP of one ton of CO2 over a 100- year period, *which is called carbon dioxide equivalent.*[3] (emphasis added)

II. Programmatic and Policy Implications of Measuring Qualified Carbon Oxides on an Equivalence Basis

The practical effect of counting carbon oxides instead of carbon "equivalence" is obvious. If Treasury adopted such an approach, it would be asking the Taxpayer to perform the impossible: count "all greenhouse gases, " then convert all gases by applying a Global Warming Potential to yield a "carbon dioxide equivalent" number, and then "unscramble" the number by segregating the carbon oxide amount and ignoring "the aggregate quantity" of all other gases used in performing the LCA. Assuming one could even "unscramble" the equivalence number, how could any taxpayer certify on a tax return that the measurement of 45Q is based on an LCA, since the tons of carbon oxides so claimed would not include the results of the LCA? Even if Treasury were to allow such an approach, why then perform the LCA instead of simply counting tons of captured and utilized carbon oxides in the same manner that 45Q treats enhanced oil recovery (EOR) and sequestration? The fact is that the Taxpayer cannot ignore the results of an LCA and claim credits simply based on tons of carbon oxides. To do so would run afoul of the plain requirements of 45Q.

Leaving aside the impossibility of conducting an LCA and then ignoring non-carbon oxides in the measurement, such an approach defies almost 10 years of regulatory precedent in the implementation of Section 211 of the Clean Air Act. Following EPA's adoption of a Final Rule implementing Section 211 in March 2010, the Agency has performed no fewer than 130 lifecycle analyses[4] by applying the same definition of "lifecycle analysis" (LCA) required under 45Q. In each and every analysis, EPA took under consideration the following factors:

- "Feedstock production – based on agricultural sector and other models that include direct and indirect impacts of feedstock production.

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[3] 76 FR 15256

[4] https://www.epa.gov/renewable-fuel-standard-program/approved-pathways-renewable-fuel

- Fuel production – including process energy requirements, impacts of any raw materials used in the process, and benefits from co-products produced.
- Fuel and feedstock distribution – including impacts of transporting feedstock from production to use, and transport of the final fuel to the consumer.
- Use of the fuel – including combustion emissions from use of the fuel in a vehicle."

Because many of these emissions were for greenhouse gases *other* than carbon dioxide, EPA included such gases and adjusted their values after considering global warming potential as required by Section 211. The result was that in each and every LCA performed in accordance with Section 211, the outcome was expressed in CO2**e,** not carbon dioxide.

Finally, by ignoring the results of an LCA through an equivalence measurement, the U.S. Department of Treasury would be treating a molecule of biogenic carbon dioxide the same as a fossil fuel-based molecule and without regard to the unique nature of biogenic carbon that is widely recognized by EPA, DOE and every known international protocol.

"Biogenic carbon dioxide" is defined by EPA to include:

- CO2 generated from the biological decomposition of waste in landfills, wastewater treatment or manure management processes;
- CO2 from the combustion of biogas collected from biological decomposition of waste in landfills, wastewater treatment or manure management processes;
- CO2 from fermentation during ethanol production or other industrial fermentation processes;
- CO2 from combustion of the biological fraction of municipal solid waste or biosolids;
- CO2 from combustion of the biological fraction of tire derived fuel; and
- CO2 derived from combustion of biological material, including all types of wood and wood waste, forest residue, and agricultural material.[5]

The fate of biogenic carbon dioxide depends upon a carbon cycle that is fundamentally different from fossil carbon dioxide. EPA has described the cycle as follows:

> "Through relatively rapid photosynthesis, plants absorb CO2 from the atmosphere and add it to their biomass, which contains roughly 50% carbon by weight, through a process called sequestration. Some of the carbon absorbed by plants may eventually be transferred from dead organic matter to the soil where it can remain for long periods of time. Plant biomass, dead organic matter, and soil carbon are ''pools'' that together make up the carbon stock on a given area of land. Carbon can cycle fairly rapidly back to the atmosphere or it can remain stored on land. Stored carbon can be released naturally

[5] Deferral for CO2 Emissions From Bioenergy and Other Biogenic Sources Under the Prevention of Significant Deterioration (PSD) and Title V Programs
https://www.govinfo.gov/content/pkg/FR-2011-07-20/pdf/2011-17256.pdf

back into the atmosphere as CO2 through decomposition or plant respiration. When biological material such as plant biomass is harvested or cleared from the land, burned for energy, used as an input to an industrial process, or biodegraded as part of waste treatment processes, the material acts as a source of carbon, releasing its stored carbon back into the atmosphere as CO2. Over large spatial scales such as States, regions, or continents, if more carbon is sequestered in plant biomass than is emitted to the atmosphere through processes such as harvest, fire, or natural decomposition, plant biomass acts as a net sink for carbon. Conversely, if more carbon is released than is sequestered, plant biomass acts as a net source for carbon. Soils can also be net sources or sinks depending on the balance of carbon added from biomass and lost through disturbances such as tillage or deforestation."[6]

Because of this unique carbon cycle, "[o]nce CO2 is emitted to the atmosphere, it is not possible to distinguish between the radiative forcing associated with a molecule of CO2 originating from a biogenic source and one originating from the combustion of fossil fuel."[7]

