DOCKETED	
Docket Number:	20-IEPR-02
Project Title:	Transportation
TN #:	233731
Document Title:	California Hydrogen Business Council Comments - CHBC Comments on IEPR Commissioner Workshop on Transportation Trends and Light-Duty Zero-Emission Vehicle Market Update
Description:	N/A
Filer:	System
Organization:	California Hydrogen Business Council
Submitter Role:	Public
Submission Date:	7/2/2020 5:21:58 PM
Docketed Date:	7/3/2020

Comment Received From: California Hydrogen Business Council
Submitted On: 7/2/2020
Docket Number: 20-IEPR-02

CHBC Comments on IEPR Commissioner Workshop on Transportation Trends and Light-Duty Zero-Emission Vehicle Market Update

Additional submitted attachment is included below.

CALIFORNIA HYDROGEN BUSINESS COUNCIL

Hydrogen Means Business in California!

Main Office: 18847 Via Sereno
Yorba Linda, CA 92886

DC Office: 1211 Connecticut Ave NW, Ste 650
Washington, DC 20036

Phone: (310) 455-6095 | Fax: (202) 223-5537
info@californiahydrogen.org | www.californiahydrogen.org

California Hydrogen Business Council Comments on IEPR Commissioner Workshop on Transportation Trends and Light-Duty Zero-Emission Vehicle Market Update

July 2, 2020

I. Introduction

The California Hydrogen Business Council (CHBC) [1] appreciates this opportunity to comment on the June 11 and June 12 IEPR Update workshops focused on Transportation Trends and a Light-Duty Zero-Emission Vehicle Market Update. Our main points are focused on the opportunities and policy issues related to accelerating light duty hydrogen fuel cell electric vehicles, as well as scaling of hydrogen production. Our comments are summarized below and elaborated on in the Comments section that follows.

a. **We strongly agree with comments made throughout the workshops that both types of zero emissions electric vehicle (ZEV) technologies – hydrogen fuel cell electric vehicles (FCEV) and battery electric vehicles (BEV) – are necessary to achieve California's policy goals, and that reflecting this, policy discussions focused on ZEVs should include both technologies.**

b. **In light of panelist consensus in Session 1 on Light-Duty ZEV Update and Trends in Larger Vehicles that popularity of SUVs and Cross-Over SUVs are a general market trend, it is important to consider global analysts' forecasts that hydrogen fuel cell technology will be more cost effective than battery electric options in the next 5-10 years for this type of vehicle, among others.**

[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/

c. **FCEVs will be key to enabling equitable and affordable access to ZEVs because multi-unit dwellings and on-street parking do not typically provide easy access to EV charging, making centralized hydrogen the more pragmatic ZEV fueling option for many Californians, including many, if not most, low-income drivers.**

d. **FCEVs have superior range among ZEVs, with all models offering over 300-mile range - an important element for consumers – and lower greenhouse gas emissions at higher ranges than BEV counterparts – an important factor for the climate.**

e. **FCEVs allow for far faster refueling than BEVs, making them more convenient for commuters, taxis, ride sharing fleets, and others who don't have time to wait and compete for charging.**

f. **As CARB found in their SB 498 report on state ZEV programs, public funding ought to be extended beyond the AB 8 sunset date of January 1, 2024 and beyond the legislation's station limit of 100 stations, in order to reach the state Executive order goal of 200 hydrogen stations by 2025 and the California Fuel Cell Partnership Goal of 1,000 stations by 2030.**

g. **Like with any emerging technology, cost reductions of FCEVs and fueling will come with scale driven by consistent policy support, especially as the market is maturing.**

II. Comments

The following comments provide further details on the CHBC's primary points summarized above.

a. **We strongly agree with comments throughout the workshops that both types of zero emissions electric vehicle (ZEV) technologies – hydrogen fuel cell electric vehicles (FCEV) and battery electric vehicles (BEV) – are necessary to achieve California's policy**

goals, and that reflecting this, policy discussions and programs focused on ZEVs should include both technologies.

