BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Safe and Reliable Gas Systems in California and Perform Long-Term Gas System Planning	Rulemaking 20-01-007 (Filed January 27, 2020)

COMMENTS OF THE CALIFORNIA HYROGEN BUSINESS COUNCIL ON THE ORDER INSTITUTING RULEMAKING TO ESTABLISH POLICIES, PROCESSES, AND RULES TO ENSURE SAFE AND RELIABLE GAS SYSTEMS IN CALIFORNIA AND PERFORM LONG-TERM GAS SYSTEM PLANNING

Emanuel Wagner
Deputy Director
California Hydrogen Business Council
18847 Via Sereno
Yorba Linda, CA 92866
310-455-6095
ewagner@californiahydrogen.org

February 26, 2020

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Safe and Reliable Gas Systems in California and Perform Long-Term Gas System Planning	Rulemaking 20-01-007 (Filed January 27, 2020)

COMMENTS OF THE CALIFORNIA HYROGEN BUSINESS COUNCIL ON THE ORDER INSTITUTING RULEMAKING TO ESTABLISH POLICIES, PROCESSES, AND RULES TO ENSURE SAFE AND RELIABLE GAS SYSTEMS IN CALIFORNIA AND PERFORM LONG-TERM GAS SYSTEM PLANNING

I. Introduction

The California Hydrogen Business Council (CHBC) [1] welcomes the opportunity to provide the following reply comments to the *Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Safe and Reliable Gas Systems in California and Perform Long-Term Gas System Planning* (OIR), issued on January 27, 2020 in the above captioned proceeding. The following is summary of our ten main points, elaborated upon in the Comments section below.

[1] 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 of the CHBC can be found here: https://www.californiahydrogen.org/aboutus/chbc-members/.

- **Background Section 1.3 on Greenhouse Gas Legislation should include SB 1383, which calls on the Commission and other agencies to consider renewable gas as a strategy for reducing short lived climate pollutants, and as such also stands to impact long term gas system planning.**

- **Future gas system demand and planning in California ought to be based on rigorous, peer-reviewed data driven analysis, which includes optimal use of hydrogen, and that factors in all state clean energy, clean air, carbon neutrality and resilience requirements.**

- **Track 1A ought to include consideration of the increasing interconnection between gas and electric system reliability.**

- **The absence of renewable gas, including renewable hydrogen, from the scope of this OIR so far is a glaring omission and should be corrected in the forecast process undertaken by the gas utilities.**

- **Planning and forecasting for the future gas system needs to be based on accurate forecasts of 1) volumes of renewable gas, including renewable hydrogen, 2) the potential for distributed fuel cells fueled by hydrogen as a flexible, dispatchable resource, and 3) the uses of the gas system, including as a long duration storage resource and to supply decarbonize natural gas end uses (e.g. zero carbon electricity generation in thermal gas plants, building energy, industrial energy), in a future in which state meets targets for carbon neutrality, resilience, clean air, and clean energy.**

- **CHBC thinks there needs to be comprehensive analysis and a realistic view of price forecasts for decarbonized hydrogen over time factored into the inquiry of how to maintain system reliability along with just and reasonable rates.**

- **The CHBC believes that a core strategy to mitigate stranded costs is to repurpose gas infrastructure for decarbonized gas sources, especially decarbonized hydrogen, which among decarbonized gases has the greatest potential to scale - an approach that is being pursued around the world.**

- **We believe that remaining gas-fired generation should transition to zero carbon and renewable gas, such as hydrogen produced using renewable or zero carbon sources, in keeping with California's goal to achieve carbon neutrality.**

- **By maintaining gas infrastructure and upgrading it for use by renewable and zero carbon gas, California will be able to keep the existing gas infrastructure workforce, while also adding value to it and creating new industries with new jobs that have long term viability.**

II. Comments

A. Background Section 1.3 on Greenhouse Gas Legislation should include SB 1383, which calls on the Commission and other agencies to consider renewable gas as a strategy for reducing short lived climate pollutants, and as such also stands to impact long term gas system planning.

