

CALIFORNIA ENERGY COMMISSION ADVANCING STATEWIDE PLUG-IN ELECTRIC VEHICLE INFRASTRUCTURE

2014 INTEGRATED ENERGY POLICY REPORT UPDATE

The California Energy Commission's *2014 Integrated Energy Policy Report Update* focuses on transportation in light of California's energy and climate goals. The following is a summary of information on the Energy Commission's investments to help spur transformation to a clean, low-carbon transportation energy future.

Advancing Statewide Plug-In Electric Vehicle Infrastructure

In 2012, the transportation sector in California accounted for 36 percent of greenhouse gas emissions. To achieve California's climate change, air quality improvement, and petroleum reduction goals, the state must transition away from fossil fuels to using predominantly zero-emission and near-zero-emission vehicles. Replacing gasoline-powered vehicles with battery-electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) driven in "electric mode" will reduce greenhouse gas emissions, air pollution, and gasoline consumption while providing fuel savings to consumers and strengthening local economies. BEVs and PHEVs are collectively referred to as plug-in electric vehicles (PEVs).

Governor Brown's Leadership

On March 23, 2012, Governor Brown issued Executive Order B-16-2012 to advance zero-emission vehicles (ZEVs)

in California, setting a long-term goal of 1.5 million ZEVs on California's roadways by 2025. The executive order established milestones for three periods: 2015, 2020, and 2025. Infrastructure goals stipulate that by 2015, California's major metropolitan areas will be able to accommodate ZEVs through infrastructure plans; by 2020, California's ZEV infrastructure will be able to support up to 1 million vehicles; and by 2025, 1.5 million ZEVs will be on California's roadways with easy access to infrastructure. California has made significant progress on achieving the 2015 goal of having the state's major metropolitan areas able to accommodate ZEVs through infrastructure plans and streamlined permitting. All of the state's major metropolitan areas now have infrastructure plans in place and have established strategies to streamline permitting.

Infrastructure, Incentives, and Technology

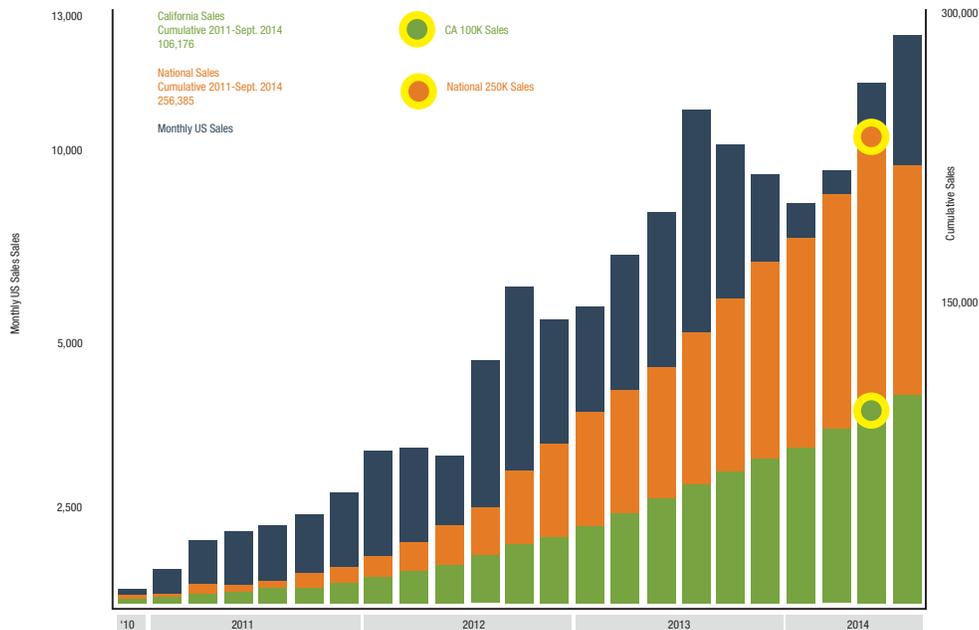
Advancements Continue to Advance the Market

The expanding market for PEVs is due to:

- » 20 new vehicle models
- » Greater driving range from improved battery technology and increased availability of charging infrastructure

