3Degrees 407 Sansome St., 4th floor
San Francisco, CA 94111

RE: 3Degrees comments in response to U.S. Department of Energy Clean Hydrogen Production Standard Draft Guidance

To: U.S. Department of Energy, submitted electronically via Cleanh2standard@ee.doe.gov

Submitted by:
Maya Kelty
Senior Director, Regulatory Affairs
3Degrees Group Inc.
235 Montgomery Street, Suite 320
San Francisco, CA 94121
781.507.1534 | mkelty@3degrees.com

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RE: 3Degrees comments in response to U.S. Department of Energy Clean Hydrogen Production Standard Draft Guidance

3Degrees appreciates the opportunity to contribute feedback on the U.S. Department of Energy's (DOE's) Draft Guidance for a Clean Hydrogen Production Standard (CHPS).

3Degrees is a leading provider of comprehensive clean energy and carbon reduction products, programs, and services that enable organizations and individuals to transition toward a low-carbon economy. To this end, 3Degrees serves hundreds of corporate and institutional customers who voluntarily purchase hundreds of thousands of megawatt-hours (MWh) of renewable electricity products annually from generators across the globe. 3Degrees also supports clean technology companies in maximizing the decarbonization impact of their products and helping meet government decarbonization and clean technology mandates. This includes working with renewable energy generators in providing qualifying RECs to meet renewable portfolio standards (RPS) and advising on clean fuels consumption under clean fuels standards (CFS). Additionally, 3Degrees serves as a carbon credit project developer and has worked closely with more than 50 projects to quantify and validate emissions reductions.

3Degrees comments focus on question (3)(c), regarding how to validate the use of renewable electricity in the production of hydrogen. 3Degrees' comments are informed by over two decades of navigating verification of greenhouse gas emissions and validation of renewable electricity usage across voluntary and mandatory programs.

3Degrees recommends that DOE recognize a "book-and-claim" accounting approach to substantiate renewable electricity from non-contiguous renewable electricity generators as an energy input to hydrogen production (process energy

and converted energy), and that the associated renewable energy certificates (RECs) be sourced from the regional grid.

In developing this recommendation, 3Degrees has considered the following:

1- RECs are required to substantiate usage and/or consumption of renewable electricity across the US and should also be required to substantiate renewable electricity as an input to hydrogen production, regardless of how the renewable electricity is procured.

RECs are recognized across the country, including in renewable portfolio standards and nationally-recognized utility voluntary renewable electricity programs, as the mechanism used to track, transact, and consume renewable electricity on the shared North American grid. The Legal Basis for Renewable Energy Certificates (Available at: https://resource-solutions.org/document/the-legal-basis-for-renewable-energy-certificates/) outlines the legal basis for the use of RECs as instruments that represent the attributes of renewable electricity generation and are used to demonstrate renewable electricity purchasing, delivery, and use in the United States. As noted in the paper, thirty-six states and territories recognize that RECs can be used to track and transact renewable electricity on the grid. This includes all territories with clean electricity or renewable electricity standards, as well as states with clean energy goals. No state or territory contradicts the recognition of RECs to track and represent usage of renewable electricity. Where methodologies do exist that allow the carbon intensity (CI) of hydrogen to be reduced through substantiating renewable electricity procurement (e.g. transportation policies in California and Oregon), all require that RECs be retained.

2- To substantiate usage and/or consumption of renewable electricity, RECs must be contractually conveyed and retired, either in a tracking system or via contract.

REC tracking systems are electronic databases that record information about each MWh of renewable electricity generated from renewable facilities registered in the database. Tracking systems have a number of benefits in terms of program implementation, including:

- Ensuring that all environmental attributes issued into the tracking system meet the agreed upon criteria. For instance, the tracking system can require that certain data be provided or certain validation be undertaken before the attribute(s) can be issued into the tracking system.
- Preventing double-counting, because only a single entity can issue environmental attributes from a given project, and then only one party can hold those environmental attributes in their account at any one time.
- Facilitating compliance reporting and tracking through standardized reports that can be submitted by compliance entities to the regulator.

The Environmental Protection Agency (EPA) has useful information on certificate-based tracking systems on its website here: https://www.epa.gov/green-power-markets/renewable-energy-tracking-systems. This webpage

also has information on how RECs can be conveyed via contract-path tracking when issuing in a tracking system is not possible. However, there should be very few generators that are unable to issue in an electronic tracking system, as tracking systems are available to renewable energy generators in every geography. We recommend that DOE align tracking system requirements with the tracking systems used regionally for renewable portfolio standard (RPS) compliance (where applicable), as the benefits of tracking systems are diminished if renewable energy generators within the same geography begin to use different tracking systems.

