



Caltrans Division of Research,  
Innovation and System Information

# Research



# Results

Executive

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Road Charge White Paper

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## Road Charge White Paper

Road Usage Charging (RUC) is an alternative way to finance the construction and maintenance of transportation, as a "road user cost" could be charged based on how many miles are driven.

### WHAT WAS THE NEED?

Through the enactment of Senate Bill 1077 in 2014, the Legislature and Governor determined it important for the state to begin to explore alternative revenue sources that may be implemented in lieu of the antiquated gas tax structure now in place. The California State Transportation Agency (CalSTA) through the California Department of Transportation (Caltrans) launched a statewide pilot program, California Road Charge Pilot Program, to explore road charging as a potential long term replacement for the gas tax. Road charging is a funding mechanism where drivers pay to maintain the roads based on the miles they drive, rather than the amount of fuel they consume.

The California Road Charge Pilot Program answered many questions and identified additional design concept challenges to a Road Charge system in California.

### WHAT WAS OUR GOAL?

This white paper sought to address a few of the Road Charge design concept challenges.

A road charge system might seem to be a simple solution to the generating the funding necessary for maintenance and upkeep of California's transportation infrastructure. However, many challenges remain for the road charge concept. Caltrans looked to carry out basic and applied research to gather unique and innovative ideas to help solve some of the road charge concept challenges using technology. Any ideas and technologies that



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have the potential to advance the road charge concept were considered for further development. California key design challenge areas included:

1. A road charge will have to be collected and enforced;
2. Simple systems report total miles traveled, but more complex systems report mileage by geographic area or class of road;
3. Any system to collect revenue will be subject to evasion and avoidance behavior;
4. If integrated with the current gas tax, modifying the point of sale software to allow the system to interact with a road charge system;
5. Communicating information on prices to vehicles and displaying to drivers;
6. Privacy and data security concerns; and
7. Simplicity to the State and end user (drivers)

## WHAT DID WE DO?

FIVE broad categories of technologies and concepts were identified, evaluated and documented for operational feasibility in California:

- (1) Time Permit Technologies
- (2) Mileage Permit Technologies
- (3) Odometer Technology
- (4) Usage-based Insurance Devices Smartphone App (i.e. GPS based), and
- (5) In-Vehicle Telematics Other Location-based Devices (non-GPS based)

The research approach looked at both (1) fixed and (2) variable types of charging with respect to three different systems for applying these charges – (1) single point charging as toll roads (2) area-based charging as in congested areas, and (3) distance based charging for the total distance traveled, using seven tasks for each of the seven design challenges described in the above goals

## WHAT WAS THE OUTCOME?

A Road Charge white paper was created with key recommendations for each design concept challenge. The white paper documents only preliminary findings based on information collected through published and unpublished sources on road usage charge – and drawing match with international congestion or road pricing implementation experiences.

Recommendations for a more in-depth study in data collection efforts for California drivers to understand each research emphasis covered in this white paper. Particularly, to observe the impact of each of the different technologies for payment methods for rural and urban residents of California.

## WHAT IS THE BENEFIT?

The benefits include the following: Understanding any ideas and technologies that have the potential to advance the road charge concept in the specific design challenge areas. This white paper serves as a great source of information on various aspects of road charge program both before and/or after it is implemented in California. This white paper can also serve the needs of other states in the country seeking some key initial insights into the road charge program.