April 23, 2020

Email to:

Public Meeting Item 20-4-2

Subject: GHC’s Comments on the Implementation of the 2017 Scoping Plan

**INTRODUCTION TO THE GREEN HYDROGEN COALTION**

**The** [Green Hydrogen Coalition](http://www.ghcoalition.org) **(GHC)** is a California non-profit that is a fiscally sponsored project of Community Initiatives, a 501(c)(3) non-profit organization. The GHC was formed in 2019 in recognition of the game changing potential of green hydrogen to accelerate multi-sector decarbonization to combat climate change. The GHC’s mission is to facilitate policies and practices that advance green hydrogen production and use in all sectors of the economy where it will accelerate a carbon-free energy future. Our sponsors include both renewable electricity users and providers, and those in the renewable natural gas space.

**WHY GREEN HYDROGEN IS A GAMECHANGER IN FIGHTING CLIMATE CHANGE**

As a mainstream commodity, hydrogen can be utilized for many applications across sectors of the economy, including displacing the use of fossil fuels in existing pipeline infrastructure. Hydrogen is widely used today for many industrial processes, however more than 99% of the hydrogen used today is produced from fossil fuels, which produce greenhouse gas emissions (“GHGs”).

[Green hydrogen](https://ec.europa.eu/jrc/sites/jrcsh/files/Vanhoudt%20Definition%20of%20Green%20Hydrogen%20SFEM.pdf), in contrast, is commercially produced today from renewable electricity by electrolysis, from biogas by steam reforming, and from biomass through thermal conversion. Green hydrogen is a clean and safe energy carrier that can be used as a fuel for transportation and electricity production, as well as a means for multi-day and seasonal dispatchable renewable energy storage. It can also be used as a feedstock for industry, displacing millions of metric tons of hydrogen made from fossil fuels today (grey hydrogen)[[1]](#footnote-2). Green hydrogen, once scaled, has the potential to be *lower* cost than hydrogen made from fossil fuels. It will not only displace grey hydrogen in multiple current industrial uses, but also serve to decarbonize the most challenging sectors of the economy such as heavy industry, heavy-duty transport and aviation.

Today, hydrogen is transported by ships, trucks, and dedicated pipeline infrastructure. It is also blended into existing natural gas pipelines to displace methane and reduce its carbon content, cutting short-lived climate pollutant emissions and helping to decarbonize many gas end uses, including thermal electric generation. For example, Hawaii’s natural gas pipeline system on the island of Oahu already has a 12% hydrogen content.[[2]](#footnote-3) Increasing the green hydrogen content in California’s pipeline would be a huge step towards decarbonizing the natural gas pipeline system and many downstream end uses. Green hydrogen thus has an inextricable role in helping to decarbonize California’s natural gas pipeline system.

The fundamental challenge for all commercially viable pathways to produce green hydrogen today is how to achieve scale and reduce cost. Globally, production and use of green hydrogen is currently being pursued at the gigawatt scale for multiple applications to help get to scale, accelerate decarbonization and to meet climate goals.

**THE GHC’S APPRAOCH TO ADVACNING GREEN HYDROGEN**

The GHC will initially focus on advancing specific green hydrogen projects at scale to further market development in California and the Western United States. One of the GHC’s first key targeted applications is the use of green hydrogen as a drop-in fuel replacement for natural gas fired thermal electric generation, and, more importantly, as a means to achieve multi-day and seasonal *renewable* energy storage *that is also dispatchable*. Wind and solar are the lowest cost energy sources at the margin today, and as more and more wind and solar are brought online, electric generation systems will become increasingly difficult to manage and maintain reliability, particularly during the spring, fall and winter when there will be multi-day and ultimately seasonal shortages and surpluses of energy.

Green hydrogen to support electric generation is being commercially developed at the Intermountain Power Project (“IPP”), an existing 1,800 MW coal-fired electric generation plant located in Delta Utah that primarily provides electric generation for southern California. IPP will be converted to a combined cycle gas generator that on its first day of operation in 2025, will combust a blend of natural gas and 30% green hydrogen by volume, ultimately increasing the green hydrogen content to 100% by no later than 2045. The green hydrogen used by IPP will be produced from curtailed and low cost wind and solar via electrolysis, a proven pathway to producing green hydrogen at scale.