We generally agree with the Commission that state and local greenhouse gas laws will lead to a decline in demand for fossil natural gas over the next 25 years, that there is uncertainty how mixed fuel and electrification approaches will impact the need for gas infrastructure, and that laws calling for biomethane and electrolytic hydrogen also need to be considered in long term gas system planning. In addition to the state laws cited in the OIR, another important provision that should be included for context is SB 1383, which directs state agencies to *"consider and, as appropriate, adopt policies and incentives to significantly increase the sustainable production and use of renewable gas, including biomethane and biogas*." [2] While the bill references

[2] The first paragraph of SB 1440 refers to the SB 1383 mandate: "*Existing law requires state agencies to consider and, as appropriate, adopt policies and incentives to significantly increase the sustainable production and use of renewable gas. Existing law requires the Public Utilities Commission (PUC), in consultation with the State Energy Resources Conservation and*

biomethane and biogas, the author with whom we worked closely, explicitly and intentionally also broadened the language to "renewable gas" in order to include renewable hydrogen in implementation of the law. The Energy Commission's *2017 Integrated Energy Policy Report* reinforces this in its discussion on implementing SB 1383, specifically including renewable hydrogen in the suite of solutions California deploys to mitigate short lived climate pollutants.[3] Future discussion and rulemaking should integrate the requirements of this law.

B. Future gas system demand in California ought to be based on rigorous, peer-reviewed data driven analysis, which includes optimal use of hydrogen and its derivatives, and that factors in all state clean energy, clean air, carbon neutrality and resilience requirements.

The OIR states in the Background section that "*Energy industry specialists have opined on the need for the Commission, among other state agencies, to develop long-term plans for phasing-out gas utility assets*." [4] First, as important as it may be to have the input of many voices on this issue as points of discussion, state policy on how to approach gas assets ought to be not simply based on opinions, but on peer reviewed, evidentiary expert analysis. This analysis ought to include optimal use of gas infrastructure as a carrier of hydrogen – blended with natural gas and up to 100% hydrogen - and methanated hydrogen. This would be complementary to the current IRP process, which is modeling a high hydrogen scenario to achieve deep decarbonization (target of 46 MMT) in the electric sector. We recommend taking this a step further and including in the modeling of future gas (and electric) system requirements carbon neutral scenarios that examines optimal use of hydrogen of up to 100% in the gas system, along with methanated hydrogen.

Second, the two sources cited in the OIR that focus on phasing out of gas assets (Gridworks and EDF) predicate their opinions regarding the need to address phasing out the gas system on the assumption that going all electric is the best way for California buildings to decarbonize, an assumption that is highly questionable given many factors, such as the nascent market in California for electrification technologies like heat pumps and the vulnerability to the electricity

Development Commission and the State Air Resources Board, to consider additional policies to support the development and use in the state of renewable gas that reduce short-lived climate pollutants in the state."

[3] See, e.g., 2017 IEPR pp. 260, 280, 285-286.

[4] OIR, p. 11

system to long term shut downs. While CHBC thinks there are valid reasons to consider electrification of building end uses in some cases, we point out in several sets of comments submitted to the Commission and other agencies over the past year many uncertainties and gaps in the notion that all-electrification is viable or preferable for all California's buildings.[5]

One major issue we will focus on here because it is particularly timely for California, and entirely ignored in both the Gridworks and EDF reports, as well as in the OIR itself, is the fact that more than a quarter of California's population is prone to multi-day planned power shutoffs to mitigate wildfire risk and unplanned shutoffs in the aftermath of wildfire and other disasters.[6] With all-electric buildings comes increased dependence on the electric grid for all building end uses. While this may well carry benefits for some buildings, it also carries significant risks, including to reliable energy service and resilience in the face of wildfire and other disaster prevention and management. Underground gas lines, which may carry increasing amounts of hydrogen, are comparatively less vulnerable with respect to fire than overhead power grids[7] and can help ensure that people are still able to have essential energy services like cooking and heating during power shutdowns, in addition to having easy and ongoing access to gas for long duration back up generation that other greenhouse gas free options like batteries are not technically capable of supplying. In addition to reducing or eliminating the greenhouse gas emissions of such gas, when used in a fuel cell, hydrogen energy can also be criteria pollutant free over its lifecycle.

