

**Planning,
Policy and
Programming****February 2025****Project Title:**Sustainability of Micro Mobility
Services: Vehicle Miles Traveled
(VMT) Reduction and Transit
Connection**Task Number:** 3374**Start Date:** May 23, 2023**Completion Date:** August 20, 2024**Task Manager:**Kevin Spiker
Associate Transportation Planner
kevin.spiker@dot.ca.gov

Sustainability of Micro Mobility Services: Vehicle Miles Traveled (VMT) Reduction and Transit Connection

Measuring the Benefits of Micro Mobility Services

WHAT WAS THE NEED?

Micro mobility services (e.g., bike share, e-bike share, e-scooter share) are often considered good options for reducing vehicle miles traveled (VMT) and greenhouse emissions. The benefit of using micro mobility services assumes that most users use bike and scooter trips in place for personal car and ride-hailing trips. If a major mode shift comes from walking and bicycling, the benefits of micro mobility services may be more limited.

Prior studies show users use micro mobility services in place of cars and occasionally use them to connect to transit. These instances are important for estimating the environmental contributions of micro mobility services. However, measuring the impact of micro mobility services on travel behavior change and greenhouse gas emission is a challenge. Data on transit connections either requires integrated payment systems or travel diaries, and because travel mode substitution occurs over time and a chain fraction, estimating sustainability from surveys raises many concerns. This project built upon a prior National Center for Sustainable Transportation (NCST) funded project by leveraging the data from a travel diary to understand the sustainability benefits of micro mobility services.

WHAT WAS OUR GOAL?

In this project, the research team measured the magnitude of micro mobility service effects on VMT through testing the validity and combination of:

1. Mode substitution
2. Transit connection
3. Driving/ride hailing behavior

DRISI provides solutions and
knowledge that improves
California's transportation system.

WHAT DID WE DO?

The project included four phases:

1. Mode substitution of micro mobility trips
2. Conduct a similar analysis as the first phase but focused on transit connections of micro mobility trips
3. Estimate VMT reduction per trip from micro mobility services
4. Estimate the impacts of micro mobility services on transportation benefits

WHAT WAS THE OUTCOME?

Results indicate median VMT reduced per micro mobility trip to be roughly 0.15 miles for e-scooter share trips and 0.25 miles for bike share (including e-bike) trips. When modeling mode substitution, this data confirms many prior conclusions of factors affecting car substitution including trip distance as the primary factor. However, in this data, the interaction of car licensure and trip distance was important for understanding car substitution. Finally, in this study we proposed two frameworks for building a sketch planning tool for examining VMT reduction from future micro mobility services. Using one of these frameworks, a tool could be developed to help cities and regions better plan for the micro mobility services to achieve VMT and GHG reduction goals. While more research is needed to employ this framework, it helps motivate a series of additional research topics to achieve a policy-focused result of a decision support tool for shared micro mobility planning.

WHAT IS THE BENEFIT?

This report leverages analysis to develop two potential frameworks for developing a decision support tool for VMT reduction from potential shared micro mobility services that leverage this analysis. These frameworks helped to highlight the future research need of understanding the relationship between pricing and micro mobility demand. While this research and many past studies can be used to help predict VMT reduction from existing services, forecasting VMT reduction from future services will require research on the influences of pricing on demand since demand, closely linked to the extent of VMT reduction, varies significantly based on

prices. This is also important for helping cities and regions compare alternative pricing and service options when planning micro mobility services for VMT reduction benefits.

LEARN MORE

View the complete report: <https://escholarship.org/uc/item/4qr5t2tw>

IMAGES



Image 1: Young women ride e-scooters in Santa Monica, California on July 13, 2018. (Photo by ROBYN BECK/AFP/Getty Images)