July 30, 2020

To Whom It May Concern:

The Global CO_2 Initiative (GCI) at the University of Michigan convenes worldwide researchers and utilizers of CO_2 with aims to identify and pursue commercially sustainable approaches that reduce atmospheric CO_2 levels. Central to this goal is to standardize the procedures for lifecycle analysis (LCA) and techno-economic assessments (TEA), with specific emphasis on designing TEA/LCA aimed to help make decisions surrounding carbon utilization. Therefore, we are pleased to see the inclusion of LCA calculations for the 45Q policy and provide comments based on our expertise in the TEA/LCA field to assist in the success of the policy.

In reviewing the proposed policy, we identified a section that we feel warrants additional clarification. 1.45Q-1(h)(3) of the proposed regulation is written such that a taxpayer who qualifies for the carbon oxide tax credit by capturing above the stated threshold of carbon oxide can allow another taxpayer, who disposes or utilizes a portion of the carbon oxide, to claim the tax credit. However, it is unclear how granular this separation of the tax credit can be, and if another taxpayer can claim less than the eligibility threshold. Theoretically, a utilizing taxpayer, with permission from the capturing taxpayer, could claim the credit for as little as a single ton of utilized/sequestered carbon oxide as long as the capturing taxpayer qualified for the credit. It would likely benefit the regulation and taxpayer if this component were clarified. Nonetheless, this component would allow the credit to be shared with more flexibility, and it could permit innovation in unique cases, particularly in developing utilization technologies as described in the following section of these comments.

In the comments and explanation of provisions included in the notice of proposed rulemaking, "Credit for Carbon Oxide Sequestration" (85 FR 34050), the IRS and Treasury department identify several questions relevant to the expertise of the GCI. The following comments are aimed primarily at addressing issues within Section 4 of the comments and explanation of provisions entitled "Utilization of Qualified Carbon Oxide."

Firstly, *how can regulations achieve consistency in boundaries and baselines so that similarly situated taxpayers will be treated consistently*? Because taxpayers maintain the choice to elect the performer of the LCA, many separate entities will likely perform the LCA analyses. Therefore, GCI believes that the best way to achieve consistency is to have documented and repetitive government evaluation of the LCAs. One specific way to enhance consistency is to improve the transparency on behalf of the evaluators and to outline particular LCA considerations. We agree with previous commenters that having public access to all previously submitted LCA calculations will benefit the consistency of submitted LCA analyses.

GCI has published several studies on developing appropriate guidelines for LCA in the context of carbon capture and utilization that would provide added clarity for CO2 utilizers performing LCAs [1]. These reports provide valuable information about determining baselines for

1 Zimmermann, Arno *et al.* Techno-Economic Assessment & Life-Cycle Assessment Guidelines for CO2 Utilization. The Global CO2 Initiative (2018). DOIs: 10.3998/2027.42/145436

calculations, deciding on the product lifecycle boundaries, and accounting for unreliable data adequately. This series of documents provide an in-depth analysis of LCA for carbon oxide utilization and includes several example studies [e.g. 2-3]. It would be beneficial to refer to this series of papers to aid in the development of accurate LCA analyses. These guidelines are available on the Global CO_2 Initiative website (globalco2initiative.org).

Secondly, *would it be beneficial to outline specific commercial markets for additional guidance in the LCA and utilization of carbon oxide*? Traditionally, we have identified fuels, chemicals, and building materials as the primary categories of carbon oxide utilization. Since often these categories are compared to a benchmark, it would be beneficial to identify these commercial markets. Also, if public access was provided to past submitted LCAs, it might be valuable to separate the reviewed LCAs into these categories.

GCI believes that there should be another category for consideration of newly developed utilization technologies. With the proposed regulation, the carbon capturer can elect to transfer part of the 45Q credit to the carbon utilizer. We believe that this opens the opportunity for fledgling technologies to use the 45Q credit to support innovation in the field of carbon utilization. These technologies often have insufficient or incomplete data to perform an LCA, and the resulting data may be subject to high uncertainty. Nevertheless, these technologies have the potential to grow significantly. We believe that a specific category for these new technologies could require regular updates to an LCA as relevant data becomes available. This category would allow for developing utilization techniques to benefit from the 45Q credit and allow for the IRS/DOE/EPA to track the carbon mitigating benefits of these new technologies. GCI has procedures for incipient technologies with imperfect information to perform LCAs outlined in its guidelines should the government choose to establish regulations of this nature [1].

For carbon utilizers, we believe that the economic viability of the business case must be considered. Therefore, we suggest that supplemental information, such as a techno-economic assessment of the market viability, be provided for the newly developed utilization technologies. This additional information will demonstrate if new methods of carbon utilization have a chance to succeed in the market, and allow the government to support developing technologies with the potential for mainstream adoption. There currently is not an ISO standard describing the contents of such an assessment; however, GCI has published guidelines and examples for techno-economic assessments that could be used to establish procedures for the performance of these analyses [1-3].

Finally, *what are the consequences of not providing standards for LCAs*? The consistency of submitted LCAs will be weakened by not providing additional guidance, such as the GCI guidelines. Having common guidelines will make the performance and evaluation of the LCAs easier and allow benchmarking more easily. Additionally, without clear guidance and transparency of LCA calculations, to successfully claim 45Q credits could require an iterative process between the taxpayer and the IRS. This iteration would increase the administrative time and cost of claiming the 45Q credit for both the taxpayer and the IRS.

[2] McCord, Stephen *et al.* Global CO2 Initiative Complete Mineralization Study 2018. The Global CO2 Initiative (2018). DOIs: 10.3998/2027.42/147467

[3] Zimmermann, Arno *et al.* Global CO2 Initiative Complete Oxymethylene Ethers Study 2018. The Global CO2 Initiative (2018). DOIs: 10.3998/2027.42/147468

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