

**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Continue  
Electric Integrated Resource Planning and  
Related Procurement Processes.

Rulemaking 20-05-003  
(Filed May 7, 2020)

**REPLY COMMENTS OF THE CALIFORNIA HYDROGEN BUSINESS COUNCIL  
ON ORDER INSTITUTING RULEMAKING TO CONTINUE ELECTRIC  
INTEGRATED RESOURCE PLANNING AND RELATED PROCUREMENT  
PROCESSES**

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**I. Introduction**

The California Hydrogen Business Council (CHBC)<sup>1</sup> appreciates the opportunity to provide reply comments on the *Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes* (Continued IRP OIR) issued on May 14, 2020.

Our comments are summarized as follows:

- a. We agree with several parties who commented that hydrogen energy storage ought to be prioritized as part of integrated resource planning because it is important and economical long duration storage resource and means of integrating variable renewable generation.**
- b. We agree with parties, such as CESA, that there ought to be a procurement mechanism for hydrogen storage included in a balanced planning strategy.**
- c. We support EDF's call for zero carbon fuels, including renewable hydrogen and its derivatives, to be included in planning as a clean firm power resource.**
- d. We agree with SoCalGas that long term planning through 2045, including a high hydrogen scenario, should be maintained, as we believe this encourages critical innovation, research and development, and the holistic and thoughtful vision that will ensure long term goals of SB 100 and state carbon neutrality policy are successfully met.**

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<sup>1</sup> The CHBC is comprised of over 100 companies and agencies involved in the business of hydrogen. Our mission is to advance the commercialization of hydrogen in the energy sector, including transportation, goods movement, and stationary power systems to reduce emissions and dependence on oil. The views expressed in these comments are those of the CHBC, and do not necessarily reflect the views of all of the individual CHBC member companies. Members are listed here: [www.californiahydrogen.org/aboutus/chbc-members/](http://www.californiahydrogen.org/aboutus/chbc-members/)

- e. **CHBC believes BAC’s comment regarding the need to factor wildfire related issues into resource planning ought to be heeded, including considering the role that technologies such as renewable hydrogen can play in the state’s wildfire strategy.**

These points are elaborated on in the Comments section below.

## **II. Comments**

- a. **We agree with several parties who commented that hydrogen energy storage ought to be prioritized as part of integrated resource planning because it is important and economical long duration storage resource and means of integrating variable renewable generation.**

Several party comments expressed support for including hydrogen as a resource for long duration storage and to help store intermittent renewable power. CEERT, for example, wrote that renewable hydrogen, among other solutions, will be “*key in overcoming wind and solar power’s variability and enabling renewable resources to meet the needs of the electric grid around the clock and throughout the year.*”<sup>2</sup> SoCalGas states that synthetic gas and hydrogen are among the gaseous fuels that can “*complement intermittent renewable resources as they are easily transportable and storable, available upon demand, and operationally more flexible across multiple sectors of the economy.*” The utility adds that leveraging the existing underground gas system can also be a pathway to storing and delivering hydrogen for end uses like thermal generation.<sup>3</sup> SDG&E similarly supports a diverse portfolio that includes hydrogen as an important storage resource,<sup>4</sup> while EDF points out that hydrogen is an “ultra low-cost” long duration storage option when deploying underground resources like large salt caverns.<sup>5</sup>

We strongly agree with these comments and urge the Commission to include hydrogen-based gas in integrated resource planning as a resource to help integrate renewables and provide scalable, economical, and geographically flexible long duration storage.<sup>6</sup>

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<sup>2</sup> See CEERT Opening Comments to the Continued IRP OIR, p. 3

<sup>3</sup> See So Cal Gas Opening Comments to the Continued IRP OIR, p. 5

<sup>4</sup> See SDG&E Opening Comments to the Continued IRP OIR, p.2

<sup>5</sup> See EDF Opening Comments to the Continued IRP OIR, p.2

<sup>6</sup> *ibid*, p. 2

**b. We agree with parties, such as CESA, that there ought to be a procurement mechanism for hydrogen storage included in a balanced planning strategy.**

CESA comments that the Commission ought to consider procurement issues related to hydrogen storage and ought to also develop a procurement mechanism for hydrogen storage.<sup>7</sup> SoCalGas also supports including hydrogen storage as part of the state’s “balanced portfolio procurement strategy” for long duration/seasonal storage.<sup>8</sup> CHBC strongly agrees with these comments.

