



MEMORANDUM

To: SCTA/RCPA Staff
From: Philip Sheehy and James Choe
Date: October 2015
Re: Fuel Shift: Reviewing Barriers and Prioritizing Actions

Introduction

The objective of this memo is to identify the action items for the Fuel Shift Plan that require additional study and dedication of resources. Ultimately, it is up to SCTA and the EV Steering Committee to prioritize local government policies, programs, and partnerships to address barriers. ICF's role in this process is to align the expectations of SCTA and the EV Steering Committee with the resource constraints of the SCTA Fuel Shift grant. ICF's recommended action items are based on our work in the Bay Area and other regions, but they are intended to be conversation starters (as opposed to conversation enders). The opinions and statements in this document are attributable exclusively to ICF staff.

In the first Steering Committee meeting (on 9/29/15), the following seven (7) items were listed as problems to be addressed in Sonoma County.

1. Local readiness
2. Workplace charging
3. Consumer education
4. Government fleets
5. Improving the dealer experience
6. Trips from outside Sonoma County
7. Involving disadvantaged and vulnerable communities

Review of Readiness Opportunities and Actions

Figure 1 on p4 below shows the key plug-in electric vehicle (PEV) readiness guidance from the Bay Area PEV Readiness Plan (2013) over the next 8-10 years, organized by stakeholder (regional agencies, local governments, and utilities) and into possible short-term, medium-term, and long-term actions. The timeline shown represents goals for implementation of these strategies across the nine-county Bay Area. However, PEV readiness requires a comprehensive suite of actions, and there are often opportunities to implement some strategies ahead of others. At the time of writing, ICF also recognized that many local governments and stakeholders had already completed or made substantial progress toward completing some of the suggested

actions shown in the ahead of schedule, and that proactive stakeholders will want to look ahead to future suggested actions in order to begin laying the groundwork for longer-term PEV readiness.

Some of these prioritized items have already been initiated or undertaken. For instance, MTC has worked with BAAQMD to implement Experience Electric, the Bay Area's promotional campaign focused on ride-and-drive events around the region.

Categorizing Readiness Strategies

For the purposes of this memo, ICF has focused on grouping readiness actions into areas that facilitate stakeholder feedback and input. We identified nine (9) areas of readiness for consideration, with attention given to readiness actions outlined in the PEV Readiness Plan and other documents (e.g., *Ready, Set, Charge!*). The nine broad categories are included below, with more than 40 specific strategies outlined in Table 1 that follows.

- 1. Stakeholder engagement.** Transitioning the fleet over to PEVs will require extensive marketing, outreach, training, and education relating to vehicles sales, charging services, and infrastructure. There are already a number of organizations and stakeholders that are leading efforts at the national, state, and regional level to develop curriculum and specialized training for electrical contractors and inspectors, workforce development training for PEV fleet technicians, public charging station owners and operators, fleet managers, dealers, automotive repair shop owners, first responders, and other safety officials.
- 2. Local government readiness: building codes.** Building codes contain safety standards and specifications that guide new construction and renovations. There are two major opportunities for building codes to support PEV deployment. The first is to specify standards for electric vehicle service equipment (EVSE) in the building code to ensure that any EVSE installations are safe and accessible. The second is to require pre-wiring for EVSE to lower the cost of future EVSE installations. "Pre-wiring" refers to the practice of providing sufficient basic infrastructure, such as conduits, junction boxes, outlets serving garages and parking spaces, adequate wall or lot space for future EVSE, and adequate electrical panel and circuitry capacity, to meet anticipated future demand for EVSE.
- 3. Local government readiness: parking policies.** Local governments in California have exclusive authority over guidelines and requirements for PEV parking and charging stations.
- 4. Local government: permitting charging infrastructure.** Since the majority of demand for EVSE is likely to be at privately owned residence and workplaces, local governments can support successful large-scale deployment of PEVs by being prepared to handle high volumes of permit requests for EVSE installations in an efficient and safe manner. The challenges associated with permitting and inspection of EVSE installations vary depending on the type of property at which the EVSE is located; whether it is at a single-family residence (SFR), at a multi-dwelling unit (MDU), or a commercial property.
- 5. Identify incentive opportunities.** There are many incentives currently available for Bay Area consumers of PEVs and EVSE and more are anticipated to become available over the next decade.
- 6. Promote PEVs in (government/municipal) fleets.** The fleet vehicle market is considerably different than the personal vehicle market; for instance, fleet managers generally procure a vehicle for specific purposes with a narrower focus on vehicle attributes. There is great potential to accelerate the PEV market through the deployment of PEVs in government fleets. Government fleet vehicles typically have relatively low mileage relative to consumer-owned vehicles and are in many cases ideally suited for PEV technology. As of 2008, there were approximately 3,500 government fleet vehicles in Sonoma County, with about 225 hybrids in service. Of the 3,500 vehicles, about 1,300 were passenger cars

