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Comment Received From: Hannah Goldsmith
Submitted On: 5/31/2019
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CalETC Comments Re IEPR Staff Workshops on ZEV Market and EV Charging Infrastructure Assessment

Additional submitted attachment is included below.

May 31, 2019

California Energy Commission
Docket Unit, MS-4
Re: Docket No. 19-IEPR-04
1516 Ninth Street
Sacramento, California 95814-5512

Submitted via electronic commenting system for docket 19-IEPR-04

Re: **IEPR Commissioner Workshop on the Status of the Zero Emission Vehicle Market And IEPR Staff Workshop on the Electric Vehicle Charging Infrastructure Assessment (AB 2127) -- Off-Road, Port, and Airport Electrification**

The California Electric Transportation Coalition (CalETC) appreciates the opportunity to provide feedback on the California Energy Commission (CEC) IEPR Commissioner Workshop on the Status of the Zero Emission Vehicle Market and IEPR Staff Workshop on the Electric Vehicle Charging Infrastructure Assessment (AB 2127), both held on May 2, 2019.

CalETC supports and advocates for the transition to a zero-emission transportation future as a means to spur economic growth, fuel diversity and energy independence, ensure clean air, and combat climate change. CalETC is a non-profit association committed to the successful introduction and large-scale deployment of all forms of electric transportation. Our board of directors includes: Los Angeles Department of Water and Power, Pacific Gas and Electric, Sacramento Municipal Utility District, San Diego Gas and Electric, Southern California Edison, and the Southern California Public Power Authority. Our membership also includes major automakers, manufacturers of zero-emission trucks and buses, electric vehicle charging providers, and other industry leaders supporting transportation electrification.

California has goals to deploy 1.5 million zero-emission vehicles and 250,000 EV charging stations, including 10,000 DC fast chargers, by 2025.[1] California also has a goal of deploying 5 million zero-emission vehicles by 2030,[2] which will require even further scale-up of the charging infrastructure for electric vehicles. The state currently has slightly over 16,700 public L2 charging connectors, and slightly over 2,900 public direct current

[1] Former Governor Edmund G. Brown Jr. Executive Order B-16-2012 set the goal of placing 1.5 million zero-emission vehicles on California's roads by 2025. Former Governor Edmund G. Brown's Executive Order B-48-18 set the goal of 250,000 electric vehicle charging stations, including 10,000 DCFC charging stations, by 2025. In addition, the Charge Ahead California Initiative, [SB 1275 (De León), Chapter 530, Statutes of 2014] set the goal of placing 1 million zero- and near-zero-emission vehicles into service on California's roads by 2023.

[2] Former Governor Edmund G. Brown Jr. Executive Order B-48-18 set the goal of 5 million zero-emission vehicles on California's roads by 2030.

fast charging connectors.[3] We have a long way to go to meet California's zero-emission vehicle and fueling goals, as well as the air-quality and climate-change targets underpinning these goals.

AB 2127 (Ting), Chapter 365, Statutes of 2018, codified as Public Resources Code section 25229, tasked the CEC with collaborating with the California Air Resources Board and California Public Utilities Commission to "prepare a statewide assessment of the electric vehicle charging infrastructure needed to support the levels of electric vehicle adoption required for the state to meet its goals of putting at least five million zero-emission vehicles on California roads by 2030, and of reducing emissions of greenhouse gases to 40 percent below 1990 levels by 2030." AB 2127, among other things, also tasked the CEC with regularly seeking data and input from stakeholders to help inform the assessment.

CalETC supports the CEC's efforts to assess the need for electric vehicle charging infrastructure to support five million zero-emission vehicles and cut greenhouse-gas emissions. We agree that it is appropriate to consider vehicle/equipment and infrastructure projections based on cost projections, relevant current and anticipated regulations that will increase zero-emission vehicle adoption, incentive programs driving adoption, local air district measures and programs, as well as other studies and factors. To help inform the CEC's efforts, we put together the preliminary list of relevant reference materials in Appendix A, which follows this letter.

Thank you for your consideration of our comments. Please do not hesitate to contact me at (916) 551-1943 or hannah@caletc.com should you have any questions or if we can be of assistance with providing additional data or information to help inform the assessment.

