

The Energy Commission's Plug-in Electric Vehicle Charging (PEV) Infrastructure Deployment Strategy

June 5, 2014



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The Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP)

Purpose

To transform California's transportation market into a diverse collection of alternative fuels and technologies and reduce California's dependence on petroleum.

“...develop and deploy innovative technologies that transform California’s fuel and vehicle types to help attain the state’s climate change policies.” (Health and Safety Code Section 44272(a))

Up to \$150 Million in Annual State Funding Through 2023

The Energy Commission will receive **\$100 million/year** to implement the ARFVTP Program: Fuel production, Infrastructure, Trucks

California Air Resources Board will receive **\$40 million/year** for *Enhanced Fleet Modernization and Air Quality Improvement*: Light Duty Vehicle, Buses and Trucks.



ZEV Action Plan

Infrastructure and Planning Goals

- California's major metropolitan areas able to accommodate ZEVs through infrastructure plans and streamlined permitting by 2015
- Infrastructure to support 1 million ZEVs by 2020
- Over 1.5 million ZEVs will be on California roadways by 2025 and their market share will be expanding.
- Californians will have easy access to ZEV infrastructure by 2025



CEC's 3-Phase PEV Infrastructure Deployment Strategy

- **Phase I:** Frontload PEV infrastructure and establish framework for PEV infrastructure planning (2010-2011)
- **Phase 2:** Continue to support the nascent, but growing, PEV market with more finely tuned solicitations, plans and actions (2011-2014)
- **Phase 3:** Deploy PEV infrastructure based on refined Statewide PEV Infrastructure Assessment, Regional PEV Readiness Plans and ongoing stakeholder input (2014 onward)



Total Energy Commission PEV-related ARFVTP Investments

EVSE funding to date= \$38.2 million for 8,646 chargers.

- Commercial = 3,901
- Residential = 3,882
- Workplace = 756
- Fast Chargers = 107

➤ \$49 million for Clean Vehicle Rebate Program

➤ \$4 million for HVIP “electric plus” rebates

➤ \$75 million for ZEV truck deployment, demonstration and manufacturing

Example: EVI to develop and deploy extended-range EV power train for medium-duty trucks



Phase I: If you build it, they will come...



Phase I: California's 2010-2012 PEV Infrastructure Funding in San Diego, Los Angeles, Sacramento and Bay Area

- Partnered with Federal ARRA Stimulus Grants: EV Project and "Charge America"
- Awarded over \$16 million in grants for over 4,200 charge points to ECOtality, Coulomb, Clipper Creek, Association of Bay Area Governments, Southern California Collaborative and others
- Additional awards for \$7.5 million for residential, workplace, fleets and DC fast charger demonstrations



Green Charge Networks DC Fast Chargers

- CEC \$2.08 million grant for 16 Smart Grid Fast Chargers
- Includes battery storage with energy management system to reduce facility demand charges at 7-11 Stores and other locations.



Need for Regional PEV Infrastructure Plans

- California is complex:
 - 482 Municipalities
 - 58 Counties
 - 170,000 miles of roadways
- Regions have unique EV micro-climates that require region-specific infrastructure plans