Plug-in Electric Vehicle Sales

California Reaches 100K PEV Sales in 2014



Source: Plug-in Electric Vehicle Collaborative

- » Incentives include carpool lane access stickers, federal tax credits, and state and air district rebates,
- » Consumers realize that PEVs are fun to drive and can satisfy a large percentage (if not all) of their daily transportation needs

Challenges and Opportunities for Infrastructure Deployment

Barriers confronting statewide charging infrastructure development include:

- » California's large and complex transportation serving 482 municipalities in 58 counties and including 170,000 miles of roadways
- » Rapid advancements in PEV technology

- » The transition of the regulatory and legislative landscape
- » Adaptation of the electricity grid to the integration of renewable energy sources
- » Costs of installation and equipment limit accessibility of charge points at workplace and public locations

These factors affect the optimal placement and number of electric vehicle charging stations (EVCS), but the Energy Commission is also involved in creating opportunities for PEV advancement:

- » Expanding PEV infrastructure, particularly as a result of a December 2014 California Public Utilities Commission (CPUC) decision authorizing utility ownership of electric vehicle charging infrastructure

- » Increasing consumer knowledge, behavior, perceptions, and experience with PEV technology and refueling options so they are viewed as convenient, safe, reliable, and cost-competitive
- » Supporting the market until economies of scale can be achieved, prices reduced, and the funding gaps bridged
- » Focusing efforts on home charging, the greatest opportunity for growth in the next few years
- » Continuing to support infrastructure opportunities at workplaces and multi-unit dwellings (MUDs) where management has indicated support for infrastructure, at garaged fleet locations with a significant numbers of PEVs, and at crowded airport and commuter parking locations.

The Energy Commission’s PEV Infrastructure Strategy

To achieve the Governor’s PEV infrastructure objectives, the Energy Commission frontloaded PEV infrastructure in partnership with federal American Reinvestment and Recovery Act grants between 2009 and 2011. Infrastructure was deployed in key metropolitan areas to create an EV-friendly environment. From the Energy Commission’s first solicitation for charging infrastructure projects, the focus has been on siting fast chargers, addressing the challenges of MUDs, encouraging workplace charging, and ensuring that the disbursement of public funds is coordinated with regional PEV readiness plans. Future deployment will focus on PEV infrastructure based on refinements to the Statewide PEV Infrastructure Assessment. This requires additional data gathering, stakeholder input, and coordination of regional readiness plans to gather best practices and to improve upon and fill in any gaps.

While information on current technology and market trends may be sufficient to support PEV infrastructure

planning at the local and regional levels, data evaluating infrastructure expansion trends along corridors or at a statewide or interstate level are limited. Consequently, assessments use scenario analyses to project future EVCS requirements. There are two quantitative scenarios, “home dominant” and “high public access,” that are used to illustrate the EVSE expansion needed to meet California’s goal of 1.5 million ZEVs by 2025.

- » “Home dominant” scenario assumes:
 - » 85 percent of the electricity needed for PEV drivers is provided at home.
- » “High public access” scenario assumes:
 - » 70 percent of the electricity needed for PEV drivers is provided at home;
 - » future PEV drivers place a higher premium on workplace and public charging, with 30 percent of electricity for PEV drivers provided outside the home;
 - » EVSE installers and suppliers receive significant benefits from installing EVSE stations.

