Plug-In Electric Vehicle Infrastructure: Metrics and Data Guidelines

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Energy Division- Emerging Procurement Strategies

California Public Utilities Commission

CPUC Auditorium, June 16, 2015

Agenda (morning)

Time (am)	Topic and Goal	Person, Organization
9:30	Administrative Items, Introduction, Purpose	Adam Langton, CPUC Noel Crisostomo, CPUC
9:45	Use and application of metrics & data collection	Energy Division-led Stakeholder Discussion
10:30	Quantifying Benefits and Costs of PEV Infrastructure	Energy Division
11:00	Break	
11:10	Measuring Benefits: Electric Miles	Cross-Party activity & reports
11:40	Measuring Costs: PEV Adoption	Cross-Party activity & reports
12:10	Lunch ***We will begin at 1:10pm***	

Agenda (afternoon)

Time (pm)	Topic and Goal	Person, Organization
1:10	Measuring Costs	Cross-Party activity & reports
2:10	Existing PEV Infrastructure Data	Stakeholder Feedback to ED
2:40	Alignment with the Standard Practice Manual	Stakeholder Discussion
3:10	Break	
3:20	Significance of Metrics and Data Guidelines	Energy Division-led Stakeholder Discussion
3:50	Wrap-Up	Energy Division

Safety & Misc.

- In case of an Emergency
  - Staff will call 911
  - To evacuate, proceed out of 1 of 4 exits:
    - **2 in the rear:** Head through courtyard and down steps, ↱ McAllister, ↱ Franklin, ↰ Turk, end at Gough/Turk at Jefferson Square Park.
    - **2 beside dais:** ↰ Golden Gate, ↱ Franklin, ↰ Turk, end at Gough/Turk at Jefferson Square Park.
- Bathrooms & fountain across the Lobby

Remote Participation

Meeting information

Topic: R.13-11-007 Plug-In Vehicle Infrastructure (PEV) Data & Performance Metrics Guidelines
Date: Tuesday, June 16, 2015
Time: 9:30 am, Pacific Daylight Time (San Francisco, GMT-07:00)
Meeting Number: 275 616 820
Meeting Password: !Energy1

To start or join the online meeting

Go to
https://van.webex.com/van/j.php?MTID=m8f05e36c564e41d04072960cf1d4d0fd

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Teleconference information

Call-in: 866 811 6884
Participant passcode: 8742156

Ground Rules

- When asking questions, please wait to be identified, and state your name and organization (into a microphone for remote participants).
- Remote participants:
  - Remain on mute unless identified.
  - Use the Raise Hand feature.
- Limit questions to clarify content on the current slide.
- Discussions will be held after each respective speaker.
- 30-second stretch breaks after a segment concludes.

Today's Objectives

Consider how Energy Division's proposed infrastructure Site Segmentation and Selection Criteria relate to Data and Metrics that are needed to evaluate PEV programs.

1) The availability of data from existing infrastructure installations;
2) How such data maps to the benefits and costs associated with PEV infrastructure; and
3) How data may inform Energy Division's, utilities', and parties' current or future analyses.

5/28/15 ALJ Ruling

Energy Division staff may

- Use information from the workshops to develop proposals on site selection & data guidelines.
- Propose how such information could be incorporated into the 3 Applications regarding PEV infrastructure.

Parties may incorporate issues or discussion into their formal filings within the 3 Applications.