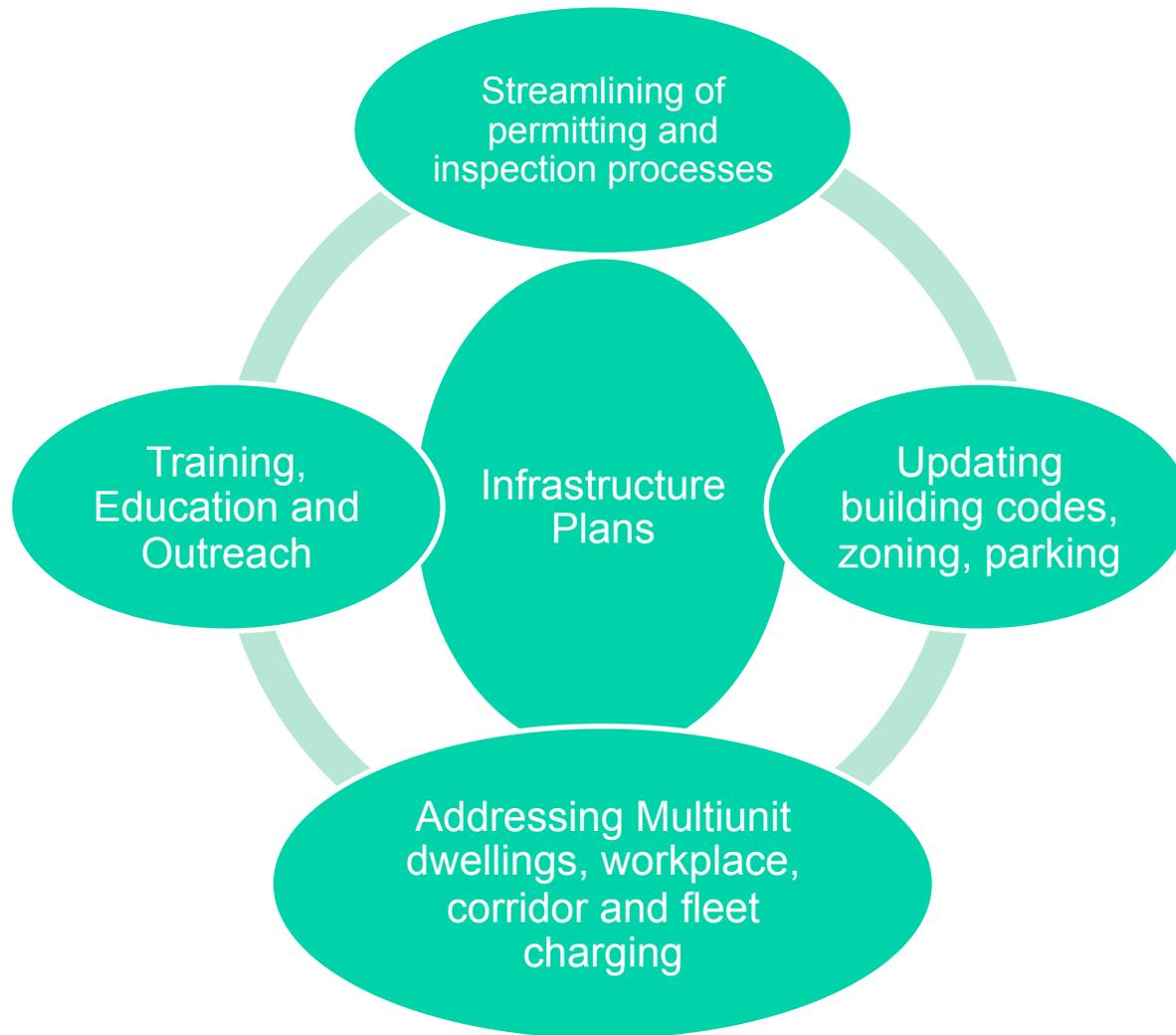


Energy Commission and DOE Regional PEV Planning Grants

Awardee	CEC \$	DOE \$
Bay Area Air Quality Management District	\$200,000	\$300,000
Monterey Bay Area (BAAQMD)	\$200,000	NA
Coachella Valley Association of Governments	\$200,000	NA
Redwood Coast Energy Authority	~\$200,000	NA
Sacramento Area Council of Governments	\$200,000	\$75,000
San Diego Association of Governments	~\$200,000	\$100,000
San Joaquin Unified Air Pollution Control District	\$200,000	\$75,000
City of Mt. Shasta	\$200,000	NA
South Coast Association of Governments	\$200,000	\$300,000
Ventura County Air Pollution Control District	\$200,000	\$50,000



