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Internal Revenue Service
CC:PA:LPD:PR (Notice 2022-58)
Room 5203
P.O. Box 7604
Ben Franklin Station
Washington, DC 20044

Submitted via Regulations.gov

Re: Comments under Notice 2022-58 Pertaining to the Clean Hydrogen Production Credit and the Clean Fuel Production Credit

Thank you for the opportunity to comment under the provision of Notice 2022-58 pertaining to the Clean Hydrogen Production Credit under Internal Revenue Code (IRC) Section 45V and the Clean Fuel Production Credit under IRC Section 45Z as enacted in the Inflation Reduction Act (IRA) of 2022. CNX Resources Corporation and its affiliates (together, "CNX") is a premier, low carbon intensive natural gas development, production, midstream, and technology company centered in Appalachia. Over the past few years, CNX has begun deploying new methane capture systems and developing innovative technologies that will produce ultra-low carbon intensive natural gas and other derivative products. The technologies and capture systems being developed allow for the production of clean hydrogen and clean fuels with a lower carbon intensity. Additionally, in partnership with the Allegheny County Airport Authority (which oversees and operates Pittsburgh International Airport), we are in the process of furthering our efforts toward the development of sustainable aviation fuel.

Hydrogen and clean fuel producers provide a valuable opportunity to reduce emissions through the development of innovative technology using methane capture technology for the production of low carbon intensity renewable fuels and other clean fuels such as sustainable aviation fuel. It is important to incentivize and encourage further technological development and reduce carbon emissions through the increased verification and monitoring of emissions toward the goal of increased production of low-emission clean hydrogen and clean fuels.

Notice 2022-58 requests comments on several key areas relevant to our business and industry with respect to the clean hydrogen production credit and the clean fuels production credit. CNX requests that Treasury consider CNX's responses on the following issues identified in Notice 2022-58.

Notice 2022-58, Section 3.01 Credit for Production of Clean Hydrogen (IRC Section 45V)

GREET model

The hydrogen production technology and feedstock carbon intensities should drive the resulting lifecycle greenhouse gas emissions rate. The Greenhouse gases, Regulated Emissions, and Energy use in

Transportation model (commonly referred to as the "GREET model") developed by Argonne National Laboratory is well suited for this task. Without additional guidance or clarification, Treasury risks stifling future innovation and technology development. Maintaining the legislative intent in keeping markets open to competitive development is critical. We believe that the GREET model is the appropriate tool for measuring the lifecycle greenhouse gas emissions and that the rules should not attempt to modify or tailor the use of the GREET model for purposes of the credit under IRC Section 45V.

In response to Notice 2022-58, Section 3.01(1)(a), CNX notes that IRC Section 45V(c)(1) provides the definition of lifecycle greenhouse gas emissions. The definition includes the reference to the GREET model in IRC Section 45V(c)(1)(B) which provides a clear outline of the required steps and emissions to be included within the well-to-gate system boundary. The GREET model lays out specific definitions and guidelines that provide taxpayers with the transparency needed to make this determination. This reference allows taxpayers to determine the appropriate hydrogen lifecycle greenhouse gas emissions rate, which establishes a system boundary that terminates at the point at which hydrogen is delivered for end use. In support of this conclusion, the National Renewable Energy Laboratory (NREL) published a fact sheet for multiple energy sources related to electric generation in 2021. The study analyzes the published lifecycle assessment estimates from multiple technologies. For electricity generation, the report shows that the lifecycle greenhouse gas emissions are 28 gCO_2/kWh for solar and 13 gCO_2/kWh for wind.[1] The lifecycle analysis from the GREET model references their carbon intensity as 0 gCO_2/kWh. Overall, the standard of producers utilizing the GREET model as a basis for well-to-gate emissions ensure accuracy.

Co-products

Section 3.01(1)(b)(i) & (ii) of Notice 2022-58 asks how emissions should be allocated to co-products from the clean hydrogen production process. CNX recommends that displacement is the default methodology for allocation of emissions to co-products, but that the rules allow for different reasonable and acceptable methods to be used depending on the specific pathways.

