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Response to the CECâ€™s Resource Portfolio Assumptions

Additional submitted attachment is included below.

Date: July 7, 2023

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RE: Green Hydrogen Coalition Response to the CEC's Resource Portfolio Assumptions for the Next CAISO 20-Year Transmission Outlook

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I. INTRODUCTION.

The Green Hydrogen Coalition (GHC)[1] is a California educational 501(c)(3) non-profit organization. GHC was formed in 2019 to recognize the game-changing potential of "green hydrogen"[2] 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 foundations, renewable energy users and developers, utilities, and other supporters of a reliable, affordable green hydrogen fuel economy for all.

The GHC would like to express our gratitude to the California Energy Commission (CEC), California Public Utilities Commission (CPUC), and the California Independent System Operator (CAISO) staff for hosting the Joint Agency Staff Workshop on Resource Portfolio Assumptions for the Next CAISO 20-Year Transmission Outlook ("the Workshop") on June 23, 2023.[3] We recognize that the ongoing commitment from the CEC, CPUC, and CAISO staff ("the staff") to support the state's goal of powering all retail electricity sold in California with renewable and zero-carbon resources by 2045 is imperative to fighting climate change.

II. COMMENTS.

The GHC acknowledges and values the unwavering commitment of the staff in their efforts to update the 2045 SB100 Scenario for the 20-Year Transmission Outlook ("the Outlook"). We would like to extend our commendation to the staff for their recognition of the state's requirement for additional clean firm power, as well as their proposed updates since the last SB100 report in 2021. As highlighted by CARB in its 2022 Scoping Plan, the attainment of the state's 2045 goals is a gradual process, and it is crucial to avoid choices that may result in stranded assets while incorporating emerging technologies.[4] With the aim of enhancing

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[1] https://www.ghcoalition.org/

[2] The GHC defines "green hydrogen" according to Assembly Bill 209.

[3] https://www.energy.ca.gov/event/workshop/2023-06/joint-agency-staff-workshop-resource-portfolio-assumptions-next-caiso-20

[4] https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf

this Outlook, we present three recommendations that prioritize the utilization of existing assets and embrace hydrogen.

A.) Accelerating California's Transition to Clean Firm Power: Repurposing Natural Gas Plants with Green Hydrogen

The GHC supports the staff's recognition of the pressing need to increase the retirement of gas power plants in the state, with a specific focus on retiring the oldest natural gas plants, especially those located in or near disadvantaged communities. It is of utmost importance to reduce California's reliance on natural gas, and expediting this process is crucial for achieving our 2045 targets.

To further strengthen this proposal, the GHC recommends that the staff consider the potential repurposing of natural gas plants using green hydrogen. Repurposing existing plants in this manner would not only help eliminate our dependence on fossil fuels but also accelerate the transition to a clean economy by minimizing infrastructure costs. We already see progress in this direction, such as the decision by the Los Angeles City Council in February 2023 to convert the Playa Del Ray gas-fired plant, known as the Scattergood Generating Station, into a 100% green hydrogen combustion facility.[5] By following this approach, California can replace fossil gas with clean firm power, complementing wind and solar energy by providing reliable electricity when the sun isn't shining and the wind isn't blowing. [6] Retrofitting existing natural gas plants provides an additional pathway to make significant strides toward achieving the SB100 goals while leveraging our existing assets.

While acknowledging that not all natural gas plants in California can be repurposed, the GHC recommends that the staff proactively identify those that have the potential for retrofitting. We further recommend that the staff:

- Conduct analysis to identify the natural gas plants suitable for retrofitting.
- Establish a timeline for repurposing the identified natural gas plants that aligns with the SB100 requirements.
- Consider the ratepayer impacts under three scenarios: (1) retirement, (2) retrofit, and (3) new construction.

[5] https://www.latimes.com/business/story/2023-02-08/l-a-is-shutting-down-a-coastal-gas-plant-and-replacing-it-with-hydrogen
[6] https://cdn.catf.us/wp-content/uploads/2021/09/21091928/SB100-clean-firm-power-report-plus-SI.pdf

We are confident that by adopting a comprehensive and proactive planning approach, the CEC, CPUC, and CAISO can play a pivotal role in accelerating the state's transition toward a clean, zero-carbon future.

B.) Explicitly Include Green Hydrogen as a Resource Type in California's Energy Portfolio

The GHC recommends that staff amend the update to the Outlook to include green hydrogen as a resource type, recognizing its potential to help California achieve its SB100 goals. To fully realize the benefits of green hydrogen, proactive planning is crucial in building a robust energy portfolio for the future. **Therefore, the CEC, CPUC, and CAISO should conduct analysis to determine an appropriate resource target for green hydrogen and explicitly include it as a resource type in the 2045 portfolio within the 2023 update.** While green hydrogen's potential use in the clean firm power/LDES portfolio allocation was mentioned, we advocate for adding green hydrogen as its distinct resource type, considering its expected importance and growing demand.

