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CHC and CHBC comments regarding the 2022 IEPR update

Additional submitted attachment is included below.

California Hydrogen Coalition

CALIFORNIA HYDROGEN BUSINESS COUNCIL

Hydrogen Means Business in California!

December 7, 2022

Vice Chair Siva Gunda
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Joint Comments following the November 9th "2022 Integrated Energy Policy Report Update"

The California Hydrogen Coalition (CHC) is a 501(c)(6) non-profit organization formed in 2019. CHC is dedicated to enabling California's transition to zero emission vehicles by expanding the availability of reliable, convenient, and affordable hydrogen fueling. Our partners include vehicle manufacturers of all weight classes, station developers, and hydrogen producers.

The California Hydrogen Business Council (CHBC) is a 501(c)(6) non-profit organization comprised of over 140 companies and agencies involved in the business of hydrogen. The CHBC's mission is to advance the commercialization of hydrogen in the energy sector, including transportation, goods movement, and stationary power systems, to reduce emissions and help the state meet its decarbonization and air quality goals. CHBC enhances market commercialization through effective advocacy and education of policymakers directly and through coalition building.

Introduction

We appreciate the California Energy Commission's (CEC) recognition that California will need gas for reliability and other purposes, and its progressive, forward-thinking leadership for California's clean energy transition – the CEC's Integrated Energy Policy Report (IEPR) is critical in this regard. Our organizations strongly support the focus on zero-carbon fuels such as renewable and clean hydrogen.

Our members share the State's climate, air quality, and energy goals, which are not easily achievable. The solutions are complex, and all have their challenges to overcome the inertia of the built environment developed over the last 150 years of industrialization. With great effort the CEC has worked to begin the transition away from fossil-based energy. The CEC and electric utilities have partnered in this effort. The hydrogen industry would like to work toward a similar relationship of mutual trust and collaboration with the CEC and utilities to achieve our shared goals.

In the next year there are several forward-looking analyses CEC has been tasked by the legislature to complete. Our desire is for those analyses to create a comprehensive understanding of hydrogen and hydrogen end-uses across California's energy economy. We are concerned that portions of the draft IEPR appear to preempt the development and outcomes of these reports. In these comments we offer suggestions to provide context and fairness to these statements. We want to partner and collaborate

with the Commission and look forward to working with commissioners and staff to achieve the necessary outcomes for achieving carbon neutrality.

Beyond the hydrogen specific analyses, the CEC has recently introduced a grant opportunity, GFO-22-304, to assess the role of hydrogen in decarbonizing California's electric system. Our members and electric utility partners are excited to participate in this opportunity and we believe the resulting assessments will help address the emerging issues discussed in the Draft IEPR as it relates to grid reliability, resource adequacy, transitioning the existing thermal fleet, and long-duration energy storage. Additionally, we believe there is a significant role for stationary fuel cells in applications ranging from firm power to smaller backup generation. Recent wildfires and peak summer demand crises present an opportunity that we hope to explore further with CEC in the next year.

Barriers to Widespread Adoption

There are many barriers necessary to achieve the current penetration of renewable electricity on today's grid and countless others before we achieve 100% clean and renewable energy. We believe hydrogen will serve an integral role in California's energy and environmental goals. As such investments should be commensurate with the initial investments in other promising tools like wind and solar.

Unfortunately, delayed and inconsistent signals over the last decade have caused issues with the initial deployment of hydrogen refueling stations - since 2015 fuel cell vehicle manufacturers have warned the CEC and Air Resources Board (ARB) that lagging station development would impact the deployment of vehicles. As it stands, today's fueling network of 56 fueling stations is just above the 2015 goal of 51 stations and a far cry from the 100 stations predicted by 2020. This has prevented scaling of FCEVs in the transportation sector. GFO-19-602 did have the impact of motivating private sector investment in hydrogen production. However, projects at this scale take time to build and permit so there is lag in the system – the current state is not ideal nor is it the end state.

Other barriers and critiques presented in the draft IEPR can be overcome with ambition to achieve scale and sound policy. As we grow the clean and renewable hydrogen sector, we ask that CEC avoid the perpetuation of fear, uncertainty, and doubt (FUD) of hydrogen that is unique compared to other decarbonization tools that deliver zero-emission end uses. Previous IEPR critiques promote and assume decarbonization technologies can overcome their challenges, scarcity, manufacturing, scalability, and upstream emissions. We ask for equitable analysis and treatment of clean and renewable hydrogen production – and hydrogen end uses that other zero-emission and significantly decarbonized alternatives receive with the context of long-term benefits and needs to achieve scale.

Arguments presented in the draft IEPR are incomplete in their analyses and in some cases simply incorrect. For example, stating hydrogen is a climate pollutant is scientifically incorrect. No governmental body recognizes hydrogen as a pollutant. This leads to significant concerns with the inclusion of other weighted analyses based on invalid conclusions.

Binding commitments in California and by our climate partners to achieve carbon neutrality is the key driving the potential and investment of the hydrogen sector. The Scoping Plan Update has clearly indicated that renewable and clean hydrogen is critical to California's ability to achieve carbon neutrality. Our associations and membership are willing partners in this energy transition. Hydrogen is not only a decarbonized energy carrier and fuel but also an emissions mitigation strategy for biogenic methane and excess biomass that is necessary to achieve California's climate goals.

