



Financing California's Plug-In Electric Vehicle Vision and Objectives

Report on Plug-In Electric Vehicle (PEV)
Financing Strategies Workshop

by
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Introduction

On February 1, 2013, California Governor Edmund G. Brown Jr., California Treasurer Bill Lockyer, and the California Plug-In Electric Vehicle Collaborative (PEVC) convened a workshop at Golden Gate University to identify financing strategies for advancing state goals on plug-in electric vehicles (PEVs). The three-hour workshop brought together 130 experts from multiple sectors to help state leadership formulate creative ideas for effective PEV financing mechanisms based on an understanding of the full scope of investment opportunities throughout the PEV sector and of the barriers and obstacles to capitalization. The workshop succeeded in generating a number of ideas, including one that participants agreed has potential to increase adoption of PEVs on a mass scale: separating batteries from vehicle sales with a battery leasing program that captures the entire value of the battery over its lifecycle. This report aims to briefly describe this transformative idea, as well as to offer a brief overview of the workshop discussion leading up to it.

Background

On March 23 2012, Governor Brown issued an Executive Order directing state government to “encourage the development and success of zero-emission vehicles to protect the environment, stimulate economic growth and improve the quality of life in the State.”¹ Zero-emission vehicles (ZEVs) are defined as either hydrogen fuel cell vehicles (HFCs) or plug-in electric vehicles (PEVs), which consist of both

battery electric vehicles (BEVs) and plug-in hybrid electric vehicles. (PHEVs).

Key among the milestones set by the Executive Order is the target of putting 1.5 million ZEVs on California roads by 2025. To translate this vision into a roadmap for realization, the Governor called for an Interagency Working Group on Zero-Emission Vehicles to create a ZEV Action Plan. A draft version of the plan was issued in September 2012², and a final draft made public in February 2013.³

A critical piece of the Plan still requiring additional attention has been what financing tools are needed to help achieve the targets of the Executive Order. To this end, the Governor’s Office decided to collaborate with the Office of Treasurer Lockyer and the California PEVC to host a workshop to begin identifying and tackling the issues involved. The non-profit organization Renewables 100 Policy Institute helped organize the event, and Citigroup’s Michael Eckhart agreed to moderate.



¹ <http://gov.ca.gov/news.php?id=17463>

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The Transformative Idea

Among the many strong ideas discussed at the workshop, participants agreed that the game changer is to decouple PEV from battery sales with a battery leasing program that gives full value to the range of the battery's benefits, both during its useful life in the vehicle and after. Doing so would carry several advantages, including:

- 1) reducing upfront PEV costs
- 2) allowing newer more efficient batteries to replace old ones, thus extending optimal vehicle life, providing reassurance to consumers, and driving innovation
- 3) ensuring that old batteries are recycled or integrated into an alternate use, such as grid storage or local demand response applications

The group touched upon several options for structuring such a program, which are described briefly below. These will need to be explored further by state decision makers to discern which one(s) carry greatest chances for furthering California's PEV goals.

OEM Option

PEV Original Equipment Manufacturers (OEMs) could separate the sales of their PEVs from batteries at the outset. It was pointed out that this practice is being undertaken by several OEM's in Europe, with some such as Renault¹ having a lease-only option for batteries in its four PEV models available for sale in European markets.² A number of U.S. PEV manufacturers

are also either moving in this direction or considering it. Questions that arose included whether the price points will be attractive enough to significantly increase consumer interest in buying PEVs. It may be that the value of the battery alone.

Utility Option

Participants in the workshop agreed that electric utilities are in a natural position to step up and play a major role in the PEV space. Utilities are after all going to continue to play key roles in providing fuel (electricity) for the vehicles.

Their operations are also influenced heavily by the PEV charging patterns, as use scales up. Grid operators and utilities are rightfully wanting to ensure that the charging infrastructure and patterns do not stress the grid and that the right price signals are in place to incentivize off peak charging.

