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CaFCP 2021-2023 Investment Plan feedback

Additional submitted attachment is included below.



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September 30, 2021

Commissioner Patricia Monahan
California Energy Commission
1516 Ninth Street, 1st Floor
Sacramento, California 95814

Re: Docket No. 21-ALT-01, Advisory Committee feedback on 2021-2023 Investment Plan for the Clean Transportation Program

Dear Commissioner Monahan:

The California Fuel Cell Partnership (CaFCP) respectfully submits this comment letter to the California Energy Commission (CEC) in response to 21-ALT-01 and the Clean Transportation Program's (CTP) updated 2021-2023 Investment Plan. We appreciate CEC establishing the Advisory Committee to provide a diversity of inputs and guidance and continuing to use this information to improve the annual Investment Plans and overall effectiveness in the CTP meeting its environmental and market transformation objectives. Based on the draft staff report, staff presentation, Advisory Committee discussion, and market progress we present the following summarized comments.

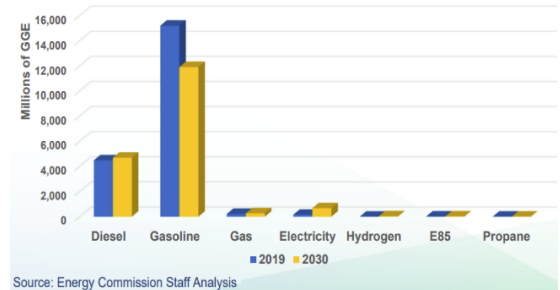
- **As CTP's existing 10-year authorization is nearly complete and the threat of climate change more threatening than ever, it is now essential that CTP focus its investments on achieving its primary mission of market transformation and 100% ZEV transition**
- **The CTP should integrate existing AB8-related ZEV, hydrogen and FCEV analysis into this and all future CTP Investment Plans to improve the state's ability to achieve its overall ZEV targets and environmental goals**
- **The CTP should integrate ALL relevant ZEV analysis and inputs that will accelerate California's ZEV transition, per its market transformation objective, rather than waiting for formal milestones or guidance to achieve its objectives**

As a national and global leader, CEC has advanced alternative fuels and vehicles, including hydrogen and fuel cell technologies, through strong leadership and focused program activities. Through this leadership, and in coordination with other agencies and industry, CEC and California continue to lead the country in making progress on our common goals and drive us towards a clean, sustainable transportation energy system. Collectively, great progress has been made, yet our goals are far from achieved and *now is the time to aggressively push forward*. CaFCP offers the following detailed feedback on the updated CTP Investment Plan, applicable to all state-supported ZEV programs and support mechanisms. CaFCP is committed to continue working closely with CEC, and all state agencies and stakeholders to achieve our shared objectives.

As CTP’s existing 10-year authorization is nearly complete and the threat of climate change more threatening than ever, it is now essential that CTP focus its investments on achieving its primary mission of market transformation and 100% ZEV transition

The CTP has proven successful at helping launch and expand the early ZEV market. However, **interim milestones are no longer sufficient**, and it is now more urgent than ever before that CTP focuses on its market transformation mission and accelerates progress toward California’s 100% ZEV transition objective. As reported in CEC’s latest Integrated Energy Policy Report¹ gasoline and diesel will still dominate more than 90% of the California’s light- and heavy-duty transportation market in 2030. **Transformational change must occur** to achieve our ZEV and environmental objectives.