The CHBC greatly appreciates comments made by Commissioner Monahan and her staff, Vehicle Miles Traveled panelists Eliot Martin and Marco Anderson, and several workshop attendees on both days, which expressed that hydrogen fuel cell electric vehicles are important to the growing light duty ZEV market, and that California policy must continue to take this into account. Executive Order B-18-48 calls for advancement of both FCEVs and BEVs and their infrastructure to meet the state 2030 goal of 5 million ZEVs, and numerous state programs have reinforced this inclusive approach to ZEV advancement, including the IEPRs. The 2019 IEPR, for example, clearly stated that California recognizes both electricity and hydrogen fueled vehicles as ZEVs that can address the tailpipe and greenhouse gas challenges of the transportation sector.[2] At times discussions about ZEVs at the CEC sometimes focus primarily or exclusively on BEVs, which sends a confusing and detrimental signal to industry and investors. However, we are reassured by the workshop comments referenced above that the value of FCEVs is growing in recognition at the agency and among stakeholders, and we hope that going forward, CEC ZEV discussions and program design will be balanced and broad in their approach.

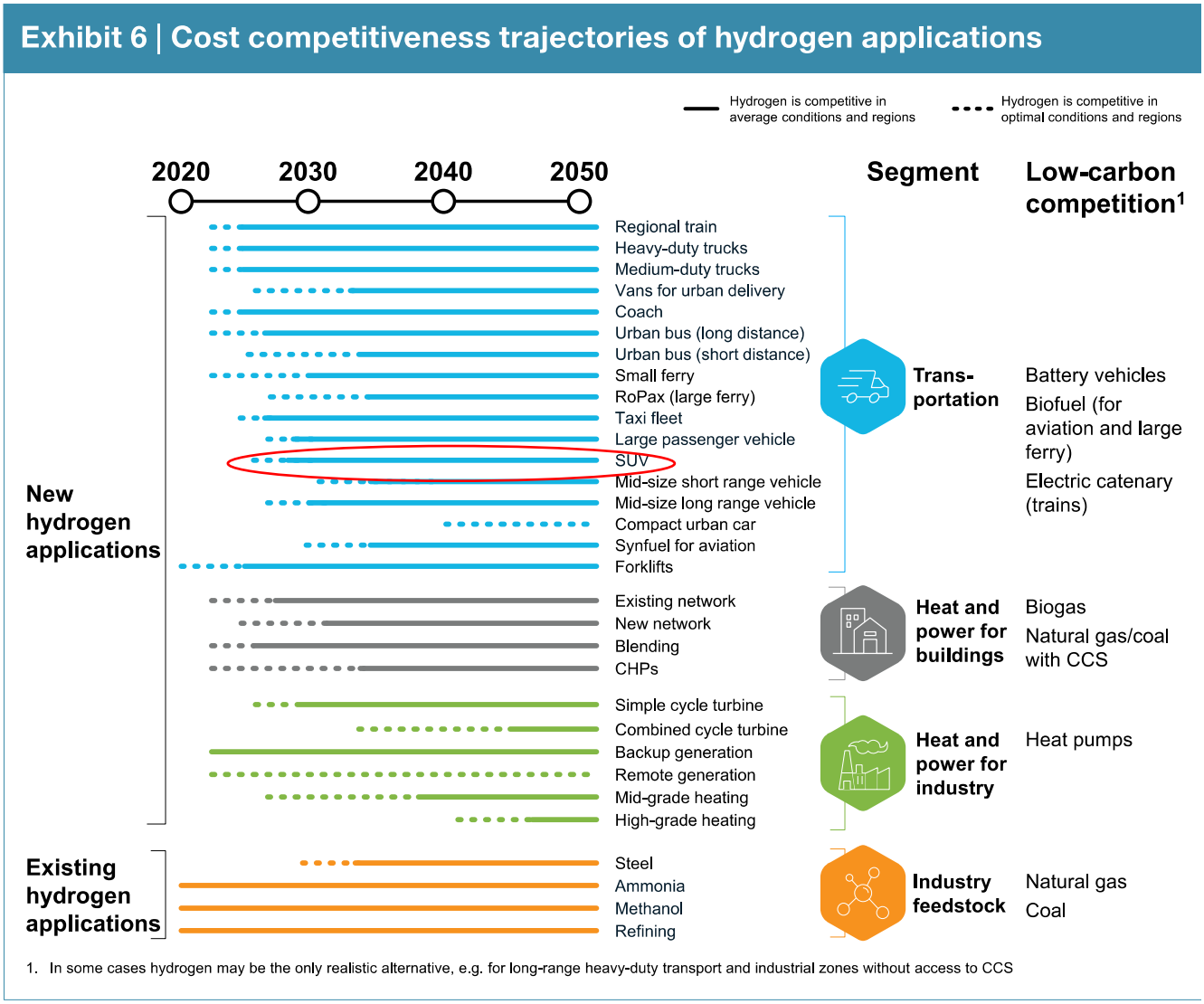
b. In light of panelist consensus in Session 1 on Light-Duty ZEV Update and Trends in Larger Vehicles that popularity of SUVs and Cross-Over SUVs are a general market trend, it is important to consider global analysts' forecasts that hydrogen fuel cell technology will be more cost effective than battery electric options in the next 5-10 years for this type of vehicle, among others.