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PEV Financing Workshop and Discussion Overview

Workshop Introduction



The PEV Financing Workshop opened with a welcome by Dan Angel, President of Golden Gate University, followed by California Deputy State Treasurer Patricia Wynne, who confirmed Treasurer



Lockyer's commitment to working with the Governor's Office to determine financing mechanisms for PEVs. She suggested that a promising source of support going

forward could be the West Coast Infrastructure Exchange,¹ a collaborative partnership between California, Oregon, Washington and British Columbia created to leverage expertise of development and finance leaders to reduce and identify innovative financing methods.



Offering the view from the Governor's Office was Cliff Rechtschaffen, Senior Advisor to Governor Brown, who emphasized the critical role of PEVs in meeting California's CO₂ reduction goals and the Governor's strong support of PEV advancement. He offered the hopeful perspective that the growing PEV market is enjoying higher sales numbers than hybrids did at a comparable stage of development. He also recognized the importance of the workshop in spawning new ideas for how to scale up this progress to meet

the state's bold PEV goals.

Representing the PEVC was former California State Senator and current PEVC Executive



Director Chris Kehoe, who laid out the organization's Strategic Plan¹, including the PEVC's six goals² for building up the California PEV market through 2020.

The PEVC sees California as poised to global economic hub for the plug-in vehicle industry and aims to ensure that there are hundreds of thousands of annual PEV sales in California within the next decade.



Michael Eckhart, Managing Director and Global Head of Environmental Finance at Citigroup, then set the stage for monitoring the morning's six presentations and discussion. He drove home the basic truth that capital will flow when investors know that policy is strong and long-term. In other words, smart policy is that which allows money to flow into a sector and does not change for a lifetime. He encouraged the group to set the bar high for the day, that is, to come up with big ideas to create a mass PEV market, which will require nothing less than billion of dollars and global participation.

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Presentations

The six workshop presentations were selected from a group of abstracts submitted in advance to the Governor's office.⁹ A brief summary of each is as follows:

Presentation 1



Nancy Pfund, Founder and Managing Director of DBL (Double Bottom Line) Investors
An Historical Perspective on the Role of

Government in New Energy Financing: Creating a Level Freeway for Electric Vehicle Growth

The basic premise of this first presentation was that the United States has an established history of supporting energy transitions. This long practice that has driven the national conventional energy economy can now be channeled toward "leveling the freeway" for emerging ZEV players in a market dominated by gasoline-based vehicles.

Ms. Pfund's specific ideas for how to strengthen support for PEV market growth included:

Advantaged electricity rate structure for ZEV charging

Advantaged rates for solar charging

Two-way vehicle to grid stability

Tax credits for PEVs and/or higher tax rates for gasoline-fueled cars, which should be designed to ensure small businesses with fleets are among those who can access credits

Bonds similar to the California Energy Efficiency Master Trust Revenue Bonds

Public-private partnership for the operations and maintenance of the statewide PEV infrastructure
Drawing a parallel to fuel pipelines, charging networks could be supported with MLPs and REITs
Tax credit for gas stations with solar-powered electric vehicle charging stations
Low Carbon Fuel Standard (LCFS) as a way to incentivize solar charging- lowers cost of fueling PEVs.

Presentation 2

David Peterson, EV Regional Manager, Corporate Planning for Nissan North America
Capital Leases for Public Agencies

The focus of this presentation was Nissan Motor Acceptance Corporation's (NMAC's) capital lease product called the Municipal Lease-Purchase. This product aims to help public agencies overcome financial barriers that have inhibited this sector from adopting PEVs as robustly as was expected. The program helps by providing the following benefits: 1) By breaking payments of the entire cost down into equal periodic amounts and by allowing the lessor to pass through tax incentives savings to the public agency, the upfront costs of PEVs are significantly reduced. 2) Additionally, from an accounting perspective, there is not a substantial difference between purchasing the PEV and executing a capital lease. (Unlike an operating lease, where payments are recorded as expenditures, vehicle payments in NMAC's Municipal Lease-Purchase program appear on the public agency's balance

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sheet as a liability, and the actual vehicle is recorded as an asset.) 3) Most public agencies qualify for capital leases. 4) They are low risk. For example, there are no mileage restrictions, no wear and tear charges, no payment penalties, and an insufficient funds exit option.

