Evaluate Zero-Emission Vehicle Charging Stations at Caltrans Facilities

Research Direct Current Fast Charging (DCFC) installation cost, challenges, and opportunities for process improvements for future installations.

WHAT IS THE NEED?

Governor’s Executive Order B-16-2012 mandates to reduce greenhouse gas emission. Electric vehicles (EV) offer a clean fuel alternative to meet above mandate. However, range anxiety and charging frequency and gaps between existing charging stations challenges adoption.

California Department of Transportation (Caltrans) is deploying charging stations to fill in gaps between existing charging stations. This effort will provide the data needed for planning process improvement for future installment.

WHAT ARE WE DOING?

The research team will:

1. Identify the types of data to be collected, including usage patterns, vandalism, concerns by the public, non-recoverable electricity costs, and maintenance and operations costs.
2. Monitor the usage monthly and collect and summarize data of the charging stations for a period of two years after construction.

WHAT IS OUR GOAL?

This research will collect data on the implementation, maintenance, and utilization of new charging facilities being deployed to increase the charging coverage throughout California. This information will assist Caltrans to develop policy and procedures regarding the deployment of future charging stations.
WHAT IS THE BENEFIT?

This project will measure the use of the charger stations and help identify user needs. The demonstrated user demand will validate continued infill of EV service gaps and reduce inconvenience to highway system users. With the information obtained, encouraging movement towards EV infrastructure will provide business opportunity for future providers of charging stations and services.

One of the limitations of zero-emission vehicles is the time required to charge them. Expanded EV infrastructure featuring DCFCs will make EV a practical option for long-distance travel and encourage consumers to move away from internal combustion engines. Usage patterns revealed in this study will help direct future development of facilities in convenient locations, improving the availability of services and quality of travel for EV users.

WHAT IS THE PROGRESS TO DATE?

Task 1: Project Launch and Construction Phase Evaluation

University of California, Davis (UCD), Institute of Transportation Studies (ITS) team is evaluating the progress of the California Department of Transportation (Caltrans) project construction and launch remotely. 5 new sites have become operational during this reporting period. The locations are Northbound Maxwell Safety Roadside Rest Area (SRRA), Southbound Maxwell SRRA in Caltrans District 3 and Westley Northbound SRRA, Westley Southbound SRRA and Lodi Park and Ride in Caltrans District 10. These sites were anticipating new PG&E connection to become operational to the public. These sites have now come online according to secondary sources from the Plug Share application and Charger usage reports received by Caltrans.

Table 1 is a summary of the status of the construction and launch phase of each site.
*Shading color codes:

- Green indicates completed sites or almost completed
- Yellow indicates sites awaiting electrical connection to be active or sites estimated to be complete within the next quarter.
- Red: Delayed

UC Davis ITS team interviewed D3 and D10 design engineer Jaswinder (Sunny) Gill to understand the delays and cost changes to the sites in D10. The delay is in power procurement from Pacific Gas and Electric Company (PG&E) and some initial onsite electrical design changes made by the contractor that needed approval from PG&E.

**Task 2: Charger Operation Data and Analysis**

As per the last progress report, UC Davis ITS team is receiving charger usage data Caltrans on a monthly basis. ITS team is in the process of organizing the information and analyzing the usage session data to better understand and study the infrastructure performance including downtime, power performance, energy dispensed, charging profiles, etc.

**Task 3: Maintenance and Operation Phase**

UC Davis ITS team have started reviewing maintenance agreements between BTC Power and Caltrans.