Regional PEV Readiness

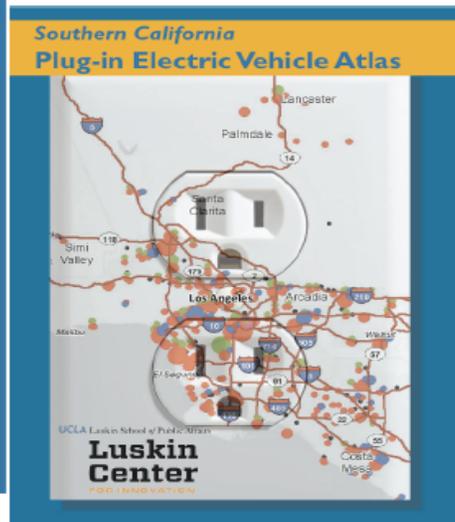


South Coast Association of Governments PEV Readiness Plan

Policy and planning guidance to facilitate charging installation and operation



Prepared for the Southern California Association of Governments
December 2012



Prioritize locations for charging

Southern California PEV Readiness Plan and Atlas

Download at innovation.luskin.ucla.edu/ev

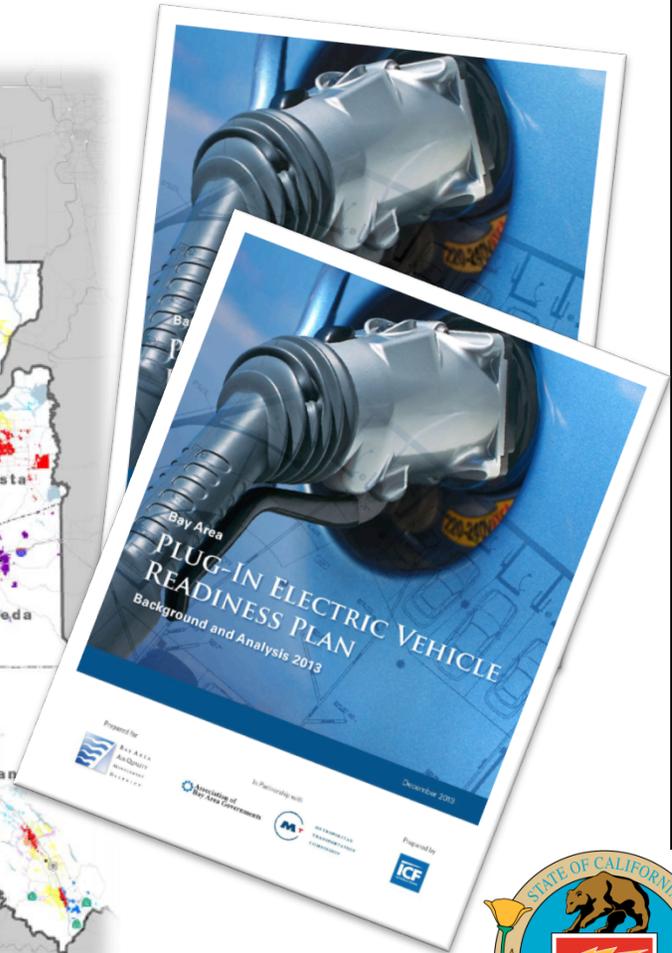
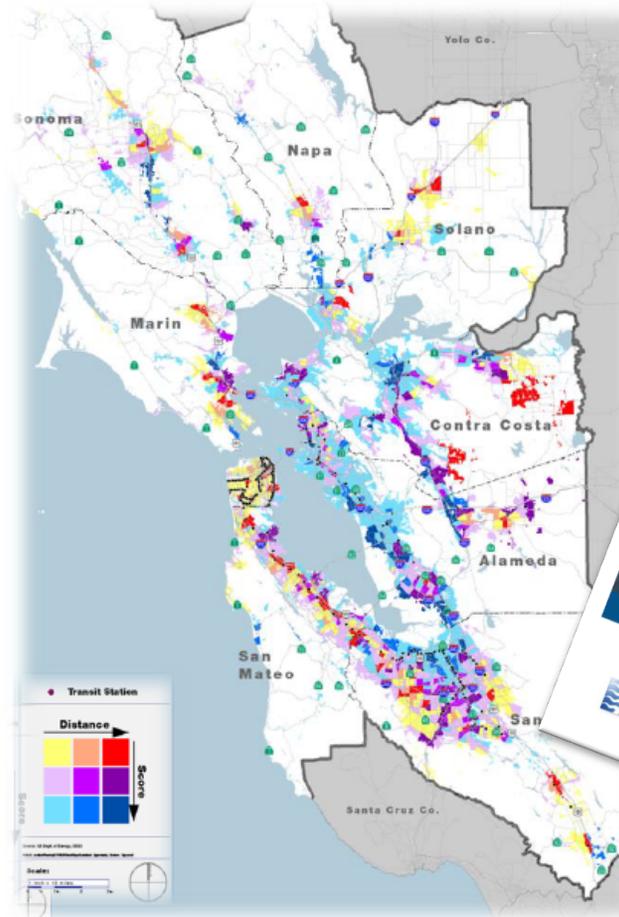


