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**Alternative and Renewable Fuel and Vehicle Technology Program - Public Comment**

*Additional submitted attachment is included below.*

# California Alternative and Renewable Fuel and Vehicle Technology Program - Public Comment

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The California Energy Commission's (CEC) proposed funding allocation for electrified transportation and infrastructure development is inaccurately skewed in favor of battery-electric vehicle (BEV) and charging infrastructure technologies. These inaccuracies stem from admitted research shortcomings from Bloomberg New Energy Finance that neglect to accurately model the market trend forecasting for hydrogen fuel cell electric vehicles (FCEV) and hydrogen fueling infrastructure, wherein models for BEV market trends are presented to year 2040 and beyond, FCEV and hydrogen trends are market forecasted no further than five years from current standing. This skewed research may be due to the manipulation of market trends associated with multimillion dollar investments made by Electrify America into regional charging infrastructure and BEV incentives, a practice that has ignored and neglected to fund FCEV and hydrogen infrastructure programs.

The CEC's own analysis highlights both a historical, and anticipated favoring of BEV and charging infrastructure (Table 3 & 4 of 2019-2020 Investment Plan Update for the Clean Transportation Program) despite identifying the volumetric benefits that favor FCEV and hydrogen infrastructure, notably the 5.8X reduction of NO<sub>x</sub> reductions per year from hydrogen fuel infrastructure compared to electric vehicle charging infrastructure (Table 7 of 2019-2020 Investment Plan Update for the Clean Transportation Program, shown right).

If the CEC's intent and focus is on the reduction of greenhouse gas (GHG) emissions derived from transportation sectors, then it would appear that prior and planned investment structures are mistakenly favoring BEV and charging infrastructure, despite FCEV and hydrogen infrastructure as having a greater impact on GHG reductions.

It is recommended that the CEC reconsider Proposed Investment Plan Allocations for FY 2019-2020 to provide a **minimum of equal funding** amounts for BEV/electric vehicle charging infrastructure to match hydrogen refueling infrastructure **for the Light-Duty category**.

For **Medium and Heavy-Duty Zero-Emissions Vehicles and Infrastructure** it is recommended that the CEC provide a **minimum of 2X (200%) greater funding for FCEV and hydrogen refueling infrastructure, over any proposed BEV and electric vehicle charging infrastructure funding allocations**. This proposal is based upon the volumetric benefits of hydrogen FCEV over BEV as identified by the CEC, paired with Department of Energy research indicating hydrogen FCEV power-to-weight ratio benefits over BEV (shown right), an attribute that is critical to payload distribution associated with commercial medium and heavy-duty fleets.

Table 3: Proposed Investment Plan Allocations for FY 2019-2020 (in Millions)

Category	Funded Activity	2019-2020
Zero-Emission Vehicles and Infrastructure	Light-Duty Electric Vehicle Charging Infrastructure	\$32.7
	Medium- and Heavy-Duty Zero-Emission Vehicles and Infrastructure	\$30
	Hydrogen Refueling Infrastructure	\$20
Alternative Fuel Production	Zero- and Near-Zero-Carbon Fuel Production	\$10
Related Needs and Opportunities	Workforce Development	\$2.5
<b>Total</b>		<b>\$95.2</b>

Source: California Energy Commission

Table 4: Most Recent Approved Investment Plan Allocations (in Millions)

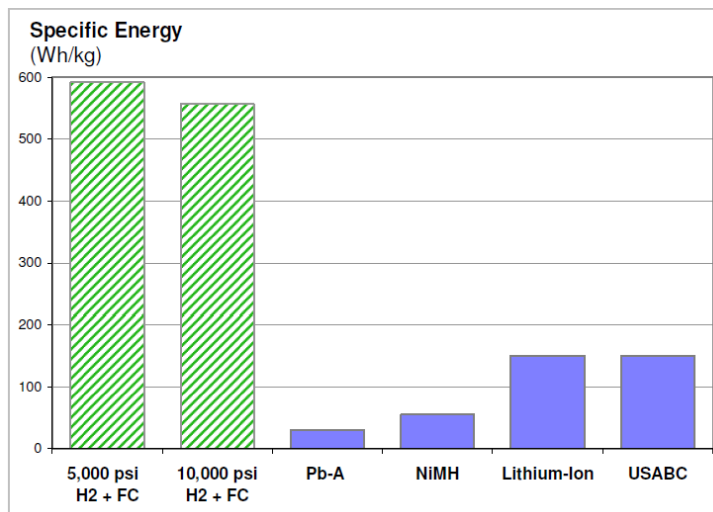
Funded Activity	2017-2018*	2018-2019	Unencumbered Funds**
Electric Vehicle Charging Infrastructure	\$16.6	\$94.2	\$44.1
Hydrogen Refueling Infrastructure	\$19.4	\$20	\$23.7
Manufacturing	\$4.9	\$8.5	\$2.5
Workforce Training and Development	\$3.4		
Emerging Opportunities	\$0.4	-	-
Advanced Freight and Fleet Technologies	\$17.5	\$17.5	\$17.5
Low-Carbon Fuel Production and Supply	\$22.9	\$12.5***	\$12.5
Natural Gas Vehicles	\$10.0	-	-
Natural Gas Fueling Infrastructure	\$2.1	-	-
<b>Total</b>	<b>\$97.2</b>	<b>\$152.7</b>	<b>\$100.3</b>

Source: California Energy Commission. \*Funding allocations for FY 2017-2018 were revised at the January 9, 2019 Business Meeting to the numbers shown here. \*\*Unencumbered funds include funding from FY 2017-2018 and FY 2018-2019 that has not yet been reserved for a funding solicitation or dedicated to a specific agreement. As of June 12, 2019. \*\*\*For FY 2018-2019, both the Clean Transportation Program fund and the Greenhouse Gas Reduction Fund each provided \$12.5 million for Low-Carbon Fuel Production and Supply. Only the \$12.5 million from the Clean Transportation Program is shown here.

Table 7: Expected Annual Air Pollution Emission Reduction Benefits From Clean Transportation Program-Funded Projects (as of June 2017)

Project Type		NO <sub>x</sub> Reductions (Tonnes/Year)			PM <sub>2.5</sub> Reductions (Tonnes/Year)		
		2020	2025	2030	2020	2025	2030
Fuel Infrastructure	Electric Chargers	1.89	1.57	1.57	0.19	0.19	0.07
	Hydrogen	9.31	8.51	9.25	0.94	1.05	0.43
Vehicles	CVRP & HVIP Support	7.06	6.44	1.83	0.11	0.09	0.05
	Medium- & Heavy-Duty	7.52	12.43	11.52	0.23	0.25	0.22
	Manufacturing	537.17	1,126.14	1,201.45	7.55	19.68	28.13
<b>Total</b>		<b>562.95</b>	<b>1,155.09</b>	<b>1,225.62</b>	<b>9.02</b>	<b>21.26</b>	<b>28.90</b>

Source: NREL



C. E. (Sandy) Thomas, Ph.D., 2009, "Fuel Cell and Battery Electric Vehicles Compared", pg 3, March 27, <https://www.energy.gov/sites/prod/files/2014/03/f9/t>