(13.5% hybrids), and the other 2,200 vehicles were light-duty trucks (2% hybrids) or about 61% of the total government fleet.

- 7. Identify planning opportunities to promote PEVs in communities.** Local governments in California have exclusive authority over all land use decisions within their jurisdictions. These decisions extend from general plans and other policies that guide the long-term growth of a community to zoning and parking ordinances that regulate the physical form of streets, buildings, and public spaces. At every step of the planning process, local governments have opportunities to prepare to accommodate greater numbers of PEVs. These include establishing a policy framework for PEV readiness.
- 8. Consumer education and outreach.** The introduction of new technologies like PEVs requires careful coordination and outreach to consumers. The familiar aspects of car ownership – such as vehicle pricing, fuel pricing, vehicle range, availability of refueling infrastructure – changes with PEV ownership. Local and regional agencies can work with others to provide key, high-level messages that highlight PEV availability and benefits, including total cost of ownership, environmental, health, and community benefits.
- 9. Utility readiness.** One of the primary concerns associated with PEV deployment for electric utilities in the region is the potential negative impact from increased load on the local grid. The degree of impact depends on parameters such as PEV penetration rates, the current condition of local distribution infrastructure, and strategies used by the electric utility to manage additional load. Through the use of tariff structures and incentives, utilities are actively seeking solutions that maximize PEV charging during periods of lower electrical demand, such as off-peak hours, to help mitigate grid impacts.

Figure 1. Action Items from the Bay Area PEV Readiness Plan (2013)

Regional Agencies

- Prioritize grant funding for quick charge network; incentives for PEV purchases; and EVSE in MDUs, workplaces
- Develop incentive programs and systems to monitor PEV deployment, local PEV readiness, and uptake of medium- and heavy-duty PEVs in fleets
- Convene EV readiness summit of local elected officials
- Implement EV Promotional Campaign
- Develop schedule for stakeholder training and outreach
- Monitor EVSE usage
- Monitor uptake of PEVs in Impacted/ Environmental Justice Communities
- Coordinate on statewide efforts: develop statewide readiness guidelines, MDU charging guidelines, and workplace charging guidelines; convene roundtable of CEOs; develop cost of ownership business calculator and report on incentives for employees

Local Governments

- Adopt building code standards for EVSE
- Develop process to expedite EVSE permitting in single-family residences
- Create a residential EVSE permitting checklist
- Train permitting and inspection officials in basic EVSE installation
- Share best practices

Regional Agencies

- Provide PEV incentives through vehicle buybacks & feebates
- Monitor PEV deployment and local government PEV readiness

Local Governments

- Adopt EVSE requirements into building/zoning code
- Allow PEV parking to count toward minimum requirements
- Incorporate PEV readiness policies into general plans, climate action plans, or adopt as stand-alone plans

Utilities

- Evaluate smart grid opportunities for PEVs
- Provide renewable energy options for PEV drivers



Utilities

- Evaluate impact of rate structures on PEVs
- Create notification protocol for PEVs and EVSE

Regional Agencies

- Update EVSE design guidelines
- Develop Regional Public Charger Network
- Monitor PEV deployment, local government PEV readiness, and uptake of PEVs in Impacted/Environmental Justice Communities

Local Governments

- Adopt PEV parking design guidelines
- Adopt PEV parking regulations and enforcement policies
- Ensure that permitting staff at counter are knowledgeable on EVSE installation

