



Nov 11, 2022

U.S. Department of Energy (DOE)
Office of Energy Efficiency & Renewable Energy
Forrestal Building
1000 Independence Avenue, SW
Washington, DC 20585

RE: COMMENTS OF CENTER FOR RESOURCE SOLUTIONS (CRS) IN RESPONSE TO THE U.S. DEPARTMENT OF ENERGY CLEAN HYDROGEN PRODUCTION STANDARD (CHPS) DRAFT GUIDANCE

CRS appreciates this opportunity to submit comments in response to the U.S. Department of Energy Clean Hydrogen Production Standard (CHPS) Draft Guidance ("Draft Guidance"). Please find our responses to questions in the Stakeholder Feedback section of the Draft Guidance.

BACKGROUND ON CRS AND GREEN-E®

CRS is a 501(c)(3) nonprofit organization that creates policy and market solutions to advance sustainable energy. CRS provides technical guidance to policymakers and regulators at different levels on renewable energy policy design, accounting, tracking and verification, market interactions, and consumer protection. CRS also administers the Green-e® programs. For over 20 years, the Green-e® program has been the leading independent certification for voluntary renewable electricity products in North America. In 2021, the Green-e® Energy program certified retail sales of over 110 million megawatt-hours (MWh), serving over 1.3 million retail purchasers of Green-e® certified renewable energy, including over 309,000 businesses.¹ The Green-e® Renewable Fuels program was launched in 2021, initially as a standard and certification for biomethane products and associated environmental attributes. This program is in the process of expanding to certify green hydrogen transactions and programs and can serve as a guide for DOE as it helps accelerate the adoption of biomethane and green hydrogen, while ensuring that they are from sustainable renewable resources and meet the highest environmental standards, and that customers are protected in their purchase and ability to make verified usage claims.

¹ See the 2022 (2021 Data) Green-e® Verification Report (soon to be published) here for more information: <https://www.green-e.org/verification-reports>

RESPONSES TO QUESTIONS FOR STAKEHOLDERS

Question 3c:

Should renewable energy credits, power purchase agreements, or other market structures be allowable in characterizing the intensity of electricity emissions for hydrogen production? Should any requirements be placed on these instruments if they are allowed to be accounted for as a source of clean electricity (e.g. restrictions on time of generation, time of use, or regional considerations)? What are the pros and cons of allowing different schemes? How should these instruments be structured (e.g. time of generation, time of use, or regional considerations) if they are allowed for use?

Clean hydrogen markets present opportunities to dramatically grow green power markets and demand for green power from hydrogen production. Allowing for renewable electricity to be used to lower the carbon intensity (CI) of electricity use for hydrogen production would provide renewable generators and suppliers access to this nascent market and potentially increase the importance of hydrogen use overall.

Renewable energy credits, power purchase agreements, or other market structures for characterizing the intensity of electricity emissions for hydrogen production

Renewable Energy certificates (RECs) include all attributes of renewable generation, including GHG emissions, and are the standard accepted proof that 1 MWh of renewable electricity was generated and used. As such, RECs are required to substantiate delivery and use claims of the specified carbon intensity of a renewable generation unit. They are the legal and most precise means of tracking renewable electricity² and therefore the appropriate tool to verify that renewable electricity is being used to produce clean hydrogen from an electrolyzer. All options for delivering, purchasing, or otherwise using renewable electricity in the U.S. must include RECs, including onsite generation, power purchase agreements (PPAs), and utility programs. Even in the case that a renewable generator is not registered with an electronic certificate tracking system ("Tracking Systems"), RECs are de facto created for each MWh of generation and may be transferred and retired contractually.

The Federal Trade Commission (FTC) requires REC ownership in order for an entity to state that it is using renewable electricity.³ RECs are recognized by actors in the voluntary market and in all thirty-five (35) states that require or have a goal to deliver renewable generation to users, as the common instrument used to demonstrate renewable electricity usage.⁴ The Solar Energy Industry Association (SEIA), the Interstate Renewable Energy Council (IREC), and other state and national consumer

² Comments to the U.S. Securities and Exchange Commission (SEC) on Proposed Climate-Related Disclosures for Investors. Available at: <https://resource-solutions.org/document/061722/>

³ Federal Trade Commission (FTC). (2012). Guides for the Use of Environmental Marketing Claims; final rule. Available at: https://www.ftc.gov/sites/default/files/documents/federal_register_notices/guides-useenvironmental-marketing-claims-green-guides/greenguidesfrn.pdf.

⁴ Jones, et al. (2015). The Legal Basis of Renewable Energy Certificates. Available at: <http://resourcesolutions.org/wp-content/uploads/2015/07/The-Legal-Basis-for-RECs.pdf>

protection agencies and organizations have also published guidance and requirements that reiterate that sole REC ownership is required for renewable electricity⁵ As RECs are used to substantiate delivery claims of renewable electricity, they can only be used to verify the carbon intensity of hydrogen production processes which use electricity, e.g. electrolyzers.