3- Eligibility of RECs should be aligned with the physical realities of the electricity system.

A critical component of credible book-and-claim accounting is that the certificate transactions align with the physical realities of the relevant system. For RECs, this means aligning with the constraints of the electricity system. This primarily impacts two components:

a. *Geographic proximity*

It is important that the renewable electricity be generated within the same electric grid as where the hydrogen production occurs. Geographic eligibility rules for RECs differ across programs in North America. For voluntary purchasing of renewable electricity, the entire U.S. is viewed as a single system within which RECs can be transacted (see the Green-e® Renewable Energy Standard for Canada and the United States at https://www.green-e.org/programs/energy/documents and https://www.epa.gov/greenpower/partnership-green-power-use-requirements). For individual state renewable energy mandates, the geographic eligibility requirements range from an entire interconnect in some cases to the balancing authority in others. Where more constrained geographic eligibility requirements exist, such as limiting to a specific state's boundaries, it is often due to a policy priority to support local jobs and economies.

In developing geographic eligibility rules, DOE should weigh the benefits of sourcing flexibility, given the nascency of the hydrogen market and current sourcing constraints in some regions, and the need to tie geographic eligibility to a reasonable area within which electricity is delivered.

b. *Temporal proximity (i.e. REC vintage)*

It is also important that the renewable electricity be generated close in time to when the hydrogen production occurs. Many state-level renewable energy policies allow RECs generated multiple years in the past to be applied towards a given year's electricity sales. It is generally agreed that this level of flexibility is overly generous for credibility. The voluntary renewable energy market, which underpins credible marketing claims for corporate and institutional customers, requires a maximum 21-month window of REC sourcing for a given year (e.g. for 2021 claims, RECs can be sourced from July 2020 through March 2022).

Over the past several years, it has been common for new programs to limit REC transactions to a calendar year or less. For example, the California Air Resources Board (CARB), which has established book-and-claim accounting for low-carbon inputs to hydrogen production under the

California Low Carbon Fuel Standard (LCFS), allows RECs to be generated in the quarter of hydrogen production or the prior two quarters.

In developing temporal proximity constraints, DOE should be aware of two restrictions from the existing REC infrastructure:

- Vintage granularity- the lowest common denominator of vintage granularity among existing REC tracking systems is quarterly. The tracking system in Texas, ERCOT, batch issues RECs by quarter. All other tracking systems issue RECs by month. There is one tracking system, MRETS, that has piloted hourly REC issuance (see: https://www.mrets.org/hourlydata/), but this is not yet possible at scale. There are still major implementation questions being answered by groups like EnergyTag (see: https://energytag.org/home/whitepaper/), such as how hourly REC issuance affects conventional monthly REC issuance. We encourage DOE to stay abreast of these conversations and consider a timeline for introducing more granular vintage matching once the tracking infrastructure is in place.

- REC issuance- most tracking systems issue RECs 90 days after the end of the period of generation. DOE should take this into consideration when it sets deadlines for submitting documentation to validate renewable electricity as an energy input.

4- If additional restrictions on renewable electricity sourcing are introduced, these restrictions should consider both the nascency of the hydrogen market and how to maximize benefits to the electric grid.

Substantiating that the inputs to hydrogen production are zero or low-carbon does not answer the question of how to deploy hydrogen production in a way that is best for the environment and grid overall. As the hydrogen market expands, additional restrictions on renewable electricity sourcing may be appropriate in order to maximize system benefits.

A common goal of introducing additional restrictions on renewable energy sourcing is to draw a causal connection between an electricity purchase and the development of a renewable energy facility. Examples of additional requirements might include: a certain length of contract, a direct relationship with the generator, or a commitment made by a certain point in the development process. Introduction of any one of these should consider the goal of the provision, its ability to achieve its intended goal, and the challenges it might present for hydrogen development. Before introducing any of these, we recommend additional stakeholder discussions to align on the role of hydrogen in a decarbonized future and the goal of additional renewable energy sourcing requirements.

In the interim, one policy provision that is common among policies seeking to drive development of new renewable energy capacity is to put in place a commercial on-line date (COD) requirement. A COD requirement can be relative to the online date of the hydrogen production facility itself, align with the beginning of the policy, or align with nearby markets to ensure the policies are complementary. For example, Green-e® Energy, the standard of

certification for renewable electricity purchased outside of state mandates (i.e. voluntarily purchased), requires that RECs be sourced from facilities with a COD less than 15 years old.

3Degrees encourages DOE to continue to convene stakeholders to explore additional policy considerations for renewable electricity used as an energy input to produce hydrogen.