Utilities

- Evaluate and upgrade distribution infrastructure
- Implement consumer outreach programs

Table 1. Overview of PEV Readiness Strategies for Discussion

Readiness Area	Strategy	Description
Stakeholder engagement	Outreach to Homeowners' Associations (HOAs) and property managers to offer MDU solutions.	To address the physical and governance challenges, agencies can work with HOAs and property management groups to help develop solutions for multi-family dwelling units.
Local government readiness: building codes	Encourage single-family residential chargers and PEV "pre-wiring" readiness	Local agencies may encourage inclusion of basic infrastructure, such as conduits, junction boxes, wall space, electrical panel and circuitry capacity to accommodate future upgrades for PEV charging. CALGreen Tier 1 includes related voluntary standards.
	Adopt and publicize building code enhancements for MDUs	MDUs face a number of physical and governance challenges around EVSE installations. Local agencies are encouraged to adopt building codes amendments that specifically address MDU installations.
	Adopt requirements for pre-wiring EVSE into the building code	"Pre-wiring" refers to the practice of providing sufficient basic infrastructure, such as conduits, junction boxes, outlets serving garages and parking spaces, adequate wall or lot space for future EVSE, and adequate electrical panel and circuitry capacity, to meet anticipated future demand for EVSE. Pre-wiring can lower the cost of installing EVSE by an estimated 65%.
	Adopt standards for EVSE into the building code	California's Building Code and Electrical Code both contain specifications related to EVSE. These codes apply in all cities and counties, unless local governments have taken action to adopt their own codes. Thus, many local governments in California already have standards for EVSE in place, and those that use their own building codes can simply adopt the relevant sections of the state code into their own codes.
Local government readiness: parking policies	Adopt PEV parking design guidelines	Local governments can adopt design guidelines that address the many unique considerations associated with PEV parking spaces in order to guide property owners through the process of creating these spaces. Among other factors, these guidelines should address dimensions, configuration, signage, and accessibility for PEV parking spaces.
	Adopt PEV parking regulations and enforcement policies	Regulations and enforcement policies can ensure that PEVs have unobstructed access to PEV charging, can create incentives for drivers to purchase PEVs, and can help local governments recoup the costs of publicly available charging in the event that the local jurisdiction owns and operates the equipment.
	Allow PEV parking to count towards minimum parking requirements	Local agencies can consider adopting minimum requirements for the number of PEV parking spaces (spaces that either include EVSE or are pre-wired to reduce the cost of installing EVSE in the future) at different land uses. As an alternative, local governments can offer incentives, such as density or FAR bonuses, for developers to include EVSE.

Readiness Area	Strategy	Description
	Reduce parking requirements for EVSE implementation	Reduced parking requirements offer an incentive for developers to invest in EV charging stations and/or PEV car-sharing agreements.
	Require EVSE for new development	Local agencies can adopt ordinance language requiring the installation of EVSE in new residential, office, lodging, industrial or other land uses.
	Incentivize EVCS installations in existing large parking facilities	Local agencies can encourage or incentivize owners and operators of existing large public parking facilities to provide an appropriate number of EVCSs based on local and regional infrastructure planning efforts. Hawaii State Statutes include language requiring EVSE in large parking facilities.
	Require sufficient area and electrical infrastructure for charging PEVs	In new multi-unit, commercial or industrial developments, local agencies may choose to require all conduits leading to the electrical room including electrical service conduits, and the electrical room to be appropriately sized to accommodate future electrical equipment necessary for electric vehicle charging stations, and the voltage and amperage capability of other anticipated infrastructure. Vancouver, Canada building codes include requirement for an EV charging electrical room in multi-family buildings.
	Adopt EVSE requirements into building/zoning code	
Local government: permitting charging infrastructure	Train permitting and inspection officials in basic EVSE installation	Local governments that anticipate a significant number of EVSE installations should consider having electrical inspection officials be certified in EV installation through an educational program that includes hands-on installation, instruction in relevant electric codes, and load calculation testing.
	Share best practices	
	Develop a process to expedite EVSE permitting in single-family residences	Expediting the installation of EVSE at appropriate locations can provide the service at a reasonable cost to consumers and maintain the safety of consumers and the public. Options include: issue permits under 48 hours; levy fees between \$100 and \$250; issue supplementary guidance to help applicants through the permitting process, and post guidance online; make permits available online or over-the-counter; limit the number of required inspections to one; minimize requirements for supporting materials and do not require site plans for EVSE. Minimizing permit requirements reduces the amount staff time devoted to permit review, which enables local governments to process permits more quickly and levy lower fees to recover costs.
	Implement online permitting of residential charging	Enable homeowners and licensed contractors to submit PEV charger permit applications online for installations at a pre-

