

Internal Revenue Service (IRS): Comments in response to Department of Treasury's Issued Guidance on Section 45V Hydrogen Production Tax Credit

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Stakeholder Feedback:

We thank the Department of the Treasury for its tireless efforts in working on Section 45V guidance and for the opportunity to provide feedback on the initial guidance.

Koloma is a venture-backed company pioneering a data-driven approach to exploration for hydrogen in the earth's subsurface ("geologic hydrogen"). Koloma has an active US-based exploration program which has identified several promising regions for geologic hydrogen production. We are leveraging nearly 200 years of subsurface exploration technology development and are using the best safety practices to rapidly scale this industry. We are also employing the highest environmental standards. Two lifecycle analyses conducted by independent third parties concluded that geologic hydrogen produced from our prospects would produce far less than 0.45 g CO₂e/g H₂.

Geologic hydrogen presents an incredible opportunity to meet both US and global demand for hydrogen production within this decade. Geologic hydrogen will be a domestically-sourced, non-carbon intensive, dispatchable resource that, crucially, is decoupled from existing natural gas supply chains and the electrical grid.

In addition to the direct benefits of clean, always-on production, the geologic hydrogen industry introduces many indirect benefits. Geologic hydrogen reservoirs are complementary to hydrogen produced from renewables-powered electrolysis. The same reservoir that was used to produce geologic hydrogen can be converted into a hydrogen storage site. Geologic hydrogen production contributes to our nation's energy security as an entirely domestic energy resource with no reliance on the availability of critical minerals. Geologic hydrogen production also secures a stable, domestic supply of helium which is a typical co-product in our process. Helium has no substitute for use in industries as diverse as health care and semiconductor manufacturing; supply disruptions in the helium industry have serious implications for U.S. security and technology leadership. With the right policies in place, we can help ensure U.S. global leadership in the geologic hydrogen sector.

As the Department of the Treasury reviews comments and considers revisions to the proposed guidance, it is crucial that the finalized guidance remain flexible and inclusive of emerging technologies like geologic hydrogen. For geologic hydrogen specifically, there are several unique aspects in its production that require special considerations for Section 45V implementation. As a natural primary energy resource, geologic hydrogen production is fundamentally different than other methods for hydrogen production and as an emerging technology pathway, tax credit clarity is even more essential. Given these unique

underpinnings, we therefore ask for the following changes in the proposed Section 45V regulations:

- 1) Clarify that a geologic hydrogen production well is a “qualified clean hydrogen production facility” and that the 10-year period for claiming 45V credits is associated with the date each well is placed in service as is done with production tax credits on electricity from wind turbines.
- 2) Specify that the “gate” in the “well-to-gate” scope for geologic hydrogen production is the point where the hydrogen exits shared facilities in cases where multiple production wells share the same above-ground equipment that separates the hydrogen from the raw gas. This would mean, consistent with this definition, that the same CI score may apply for multiple wells since the lifecycle emissions are determined at the “gate” where the hydrogen is ready for delivery to customers.
- 3) Set a deadline for the Department of Energy to approve Provisional Emissions Rate (PER) requests. Work to develop a specific 45VH2-GREET pathway for geologic hydrogen.
- 4) Make the Final Investment Decision (FID) an appropriate measure of project maturity to commence the DOE’s PER process for geologic hydrogen.
- 5) Universally apply the system expansion method in 45VH2-GREET for allocating emissions across co-products to all hydrogen production technologies. If an alternative emissions allocation method is being considered, it should be a mass-based physical allocation scheme which is the most straightforward and tractable approach.

Points 1 and 2: Definition of a “Clean Hydrogen Production Facility” and “well-to-gate” scope for geologic hydrogen.

Section 45V defines a qualifying clean hydrogen production facility as “a facility (A) owned by the taxpayer, (B) which produces qualified clean hydrogen, and (C) the construction of which begins before January 1, 2033.” The statute and the blue book from the Joint Committee on Taxation in December 2023 do not explicitly address the definition of a qualifying clean hydrogen facility or how any production site would qualify as a facility.

A “facility” is commonly understood to mean equipment and other tangible property that are integral to producing a product. For geologic hydrogen operations, a production well and the related pipes and other above-ground equipment at the production site that separate the raw gas into saleable hydrogen should constitute a “clean hydrogen production facility”.

The proposed regulations define the “facility” as a single production line that produces qualified clean hydrogen. A geologic hydrogen producer may start with any number of wells but a single set of above-ground equipment to separate the hydrogen from the raw gas. It may add other production wells later.

The wells produce gas from a single subsurface reservoir. The above-ground equipment is shared by all the wells, like multiple wind turbines feeding into a single project substation. The saleable hydrogen product is ready for delivery to offtakers at the shared facilities gate. This is captured quite literally in 45V’s “well-to-gate” definition. As such, the lifecycle carbon emissions assessment (or “CI Scoring”) should be completed at the shared facilities gate.