Development of a Carbon Intensity Framework

We encourage the CEC to work with the hydrogen industry to develop a carbon intensity (CI) framework to appropriately categorize all production pathways for hydrogen based on environmental attributes. Each production pathway for hydrogen includes a feedstock and an energy source. The CI for any given pathway is driven by these two factors – for example, the CI of production pathways that utilize renewable feedstocks could be high if fossil fuels are used for the primary production process energy source. Electrolytic pathways that utilize water as a feedstock would still have a very high CI if the electricity used for the electrolysis process were produced from fossil fuels. A system of characterizing the resulting hydrogen based on a CI framework rather than color coding (e.g., grey, brown, blue, green, turquoise, yellow, pink, red, etc.) allows for more accurate accounting and comparison.

This effort should be conducted in partnership with the California Air Resources Board (CARB), leveraging their emissions expertise and the low-carbon fuel standard pathways development, as well as other state agencies like the California Public Utilities Commission to create a common lifecycle analysis standard for eligible hydrogen and a CI ceiling that aligns with California's decarbonization goals. A CI framework in California will ensure technology neutrality and encourage competition between various hydrogen production routes that meet the required CI at the lowest costs. In the longer term, a CI framework will provide a mutually agreed approach for a certificate and tracking framework for consumers to track hydrogen's origin and environmental attributes. In short, a well understood and commonly accepted CI framework is foundational to tracking and compensating renewable hydrogen projects for their environmental attributes and is thus foundational to a sustainable business value proposition that can attract investment capital.

Renewable hydrogen pathways serve as an important mitigation strategy that should be accounted for in the IEPR as it is in the Scoping Plan. The ability for hydrogen demand to support the capture and utilization of biogenic methane underscores the importance of developing strong economic signals for production and use of hydrogen in high-value markets like transportation. We note that that Lawrence Livermore National Laboratory states, “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.”[1] The report goes on to state that, “the hydrogen scenario is clearly favorable above the others” and “[t]he success of the gasification scenario, for example, depends largely on the value of hydrogen as a transportation fuel.”[2]

Furthermore, the ability to unlock 100% renewable and clean energy 24-hours a day is more cost-effective and achievable with renewable hydrogen. Regardless of if the sun is shining, the wind is blowing or if we’re in a drought, the ability to transform renewable electrons to renewable hydrogen allows California to move zero-carbon energy through time and space, for use when most needed. All told, development of an objective definition that focuses on feedstocks and energy sources will allow for diversity in production pathways lending themselves to innovation, competition, and different regional approaches that can deliver decarbonized energy, preserve value of renewable production, and in many cases mitigate harmful emission sources while aiding in compliance to our State’s environmental goals. The ability to cost-effectively store months of renewable energy will also aid in reliability and security of energy supply.

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[1] “Getting to Neutral Options for Negative Carbon Emissions in California,” ClimateWorks Foundation, Lawrence Livermore National Laboratory, pg. 5

[2] ibid, pg. 140

Recommendations

The following recommendations are an expression of our shared desire for deep collaboration with the Commission. Below we seek to provide suggestions for context and unbiased treatment of hydrogen in the draft IEPR.

Contextualize Leakage and Climate Impacts

The mechanisms described in 2006[3] and 2021 by Dr. Derwent, reiterated in the IEPR cited study by the Environmental Defense Fund, about how hydrogen in the atmosphere can have an indirect global warming impact are accurate. However, just as oxygen interacts with criteria pollutants in the formation of tropospheric ozone – hydrogen is not a greenhouse gas or climate pollutant because it interacts with methane pollution.

Hydrogen can react with chemical species that would otherwise react with and eliminate atmospheric methane, a global warming gas. This effect can increase the persistence of methane in the atmosphere thereby creating a global warming impact. In addition, hydrogen can react in the upper atmosphere to form water, which also has a global-warming impact.

However, the magnitude of the impact of these mechanisms depends on the amount of hydrogen and methane in the atmosphere. Managing methane leakage, as required in SB 1383 (Lara, Chapter 395, Statutes 2016) and implemented in CARB's Short-lived Climate Pollutant Strategy, can eliminate most of the indirect impacts of hydrogen leakage.

If hydrogen was used in substitution for current fossil fuels that release methane, CO2, and other GHG emissions into the atmosphere and it leaked at a "reasonable" rate of 1%, utilizing hydrogen would reduce climate impacts by 99.4%; even if it leaked at an "unreasonable" rate of 10% it would still reduce climate impacts by 94%.[4] IEA's high-risk scenario predicts a 5.6% leakage indicates a 96.6% reduction in GHG emissions from leakage if decarbonized hydrogen is displacing fossil fuels.[5]

We agree that leakage is expensive, and the industry is working to ensure that losses are minimal for economic reasons, however the environmental risks are overstated, and absent context will be misconstrued. We can engineer our way to reducing the economic issue; there are coatings and solutions that mitigate those concerns. Utilization of a dedicated or retrofitted pipeline will further reduce any leakage risks, emphasizing the need to develop policy and act quickly on constructing this network. As infrastructure for the hydrogen economy matures, leakage risks are minimized, and biogenic methane will be a valuable feedstock for renewable hydrogen production – the combination of these factors supports maturation of hydrogen infrastructure to rapidly decarbonize gas infrastructure.