In most of the U.S., RECs are only issued in Tracking Systems for certain renewable resource types. In certain regions, however, there are all-generation certificate tracking systems that track and issue certificates for production from all generation resources and each MWh of generation in the region, not only renewable facilities. In these regions, generation attribute certificates from these systems would be similarly required to demonstrate use of an eligible nonrenewable resource type (e.g. nuclear) and associated emissions. For eligible resources that are not tracked and issued certificates in a certain region as well as renewable facilities that are not registered in Tracking Systems (e.g. small resources), the environmental attributes/RECs will need to be contractually verified.

Calculating Carbon Intensity Using RECs

We recommend that RECs be used to characterize the generation (and CI) of the electricity used to produce hydrogen, specifically to verify use of a renewable generation source with a specified emissions rate or CI. Calculating the emissions associated with the electricity used to produce hydrogen is “attributional” emissions accounting, and the CI is based on the direct emissions from the generation used (e.g., zero for wind, solar, and hydropower generation). This is in contrast to “consequential” accounting, which calculates the grid emissions effect of electricity use for hydrogen production and the grid emissions effect of any renewable electricity (RECs) that is purchased for hydrogen production, e.g., using marginal grid emissions (or CI) data. While consequential accounting can provide an indication of the carbon impact of hydrogen production and renewable electricity used for hydrogen production, it cannot characterize the CI of electricity used for production, in which case “clean hydrogen” refers to the impact of hydrogen production on clean electricity production as opposed to the use of clean electricity to produce clean hydrogen.⁶

Time of generation (vintage), time of use, regional considerations, and other potential requirements for RECs

CRS can help DOE investigate and determine what REC vintage requirements are appropriate for the CHPS. Historically, best practices in both voluntary and regulatory markets have set requirements for the vintage (i.e., time of production) for RECs depending on their use case. While there is variation on vintage requirements depending on reporting programs, renewable energy leaders such as CDP,

⁵ For example, see: Solar Energy Industry Association (SEIA). (2015). SEIA Solar Business Code. Available at: <http://www.seia.org/policy/consumer-protection/seia-solar-business-code>.

Interstate Renewable Energy Council (IREC). (2015). IREC’s Clean Energy Consumer Bill of Rights. Available at: <http://www.irecusa.org/consumer/bill-of-rights.pdf>.

⁶ For more information, see CRS. (2022). Guide to Electricity Sector Greenhouse Gas Emissions Totals. Available at: <https://resource-solutions.org/wp-content/uploads/2022/11/Guide-to-Electricity-Sector-Greenhouse-Gas-Emissions-Totals.pdf>.

RE100, and the Green-e® Energy program recognize that RECs should be paired with generation that is reasonably close to the time the electricity was consumed.⁷

As a minimum requirement for credible renewable electricity usage claims in the U.S., the Green-e® Energy program's 21-month vintage window—which includes the calendar year in which electricity use occurred, the last six months of the prior calendar year, and the first three months of the following calendar year—is a commonly used vintage requirement for RECs. However, depending on DOE's objectives and to ensure that hydrogen production benefits local renewable energy production, time-matching local renewable electricity generation (and RECs) to hydrogen production, e.g., using an hourly REC vintage requirement, may be important for this particular usage. While RECs can facilitate this hourly accounting, most Tracking Systems have not yet integrated more precise (e.g., hourly) vintage data into their systems. The market conditions necessary to sustain time-matching of RECs at scale will not likely be ready until likely 2025.

We do not recommend that DOE delay moving forward with incentivizing clean electricity use in the CHPS until hourly RECs and other market infrastructure needed to support and scale hourly tracking and trading of generation attributes is created and widely available. Requirements can be set for hourly tracking that start at a later date and ramp up. In the meantime, DOE can support the development of tracking systems to accommodate hourly claims— integration of all-resource tracking and more precise vintage and location data.

While there is no need to limit REC use based on generator location or transaction type (e.g., “bundled” vs. “unbundled” renewable energy) to ensure accurate accounting and credible renewable electricity usage claims, DOE may again consider geographic restrictions on RECs to achieve local and decarbonization objectives. CRS will also be investigating these questions and gathering stakeholder feedback as part of the standard setting process for the Green-e® Renewable Fuels program.

In addition to vintage and geographic requirements, setting restrictions on facility age for renewable generators has long been a tool of voluntary and compliance markets to encourage new generation. With this market in a nascent stage, the Green-e® Renewable Fuels program will be exploring the potential market effects of a facility age (i.e., “new date”) requirement for electricity used in hydrogen production. Though an appropriate facility age requirement has yet to be determined, a principal concern is the risk of existing renewable generation being shifting if there is a higher financial return for its use in hydrogen production. This could create an equity issue as renewable energy that is currently being delivered, particularly to residential customers, could end up being reallocated to hydrogen production for the benefit of large corporate and commercial customers. Purchasing from newer facilities is also important if DOE's objective is to drive more production of clean energy. To best

⁷ RE100 Technical Working Group. (2016). Making Credible Renewable Electricity Usage Claims. Available at: <https://www.there100.org/sites/re100/files/2020-09/RE100%20Making%20Credible%20Claims.pdf>

incentivize renewable energy and thus hydrogen production that is sustainable, equitable, and impactful, the CHPS should seek to encourage generation from newer facilities.

