January 12, 2021

To Joint Utilities: Southern California Gas Company, San Diego Gas and Electric Company, Pacific Gas and Electric Company and Southwest Gas Corporation

From: The Green Hydrogen Coalition (GHC), California Hydrogen Business Council (CHBC), California Fuel Cell Partnership (CFCP), Bioenergy Association of California (BAC), Coalition for Renewable Natural Gas (RNGC), California Hydrogen Coalition (CHC), True North Renewable Energy (TNRE) and the National Fuel Cell Research Center of the University of California Irvine (collectively, ‘Hydrogen and Renewable Gas Stakeholders’)

RE: Defining Green Hydrogen

The Hydrogen and Renewable Gas Stakeholders met on January 8, 2021 with the goal of establishing a single definition and framework for green hydrogen. Because this meeting did not occur until after January 4, 2021, the filing deadline for parties to respond to the Joint Utilities Application, the Hydrogen and Renewable Gas Stakeholders are instead submitting this letter directly to the Joint Utilities to request that the Joint Utilities adopt and recommend the following definition for green hydrogen to the Commission in its formal replies due January 14, 2021:

“Green hydrogen is hydrogen that is not produced from fossil fuel feedstocks.”

This recommended definition is founded on the following shared principles and goals among the Hydrogen and Renewable Gas Stakeholders:

The definition for green hydrogen molecules must:

1) Support carbon reduction and help fight climate change;
2) Support innovation and competition as a fundamental pathway for progress. As such, the definition must:
3) be technology agnostic;
4) encompass a broad range of non-fossil fuel feedstock and technology pathways, including pathways that are not invented or commercialized; and,
5) treat all pathways in a logically consistent and transparent way, especially with regard to the distinction between feedstock and energy sources used to produce the hydrogen, and the greenhouse gas production and emission consequences;
6) Support existing California law, including consistency with SB 1369 that defines green electrolytic hydrogen in Public Utilities (PU) Code Section Code 400.2 and attainment of SB 100’s 2045 retail electricity decarbonization goals, SB 32 greenhouse gas emissions targets, and SB 1383 targeting short lived climate pollution reduction including Public Utilities Codes 650 (a) and 650(b).

7) Support green hydrogen infrastructure and project development not only in California, but also support progress throughout the US and globally.

Importantly, this definition is also based on the following framework, which illustrates several commercially viable pathways for green hydrogen production and distinguishes them from the myriad of potential applications or end uses of the resulting green hydrogen. Each green hydrogen production pathway is based on a feedstock source and a primary energy source for converting that feedstock into green hydrogen (via a primary production process). With respect to production pathways, it is important to distinguish between feedstock vs. energy source and production process.

1) **Primary Feedstock**: Where is the hydrogen derived from or what is the feedstock that is being converted (e.g., splitting water vs. gas reformation)?

2) **Primary Energy source**: What is the primary energy source for conversion (e.g., electricity to run the electrolyzer vs. natural gas or biogas used to provide process heat for the SMR unit)?

3) **Production Process**: what is the process used to convert the feedstock into green hydrogen? (e.g., electrolysis vs. thermochemical conversion)

Notably, each pathway, depending on its feedstock and primary energy source will have different carbon and emissions implications. While all pathways result in green hydrogen, depending on the inputs, the resulting carbon intensity of the resulting green hydrogen may vary.

![Green Hydrogen Definition Framework](image-url)

*Each pathway has different carbon and emissions implications*
The Hydrogen and Renewable Gas Stakeholders urge the Joint Utilities (and the Commission) to limit the definition of green hydrogen to only the production pathways to produce hydrogen and to evaluate the resulting green hydrogen’s merits, benefits and eligibility for specific programs as a core consideration of the eligibility requirements of each program. The actual carbon and emissions benefits for green hydrogen production and use will depend on the carbon profile of the alternative resource it is displacing which can vary tremendously depending on the end use application.

Green Hydrogen Definition Framework—Should Focus on Production Pathways Only
Each pathway has different carbon and emissions implications

![Green Hydrogen Definition Diagram]

The pathways shown above are merely examples of those that are commercially viable today. The proposed definition of green hydrogen is intentionally broad so that the myriad of non-fossil fuel based future pathways to produce green hydrogen will not be excluded, including, for example, high temperature electrolysis and photobiological solutions which are not yet commercial today.

For the purposes of the Joint Utilities Application, green hydrogen can be used to displace natural gas in the existing natural gas pipeline system, effectively decarbonizing natural gas usage in California. And, given the size of the opportunity and urgent need to decarbonize, the Hydrogen and Renewable Gas Stakeholders strongly urge the Joint Utilities and the Commission to ensure that all production pathways as noted above are considered eligible to supply, green hydrogen that is blended and injected into the natural gas pipeline will result in a lower carbon content than the natural gas that was displaced. Green Hydrogen means hydrogen that is not produced from fossil fuel feedstock sources. Eligible production pathways include, but are not limited to:

1) Green electrolytic hydrogen as defined in PUC Code Section 400.2;
2) Steam methane reforming (SMR), autothermal reforming (ATR), methane pyrolysis and other pathways that convert renewable gases or liquids (or biogas, biomethane, ethanol and other renewable gases and liquids) to hydrogen;
3) Gasification, pyrolysis, thermochemical conversion, and other pathways that convert biomass, including the organic portion of MSW and organic waste feedstocks listed in Public Utilities Code Section 605(b), to hydrogen;
4) Waste or byproduct hydrogen recovered from non fossil-fuel industrial processes;
5) Photochemical and photobiological water splitting;
6) Hydrogen produced from other methods or other feedstocks as determined by the state board.

The Hydrogen and Renewable Gas stakeholders appreciate the Joint Utilities’ efforts on this historic application and respectfully submit these comments and request that the proposed definition for green hydrogen be adopted as described.

Signed,

The following Hydrogen and Renewable Gas Stakeholders:

Janice Lin, Founder and President, Green Hydrogen Coalition (GHC) www.ghcoalition.org

Bill Zobel, Executive Director, California Hydrogen Business Council (CHBC)
/s/ Keith Malone
Keith Malone, Public Affairs, California Fuel Cell Partnership (CFCP)

Julia Levin, Executive Director, Bioenergy Association of California (BAC)
/s/ Sam Wade
Sam Wade, Director of State Regulatory Affairs, Coalition for Renewable Natural Gas (RNGC),

Teresa Cooke, California Hydrogen Coalition (CHC)
/s/ Lorraine Paskett
Lorraine Paskett, Vice President, True North Renewable Energy
/s/ Dr. Jack Brouwer

Dr. Jack Brouwer, Director of the National Fuel Cell Research Center, Advanced Power and Energy Program, University of California Irvine