California Public Utilities Commission- Energy Division

Noel Crisostomo

USE & APPLICATION OF METRICS

Iterative Deployment Strategy

State Goals

Ready for 1 M ZEV by 2020

Adopt 1.5 M ZEV by 2025

Plan

6/10:
Site Segmentation & Selection Criteria

Market Intervention

Install EVSE & Infrastructure

Deploy

Market Response

Customer Use & Measurement

Analyze

Review & Report

Effectiveness Analyses

Track

6/16:
Metrics & Data Guidelines

Regulation given uncertainty

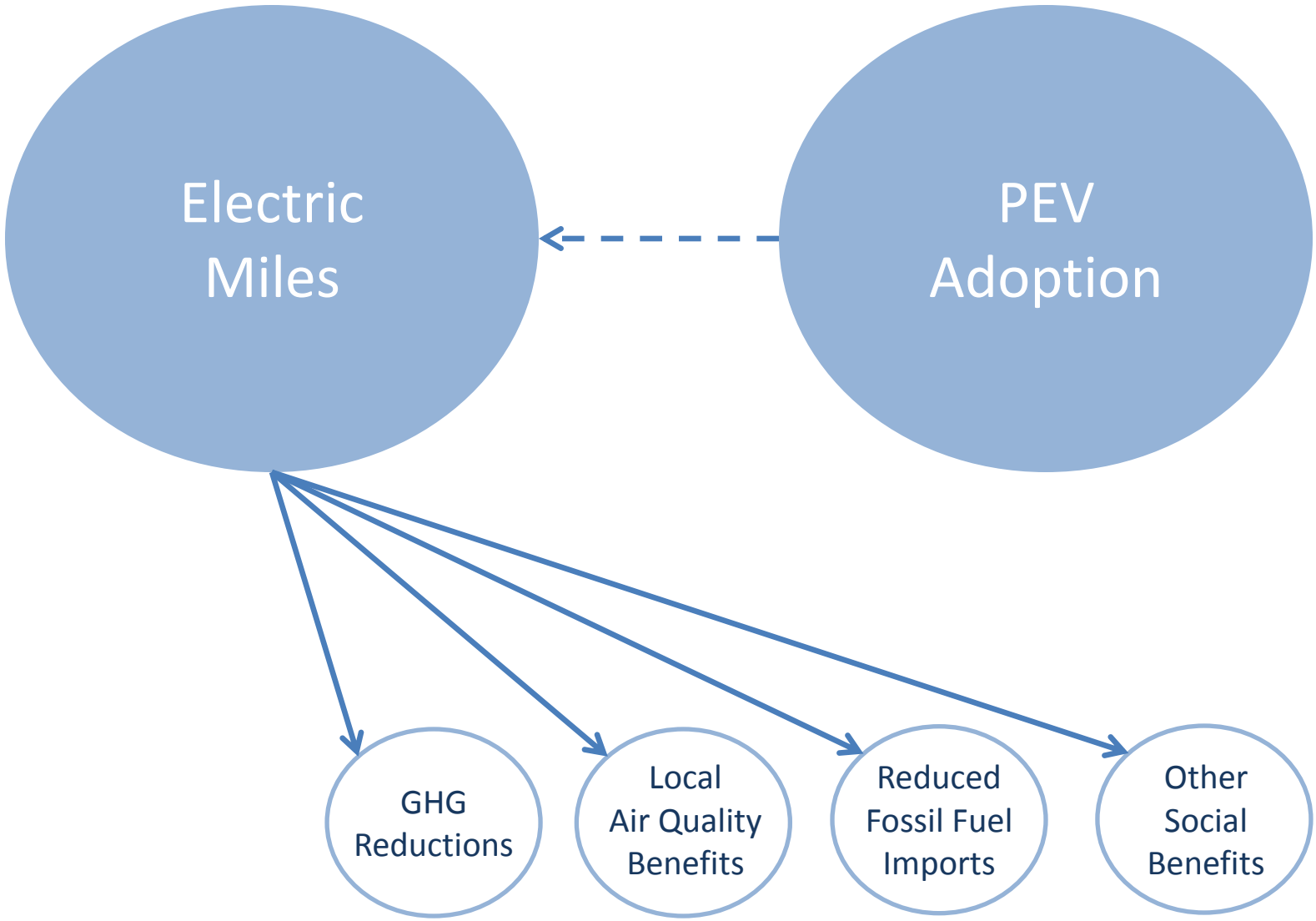
- CPUC is responsible for ensuring that ratepayers' costs are fair, just, and reasonable.
  - $1.1 B scale is unprecedented when compared to government-funded PEV investments.
  - Stakeholders should focus on the ***net value*** (not just cost) of the investments.
  - The Commission can establish processes to ensure that sited PEV infrastructure is guided by analysis and that its usage informs our future decisions.
  - Efforts toward gaining certainty must be weighed.
    - Modeling limitations
    - Diminishing marginal benefit of analysis
    - Opportunity cost of delaying deployment
    - Unclear market signal.