ADDITIONAL COMMENTS ON THE CHPS:

Electricity Carbon Intensity Scores from Emitting Generation

While there may be advantages to using utility-specific and even electricity product-specific CI data, this data is not yet widely available and can be inconsistent in terms of quality and methodology. There is a strong consensus that consumers can claim to be using Standard Delivery Renewable Energy when renewable energy attributes and other requirements for credible renewable electricity usage claims are substantiated using credible data. CRS has proposed a framework of credibility criteria and quality considerations that may be used to evaluate data sources available to customers and explains how to integrate this information into renewable energy reporting. The framework also provides guidance on how to report active procurement and Standard Delivery Renewable Energy together when calculating renewable energy use.

If the time of (or hourly) production and use is being accounted for, then grid power used for hydrogen production should be accounted for based on the hourly mix of generating resources at the time of production plus the attributes associated with that generation. CRS could work with DOE verifying hourly and time-coincident use of local generation both with and without time-stamped/hourly RECs.⁸

Hydrogen Produced by Steam Methane Reforming (SMR)

In the United States, 95 percent of hydrogen is produced by steam methane reforming (SMR), a reaction between a methane source, such as natural gas, and high-temperature steam⁹. Biomethane, also known as renewable natural gas (RNG), is increasingly becoming a solution for commercial and residential customers who want an effective way to use fuels with lower lifecycle greenhouse gas emissions and offers a pathway to accelerate the transition to a clean energy economy and presents an opportunity to lower the CI score of Hydrogen produced by SMR.

RNG markets and the CI ratings of the fuel are well-established by the EPA as well as several state programs. The EPA Renewable Identification Number (RIN) Program is an incentive to produce RNG and California's Low Carbon Fuel Standard (LCFS) allows RNG producers to generate credits based on RNG's lower carbon intensity.

There are multiple pathways for producing RNG, each with their own environmental and social considerations. Many of the same factors that are relevant to producing high quality renewable energy, such as accounting for fuel delivery, using sustainable resources, credit vintage requirements, and

⁸ CRS (2021). Accounting for Standard Delivery Renewable Energy. Available at: <https://resource-solutions.org/document/030921/>

⁹ For further discussion see U.S. DOE (2020). HYDROGEN STRATEGY Enabling A Low-Carbon Economy. Available at: https://www.energy.gov/sites/prod/files/2020/07/f76/USDOE_FE_Hydrogen_Strategy_July2020.pdf

facility age have bearing on RNG production as well. The Green-e® Renewable Fuels program can serve as a guide for the CHPS to ensure that RNG used in hydrogen production meets the highest standards and has positive impacts.

Renewable Fuel Certificates (RFCs) should be required as proof that SMR Hydrogen is produced with RNG. An RFC represents the environmental benefits of one dekatherm of renewable gas. For each dekatherm of renewable fuel produced, an equivalent RFC is produced. Purchasing and pairing RFCs with gas supply substantiates claims of using and receiving the benefits of that renewable fuel. RFC purchases also help build a market for renewable fuels. Increased demand for, and production of, renewable fuels helps avoid fossil natural gas extraction and processing, and helps make use of waste materials.

The RFCs in a Green-e® certified product are verified under the Center for Resource Solutions' Green-e® program, and the seller of a Green-e® certified product is required to disclose the quantity, type, vintage, carbon intensity, and geographic source of each certificate. Center for Resource Solutions also verifies that the RFCs are not sold more than once or claimed by more than one party.

Using the Green-e® Programs

The rules the CHPS sets regarding electric generator facility age, generation vintage, and geographic restrictions, etc. should be based on DOE's goals and desired impact. As described in the EPA's *Guide to Purchasing Green Power*, certification and verification programs serve an important role in the voluntary market by providing oversight.¹⁰ The Green-e® programs do this by setting sustainability requirements for green power products ensuring environmental attributes are not claimed by multiple entities.

The Green-e® programs are developed by working and advisory groups comprised of environmental nonprofit organizations, academic experts, and industry stakeholders to provide environmental, technical, and market input. CRS is beginning a process next year to determine the rules for these factors for green hydrogen in our Green-e® Renewable Fuels certification program. As the administrator of the Green-e® programs, CRS staff would be happy to set up a call to discuss best practices and the appropriate verification measures for renewable electricity and RNG usage. CRS has extensive experience developing reporting and verification processes, and has advised state, national, and international agencies on verification approaches and procedures.

¹⁰For further discussion see EPA's Guide to Purchasing Green Power (pg. C-5). Available at: https://www.epa.gov/sites/default/files/2016-01/documents/purchasing_guide_for_web.pdf

We thank you for this opportunity to provide comments on the Clean Hydrogen Production Standard Draft Guidance. Please feel free to reach out with any questions or comments.

Sincerely,

_____/s/____

Lucas Grimes
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