Mr. Peterson encouraged the following actions by the State of California to help increase awareness of capital leases as an option to help public agencies acquire PEVs:

Educating decision-makers of commonly acceptable accounting and financing tools to acquire PEVs

Providing template language for RFPs and RFQs for vehicle acquisition that would allow for proposals and quotations containing a capital lease

Presentation 3:

Shouvik Banerjee, Senior Manager of New Products Business Development at SolarCity
Solar Miles Purchase Agreement (MPA): Clean Electric Drive as a Service

Mr. Banerjee proposed that a Solar Miles Purchase Agreement (MPA) could require a recurring fee from customers that covers costs of a home's charging station and solar power equipment. Like the Solar City's solar leasing program, the Solar MPA would aim to attract customers by being cheaper than the cost of operating gasoline-powered alternatives. Also like solar leasing programs, the Solar MPA could be structured as a lease-to-own or a lease-to-operate arrangement. Mr. Banerjee argues that the Solar MPA would reduce the cost of driving PEVs, be easy to understand, and protect

customers from fluctuating – and in the long term, rising – gas and electricity prices.

Going forward, Banerjee recommends:

Ensuring any necessary legal structures are in place to enable a Solar MPA

A public education campaign that helps consumers understand the monthly total costs of ownership compared to gasoline-powered alternatives

Financial regulations that capture total costs of ownership

Factoring total cost of ownership into interest rates for car loans

Stable PEV infrastructure tax credit.

Presentation 4:

Max Baumhefner – Sustainable Energy Fellow at NRDC

Accounting for Vehicle Efficiency in Automotive Leasing

Mr. Baumhefner pointed out that current automotive lending practices generally ignore the impact of fuel expenses on ability of consumers to pay off the loan, as well as evidence suggesting that efficient vehicle buyers tend to be lower risk borrowers.

Mr. Baumhefner recommended:

Creditors conduct further analysis on whether there is a correlation between vehicle efficiency and loan performance, and if there is, it should be reflected in loan terms.

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Policymakers could make publicly-funded incentives for lending institutions, along with other forms of recognition, contingent upon their providing financing that rewards the purchase of efficient and Zero Emission Vehicles.

Presentations 5 & 6:

Ulric Kwan – Electric Vehicles Manager at Pacific Gas and Electric Company (PG&E) and Adam Langton – Energy Analyst at California Public Utilities Commission (CPUC)

Capturing Residual Battery Value to Facilitate PEV Adoption

In a joint presentation, Mr. Kwan and Mr. Langton offered ideas for how utilities might help to bring down the upfront premium costs of PEVs by compensating consumers for the value to the utility of the PEV battery.

The arrangement could be a win-win for consumers and utilities. Consumers currently pay an extra initial \$15-30k for PEVs than for Internal Combustion Engine (ICE) counterparts, while utilities increasingly need battery storage to meet the challenge of integrating rising amounts of electricity from intermittent sources, such as wind and solar. Utilities could provide incentives and rebates to consumers for PEV batteries as a service, which could bring down upfront costs for PEV buyers and give utilities access to PEV batteries for grid storage.

Such an arrangement could also mitigate the problem of what to do with batteries when they lose their useful life in PEVs. According to the presentation, a PEV battery with 24 kwh capacity in year one can expect to only have 14

kwh capacity by year 5-7. Utilities can derive significant grid storage value from PEV batteries long after their useful life in vehicles, thus providing an added benefit of extending battery life before recycling.

Underscoring the potential synergy between the development of the PEV market and the rising need for grid storage, the presenters noted that PEV adoption is particularly high in coastal areas where the grid is least robust.

Mr. Kwan and Mr. Langton recommended:
Utilities like PG&E explore providing and receiving grid storage value from PEVs, in order to help reduce the upfront and ongoing costs for purchasing these vehicles and to provide a residual value to the battery after it is no longer useful for automotive applications.

Moving forward with a pilot program that is already underway and aims to

Find customers to provide this value

Test out how PEV batteries perform on the grid

Discover how to incentivize customers to act now

Determine how valuable PEV batteries are to the grid, including the residual value of battery after automotive application

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The presentation period was closed with remarks by Alan Lloyd, President of the International Council on Clean Transportation, who shared thoughts on quantifying the amount of funding needed to meet EV deployment goals and California's return on investment. The bottom line: Costs are substantial, but decreasing over time. Investments are needed, but the payoff is as high as a factor of 10, when external costs like greenhouse gas reductions and health impacts are taken into account.