Discussion

1. How should the cost of data collection be balanced against the benefits of analysis?
2. What limitations do quantitative metrics have in evaluating the performance of PEV infrastructure deployment?
3. How should the Commission interpret and apply quantitative metrics for PEV infrastructure deployment?

California Public Utilities Commission - Energy Division
Adam Langton

QUANTIFYING THE COSTS & BENEFITS OF PEV INFRASTRUCTURE


Electric Miles
PEV Adoption
GHG Reductions
Local Air Quality Benefits
Reduced Fossil Fuel Imports
Other Social Benefits

Elements of Metrics and Data Collection

Program Benefit

Outcome that the program is trying to enable

Measurement aspect

Component of the benefit that is being measured

Includes the units of the metric

Data Needs

Data source and location for the data used in the metric

Collection Strategy

Methods for collecting the data of the metric (tools used to collect data, actors involved, etc.)

Processing, analysis, reporting

How data should be analyzed?

Who should analyze it?

How often should results be reported?

EXAMPLE: PEV Adoption Impact

Program Benefit	Metric element	Data Needs	Collection Strategy	Processing, analysis, reporting
PEV Adoption	How many people purchased PEVs because of the infrastructure program?			
	How many people were influenced to purchase a PEV by the infrastructure program?			
	Did the existence of the infrastructure reduce range anxiety among non-PEV owners?			

Stakeholder Activity

MEASURING BENEFITS: ELECTRIC VEHICLE MILES TRAVELLED

Interactive Brainstorming Activity

Pick a Topic

Develop a list of data needs, collection strategies, and analysis for the following electric miles metrics:

1. Dispensed kWhs
2. Displaced home charging
3. Inefficient prioritization
4. Impact on Range Confidence

Rules

Split up among parties- do not work with colleagues.

Groups < 6 people.

Roles:

- Note-taker
- Presenter(s)

Supplies available:

- Poster paper
- Pens
- Post-Its

Stakeholder Activity

MEASURING BENEFITS: PEV ADOPTION

PEV Adoption Impact

Program Benefit	Metric element	Data Needs	Collection Strategy	Processing, analysis, reporting
PEV Adoption	How many people purchased PEVs because of the infrastructure program?			
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Stakeholder Activity

MEASURING COSTS: INFRASTRUCTURE INSTALLATIONS

Measuring Costs

Different categories of costs

direct ratepayer costs
direct host costs
indirect host costs
direct user costs
indirect user costs

Potential Ratepayer costs

Site Acquisition
Installation
Operations
Data collection/analysis

Potential Site costs

Shared installation cost
Additional operation cost
Lost control of parking spot
Data collection/analysis

Potential User costs

Charging fees

Data collection/analysis

Stakeholder Feedback

EXISTING PEV INFRASTRUCTURE DATA

Select Public Datasets

- AB 118 Programs
  - Clean Vehicle Rebate Program and Survey
  - Grant Awardees
- National Census Data
  - American Community Survey
  - National Household Travel Survey
- American Recovery & Reinvestment Act
  - The EV Project
- Investor Owned Utilities
  - Annual Load Research Reports
  - NRG Settlement
  - Demand Response Pilots
  - PEV Submetering Pilot
  - Electric Program Investment Charge R&D
  - Low Carbon Fuel Standard
  - Distribution Resource Plans
  - PEV Infrastructure Applications