Transportation Energy Demand Forecast by Fuel Type: 2019 vs 2030 High Demand Case



Over the years CEC has adapted and modified its approaches to strengthen and expand the transition to zero-emissions. The most successful of these are those that focus on market-building support mechanisms; leveraging public funding to help industry build the economic case for ZEVs and decarbonization rather than merely providing financial support with no strategy or schedule for becoming a sustainable marketplace. A leading example of this approach is the last CEC hydrogen infrastructure solicitation GFO-19-602² which shifted from typical annual grant support to an innovative multi-year approach aimed at achieving the economies of scale required to lower costs to achieve a sustainable market. **This solicitation succeeded in co-funding 10x the number of stations, shifting co-funding to predominately private investment, and resulting in larger, more capable stations than any previous solicitation.** CEC’s new approach enabled industry to better leverage the available public co-funding to build real and sustainable business models that can provide this emerging market visible exit ramps from public subsidies. This type of approach, along with similar mechanisms such as the recent Low Carbon Fuel Standard amendments for hydrogen fueling and fast charging, are some of the market-transforming approaches needed to accelerate the ZEV rollout and make progress towards our environmental objectives. Going forward, *all future CTP and other state investments should include metrics that require recipients to demonstrate market-building progress and outcomes to receive public investment support.*

The CTP should integrate existing AB8-related ZEV, hydrogen and FCEV analysis into this and all future CTP Investment Plans to improve the state’s ability to achieve its overall ZEV targets and environmental goals

The California hydrogen and fuel cell vehicle market has developed rapidly since CTP was first introduced, from a nascent technology demonstration to a market reality with real-world success and benefits. California leadership and CTP were instrumental in that success, as were the significant volume of stakeholder analysis and reports developed to identify market challenges and opportunities along the way. *However, the Investment Plan omits several significant and related AB8 analysis reports from this document.*

¹ [Final 2020 Integrated Energy Policy Report](#), CEC-100-2020-001-V1-CMF Staff presentation. March 2021

² [Hydrogen Refueling Infrastructure Solicitation GFO-19-602](#), CEC. December 2019

The most important hydrogen evaluation reports that should be integrated into this Investment Plan are the existing *Annual Evaluation of FCEV Development and Hydrogen Fuel Station Network Development* reports, the most recent released September 2021³. While the timing for inclusion of this latest report may be challenging, the single paragraph dedicated to these annual reports, specifically developed to support the AB8 funding mechanism of CTP, is particularly concerning, especially when compared to the numerous reports documented at length in this Investment Plan to support battery electric and plug-in electric vehicles (PEV) and charger deployments, many not directly tied to AB8. Furthermore, as is too common in this Investment Plan, the references provided for hydrogen and FCEVs only look at immediate near-term targets and do not consider the state’s larger 100% ZEV transition and market transformation needs and opportunities for this technology, again glaringly different than the resources or approach used for other ZEV technologies. All existing AB8 ZEV analysis and reporting should be fully integrated into this and each Investment Plan to increase CTP market impact and ability to meet California and CTP ZEV transition objectives.

The ZEV regulation was adopted to put the transportation market on notice that a full transition to zero-emission was required, with CTP designed to assist and accelerate that transition. In November 2020 the California Air Resources Board (CARB) released the draft *Hydrogen Station Network Self-Sufficiency Analysis*⁴, specifically tasked in AB8 to determine how government support can help bring the hydrogen network to self-sufficiency. This first-of-its-kind ZEV report identified the California light-duty FCEV market can become self-sustaining by 2030, the first globally identified pathway to achieving a ZEV transition. The analysis notes this success requires continued state and private investment support and may even be *accelerated* if additional support and resources are implemented. **Despite this report presenting the first glimpse of a successful transition to a thriving zero-emission market as originally envisioned by the ZEV regulation, it is completely absent from this Investment Plan.** If the substance and outcomes outlined in this report do not compel significant review and consideration within this document on their own merits, the legislative directives and intent of AB8 should obligate its inclusion. It is essential and unconditional that this report is integrated into this Investment Plan.