That said, EPA has concluded that

> "[b]iogenic CO2 differs qualitatively from fossil CO2 in that there is a significant difference between fossil carbon and biogenic carbon in the length of time required to replenish the reservoirs where the carbon is stored. For example, many coal deposits in North America originated during the Carboniferous Period, hundreds of millions of years ago. In contrast, the reservoirs of carbon found on the surface of Earth, in pools such as tree biomass and cropland soils, have accumulated over decades, not millennia. Because these land-based biomass carbon stocks can be replenished more quickly than fossil carbon stocks, these biogenic carbon stocks can act as a sink on a far shorter time scale than fossil carbon."[8]

Because biogenic CO2 is "qualitatively different" than fossil CO2, its greenhouse gas impacts must be measured by using the carbon equivalent metric. There is no other means of measurement since "a molecule of CO2 originating from a biogenic source and one originating from the combustion of fossil fuel" have different global warming impacts once measured on an equivalence basis.

To illustrate this last point, consider EPA's recent lifecycle analysis of San Joaquin Renewables, a California-based biomass gasification project that intends to convert wood residue, almond shells, and pistachio shells through gasification into compressed natural gas[9]. Although the process does not involve "capture," a review of the LCA highlights the shortcomings if Treasury were to ignore measurement on an equivalence basis.

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[6] https://cfpub.epa.gov/roe/indicator_pdf.cfm?i=86

[7] 76 FR 15254

[8] https://www.govinfo.gov/content/pkg/FR-2011-03-21/html/2011-6438.htm

[9] https://www.epa.gov/renewable-fuel-standard-program/san-joaquin-renewables-approval

In applying the four-part test outlined above (feedstock production, fuel production, fuel and feedstock distribution, and use of the fuel), EPA noted that the "alternative fate" of the residues used in the gasification process would likely be open burning and that by gasifying the material, the avoided emissions not only include carbon dioxide but also methane and nitrous oxide. In other words, "all greenhouse gas emissions." These greenhouse gases are then adjusted based on their GWP and added to the total carbon dioxide emissions from the open burning to arrive at 161 kgCO2e/mmBtu.

As noted in the below summary from the EPA LCA, the "avoided wood burning" appears as a "credit" of a -161. When the residue is gasified, it generates 113 kgCO2e/mmBtu, but on a "net" basis and taking into account "all greenhouse gas emissions," the gasification of this feedstock yields significant, measured results.

Table 3: Lifecycle GHG Emissions for CNG Produced Through the San Joaquin Renewables Pathway (kgCO2e/mmBtu)[19]

<table>
<tr><th>Lifecycle Stage</th><th>San Joaquin Renewables Pathway</th><th>2005 Diesel Baseline</th></tr>
<tr><td>Feedstock Collection & Transport</td><td></td><td rowspan="11">79</td></tr>
<tr><td>Avoided Wood Burning</td><td>-161</td></tr>
<tr><td>Avoided Shell Aerobic Decomposition</td><td>-48</td></tr>
<tr><td>Wood Chipping</td><td>1</td></tr>
<tr><td>Wood and Shell Transport</td><td>1</td></tr>
<tr><td>Gasification & Upgrading</td><td></td></tr>
<tr><td>Material Inputs</td><td>1</td></tr>
<tr><td>Feedstock Gasification</td><td>113</td></tr>
<tr><td>Energy Use</td><td>31</td></tr>
<tr><td>Co-Products</td><td>2</td></tr>
<tr><td>Downstream</td><td></td></tr>
<tr><td>Compression & Distribution</td><td>4</td><td></td></tr>
<tr><td>Tailpipe</td><td>60</td><td>18</td></tr>
<tr><td>Net Emissions</td><td>4</td><td>97</td></tr>
<tr><td>Percent Reduction Relative to Baseline</td><td>96%</td><td>--</td></tr>
</table>

Now consider the same project, but assume that instead of gasifying the material, San Joaquin were to "capture" the 113 kg/CO2e/mmBtu and thereafter utilize the carbon dioxide in a food grade product and displace fossil-derived carbon dioxide. If measured on an equivalence basis, the LCA would account for all non-carbon dioxide GHGs and also account for the alternative fate, open burning. Like the gasification example, the environmental benefits would be significant because emissions of carbon dioxide equivalent are dramatically reduced compared to fossil alternatives.

If, however, the measurement were to ignore the alternative fate of all GHG emissions and treat the resulting 113kg no differently than 113kg of fossil carbon dioxide, the result would be zero credits under 45Q because even though the project captured 113kg, it still resulted in the release of 113kg with no "credit" given for the alternative fate of the material, no credit for avoiding other GHG gases, and when the food grade carbon dioxide is ultimately released into the atmosphere, no distinction between biogenic and fossil carbon. This, in summary, is why measurement based on "equivalence" is so important for biomass and central to the statutory structure and integrity of 45Q.

We look forward to participating further in this rulemaking process and appreciate this opportunity to provide comments.

Sincerely,

Robert E. Cleaves
President
Biomass Power Association

Carrie Annand
Executive Director
Biomass Power Association