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## **Green Hydrogen Coalition Responses to the Senate Bill 100 Kickoff Workshop**

*Additional submitted attachment is included below.*



**Date:** September 6, 2023

**Docket Log:** [23-SB-100](#)

**RE: Green Hydrogen Coalition Responses to the Senate Bill 100 Kickoff Workshop**

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## **I. INTRODUCTION.**

The Green Hydrogen Coalition (GHC)<sup>1</sup> is an educational 501(c)(3) non-profit organization. GHC was formed in 2019 to recognize the game-changing potential of "green hydrogen"<sup>2</sup> 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.

We extend our gratitude for the recent joint workshop on SB 100 orchestrated by the California Energy Commission (CEC), the California Public Utilities Commission (CPUC), and the California Air Resources Board (CARB). This session proved invaluable in addressing the findings and recommendations from the 2021 SB 100 Joint Agency Report. Recognizing their significance in shaping the forthcoming 2025 SB 100 Joint Agency Report, in line with Senate Bill (SB) 100, is pivotal for advancing the "100 Percent Clean Energy Act of 2018."

We commend these agencies for their collaborative efforts in shaping California's clean energy trajectory. The insights derived from this collaborative workshop are instrumental in propelling the state towards a sustainable, carbon-neutral energy landscape. The alignment of expertise and aspirations among these agencies echoes the principles championed by the GHC. Specifically, we appreciate the inclusion of renewable hydrogen in the new proposed pathway for resource diversification for the 2025 Report. We are confident renewable hydrogen will be a key energy resource for reaching our SB 100 goals and thereby appreciate the agencies' inclusive approach. We are confident that these combined endeavors will drive California's transition to a cleaner, more accessible energy future. In the following section, the GHC offers comments on distinct presentations from the SB 100 Kickoff Workshop.

## **II. COMMENTS.**

### **A.) THE CPUC'S CURRENT AND ANTICIPATED IRP & SB 100 COORDINATION IS CRITICAL FOR MEETING CALIFORNIA'S DECARBONIZATION GOALS**

California's unwavering commitment to a sustainable and decarbonized energy future has set an example for the world. The proactive steps taken by the CPUC to align its Integrated Resource Planning (IRP) process with the goals of SB 100 are pivotal in realizing this vision. As the state progresses towards its

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<sup>1</sup> <https://www.ghcoalition.org/>

<sup>2</sup> The GHC defines "green hydrogen" according to [Assembly Bill 209](#).

energy goals, a focused approach on the integration of firm, clean, and dispatchable power sources, with renewable hydrogen as a central pillar, is essential to ensure a robust and reliable energy transition. Accordingly, we recommend the following:

- **Harnessing the Power of Renewable Hydrogen:** Renewable hydrogen holds immense potential as a versatile energy carrier, offering solutions to both energy storage and emissions reduction challenges. To harness this potential, we recommend the CPUC take a comprehensive approach within the IRP process, conducting in-depth analyses of every aspect of renewable hydrogen. This should encompass the entire hydrogen value chain, including production technologies, storage solutions, transport infrastructure, and efficient grid integration strategies. By delving into the technical and economic viability of different hydrogen pathways, California can develop a strategic roadmap for maximizing the benefits of renewable hydrogen.
- **Setting Milestones for Hydrogen Implementation:** A transition of this magnitude requires well-defined milestones that guide the adoption of renewable hydrogen technologies. Collaborative efforts between the CPUC, state agencies (e.g., CEC, CARB), and industry stakeholders should lead to the establishment of clear and attainable targets. These milestones can span various aspects of the supply chain, such as the scale-up of hydrogen production facilities, advancements in electrolysis technologies, expansion of hydrogen refueling infrastructure, and seamless integration into existing energy systems. Setting these milestones will provide a tangible trajectory towards realizing the full potential of renewable hydrogen.
- **Unifying Scenario Development:** The synergy between IRP modeling and SB 100 scenario development is pivotal in crafting a holistic energy strategy. CPUC, in collaboration with the CEC and other relevant entities, should work towards a unified modeling approach that rigorously evaluates renewable hydrogen's potential contributions. This involves consistent assumptions on hydrogen costs, technological advancements, grid integration requirements, and infrastructure development. By harmonizing these variables across modeling exercises, California can derive a comprehensive view of how renewable hydrogen fits into the broader energy landscape.