In Session 1 on June 11, panelists agreed that the passenger vehicle market is trending clearly toward SUVs. Notably, industry experts are projecting the total cost of ownership for hydrogen fuel cell electric SUVs to be lower than battery electric counterparts within the coming decade. The Hydrogen Council, supported by analysis by McKinsey and Company, after considering 25,000 data points across several continents, found that FCEVs will be cost-competitive compared to BEV options in approximately 5

[2] 2019 IEPR, Final Clean Version, CEC, p. 67

years under optimal policy and resource conditions and in about 7 years under average conditions. See the chart below (Fig 1).

Fig. 1[3]



Similar findings were made in a European Union multi-stakeholder study on the role of BEVs, PHEVs, and FCEVs, which reported that FCEVs in larger passenger vehicle applications cost less to abate CO2 than BEVs or PHEVs. See Figure 2 on next page.

[3] *Path to Hydrogen Competitiveness,* Hydrogen Council; January 2020, See p. 10 https://hydrogencouncil.com/wp-content/uploads/2020/01/Path-to-Hydrogen-Competitiveness_Full-Study-1.pdf

The CHBC hopes that the CEC will take these projections that FCEVs will be the lower cost option for SUVs and several other passenger vehicles into consideration when preparing the 2020 IEPR update and creating recommendations for California's transportation policy through 2030 and beyond.

Fig. 2[4]

