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Project Title:

Pricing Your Way to Operational Efficiency:
One-Way Electric Vehicle Carsharing in
San Diego

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Improving One-Way Electric Carsharing Operations

Do pricing incentives encourage the use of electric vehicles?

WHAT IS THE NEED?

The flexibility of one-way carsharing is appealing to users, but adds a level of complexity and expense to managing fleets. Operators need to ensure that cars are available at areas of high demand and dropped off in locations that encourage turnaround and reuse. Carsharing reduces vehicle ownership and facilitates the use of other modes of transportation, thereby lowering greenhouse gas (GHG) emissions. Electric vehicles have the potential to further reduce GHG. Managing one-way electric vehicle carsharing adds another layer of complexity due to concerns of the battery level and driving range anxiety. To rebalance the fleet and recharge batteries, staff must take the time to move cars to a charging station; reducing operational efficiency and increasing costs and energy use. Pricing incentives can be successful in promoting one-way electric carsharing and facilitating optimal charging and distribution.

WHAT WAS OUR GOAL?

The goal was to evaluate the impact of one-way electric vehicle carsharing on travel behavior and user response to pricing incentives that encourage leaving cars in specified charging zones to improve operational efficiency.

WHAT DID WE DO?

The University of California, Berkeley Transportation Sustainability Research Center, in partnership with Caltrans, SANDAG, the city of San Diego and Car2go, designed a pricing



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and incentive structure for a pilot carsharing system in San Diego to improve operational efficiency of the vehicle fleet. The pricing incentives encouraged users to park closer to charging stations or move vehicles out of a congested area. In conjunction with longitudinal surveys with car2go users, the researchers analyzed de-identified driver profile data to understand how two different pricing schemes affected user behavior.

WHAT WAS THE OUTCOME?

Car2go was found to reduce overall net VMT and GHGs from transportation activity in San Diego. However, the pricing experiment had limited impact on vehicle relocation. Some users did collect on the incentive to bring vehicles closer to charging stations, but the pricing measure did not produce broad changes in vehicle distribution in terms of increased charging. The research showed that operating electric vehicle carsharing required 17% of all miles driven to be staff miles, as compared to 4% to 7% for gasoline-powered vehicles. The electric vehicle fleet generated a very low emissions footprint and had a substantive impact on the travel behavior of users. The study estimates that users of car2go in San Diego shed about 1 vehicle for every car2go vehicle in the pilot. It further determined that car2go suppressed about 6 vehicles for every car2go vehicle.

WHAT IS THE BENEFIT?

One-way carsharing has been considered controversial, with questions about whether the vehicles add to congestion by facilitating automotive commuting. This research found that one-way carsharing systems do reduce overall driving, even under a number of conservative assumptions. This study encourages increased municipal policy support for carsharing systems

and the accompanying benefits. However, electric vehicle carsharing is far more challenging to operate because of the limited driving range and availability of charging stations. Fostering one-way electric vehicle carsharing systems could raise the demand for charging stations and accelerate the electrification of vehicle miles traveled faster than a long-range turnover in vehicle ownership. Future work is needed to build on this understanding, such that future initiatives to deliver EV carsharing are more sustainable.

LEARN MORE

The Final Report will be provided later.

IMAGES