The CTP Investment Plans are specifically developed to “guide the allocation of program funding” for the CTP as it strives to “reduce greenhouse gas emissions, petroleum dependence, and criteria pollution emissions for All Californians. It details how CEC determines the goal-driven priorities of the program... to develop and deploy innovative technologies that transform California’s fuel and vehicle types to attain the state’s climate change policies.”⁵ In addition to seeing more market transformation focus from CTP, it is also imperative that CEC begin incorporating the recently published CTP Benefits Analysis⁶ results from NREL to better guide CTP funding allocations of public funding. These are directly applicable to the mission and objective of CTP and provide more clarity on the real-world benefits and value of every CTP investment.

³ [2021 Annual Evaluation of FCEV Deployment & Hydrogen Fuel Station Network Development](#), CARB. September 2021

⁴ [Draft Hydrogen Station Network Self-Sufficiency Analysis per AB8](#), CARB. November 2020

⁵ [2021-2023 Investment Plan Update for the Clean Transportation Program](#), CEC-600-2021-0038. April 2021

⁶ [IEPR Commissioner Workshop on Benefits from the Clean Transportation Program](#), CEC. July 30, 2021

The CTP benefits analysis demonstrates the importance of CTP hydrogen infrastructure investment in the ability to significantly address some of California's greatest environmental challenges. These reported hydrogen investment benefits demonstrate similar GHG and petroleum reduction benefits compared with charger investments, and the greatest GHG and petroleum reduction benefits of any technology by 2030. When accounting for total CTP funding to achieve those benefits, the hydrogen infrastructure benefits come at half the CTP dollar investment per benefit. NREL analysis also states that development of hydrogen infrastructure has significant market transformation potential in induced vehicle sales, the most important metric to ZEV adoptions. Hydrogen and fuel cell vehicles have proven even this early market rollout phase that they are complimentary to other ZEV technology deployments and necessary and critical to address our climate challenges. This information should be fully integrated into the Investment Plan so CEC, the Advisory Committee, other stakeholders and the public can see the correlation between investment decisions to program progress and benefits. As this information is integrated into the Investment Plan, we offer the following input for its inclusion and future analysis.

- The station utilization into e-miles traveled developed for EVSE is an excellent metric for understanding real results and opportunity. It should be applied to all fuels and technologies,
- The projected utilization for EVSE over time should be applied to all fuels and technologies,
- The utilization trends by quarter for H2 stations should be applied to all fuels and technologies,
- The historic carbon intensity for H2 stations should include projected carbon intensity, as is done for EVSE and the CA grid. The renewable content of existing H2 stations, as identified in annual AB8 reports as over 90%, should be noted,
- An overall GHG and petroleum reduction benefits achieved per CTP dollar investment analysis should be developed for overall investment effectiveness consideration to stated objectives,
- Market transformation benefits (perceived vehicle price reductions, vehicle cost reductions, etc.) require greater context and discussion, as critical CTP objective outcomes.

As noted in previous Investment Plan feedback submissions, CEC and CTP have leveraged in-house staff, other government agencies, and outside experts to develop numerous effective and impactful analysis tools for PEVs and charging deployment decisions. Similar analysis is needed for hydrogen and FCEVs to provide similar opportunities and put *all* ZEVs on a successful market development pathway and accelerate 100% ZEV transition. This PEV support includes the EVI-Pro tool (focused on short-distance PEV charging needs), EVI-Pro RoadTrip (focused on long-distance PEV charging needs), HEVI-Pro (medium- and heavy-duty EV infrastructure projections), the CALeVIP program (providing streamlined charger incentives), and the WIRED model (identifying Wide-spread Infrastructure for Ride-hailing EV Development). Collectively these tools and the holistic "plan to succeed" approach CEC takes to PEV and charging deployments has sent strong policy signals to industry and proven very successful for initial rollouts. It is imperative CTP objectively support the success of all ZEVs through appropriate and fuel neutral resource allocation with a focus on program objectives. As noted previously CEC should integrate existing AB8 analysis and tools developed by CARB and others, and where analysis gaps still exist expand existing PEV tools to include FCEV analysis or develop similar tools.

