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GHC Comments on Staff Workshop on RPS Requirements for Energy Storage

Additional submitted attachment is included below.

February 22, 2022

Email to: docket@energy.ca.gov
Docket Number: 21-RPS-02
Subject: GHC's Comments on the Staff Workshop on RPS Requirements for Energy Storage Devices

Re: Comments of the Green Hydrogen Coalition Regarding the February 8 Staff Workshop on Renewable Portfolio Standard Requirements for Energy Storage Devices

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The Green Hydrogen Coalition ("GHC") appreciates the opportunity to comment on the Staff Workshop on Renewable Portfolio Standard ("RPS") Requirements for Energy Storage Devices ("the Workshop") held on February 8, 2022. GHC recognizes the California Energy Commission's ("CEC") initiative to assemble a vast group of stakeholders to evaluate revisions to the RPS Guidebook.

I. INTRODUCTION & SUMMARY

The GHC welcomes the CEC hosting this Workshop to update the requirements associated with energy storage resources within the RPS framework. As underscored by several parties during the Workshop, the energy landscape has changed significantly in the last 20 years, warranting a revision of this framework's definition of storage and its requirements. In this context, the GHC's comments are focused on the following areas:

- **The energy landscape has fundamentally changed over the last 20 years:** Today, California must plan to invest in solutions, such as green hydrogen, that allow deep decarbonization across multiple sectors.

- **The RPS Program currently does not incent cost-effective solutions for deep decarbonization:** This omission could result in suboptimal land use, increased costs, and technology lock-in at the expense of reliability.

- **The CEC should move towards equal treatment of standalone and paired storage:** The storage of renewable energy is independent of generation and should not be penalized in any configuration via REC accounting.

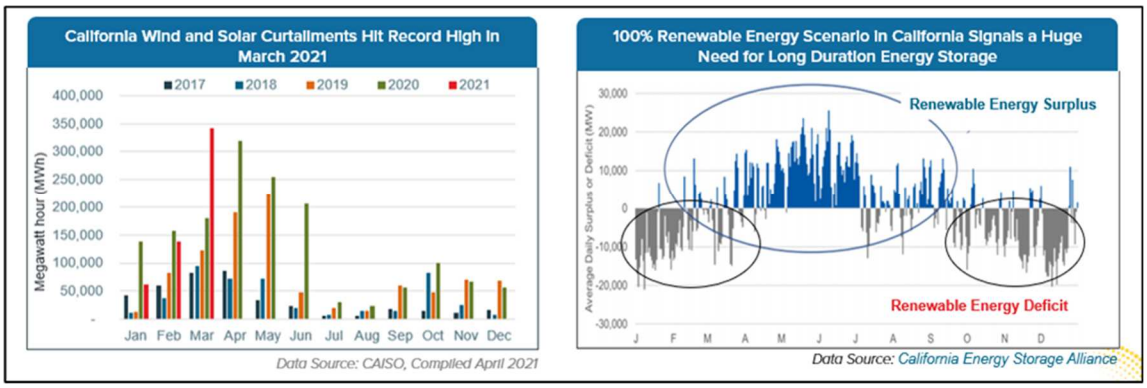
- **The CEC should clarify that a gas turbine that uses renewable hydrogen can be certified as an eligible renewable energy resource:** This exclusion could hinder electrolytic green hydrogen storage development since gas turbines are a key component to convert the stored hydrogen back into renewable electricity.

II. COMMENTS

1. The energy landscape has fundamentally changed over the last 20 years.

One of the motivating questions CEC staff presented to stakeholders during the Workshop asked how the energy landscape has changed in recent years. The GHC considers that the energy sector is profoundly different today compared to 2002 when the RPS program was introduced. Since the RPS was established, intermittent renewable capacity has grown tenfold, from 1,924 MW in 2002 to 19,977 MW in 2020.[1] As such, the RPS program has significantly contributed to the dramatic increase in solar and wind generation. Nevertheless, the increase in intermittent renewable capacity has been paired with a significant rise in the amount of energy curtailed due to the fact that renewable energy is often generated in periods of low demand. According to the California Independent System Operator ("CAISO"), California's wind and solar curtailments hit a record high of nearly 350,000 MWh in March 2021.[2] As seen in Figure 1, renewable hydrogen can harness this abundant renewable resource for later use in the power sector (even a different season) and concurrently harness this abundant energy source to displace fossil fuels in other sectors.