Bay Area Air Quality Management District PEV Readiness Plan, December 2013

Current EVSE Deployment



EVSE Suitability Study



Phase 2: Continued Support of Emerging PEV Market

➤ **\$11.4 million solicitation** for charging infrastructure with awards for 849 chargers—including 53 DC fast chargers (April 2014)

- **A New Approach:**
Applicants were primarily public entities that were required to coordinate EVSE deployment with Regional PEV Infrastructure Plans.
- **Solicitation oversubscribed by 2.5 times**

➤ **Development of Statewide PEV Infrastructure Assessment with NREL and stakeholder input**

➤ **Coordination with PEV Planning Regions, Clean Cities and other local agencies**

➤ **Allocation of \$15 million for charging infrastructure in the 2014-2015 ARFVTP Investment Plan**

➤ **Research on Battery Second Use and Recycling and Vehicle to Grid**



Phase 2: What We've Done...

- Lead on multiple 2013 ZEV Action Plan efforts
 - Example: Statewide Plug-In Electric Vehicle Assessment
- Stakeholder Workshops and Webinars
 - Examples: Statewide PEV Infrastructure Plan Stakeholder Workshop (Jan '13) EVSE Interoperability Workshop (Aug '13);
 - Regional Coordination Webinars (Spring/Summer 2013)

The screenshot shows the California Energy Commission website. The header includes the CA.GOV logo and navigation links: HOME, ABOUT US, EFFICIENCY, FUNDING, POWER PLANTS, RENEWABLES, RESEARCH, TRANSPORTATION. The main content area is titled "Implementation of Energy Commission Activities within the Zero Emission Vehicle Action Plan" and includes a docket number (13-ALT-01) and links to "State and Regional Plug-in Electric Vehicle Planning Documents".



CEC PEV-Related Research

PHEV /EV Consumer Behavior

- Projecting demand on the grid that will be created from increased numbers of PEVs
- Charging behavior and optimal infrastructure locations
- PEV Consumer profiles

Battery 2nd Use (B2G)

- Perform benchmark testing on spent PEV batteries to see if they are able to serve as distributed energy storage

Vehicle to Grid (V2G)

- Developed V2G Roadmap with the California ISO
- Partnering with Department of Defense for V2G demonstrations

Battery Recycling

- Establishing methods and processes for in state recycling operations for PEV batteries