The CTP should integrate ALL relevant ZEV analysis and inputs that will accelerate California's ZEV transition, per its market transformation objective, rather than waiting for formal milestones or guidance

California continues to lead the nation toward a 100% transition to zero-emission passenger cars, trucks, transit buses and the entire transportation market. There is no mistaking the directive or urgency needed. No longer can CTP, or any related state program or activity, fall short in expending its resources towards this market transformation objective merely because there aren't sufficient near- or long-term specific targets and directives currently available from legislature or others. California requires an acceleration of *all* ZEV and supporting infrastructure. This includes CTP no longer resting on merely achieving the near-term 200 hydrogen station target established by Executive Order B-48-18. CTP needs to begin doing all it can to fulfill Executive Order N-79-20's expectation of a full ZEV transition and begin incorporating additional available ZEV analysis and inputs that help achieve that objective.

The CaFCP has published two supporting ZEV transition documents directly aimed to support California's market transformation objectives; the 2018 *California Fuel Cell Revolution*⁷ and the 2021 *Vision for Freight Movement in California—and Beyond*⁸. These two documents, developed through a public-private process, were developed to provide expanded hydrogen infrastructure targets to support California's ZEV transition. The *Revolution* document focused on the light-duty passenger FCEV market and concluded that a network of 1,000 hydrogen stations throughout California supporting up to 1,000,000 FCEVs could enable the tipping point where vehicle, fuel and infrastructure costs were cost competitive with traditional and other ZEV technologies by 2030. Achieving this target of 1,000 stations and 1,000,000 FCEVs would displace nearly 700M gallons of gasoline and avoid 2.7M metric tons of GHG and create a hydrogen station network coverage that would reach 97% of identified priority communities. The environmental benefits are even greater if the network maintains the 90% renewable content reported in annual AB8 reports the past few years, instead of the conservative 33% minimal content used at the time of publication. The CARB *Hydrogen Station Network Self-Sufficiency Analysis* published more recently further reinforces the progress and opportunity for expanded hydrogen targets to accelerate the market transformation objectives of the ZEV regulation and CTP.

The 2021 *Vision for Freight Movement* report provided expanded hydrogen infrastructure targets for deployment of fuel cell electric trucks (FCET) in California, with consideration of how California's leadership will help expand ZEV heavy-duty deployment in California and across the western states. This document outlined expanded infrastructure targets of 200 heavy-duty hydrogen stations and 700,000 class 8 FCETs by 2035 to launch this critical ZEV market application and put the industry on a similar self-sufficiency pathway. Achieving these targets would displace over 540M gallons of diesel and avoid 6.7M metric tons of GHG in some of the most impacted communities across California. The CTP Investment Plan should recognize and integrate the expanded 1,000 light-duty and 200 heavy-duty hydrogen station targets developed through the collaborative work of public and private stakeholders supporting state and CTP ZEV objectives. California cannot sit by and wait when it can do more to accelerate *all* ZEV deployments

⁷ [California Fuel Cell Revolution: A Vision for Advancing Economic, Social & Environmental Priorities](#), CaFCP. July 2018

⁸ [Fuel Cell Electric Trucks: A Vision for Freight Movement in California – and Beyond](#), CaFCP. July 2021

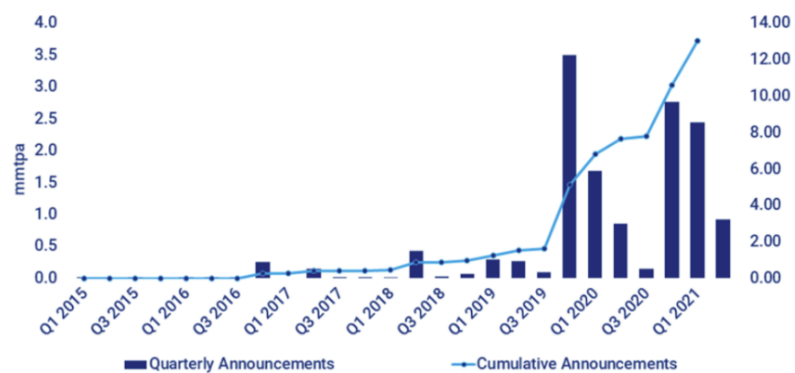
Three questions were posed to the Advisory Committee during the September 16th meeting. The following feedback is provided, as requested, to facilitate a stronger CTP and hastened achievement of program objectives.