Workshop Discussion and Follow-up Action Items

The second half of the workshop consisted of a "roll up your sleeves" discussion among the stakeholders aiming to 1) identify key areas that must be addressed, in order to accelerate PEV adoption and infrastructure build out in California, 2) come up with a "big idea" for a transformative model program that can be replicated nationally and globally, including in major growing markets like China.

Key Areas to Address

The group agreed that four overarching principals will underlie any effective action plan intended to improve the PEV market's financial landscape:

Values specifically inherent to PEVs must be identified and monetized in an expedited fashion. Specifically, these values include the infrastructure for charging the vehicles, the benefits of fuel with no tailpipe emissions and lowered lifecycle GHG emissions¹, and the residual value of the batteries after they are no

longer useful for a mobile PEV application.

Any applicable policies must be long term, easy to administer, and flexible to adjust as needs change. Sunset provisions and short-term fixes will only cause problems. New regulations also must be implemented in parallel with financing programs.

If it is not convenient and inexpensive, people won't do it.

The free market must be ensured support, as it drives innovation.

With these principals in view, the group laid out several action items in broad strokes that ought to be explored and distilled for feasibility and potential effectiveness at stimulating the PEV market. To summarize, these included:

Identify and seek to overcome barriers in the current regulatory framework that stand in the way of capturing PEV benefits.

Identify currently available regulatory mechanisms and financial structures that have helped advance existing energy-related programs (e.g. PPA, FIT, REITs, tax credits, etc.), with a view toward how they could be applied to support the PEV sector.

Strengthen and publicize visible metrics that show the monthly or annual costs of owning and operating a PEV, which could include next steps,

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such as surveying existing studies and tools and creating user-friendly online and smart phone tools.

Empower existing state working group and supplement it as necessary with other experts, in order to build the capability to network and bring together all necessary policy and financing pieces.

Examine the option of a State entity to finance the upfront cost vehicle difference between PEVs and ICE vehicles, taking into account the lifecycle costs (battery costs, technology evolution, recycling, etc.) and savings (emissions, fuel, etc).

Analyze with the California Department of Financial Institutions and other relevant agencies how the banks can play a more robust role in the emerging PEV and related infrastructure market space in California, if the rules for posting internal collateral are modified.

Seek to establish a statewide PEV charging rate for different entities (e.g. residential, commercial, public), beginning with surveying current PEV charging rates throughout the state of California.

Examine with the Department of General Services what, if any, barriers exist to capital leasing for public agencies, and if there are any, how they might be overcome.

Look into whether air quality constraints in the Los Angeles Basin and Central Valley can be captured for financing – e.g. Could the Air Quality Management District (AQMD) PPM, NOx

and SOx credits or California Air Resources Board (CARB) GHG credits designated by AB 32 go to the entity that owns the car or to a credit pool to benefit EV owners?

Explore the possibility of a battery leasing model by the Original Equipment Manufacturers (OEMs), the utilities and/or a limited, competing group of private entities with designated authority (via licenses or concession agreements, e.g.) to lease batteries.

As discussed, the last action item was the one generally considered to have the greatest potential to catalyze rapid uptake of PEVs and become a national or global model.

Conclusion

The workshop succeeded in its mission to generate timely and innovative financing ideas that can accelerate the California plug-in electric vehicle market, including one with significant potential to be transformative. A PEV battery leasing program that compensates consumers for the value of the batteries to the grid, both during and after the battery's useful life in the vehicle, would substantially lower upfront costs of PEVs, thus reducing one of the biggest barriers to electric vehicle adoption. Going forward, State offices will thoroughly examine the ideas raised, with a critical next step being a hearing at the California Public Utilities Commission to examine in depth the three

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models of battery leasing program discussed in depth. An action plan for implementing the program model deemed most likely to be effective in advancing state PEV goals will be released within 90 days of that hearing.

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