1) Green Hydrogen's Role in California's Portfolio

A diverse energy portfolio is essential for combating climate change and achieving SB100's decarbonization objectives. Research emphasizes that a broad range of clean energy technologies makes the transition to a low-carbon energy system both feasible and cost-effective. [7] Within this diversified portfolio, green hydrogen is poised to play a crucial role in facilitating the U.S.'s transition to a net-zero emissions future, leveraging regional resources and fostering equitable and sustainable growth. [8] Including green hydrogen as its own resource type is pivotal for realizing a clean and viable energy transition. Moreover, **green hydrogen's inclusion in the portfolio is necessary to bridge the energy gap arising from increased electricity demand and retiring fossil resources while decarbonizing the state's electricity sector and providing reliable clean power.**

2) Hydrogen's Growing Demand

Currently, the U.S. produces 10 million metric tons of hydrogen, [9] with the majority being utilized for petroleum refining and ammonia production.[10] However, emerging applications are paving the way for green hydrogen use in decarbonizing hard-to-abate sectors. Projections by the Department of Energy (DOE) indicate a rapid growth trajectory for the U.S. clean hydrogen market, driven by funding initiatives like Hydrogen Hub, hydrogen production tax credits, DOE's Hydrogen Shot, and decarbonization goals across

[7] https://www.pnas.org/doi/10.1073/pnas.1610381114
[8] https://www.hydrogen.energy.gov/pdfs/us-national-clean-hydrogen-strategy-roadmap.pdf
[9] https://www.energy.gov/eere/fuelcells/hydrogen-production
[10] https://www.energy.gov/eere/fuelcells/hydrogen-production

public and private sectors.[11] Hydrogen is also identified as a near-term first mover in long-duration energy storage,[12] holding the potential to decarbonize up to 25% of global energy-related CO2 emissions.[13] At the sub-national level, the growth of the hydrogen market is crucial for California to achieve its decarbonization targets, requiring a 1,700-fold increase in renewable hydrogen supply by 2045, according to the California Air Resources Board.[14] Hydrogen's zero-carbon attributes, storage capabilities, and dispatchability make it a valuable and desirable resource, ensuring electric grid reliability during the transition away from fossil fuels.

By integrating green hydrogen into California's energy portfolio, the state can proactively advance its decarbonization goals, leverage the anticipated growth of the hydrogen market, and secure a reliable energy market as the transition from fossil fuels progresses.

C.) Increase the Portfolio Target for Clean Firm Power/LDES & Establish A Hydrogen Carve Out

We greatly appreciate the proposal put forth by the staff to add 5 gigawatts (GW) of either generic, clean, firm resources or long-duration energy storage (LDES) to California's portfolio. We are particularly pleased with the decision to include a generic clean firm, dispatchable resource type that is not limited to pumped hydro, as it opens opportunities for reliable clean energy storage, including green hydrogen.

While we acknowledge the steps taken, we believe that a greater increase in clean firm power is necessary to ensure the resilience of the state's portfolio. Research conducted in collaboration with the Environmental Defense Fund, Stanford University, Princeton University, Energy & Environmental Economics, Clean Air Task Force, UC San Diego, and the Brookings Institution, indicates that a range of 25-40 GW of clean firm power would be optimal for California to achieve its SB100 targets while keeping costs in check and maintaining energy reliability.[15] Investing in this level of clean firm power also has the potential to "eliminate the need for ten times the amount of renewable energy, significantly reduce land area requirements for solar facilities and energy storage and decrease transmission infrastructure needs by 2045."[16]

[11] https://liftoff.energy.gov/wp-content/uploads/2023/03/20230320-Liftoff-Clean-H2-vPUB.pdf
[12] https://www.hydrogen.energy.gov/clean-hydrogen-strategy-roadmap.html
[13] https://liftoff.energy.gov/wp-content/uploads/2023/03/20230320-Liftoff-Clean-H2-vPUB.pdf
[14] https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf
[15] https://cdn.catf.us/wp-content/uploads/2021/09/21091928/SB100-clean-firm-power-report-plus-SI.pdf
[16] https://cdn.catf.us/wp-content/uploads/2021/09/21091928/SB100-clean-firm-power-report-plus-SI.pdf

In analyzing the proposed Outlook,[17] we appreciate the inclusion of other forms of clean firm power/LDES, such as geothermal, biomass, and pumped hydro LDES. However, these additions alone do not seem sufficient to meet the estimated portfolio needs. When combined with the proposed increase of 5 GW of generic clean firm power, the total falls short of the recommended range of 25-40 GW. Therefore, we strongly recommend that the staff conduct further analysis and engage relevant stakeholders to determine appropriate targets and thereby help ensure that California's resource mix is adequate to provide reliable, zero-carbon energy.

Furthermore, we maintain that it is crucial to establish specific carve-outs for hydrogen within the "generic clean firm/LDES" resource category. As discussed earlier, hydrogen will play a vital role in California's portfolio for achieving SB100. By providing a dedicated GW carve-out for hydrogen, California can help create a clear roadmap that instills confidence in green hydrogen's future role in a clean energy economy, and thereby helps facilitate market development.

In summary, the GHC emphasizes the need for the CEC, CPUC, and CAISO staff to consider increasing the target for clean firm power within the range of 25-40 GW as recommended by prominent research. We urge the staff to conduct further analysis and engage with stakeholders to ensure that California's clean firm power is sufficiently robust. And finally, we advocate for the inclusion of specific carve-outs for green hydrogen within the generic clean firm/LDES resource type, fostering market development and providing clarity on green hydrogen's role in the future.

III. CONCLUSION.

The GHC appreciates the opportunity to submit comments on the 2023 Resource Portfolio Assumptions for the Next CAISO 20-Year Transmission Outlook. We would like to thank the CEC, CPUC, and CAISO for their leadership, and look forward to continuing to collaborate with all other stakeholders.

Respectfully submitted,

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[17] https://www.energy.ca.gov/event/workshop/2023-06/joint-agency-staff-workshop-resource-portfolio-assumptions-next-caiso-20