

MAINTENANCE

Building ZEB Infrastructure for Battery Electric Fleets

California Energy Commission (CEC)

Transit-Related Activities in the CEC's Fuels and Transportation Division



Wendell Krell
November 13, 2019
California Energy Commission

Fuels and Transportation Division (FTD) Home Page:
<https://www.energy.ca.gov/about/divisions-and-offices/fuels-and-transportation-division>



Assembly Bill 2127

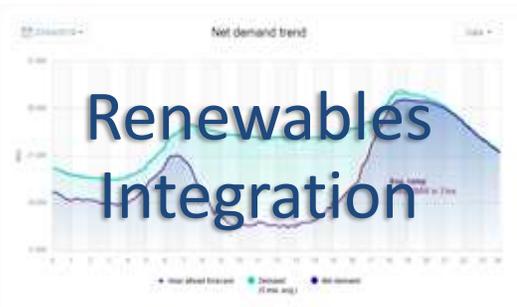
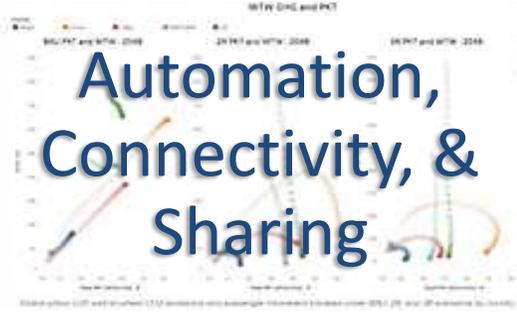
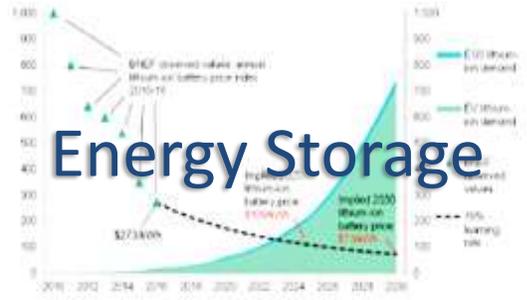
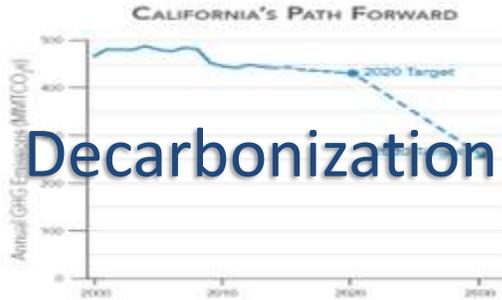
- Biennial statewide charging infrastructure assessment to meet California goals:
 - 5 million ZEVs by 2030
 - Reducing GHG 40% below 1990 by 2030
- Expand upon the California Energy Commission (CEC) Electric Vehicle (EV) infrastructure projections to consider all necessary charging infrastructure:
 - Charging infrastructure
 - Make-ready electrical equipment
 - Hardware and software
 - Other programs to accelerate adoption
- Examine existing and future needs:
 - Throughout California
 - Low-income communities
- Seek data and input from stakeholders:
 - CPUC, CARB, utilities, transportation & transit agencies, electrical infrastructure, environmental groups, automobile manufacturers, and others

All Vehicle Categories

- Road
- Highway
- Off-road
- Port
- Airport



Considerations for Expanded EV Infrastructure Projections





Assembly Bill 2127 Assessment

- Data collection
 - Workshops/interviews
 - Contracted research
 - Published documents, lessons learned from investments
- First biennial assessment period
 - Calendar years 2019/2020



Early Transit Experience

- First electric bus charger in Northern California
- Product demonstration
- On-route style charging system
- Infrastructure upgrades were needed
- Difficult to align all potential/desired elements



Early Transit Experience (Successful)



**Proterra EcoRide Electric Transit Bus EV1
Stockton - 2012**

**San Joaquin Regional Transit District
Fast charger and docking station**





Additional CEC Projects

Agreement #	Awardee	Project	Award Amount	Type
600-10-013	AC Transit	Transit Fueling	\$3,000,000	1 Hydrogen Station
ARV-11-014*	Calstart	Transit Bus	\$17,992,802	2 Electric Buses
ARV-14-025	Calstart	Transit Bus	\$900,000	1 Fuel Cell Bus
ARV-15-001	Hydrogenics	Transit Bus	\$2,148,177	1 Fuel Cell Bus
ARV-15-003	Calstart	Transit Bus	\$2,886,248	4 Electric Buses
ARV-15-006	City of Gardena	Transit Bus	\$2,745,419	5 Electric Buses
EPC-16-058	Prospect Silicon Valley	Smart Charging / VGI Demo	\$1,899,199	Advanced Transit Bus VGI Project
EPC-16-065	Zero Net Energy Alliance	Smart Charging / VGI Demo	\$3,327,953	California E-Bus to Grid Integration Project

**Agreement ARV-11-014 funded several vehicle types (off-road excavators, diesel plug-in hybrids, BEVs, electric wheel loaders, BEV drayage trucks, and Class 8 PHEV, CNG and BEV trucks). The 2 electric buses were only a portion of the project.*



Electric School Bus Benefits



- Improved Childrens' Health
- Lower Emissions
- Quieter, Smoother Ride
- Lower Maintenance
- Lower Fuel Cost
- Potential for Vehicle-to-Grid



Demonstration Projects: Lessons Learned

- Estimated Equipment and Labor Costs
- Load Impacts for MD/HD Installations
- Standardization
- Project Development Timelines
- Emerging Technologies (Automatic; Wireless)



Lessons Learned (Then vs. Now)

- Choices have grown significantly
- Planning for future/change is still a must
- Plan, storyboard, and gain buy-in agency wide
- Get the help needed to succeed (internal or external)
- *"Plans are nothing; planning is everything."*

Dwight D. Eisenhower



Lessons Learned (Continued)

Becomes a manageable project that meets the strategic plan





Grant Funding Opportunity

- \$47.5 million available
 - Medium/heavy-duty zero emission vehicles and infrastructure
- Transit fleets under consideration
 - Concept #2: Transit and truck fleets, capital expense assistance for zero-emission infrastructure deployment
- October 25, 2019 pre-solicitation workshop (solicitation in 2020)
 - <https://www.energy.ca.gov/event/workshop/2019-10/staff-workshop-medium-and-heavy-duty-zero-emission-vehicles-and>
 - <https://ww2.energy.ca.gov/listservers/index cms.html>



Free Training Opportunity

- National Renewable Energy Laboratory (NREL), no cost training Monday, November 18, 2019, in Columbus, Ohio
 - <https://www.wbdg.org/continuing-education/femp-courses/fempws11182019>
 - “Become subject matter experts in electric vehicle implementation.”

Questions?

For additional information:
wendell.krell@energy.ca.gov

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