California
Road Charge

Fair. Transparent. Sustainable.

About Road Charge • March 2022

As California makes progress toward our ambitious clean air goals, many Californians are switching to more fuel-efficient vehicles, so they buy less gasoline and pay less gas tax. This not only means less funding to maintain our transportation system but may also disproportionately place more of the burden of funding road repairs and maintenance on low- and middle-income families that can't afford to purchase a new car.

California needs a fairer, more transparent, and more sustainable way to fund our roads. That's the reason the state is exploring replacing the gas tax with a road charge, an alternative funding mechanism that allows drivers to support road and highway maintenance based on how many miles they drive, instead of how many gallons of gas they buy.

2013
California joins RUC West to engage in joint research and deliberation on road charge concepts.

2014
The California State Legislature passes SB 1077 (DeSaulnier) to conduct a road charge pilot study.

2016 - 2017
California's Road Charge Pilot Program successfully tests more than 5,000 vehicles that report more than 37 million miles.

2017
California passes SB 1 (Beall), the Road Repair and Accountability Act of 2017.

2020
California conducts research relating to road charge impacts to disadvantaged communities and rural drivers, as well as an interoperability pilot with the State of Oregon.

2021
California launches four technology demonstrations: usage-based insurance, ridesharing, electric charging stations/ pay-at-the-pump systems, and autonomous vehicles.

About the 2021 Road Charge Four-Phase Demonstration

The 2017 Road Charge pilot, authorized by Senate Bill 1077, (Desaulnier, 2014), concluded that a road charge is feasible and recommended the state find ways to improve the user experience by testing pay-at-the-pump approaches similar to the gas tax. California's 2021 Four-Phase Demonstration Project was a technical demonstration that assessed how the user experience could be made as easy as possible. With support from a federal Surface Transportation System Funding Alternative grant, California tested how road charge might work with four technologies:

Electric vehicle charging stations/ pay-at-the-pump systems

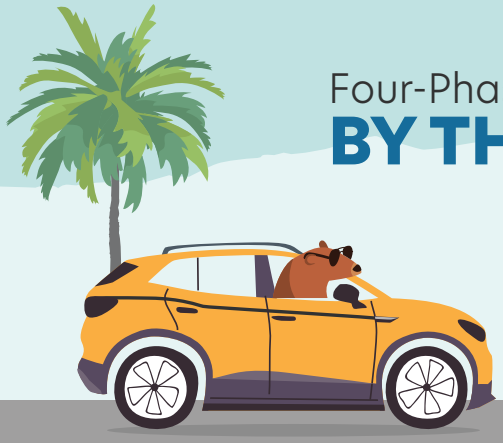
Usage-based insurance

Ridesharing

Autonomous vehicles

2021 Four-Phase Demonstration Overview

The Four-Phase Demonstration was a technology test to see how existing transportation service business models could be used to provide an easy user experience for road charge program users. The demonstration was conducted between January and June 2021 using four technologies. Each technology had a unique mileage collection and reporting process, but all were designed to simulate how a driver might actually validate their mileage, be assessed a road charge, and receive any relevant fuel tax credits for gasoline purchased.



Four-Phase Demonstration
BY THE NUMBERS

technologies	months	participants	miles traveled
4	6	83	175,024

The Demonstration compiled data for all phases through the Platform for Road charge Innovation and Mobility Evolution (PRIME) – a first-of-its-kind data warehouse which combined private, sanitized participant data with other California data sources. Together, this data processing provided a series of operational dashboards that could improve transportation planning, forecasting, and operations.

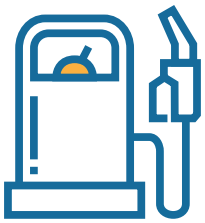
			MILEAGE COLLECTION MECHANISM	FUEL USE REPORTING PROCESS
PHASE 1A Pay-At-The-Pump	participants 33	miles traveled 80,675	Collected from the vehicle and transmitted during fueling events using an OBD Plug-In Device.	Participants used a special gas payment card that allowed fuel consumption and fuel taxes paid to be determined.
PHASE 1B ChargePoint	participants 9	miles traveled 21,763	Collected from the vehicle and transmitted during charging events using an OBD Plug-In Device.	Electric vehicles do not pay fuel taxes, so there was no need to determine fuel consumed.
PHASE 2 Usage-Based Insurance	participants 29	miles traveled 72,116	Provided by the participant on a monthly basis by using a smartphone app to take a photo of the odometer.	Fuel consumption and fuel taxes paid were determined by using the vehicle's estimated fuel efficiency and the reported miles driven.
PHASE 3 Ridesharing	participants 9	miles traveled 175	Collected and reported through the ridesharing service's smartphone app.	Fuel consumption and fuel taxes paid were determined by using the vehicle's estimated fuel efficiency and the reported miles driven.
PHASE 4 Autonomous Vehicles	participants 0	miles traveled 295	In-Vehicle Telematics.	Electric vehicles do not pay fuel taxes, so there was no need to determine fuel consumed.