The CPUC's proactive alignment of the IRP process with SB 100 objectives will be a testament to California's leadership in clean energy transition. By focusing on renewable hydrogen as a key energy resource, California can build the resilient and sustainable energy system needed to combat climate change. Through comprehensive assessments, targeted milestones, inventive, collaborative modeling, transparent communication, and problem-solving partnerships, California would be poised to not only achieve its energy goals but also set a global example for a future powered by clean and dispatchable energy.

**B.) THE CPUC SHOULD COORDINATE SB 100 AND LONG-TERM GAS PLANNING TO ENSURE SUFFICIENT PLANNING**

Considering IRP and SB 100 coordination, it is imperative the CPUC extend its coordination efforts to encompass both the integration of SB 100 goals and long-term gas planning efforts. As California moves forward in its commitment to a sustainable energy future, the convergence of these two planning aspects

will ensure a comprehensive and well-coordinated approach to our energy transition. Accordingly, we recommend the following:

- **Integrating SB 100 and Long-Term Gas Planning:** As the state's energy landscape evolves, the coordination between SB 100 and long-term gas planning becomes essential to guarantee a seamless and balanced transition. This coordination should involve robust analyses of how renewable hydrogen can integrate with the gas infrastructure, including its potential applications in sectors that rely on natural gas. Key components of this effort will include evaluating the compatibility of hydrogen pipelines replacing gas networks, exploring the potential for power-to-gas technologies, and identifying optimal locations for hydrogen infrastructure.
- **Balancing Decarbonization Strategies:** California's decarbonization efforts necessitate a balanced approach that addresses both the electricity and gas sectors. While the focus on renewable hydrogen within the electricity sector is crucial, it is equally important to assess how hydrogen can contribute to emissions reductions within the gas sector. Long-term gas planning should incorporate scenarios that explore the substitution of conventional natural gas with renewable hydrogen, which would reduce carbon emissions and promote sectoral integration.
- **Unifying Modeling and Scenario Development:** To ensure effective coordination between SB 100 and long-term gas planning, the CPUC should collaborate with relevant agencies, such as the CEC, CARB, and other stakeholders, to unify modeling and scenario development. This unified approach should account for the interactions between the electricity and gas sectors, showcasing the potential synergies and trade-offs of integrating renewable hydrogen into both sectors.
- **Setting Inclusive Milestones:** Similar to the milestones proposed within the SB 100 framework, the CPUC should work towards establishing inclusive milestones for integrating renewable hydrogen into the gas sector. These milestones should outline the scaling up of renewable hydrogen production, integration of hydrogen into gas infrastructure, such as power plants, and other relevant aspects. A well-defined set of milestones will guide the state's progress in both the electricity and gas sectors, ensuring a comprehensive and synchronized energy transition.

Overall, extending CPUC's coordination efforts to include the integration of SB 100 goals with long-term gas planning is essential for California's comprehensive and successful energy transition. This concerted approach will ensure that the state's commitment to sustainability is met with a well-coordinated strategy that encompasses both the electricity and gas sectors. By balancing decarbonization strategies, unifying modeling efforts, setting inclusive milestones, fostering stakeholder engagement, and committing to adaptive planning, California can position itself as a global leader in achieving a carbon-free energy future.

**C.) THE CEC SHOULD EXPLICITLY INCLUDE LINEAR GENERATORS AND COMBUSTION TURBINES FUELED BY RENEWABLE HYDROGEN AS ELIGIBLE RESOURCES AND ESTABLISH AN OFFICIAL DEFINITION FOR "ZERO-CARBON RESOURCES."**

We extend our appreciation to the CEC for its dedicated efforts in driving California's transition to a sustainable energy future, as outlined by SB 100. As the state works towards its ambitious carbon reduction

goals, we strongly advocate for the following: the inclusion of linear generators and combustion turbines fueled by renewable hydrogen as eligible resources within the SB 100 framework. Additionally, we encourage the CEC to formalize an official definition for "zero-carbon resources" that encompasses renewable hydrogen technologies. This approach will provide market certainty and pave the way for an effective integration of these innovative solutions. Our recommendations are detailed below:

- **Inclusion of Linear Generators and Combustion Turbines Fueled by Renewable Hydrogen:** In the context of eligible resources for SB 100 compliance, we propose the addition of combustion turbines powered by renewable hydrogen. As we have outlined above, renewable hydrogen is a versatile and sustainable energy carrier with significant potential to decarbonize hard-to-electrify sectors. By utilizing renewable hydrogen as a fuel source, combustion turbines can achieve near-zero or zero greenhouse gas emissions. This inclusion recognizes the pivotal role renewable hydrogen can play in ensuring reliability and dispatchability in the energy system while aligning with the state's clean energy objectives. Additionally, we advocate for the inclusion of linear generators, which are fully dispatchable and can continuously generate clean electricity from hydrogen or ammonia. This technology, which uses a non-combustion reaction that results in near zero nitrogen oxide (NO<sub>x</sub>) emissions and low carbon dioxide emissions, helps firm renewable electricity generation and provides supply 24/7. Together, linear generators and combustion turbines powered by renewable hydrogen can be instrumental in California's energy transition.
- **Establishing an Official Definition for Zero-Carbon Resources:** To ensure a clear understanding and consistent application of the term "zero-carbon resources," we recommend that the CEC establishes an official definition that encompasses technologies powered by renewable hydrogen. This definition should consider the entire lifecycle emissions, emissions reduction potential, and the broader environmental impact of renewable hydrogen-based solutions. A well-defined definition will serve as a guiding framework for decision-making, procurement strategies, and policy development, fostering a transparent and effective pathway towards SB 100 goals.

The CEC's commitment to advancing renewable and zero-carbon resources under SB 100 is commendable and reflects the state's dedication to a sustainable energy transition. By including both linear generators and combustion turbines fueled by renewable hydrogen as well as formalizing an official definition for zero-carbon resources that embraces renewable hydrogen technologies, California can lead the way in clean energy innovation. These measures will provide the necessary clarity for market participants to invest in and develop renewable hydrogen-based solutions, contributing to the realization of California's clean energy vision. We eagerly anticipate further collaboration and progress in shaping California's energy landscape.

**D.) ADOPT EDF'S RECOMMENDATIONS FOR ACCELERATING CALIFORNIA'S CLEAN ENERGY TRANSITION**

We strongly urge the CPUC, CEC, and CARB to swiftly adopt the recommendations put forth by the Environmental Defense Fund (EDF) in the workshop to expedite California's shift towards a cleaner and more sustainable energy future.<sup>3</sup> These recommendations by EDF encompass a multifaceted strategy:

1. Develop a comprehensive clean energy deployment plan that outlines specific quantities, locations, and timelines for new resource development and infrastructure expansion. This roadmap will provide a clear trajectory towards achieving ambitious clean energy targets.
2. Assign a lead agency for effective implementation, with CPUC taking the lead and supported by CEC and CARB. This streamlined coordination will eliminate duplication, thereby ensuring clear accountability for achieving the state's clean energy aspirations.
3. Establish a transparent progress tracking dashboard accessible to the public. This visual representation of clean energy deployment progress fosters informed public engagement and collective responsibility.
4. Advocate for supportive policies for clean energy infrastructure. Streamlining processes for planning, permitting, financing, and construction will facilitate rapid deployment of renewable energy solutions.
5. Strengthen public engagement efforts by building on existing initiatives. This engagement empowers citizens to contribute insights and shape the state's energy future.

Adopting EDF's recommendations will allow CPUC, CEC, and CARB to collaboratively steer California towards an accelerated clean energy transition, reinforcing the state's commitment to environmental stewardship and sustainable energy practices.

**III. CONCLUSION.**

The GHC appreciates the opportunity to submit comments on the SB 100 Kickoff Workshop. We would like to thank the CEC, CPUC, and CARB for their leadership and look forward to continuing to collaborate with all other stakeholders.

Respectfully submitted,

**Nicholas Connell**  
Interim Executive Director  
**Green Hydrogen Coalition**  
Tel: 949-558-1305  
Email: [nconnell@ghcoalition.org](mailto:nconnell@ghcoalition.org)

**Hope Fasching**  
Senior Policy Analyst  
**Green Hydrogen Coalition**  
Tel: 510-495-6090  
Email: [hfasching@ghcoalition.org](mailto:hfasching@ghcoalition.org)

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<sup>3</sup> <https://efiling.energy.ca.gov/GetDocument.aspx?tn=251719&DocumentContentId=86698>