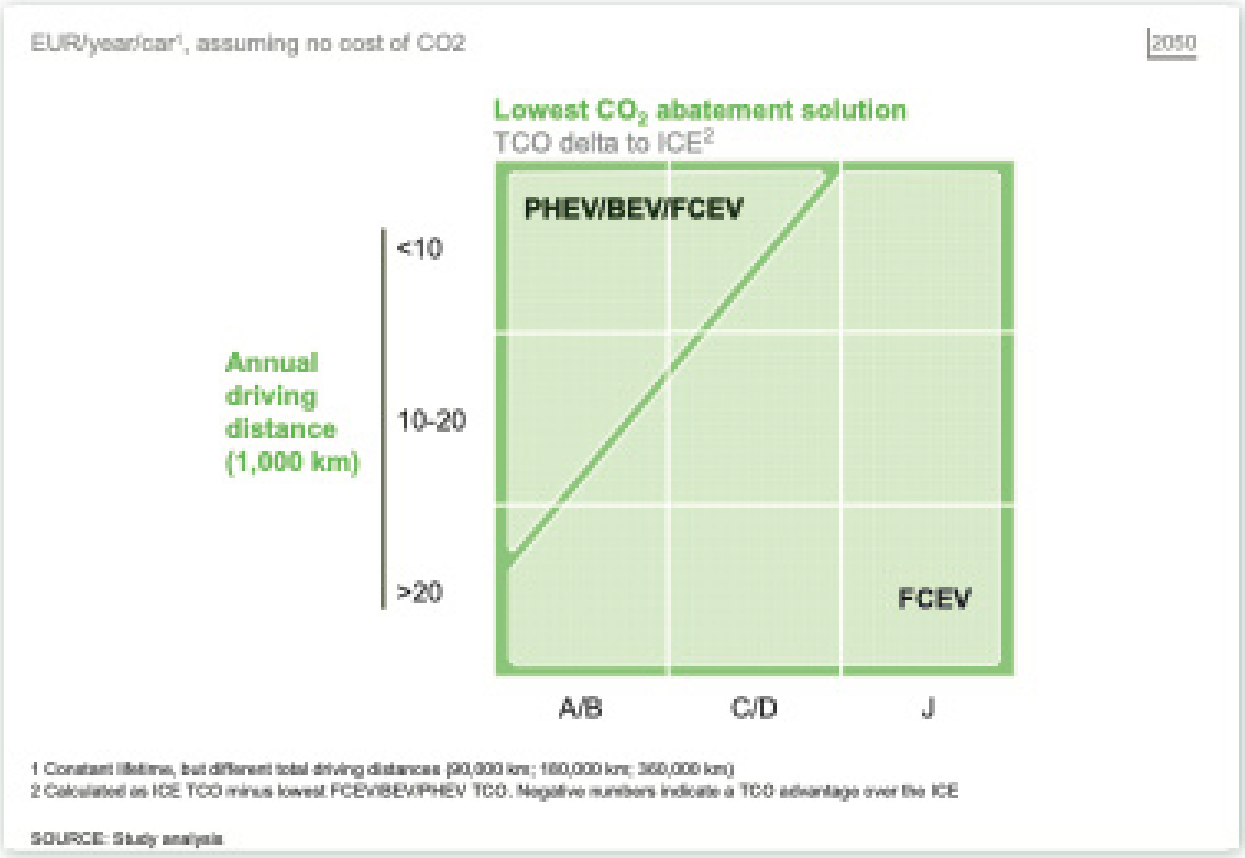


Exhibit 32: The FCEV has a TCO advantage over BEVs and PHEVs in the heavy/long-distance car segments

In terms of car size and annual driving distance, BEVs are economic for smaller cars and shorter trips while FCEVs perform best for C/D and J segments (medium and larger cars) and longer trips.

See p. 42 https://www.fch.europa.eu/sites/default/files/documents/Power_trains_for_Europe.pdf

[4] *A Portfolio of Power Trains for Europe: A Fact-based Analysis, Executive Summary,* European Climate Foundation et al. See p. 42 https://www.fch.europa.eu/sites/default/files/documents/Power_trains_for_Europe.pdf

c. FCEVs will be key to enabling equitable and affordable access to ZEVs because multi-unit dwellings and on-street parking do not typically provide easy access to EV charging, making centralized hydrogen refueling the more pragmatic ZEV fueling option for many Californians, including many, if not most, low-income drivers.