OVERALL LESSONS LEARNED

- **Building on existing models is a win-win-win.** Leveraging familiar processes and systems from tried and trusted sources creates an easy avenue to expand market access for the business partner, an easy experience for the taxpayer, and can lower administrative costs for the state.
- **All of the business partners expressed interest in a market share under an operational program.** Road charge continues to gain popularity across the country and each of the business partners see the strategic advantage in becoming an early adopter of the road charge concept.
- **Existing business providers can be integrated securely and reliably with a road charge system.** The entire Demonstration system, including third-party systems, was successfully tested to ensure reliability, security, and successful operations with no issues identified and no remediation efforts needed.
- **Simple, transparent approaches will be more positively accepted than complex solutions.** Transparency is key to acceptance as drivers want to see how their road charge is calculated, how secure and safeguarded the systems are, and how road charges paid correlate with improvement to California's highways.
- **Privacy concerns and complexity are perceived challenges.** Participants in phases with minimal steps to enroll and report data showed higher satisfaction and fewer concerns with privacy and data security.
- **Technology-based reporting methods can pose accessibility issues.** Smartphones are not yet ubiquitous, and an overdependence on high tech solutions can result in accessibility challenges and inequities with economically underserved and older populations.
- **Clear definition, communication, and proactive enforcement of business practices is critical.** Future state oversight agencies must establish, communicate, and audit customer service standards for commercial account managers.

Phase 1A: Pay-At-The-Pump

California drivers are used to paying the gas tax - and therefore funding transportation infrastructure - through charges assessed at the pump. However, there does not yet exist an easy way to integrate road charge with existing fueling infrastructure to collect road charge fees and calculate gas tax credits.



1. ENROLL

- Download GasBuddy app
- Attach bank account to GasBuddy card

2. DRIVE

Mileage Reporting Option (MRO)

- Miles transmitted via OBD-II device
- Fuel purchased with GasBuddy card

3. PAY

- Credits for fuel tax paid are deducted from road charges
- Road charges are invoiced in GasBuddy app & sent email
- Road charges are paid in GasBuddy account/ card (simulated)

4. SURVEY

Three participant surveys
- After enrollment
- Middle of pilot
- After pilot ended

Summary Financial Results

33 Total participating vehicles

80,675 Total Miles

80,275 California Miles

400 Out-of-state miles

2,246 Gallons of fuel purchased

$1,766 Gross Road Charge assessed

-$1,134 Fuel tax credits

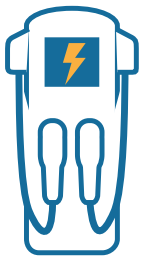
$632 Net Road Charge

PHASE 1A LESSONS LEARNED:

- A Pay-at-the-Pump Road Charge Model can support accurate calculation of fuels tax credits.
- While the technology is available, there is not an existing business model to support pay-at-the-pump road charge.
- Integration with existing fueling infrastructure is possible but not the best path at this time.
- Third-party smartphone apps may not accurately capture trip information needed to support a functioning road charge system.
- Technologies and apps for fuel retailers may prove over complex for some motorists.

Phase 1B: Pay-At-The-ChargePoint

Electric vehicle charging infrastructure is becoming more ubiquitous in communities across the state. However, current electric vehicle charging technology does not collect a car's mileage, and the existing electric vehicle charging market is extremely fragmented, meaning there is no singular way to collect data across different chargers.



1. ENROLL

- Download chargepoint app
- Create ChargePoint account
- Attach a payment card to account

2. DRIVE

Mileage Reporting Option (MRO)

- Miles transmitted via OBD-II device
- Electricity charged at ChargePoint stations

3. PAY

- Road charges are invoiced by ChargePoint & emailed
- Road charges are paid in ChargePoint account (simulated)

4. SURVEY

Three participant surveys
- After enrollment
- Middle of pilot
- After pilot ended

Summary Financial Results

9 Total participating vehicles	**0.0** Gallons of fuel purchased
21,763 Total Miles	**$479** Gross Road Charge assessed
21,763 California Miles	**$0** Fuel tax credits
0.0 Out-of-state miles	**$479** Net Road Charge

PHASE 1B LESSONS LEARNED:

- At this time, electric vehicles do not directly transfer mileage data through a charging station.
- Many electric vehicles do not have an onboard diagnostics port, making plug-in devices obsolete.
- A pay-at-the-chargepoint model may work well for electric vehicle drivers that regularly use a provider's electric vehicle charging station network or purchase their home-charging station.

Phase 2: Usage-Based Insurance

The usage-based insurance model proved to be well aligned with a prospective Road Charge program - not only because of the ease and accuracy of odometer image uploads, but also because mileage reporting is already integrated into the existing process for usage-based insurance payments.