Sincerely,

Hannah Goldsmith
Deputy Executive Director
California Electric Transportation Coalition

[3] Data from www.afdc.energy.gov. Accessed on May 15, 2019. This represents 673 public DCFC stations and 4,675 public L2 stations.

Appendix A: Linked Data Sources on Status of ZEV Market and Off-Road, Port and Airport Electrification

Batteries

1. Plug-in America: Battery surveys
2. https://insideevs.com/news/347324/vw-batteries-last-life-electric-car/
3. Nissan batteries to outlast car by 10 or 12 years
4. GlobalData: Global battery energy storage market to grow by 7% to reach $13.13B by 2023
5. https://www.reuters.com/article/us-usa-lithium-exclusive/exclusive-united-states-sets-sights-on-china-in-new-electric-vehicle-push
6. https://www.bloomberg.com/news/features/2018-02-01/the-breakneck-rise-of-china-s-colossus-of-electric-car-batteries
7. https://www.greencarreports.com/news/1117705 as-used-electric-car-batteries-set-to-flood-market-automakers-ramp-up-reuse-efforts

Load and EV forecasts, trends, and surveys

8. EPRI: US National Electrification Assessment 2018
9. More than 1M plug-in vehicles sold in China in 2018; 8.1% of LDV market (source USDOE)
10. https://insideevs.com/news/347761/electric-car-sales-automotive-groups-q1-2019/
11. https://cleantechnica.com/2019/02/17/top-10-best-selling-plug-in-vehicle-brands-in-2019/
12. VW to produce 22 million EVs by 2028 - with 50% made in China
13. https://insideevs.com/plug-in-electric-favorite-fuel-future/ Navigant study finds EVs are best fuel for the future
14. https://www.greencarreports.com/news/1122249_forecast-in-2030-gasoline-will-still-power-7-out-of-10-new-u-s-vehicles
15. Moody's: Automakers fully engaged on BEVs, but transition will pressure returns; need to invest in multiple technologies 24 January 2018
16. BofA Sees Oil Demand Peaking by 2030 as Electric Vehicles Boom Bloomberg
17. Bloomberg NEF Electric Vehicle Outlook 2018
18. Roland Berger: demand for purpose-built vehicles for ride-sharing, many electric, to reach 2.5M cars by 2025
19. https://www.cnbc.com/2019/04/08/fitch-says-chinese-electric-vehicle-sales-to-boom-despite-subsidy-cuts.html
20. Frost and Sullivan: Global Electric Vehicle Market Outlook, 2018: more than 1.6 million EVs are likely to be sold globally
21. Electric Cars May Be Cheaper Than Gas Guzzlers in Seven Years Bloomberg
22. BP sees self-driving electric vehicles crimping oil demand by 2040 Reuters
23. Survey: Half of young people want EVs
24. Global Trends in Clean Energy and Transportation, BNEF 2018

25. https://chargedevs.com/newswire/aaa-survey-americans-are-interested-in-evs-but-know-little-about-them/
26. Japan's Fuji Keizai Group forecast: global EV sales of 11.25 million in 2035 nearly 15 times the 2017 sales with China at 57% of total
27. How Self-Driving Cars Will Accelerate Electric Vehicle Adoption ... https://www.greencarcongress.com/2018/07/20180720-hayden.html
28. Study finds behavior-influencing policies remain critical for mass ... https://www.greencarcongress.com/2018/07/20180723-iiasa.html
29. Researchers forecast light-duty vehicle electricity use in 2050 considering electrification, autonomy and sharing: 13-26% of total demand Green car Congress
30. GlobalData: EVs will transform the automotive industry over the next ... https://www.greencarcongress.com/2018/08/20180807-gd.html
31. GlobalData: Global battery energy storage market to grow by 7% to ... https://www.greencarcongress.com/2019/.../20190503-globaldata.html
32. GlobalData: Global lithium production to triple over the next four years https://www.greencarcongress.com/2018/08/20180820-li.html
33. Surging Demand for Electric Vehicles - Bloomberg 2018
34. L.A. sets electric-car targets as host for 2028 Olympics - Green Car Congress
35. https://insideevs.com/worlds-top-10-ev-automotive-groups-2018/
36. Deloitte report predicts 21 million EVs by 2030 and price parity by 2022
37. https://www.greencarreports.com/news/1121091_from-a-global-view-going-electric-could-hike-up-small-car-prices
38. From a global view, going electric could hike up small-car prices Green Car Congress
39. https://insideevs.com/china-too-many-electric-cars/ in 2020 China will be able to make 20 million EVs, when target is 2 million
40. Bank of America: Oil Demand Growth to Hit Zero Within a Decade, EVs the Culprit<https://www.greencarcongress.com/2019/02/20190207-baml.html>
41. International Energy Agency: Global oil demand under growing threat from electric cars, cleaner fuel
42. https://www.greenbiz.com/article/ev100-initiative-31-companies-join-drive-switch-electric-vehicles
43. UC Berkeley: How to Achieve 100% zero-emission vehicles
44. Plug-in Electric Vehicle Sales Forecast Through 2025 and the Charging Infrastructure Required EEI June 2017
45. Electric Vehicle Sales Forecast and the Charging Infrastructure Required Through 2030 EEI Nov 2018
46. https://www.electrificationcoalition.org/programs/electric-vehicle-fleets/
47. Electrification Roadmap - Electrification Coalition
48. Overcoming Barriers to Deployment of Plug-in Electric Vehicles, Nat'l Academy of Sciences, 2015
49. Reinventing the Wheel: The future of cars, oil, chemicals, and electric power, IHS Markit June 2017

