

## Research Questions

- What are the potential benefits from implementing a demand management system that considers freight and passenger traffic?
- Should we consider freight demand management as a passenger demand management strategy?
- What are the implications for sustainability, especially in metropolitan areas where residential or household (e-commerce) freight trip generation is shaping both passenger and freight demand?
- How can the benefits from demand management strategies foster the introduction of new sustainable transport technologies?

## Freight Demand Management Example

- Off-Hour Delivery Programs
- Shift freight deliveries to the off-hours
  - New York, London, Sao Paulo

### Receivers gained

- ✓ More time for customer interaction
- ✓ Higher staff productivity
- ✓ On time deliveries
- ✓ Inventory savings

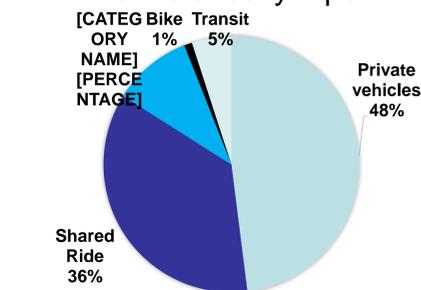


### Carriers saved time and money

- ✓ Shorter delivery times
- ✓ Lower fuel costs
- ✓ Faster traveling speeds
- ✓ Fewer parking tickets
- ✓ Less congestion

## Case Study: Bay Area

Description:  
7 million residents  
185,000 establishments  
3.2 million jobs  
24 million total daily trips:



## Methodology

Use of the Metropolitan Transportation Commission Activity Based Model

- Estimate the potential impacts of OHD
- Develop set of scenarios
- Consider the impact on travel decision by individuals and households

Update Truck model

Scenarios

OHD Shifts: 5, 10, 20% daily truck traffic to EV and EA

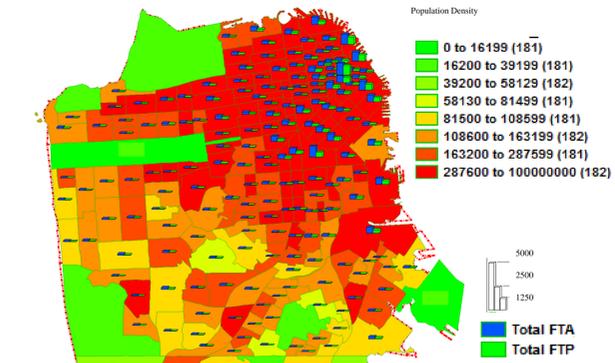
**Direct Benefits:** Directly perceived by the traffic from the shift of truck traffic

**Feedback Benefits:** New equilibrium after the synthesized population internalizes the *Direct* benefits

Considered as **Induced Demand**

Estimate truck traffic O/D San Francisco

Type of Vehicle	Time Segment					Sub-Total
	AM	MD	PM	EV	EA	
Very Small trucks	-	190,855	62,128	53,596	7,020	313,599
Small Trucks	12,577	19,543	11,333	4,453	3,718	51,624
Medium Trucks	1,216	1,700	656	206	174	3,952
Large Trucks	2,251	3,322	1,685	1,043	1,352	9,652
Sub-total	16,045	215,419	75,802	59,297	12,264	378,827

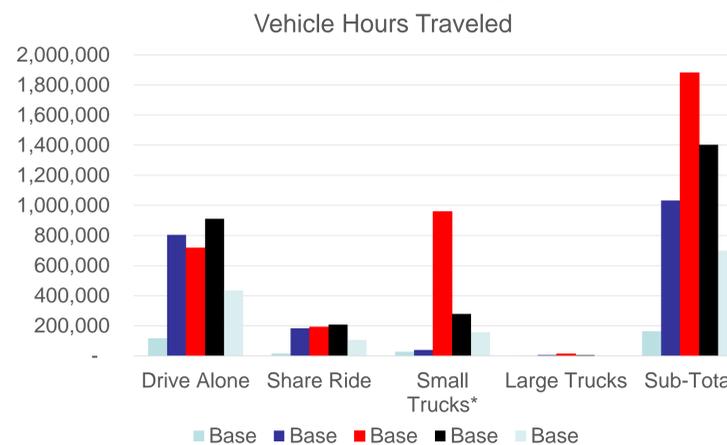


Daily Truck VMT

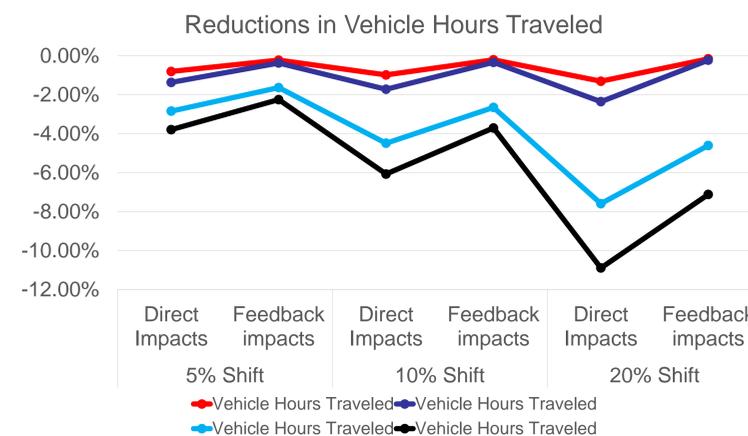
Type of vehicle	Sub-total
Very Small, Small Trucks, and Medium Trucks	52,851,785
Large Trucks	1,186,931
<b>Total</b>	<b>54,038,716</b>

## Empirical Results

Results from Freight Demand Management



Impact of Passenger Travel Induced Demand



Contending with Induced Demand:

- VMT Fee (10 cents per mile passenger travel)
- Bridge Fee (10% toll increase to bridges leading to SF)

		Drive Alone	Shared Ride	Small Trucks*	Large Trucks	Sub-Total
VMT Fee & 10% Shift	Additive	-7.00%	-7.94%	-5.09%	-3.84%	-6.57%
	Combined	-5.72%	-7.22%	-4.19%	-2.97%	-5.48%
	Synergy	1.28%	0.72%	0.90%	0.88%	1.10%
Bridge Fee & 10% Shift	Additive	-1.37%	-0.93%	-3.05%	-1.64%	-1.79%
	Combined	-0.88%	-0.44%	-2.53%	-1.24%	-1.29%
	Synergy	0.49%	0.49%	0.52%	0.41%	0.50%

There is great potential for the implementation of an OHD program in San Francisco

Scenario	Annual Vehicle Hours Traveled (millions)	Annual Vehicle Miles Traveled (millions)
Base case	1,657	59,683
5% Shift	16	119
10% Shift	24	119
20% Shift	39	137

Less congestion and less environmental emissions across the region, not only San Francisco

We need a comprehensive demand management strategy that: Considers both freight and passengers