The OIR background section also bases the conclusion that gas demand will go down on the assumption that "*As retail sellers procure less electricity from gas-fired generators, which comprise approximately 30 percent of the demand for natural gas in California, the gas*

---

[5] Please see CHBC's Comments on CEC Staff June 6, 2019 Workshop on the Natural Gas Distribution Infrastructure and Decarbonization Targets: https://www.californiahydrogen.org/wp-content/uploads/2019/07/CHBC-Comments-on-CEC-Staff-Workshop-FINAL.pdf; CHBC Comments - on E3's Final Project Report, Natural Gas Distribution in California's Low-Carbon Future, submitted November 20, 2019; https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-MISC-03; CHBC Comments on August 27 Joint Agency Workshop on Energy Efficiency and Building Decarbonizationhttps://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-IEPR-06; CHBC's multiple Comments and Reply Comments on R1901001 - Order Instituting Rulemaking Regarding Building Decarbonization https://apps.cpuc.ca.gov/apex/f?p=401:57:0::NO

[6] More than a quarter of California's population is now living in Wildand Urban Interface zones that are especially wildfire prone. https://www.gov.ca.gov/2019/04/23/newsom-warns-of-wildfire-risk-to-urban-communities-across-state/

[7] pp. 4, 14 *The Shakeout Scenario Supplemental Study, Fire after Earthquake*, prepared for the US Geological Survey and CA Geological Survey, C.E. Scawthorn S.E. Spa Risk LLC, 2008. This study states that the cause of about half of fires after earthquakes are electrical related, compared to about a quarter that are gas-related. https://pdfs.semanticscholar.org/ccb9/b7786761464797f25de0abb35bfb30a0d4d0.pdf

throughput assigned to these customers will also decline."[8] This may be true, although the 2019-20 IRP Proposed Reference System Plan shows that this decline may be quite limited – that outside a few OTC plant retirements, almost all gas capacity is retained due to high-peak demand post 2030.[9]

Lastly, at a September 24, 2019 California Energy Commission workshop on near zero electricity,[10] presenting experts from Energy Futures Initiatives (EFI)[11] and E3[12] shared hydrogen and other gaseous fuel solutions will be probably be needed to get to zero carbon electricity, that solar, wind, hydro, flexible loads and batteries, while important, will alone not allow California to achieve its clean energy and climate goals; innovation and investment in additional solutions will be needed, and hydrogen and fuel cells ought to be among those considered. CHBC strongly agrees with this view.

C. Comments on 3.1.1. Track 1A: Reliability Standards

One general comment on Track 1A is that the questions in this section of the OIR are missing consideration of the increasing interconnection between gas and electric system reliability, as it pertains to:

- maintaining reliability during PSPS and long term, post disaster shutdowns, including the need for gas to supply 24/7 multi-day power (e.g. in fuel cells) for backup generation and microgrids (e.g. in fuel cells) and critical services like heat and cooking.
- how hydrogen produced with renewable electricity can displace fossil natural gas in the gas system, reduce or eliminate greenhouse gas emissions in this gas supply, and increase electricity grid reliability by supplying ancillary services, absorbing otherwise curtailed renewable generation for a useful purpose, and providing long duration storage that will