Electric Program Investment Charge

Commercial Stage & Objective		Segment of Electricity Value Chain, Project Subject, Utility and EPIC Investment Plan			
Technology Demonstration & Deployment	***Cross-Cutting**		**Utility Dispatch of CAISO DR, SCE 2* **Regional Grid Optimization, SCE 2*	**Mobile Metering, PG&E 2* **Automated Open Architecture Devices, PG&E 2*	
	Customer Products & Services Enablement		*Load Scanning to Identify EV, SCE 1* *Transformer Load Management, SCE 1* *Advanced V2G Applications, CEC 1*	Submetering & Subtractive Billing, PG&E 1 Submetering & Subtractive Billing, SCE 1 DCFC Mapping Tool, PG&E 1	DCFC Installation, SCE 2 L1 Make-Readies, SCE 2 Off-Road Electrification, SCE 2 A/S & Streetlight EVSE, CEC 2
	Renewable & Distributed Energy Resource			*Intelligent Univesal Transformer, PG&E 2* DER Management System, PG&E 2	
	Grid Optimization & Modernization		EVs for P Quality & Outages, PG&E 1	VAPS Retrofits, SCE 2	
Applied Research & Development		*Charging to Integrate Renewable Energy CEC-2*	*V2G Communications Interfaces CEC-1,2*		*Battery Recycling, CEC-2* Smart & Efficient EVSE, CEC-1 Customer EMS, CEC-2
		Generation	**Transmission**	**Distribution**	**Demand-Side Management**

Key Data Needs

- Utilization of EVSE
  - Charging sessions (kWh, length, frequency, vehicle types)
- Longitudinal Travel Patterns
  - Infrequent Trips
  - Share of charging events among EVSE locations
- Vehicle State of Charge
- Motivators for Adoption

Discussion

1. *What data does industry currently collect from their deployments?*
2. *How do they conduct analyses to inform their business decisions?*
3. *What learnings can the Commission leverage to inform future program designs?*

Stakeholder Discussion

ALIGNMENT WITH THE STANDARD PRACTICE MANUAL

Standard Practice Manual

- Developed four tests to measure the Cost-Effectiveness of Energy Efficiency and other demand-side management programs

Perspective	SPM C-E Test
Utility & Participant	Total Resource Cost
Program Administrator/Utility	Program Administrator Cost
Ratepayers	Ratepayer Impact Measure
Participant	Participant Cost
Society	Societal Cost (variant on TRC)

CPUC did not adopt a previous ED proposal that includes externalities and uses a social discount rate. However, it is arguable that societal perspective is required for PEV programs.

PEV Infrastructure programs must directly benefit ratepayers & promote positive externalities.

- Public Utilities Code 740.3
  - The Commission's policies authorizing utilities to develop equipment or infrastructure needed for …[PEVs]…shall ensure that the costs and expenses for those programs are not passed through to electric…ratepayers unless the CPUC finds and determines that those programs are in the ***ratepayers' interest***.
- Public Utilities Code 740.8
  - [Ratepayer interests include] ***short- or long-term, mean direct benefits*** that are specific to ratepayers in the form of
    - safer, more reliable, or less costly…electrical service, consistent with Section 451, "comfort" of PEV and "convenience" of onsite recharging?
  - And ***activities that benefit ratepayers*** and ***that promote***
    - Energy Efficiency, versus a internal combustion engine?
    - Reduction of
      - health and environmental impacts from air pollution,
      - …to U.S. EPA and Federal Clean Air Act compliant levels?
      - And greenhouse gas emissions related to electricity and natural gas production and use, …by specifically using renewable fuels?
    - And increased use of alternative fuels.

Energy security, avoidance of oil production and refining?