Research Institutions Resource Guide

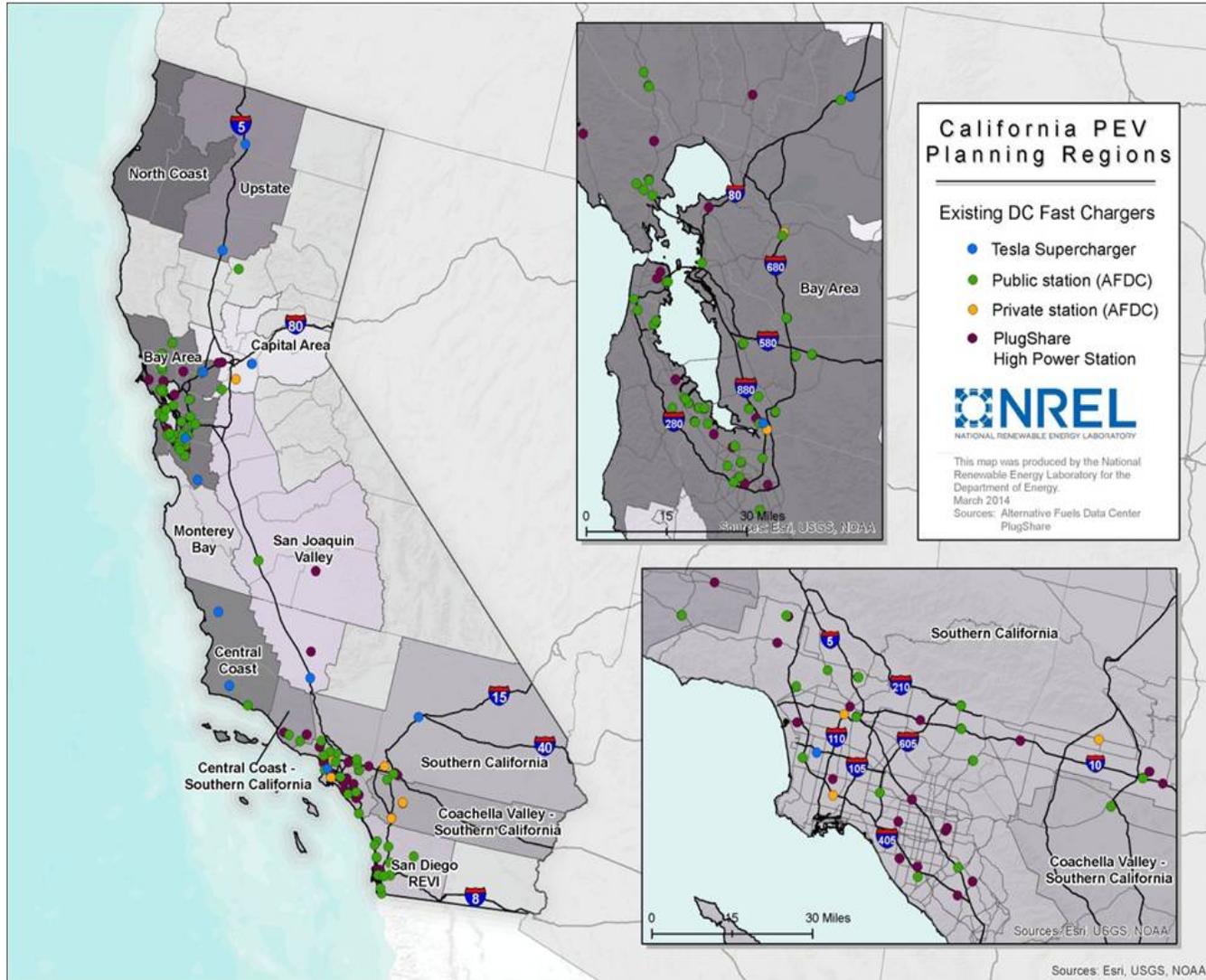


Phase 3: Deploy PEV infrastructure based on refined Statewide PEV Infrastructure Assessment, Regional PEV Readiness Plans and ongoing stakeholder input

1. Collect and analyze consumer charging behavior and relevant data to inform assumptions used in Assessment
2. Coordinate with 10 PEV Planning Regions as plans are finished and implemented—provide opportunities for sharing lessons learned and plan refinements.
3. Refinements to DC Fast Charger siting with analysis of statewide and inter-regional infrastructure needs. Coordination with regions, stakeholders and Governor's Office.



California PEV Planning Regions and Existing DC Fast Chargers



Resources

Governor's 2013 ZEV Action Plan

[http://opr.ca.gov/docs/Governor's_Office_ZEV_Action_Plan_\(02-13\).pdf](http://opr.ca.gov/docs/Governor's_Office_ZEV_Action_Plan_(02-13).pdf)

California Energy Commission "Drive"

<http://www.energy.ca.gov/drive/index.html>

CEC ZEV Action Plan Implementation (includes NREL Assessment and links to Regional PEV Plans)

<http://www.energy.ca.gov/2013-ALT-01/documents/>

California Air Resources Board: www.DriveClean.ca.gov/PEV

Statewide PEV Collaborative: <http://www.pevcollaborative.org/policy-makers>

Electric Drive Transportation Association

www.goelectricdrive.com

Plug-In America-We Drive Change

www.pluginamerica.org

U.S. Department of Energy

www.afdc.energy.gov/afdc