BEV and PHEV data

50. Plug-in America: Evaluating Methods to Encourage Plug-in Electric Vehicle Adoption 2016
51. Jack Fawcett & Associates: CA investment in ZEV Incentives Pays Off 2015
52. ICF: California Transportation Electrification Assessment: Phase 1 2014
53. ICF and E3: California Transportation Electrification Assessment: Phase 2: Grid Impacts 2014
54. Plug-in America: Used EV Guide 2019
55. EPRI: US National Electrification Assessment 2018
56. EPRI and NRDC: Environmental Impacts of Plug-in EVs 2007
57. EPRI and NRDC: Environmental Assessment of a Full Electric Transportation Portfolio 2015 (4 reports)
58. EPRI and NRDC: Environmental Assessment of a Full Electric Transportation Portfolio – California 2016 (no link)
59. UC Davis: Exploring the Role of Plug-In Hybrid Electric Vehicles in Electrifying Passenger Transportation
60. https://insideevs.com/news/345852/carmakers-to-spend-255-billion-on-electrification-by-2022-some-are-skeptic/
61. https://insideevs.com/european-countries-with-the-highest-plug-in-car-market-share-in-2018/
62. https://insideevs.com/mini-usa-electric-car-survey/ most are OK with 75 miles range
63. https://www.greencarreports.com/news/1116066_mckinsey-summarizes-state-of-the-art-latest-trends-in-electric-cars
64. https://www.greencarreports.com/news/1116043_china-plans-to-standardize-electric-car-tech-nationally-to-expand-its-global-lead
65. Ihttps://www.automotiveworld.com/news-releases/icct-the-continued-transition-to-electric-vehicles-in-u-s-cities/ 2018
66. ICCT assesses factors driving EV market in US cities 2017
67. Blockchain for EV charging: McKinsey report
68. Great charts on all of the PHEVs in the US - cost, range, etc.
69. Gov't, industry, national labs collaborate on comprehensive cradle-to-grave LCA study and economic assessment of LDV GHG reductions Green Car Congress
70. Global carmakers to invest at least $90 billion in electric vehicles Reuters
71. Publications by UCD's EV center
72. publications by UC Berkeley on EVs
73. Publications by UCLA on EV planning
74. Publications by the ICCT on EVs
75. Publications by Calstart on electric cars
76. Publications by Union of Concerned Scientists on electric cars
77. Publications by Natural Resources Defense Council on electric cars

BEV and PHEV prices and costs

78. https://insideevs.com/news/348031/electric-car-compared-us-may-2019/
79. https://insideevs.com/news/348078/most-affordable-evs-per-mile-of-range-may-2019/
80. updated guide to comparing EVs - cost, specs, range, and more