1. ENROLL

- Enroll in Auto Policy (simulated)

2. DRIVE

Mileage Reporting Option (MRO)

- Miles transmitted with photo of odometer via text message from Participant's cell phone

3. PAY

- Road charges are invoiced monthly in Auto Policy (simulated)
- Road charges are paid with Auto Policy payments (simulated)

4. SURVEY

Three participant surveys
- After enrollment
- Middle of pilot
- After pilot ended

Summary Financial Results

29 Total participating vehicles	**2,371** Gallons of fuel purchased
72,116 Total Miles	**$1,587** Gross Road Charge assessed
NA California Miles	**$1,197** Fuel tax credits
NA Out-of-state miles	**$389** Net Road Charge

PHASE 2 LESSONS LEARNED:

- The usage-based insurance business model aligns well with road charge as mileage data is already reported for the insurance policy.
- The usage-based insurance mileage collection method used (odometer photo upload) was widely supported by participant smartphones.
- Risk of fraudulent odometer photo uploads is minimal.
- Odometer photo uploads can be used to assess road charges without the need for location technology.
- Participants were extremely pleased with how the odometer photo upload protected their privacy over other methods.

Phase 3: Ridesharing

The ridesharing business model aligns well with road charge because mileage and location data are already integrated into the platforms. However, policy considerations about how to fairly assess road charges across drivers and riders must be addressed in order to effectively implement a road charge program.

1. ENROLL

- Download Via rideshare app
- Create Via account
- Attach a payment card to account

2. DRIVE

Mileage Reporting Option (MRO)

- Miles transmitted thru Via operations (as vehicles driven by Via employees)
- Participant trip miles estimated by Via app

3. PAY

- Road charges are added to ride share trip by Via app (simulated)
- Road charges are paid thru Via account as part of trip (simulated)

4. SURVEY

Three participant surveys

- After enrollment
- Middle of pilot
- After pilot ended

Summary Financial Results

12 Total participating vehicles	**6.95** Gallons of fuel purchased
175 Total Miles	**$3.86** Gross Road Charge assessed
175 California Miles	**-$3.53** Fuel tax credits
0 Out-of-state miles	**$0.33** Net Road Charge

PHASE 3 LESSONS LEARNED:

- The ridesharing business model aligns well with road charge.
- The ridesharing business model raises policy considerations about how to assess road charges during non-fare operations and how to assess charges for multiple riders.
- When a smartphone is required for the taxpayer to receive a service other than road charge, it can be a reliable collection method for a road charge system as it eliminates the risk of the smartphone being left at home.
- Rideshare systems' reliance on smartphones mean it's not for everyone.

Phase 4: Autonomous Vehicles

Autonomous vehicles already collect and report more than enough data to support a road charge program; however, effective deployment of a road charge program will require robust data sharing and integration with autonomous vehicle companies that may hesitate to integrate with the program.

1. ENROLL > **2. RIDE** > **3. PAY** > **4. SURVEY**

No Participants in Phase 4

Business Partners

EasyMile Via

- Participant trip miles simulated by Via (for simulated public transit trips)

- Miles transmitted thru EasyMile operations (as automated vehicle traveled dedicated route)

- Road charges are paid thru Via account as part of trip (simulated participants)

No participant surveys

Summary Financial Results

1 Participating vehicle	**0** Gallons of fuel purchased
295 Total Miles	**$6.49** Gross Road Charge assessed
295 California Miles	**$0** Fuel tax credits
0 Out-of-state miles	**$6.49** Net Road Charge

PHASE 4 LESSONS LEARNED:

- Mileage and location data collected by automated vehicles exceeds what would be needed to accurately assess a road charge.
- Automated vehicle businesses may have varying levels of comfort levels with sharing data.
- The Automated, Connected, Electric, and Shared business model supports a road charge, as long as vehicles are integrated with fleet management business models and systems.
- Automated vehicle systems and associated data offer additional opportunities for agencies outside of revenue.

Road Charge Communications Lessons Learned

- **Explaining the problems with the gas tax is a critical first step toward helping the public see the need for a replacement system.** Messaging that leads with explaining the problem is more likely to leave people open to the idea of potential solutions.
- **As a brand new idea, building public support for a road charge is an uphill battle, but education helps.** Presenting road charge after educating about the deficiencies of the gas tax, and explicitly as a replacement for the fuel tax further increased acceptance
- **Fairness and Equity are Key Points.** Messaging that included themes directly addressing concerns about fairness and equity were some of the most impactful ways to talk about road charge as a replacement for the gas tax.
- **Numbers and Implementation Details Matter.** People want to know how much road charge will cost them personally and the details of implementation before they are comfortable supporting the concept.
- **Commercial Vehicles Should be a Visible Part of the Solution.** Commercial vehicles are viewed as chief culprits in terms of damage to roads, and people want to ensure that businesses are also contributing their fair share towards maintenance.

What's Next?

Since 2014, with the passage of Senate Bill 1077, California has been actively developing, exploring, and testing, the road charge concept as a replacement to the gas tax for financing California's transportation system. The Four Phase Demonstration explored how to make the collection of a road charge an easy experience. Next, California has been awarded a grant from the Federal Highway Administration to test the viability of current GPS technology to differentiate between public and private roads in a road charge system. Through the Public/Private Roads Project, the state hopes to engage rural communities in a conversation about what road charge looks like for them. To learn more about the upcoming pilot or past research, please visit caroadcharge.com or email Road.Charge.Pilot.Program@dot.ca.gov.