Readiness Area	Strategy	Description
		determined complexity level to reduce the number of time-consuming visits to government offices.
	Provide outreach and resources on residential EVSE requirements	Information about PEV benefits and types, EVSE options, permitting process, and other issues regarding residential EVSE should be easily accessible.
	Prioritize EVSE permitting	Agencies may choose to prioritize the processing of charger permit applications. For example, San Francisco allows for prioritization of some permits, but requires permit applicants to trigger the expedited process by requesting prioritization.
	Employ universal permit applications	Regions may seek to adopt standardized permitting checklists. Tri-chapter Uniform Code Committee (TUCC), the Los Angeles Department of Public Works and Los Angeles County Chapter of the International Code Council, and NREL and US Car GITT Permit Working Group have developed checklists.
	Establish flat fees for standard installations	Currently, many jurisdictions set permit fees based on a percentage of the overall cost of the project. This penalizes homeowners that have more costly installations. Cities and counties may adopt flat fees that are cost recovery-based.
	Waive plan check requirements for simple residential installation	Local agencies can waive requirements for formal drawings for standard installations or minor residential electrical work.
Identify incentive opportunities	Provide PEV incentives through vehicle buybacks & feebates	In a feebate program, consumers purchasing a vehicle that emit more CO ₂ on a gram per mile basis than a defined standard are assessed a fee at the point of purchase. These fees are used to provide rebates to consumers who purchase vehicles that emit less CO ₂ on a gram per mile basis than the defined standard. In a vehicle buyback program, older vehicles that meet a certain fuel economy threshold can be traded in. The incentive amount will vary with the fuel economy of the vehicle being traded in as well as the vehicle type being purchased (e.g., PHEV or BEV).
	Provide tax incentives for the use of PEV taxis	Permitting agencies, often cities or counties, can adopt policies to create incentives for taxi companies and private taxi owners to purchase plug-in hybrid electric or all electric vehicles. These incentives range from lowered permitting costs, inspection changes, preferred route and zone selection, airport and destination center access, and staging area advantages.
	Provide charging and parking incentives	California's Vehicle Code does not prohibit local governments from adopting additional parking ordinances, including designating preferential or free parking for PEVs.
	Develop policy for electrification of fleets	Public agency administrations can shape and introduce public policy for local elected officials to adopt, calling for public

Readiness Area	Strategy	Description
<p>Promote PEVs in (government/municipal) fleets</p>		<p>fleets to be powered by electricity and other alternative fuels.</p>
	<p>Deploy electric vehicles in transit fleets</p>	<p>Electric buses are available for transit fleets. However, range and charging times can limit deployment and/or route options. Overhead catenary or wirelessly powered/charged vehicles area also all-electric options but require significant infrastructure investments.</p>
	<p>Update standard plans and details for EV infrastructure</p>	<p>EV-readiness is now becoming part of the design review for certain capital improvement projects. To accelerate and lower the cost of EV-readiness, local governments are encouraged to change design guidelines, standard drawings, specifications and details for qualifying public works infrastructure projects.</p>
<p>Identify planning opportunities to promote PEVs in communities</p>	<p>Convene EV readiness summit of local elected officials</p>	<p>The growing strain on local finances would make it difficult for local jurisdictions to take on new work or to implement new policy directions without priority setting and impetus from local leadership. A regional summit would provide an opportunity to present strategies, share best practices, and solicit the support of local elected leadership.</p>
	<p>Monitor uptake of PEVs communitywide</p>	<p>Uptake of EVs in low income communities is likely to occur at a slower pace over several years. It is important that communities that are disproportionately impacted by transportation sources be targeted for PEV adoption to assist in the reduction of harmful particulate emissions from both light- and heavy-duty vehicles.</p>
	<p>Coordinate on statewide and regional efforts</p>	<p>Coordination efforts could include developing readiness guidelines, MDU charging guidelines, and workplace charging guidelines; convening roundtable of CEOs; developing cost of ownership business calculator; and reporting on incentives for employees.</p>
	<p>Incorporate PEV readiness policies into general plans</p>	<p>Amendments to the General Plan can guide the long-term growth of a city or county. Since General Plans set the policies that guide development of cities and counties, PEV readiness efforts will ultimately be most effective if General Plans are amended to accommodate requirements and policies relating to PEVs. The primary benefit of incorporating PEV readiness into a General Plan is that it lays the groundwork for local governments to allocate funding from a wider variety of sources toward these efforts rather than limiting funding for these efforts to grants and other sources that are specifically devoted to PEV readiness.</p>
	<p>Develop community-wide charging station siting plans</p>	<p>Working through a regional planning agency and with utility service providers, local agencies and other stakeholders including neighboring cities are encouraged to create 3- to 5-year short range siting plans for high priority public charging stations.</p>