81. https://www.myev.com/research/buyers-sellers-advice/the-best-used-electric-vehicles-for-the-money
82. https://www.greencarreports.com/news/1122631 tesla-launches-battery-recycling-at-nevada-gigafactory
83. https://insideevs.com/news/345797/nissans-supplier-aesc-to-build-20-gwh-battery-factory-in-china/
84. https://insideevs.com/which-electric-cars-are-the-cheapest-to-lease/
85. https://www.myev.com/research/buyers-sellers-advice/electric-vehicles-with-the-best-resale-values-for-2019
86. https://www.greencarreports.com/news/1114793_gm-promises-it-can-make-money-on-all-electric-cars-by-2021
87. https://www.myev.com/research/buyers-sellers-advice/the-best-electric-car-lease-deals-under-300-per-month May 2019
88. https://insideevs.com/news/349502/drivers-wont-buy-electric-too-expensive/
89. Bloomberg: EVs are estimated to be Cheaper than Regular Cars by 2022
90. The ICCT: Nearly half of the world's EVs are in 25 cities; China leads the way

Utilities

91. Several dozen EPRI reports on EVs, e-trucks, and electric non-road
92. EEI Accelerating EV Adoption Feb 2018
93. AEEE report: What utility commissioners need to know about the accelerating electric vehicle marke
94. Engaging Utilities and Regulators on Transportation Electrification, Electricity Journal 2015
95. Advancing Industry Collaboration in the EV Market, Atlas Public Policy, Nov 2016
96. Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business, EEI, Jan 2013
97. EEI: Utility Fleets Leading the Charge, 2014
98. EEI: Utility Guide to EV Readiness, 2011
99. SCE PEV Readiness Strategy and Roadmap 2011 (no link)
100. https://www.smartgrid.gov/files/Southern_California_Edison_Smart_Grid_Strategy_Roadmap_201012.pdf
101. https://www.ethree.com/tools/electric-vehicle-grid-impacts-model-2/
102. Electrification: emerging opportunities for utility growth, Brattle Group, 2017
103. Electric Vehicles and the grid, Next 10, 2018
104. Other studies by E3
105. Edison International publications on EVs and here
106. SMUD reports
107. SCPPA member programs
108. PG&E programs and here
109. SDG&E programs

Charging (general)

110. https://insideevs.com/news/348050/electric-vehicle-charging-guide/
111. SAE publishes recommended practice standard for wireless EV charging up to 11 kW 02 May 2019

112. https://www.nrel.gov/news/press/2018/nrel_research_determines_integration_of_electric_vehicles.html
113. https://www.greencarreports.com/news/1114590_south-korea-to-standardize-on-ccs-fast-charging-standard-used-by-us-german-makers
114. https://chargedevs.com/newswire/new-study-finds-v2g-discharging-harmful-to-ev-batteries/
115. https://calstart.org/wp-content/uploads/2018/10/Electric-Truck-and-Bus-Grid-Integration_-Opportunities-Challenges-and-Recommendations.pdf
116. Electric Vehicle-To-Grid Services Can Feed, Stabilize Power Supply Forbes
117. https://www.greencarreports.com/news/1114386_under-paris-agreement-electric-cars-will-hurt-oil-demand-well-before-power-supply-report
118. http://innovation.luskin.ucla.edu/content/overcoming-barriers-electric-vehicle-charging-multi-unit-dwellings-westside-cities-case-stud
119. Electric Power Research Institute "National Charging Costs" Dec 2017, Dunckley, Jamie (no link)
120. http://www.chargevc.org/wp-content/uploads/2017/12/6-EPRI-The-Value-of-Transportation-Electrification.pdf
121. EPRI Multi-State EV Market and Charging Survey 2016
122. https://www.reuters.com/article/us-blockchain-energy/as-energy-markets-evolve-blockchain-powers-up-idUSKBN1EG0V1
123. GreenTechMedia report: US Charging market to grow to $18.6 billion by
124. ICCT quantifies the EV charging infrastructure gap across US markets, 2019
125. Plugging Away: How to Boost Electric Vehicle Charging Infrastructure, UCLA and UCB, June 2017
126. ELECTRIC DRIVE BY '25: How California Can Catalyze Mass Adoption of Electric Vehicles by 2025, UCLA and UCB, 2012
127. National Economic Value Assessment of Plug-In Electric Vehicles volume 1, Dec 2016, NREL
128. Electrification Futures Study: End-Use Electric Technology Cost and Performance Projections through 2050, NREL
129. NREL National Plug-in Vehicle Infrastructure Analysis, 2017
130. Impact of uncoordinated plug-in electric vehicle charging on residential power demand, Nature, Jan 2018
131. https://rmi.org/insight/electric-vehicles-distributed-energy-resources/
132. RMI: EVGO fleet and tariff analysis - California
133. https://rmi.org/insight/from_gas_to_grid/
134. best practices for workplace charging, Calstart, 2013
135. https://www.amplypower.com/gasvselectricwhitepaper/
136. https://www.amplypower.com/gasvselectric/