Efficiency – Important but not Omnipotent

The false dilemma presented in the draft IEPR referencing editorial commentary that compares efficiency of battery electric vehicle and fuel cell electric vehicles is misleading. The editorial assessment asserted as fact in the IEPR is seemingly meant to justify the lack of investment or urgency to invest in hydrogen and fuel cells.

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[3] Derwent, Richard, et al.,2006. Global Environmental Impacts of the Hydrogen Economy

[4] Ibid

[5] Fan, Zyhiyuan, et al., July 2022 Columbia Study of Hydrogen Leakage,

We can accept that tank to wheel efficiency of a BEV is greater than a FCEV and FCEVs are significantly more efficient (over 2.5X) than the light-duty gasoline and diesel vehicles that they replace. Critique absent context in this scenario delays the deployment of technologies necessary to achieve carbon neutrality and immediate and near-term criteria and air toxic emission reductions.

Furthermore, in order approximate the scenario for BEVs it would be economically infeasible requiring all BEVs to charge when the grid is only 100% renewable, thus requiring upwards of $78,000,000,000 in public charging infrastructure to support midday charging. For comparison, adding hydrogen to most of the retail gas stations in California would cost just over $8,000,000,000. The primary consumer benefit of BEVs and reason initial adoption has been successful is the ability and typical behavior of at home charging during off-peak hours. These hours are when the grid is at its least efficient and has its highest carbon intensity. A complete analysis would need to account for the combined cycle natural gas fleet, at 45-53% efficiency, that is the major evening resource for at-home BEV charging. Time of use, grid resources, and even ambient temperatures change the entire dynamic of the efficiency argument. Additionally, if renewable electricity is stored – voltage converted up/down or AC-DC/DC-AC a few times – the efficiency arguments are not as persuasive.

We believe the Renewable Portfolio Standard will drive additional reduction in the grid CI, we also believe Low-carbon Fuel Standard and other policies will continue to drive CI reductions in hydrogen. Efficiency is a factor in these reductions but not the sole factor. For these reasons hydrogen and fuel cell proponents focus on lifecycles, carbon emissions, duty-cycles, and zero-tailpipe emissions. Efficiency is not the sole determinant of a techno-economic analysis or justification of why or why not to use hydrogen. In the real-world individuals, households, and businesses use complex, sometime nonlinear decision processes that go beyond a single factor analysis of efficiency to justify adoption of a technology or purchase of a vehicle. Clearly efficiency is not the highest-ranking factor as evidenced by the most popular vehicles sold in CA and the USA. As the CEC's sister agency, CARB, consistently notes, no single technology is going to meet everyone's needs and Advanced Clean Fleet data supports upwards of 17% of zero emission passenger vehicles will be fuel cells.

We cannot ignore the pace and scaling of zero-emission vehicle infrastructure needed to meet our carbon neutrality goals. Not to mention the significant criteria pollutant and air toxic benefits associated with utilization of this zero-carbon fuel and zero emission fuel cells. The CEC should never pit zero-emission technologies against one another, especially when CARB's Advanced Clean Cars II rule projects the need for a minimum 1,665,000 passenger fuel cells by 2035.

We recommend avoiding the false dichotomy of FCEV or BEV. It is and will be both technologies for a multitude of factors not presented in the draft IEPR. We question the value in CEC testifying to these ends before the legislature and including it in the IEPR as it is counterproductive and diminishes achievement of State goals. BEVs and FCEVs are more efficient than internal combustion which is the technology we are seeking to displace. The appropriate focus for the IEPR is reducing the reliance on fossil fuels to achieve reductions in criteria, toxic, and climate emissions through low to zero-emission fuels and electricity.

Conclusion

The California Hydrogen Coalition and California Hydrogen Business Council appreciate the opportunity to work with the CEC in furtherance of our clean energy goals and hope the input above is fully

considered. As noted, the findings of SB 1075 (Skinner, Chapter 363, Statutes 2022), SB 643 (Archuleta, Chapter 646, Statutes 2021), the Clean Transportation Program, Clean Hydrogen Program and associated grants set the stage for hydrogen's inevitable and significant role in reducing emissions and improving public health outcomes in communities of concern. We are California's partner in decarbonization, and strong signals of support are critical for the private investments that will enable carbon neutrality in California.

France is California's only economic competitor with lower per capita GHG emissions and President Macron offered the following statement last week, "In a few years, we're going to have concrete reductions and, in 2050, reduction will be massive and profound change in our lifestyle. ***Hydrogen is a true lever in our strategy.***"

We look forward to developing similar ambition for hydrogen in California's climate and energy strategy.

Sincerely,

/s/

Teresa Cooke
Executive Director
California Hydrogen Coalition

/s/

Katrina Fritz
Executive Director
California Hydrogen Business Council