

EPIC TRIENNIAL INVESTMENT PLAN 2015-17
Proposed Energy Research Initiative
Questionnaire



Title of Proposed Initiative (Short and concise): ***Localized Impacts of Plug-in Electric Vehicle Adoption***

Investment Areas (Check one or more) – *For definitions, see First Triennial Investment Plan, page 12:*

- Applied Research and Development
 Technology Demonstration and Deployment
 Market Facilitation

Electricity System Value Chain (Check only one): See CPUC Decision 12-05-037, Ordering Paragraph 12.a. http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF.

- Grid operations/market design
 Generation
 Transmission
 Distribution
 Demand-side management

California Energy Commission

DOCKETED

12-EPIC-01

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Issues and Barriers:

Transportation consumes 38% of primary energy in California, more than any other individual sector, and is heavily reliant on petroleum. Decarbonizing California's transportation sector is likely to require substantial electrification coupled with a shift toward renewable power generation. Plug-in electric vehicles (PEVs) allow for the electrical grid to meet some fraction of transportation energy demand, providing an opportunity for decarbonization and other localized environmental benefits. However, localized environmental benefits will vary over space and time, and are not well understood. A robust assessment of these impacts including multiple scenarios and uncertainty analysis would provide valuable information to the public, policy makers, and utilities.

Initiative Description and Purpose:

A better understanding of the impacts of PEV adoption on the electrical grid, greenhouse gas (GHG) emissions, and local environmental quality would allow policy makers to invest strategically in incentive programs and infrastructure to maximize both the short- and long-term benefits of electrified vehicles. Fostering this collaboration between experts in chemical transport modeling, electricity markets, life-cycle assessment, and risk assessment will provide a more comprehensive and informed evaluation of the impacts of vehicle electrification than what has been previously achieved.

Stakeholders:

- Utilities who must plan for increases in PEV electricity demand.
- State, regional, and local governments who establish PEV-related incentive programs
- State policy makers tasked with helping to achieve California's GHG emission targets and other environmental standards

Background and the State-of-the-Art:

- California has aggressively encouraged adoption of PEVs through HOV lane access, subsidies, and charging infrastructure. To date, the focus has been on GHG emissions reductions. Understanding localized tradeoffs would allow policy makers to work towards climate goals while maximizing co-benefits of alternative vehicles.
- The results will allow for PEV infrastructure and incentives to be optimized based on performance metrics aside from just GHG emissions. Policy makers will also gain a better understanding of how transportation electrification initiatives can contribute to changes in local environmental quality.

**Justification:**

Describe how this technology or strategy will provide California IOU electric ratepayer benefits and provide any estimates of quantified annual savings/benefits in California, including:

- This research applies to all California energy production and end-use sectors.
- This research will provide metrics for PEV-related power demand increases and localized impacts
- The research will identify areas where PEV adoption will yield the greatest benefits
- The work will evaluate the sensitivity of power demand, GHG emissions, and local impacts to a variety of input variables

Ratepayer Benefits (Check one or more):

- Promote greater reliability
- Potential energy and cost savings
- Increased safety
- Societal benefits
- Environmental benefits – specify—protection the California population from extreme climate and assuring reliability of energy supply during extreme climate events
- GHG emissions mitigation/adaptation in the electricity sector at the lowest possible cost
- Low emission vehicles/transportation
- Waste reduction
- Economic development

Describe specific benefits (qualitative and quantitative) of the proposed initiative

This project will lead to projections of increased power demand due to PEVs, allowing utilities to incorporate this information into long-term planning. The results will also provide valuable information about how PEVs in California are likely to impact local environmental quality, leading to more informed policy incentive programs.

Public Utilities Code Sections 740.1 and 8360:

Please describe how this technology or strategy addresses the principles articulated in California Public Utilities Code Sections 740.1 and 8360. The California Public Utilities Code is available online at www.leginfo.ca.gov/cgi-bin/calawquery?codesection=puc.