Do the revised funding allocations in the latest version of the Investment Plan appropriately account for the availability of new General Fund monies? If not, what changes to the investment plan should the CEC consider?

Considering the points laid out in this letter, additional consideration needs to be given to increased funding for hydrogen and FCEVs (light- and heavy-duty) as the technology with the greatest demonstrated long-term environmental benefits and only identified pathway to market sustainability. These are the core market transformation objectives of CTP, the Governor’s ZEV Executive Order and original light-duty and subsequent heavy-duty ZEV regulations. While the current AB8 directive caps CTP hydrogen expenditures to \$20M or 20% of the program annually, the inclusion of General Funds opens the opportunity to significantly advance hydrogen infrastructure and FCEV adoption and achieve program objectives well ahead of any other technology. Furthermore, with the draft *Hydrogen Station Network Self-Sufficiency Analysis* stating that an additional \$300M in state funding would likely be sufficient to achieve light-duty FCEV market sustainability by 2030, splitting the General Funds across the two ZEV technologies, rather than supporting only one technology, or even providing hydrogen infrastructure a lesser yet significant portion of the funding would send meaningful, strong signals to industry to expand market deployment above and beyond what the GFO-19-602 hydrogen station solicitation started. The opportunity to leverage this considerable one-time General Fund investment to create the tipping point for the world’s first sustainable ZEV market should not squandered.

The most recent CEC hydrogen solicitation was significant in how it shifted towards a market-building support mechanism, and industry responded. Since its original inception and eventual awards, GFO-19-602 did more than markedly increase the number of hydrogen stations in development, it provided the strong market signal industry needed to increase private investment in California’s hydrogen and FCEV market. Similar to how dozens of countries’ national hydrogen strategies^{9,10} expanded private investments in green hydrogen¹¹, CEC’s hydrogen solicitation reinforced and encouraged expanded private investment and activities in

Low-carbon hydrogen project announcements by quarter
Q1 2017-Q1 2021 (mmtpa)



⁹ [Countries roll out green hydrogen strategies](#), Electrolyzer Targets, Power Magazine. February 1, 2021

¹⁰ [Hydrogen insights](#), Hydrogen Council. February 2021

¹¹ [Why green hydrogen is reaching a tipping point](#), Wood Mackenzie. June 9, 2021

the hydrogen transportation market. These include-yet are not limited to- hydrogen infrastructure announcements by Air Liquide¹², Chevron¹³, Iwatani¹⁴, Shell¹⁵, SoCalGas¹⁶, BayoTech¹⁷, FirstElement Fuel¹⁸, Linde¹⁹, Air Products²⁰, and Plug Power²¹, as well as vehicle manufacturer fuel cell announcements by Hyundai^{22, 23}, Toyota²⁴, Cummins²⁵, Cellcentric²⁶, Daimler Trucks²⁷, Nikola²⁸, Ford²⁹, GM³⁰, BMW³¹, Stellantis³², and Great Wall³³. Durable market-building government policies and strong signals are resulting in complimentary strong private investments and market development activities by hydrogen and fuel cell stakeholders.

California historically has led the development and deployment of hydrogen and FCEVs, yet in recent years has fallen behind many countries in hydrogen infrastructure development and FCEV deployments³⁴. However, California is still the leading automotive market and industry is positioning itself worldwide to meet the ZEV transition with both FCEVs and PEVs wherever policies and hydrogen infrastructure reinforce market deployment³⁵. California can retake its leadership position, and the benefits that accrue with that position, with expanded support from this one-time General Fund effort and vault California ahead in ZEV and FCEV deployment.