ISO standards recommend displacement (system expansion) as the default method to account for co-products. Where displacement is infeasible or could cause significant increase in uncertainties in lifecycle assessment (LCA) results, allocation methods based on energy values, economic values, and mass can be applied. Co-product accounting methods should be based on specific pathways. Multiple agencies and LCA-based regulations have provided flexibility in selecting the practical co-product accounting methods. Classic examples are distiller grains co-product in corn-based ethanol pathways, soybean meal and glycerin in the soybean biodiesel pathways.

Clean hydrogen production should not be confined to renewables, biofuels, and related biomass materials. Blending of low-carbon intensity methane with other feedstocks has the same potential to achieve well-to-gate lifecycle greenhouse gas emissions below 0.45 kg of CO_2e/kg of hydrogen threshold outlined in IRC Section 45V(b)(2)(C)(ii). Notice 2022-58, Section 3.01(1)(b)(iii) asks what considerations support the recommended approaches to these issues. When determining greenhouse gas emissions allocable to co-products, standards, practices, and procedures utilize the recognized pathways and standards of other agencies such as the Environmental Protection Agency (EPA) and the Department of Energy (DOE) with the database from the Energy Information Administration (EIA). Additionally, the GREET model is a useful tool since it was developed based on the EIA database. Producers should use established LCA modelers to model the pathway and a 3rd party reviewer to improve the transparency and rigor of lifecycle results. These standards, along with those presented by the National Energy

[1] https://www.nrel.gov/docs/fy21osti/80580.pdf

Technology Laboratory (NETL) and NREL, recognize co-products as part of the lifecycle analysis. It is CNX's recommendation that Treasury follow established LCA procedures consistent with those utilized under IRC Section 45Q wherein taxpayers obtain a LCA which has been reviewed by an independent 3rd party and then submitted to the DOE/Treasury for approval.

Clean hydrogen as a byproduct

When allocating lifecycle greenhouse gas emissions to clean hydrogen that is a by-product of industrial processes (Notice 2022-58, Section 3.01(1)(c)(i)), if the by-product does not currently have a market, then the product should be treated as a waste material. If the by-product has a market, it should not be treated as a waste material and has a zero upstream carbon intensity.

Verification of inputs

In response to Notice 2022-58, Section 3.01(1)(e), qualified clean hydrogen production processes should be required to verify the delivery of energy inputs that would be required to meet the estimated lifecycle greenhouse gas emissions rate as determined using the GREET model or other tools used to supplement GREET. The GREET Model has two models for hydrogen distribution (local vs. regional transportation). The Greet 2022 Model has a hydrogen graphic user interface (GUI) that allows the user to customize hydrogen distribution models and distance for each project. Therefore, the verification would be to utilize the GREET model and the current process and standards that have been created through this organization. The shift to the production of low carbon intensity gas has resulted in the continuous improvement of the production process and spurred the development of innovative technologies to reduce emissions across the well-to-gate lifecycle.

It is possible to use feedstock specific assessments in the GREET model. Using low carbon intensity gas, producers are able to harness waste energy to make hydrogen using an apparatus that produces hydrogen through electrolysis, which separates the hydrogen and oxygen molecules of which water is composed using electricity (i.e., an electrolyzer). The resulting clean hydrogen would meet the required emissions metrics not otherwise available in the conventional production of natural gas.

