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UNIVERSITY OF CALIFORNIA Berkeley Transportation Sustainability RESEARCH CENTER

Considerations on VMT and Emissions from New Mobility Systems and Other Technologies

Elliot W. Martin, PhD Research and Development Engineer

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New and Shared Mobility Systems Today

- Main Types
 - Carsharing
 - Bikesharing
 - TNCs
 - Microtransit
 - Micromobility
 - Public transit













US Trends in VMT and VMT per capita





How will mobility as a service change VMT?

- Travel behavior changes in public transit, walking, bicycling, other shared or active modes, and personal vehicle driving
- Changes in vehicle ownership
- Changes in fuel type
- System vehicle activity
- System logistical operations



Main Traveler Behavior Components of TNC VMT Change

Change in Personal Vehicle Miles Traveled (PVMT)

- The substitution of PVMT with TNC activity
- Deadheading still adds miles, but pooling can reduce them

Personal Vehicle Shedding

- The reduction in household vehicle ownership due to TNCs
- Some consumer action involved, but results in substantive reductions in VMT

Personal Vehicle Suppression

- The prevention of vehicle ownership from happening in the first place
- Easy to do and results in considerable reduction in VMT

Change in the Use of Other Shared Vehicle Modes

- Changes in the use of taxis, carsharing, and other personal vehicle modes
- Avoid counting VMT just because it is observed in a TNC without considering the mode substitution.

Main Components of VMT Decline



Main Vehicle Activity Components of TNC VMT Change

Period 0 (Travel to Passenger Market)

• Some share of drivers travel to the markets they serve.

Period 1 (Open to Passengers)

- Vehicles open to passengers, may be circulating, may be stationary.
- Double counting of miles can occur during this period.

Period 2 (Fetching Passengers)

- Passenger assigned, vehicle traveling to it
- Double counting likely ceases at this point.

Period 3 (With Passengers)

• Vehicle is with at least one passenger



How can TNCs work with and complement transit? Are there case studies?

- Numerous studies suggest that TNCs draw from public transit.
- But there are also examples of TNCs complementing public transit through natural activity as well as supportive projects in collaboration with public agencies.
- Building on lessons learned from these studies, TNCs, microtransit, and other forms of shared mobility may better integrate and support public transit systems.



FTA Mobility on Demand (MOD) Sandbox

- Projects are testing new innovations in:
 - Carpooling
 - Public transit connections
 - Trip Planning
 - TNC/Microtransit integrations
 - Paratransit innovations
 - Bikesharing
 - Real-time traveler
 information

Map of Eleven Selected Projects Across the Country

Federal Transit Administration





DART – The First and Last Mile Solution (Dallas)

13:16:49 Local, PM PASS Adult

5/7/2019

1:38 PM

1:43 PM

1 \$ 90%

5/8/2019

3:00 AM

Verizon LTE

GoPass



Project Overview

 Produce an updated version of DART's existing ticketing app. The new version incorporated shared mobility services, including UberPool, to provide improved FMLM connections to transit stations and allow users to pay for services within the app with Plano and other regions of the Dallas Metropolitan area.

Key Objectives



- Increase DART ridership
- Increase awareness and usage of alternative modes accessing DART, specifically carpooling
- Reduce travel with personal vehicles
- Improve FMLM access to DART for the general population, as well as travelers with disabilities
- Improve customer satisfaction and user perception of the DART brand

9/26/2019

Pierce Transit Limited Access Connections (Tacoma)

Project Overview

 A partnership between Pierce Transit and Lyft. Lyft is providing FMLM connections to transit stations and park-and-ride lots with guaranteed rides home after regular service hours.

Objectives

- Increase Pierce Transit ridership
- Improve the quality of transit service through reduced travel and wait times
- Improve access to transit and provide access services more cost effectively
- Improve mobility of wheelchair users and provide paratransit services more cost effectively
- Reduce parking lot use and net VMT
- Increase student enrollment in the program
- Increase transit use and traveler satisfaction among those far away from fixed-route services





LA County and Puget Sound MOD First and Last Mile Partnership

Project Overview

 A partnership between LA Metro and Via. Via is providing FMLM connections to transit stations and allow users to pay for rides using the regional TAP card. There is a companion project that is taking place in Seattle that is led by Sound Transit.

Key Objectives

- Improve mobility and accessibility across all populations, including travelers with disabilities
- Expand the number of unique public transit users and increase overall ridership for both access and egress trips to transit
- Preserve or enhance the environment
- Reduce congestion from personal vehicles
- Ensure travelers feel safe on public transit and at public transit facilities
- Improve cost efficiency of access and egress trips to transit and level of service per user cost



BART Integrated Carpool to Transit Access Program

Project Overview and Objectives

 Scoop is matching carpoolers and facilitate carpooling trips for passengers going to or leaving from BART stations with guaranteed parking.

Objectives

- Increase carpooling to BART and reduce fraudulent use of carpool parking spaces
- Increase BART ridership and spread out arrival of BART riders over the morning peak commute period
- Reduce VMT and GHG emissions from travel
- Reduce traveler cost and increase BART revenue relative to the operational cost of implementation incurred by BART.





Picture: Elliot Martin

Via in West Sacramento

- Microtransit operator Via has operated a system in West Sacramento.
- The project runs shuttles that provide service within the city of West Sacramento.





GoMonrovia

- TNC integration with public transit through pricing.
- Different flat rates are applied depending on the:
 - Destination
 - Pooling and
 - Connection to public transit



NEW PRICING EFFECTIVE JUNE 1

\$5.00 CLASSIC RIDE

Travel anywhere within the service area!

Private ride or for groups up to 4 passengers

No stops before reaching final destination

\$2.50 SHARED RIDE

Select a shared ride and receive **50% off** regular price when traveling in the service area!

Up to two (2) passengers

Possible stops before reaching final destination

\$0.50 SHARED RIDE

Those traveling to and from Old Town Monrovia, the Metro Gold Line Station, or any hospitals within the service area will pay just \$0.50!



Evidence of Impacts from One-way Carsharing

Key Findings:

- Between 2% to 5% of members sold a vehicle due to carsharing across study cities.
- 7% to 10% of respondents did not acquire a vehicle due to car2go.
- Across five cities, car2go took estimated 28,000-plus vehicles off the road (including shedding and suppression) and reduced parking demand

City	% Reduction in VMT by Car2go Households
Calgary, AB	-6%
San Diego, CA	-7%
Seattle, WA	-10%
Vancouver, BC	-16%
Washington, D.C.	-16%

Incentives and Operational Impacts

- Evaluations generally find carsharing reduces GHG emissions.
- Policies supporting carsharing may enable better sustainability over wider areas and with cleaner technologies.







Shaheen et al.. (2018)

Will micromobility impact VMT? If so, how?

- Micromobility travelers may reduce their VMT through mode substitution.
- But the trips they substitute for are generally short.
- EV-based systems require energy input.
- Vehicle activities facilitate vehicle charging and redistribution and add VMT.



Spatial Impacts in Bikesharing



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Picture: Elliot Ma





Trends in Taxable Diesel Fuel in California



Source: California Department of Tax and Fee Administration

Technology for Trucks

- Electrification of heavy duty trucks may be in the future.
- The electrification of idling is achievable with contemporary technology.
- Substitution with CNG is possible for long-haul, but can face infrastructure and capital limitations.
- Within California, a sizeable network of stations exist, but key gaps remain on long-haul routes.





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THANK YOU, QUESTIONS?