Is the CEC appropriately balancing the needs and opportunities for ZEV infrastructure across the light- and medium-/heavy-duty sectors? If not, what changes to the Investment Plan should the CEC consider?

Light- and heavy-duty ZEV market applications are very different in user requirements, infrastructure needs and state of market development. It is appropriate and constructive to keep the funding for these sectors distinct to concentrate on their individual commercial development needs. The light-duty market for both ZEV technologies is now in early commercial, albeit nascent, rollout with manufacturers continuing to increase the number of available makes and models and overall vehicle production capacities. The focus is now on increasing ZEV adoption for all Californians, and ensuring the infrastructure is there to support those deployments.

¹² [Air Liquide committed to producing renewable hydrogen for West Coast mobility market](#), Air Liquide. October 8, 2109

¹³ [Chevron invests in waste-to-hydrogen startup in California](#), S&P Global. August 18, 2021

¹⁴ [Iwatani, SG H2 & City of Lancaster launch green H2 transportation eco-system](#), Green Car Congress. September 12, 2021

¹⁵ [Shell to develop multi-modal hydrogen station in California](#), H2 View. August 12, 2021

¹⁶ [SoCal Gas & CEC to provide funds to test hydrogen fuel cell technology for marine vessels](#), SoCalGas. April 27, 2021

¹⁷ [BayoTech secures private equity to expand hydrogen production offerings](#), NGI. January 6, 2021

¹⁸ [FirstElement's California hydrogen network receives \\$24M to quadruple its retail capacity](#), Cision. April 2, 2019

¹⁹ [Linde to produce green hydrogen for mobility market in California](#), Linde. November 2, 2020

²⁰ [Air Products and Cummins to accelerate hydrogen fuel cell trucks](#), Air Products. July 26, 2021

²¹ [Fresno Co. lands West Coast's largest green hydrogen plant](#), Fresno Bee. September 21, 2021

²² [Hyundai's XCIENT fuel cell hitting the road in California](#), Hyundai. July 26, 2021

²³ [Hyundai to offer hydrogen fuel cell versions of all commercial vehicles by 2028](#), Reuters. September 6, 2021

²⁴ [Toyota unveils new fuel cell car in fresh push on hydrogen technology](#), Reuters. December 8, 2020

²⁵ [Cummins fuel cells powering North America's first commercial zero-emissions ferry](#), Cummins. February 9, 2021

²⁶ [Daimler, Volvo debut Cellcentric](#), FleetOwner. April 16, 2021

²⁷ [World's largest long-haul truckmaker sees hydrogen-fueled future](#), New York Times. May 23, 2021

²⁸ [Nikola expands sales and service coverage in Southern California](#), Nikola. September 1, 2021

²⁹ [Ford and AVL examine FCEV Transit viability](#), electric.com. Sep 27, 2021

³⁰ [Plans, trains & automobiles: if it moves, GM will build hydrogen fuel cells](#), Forbes. June 17, 2021

³¹ [Everyday testing of BMW i Hydrogen NEXT with hydrogen fuel cell](#), BMW Group. June 16, 2021

³² [Stellantis Hydrogen Fuel Cells for Light Commercial Vehicles](#), Stellantis. March 2021

³³ [China's Great Wall plans hydrogen fuel cell SUV model](#), Reuters. March 29, 2021

³⁴ [Platts launches hydrogen pump prices in Germany, Japan and California](#). S&P Global. September 2, 2021

³⁵ [Auto Innovators: aligning policies for a cleaner future](#), Alliance for Automotive Innovation. August 5, 2021

The heavy-duty sector for both technologies are still in development phase, focusing on vehicle and infrastructure technology advancements, deploying early development fleets to enable later production expansion, and bringing together the various vehicle, infrastructure, fleet operator, and government stakeholders to develop the market collaboratively to meet public and private needs for a commercial market success.