Figure 1. Substantial storage capacity will be needed to support a 100% renewables scenario in California



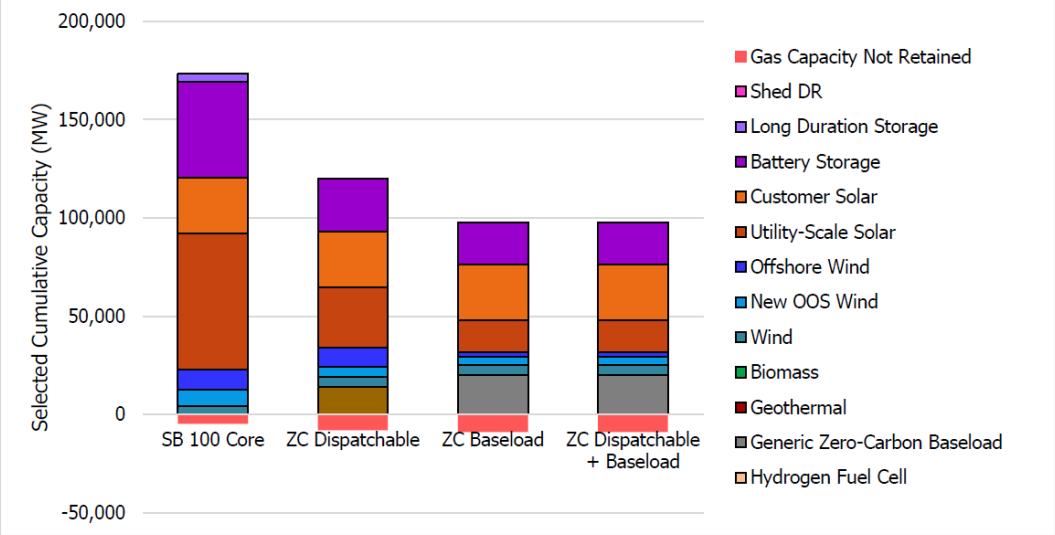
Today, California's most stringent climate goal is enshrined in Senate Bill ("SB") 100, which requires the decarbonization of 100% of retail electricity sales by 2045. This target underscores a stark departure from RPS-like goals, which were previously focused on the energy generated. Today, conversely, California has its goals defined in terms of energy consumed. The CEC is collaborating with the California Public Utilities Commission ("CPUC") and the California Air Resources Board ("CARB") (together, "the Joint Agencies") to identify a portfolio mix that can

[1] *See* CEC, *Electric Generation Capacity and Energy*, available at https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/electric-generation-capacity-and-energy
[2] CAISO Managing Oversupply. Data compiled April 2021. http://www.caiso.com/informed/Pages/ManagingOversupply.aspx#dailyCurtailment

attain this goal. In 2021, the Joint Agencies released the first SB 100 Joint Agency Report ("SB 100 JAR"), where they identified a series of portfolios that may meet this target.

While the SB 100 Core scenario was selected as a type of benchmark to meeting SB 100 goals, the JAR also identifies other alternatives that are dependent on certain sensitivity factors. The SB 100 Core portfolio selects 145 GW of incremental utility-scale capacity additions by 2045, including 70 GW of solar PV, 4 GW of pumped storage, and 49 GW of battery storage.[3] This portfolio has an estimated total resource cost of 66 billion USD by 2045.[4] In an effort to better understand the benefits of zero-carbon firm capacity, the Joint Agencies also considered a Generic Zero-Carbon Firm Resource scenario in which "generic dispatchable" resource and "generic baseload" candidate resources were included to represent a wide variety of emerging technologies, such as natural gas with 100% carbon capture, 100% green hydrogen combustion, or other renewable fuels. In scenarios where either the generic dispatchable resource, generic baseload resource, or both are included as a candidate resource, the model selects about 15 GW of either or both resources in total. The inclusion of the lower-cost zero-carbon firm resources significantly lowers the utility-scale solar and battery storage selected in the model and reduces total resource cost in 2045 by $2 billion, or about 3 percent.[5] These figures demonstrate that the cost of meeting our policy targets is directly contingent on California's investment in zero-carbon firm assets, such as green electrolytic hydrogen.

Figure 2. Cumulative Capacity Additions for SB 100 Core Scenario and Generic Zero-Carbon Firm Resource Scenarios in 2045 [6]



Source: CEC staff and E3 analysis

[3] 2021 SB 100 JAR, at 75.
[4] *Ibid,* at 83.
[5] *Ibid,* at 13.
[6] *Ibid,* at 13.

Figure 2 clearly demonstrates that SB 100 goes significantly beyond RPS requirements, and its cost-effective achievement largely hinges on whether or not green hydrogen is ubiquitous. As a result, the RPS structure would be amiss by disincentivizing any policy geared towards furthering the use of renewable energy for the purposes of green hydrogen production.