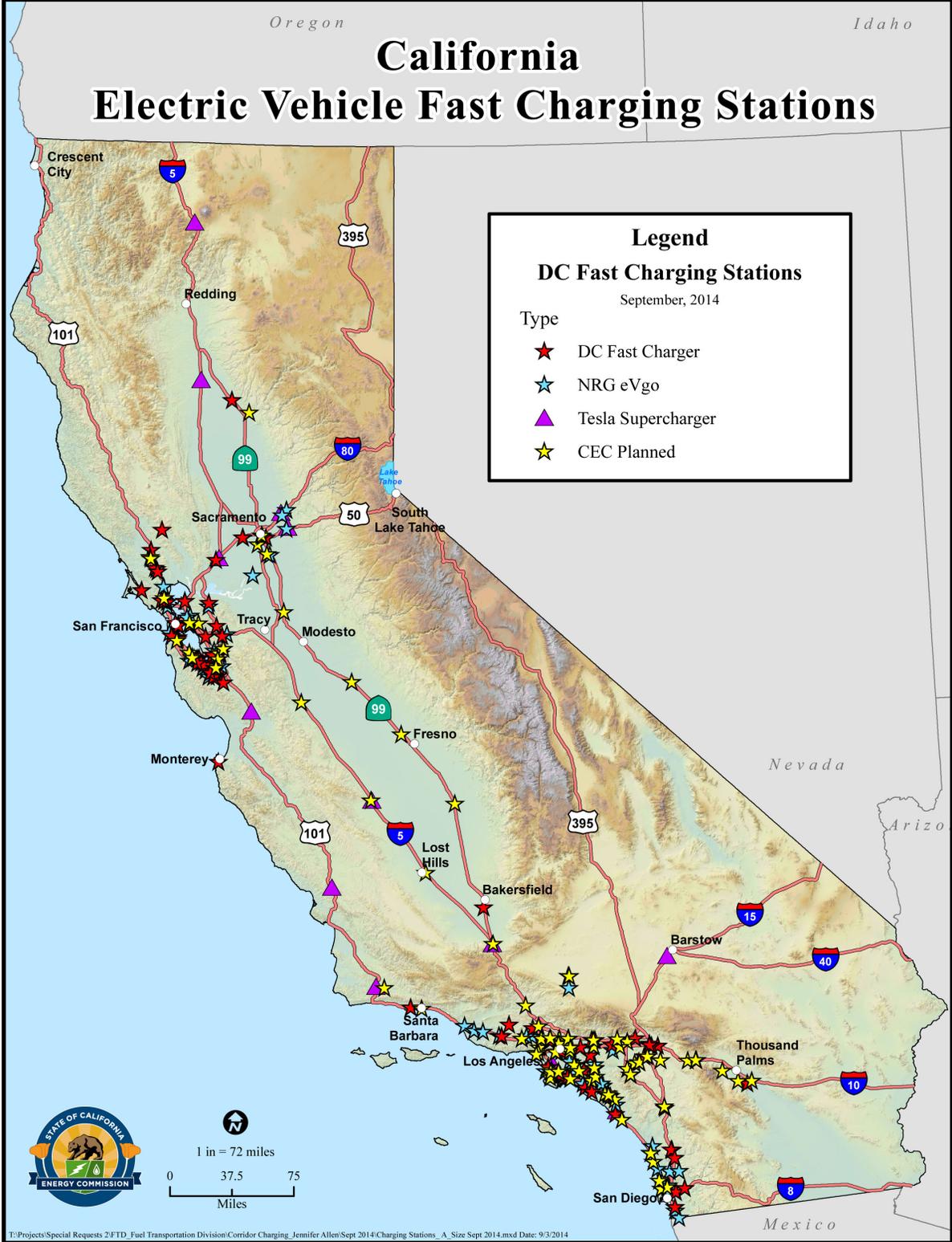
Additional empirical and statistical data are needed to further refine and calibrate efforts.

Deploying Electric Vehicle Charging Infrastructure and Supporting Incentives

The ARFVTP has helped deploy electric vehicle charging infrastructure to support current drivers of electric vehicles. So far, the program has:

- » Funded more than 9,300 charge points in residential, workplace, and public access locations, including 107 DC fast chargers in urban areas and along intercity corridors;

Existing Electric Vehicle Fast Charging Stations in California (December 2014)



- » Enabled 21 regional government coalitions to create regional readiness plans that assess local needs for charging infrastructure and develop a regionally focused plan that meets the needs of local communities;
- » Awarded four planning grants to develop plans for multiple alternative fuels, including hydrogen, in an early deployment area for fuel cell electric vehicles (FCEVs);
- » Supported the Air Resource Board's (ARB) Clean Vehicle Rebate Project by transferring approximately \$49.6 million to fund incentives for about 21,000 battery-electric vehicles and plug-in hybrid electric vehicles.

Next Steps

To support the Governor's ZEV Action Plan goals for infrastructure over the next decade, the Energy Commission will support efforts to deploy convenient, safe, reliable, and competitively priced charging infrastructure. These efforts include preparing California cities and regions for PEVs and ensuring sufficient charging infrastructure to support the vehicles.

For more information, please see the 2014 Integrated Energy Policy Report Update, available at www.energy.ca.gov/2014_energy/policy/.

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