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California Fuel Cell Partnership feedback to ZIP Development

Additional submitted attachment is included below.

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February 4, 2022

California Energy Commission
Docket Unit, MS-4
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Docket No. 21-TRAN-03, Zero Emission Vehicle Infrastructure Plan

Dear CEC Administrator –

The California Fuel Cell Partnership (CaFCP) respectfully submits this letter of comment to the California Energy Commission (CEC) in response to 21-TRAN-03, Zero Emission Vehicle Infrastructure Plan (ZIP). CaFCP, working within its charter, provided the membership a platform for open discussion and input. These are intended as broad comments, based on learnings from our over 20 years of collective global experience in the fuel cell electric vehicle market and rapidly growing light-, medium- and heavy-duty fuel cell vehicle sectors and infrastructure deployment.

Industry applauds CEC development of the ZIP, its ZEV neutral approach and the infrastructure-first policy which is consistent with the industry experience that hydrogen station and electric vehicle service equipment (EVSE) deployment needs to precede zero emission vehicle (ZEV) rollout and then continue to grow in conjunction with the ZEV population. In the spirit of collaboration that is central to our partnership. We offer input for each of the chapters included in the ZIP outline.

Chapter 1: Introduction

Fundamentally, we view public ZEV infrastructure investment as the stimulus for private sector investment in ZEV technologies, affecting a self-sufficient ZEV marketplace. Due to the dominance of fossil-derived gasoline and diesel fuels, decarbonization of the transportation sector in the shortest time possible will require significant investment in all zero-emission technologies. Given the breadth of vehicle size, weight and duty cycle, across all weight categories, there is no single ZEV platform that is a 1:1 replacement for internal combustion engines. To maximize success, California's ZEV infrastructure funding should be allocated equally between development of hydrogen fueling infrastructure to support Fuel Cell Electric Vehicles (FCEV) and Electric Vehicle Service Equipment (EVSE) to support battery-electric vehicles. This is a critical time for California to develop and implement a holistic and enduring action plan that achieves our short- and long-term objectives, without sacrificing one for the other. This is aligned with the Infrastructure Pillar of the GoBiz California Zero-Emission Vehicle Market Development Strategy.[1]

[1] *California Zero-Emission Vehicle Market Development Strategy*, GoBiz, February 2021, p. 7, https://static.business.ca.gov/wp-content/uploads/2021/02/ZEV_Strategy_Feb2021.pdf, accessed February 2, 2022.

In the medium- and heavy-duty space, ZEV has not yet achieved full-scale commercialization in either the battery-electric or fuel-cell electric space, therefore it is sensible to invest equally in both categories to prepare for their impending commercial launch. Specific to FCEV and hydrogen, the number of OEM entrants in this space has quadrupled in the past few years with proportional increases in activity around fuel cell-electric truck and bus technology development and demonstration. The ZIP needs to signal to that marketplace that sufficient hydrogen infrastructure at strategic, early market locations will be available to support commercial deployment of vehicles.

Chapter 2: Assessment of Infrastructure Need/ Scope of Challenge & Opportunities

As a starting point, we recommend analyzing the 100% transition cost and the sources of funding to pay those costs. This goal setting exercise should map California's financial journey starting with primarily public funding, currently underway, and then transitioning to 100% private funding and a self-sustaining marketplace. California's regulations and directives are now clearly focused on achieving this 100% ZEV transition, and the ZIP needs to reflect the full strategy rollout and financial strategy for achieving this objective.

On the light-duty side, the California Air Resources Board published report on Hydrogen Station Network Self-Sufficiency[2] found the light-duty hydrogen station network in California could achieve self-sufficiency by 2030 through an additional investment of $300 million or less.[3] This report highlights that with this modest additional California investment in hydrogen refueling infrastructure, light-duty hydrogen self-sufficiency was not only possible under various scenarios, but that it could be achieved primarily through private industry investments. These private investments, like the existing refueling market, would place the responsibility of development and maintenance investments on industry, avoiding stranded public assets beyond early market development support. It should also be noted that tools are available for the mapping of this hydrogen fueling infrastructure. NREL's Scenario Evaluation, Regionalization, and Analysis (SERA) Model has the capability to perform hydrogen infrastructure network expansion analysis, and CARB's California Hydrogen Infrastructure Tool (CHIT), is a GIS based model that assesses the spatial distribution of the gaps between the coverage and capacity provided by existing and funded stations and the potential first adopter market for Fuel Cell Electric Vehicles.

A companion body of work developed by a group of CaFCP stakeholders in 2020, identifies additional incentives that California can offer private investors that will further derisk investment in hydrogen fueling infrastructure (see Attachment, *Hydrogen Fuel Production and Refueling Infrastructure: Financing and Investment Options*). The most effective way to protect public funds from being stranded is to remove the need for public support mechanisms as quickly as possible and build the type of sustainable ZEV market identified in this report. Furthermore, the early California public investments can create not only a self-sufficient market opportunity for California's light-duty FCEV market, but it also enables cost-reductions, lessons learned, and accelerated ZEV opportunities throughout the U.S. For hydrogen and FCEVs to facilitate California ultimately reaching its ZEV objectives, greater investment in light-duty hydrogen fueling infrastructure beyond the current 2025 target of 200 hydrogen fueling stations is necessary.

