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Comments on the Staff Workshop on the Implementation of the Clean Hydrogen Program

Additional submitted attachment is included below.

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December 14, 2022

Jonah Steinbuck, Deputy Director
Energy Research and Development Division
California Energy Commission
Docket Unit, MS-4
Docket No. 22-ERDD-03
715 P Street
Sacramento, California 95814

Subject: Comments on the Staff Workshop on the Implementation of the Clean Hydrogen Program

Dear Jonah Steinbuck:

Southern California Gas Company (SoCalGas) appreciates the opportunity to provide comments on the December 1, 2022, California Energy Commission (CEC) Staff Workshop on the Implementation of the Clean Hydrogen Program. SoCalGas commends and supports the CEC's work in exploring how hydrogen can be a crucial tool in enabling California's ambitious decarbonization goals through the Clean Hydrogen Program created under Assembly Bill (AB) 209. We also acknowledge and appreciate the CEC's efforts to gather the input of a diverse set of viewpoints from utilities, researchers, businesses, and governmental organizations. Such an approach contributes to the quality and breadth of the CEC's new Clean Hydrogen Program and SoCalGas looks forward to continuing collaboration with stakeholders in these efforts.

A foundational point in the consideration on the potential future role of hydrogen is captured in the California Governor's 2021 Report on California's Electricity System of the Future, which asserts, "[t]he technology exists today to achieve California's clean energy goals, but we need to build new resources at an unprecedented pace and scale, and we need to start now."[1] We strongly agree with the Governor's statement. SoCalGas submits that one such primary technology is hydrogen and its potential to offer increasingly important capabilities in supporting a reliable and increasingly decarbonized energy system. Similarly, the gas system infrastructure has the potential to facilitate the integration of hydrogen molecules as a resource in California's energy

[1] *See* "California's Electricity System of the Future", Filsinger Energy Partners, https://www.gov.ca.gov/wpcontent/uploads/2021/07/Electricity-System-of-the-Future-7.30.21.pdf, p.6

infrastructure. To that end, SoCalGas offers the following viewpoint on the Clean Hydrogen Program for the CEC's consideration:

Effective clean hydrogen transportation techniques are imperative to consider when attempting to create a successful hydrogen supply chain in California.

The proposed program scope is focused on opportunities to accelerate clean hydrogen production and use; however, the transportation of hydrogen is every bit as important as its production. According to Bloomberg NEF, approximately **85 percent** of hydrogen is made close to the point of use, but in the future, supply and demand may decouple because of i) cost differences between local production and imports and ii) a lack of space to produce enough hydrogen locally.[2]

Large-scale hydrogen deployment will require efficient and cost-effective transportation, storage, and supply chain infrastructure strategically planned to connect production (supply) sources to demand centers necessary to build a resilient and deep market for hydrogen production and end uses at scale. Cost-effective, safe, and resilient supply chain pathways are critical in integrating hydrogen supply and demand and to enhance overall system flexibility. The connecting infrastructure will be critical to support local energy demand centers, regional industrial and commercial hubs that consume hydrogen, and eventually national and international integrated hydrogen carrier networks.

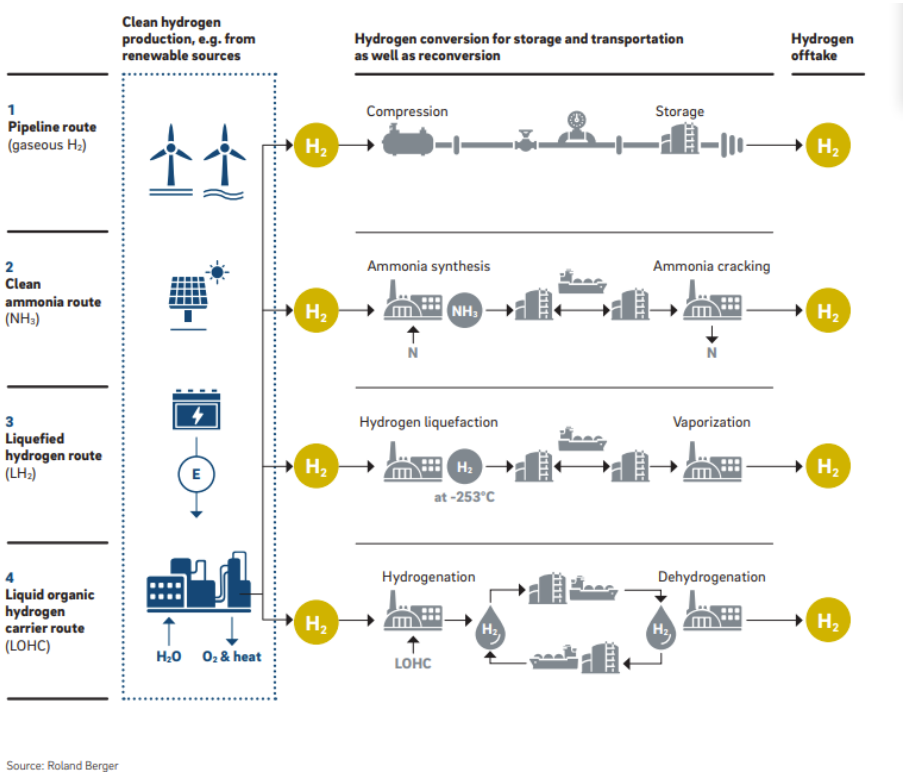
As traditional fuels become more limited in their ability to achieve emission reduction targets, methods of transporting, storing, and delivering low-carbon energy sources such as hydrogen will likely play a key role towards a future decarbonized energy ecosystem in California. Multiple supply chain modalities will most likely coexist to help scale the hydrogen economy, with ultimate success determined by cost-economic potential, market adoption speed, safety, and supply reliability.