**c. We support EDF’s call for zero carbon fuels, including renewable hydrogen and its derivatives, to be included in planning as a clean firm power resource.**

EDF opines: *“This proceeding should evaluate the need for new renewable and other clean firm electric resources to meet California’s long-term greenhouse gas reduction mandates. Options for clean firm power include, but are not limited to: zero-carbon fuels, including biomethane, synthetic methane, hydrogen, or ammonia from carbon neutral processes.”*<sup>9</sup>

SoCalGas also points out the capability of hydrogen to generate electricity when variable renewables are not available. CHBC strongly supports the Commission’s integrated resource planning and procurement processes including hydrogen and its derivatives as low and zero carbon firm electricity resources.

The CHBC believes that a core strategy to achieve state zero carbon electricity (SB 100), short lived climate pollutant (SLCP) reduction (SB 1383), and carbon neutrality (Executive Order B-18-55) goals and mitigate stranded costs is to repurpose gas infrastructure, including thermal generation units required for firm power, for use by decarbonized hydrogen and other green gas sources. As stated in our December 2019 comments on the IRP Reference System Portfolio,<sup>10</sup> CHBC believes the plans for thermal generation must go beyond the current plan of retaining fossil natural gas as a fuel source for the foreseeable future, and instead transition to be free of greenhouse gas emissions, if California is going to reach its goal of carbon neutrality. Hydrogen made from eligible renewable and zero carbon sources, like curtailed renewable generation and

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<sup>7</sup> CESA Opening Comments to the Continued IRP OIR, p. 5

<sup>8</sup> Ibid. p. 5

<sup>9</sup> EDF Opening Comments to the Continued IRP OIR, p. 2; Note that synthetic methane is derived from hydrogen gas by adding CO<sub>2</sub>, and ammonia is derived by combining hydrogen gas and nitrogen gas.

<sup>10</sup> See *COMMENTS OF THE CALIFORNIA HYDROGEN BUSINESS COUNCIL ON THE ADMINISTRATIVE LAW JUDGE’S RULING SEEKING COMMENT ON PROPOSED REFERENCE SYSTEM PORTFOLIO AND RELATED POLICY ACTIONS*, submitted December 17, 2019 on R1602007 Docket.

legacy hydro, is technically capable of replacing fossil fuels in thermal generation up to 100%, thus having the potential to eliminate greenhouse gas emissions entirely on a lifecycle basis. Critically, clean hydrogen and other decarbonized gas can do so in the 2030 timeframe to reduce SLCPs, as called for by SB 1383. Among renewable gases, renewable hydrogen has the unique capability of reducing SLCPs by displacing natural gas in the pipeline system. Blending hydrogen even in modest amounts with fossil natural gas – e.g. 5-7% - would not likely negatively impact ratepayers or equipment, while significantly reducing the risk of methane emissions from the gas system. Gas turbines and fuel cells are available that can take far higher amounts of hydrogen, up to 100%, and projects and are in progress around the world. For example:

- In Japan, Obayashi Corporation and Kawasaki Heavy Industries, Ltd., (as part of the New Energy and Industrial Technology Development Organization project) delivered the world's first gas turbine fueled by 100% hydrogen for energy and heat generation.<sup>11</sup>
- Mitsubishi Hitachi Power Systems has successfully developed a large-scale hydrogen gas turbine that uses up to 30% hydrogen and is in the process of developing a 100% hydrogen turbine.<sup>12</sup> A project underway in the Netherlands seeks to convert a natural gas power plant to 100% hydrogen using this technology.
- Mitsubishi Hitachi Power Systems has also partnered with Magnum Development to recently announce a 1 GW energy storage project in Utah that will deploy electrolytic hydrogen storage and hydrogen electricity generation, along with other solutions.<sup>13</sup>
- Mitsubishi Hitachi Power systems will also deploy their hydrogen turbines to support a project underway by LADWP to convert their Intermountain Power Project (IPP) in Utah from a coal generation to 30% renewable hydrogen by 2025 and 100% renewable hydrogen by 2040.<sup>14</sup> The Magnum salt cavern is adjacent to the IPP and will be leveraged for this project.
- General Electric's (GE) "hydrogen-ready" (6B.03) turbines at the Gibraltar-San Roque Oil Refinery in Spain, have logged thousands of hours combusting a blend of hydrogen

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<sup>11</sup> New Energy and Industrial Technology Development Organization. *World's First Heat and Electricity Supplied in an Urban Area Using 100% Hydrogen-Towards Establishing Optimal Energy Control Technology in Local Communities*. April 2018.