On the heavy-duty side, CaFCP published *Fuel Cell Electric Trucks: A Vision for Freight Movement in California and Beyond*, which identifies infrastructure rollout in support of HD FCEV truck technology implementation to help achieve California's heavy-duty ZEV objectives, which are defined

[2] https://ww2.arb.ca.gov/resources/documents/self-sufficiency-report

[3] *Hydrogen Station Network Self-Sufficiency Analysis per Assembly Bill 8*, California Air Resources Board, October 2021, https://ww2.arb.ca.gov/sites/default/files/2021-10/hydrogen_self_sufficiency_report.pdf, accessed February 2, 2022.

in the soon to be adopted CARB Advanced Clean Fleet regulation. CaFCP HD truck stakeholders are currently developing a FCEV truck road map, which will have more specific infrastructure recommendations and cost/benefit analysis.[4]

Chapter 3: Deployment Plan for Infrastructure

Specific to fueling location In the light-duty space, historically, CaFCP has polled our OEM vehicle manufacturers on priority market locations where they would like to see infrastructure developed, published in a letter. CEC has referenced this letter in its hydrogen fueling infrastructure GFO 19-602. CaFCP would gladly evolve that effort into a new set of light-duty infrastructure priority market locations.

We recommend starting the mapping of HD hydrogen fueling infrastructure through the simple exercise of mapping freight routes and conventional truck fueling travel plazas. This paired with CaFCP facilitated industry dialogue, could enable both HD and LD rollout of hydrogen fueling stations statewide with a minimal number of stations, and be a backbone for statewide deployments, especially into more rural portions of the state. Similar to the process used for light-duty station location recommendations mentioned previously, CaFCP dialogue could include poll its members on the priority heavy-duty hydrogen fueling market locations, to be consolidated into one list.

Regarding the multiple trajectories of technology innovation in the FCEV and hydrogen fueling infrastructure space, we recommend that CEC take a look inwards to past grant funding offerings around hydrogen refueling infrastructure, not just the structure of the grant offerings, but also the applications received. Along the line of the grant offerings, we anticipate that CEC will find a transition from typical grants to more market motivating approaches and composite combinations thereof (i.e, CEC GFO process in combination with CARB's Low Carbon Fuel Standard (LCFS) Hydrogen Refueling Infrastructure (HRI) credit program). It is likely that these programs will demonstrate increasing efficiency of stimulating hydrogen station deployment and accelerating the pace of private investment in direct correlation with CEC initiative.

CEC evaluation of grant applications received in response to hydrogen fueling infrastructure offerings is likely to reveal trends such as an industry evolution from lower volume, single dispensing hydrogen stations with gaseous storage to higher capacity, multiple fueling position stations with liquid hydrogen storage, increasingly shorter station construction times and increasingly reduced construction cost for higher performing stations, with each successive GFO offering. This data set could then be used to project the speed at which the hydrogen fueling infrastructure can scale to meet future ZEV demand. Although this data is specific to light-duty stations, they can be used as predictive analogs in the heavy-duty hydrogen infrastructure space.

Regarding the current status of the hydrogen fueling network in California, CaFCP suggests the following resources:

- Stations Map | California Fuel Cell Partnership (cafcp.org). This is a listing of all existing and publicly announced, future, hydrogen fueling stations.
- By The Numbers | California Fuel Cell Partnership (cafcp.org). This is a compilation of hydrogen vehicle and fueling station population.

[4] This truck roadmapping exercise parallels CaFCP's 2012 Roadmap, which successfully launched the light-duty market with a Cluster/Destination/Connector strategy, and, being based on similarly successful alternative fueled vehicle fleet/anchor station/hub strategies, should be a guide for future deployment.

- CARB 2021 AB8 Report, https://ww2.arb.ca.gov/sites/default/files/2021-09/2021_AB-8_FINAL.pdf
- CARB, Zero and Near Zero Emission Freight Facility grant program; Hydrogen for MD/HD, Zero-Emission Freight "Shore to Store" Project; no published findings as this is an active demonstration project of class 8 hydrogen fuel cell powered truck tractors; we will be happy to facilitate conversations with industry members active in this project.

Chapter 4: Conclusion

CaFCP encourages an ecosystem approach to ZEV infrastructure as there are many synergies to be realized between hydrogen and utility supplied energy (both electricity and natural gas).
Within the hydrogen sector, itself, the California light-duty retail hydrogen marketplace is established and scaling, while the heavy-duty marketplace is just launching; combined, these two sectors will accelerate the rate at which economies of scale are achieved in both sectors.

