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CHBC Comments on 2019 IEPR Workshop on the Revised Natural Gas Price Forecast and Draft Outlook

Additional submitted attachment is included below.

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California Hydrogen Business Council Comments
on 2019 IEPR Workshop on the Revised Natural
Gas Price Forecast and Draft Outlook Electricity
Modeling and Results

November 11, 2019

I. INTRODUCTION

The California Hydrogen Business Council (CHBC) ¹ appreciates the California Energy Commission (CEC) holding a public workshop on the Revised Natural Gas Price Forecast and Draft Outlook Electricity Modeling and Results, and for providing this opportunity to comment. The two major points made in our comments are summarized as follows:

- A. We welcome the inclusion of hydrogen storage and pipeline injection in the discussion of CEC compliance with AB 1257's long-term infrastructure reliability policy provision and request that this lead to meaningful recommendations in the final IEPR.**
- B. We also encourage the CEC to evaluate in authoritative, peer-reviewed scientific analysis – or in consultation with the California Air Resources Board – optimal pathways to fully decarbonize the gas system with renewable and zero carbon gas, including hydrogen from renewable and zero carbon feedstocks, in order to enable the state goal of achieving carbon neutrality economy wide.**

A detailed explanation of these points is 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 are listed here: www.californiahydrogen.org/aboutus/chbc-members.

II. COMMENTS

A. We welcome the inclusion of hydrogen storage and pipeline injection in the discussion of CEC compliance with AB 1257’s long-term infrastructure reliability policy provision and request that this lead to meaningful recommendations in the final IEPR.

We agree with the presentation that hydrogen impacts on the natural gas system should be addressed and support the ideas put forth in the presentation that these impacts ought to include those associated with SB 1369’s provisions on electrolytic hydrogen (“Power-to-Gas”) for storage, along with related issues, including hydrogen blending limits. To take this a step further into meaningful state action, we recommend that the final IEPR:

- Encourage the California Public Utilities Commission (CPUC) and other agencies to implement SB 1369, per the law’s mandate. The bill was signed into law more than a year ago, but to date no rulemaking or other implementation mechanism has been undertaken.
- Urge the CPUC to move forward on a scientific, technical study on hydrogen blending limits and using this as a basis to set hydrogen injection standards and protocols in the next phase of the Order Instituting Rulemaking to Adopt Biomethane Standards and Requirements, Pipeline Open Access Rules, and Related Enforcement Provisions (R.1302008). Doing so would be in line with interest expressed by the Commission at the May 16, 2019 hearing to adopt the Decision Regarding Biomethane Tasks on SB 840, along with several California policies.² The presentation on AB 1257 implementation mentions that “Existing natural gas infrastructure can feasibly transport 5% to 15% H2 blends.”³ This has not, however, been evaluated yet in an evidence-based technical study in California. Other regions around the world have been studying and demonstrating hydrogen injections into pipelines in concentrations up to 100%, but a formal process has not yet been undertaken in the state of California. We, therefore, strongly encourage the 2019 IEPR to include such an effort among its recommendations.

B. We also encourage the CEC to evaluate in authoritative, peer-reviewed scientific analysis – or in consultation with the California Air Resources Board – optimal pathways to fully decarbonize the gas system with renewable and zero carbon gas, including hydrogen derived from renewable and zero carbon feedstocks, in order to enable the state goal of achieving carbon neutrality economy wide.

² See pp. 7-16, *Comments by the California Hydrogen Business Council on the Alternative Proposed Decision Regarding Biomethane Tasks in Senate Bill 840*, May 2, 2019 <http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M287/K382/287382169.PDF>

³ p. 9, CEC Compliance with AB 1257

Experts are predicting that California will rely on gas for the foreseeable future, even in high electrification scenarios.⁴ We believe that California ought to aim to decarbonize the gas sector, similarly to its efforts in other sectors like electricity. To that end, we urge the CEC to undertake an authoritative, peer-reviewed scientific analysis – or to do so in consultation with the California Air Resources Board - of optimal scenarios for decarbonizing the gas system with renewable and zero carbon sources, including hydrogen from renewable and zero carbon feedstocks. And we request that this be included among the 2019 IEPR’s recommendations for evaluating the future of California’s gas system.

