October 22, 2021

Ms. Rajinder Sahota, Deputy Director
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: GHC Comments on CARB's 2022 Scoping Plan Update – Draft Scenario Inputs Technical Workshop

Introduction

The Green Hydrogen Coalition (GHC)[1] appreciates the opportunity to comment on the California Air Resources Board's (CARB) *2022 Scoping Plan Update - Draft Scenario Inputs Technical Workshop*. GHC is a California educational 501(c)(3) non-profit organization. GHC was formed in 2019 to recognize the game-changing potential of green hydrogen to accelerate multi-sector decarbonization and combat climate change. GHC's mission is to facilitate policies and practices that advance green hydrogen production and use in all sectors of the economy to accelerate a carbon-free energy future. Our sponsors include renewable energy users and developers, utilities, and other supporters of a reliable, affordable green hydrogen fuel economy for all.

GHC defines green hydrogen as hydrogen produced from non-fossil fuel resources and has climate integrity – emits zero or de minimis greenhouse gases on a lifecycle basis.[2] Green hydrogen can be used as a fuel for electricity production and a means for multi-day and seasonal renewable energy storage. In addition, once scaled, green hydrogen can help California move away from fossil fuel use in other applications such as transportation, industrial, maritime, and aviation. Considering that hydrogen is a mainstream commodity that can be utilized in many applications across many sectors of the economy, the production

[1] https://www.ghcoalition.org/
[2] "De minimis" means an insignificant amount of non-renewable energy resources (does not exceed 10 percent of the total energy inputs) allowed to be counted as RPS-eligible. See Green, Lynette, Christina Crume. 2017. Renewables Portfolio Standard Eligibility Guidebook, Ninth Edition. California Energy Commission, Publication Number: CEC300-2016-006-ED9-CMFREV.

and use of green hydrogen will be essential to decarbonize sectors beyond electricity, further enabling the attainment of our climate goals.

GHC specific comments on CARB's workshop are below.

I. *Comments on Draft Scenarios for a Carbon-Free Electricity Grid*

GHC opposes Alternative 1 due to the complete phase-out of combustion. Combustion units will continue to be needed in California for firm dispatchable generation. According to a recent study by Environmental Defense Fund, gas power plants can be converted to burn clean fuels, such as green hydrogen, to provide critical reliability. Furthermore, this study found that a robust investment in a portfolio of clean firm power, including gas power plants converted to burn green hydrogen, can support a 100% carbon-free clean electricity supply by 2045 while keeping consumer costs like those paid today. This investment could also reduce the amount of wind and solar capacity needed and significantly reduce associated transmission expansion and the land area required for electricity generation facilities.[3]

Rather than exclude combustion units for power generation, CARB should focus on fuel replacement. Some combustion units for power generation can be updated, repowered, and converted to blend green hydrogen today.[4] Furthermore, switching from a fossil fuel feedstock to a green hydrogen feedstock will eliminate particulate, sulfur, carbon dioxide, and carbon monoxide emissions, as no carbon or other impurities exist in the fuel. The GHC urges CARB to develop green hydrogen blending targets for combustion units used for power production. Green hydrogen blending targets could include 25% by 2025, 60% by 2031, and 100% by 2035. These blending targets also align with planned technology advancement, as highlighted by several manufacturers.[5]

Moreover, GHC generally supports Alternatives 2-4 since they are inclusive of current and emerging non-fossil fuel options. These Alternatives also align with GHC's comments outlined above. However, GHC cautions CARB using the term "hydrogen" broadly since this

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[3] Environmental Defense Fund, etc. *California needs clean firm power, and so does the rest of the world. 2021.* https://www.edf.org/sites/default/files/documents/SB100%20clean%20firm%20power%20report%20plus%20SI.pdf
[4] https://power.mhi.com/special/hydrogen/article_1/index.html
[5] https://www.powermag.com/siemens-roadmap-to-100-hydrogen-gas-turbines/

is inclusive of hydrogen produced from a fossil fuel feedstock. To ensure parties are discussing hydrogen from a zero-carbon fuel standpoint, CARB should adopt GHC's "green hydrogen" definition in the absence of a definition in statute.[6]

II. Comments on Draft Scenarios for the Industrial Sector

GHC opposes Alternative 1 due to the implications of a 100% electrification strategy. While GHC encourages the electrification of as many applications as possible, the feasibility of this application is unlikely and could have profound economic implications. 100% electrification of industrial processes (e.g., steel, cement, glass, and chemicals) is extremely difficult and, in some cases, not feasible due to the high temperature needed to manipulate raw inputs into valuable outputs. If these processes cannot be 100% electrified and have no other alternatives, it could phase out much of the industrial sector in California. The economic implications of jobs, increased imports, decreased exports, and loss of revenue will hurt California and should not be considered in this Scoping Plan.

Regarding Alternatives 2-4, industrial processes in California using hydrogen produced from a fossil fuel feedstock are well-positioned to switch to green hydrogen. CARB should set more ambitious goals for fuel switching industrial process applications. For example, Alternative 2 could require 50% green hydrogen use by 2030, and 100% by 2035. Alternatives 3-4 could require 25% green hydrogen by 2030, 50% by 2035, and 100% by 2045.

III. Comments on Draft Scenarios for Vehicle Fleet Electrification

GHC asks CARB to clarify that these "Vehicle Fleet Electrification" Alternatives represent electric and hydrogen vehicles for transparency purposes. Secondly, GHC recommends the inclusion of a fossil fuel feedstock phase-out for all hydrogen Alternatives. For example, Alternative 2 could require all hydrogen transportation fuel to be 100% green hydrogen by 2035. Alternatives 3-4 could require all hydrogen transportation fuel to be 100% green hydrogen by 2045.

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[6] GHC defines green hydrogen as hydrogen produced from non-fossil-fuel resources and emits zero or de minimis greenhouse gases on a lifecycle basis.

IV. Comments on Draft Scenarios for Biofuels

GHC opposes Alternative 1 because it excludes the use of biofuels that can provide carbon reductions and carbon negative fuels. GHC generally supports Alternatives 2. This alternative aligns with SB 1383 landfill organics diversion goals,[7] the phase-out of agricultural burning,[8] and California's wildfire mitigation efforts. GHC does not support Alternatives 3-4 since they do not meet the legally required landfill diversion requirements outlined in SB 1383.

Conclusion

GHC thanks CARB for its thoughtful leadership in framing the *2022 Scoping Plan Update - Draft Scenario Inputs Technical Workshop* and for this opportunity to comment on the process. We look forward to continuing to work with CARB to understand how green hydrogen can become an essential piece of California's carbon neutrality strategy.

Respectfully submitted,

Nicholas Connell
Policy Director
GREEN HYDROGEN COALITION
nconnell@ghcoalition.org

[7] SB-1383 Short-lived climate pollutants: methane emissions: dairy and livestock: organic waste: landfills. (2015-2016)
[8] https://somachlaw.com/policy-alert/carb-approves-phased-in-agricultural-burning-ban-in-san-joaquin-air-quality-management-district/#:~:text=Farmers%20and%20ranchers%20in%20the,burning%20by%20January%201%2C%202025