2. The RPS Program currently does not incent cost-effective solutions for deep decarbonization.

At the Workshop, CEC staff asked parties about the impacts of current RPS requirements on energy storage development. A number of parties underscored that the current RPS definitions do not incent the pairing of energy storage assets with eligible renewable facilities. The GHC considers that this outcome is not desirable from a policy perspective, as it may hinder the economic case for co-locating electrolyzing resources with renewable generation despite the clear case for green hydrogen in the State.

Currently, the RPS Guidebook defines energy storage as potential additions or enhancements to eligible renewable facilities. In this context, storage can be either integrated into the facility or directly connected to the facility. The sole difference between integrated and directly connected energy storage is whether it is limited to charge exclusively from the onsite eligible renewable resource (integrated) or whether it can charge from additional energy sources, such as the grid or a non-eligible facility.[7] Crucially, in both these cases, the storage is deemed part of the eligible facility, and any losses related to its use must be netted from the generation of RECs. Critically, the definition of these two pairing methods is inconsistent with the RPS program's treatment of standalone storage.

Conversely, today, the RPS program does not consider standalone storage as an eligible technology since it does not generate electricity and is defined only as a potential addition to eligible renewable resources. The GHC considers that this understanding merits reevaluation, as explored further in part 3 of these comments. Given the fact that storage by itself is not an eligible technology, the RPS Guidebook does not attempt to quantify the effects of standalone storage assets on the renewable generation that is separately interconnected. This creates an uneven playing field for paired assets. As mentioned during the Workshop, current RPS rules would treat significantly different two resource configurations with the same components. This outcome has significant implications as the sole difference between paired and standalone configurations is that the assets happen to share a point of interconnection in the paired case. In this context, RPS rules incent against the pursuit of paired configurations that may be cost-effective and particularly essential in local reliability areas ("LRAs") such as the Los Angeles ("LA") Basin or the Greater Bay Area. These significant load pockets usually cover urban areas with scarce land and high load, making them particularly complex to decarbonize. In this context, minimizing costs and optimizing land use are essential to enact decarbonization in LRAs. As a result, the CEC would be amiss to retain the current requirements as they may have material impacts on the costs and land needed to meet SB 100 goals in a timely manner.

[7] RPS Guidebook, at 40.

3. The CEC should move towards equal treatment of standalone and paired storage.

The GHC recommends the CEC recognize that energy storage is not an upgrade or addition to eligible renewable facilities but an enabler of the utilization of the electricity said facilities generate. The CEC should amend the RPS Guidebook to acknowledge that the use of storage resources, be it paired or standalone, is independent of the act of generation undertaken by the eligible renewable facilities.

Just as the CEC's RPS program does not discount the effect of transmission on generation or REC minting, the GHC argues that the same treatment should be applied to storage, regardless of configuration. In essence, storage resources should be deemed beyond the scope of the RPS framework, with the losses associated with the act of storing energy not being incorporated into REC accounting. The GHC notes that this treatment is consistent with the goals of the RPS program as it would continue to incent the development of renewable assets. Moreover, this approach would be consistent with the needs of California's future grid.

Without this redefinition, the CEC could inadvertently incent suboptimal resource deployment, inefficient land use, and increased ratepayer costs. By recognizing the nature of storage assets as separate from the act of generation, the CEC would be able to continue to manage the RPS program in a manner aligned with California's broader policy goals. To do so, the GHC recommends recognizing energy storage in all its forms, including electrolytic hydrogen, in the RPS Guidebook while noting that the standalone or paired use of storage does not affect the act of generation, which is the conduit of REC minting.

4. The CEC should clarify that a gas turbine that uses renewable hydrogen can be certified as an eligible renewable energy resource.

The GHC, in conjunction with the Los Angeles Department of Water and Power ("LADWP") and other key partners, launched HyDeal LA,[8] an initiative that seeks to create the first competitive, high-volume multi-sectoral renewable hydrogen hub in North America. The effort builds on the LADWP's leadership in transforming the Intermountain Power Project, a 1,800 MW coal-fueled generator, to an 840 MW combined cycle gas turbine scheduled to go online in the summer of 2025 with a 30% green H2 blend, increasing to 100% by 2045. LADWP is currently developing a system plan for converting four in-basin generating facilities from natural gas-fueled to 100% renewable hydrogen-fueled turbines by 2035.

These generating facilities will serve reliability needs by utilizing electrolytically produced renewable hydrogen for long-duration energy storage needs. The cost-effectiveness of renewable hydrogen for gas turbine use is best evaluated under a storage framework compared to other storage alternatives. In this regard, the production and use of renewable electrolytic hydrogen as energy storage will serve other potential benefits, including capacity and ancillary services. Furthermore, renewable hydrogen storage is the only commercially viable pathway to achieve

[8] https://www.ghcoalition.org/ghc-news/hydeal-losangeles

seasonal balancing and matching renewable energy supply with demand from a longer duration perspective. However, this cannot happen overnight, and the only reasonable pathway forward to achieving seasonal renewable energy storage is by increasing the amount of renewable hydrogen used by the power sector over time. As a result, this requires multiple pathways for the power sector to produce renewable hydrogen and use the hydrogen to produce electricity.