This would be aligned with the recommendations of national and international energy research and policy frameworks, which are calling for renewable hydrogen and its derivatives as core elements of approaches to achieve deep decarbonization or carbon neutrality/carbon negativity across sectors. For example:

- **North America/United States** – Part of the U.S. Department of Energy’s multi-sector approach to developing advanced energy solutions is its H2@Scale Initiative, which is committed to exploring the potential for wide-scale production and utilization of hydrogen in the U.S. to foster grid resiliency, jobs, and other benefits. Demonstrating its continued commitment, the program recently announced \$31 million of funding to research and develop electrolytic hydrogen for multiple applications.⁵ Showing that advancing hydrogen carries bipartisan national support, both of the former U.S. Department of Energy Secretaries under President Obama are also focusing on renewable hydrogen as a key component of their continued effort to build a clean energy future. Secretary Chu advocates for storing electrolytic hydrogen produced with renewables in underground resources, in order to overcome the limitations of batteries to supply the scale of storage needed in a climate safe future.⁶ He also recently forecast that the falling cost of renewable electricity holds promise to make renewable electrolytic hydrogen cost competitive with hydrogen produced with natural gas.⁷ Secretary Moniz recently oversaw a report that identified hydrogen as among the handful of “breakthrough technologies” that are “major potential

⁴ pp. 5-6, Fig 20 p. 54 E3’s draft report on the *Future of Natural Gas in Distribution* <https://ww2.energy.ca.gov/2019publications/CEC-500-2019-055/index.html>; In the 9/23/19 IEPR Workshop on Near Zero Emissions Electricity, the presenter from the Energy Futures Initiative (EFI) also made the case that hydrogen will be among the fuels needed to ensure stable electricity supply, as California transitions to predominantly variable renewable power, as well as decarbonization in other sectors. Presentation: https://ww2.energy.ca.gov/2019_energyppolicy/documents/2019-09-24_workshop/2019-09-24_presentations.php More background on EFI’s assessment that hydrogen is among the breakthrough technologies needed to reach a carbon neutral future in CA can be found here: https://static1.squarespace.com/static/58ec123cb3db2bd94e057628/t/5ced6fc515fcc0b190b60cd2/1559064542876/EFI_CA_Decarbonization_Full.pdf

⁵ <https://www.energy.gov/eere/fuelcells/h2scale>

⁶ *Obama Secretary Flat on Battery Plants, The Australian*, February 1, 2018

⁷ *Get Ready For 1.5¢ Renewable Electricity, Steven Chu Says, Which Could Unleash Hydrogen Economy*, Jeff McMahon, *Forbes*, April 2, 2019

contributors to California’s deep decarbonization over the long-term,” adding that “(t)he work must pick up the pace today and be sustained to support their development.”⁸

Large scale hydrogen projects are starting to be realized in North America, with a 1 GW storage project that will include hydrogen storage recently announced to be developed in Utah.⁹ A 2.5 MW electrolytic hydrogen storage project is also already up and running in Ontario Canada, procured by national transmission grid operator to help integrate renewables and stabilize the grid.¹⁰

- **European Union** - The European Commission issued an extensive report in November 2018 examining pathways to greenhouse gas neutrality for the European Union, which looked at eight scenarios and found that the only ways to achieve deep decarbonization of 90+% greenhouse gas emissions below 1990 levels by 2050 involve aggressively pursuing diversified approaches that focus not only on electrification nor decarbonized gaseous fuels like hydrogen, SNG, or bio-based gas alone, but rather all of the above, along with efficiency, a circular economy, and smart technologies, and that net carbon neutrality by 2050 and net negativity thereafter would require this same strategy, in addition to additional carbon capture or advanced management of land sinks.¹¹

We recommend California look closely at comprehensive, science-based examples like the European Union scenarios and adopt a similarly in-depth, holistic approach to analysis, rather than framing the debate between electrification and renewable gas, which we believe sets up an oversimplified false choice, as previously described. To ensure California continues to remain on the vanguard of global climate leadership, we urge California as a separate but related effort, to adopt diversified approaches to investigating deep decarbonization strategies that, like the European Union’s, pursue multiple pathways to decarbonization, including electrification *and* a wide range of renewable gases and fuels, such as renewable hydrogen and its derivatives, among other promising tools.

⁸ *Optionality, Flexibility, and Innovation – Pathways for Deep Decarbonization in California*, Energy Futures Initiative (Secretary Ernst Moniz, Founder & CEO); April 2019

⁹ <https://www.greentechmedia.com/articles/read/utah-aims-to-shatter-records-with-1000-mw-energy-storage-plant#gs.iwx5ic>

¹⁰ <https://www.hydrogenics.com/2018/07/16/north-americas-first-multi-megawatt-power-to-gas-facility-begins-operations/>

¹¹ *A Clean Planet for all - A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy*, European Commission, November 28, 2018 Specifically, the first five scenarios focus on impacts of specific technology pathways, varying in the intensity of application of electrification, hydrogen, electrolytic fuels, end user energy efficiency, as well as the role of a circular economy, as actions to reduce emissions. The study found that while all of these can likely achieve 80% greenhouse gas reductions below 1990 levels, none can achieve deeper decarbonization. To reduce emissions at least 90% below 1990 levels, all five pathways must be aggressively pursued in combination (the sixth pathway). To achieve net carbon neutrality followed by net carbon negativity, however, the seventh and eighth pathways studied add to the combination scenario either negative emissions technology in the form of bioenergy combined with carbon capture and storage, or reliance on a circular economy, change in consumer choices that are less carbon intensive, and strengthening the land use sink to reduce the need for negative emissions technologies.