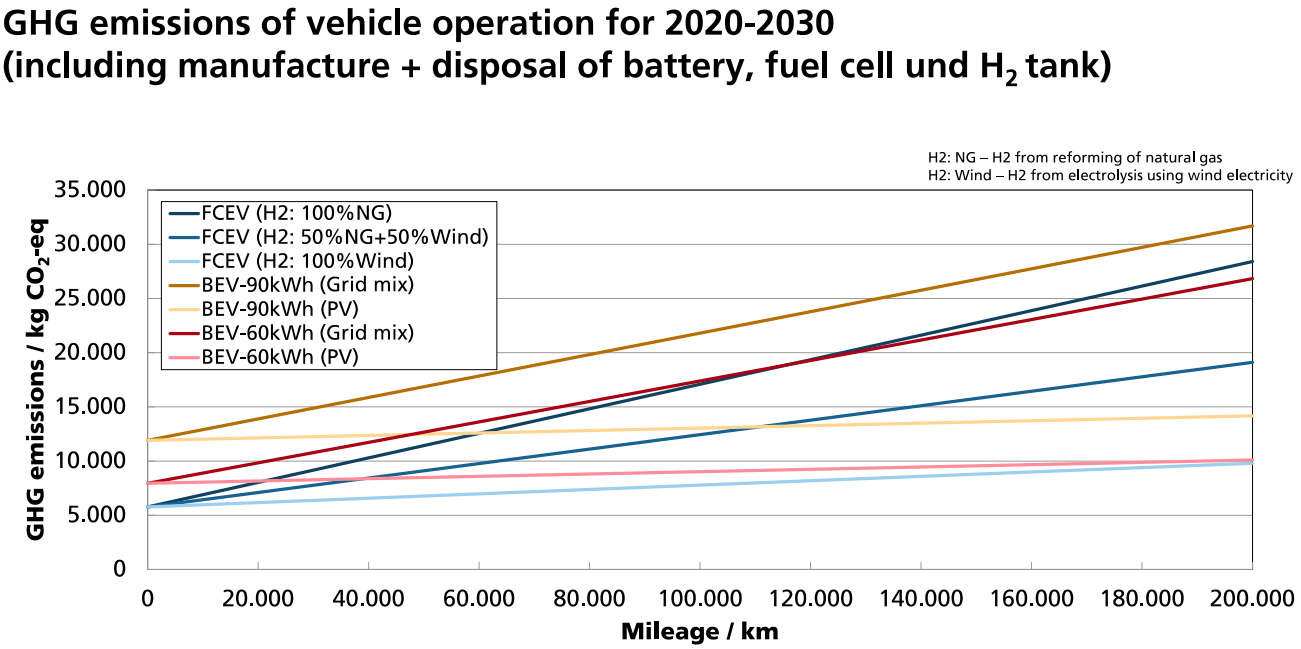
More than 80% of EV drivers charge at home, due to convenience and cost effectiveness.[5] However, many Californians live in homes where EV charging is not easy or affordable. Nearly half of homes in the state are not single detached units.[6] Moreover, low-income people are most likely to live in rental units where EV charging is unavailable and cost prohibitive to install. Hydrogen refueling for FCEVs, by contrast, is centralized and with capital investment, can be similar in convenience and accessibility to conventional gasoline fueling. To ensure that driving a ZEV will be equitably available to all California drivers, state policy ought to therefore equally support advancement of FCEVs and hydrogen fueling along with BEVs and EV charging.

d. FCEVs have superior range among ZEVs, with all models offering over 300-mile range - an important element for consumers – and lower greenhouse gas emissions at higher ranges than BEV counterparts - and important factor for the climate.

Whereas range over 300 miles is only available in a few of the highest end models of light duty BEVs and under ideal driving and climate conditions, all passenger FCEVs on the market today in California have over 300 miles of range. While manufacturers of both types of ZEV are aiming for higher ranges, research suggests FCEVs will be able to do so with lower lifecycle greenhouse gas emissions. The chart on Figure 3 shows that greenhouse gas emissions are lowest for FCEVs compared to BEVs, regardless of whether the electricity feedstock is renewable, and that this is all the more the case when battery range increases.

[5] https://www.energy.gov/eere/electricvehicles/charging-home
[6] https://www.infoplease.com/us/census/california/housing-statistics

Fig. 3



https://www.ise.fraunhofer.de/content/dam/ise/en/documents/News/190815_LCA-BEV-FCEV_Results_EnglishVersion.pdf

What's more, the higher the range of battery electric resources, the greater the amount of constrained lithium and cobalt resources are necessary to produce the large batteries. FCEVs use comparatively far less mineral resources.

e. FCEVs allow for far faster refueling than BEVs, making them more convenient for commuters, taxis, ride sharing fleets, and others who don't have time to wait and compete for charging.

