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CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION

TRANSFORMING IDEAS INTO SOLUTIONS

Research Notes

Cost-Benefit Analysis for Installing EV Chargers Versus Using Public Infrastructure

This research project plans to evaluate costs associated with installation, maintenance, and energy consumption, as well as the long-term financial impacts of owning versus depending on public infrastructure. By providing an in-depth analysis, this project will identify the most cost-effective strategy for charging the California Department of Transportation (Caltrans) fleet.

Equipment

May 2026

Project Title:

Cost-Benefit Analysis for Installing EV Chargers Versus Using Public Infrastructure

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WHAT IS THE NEED?

Caltrans has already begun integrating more electric vehicles (EVs) into its fleet, including electric heavy equipment and sweepers. However, a significant challenge persists: the lack of sufficient EV charging infrastructure at critical operational sites like maintenance yards, equipment depots, and construction locations. This shortage of chargers leads to operational delays and reduced fleet efficiency, disrupting daily operations. To tackle these issues, Caltrans seeks a comprehensive cost-benefit analysis to identify the most effective and efficient strategy for deploying EV charging infrastructure at these sites. This analysis will help balance the need for expanding charging capabilities with financial and operational constraints, ensuring Caltrans can support its growing EV fleet while advancing sustainability goals.

WHAT ARE WE DOING?

This research project plans to evaluate the economic impact of installing dedicated EV chargers compared to using public infrastructure by conducting a comprehensive cost-benefit analysis. The analysis will be considering factors such as the type and number of EVs, site-specific charging needs, grid capacity, and projected future demand. Additionally, the analysis aims to compare the financial implications of installing EV chargers at Caltrans facilities with the option of relying on public charging networks, with a focus on high-power Direct Current (DC) fast chargers. Evaluate the most effective and

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efficient approach for deploying EV chargers to support Caltrans' growing fleet of electric light-duty and heavy-duty vehicles. By anticipating long-term requirements, Caltrans can ensure its infrastructure is scalable and adaptable, optimizing investments to support a smooth transition to sustainable and efficient operations.

WHAT IS OUR GOAL?

The goal of the study is to conduct a comprehensive cost-benefit analysis to guide Caltrans in expanding its electric vehicle (EV) charging infrastructure. The study aims to compare the economic impacts of installing EV chargers at Caltrans facilities versus relying on public charging networks.

WHAT IS THE BENEFIT?

The results of this project will provide guidance on the most cost-effective strategy for charging Caltrans' fleet, helping optimize investment decisions while supporting California's transition to zero-emission vehicles by 2035.

WHAT IS THE PROGRESS TO DATE?

The project panel kickoff meeting was held on June 10, 2025, followed by a coordination meeting with Caltrans and Michael Todd from the ZEV Planning Tool team on August 14, 2025. Since then, vehicle operational data has been collected for selected locations, and fleet attributes—including make, model, duty classification, model year, and fuel type—have been extracted from GeoTab and Caltrans source files. All records were cross-validated through VIN decoding and matching to ensure the accuracy and integrity of the dataset.

A planning-level market scan was completed for the EV charger categories most relevant to the selected Caltrans sites. The assessment compiled representative charger power levels, hardware costs, installed costs, annual operations and maintenance/network costs, and expected service life to support cross-site comparison and scenario development. In addition, a preliminary grid-readiness assessment was conducted for the four selected sites, including a review of the transmission and service chain, available public utility datasets, and potential utility-side upgrade triggers that could affect deployment feasibility. Using the cost framework developed from the EV charger market assessment and the screening results from the grid capacity evaluation, two common charger installation scenarios were established for cross-site evaluation. However, final site-specific installation costs will remain dependent on confirmation of utility service conditions, available electrical capacity, and customer-side infrastructure constraints.