However, the 10-year period for 45V credits should run from the date that each separate well is placed in service. This is no different than what happens at a wind farm with multiple wind turbines that share a common substation and main power transformer. The 10 years run from the date each separate turbine is placed in service, even though the multiple turbines are considered a single project for some other purposes like when construction starts for tax purposes.

The definitions included in final Section 45V guidance should make these points clear and certain.

Point 3: The Provisional Emissions Rate (PER) process for geologic hydrogen.

We appreciate that initial Section 45V guidance provided more details on the PER process and specifically named geologic hydrogen as an eligible technology for this process. As currently proposed, the Department of Energy has a critical role managing the PER process for evaluating the carbon intensities for hydrogen production technologies that are not represented in the 45VH2-GREET model. We agree that the Department of Energy is the appropriate body to complete this work but emphasize that this process needs to balance expediency and thoroughness.

A. The PER process must be efficient.

The Hydrogen Production Tax Credit provides critical support for companies developing and deploying novel technologies. Tax credit uncertainty compounds risks for early-stage companies. As such, the PER process must be both predictable and provide tax credit certainty on a reasonable time frame to empower companies to raise the necessary capital to fund technology development and deployment. Lengthy PER determinations would undermine the tech agnostic congressional intent of Section 45V by unfairly disadvantaging emerging technologies and result in delays or project cancellations. For the purposes of successful business planning and execution, it is both essential and reasonable to have tax credit level certainty within 6 months of data submission. This timeline balances the need for financial certainty while also providing regulators ample time to make fully informed decisions.

Notably, a qualified clean hydrogen production facility may begin producing hydrogen before the PER process is completed. The Department of the Treasury must clarify that the PER determination for such a facility shall apply retroactively in that case, allowing the producer to be eligible for and claim the 45V credit on all qualified clean hydrogen produced. This is particularly important if the PER process takes longer than it does to bring new clean hydrogen to market.

B. The PER process must be clear and flexible.

Additional clarification regarding when the PER process may commence is required from the Department of Energy and Department of Treasury. This is particularly salient for geologic hydrogen, which is a naturally occurring, primary energy resource. Unlike other clean hydrogen production methods (i.e., hydrogen produced from steam methane reforming or water electrolysis) whose technological nature is to have consistent inputs and outputs, geologic hydrogen production and its associated carbon footprint will depend on the specific characteristics of a particular facility and reservoir. For this reason, the Departments of Energy and Treasury should specify that a PER petition filed by a taxpayer is appropriate on a per facility basis. We also note that adding an additional well in the same reservoir system at the

same facility is akin to incrementally adding a new electrolyzer at a green hydrogen production site and should therefore not trigger another PER determination. This “facility” (i.e., reservoir) approach would balance thoroughness, ensure accuracy, and minimize administrative burden.

As part of the Department of Energy’s PER review for a single geologic hydrogen production facility, a sensitivity analysis should be conducted which indicates the range of conditions where geologic hydrogen production can reasonably expect to remain eligible for each tier of the Section 45V tax credit. This provision is crucial because, as a natural energy resource, production does not have standardized inputs and outputs. Including a range of conditions which qualify for a particular 45V tier from a sensitivity analysis will improve the durability of the PER determination, provides enough certainty for a geologic hydrogen producer to move forward on a project, and reduces the administrative burden on the Department of Energy as production at a geologic hydrogen production facility commences.

Requiring geologic hydrogen producers to petition for a PER process per well or even per year will unnecessarily drain agency resources and increase the regulatory compliance burden for geologic hydrogen producers, all of whom today are startups with lean operations. Additionally, Treasury should clarify that each new well at a geologic hydrogen production facility will have its own 10-year time window to claim the tax credit, consistent with the definition of a “qualifying clean hydrogen production facility”. This provision incentivizes the scaleup of the geologic hydrogen industry and addresses the goal of the clean hydrogen production tax credit which is intended to foster the domestic clean hydrogen industry.

C. There should be a safe harbor provision.

Producers rely on 45V eligibility and tier certainty to proceed with the sizable necessary investments to make projects a reality. To this end, Treasury should institute a safe harbor provision. Such a provision should clarify that the applicable 45VH2-GREET model version or PER determination at the time of project commencement be applicable for the lifetime of the facility. The safe harbor provision should apply as long as that facility maintains operations consistent with those present at the time of CI score determination. If operations change in a way which meaningfully alters carbon emissions, the safe harbor should not apply.