Alignment with Clean Hydrogen Production Standard

Notice 2022-58, Section 3.01(2) address the alignment of the draft guidance for a Clean Hydrogen Production Standard (CHPS) developed to meet the requirements of Section 40315 of the Infrastructure Investment and Jobs Act (IIJA), Public Law 117-58, 135 Stat. 429 (November 15, 2021). The CHPS draft guidance establishes a target lifecycle greenhouse gas emissions rate for clean hydrogen of no greater than 4.0 kilograms CO_2e/kg of hydrogen, which is the same lifecycle greenhouse gas emissions limit required by the IRC Section 45V credit. In the Department of Energy's Draft CHPS, System Boundary for Lifecycle Target, under the extraction of feedstock tab, which includes fuel combustion, fugitive emissions, feedstock treatment, and net GHG (greenhouse gas) emissions associated with production of biomass feedstocks, but does not specify, define, or include additional sources of GHG emissions that are similar in nature. Specifically, as it relates to net GHG emissions, other sources of methane which are being emitted as a byproduct should be incorporated in the CHPS, not only those from biomass or bio-derived feedstocks. While the CHPS draft is useful and consistent with many aspects of the IRC Section 45V framework because it does not include additional sources of GHG emissions as it is currently drafted, it should not be relied upon in formulating the IRC Section 45V rules or incorporated by reference into such rules.

Like Agricultural Renewable Natural Gas projects, these other sources of sustainably derived methane, such as methane being emitted from active and abandoned coal mines, is typically ventilated

to the atmosphere as a residual waste not associated with the core product in the manufacturing process.

This methane, which is recovered incrementally from standard practice and baseline assumptions has an ultra-low, even negative carbon intensity, comparable to swine or dairy farm RNG, based on studies verified by independent specialists and it should be included in the lifecycle assessment. If it is not captured and utilized – in this scenario to produce hydrogen – the methane is likely to be emitted, contributing a greenhouse gas roughly 28 times more potent than CO_2 to the atmosphere. The feedstock should be treated as a waste material in the lifecycle assessment.

The quantity of methane being released into the atmosphere is a significant amount of emissions. The EPA states that coal mine methane (CMM) emissions are 7% of total US emissions in 2020.[2] The Greenhouse Gas Reporting Program (GHGRP) reports that 30 million metric tons (MMT) of carbon dioxide equivalent was emitted in 2020.[3] By incentivizing the capture and beneficial use of CMM that would otherwise be released to the atmosphere, the resulting methane reductions will enhance the quality of life for the communities most impacted by improving the air quality and providing additional jobs to those underserved communities where projects may be located.

Inclusion of these additional waste sources as a viable feedstock for clean hydrogen production can lead to a meaningful reduction in methane emissions across Appalachia and help shift some of the dependence on less mature and defined solutions such as carbon capture and sequestration to meet the proposed ($4kgCO_2e/kg\ H_2$) standard. The flaring of the methane source qualifies for carbon offset under California Cap and Trade and all leading non-profit standards such as American Carbon Registry, Climate Action Reserve, and VERRA. Additionally, by utilizing these sources of waste methane as a feedstock, we can offset the use of higher carbon intensive natural gas, which is currently the prominent feedstock, making up nearly 95% of current production. Utilizing mature, proven, and scalable technology and processes within the existing transportation infrastructure will enables a far lower full lifecycle carbon intensity product that can be deployed faster than other options being discussed while also meeting, or exceeding lifecycle emissions goals. In addition to being a solution to meet the standard for blue hydrogen applications, the use of low carbon intensity gas sources can also be converted to electricity to power electrolyzers to create green hydrogen through various applications.

The Department of Treasury should utilize lifecycle assessment tools such as the GREET model to validate the carbon intensity estimates of gases for hydrogen production. Further, we believe the GREET model should be expanded to include other sources of waste emissions as potential feedstock for hydrogen.

Provisional emissions rates

The determination of provisional emissions rate discussed in Notice 2022-58; Section 3.01(3)(a) is another area worthy of attention. Taxpayers should be permitted to file a petition for a provisional emission rate that demonstrates a lifecycle emissions rate that falls within the boundary of the applicable credit ranges after independent verification of the process has been performed using industry standards for any feedstock source (not just renewables, biofuels, and biomass materials) that produces clean hydrogen.

Regarding Notice 2022-58, Section 3,01(3)(b), CNX recommends that carbon intensity for hydrogen production should only be from well-to-gate for the system boundary. The policies should

[2] https://www.epa.gov/cmop

[3] https://www.epa.gov/ghgreporting/ghgrp-underground-coal-mines

make hydrogen production technology policy neutral, and the comparison purely based on carbon intensity. The emissions rates should be derived from a life cycle analysis performed using the GREET Model.