Readiness Area	Strategy	Description
	Advocate for policies and funding to accelerate EV use	Much of the Bay Area PEV Readiness Plan was focused on strategies and policies that can support and facilitate PEV adoption. Moving forward, more progressive stakeholders will seek to identified specific policies and funding opportunities that can demonstrably accelerate
Consumer education and outreach	Implement a campaign to build awareness and demand for EVs along with helping to stimulate additional supportive actions for infrastructure development.	Provide an installation process checklist for homeowners: Simple “how-to” information for consumers to determine if they can safely accommodate charging equipment. This can help advise consumers on the range of drivers impacting installation feasibility and cost.
Utility readiness	Evaluate impact of rate structures on PEVs	Utilities can consider alternatives to tiered rate structures and time of use rates. A tiered rate structure does not take into account the environmental benefits of PEVs and in many cases could move a consumer into to a more expensive tiered rate. Time-of-use (TOU) rates can be an effective tool to mitigate grid impacts by encouraging consumers to charge during certain periods.
	Create notification protocol for PEVs and EVSE	Cities and counties have franchise agreements with utility companies, which allow entry into public rights-of-way. CPUC Rulemaking 09-08-009 directs electric utilities to collaborate with automakers and other stakeholders on a notification process regarding the location of electric vehicle charging stations (EVCS). Consistent with the ruling, local public works and planning staffs are encouraged to advise utilities where new charging systems are being planned so that upgraded energy storage, local distributed generation, facility energy management solutions, or electrical supply infrastructure can be incorporated into utility service plans.
	Evaluate and upgrade distribution infrastructure as needed	When making upgrades or adding distribution infrastructure, utilities, regulators, and planners should include the potential for PEV charging impacts as part of the analysis and, where possible, make strategic and cost-effective investments. As larger numbers of PEVs are adopted, infrastructure may become vulnerable, particularly in areas more likely to experience PEV clustering and large public infrastructure projects.
	Evaluate vehicle grid integration (VGI) and vehicle to grid (V2G)	Bidirectional power flow between EVSE and PEVs would allow energy stored in the battery to be used to power other vehicles, the local building, or back to the power grid. This is called V2B (vehicle to building) or V2G (vehicle to grid). Power flow from the battery to the electric grid may be useful as a power source if sufficient numbers of connected batteries can be aggregated. Power flow to and from the grid can also be useful in voltage and frequency regulation for grid stability.

Readiness Area	Strategy	Description
	Provide renewable energy options for PEV drivers	A study (Axsen and Kurani, 2013) conducted by University of California at Davis and Simon Fraser University shows that consumers are more likely to buy PEVs if they know that the electricity that will power the car will come at least in part from renewable energy. The research team found that that demand for PEVs is 23 percent higher in regions with a “green electricity” option than in areas without a clean-energy program. Utilities can also mitigate the environmental impacts of increased electricity demand by allowing PEV owners to charge their vehicles using renewable energy.