

Planning, Policy,  
Programming

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**Project Title:**

Assessment of requirements, costs, and benefits of providing battery charging for battery-electric heavy-duty trucks at Safety road-side rest areas facilities

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## Assessment of Providing Battery Charging for Battery-Electric Heavy-Duty Trucks at Safety Road-Side Rest Area Facilities

Define possibilities for and barriers to provision of battery charging infrastructure for heavy-duty electric trucks at roadside rest areas

### WHAT WAS THE NEED?

The purpose of the proposed research is to better define possibilities for and barriers to the provision of battery charging infrastructure for heavy-duty electric trucks at roadside rest areas. Caltrans maintains an extensive series of roadside rest areas throughout California that are widely used by long-haul trucks. By 2030 it is expected that a significant fraction of those trucks will be electrified and some of them will have the need for recharging their batteries away from their home base. In this research, it will be determined whether charging at roadside rest areas, especially those along interstate highways, are likely to meet the needs of the trucks that have multi-day trips.

### WHAT WAS OUR GOAL?

The goals of this research are to determine whether providing the charging at the rest stops is practical for Caltrans to consider, and to assess whether it is likely that the truck companies and drivers who will have multiple options for recharging their batteries will utilize charging at rest stops. The final step in the research will be to determine under what circumstances providing recharging at rest stops makes sense for Caltrans.

### WHAT DID WE DO?

The major areas of research were the following:

1. Determine battery charging requirements at rest stops
2. Assess how the trucks would use the charging facility
3. Evaluate the economics of the charging facility
4. Determine the barriers to Caltrans establishing the charging facilities
5. Consider whether it makes sense for Caltrans to establish the charging facilities



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## WHAT WAS THE OUTCOME?

By 2030 it is expected that a significant fraction of the long-haul trucks will be electrified and some of them will have the need for recharging their batteries away from their home base. In this research, it was determined that the most cost-effective approach to achieving 600 mile daily range capability in a battery-electric long haul truck was to size the battery for 300 miles and opportunity charge the battery in one hour stops up to twice per daily trip. This would require 450 kW chargers at the safety rest stops. The installed cost of each charging unit would be about \$400k. The cost of electricity to charge the battery would be about \$.25/mile plus utility demand charges which could increase the electricity cost to \$.30/mile. In California, much of the charger cost and electricity cost can be offset by Low Carbon Fuel Standard (LCFS) credits in 2022-2030. Hence, the operating cost of the truck could be relatively low.

At the present time, a major barrier for Caltrans to establish battery charging facilities at rest stops is that both California and federal regulations forbid the commercialization of rest stops especially along interstate highways. There are discussions at both the state and federal levels to change the regulations to permit commercialization of rest stops. These discussions are motivated by the need to provide battery charging facilities along US highways for long haul trucks. California has an electric truck mandate which will require 30% of tractor-trailer trucks sold in 2030 to be electric. Some provision for highway battery charging will be needed for the mandate to be successful.

The research indicates that Caltrans should at least consider becoming involved in some way with establishing highway battery charging facilities in California. The initial cost to begin the project seems reasonable especially if LCFS credits are considered. It also seems likely that truckers who presently use the rest stop areas in relatively large numbers would utilize the battery charging facilities when they begin to drive battery-electric trucks.

## WHAT IS THE BENEFIT?

Caltrans is the state agency that is responsible for the California system of roadside rest areas. This project was concerned directly with the roadside rest areas and how they can be utilized to charge the batteries of electric long-haul trucks. The research determined that it is practical for Caltrans to consider providing battery charging facilities at safety rest stops and that the truck companies and drivers would utilize the battery charging facilities to extend the daily range of the trucks to 600 miles or longer. This would contribute to the success of the California ZEV truck mandate.

## LEARN MORE

To view the evaluations:  
<https://ncst.ucdavis.edu/project/assessment-requirements-costs-and-benefits-providing-battery-charging-battery-electric>

## IMAGES



Image 1: Streamlined electric long-haul truck