Replacing natural gas power generation with a combination of renewables and energy storage will be key to meeting decarbonization goals.  One way to cost effectively aid this transition is by leveraging existing infrastructure to support the large-scale integration of renewables through hydrogen energy storage. As grids move toward larger penetrations of renewables, so does our need to move toward securing bulk energy storage to absorb the increasing percentage of daily, weekly, and seasonal surplus renewable energy and to shift it to periods of time when the grid faces sustained shortages.

The IPP conversion is strategically important regionally, as it will also be the first step in the creation of a strategic renewable reliability reserve in the adjacent underground salt dome formation, which is the lowest cost commercially available means of storing hydrogen today. The salt dome in Delta Utah is the largest in the Western United States and can provide seasonal carbon-free renewable energy storage for IPP and multiple states in the Western US. Historically the United States has always maintained a strategic petroleum reserve. The salt dome at IPP presents an viable pathway to create the world’s first *strategic renewable energy reserve*.

The GHC’s role in the IPP conversion and creation of regional strategic renewable energy reserve is to identify and advocate for the regulatory changes necessary to ensure that the IPP conversion is successfully realized. This will entail close collaboration with local, state and regional stakeholders and direct engagement in the long-term energy planning processes associated with both gas and electric utilities, gas-fired electric generators and renewable energy developers.

By working through this ambitious project, the GHC plans to collaboratively work with stakeholders in multiple sectors even beyond the power and gas sectors to help develop a long-term planning strategy for how California can leverage the many ways to produce and use green hydrogen to accelerate the state’s transition away from natural gas and achieve the goals of SB 100, including zero emissions from the power sector and achieving carbon neutrality as fast as possible.

**SCOPING PLAN AND RECOMMENDED NEXT STEPS FOR CARB**

The GHC appreciates the CARB’s consistent leadership and support of hydrogen. The [2017 Scoping Plan](https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf) very clearly highlighted an important role for renewable gas, including green hydrogen, to help the state meet both its 2030 and longer term greenhouse gas reduction goals and specifically highlights green hydrogen’s role in reducing emissions from waste, transportation, industrial, and water sectors.

However, the 2017 Scoping Plan does not explore the key role that green hydrogen needs to play in the power sector as seasonal energy storage and zero-carbon dispatchable renewable energy storage solution as envisioned at IPP, which will be key to meeting California’s decarbonization, affordability and reliability goals. We encourage CARB and other state agencies to continue to look at the role of green hydrogen broadly to displace fossil fuels – *and* also to specifically consider its unique and important role in the power sector to achieve 100 percent clean energy; affordably and reliably.

We also encourage you to consider policies to bring the promise of green hydrogen forward as quickly as possible. Because of green hydrogen’s cross-cutting capabilities that span multiple sectors and multiple jurisdictions, we respectfully recommend that CARB, in conjunction with other agencies, convene and lead a task force specifically focused on the role of green hydrogen to accelerate multi-sectoral decarbonization and needed policies to achieve the State’s clean energy and climate goals, especially SB 100. For example, this might include looking at blending renewable hydrogen into the existing natural gas pipeline (as mentioned in the Scoping Plan) as well as strategies to repurpose organic waste from working lands and municipal waste to increase the production of green hydrogen to expand its availability for multiple applications and sectors. Additional policies and regulations are needed to incresae the production and use of renewable gas broadly in California per SB 1369 and SB 1383. The flexibility of green hydrogen as a vector resource touching multiple carbon sources and sinks lends itself to a focused effort to ensure well coordinated progress toward establishing appropriate market design to stimulate investment and accelerated realization of carbon neutrality.

The GHC appreciates the opportunity to provide these comments and looks forward to collaborating with the CARB and other agencies, including the California Energy Commission (CEC) and California Public Utilities Commission (CPUC), the California Independent System Operator (CAISO) and stakeholders in this proceeding to achieve the goals of SB 100.

Thank you.

Sincerely,



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1. The definition of Green Hydrogen should ultimately be harmonized with low GHG definitions as adopted by the European Commission - [Link](https://ec.europa.eu/jrc/sites/jrcsh/files/Vanhoudt%20Definition%20of%20Green%20Hydrogen%20SFEM.pdf) [↑](#footnote-ref-2)
2. <https://www.hawaiigas.com/about-us/> and <https://www.hawaiigas.com/clean-energy/hydrogen/> [↑](#footnote-ref-3)