Recordkeeping and reporting

Notice 2022-58, Section 3.01(4)(a) seeks comment on what documentation should be maintained or created to demonstrate the lifecycle greenhouse gas emissions rate resulting from a clean hydrogen production process. CNX believes it is appropriate to use measurement and peer reviewed of assumed emissions along the lifecycle process to document or substantiate the lifecycle greenhouse gas emissions rate resulting from a clean hydrogen production process. The documentation should include a lifecycle assessment report. When utilizing the GREET Model, projects can submit model results with a peer reviewer (the Argonne LCA modeling team) and do not need a verifier. To enhance credibility, the peer reviewers should provide a statement of no conflict of interest with the project developer.

Notice 2022-58, Section 3.01(4)(f) addressed indirect book accounting factors that reduce a taxpayer's effective greenhouse gas emissions (also known as a book and claim system), including, but not limited to, renewable energy credits, power purchase agreements, renewable thermal credits, or biogas credits. The provision as written is narrow in its interpretation and should allow for other low carbon intensity feedstocks other than biogas. The book and claim system is utilized and widely accepted under the EPA's Renewable Fuel Standards (RFS) program and the California Low Carbon Fuel Standards (LCFS) program. This delivery mechanism is a valid process to track the delivery of low carbon intensity feedstocks and encourage a broader geographic market for project developers to locate plants/projects throughout the United States.

Coordination with IRC Section 45Q

In Notice 2022-58, Section 3.01(6)(c), Treasury asks for input regarding coordination with IRC Section 45Q. It is possible that certain circumstances occur in which a single facility with multiple unrelated process trains could qualify for both the IRC Section 45V credit and the IRC Section 45Q credit notwithstanding the prohibition in IRC Section 45V(d)(2) preventing any IRC Section 45V credit with respect to any qualified clean hydrogen produced at a facility that includes carbon capture equipment for which a IRC Section 45Q credit has been allowed to any taxpayer.

It is our recommendation that rules under IRC Section 45V define "facility" narrowly such that at a single site, carbon capture equipment installed on process trains unrelated to the production of clean hydrogen does not invoke the application of IRC Section 45V(d)(2).

The DOE looks favorably on clean hydrogen's role in meeting climate goals in the United States, noting that "hydrogen can serve as a key enabler of our goal due to its versatility and potential to complement other clean technologies in three of the most energy and emissions-intensive sectors in the United States: industry, transportation, and electricity generation." DOE has outlined in its National Clean Hydrogen Strategy and Roadmap[4] the potential to increase clean hydrogen production from nearly zero today to 10 MMT per year by 2030, 20 MMT per year by 2040, and 50 MMT per year by 2050. DOE estimates that achieving these clean hydrogen production targets by 2050 would reduce US GHG emissions by approximately 10% relative to 2005 levels.

[4] https://www.hydrogen.energy.gov/pdfs/clean-hydrogen-strategy-roadmap.pdf

In short, the clean hydrogen production credit should be about lifecycle analysis and carbon intensity, not picking fuel sources. We agree that accessibility and sustainability should be considered but that does not just mean renewables are the only viable sources to produce clean hydrogen.

Notice 2022-58, Section 3.02 Clean Fuel Production Credit (IRC Section 45Z).

The production of clean fuels (such as sustainable aviation fuel) provides another opportunity to incentivize the reduction of carbon emissions through the development of innovative technologies.

Emissions rate for sustainable aviation fuel

When establishing an emissions rate for Sustainable Aviation Fuel as described in Notice 2022-58, Section 3.02(2), IRC Section 45Z(b)(1)(B)(iii) provides that the lifecycle greenhouse gas emissions of sustainable aviation fuel shall be determined in accordance with the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) or "any similar methodology which satisfies the criteria under Section 211(o)(1)(H) of the Clean Air Act (42 U.S.C. 7545(o)(1)(H)), as in effect on the date of enactment of this section." CNX has reviewed the requirements of the CORSIA standards adopted by the International Civil Aviation Organization and believes that the incorporation of other similar methodologies such as the GREET model can be used to accurately calculate lifecycle greenhouse gas emissions for sustainable aviation fuel. CNX recommends that Treasury add clarifying language to align with the requirements under IRC Section 45V which references use of the GREET Model or any other similar methodology.