Commercial EVs (general)

137. ICF: California Transportation Electrification Assessment Phase 3-Part A: Commercial and Non-Road Grid Impacts – Final Report, 2016
138. ICF - Medium- and Heavy- Duty Electrification in California, Literature review, Dec 2018

139. ICF - Heavy-Duty Alternative Fuel Trucks, 2015
140. ICF: California Transportation Electrification Assessment: Phase 1 2014
141. EPRI: US National Electrification Assessment 2018
142. GM confirms electric pick-up is coming
143. Lightning Systems debuts new all-electric Ford F-59 Model, electrifying delivery vans and food trucks 01 May 2019
144. Foothill Transit Battery Electric Bus Demonstration Results: Second Report NREL
145. Foothill Transit Battery Electric Bus Demonstration Results NREL
146. Ford to Invest $500 Million in Rivian
147. https://www.greenbiz.com/article/big-truck-makers-are-starting-take-electric-trucks-seriously
148. Penske deploys DC fast charging for trucks in So Cal for leased trucks
149. Trillium deploys new charging products for fleets
150. https://insideevs.com/news/346854/freightliner-produce-electric-trucks-2021/ in Portland Oregon a Daimler company
151. Dana and Motiv Power collaborate on integration of all-electric Spicer e-Axle on Ford Super Duty F-550 chassis 25 April 2019
152. Toyota, Kenworth, POLA and CARB unveil next-gen heavy-duty fuel-cell truck; ZANZEFF 23 April 2019
153. https://insideevs.com/news/345866/a-closer-look-at-nikola-world-2019-5-debuts-advantages-challenges/
154. https://insideevs.com/news/345833/renault-announces-experimental-last-mile-delivery-van-ez-flex/
155. https://insideevs.com/news/345571/byd-electric-refuse-truck-california/
156. https://insideevs.com/news/346746/tesla-semi-prototype-amazingly-production-delayed/ to 2020
157. https://insideevs.com/news/345845/nikola-wows-huge-crowd-with-five-zero-emission-vehicles/
158. Calstart publications on electric trucks
159. GNA publications on electric trucks
160. Union of Concerned Scientists Publications on electric trucks and buses
161. Roadmap to climate friendly land freight and buses in Europe, Transport and Environment, 2017
162. International Energy Agency: The Future of Trucks, 2017
163. North American Council on Freight Efficiency Ex Summary - Electric Trucks Where they make sense 2018
164. North American Council on Freight Efficiency Exec Summary - medium duty electric trucks - cost of ownership
165. North American Council on Freight Efficiency Exec Summary - e-truck charging infrastructure 2019
166. https://electrek.co/2019/04/16/proterra-battery-leasing-program/
167. McKinsey Insights: Harnessing momentum for electrification in heavy machinery and equipment, 2019
168. New MIT Concept for Plug-in Hybrid Heavy-duty Trucks Could Compete with Tesla

Off-road EVs

169. ICF: California Transportation Electrification Assessment: Phase 1 2014
170. EPRI: Electric Lift Truck Cost Calculator

Port EVs and Drayage trucks

171. ICF - Medium- and Heavy-Duty Electrification in California, Literature review, Dec 2018
172. Energy and Environmental Research Associates (EERA) Report Finds Significant Economic Benefits to the Nation and Regions from Electrification of Transportation-Related Medium- and Heavy-Duty Technologies (April 2018)
173. ICF: California Transportation Electrification Assessment: Phase 1 2014

Airport EVs

174. ICF: California Transportation Electrification Assessment: Phase 1 2014

California Agencies

175. Overview of CPUC and other agencies' efforts
176. VGI communication protocol working group
177. CARB Technology and Fuels Assessments, and Plans