[8] p. 10, OIR
[9] Slide 158, 2019-20 IRP: Proposed Reference System Plan, CPUC Energy Division; November 6, 2019
[10] https://www.youtube.com/watch?time_continue=6075&v=VZp3oSUSmfg&feature=emb_logo
[11] See Slide 10 *Optionality, Flexibility & Innovation - Pathways for Deep Decarbonization in California* TN-229819 Submitted 9/23/2019; https://ww2.energy.ca.gov/2019_energypolicy/documents/2019-09-24_workshop/2019-09-24_presentations.php And 2:06: https://www.youtube.com/watch?time_continue=6075&v=VZp3oSUSmfg&feature=emb_logo
[12] Slide 10, 11 *The Role of Electricity in Decarbonizing CA's Energy System* TN-229820 Submitted 9/23/2019. https://ww2.energy.ca.gov/2019_energypolicy/documents/2019-09-24_workshop/2019-09-24_presentations.php

be increasingly needed as the state transitions to 100% renewable and zero carbon electricity sources, per SB100.

Hydrogen technologies have been shown to hold promise to ensure all weather energy resiliency in California, for example at the Stone Edge Farm microgrid located in Sonoma County, which incorporates hydrogen fuel cells."[13] Discussions and decisions regarding reliability standards ought to incorporate these issues.

D. 3.1.2. Track 1B: Market Structure and Regulations

We have no comments on the questions listed in this section of the OIR.

3.1.3. Track 2: Long-Term Natural Gas Policy and Planning

1. Given the current greenhouse gas-related laws, what is the appropriate gas infrastructure portfolio for gas utilities that operate in California?

a. How much gas infrastructure is needed to ensure reliable gas service from 2019-2030, 2030-2040, and beyond 2045 (Time Horizons)? What type of data should the Commission collect from gas utilities to forecast the expected decline in demand for each customer class on the gas utilities' backbone, local transmission and distribution systems during each Time Horizon?

First, while many scenarios do reflect declining throughput in the gas system due to electrification and efficiency, as pointed out elsewhere in these comments, the gas system will likely remain an important energy carrier for the foreseeable future. Notably, E3 forecasts similar amounts of natural gas in the system in 2050 in a low carbon future regardless of electrification and significant amounts of gas throughput overall in all scenarios.[14]

Second, the CHBC believes that these analyses need to be thorough, rigorous, and up to date in their forecasts of 1) volumes of renewable gas, including renewable hydrogen, 2) the

[13] https://www.environmentalleader.com/2018/02/self-sustaining-microgrid/
[14] p. 41, *Future of Gas Distribution in California's Low Carbon Future*, E3; October 2019

potential for distributed fuel cells fueled by hydrogen as a flexible, dispatchable resource, and 3) the uses of the gas system, including as a long duration storage resource and to supply decarbonize natural gas end uses (e.g. zero carbon electricity generation in thermal gas plants, building energy, industrial energy), in a future in which state meets targets for carbon neutrality, resilience, clean air, and clean energy.

The absence of renewable gas, including renewable hydrogen, from the scope of this OIR so far is a glaring omission and should be corrected in the forecast process undertaken by the gas utilities. Such a view is backed up by E3 in their most recently published draft report on *Natural Gas Distribution in California's Low Carbon Future,* in which they acknowledge that "*comprehensive analysis of the role of distributed fuel cells or the uses for the bulk gas system in a carbon-neutral future is beyond the scope of this analysis and is an area that deserves further investigation*."[15] Notably, Lawrence Berkeley Livermore Laboratory recently found in a report on getting to carbon neutrality in California that "*Gasifying biomass to make hydrogen fuel and CO2 has the largest promise for CO2 removal at the lowest cost and aligns with the State's goals on renewable hydrogen*."[16] Energy Futures Initiative (EFI) also recently identified hydrogen produced via electrolysis as one of eleven breakthrough technologies that are potential major contributors to deep decarbonization in California.[17]

b. For each Time Horizon, during which gas demand is expected to decline, how does the Commission ensure that the gas utilities maintain safe and reliable gas systems at rates that are just and reasonable?