Provisional emissions rates

Similar to the request for clean hydrogen, Notice 2022-58, Section 3.02(3) requests comments regarding filing a petition for a provisional emissions rate with the Secretary for determination of the emissions rate for a transportation fuel which has not been established. Taxpayers should be permitted to file a petition for a provisional emission rate that demonstrates a lifecycle emissions rate that falls within the boundary of the applicable credit ranges after independent verification of the process has been performed using industry standards for any feedstock source (not just renewables, biofuels, and biomass materials) that produces clean fuels.

Certification requirements

In response to Notice 2022-58, Section 3.02(4), IRC Section 45Z(f)(1) provides several requirements for a taxpayer to claim the IRC Section 45Z credit, including for sustainable aviation fuel a certification from an unrelated party demonstrating compliance with the general requirements of the CORSIA, or in the case of any similar methodology, as defined in IRC Section 45Z(b)(1)(B)(iii)(II), requirements that are similar to CORSIA's requirements. With respect to this certification requirement for sustainable aviation fuel, while CORSIA provides guidelines for determining the lifecycle greenhouse gas emissions requirements for sustainable aviation fuel, it would be prudent to include other similar methodologies such as the GREET model for purposes of the certification requirement.

Summary

The market adoption of low carbon intensity energy has been slowed in part by renewable energy's high cost and reliance on foreign suppliers. Low-carbon methane offers a carbon intensity solution that can produce important environmental benefits immediately while utilizing a reliable, consistent, domestic fuel source. For example, the California LCFS program has led to a four times

increase in compressed natural gas (CNG) use for transportation since 2010, while reducing GHG emissions by approximately 30%.[5]

Local governments will benefit from new tax revenue and income thanks to the utilization of low carbon attributes which can be exported to various states, countries, and businesses alike, striving to meet emissions reductions goals. For example, a recent study showed that one state's investment in renewable natural gas could lead to the creation of approximately 130,000 jobs and up to $14 billion of added economic value.[6] CNX alone is proposing to invest millions of dollars each year into new methane capture facilities.

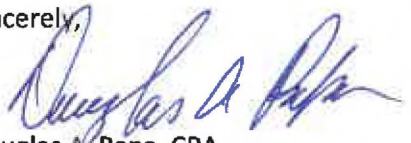
The methane capturing process is highly beneficial because absent intervention, those gases would continue to be released into the atmosphere for decades. A consistent and sustainable incentive structure will be the catalyst for job creation and induce new capital expenditures across Appalachia, all while reducing millions of tons of GHG emissions each year. Allowing feedstocks that meet or achieve the desired lifecycle emissions reductions from sources other than renewables, biofuels, and biomass materials to aid in the production of clean hydrogen will help further spur economic development and innovation toward reducing methane emissions and lowering the overall impact of methane release into the atmosphere.

We respectfully urge Treasury to provide this additional clarity through forthcoming regulations and other guidance implementing these provisions around the clean hydrogen production credit and the clean fuel production credit.

If you have any questions regarding this submission, please contact Douglas A. Papa at (724) 485-4611 or douglaspapa@cnx.com.

CNX appreciates the opportunity to provide comments under Notice 2022-58 regarding the Clean Hydrogen Production Credit and the Clean Fuel Production Credit with the goal of promoting investment in clean energy across the United States.

Sincerely,



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[5] Department of Energy, 2021 https://afdc.energy.gov/states/ca
[6] California Natural Gas Vehicle Coalition, 2017 https://cngvc.org/study-rng-can-create-130000-jobs-14-billion-economic-benefits-california/