D. The PER process should only be available to hydrogen production technologies not represented in 45VH2-GREET.

The Treasury Department should retain current guidance stating that the PER process is reserved only for hydrogen producers who have no other alternative pathways to Section 45V eligibility and qualification. We note that allowing hydrogen production technologies which are already represented in the 45VH2-GREET model to petition for a PER process would lead to a massive drain on Department of Energy’s resources, significantly impacting the anticipated timelines for the PER process and increasing the regulatory burden for emerging hydrogen production technologies.

Instead, the 45VH2-GREET model should document the model’s default assumptions. If a hydrogen producer seeks to modify one or more assumptions, they should have the ability to do so by providing the necessary documentation to justify any modification, and re-running 45VH2-GREET to quantify the impact on the hydrogen carbon intensity score. This process should be wholly separate from the PER process.

E. The PER process should not detract from the need for 45VH2-GREET model development.

The availability of a PER process must not diminish or detract from the urgency of expanding the 45VH2-GREET model to include new clean hydrogen production pathways such as geologic hydrogen. While the PER process will serve a critical role for new and emerging clean hydrogen production technologies in the short-term, the only way to minimize eligibility risk and uncertainty in the long term is to incorporate those technologies into 45VH2-GREET. The Department of Energy, in particular, should have an annual budget allocation for 45VH2-GREET model expansion.

Point 4: Indicators of project maturity for geologic hydrogen producers.

We appreciate the intention of Treasury to establish a commonly accepted standard for measuring project maturity. We also note that geologic hydrogen has dramatically different footprints and capital requirements than most other clean hydrogen production facilities. A FEED study may not be applicable or necessary for developing a geologic hydrogen production facility.

Broadly, the Department of Treasury should determine an appropriate metric of project maturity on a case-by-case basis for each type of emerging clean hydrogen technology. At minimum, a project maturity metric should be selected whereby the clean hydrogen project under consideration has enough detail and empirical evidence to enable the Department of Energy to provide a PER determination. This flexibility in measuring project maturity would account for projects that are utilizing new and innovative hydrogen production methods where a FEED study is not suitable or required.

Developing a geologic hydrogen resource into an asset involves exploration, production testing, and conversion of that asset into a production site. Each step involves several multi-million-dollar investments. Geologic hydrogen projects today are moving at an accelerated pace and companies require tax credit certainty as early as possible to make investment decisions.

An appropriate measure of maturity for a geologic hydrogen project is a Final Investment Decision (FID). As a precursor to FID, a geologic hydrogen producer will have obtained flowing production data that will inform project economics and facility design. Facility design will determine major processing equipment, mass and energy balances, facility arrangement, design calculations and information pertinent to validating the facility carbon footprint.

Point 5: Emissions allocation methods.

45VH2-GREET currently uses a system expansion method for allocating emissions to co-products with market value that are productively used or sold. This method is appropriate and applicable to a wide range of hydrogen production technologies and most accurately reflects the knock-on impacts of co-products. However, if an alternative mechanism for emissions allocation is being considered, it should be a physical allocation method based on the mass of co-products with market value that are productively used or sold. This method is the simplest and easiest to verify for clean hydrogen producers and is expected to be flexible enough for a wide range of production methods.

Three primary reasons exist for using a mass-based emissions allocation method. First, a mass-based emissions allocation method is easily verified and compared across a variety of production processes. Second, other physical allocation methods may not be appropriate or may be too cumbersome for all types of hydrogen production processes. For example, an

energy allocation method does not work when hydrogen co-products include nitrogen or helium, as may be the case for geologic hydrogen production, as neither nitrogen nor helium are energy carriers. Third, other emissions allocation methods may lead to inconsistent results. This is particularly true for economic emissions allocations methods where the price of co-products may fluctuate significantly over time, from region to region, or from producer to producer. Economic emissions allocation schemes are inappropriate because there exists no commodity hydrogen market today with a standard price point reference and the price of hydrogen will depend on the value of the hydrogen credit which creates a circular reference (i.e., hydrogen price depends on carbon intensity which depends on the hydrogen price when using economic emissions allocation). Furthermore, economic allocation methods are susceptible to misuse by actors who wish to show arbitrarily low carbon intensity scores for hydrogen or co-product production.

If the Department of the Treasury is considering alternative emissions allocation approaches, there should be clear boundaries dictating when alternative methods can be used. These boundaries should be designed to prevent abuse of allocation methods which may lead to arbitrarily low carbon intensity scores for hydrogen production.

Koloma appreciates the opportunity to provide comments on this landmark legislation. Clean hydrogen production has the potential to transform and decarbonize the United State's heaviest-emitting industries and be an important tool in our fight against climate change. We are excited about geologic hydrogen's role in the scaleup of the clean hydrogen industry and we appreciate the Department of Treasury's careful consideration of this tax credit.