Within the greater ZEV marketplace, the provision of choice –BEVs *and* FCEVs[5]– will greatly enhance the speed at which the ZEV transition can occur, as neither is a perfect replacement for combustion fuels, yet in tandem, provide most, if not all of the features of gasoline or diesel. Therefore, comprehensive, holistic support for both ZEV technologies across support mechanisms is encouraged to achieve our common objectives. Furthermore, we anticipate that unknown synergies between and within these emerging energy economies will further shorten the time in which the transition can occur.

CaFCP is prepared to continue to offer our collective input and experience to CEC and would be happy to arrange a meeting with our leaders to offer further assistance. I can be reached at any time by email at dpark@cafcp.org or by phone at (213) 213-1968.

Sincerely,

David Park, Industry Affairs

[5] https://hydrogencouncil.com/wp-content/uploads/2021/10/Transport-Study-Full-Report-Hydrogen-Council-1.pdf

Hydrogen Fuel Production and Refueling Infrastructure: Financing and Investment Options

California Fuel Cell Partnership Market Activation 2.0 Workgroup
October 2020

Investor Perceptions

- Project financing cobbled together with government grants and private equity from IPOs, SPACs, corporate pockets and strategic partners – no systematic replication
- California offers relative consistency in government interventions, but requires frequent monitoring of incentive deployment, regulatory compliance and product demand
- Fractured market, no clear process, and undefined funding resources
- Private capital available but barriers stifle investment flow and require policy problem solving, new initiatives and/or government backed guarantees or credit enhancements:
  - Uncontracted revenue sources and uncertain demand
  - 30% higher California business cost
  - Industry sector, business models, and fuel/technology require greater market maturity

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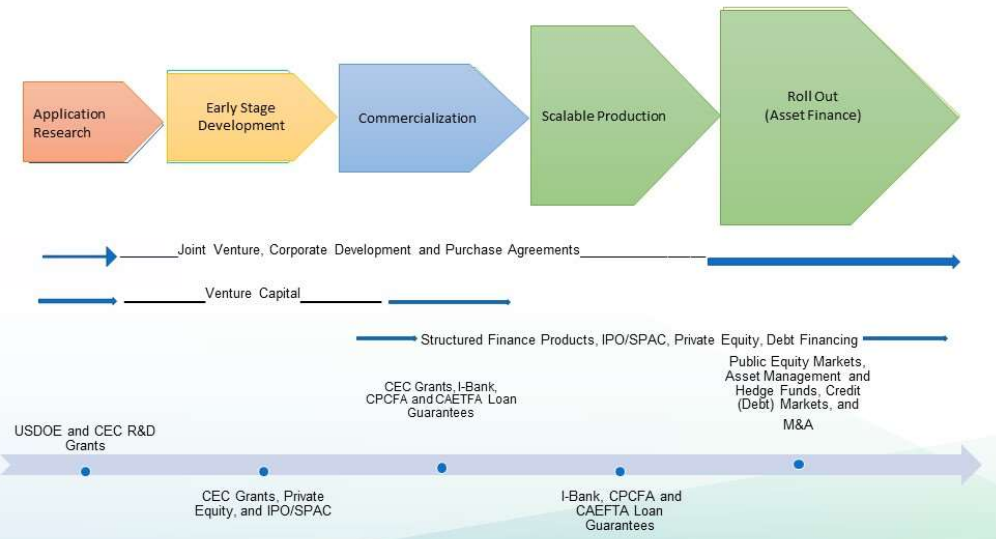
Hydrogen Fuel Production and Refueling Infrastructure Financing Mechanisms by Development Stage



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Proposed Actions – Existing Programs

- Simplify and align existing programs and re-evaluate incentive compliance requirements
- Align government incentives with private investment commitments
- Modify LCFS mechanisms to provide hedges for credits
- Provide state loan guarantee for securitized insurance company investments

Proposed Actions – Establish New Initiatives

- Establish long term contracts for ancillary services
- Establish price stability mechanism for hydrogen and RNG
- Establish renewable hydrogen mandate along lines of RPS type of requirement
- Establish hydrogen fuel blending standard in natural gas supply

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Proposed Actions – Explore New Financing Mechanisms

- Establish multi-year investment tax credit and/or production tax credit for fuel production, infrastructure, distribution and vehicles
- Provide state loan guarantee modeled after USDA business and industry program loan guarantee
- Expand Qualified Opportunity Zones for Hydrogen Production and Refueling Infrastructure
- Provide lender/investor guarantees or securitized insurance company investments
- Explore technology risk and regulatory risk insurance to protect debt service and equity returns
- Provide tax exempt bond financing to produce renewable hydrogen from waste residues
- Stimulate development of mezzanine debt structures to fund working capital and repay at financial closing

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Energy Commission Contact

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Financing and Investment Initiative at www.energy.ca.gov

https://www.energy.ca.gov/programs-and-topics/programs/clean-transportation-program

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