Categorizing PEV Programs in the SPM

- PEVs "increase annual consumption of electricity…relative to what would have happened in the absence of the program…"[1]

Noteworthy Test Aspects	Load Building (increase sales)	Fuel Substitution ("inducing the choice of 1 fuel")
Generally		Incl. cost of gas T&D, environmental externalities.[1]
Total Resource Cost	Inapplicable since Load Building is not an alt. to other supply options[2]	Net effect between the foregone & program fuel.[3] Measures economic efficiency of the total energy supply system.[3] Benefits: avoided device costs, avoided energy supply costs from device foregone. Costs: Increase in supply costs of chosen fuel.[5]
Ratepayer Impact	Preferred Unit: Lifecycle revenue impacts/customer	Preferred Unit: Lifecycle revenue impacts/customer
Participant Cost	Benefits: Optional to incl. increase in productivity &/ service, and if so, perform the Social Cost Test.[3]	Benefits: Incl. avoided capital & O&M of equipment not chosen.[3] NPV determines whether participation is in the long-run best interest of the customer.[4]

1. Standard Practice Manual at 2-3; 2. Ibid at 6, 21, 24; 3. Ibid at 8; 4. Ibid at 9; 5. Ibid at 18.

The use of C/E Protocols

- As opposed to the "all cost-effective" descriptions of efficiency resources in the Energy Action Plan[1] and subsequent policies, the Commission's PEV responsibilities appear to focus on deployment due to the criticality of transportation sector GHG reductions.
- The SPM poses challenges because PEVs share characteristics of both Load Building and Fuel Substitution, which are intended to be evaluated by different Tests.
  - How should PEV programs be categorized?
- Practically, is it fair to apply restrictions to nascent PEV programs if we want the utilities and third parties to experiment, albeit carefully and deliberately?
  - If the Commission were to apply C/E Tests, should they be applied on a "portfolio" level or on a "program" level? (e.g. across the entire utility expenditure or separated by charging technology/customer?)
  - Does P.U. Code 740.8 implicate the use of the SCT?

The 2003 EAP focused primarily on demand reduction and ensuring clean, sufficient supply.

Discussion

CPUC's SPM favors an open public process to "incorporate the diverse views of stakeholders before adopting externality values and policy rules."

1. *Should the requirements of the Standard Practice Manual shape our approach to measurement, evaluation, and program review? If so, how?*
2. *If there are shortcomings, how could the Commission's analysis be modified to reflect the characteristics of PEV infrastructure programs?*

Stakeholder Feedback

SIGNIFICANCE OF METRICS & DATA GUIDELINES

Roles for Stakeholders in Review

- Spectrum of decision-making authority.

Advisory	Consensus	Majority	Unanimity
• Provides input to the IOU, which maintains its executive authority.	• There must be general agreement on an issue for it to be approved.	• > 50% of the participants must agree on an issue for it to be approved.	• All participants must agree on the issue for it to be approved.

- Does it amount to a preview of Protests to be resolved through an informal proceeding (Energy Division Advice Letter process)?
- What is the role of competitors (i.e. analogous the market participants that are *excluded* from IOU Procurement Review Groups) in these groups and how does this impartial impact cost analysis?

Balancing Conflicting Principles

- What happens when competition must be weighed against cost-effectiveness?
  - What if a service provider's business model relies on an element of a program to continue to be supported by a ratepayer investment?
  - What trade-offs exist and how will advisory groups address them?

Implementation & Program Redesign

- How do parties understand and distinguish between "Phasing" and "Piloting"?
- Do deployments of infrastructure continue or cease between review of program implementation?
- What are parties' expectations for "Expedited Review" of initial phases or pilots of infrastructure installations from different perspectives?
  - Business planning
  - Ability to conduct data requests
  - Achievement of State PEV Goals

Discussion

1. *How do we use the information available from PEV infrastructure deployments to provide market certainty during program reporting, review, redesign, and further implementation?*

Wrap Up

- Metrics Workshop on (6/16)
  - Questions & comments from any part of the workshop.
  - Are there methodologies or reports that evaluate costs and benefits from PEV infrastructure that you want Energy Division to know about?
  - How would parties like to capture thoughts with the information presented and gathered today?

Thank you for participating!

CPUC Alternative Fuel Vehicles Page

http://www.cpuc.ca.gov/PUC/energy/altvehicles/

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