CHBC thinks there needs to be comprehensive analysis and a realistic view of price forecasts for decarbonized hydrogen over time factored into the inquiry of how to maintain system reliability along with just and reasonable rates. This should take into the most recent information from sources like Hydrogen Council, [18] UC Irvine's CEC Commissioned California

[15] *p. 7, ibid.*
[16] p. 5, *Getting to Neutral,* Lawrence Berkeley Livermore Laboratory; January 2020 https://www.llnl.gov/news/new-lab-report-outlines-ways-california-could-reach-goal-becoming-carbon-neutral-2045
[17] *Optionality, Flexibility, and Innovation, Pathways for Deep Decarbonization in California;"* EFI, April 2019 https://energyfuturesinitiative.org/efi-reports
[18] *Path to Hydrogen Competitiveness, A Cost Perspective*, Hydrogen Council; January 2020 https://hydrogencouncil.com/wp-content/uploads/2020/01/Path-to-Hydrogen-Competitiveness_Full-Study-1.pdf

Renewable Hydrogen Production Roadmap, [19] and Bloomberg New Energy Finance.[20]

c. For each Time Horizon, how can the Commission manage the transition of gas infrastructure so that the stranded costs and operations and maintenance expenses caused by declining throughput are mitigated? Should the Commission consider accelerated depreciation or targeted infrastructure retirements?

The CHBC believes that a core strategy to mitigate stranded costs is to repurpose gas infrastructure for decarbonized gas sources, especially decarbonized hydrogen, which among decarbonized gases has the greatest potential to scale. Such an approach is being pursued around the world. For example:

- Los Angeles Department of Water and Power (LADWP), as recently presented to the CPUC,[21] is seeking to convert its Intermountain Power Project from fossil fuels to 100% hydrogen by 2045.
- Meanwhile another 1 GW storage project using the same salt caverns in Utah is also aiming to deploy hydrogen storage and electricity generation among its suite of solutions.[22]
- A power plant in the Netherlands is planning convert a 440 MW gas turbine to 100% hydrogen by 2023.[23] while 100% low Nox hydrogen generation is already being demonstrated in a smaller unit in Japan.[24]
- In Germany, the gas transmission operator recently announced plans to convert 5900 km of existing gas pipeline and storage infrastructure to pure hydrogen,[25] and a pilot testing 20% hydrogen blends is already underway for pipelines feeding

[19] https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=17-HYD-01; https://www.youtube.com/watch?v=OXpaCIZEbFA
[20] As referenced here: https://www.bloomberg.com/news/articles/2020-01-14/green-hydrogen-could-price-gas-out-of-power-markets-by-2050
[21] https://www.cpuc.ca.gov/uploadedFiles/CPUC_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Gas/Natural_Gas_Market/Nov13LADWP.pdf
[22] https://amer.mhps.com/world%E2%80%99s-largest-renewable-energy-storage-project-announced-in-utah.html
[23] https://www.nsenergybusiness.com/projects/nuon-magnum-power-plant/
[24] https://global.kawasaki.com/en/stories/articles/vol74/
[25] https://www.euractiv.com/section/energy-environment/news/germany-floats-draft-hydrogen-strategy-ahead-of-eu-presidency/

400 home heating systems.[26] Germany has determined that repurposing its gas infrastructure for electrolytic hydrogen storage will be key to achieving an all renewable energy supply[27]near carbon neutrality.

- In the United Kingdom (U.K.), Keele University is exploring hydrogen blending into its private gas network to reduce carbon emissions from heating buildings.[28] and the HyDeploy Project is blending 20% hydrogen into the ga system as part of their decarbonization efforts.[29] Also Leeds, one of the largest cities in the U.K., is targeting the conversion of the existing natural gas supply and distribution system to deliver hydrogen to consumers. Blending hydrogen with natural gas across the U.K. is estimated to reduce 6 million tons of carbon annually, the equivalent of taking 2.5 million cars off the roads.[30]
- France is targeting 10% hydrogen penetration in their industrial gas use by 2023 and 20% to 40% by 2028.[31]
- Japan is aiming to be the world leader in decarbonizing by becoming an entirely hydrogen-based society and is adopting a multi-pronged strategy for realizing this vision.[32] Converting existing infrastructure, such as thermal power plants, to run on hydrogen is part of this strategy.[33]
- Australia's national hydrogen strategy also considers repurposing existing infrastructure for hydrogen energy use. High level modeling of pathways to decarbonize the state of Victoria's gas consumption suggests that replacing natural gas use with hydrogen using existing infrastructure may be up to 40% less expensive than full electrification.[34]