For this reason, we are seeking clarification that a gas turbine facility that uses renewable hydrogen ("Renewable Hydrogen Gas Turbine"), as described below, can be certified as an eligible renewable energy resource by the CEC. For the purposes of this requested clarification, the renewable hydrogen used by the facility would be created by an electrolysis process, as defined in California Public Utilities Code § 400.2, certified by the CEC as an "eligible renewable energy resource." While we believe that certification of the Renewable Hydrogen Gas Turbine should be permitted when the electrolysis process is powered by any "eligible renewable energy resource," we are seeking the CEC's guidance and clarification. Further, based on current gas turbine technology, today, most gas turbines can operate on a blend of renewable hydrogen and natural gas as fuel. As described below, an eligible renewable energy resource may use non-renewable energy resources to generate electricity so long as the certified facility accurately measures the annual contribution of each energy resource used when producing electricity.

Renewable Hydrogen Gas Turbines meet the relevant eligibility criteria as an addition or enhancement to an eligible renewable facility, as provided in Section 399.12(e) of the California Public Utilities Code and Section 25741(a)(1) of the California Public Utilities Code. Currently, the CEC is responsible for certifying "eligible renewable energy resources" that retail sellers and local publicly owned electric utilities may use to satisfy their RPS procurement requirements per California Public Utilities Code § 399.25(a) and § 399.15(b). An "eligible renewable energy resource" is defined, in relevant part, as a "renewable electrical generation facility,"[9] which is a facility that uses "biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, small hydroelectric generation of 30 megawatts or less, digester gas, municipal solid waste conversion, landfill gas, ocean wave, ocean thermal, or tidal current, and *any additions or enhancements to the facility using that technology*."[10] The CEC has found that an addition or enhancement to an eligible renewable facility includes energy storage technologies using pumped-storage hydroelectric so long as "the electricity used to pump the water into the storage reservoir qualifies as RPS-eligible."[11]

Like the pumped hydroelectric storage facility, the Renewable Hydrogen Gas Turbine would utilize a fuel (pumped water in the case of the storage facility and renewable hydrogen in the case of the Renewable Hydrogen Gas Turbine) that was created with electricity from other facilities certified as eligible renewable energy resources. For the purposes of the requested clarification, only wind and solar-powered electrolysis processes would be utilized to create renewable hydrogen. Thus, consistent with Section 25741(a)(1) of the California Public Resource Code, the

[9] California Public Utilities Code § 399.12(e)
[10] Cal. Pub. Res. Code § 25741(a)(1) (emphasis added).
[11] CEC RPS Eligibility Guidebook, Chapter 3.F. at p. 41 (9th Rev. Ed.) (CEC Guidebook).

Renewable Hydrogen Gas Turbine would qualify as an addition or enhancement to an existing RPS-eligible facility.

While the Renewable Gas Turbines will not initially operate on 100% renewable hydrogen, these systems are committed to transitioning to that threshold as time progresses. Over time, these Renewable Gas Turbines can be upgraded or replaced to combust 100% renewable hydrogen. As detailed in Chapter 3.B of the CEC's Guidebook, certificated facilities "may use one or more non-renewable energy resources to generate electricity" in addition to RPS-eligible renewable resources.[12] Like such facilities, and in accordance with the CEC Guidebook, a Renewable Hydrogen Gas Turbine would measure the energy content of each energy resource that it utilizes as fuel and calculate the electric generation attributable to the RPS-eligible source (*in this case, renewable hydrogen produced as described above*).

Lastly, additional guidance may be required for the de minimis quantity associated with electrolytic production. To illustrate, the RPS Eligibility Guidebook states that "facilities using non-renewable energy resources in excess of the de minimis quantity may continue to claim a de minimis quantity of the facility output attributable to non-renewable energy resources as RPS-eligible if the total contribution of the non-renewable energy resource does not exceed 10 percent of the total energy inputs."[13] For electrolytic production, the CEC may need to clarify that de minimis greenhouse gas emissions would include auxiliary grid loads for electrolytic hydrogen, provided that such loads do not exceed 10 percent of the total energy input.

III. CONCLUSION

GHC appreciates the opportunity to provide these comments and feedback on the Workshop. We look forward to collaborating with the CEC and other stakeholders in this docket.

Respectfully submitted,

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Nicholas Connell
Policy Director
GREEN HYDROGEN COALITION

[12] CEC Guidebook at p. 28.
[13] CEC Guidebook at p. 32.