Available at: [https://www.nedo.go.jp/english/news/AA5en\\_100382.html](https://www.nedo.go.jp/english/news/AA5en_100382.html)

<sup>12</sup> [https://www.mhps.com/special/hydrogen/article\\_1/index.html](https://www.mhps.com/special/hydrogen/article_1/index.html)

<sup>13</sup> <https://www.environmentalleader.com/2019/05/energy-storage-project-utah/>

<sup>14</sup> <https://amer.mhps.com/intermountain-power-agency-orders-mhps-jac-gas-turbine-technology-for-renewable-hydrogen-energy-hub.html>

and fuel gas. The same turbines are also in operation at a South Korean refinery, with more than 20 years combusting a fuel blend with more than 70% hydrogen and has operated at a 90% hydrogen blend. In the U.S., a petrochemical plant in Louisiana has been producing electricity using a blend of natural gas with hydrogen with its GE 7F gas turbines.<sup>15</sup>

- Hydrogen stationary fuel cells up to the megawatt scale are in operation today<sup>16</sup> with a growing backup power market for sectors, such as critical facilities, data centers, and telecommunication and intelligent transportation systems (including traffic signals and railroad crossings. These systems operate for extended periods (72 hours or more) during grid outages.

**d. We agree with SoCalGas that long term planning through 2045, including a high hydrogen scenario, should be maintained, as we believe this encourages critical innovation, research and development, and the holistic and thoughtful vision that will ensure long term goals of SB 100 and state carbon neutrality policy are successfully met.**

CHBC strongly agrees with SoCalGas that the Commission ought to continue “*to set the IRP planning and modeling framework in the planning track to extend until 2045 (to meet the Senate Bill (SB) 100 requirements)*” and that this “*new planning framework could be similar to the 2045 framing scenarios developed in the 2019-2020 IRP cycle to evaluate high electrification, high biofuels, and high hydrogen scenarios.*”<sup>17</sup>

As previously stated in CHBC comments related to the 2019-2020 Reference System Plan<sup>18</sup> we suggest the Commission extend the modeling and system planning process to comply with SB 100 goals and timelines (i.e. 44% RPS by 2024, 52% RPS by 2027, 60% RPS by 2030 and 100% RPS/Zero Carbon by 2045).<sup>19</sup> We additionally recommend that the Commission consider scenarios based on the California achieving carbon neutrality in the electricity system by 2045,

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<sup>15</sup> GE Reports. The Hydrogen Generation: These Gas Turbines Can Run On The Most Abundant Element In the Universe. January 2019, <https://www.ge.com/reports/hydrogen-generation-gas-turbines-can-run-abundant-element-universe/>

<sup>16</sup> See, e.g. <https://www.hydrogenics.com/2015/11/03/kolon-hydrogenics-starts-commercial-operation-of-megawatt-fuel-cell-system-in-south-korea/>

<sup>17</sup> So Cal Gas Opening Comments to the Continued IRP OIR, p. 2

<sup>18</sup> See *COMMENTS OF CALIFORNIA HYDROGEN BUSINESS COUNCIL ON ASSIGNED COMMISSIONER'S RULING ON INPUTS AND ASSUMPTIONS FOR DEVELOPMENT OF THE 2019-2020 REFERENCE SYSTEM PLAN*, Submitted January 4, 2019, Rulemaking 16-02-007 Docket

<sup>19</sup> Text of SB 100: [https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill\\_id=201720180SB100](https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB100)

in alignment with state policy on transitioning to carbon neutrality economy wide and negative net carbon emissions thereafter. As renewable and other zero carbon generation reaches higher concentrations on the grid, better understanding of how to manage the constraints and opportunities is needed. This should be a coordinated, multi-agency effort to maximize efficient, well informed and effective planning.

- e. **CHBC believes BAC’s comment regarding the need to factor wildfire related issues into resource planning ought to be heeded, including considering the role that technologies such as renewable hydrogen can play in the state’s wildfire strategy.**

BAC urges in their comments that the Commission “include a specific track in the IRP process that focuses on integration with the various wildfire proceedings going on at the Commission,” and that among “the many issues related to wildfire and the energy portfolio” is “need for vegetation removal around power infrastructure and opportunities to convert that vegetation to electricity, combined heat and power, and renewable hydrogen.”<sup>20</sup> We agree that that it is imperative for the integrated resource planning process to consider wildfire related issues and existing state efforts and that this ought to include the role that renewable hydrogen, among other solutions, can play to increase resilience while protecting the climate and air quality, which is all the more essential during the COVID-19 pandemic.

### **III. Conclusion**

The CHBC thanks the Commission for their consideration and looks forward to working together building understanding of how hydrogen as a storage and power generation resource can play important roles in integrated resource and procurement planning processes in California.

Respectfully submitted,

Dated: June 30, 2020



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<sup>20</sup> BAC Opening Comments to the Continued IRP OIR, p. 9