In addition to serving local and intercity hydrogen demand, as future demand increases for hydrogen supplied by renewable sources from locations far away from demand centers, transporting hydrogen via pipelines using compressed gaseous and liquified hydrogen and other carrier modes such as ammonia or methanol over longer distances might become attractive.

[2] *See* Bloomberg NEF, *Hydrogen: The Economics of Pipeline Transport*, May 31, 2022. Report created by Bloomberg NEF Contributor Adithya Bashyam.

According to recent research conducted by Roland Berger, "[g]etting hydrogen from global production sites to end users at the lowest possible cost will be key to the success of the green economy…"[3] Despite that conclusion, investments in clean hydrogen to date have tended to focus on hydrogen production and end user applications, while "transportation" has been largely overlooked.[4] **Figure 1** below illustrates the most common routes for large-scale hydrogen transportation. Further, **Figure 2** below illustrates that transport cost of hydrogen is mainly a function of volume transported and distance; increases in volume or distance make pipelines the most cost-effective route, ranging from distribution pipelines to transmission pipelines as the volume transported increases.[5]

Figure 1: *The Most Common Routes For Large-scale Hydrogen Transportation*[6]



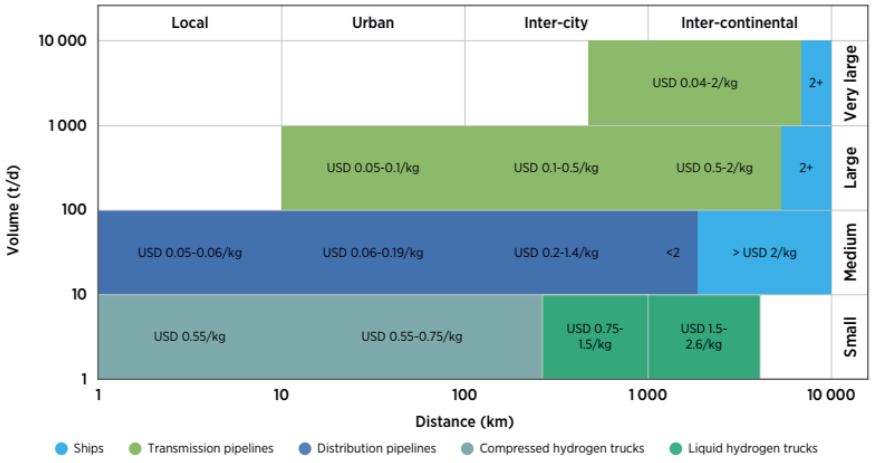
[3] *See* Roland Berger, Hydrogen Transportation | The key to unlocking the clean hydrogen economy, October 2021, at p. 4, available at: https://www.rolandberger.com/publications/publication_pdf/roland_berger_hydrogen_transport.pdf.

[4] *See* Roland Berger, Hydrogen Transportation | The key to unlocking the clean hydrogen economy, October 2021, at p.6

[5] *See* International Renewable Energy Agency (IRENA), Global Hydrogen Trade to Meet the 1.5°C Climate Goal: Technology Review of Hydrogen Carriers, April 2022, at p. 17, available at: https://www.irena.org/publications/2022/Apr/Global-hydrogen-trade-Part-II.

[6] *See* Roland Berger, Hydrogen Transportation | The key to unlocking the clean hydrogen economy, October 2021, at p. 10, available at: https://www.rolandberger.com/publications/publication_pdf/roland_berger_hydrogen_transport.pdf.

Figure 2: *Hydrogen Transport Cost Based on Distance and Volume*[7]



Notes: A typical pressure for compressed hydrogen trucks is 500 bar for a 1.1 t capacity (Wulf et al., 2018).
Source: (Energy Transition Commission, 2021a; Li et al., 2020).

Although the CEC chooses not to directly fund the transportation of clean hydrogen through the new Clean Hydrogen Program, CEC Staff should consider projects and applications that include an efficient and effective transportation component. As summarized above, research shows that the transportation of hydrogen is an important component of the overall cost of clean hydrogen at the point of use.[8]

Conclusion

As we collectively pursue California's energy system decarbonization, it is imperative that we consider the public interest; policymakers, market participants, and stakeholders should collaboratively prioritize and help scale clean hydrogen as part of a balanced portfolio of clean energy resources in California. It is important to develop commercial pathways to develop and scale up the clean hydrogen supply chain. SoCalGas looks forward to contributing and advancing those efforts by working with the CEC, the CPUC, and sister agencies to define solutions for advancing the clean hydrogen supply chain.

Respectfully,

/s/ Kevin Barker

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[7] *See* International Renewable Energy Agency (IRENA), Global Hydrogen Trade to Meet the 1.5°C Climate Goal: Technology Review of Hydrogen Carriers, April 2022, at p. 17, available at: https://www.irena.org/publications/2022/Apr/Global-hydrogen-trade-Part-II.

[8] *See* Reuters, Hydrogen uses to be determined by delivery methods, October 12, 2022, available at: https://www.reuters.com/business/energy/hydrogen-uses-be-determined-by-delivery-methods-2022-10-12/.