ZEVs will only be adopted at mass scale if everyone who needs a car can use them conveniently, and this includes ability to refuel when and in a time frame that works for the driver. FCEVs can refuel from empty to full in 3-5 minutes, whereas using the fastest commercial DC fast chargers take 30 minutes from empty to 80% under ideal weather conditions. Especially for those for whom simply recharging at night at home is not feasible or affordable and who need quick refueling, FCEVs are the more practical choice. This further points to the need for ensuring a complementary choice of technology type for consumers, rather than either BEV or FCEV.

f. As CARB found in their SB 498 report on state ZEV programs, public funding ought to be extended beyond the AB 8 sunset date of January 1, 2024 and beyond the legislation's station limit of 100 stations, in order to reach the state Executive Order goal of 200 hydrogen stations by 2025 and the California Fuel Cell Partnership goal of 1,000 stations by 2030.

CARB states in their December 2019 SB 498 report that "Both electric vehicle and hydrogen refueling infrastructure investment will continue to be needed after 2023, when the funding sunsets, to continue closing the gap between needed ZEV refueling infrastructure and the State's ZEV deployment targets.[7] Support is critical to ensure that stations are distributed throughout the State to serve all markets and to allow the ZEV market to mature sufficiently for infrastructure to become a sustainable business model."[8] They add that "increasing the number of hydrogen retail stations throughout California is important to drive growth in the number of light-duty hydrogen-powered FCEVs sold. The network of 64 open and funded hydrogen stations in California provides coverage to only 41 percent of the State's population within a 15-minute drive; 21 percent of the covered population lives within a disadvantaged community. Hydrogen fueling networks of 200 and 1,000 stations (reflecting the goals of Executive Order B-48-18264 and the California Fuel Cell Partnership's A California Fuel Cell Revolution: A vision for 2030, respectively) could provide coverage to 68 percent and 94 percent of the state's population."[9] The CHBC strongly agrees with these statements and hopes that they will be reflected in the 2020 IEPR Update discussion and recommendations.

g. Like with any emerging technology, cost reductions to FCEVs and fueling will come with scale driven by consistent policy support, especially as the market is maturing.

---

[7] Footnotes 22, 23 in *Draft: Assessment of CARB's Zero-Emissions Vehicle Programs Per Senate Bill 498,* CARB, December 17, 2019 – Bedir, et al., 2018. California Energy Commission Staff Report CEC-600-2018-001. March 2018. "California Plug-In Electric Vehicle Infrastructure Projections: 2017-2025." https://efiling.energy.ca.gov/GetDocument.aspx?tn=224521&DocumentContentId=55071.
CARB, 2018. July 2018. "2018 Annual Evaluation of Fuel Cell Electric Vehicle Deployment & Hydrogen Fuel Station Network Development." https://ww3.arb.ca.gov/msprog/zevprog/ab8/ab8_report_2018_print.pdf.

[8] *Draft: Assessment of CARB's Zero-Emissions Vehicle Programs Per Senate Bill 498,* CARB, December 17, 2019, p. vii

[9] Ibid, p. 88

All energy-related technologies depend on an encouraging policy environment over a long term to develop sustainable markets. California's booming solar industry would not be the success story it is today without numerous policies and regulatory incentives, and the same is true for clean transportation solutions like ZEVs. The CHBC appreciates that California has been a longtime and early champion of hydrogen fuel cell electric vehicle technology, which has helped put thousands of FCEVs on the road and dozens of hydrogen fueling stations in operation, with many others planned. Cost-competitiveness is within reach in the foreseeable future, as the aforementioned analyses suggest, although this will only happen with sustained policy support to initially drive scale.