---

[26] https://fuelcellsworks.com/news/hydrogen-levels-in-german-gas-distribution-system-to-be-raised-to-20-percent-for-the-first-time/
[27] See p. 9 https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/germany_2050_a_greenhouse_gas_neutral_country_langfassung.pdf
[28] https://networks.online/gphsn/news/1000904/trial-explore-blending-hydrogen-gas-network
[29] https://networks.online/gphsn/news/1000904/trial-explore-blending-hydrogen-gas-network
[30] https://www.telegraph.co.uk/business/2018/01/06/hydrogen/
[31] https://fuelcellsworks.com/news/french-minister-unveiled-his-100m-hydrogen-plan/
[32] https://www.meti.go.jp/english/press/2017/pdf/1226_003a.pdf
[33] pp. 20, 21, A Strategic Roadmap for Hydrogen and Fuel Cells, Hydrogen and Fuel Cell Strategy Council; March 12, 2019 https://www.meti.go.jp/english/press/2019/pdf/0312_002b.pdf
[34] p. 30, *Hydrogen for Australia's Future*, Hydrogen Strategy Group https://www.chiefscientist.gov.au/sites/default/files/HydrogenCOAGWhitePaper_WEB.pdf

d. Should the Commission establish parameters to determine when aging infrastructure, such as assets that are near the end of their useful lives, should be replaced to meet reliability needs?

While CHBC does not have a specific opinion on parameters that should be established, we generally agree that aging gas infrastructure should be replaced at the end of its useful life with hydrogen compatible infrastructure.

2. Should the Commission reconsider gas rate design and cost allocation methods, particularly marginal cost allocation methods versus embedded cost methodologies, in subsequent General Rate Cases? Do rate design changes raise affordability and other economic concerns, especially for disadvantaged residential customers, and what criteria should the Commission apply when considering this issue?

We have no comment at this time.

3. **How should the Commission manage the natural gas transition indicated by the long-range portfolio modeling in the Commission's Integrated Resource Plan program, in which gas- fired generation undergoes economic retirements but also remains needed in the short term for reliability purposes?**

We believe that remaining gas-fired generation should transition to zero carbon and renewable gas, such as hydrogen produced using renewable or zero carbon sources. This is in keeping with California's goal to achieve carbon neutrality.

4. **What utility workforce considerations are raised by a transition away from natural gas, and how should these be included in the long-term gas planning process?**

By maintaining gas infrastructure and upgrading it for use by renewable and zero carbon gas, California will be able to keep the existing gas infrastructure workforce, while also adding value to it and creating new industries with new jobs that have long term viability. Similarly to

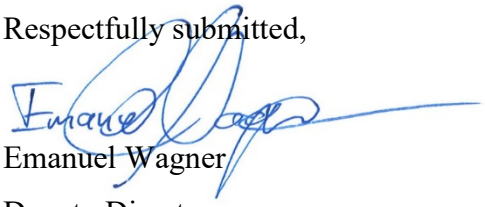
how the state has lead the way on green jobs in the renewable electricity sector and demonstrated that cleaner power means more not fewer good jobs, California could pioneer such programs in the renewable gas industry with parallel programs and incentives for workforce training, public projects, and policies that support infrastructure upgrades and other industry market development.

IV. Conclusion

The CHBC thanks the Commission for the opportunity to submit these comments and looks forward to working with you to establish better understanding of the essential role of hydrogen and its derivatives in enabling state climate, clean air, clean energy and resilience goals and in future gas system planning.

Dated: February 26, 2020

Respectfully submitted,



Emanuel Wagner
Deputy Director
California Hydrogen Business Council