- **Asia – Japan** is aiming to be the world leader in decarbonizing by becoming a hydrogen-based society and is adopting a multi-pronged strategy for realizing this vision.¹² Showcasing this ambition, the 2020 Olympics in Japan aims to run entirely on hydrogen. A report prepared for Japan by the International Energy Agency declares: *“This is a critical year for hydrogen. It is enjoying unprecedented momentum around the world and could finally be set on a path to fulfil its longstanding potential as a clean energy solution. To seize this opportunity, governments and companies need to be taking ambitious and real-world actions now.”*¹³ California ought to avoid the opposite pathway of inaction.
- In **China**, the “father” of China’s electric vehicle industry and vice chairman of China’s national advisory body for policy making, Wan Gang, who convinced Chinese leaders twenty years ago to adopt battery electric vehicle technology, is now saying the country should be looking into “establishing a hydrogen society” and is seeking to have China similarly become a global leader in developing hydrogen technology.¹⁴
- The **South Korean** government also reportedly has a US\$2.33 billion public-private investment plan to accelerate hydrogen fuel cell infrastructure, manufacturing capabilities and technology development for transportation and stationary applications.¹⁵
- Hydrogen is also gaining interest in the **Middle East**, and a multi-megawatt solar hydrogen project has broken ground in Dubai,¹⁶ among other projects.
- Hydrogen is also on the national agenda of **Australia**. The nation’s Chief Scientist states that the country’s “vision is a future in which hydrogen provides economic benefits to Australia through export revenue and new industries and jobs, supports the transition to low emissions energy across electricity, heating, transport and industry, improves energy system resilience and increases consumer choice.”¹⁷ By 2030, it is estimated that the Australian hydrogen industry could be worth over a billion dollars and provide 2,800 jobs.¹⁸ Notably, a 2017 study by the Australian Gas Infrastructure Group with input from Deloitte comparing an electrification to a hydrogen conversion pathway to decarbonizing the state of Victoria’s gas consumption found that although costs of long-term hydrogen storage need to be better understood, modeling showed that the hydrogen conversion pathway would cost about 40% less than

¹² https://www.meti.go.jp/english/press/2017/pdf/1226_003a.pdf

¹³ P. 1, *The Future of Hydrogen, Seizing Today’s Opportunities, Executive Summary and Recommendations*, IEA, June 2019

<https://webstore.iea.org/download/summary/2803?fileName=English-Future-Hydrogen-ES.pdf>

¹⁴ <https://www.supplychainbrain.com/articles/29843-chinas-father-of-electric-cars-says-hydrogen-is-the-future>

¹⁵ p. 56, *Hydrogen for Australia’s Future*, Hydrogen Strategy Group (Chaired by Australia Chief Scientist, Dr. Alan Finkel); August 2018

¹⁶ <https://gulfnews.com/uae/first-green-hydrogen-project-breaks-ground-in-dubai-1.1549175502065>

¹⁷ p. i, *ibid.*

¹⁸ p. 12, *ibid.*

the full electrification pathway, largely because of the flexibility of electrolysis to meet gas demand, lower long-term requirement for electricity storage through batteries or hydro, and lower network upgrade costs because of the use of the existing gas infrastructure.¹⁹ Indeed, leaders are exploring the role of hydrogen to enable use of much more than 100 percent renewable power in the near term, and as the lowest cost and most effective method of powering all sectors – including electricity, transportation and buildings – with renewable power.²⁰

- **New Zealand** also has recently released a vision develop hydrogen as a core strategy for transitioning to a low emissions economy.²¹

III. CONCLUSION

The CHBC thanks the CEC for consideration of these comments and looks forward to working with you to advance hydrogen as a key enabler of decarbonizing energy in California, including the gas system.

Regards,



Emanuel Wagner

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California Hydrogen Business Council

¹⁹ Ibid, p. 30

²⁰ <https://reneweconomy.com.au/south-australia-unveils-plans-for-100-renewable-hydrogen-economy-58723/?fbclid=IwAR17hiAPRFoAc0Dm0z19-Vep20bXetvdIVJkdkI6Bd3qE5wjwYnJWkqLTNc>

²¹ <https://www.mbie.govt.nz/dmsdocument/6798-a-vision-for-hydrogen-in-new-zealand-green-paper>