This policy support must be there for FCEVs, hydrogen fueling infrastructure, and the hydrogen needed to fuel the vehicles, particularly if that hydrogen is to be low and zero carbon, in line with state climate and clean energy goals. UCI recently published a report that finds with the right policies, renewable hydrogen produced by either electrolysis or gasification can reach a competitive cost point below $2 per kilogram by 2030, and the full dispensed cost of hydrogen for fueling vehicles can reach a cost point of under $5 per kilogram over the long term.[10] Bloomberg similarly finds that with the falling cost of renewable power and sustained policy support, renewable hydrogen costs could plunge to as low as $1.40 a kilogram by 2030 from the current range of $2.50 to $6.80, and to 80 cents by 2050, which would bring it to parity with natural gas.[11]

Other frontrunner regions on climate and clean energy are seeing this potential and investing heavily in hydrogen for transportation and other uses. Germany, for example, announced funding earlier this year of 3.4 billion euros for hydrogen vehicle fueling infrastructure in addition to 400 million euros previously provided.[12] The country has also set a target of 5 GW of electrolysis by 2030 and 10 GW by 2030 to help green electrolytic hydrogen achieve economy of scale for transportation and other beneficial end uses.[13] These bold actions are part of a recently published German National Hydrogen Strategy, that will pour €7 billion into domestic hydrogen market development and €2 billion into

[10] http://www.apep.uci.edu/Press_Release_APEP_Releases_California_Renewable_Hydrogen_Production_Roadmap.html
[11] https://www.bloombergquint.com/business/cost-of-hydrogen-from-renewables-to-plummet-next-decade-bnef
[12] https://www.euractiv.com/section/energy-environment/news/germany-floats-draft-hydrogen-strategy-ahead-of-eu-presidency/
[13] https://www.cleanenergywire.org/factsheets/germanys-national-hydrogen-strategy

international partner hydrogen development.[14] Notably, the lead agencies that developed the plan explicitly and deliberately included a focus on passenger vehicles in the Strategy.[15] Support for green hydrogen is also a centerpiece of the massive, multi-billion Euro European Green Deal stimulus package.[16] Globally there are 18 national hydrogen strategies that roadmap hydrogen development, signaling that this is part of a growing global movement.[17]

We urge California to build on its early support of hydrogen fuel cell electric passenger vehicles by helping the industry scale to the next level of potential through additional and sustained policies and incentive programs to help build out the necessary infrastructure and scale hydrogen production, which can help not only give confidence to FCEV manufacturers to bring business to California and to consumers to buy the vehicles, but can also unleash the full benefits of economical hydrogen for other important applications as well.

III. Conclusion

The CHBC appreciates your consideration of these comments and looks forward to working with you to build understanding of how FCEVs and hydrogen fueling are key to providing equitable, mass scale access to ZEV passenger vehicles and to accelerating and realizing state goals to advance zero criteria emissions and greenhouse gas reductions in the transportation sector.

Best regards,

William Zobel | Executive Director

California Hydrogen Business Council

[14] ibid

[15] A letter to the federal legislature from the heads of the four lead federal agencies on the National Hydrogen Strategy explicitly states about the Strategy in the third sentence on p. 3 (English translation): "In the passenger car sector, too, hydrogen makes sense in addition to the fuel cell in addition to battery vehicles. In short: hydrogen supplements - across all modes of transport - other alternative forms of drive make sense and are climate-friendly."https://www.flachsbarth.info/wp-content/uploads/2020/06/200615_LFB_NSW_BMWi_BMBF_BMVI_BMZ.pdf

[16] https://www.greentechmedia.com/articles/read/a-green-hydrogen-cfd-and-eu-wide-renewables-tenders-leak-lifts-lid-on-eus-green-deal

[17] *Path to Hydrogen Competitiveness: A Cost Perspective,* Hydrogen Council; January 2020, p. vi https://cafcp.org/sites/default/files/Path-to-Hydrogen-Competitiveness_Full-Study-1.pdf