CTP has historically recognized these distinctions between the light- and heavy-duty ZEV markets by establishing separate funding allocations for light- and medium-/heavy-duty ZEV infrastructure. This is appropriate and should continue. However, while it continues to respect these differences between light- and heavy-duty PEV charging allocations, it has recently proposed mixing light- and heavy-duty hydrogen allocations. This is neither appropriate nor equitable, and the allocations should remain distinct and focused to maximize market rollout for each sector. This separation and focus is especially important considering the light-duty market is within a decade of reaching initial self-sufficiency, as this success will facilitate lower infrastructure and vehicle costs for the heavy-duty market, hastening its transition to 100% ZEV faster than would be possible without light-duty success.

Does the Investment Plan reflect the needs of low-income, disadvantaged, or underrepresented Californians and California communities? If not, what changes to the Investment Plan should the CEC consider?

As a large, diverse state with many different geographies, populations, and lifestyles California requires a variety of zero-emission vehicle and fueling options that enable every Californian the ability to access and participate in the ZEV transition. This includes supporting and enabling both battery electric and fuel cell electric vehicles to achieve overall market success. The two technologies are complimentary, with FCEVs providing the fast fill, long-range option that is immediately accessible to high-density housing³⁶, long distance or “super commuter” lifestyles and those who prefer a conventional automotive experience with little to no change in consumer behavior. FCEVs enable a 1:1 replacement of a conventional vehicle, light- or heavy-duty, and empowers all Californians to participate in the ZEV transition with fewer obstacles to widespread ZEV adoption with accessible public infrastructure.

The multitude of global ZEV adoption studies demonstrate that customers require a variety of ZEV options, a network of reliable infrastructure, and that vehicle, fuel and infrastructure costs are competitive to facilitate early adoption, let alone the full transition to 100% zero emissions^{37,38,39,40}. The road to 100% ZEV adoption is challenging, with no silver bullet, and thus every ZEV opportunity needs to be supported to enable every Californian can participate. Even California’s globally recognized policies and incentive programs have proven insufficient to meet state ZEV targets or achieve the ZEV adoption tipping point required to meet California goals. As

³⁶ [City & County of San Francisco Alternative Fuel Readiness Plan](#), City & County of SF, Dept of Environment. February 2017

³⁷ [The role of charging and refueling infrastructure in supporting ZEV sales](#), Simon Fraser University. June 2019, et al

³⁸ [Hydrogen Vehicles Get Favorable Marks](#), David Binder Research. May 2021

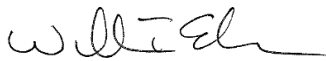
³⁹ [KPMG Global Automotive Surveys](#), KPMG

⁴⁰ [Hydrogen vehicles get favorable marks](#), David Binder Research. June 16, 2021

stated in CaFCP's previous Advisory Committee feedback letter,⁴¹ California needs every ZEV it can get, including fuel cell electric vehicles, and CTP should support all ZEVs and position them for sustained market success to support all Californians in participating in the ZEV transition.

Collectively, the feedback in this submission highlights that the California light-duty FCEV and hydrogen market could be self-sufficient and cost effective by 2030 and that this will facilitate the heavy-duty market along a similar sustainable pathway, enabling all Californians to participation in the ZEV transition. By increasing the level of support for hydrogen infrastructure and FCEVs, including expanding resource allocations and the market signals that accompany them, the CTP can hasten ZEV adoption among the most impacted communities and provide the needed environmental benefits they enable. While special incentives and support mechanisms are important, integrating this feedback and *accelerating the full ZEV transition into a sustainable market will be the most durable method to support all Californians participate in a successful 100% ZEV market transformation.*

Sincerely,



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cc:

Liane Randolph, CARB
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CaFCP members

⁴¹ [Advisory Committee feedback on 2021-2023 Investment Plan](#), CaFCP. May 14, 2021