



**UC Davis STEPS PROGRAM:
Trucks/Freight. Sustainable Freight Initiative**

Miguel Jaller

June 2, 2016

Sustainable Freight Initiative

- Scope:
 - Covers a range of freight modes, though primary focus is on trucking;
 - Long haul and urban analysis;
 - Forward looking with sustainability as a key theme
- Research Questions: Duality of approach:
 - How can future technologies/fuels be adapted to be more suitable for use by logistics operators?
 - How can supply chains be optimized to better accommodate the use of new truck technologies and fuels?

2016 GUSTO PROJECT

Analysis of potential improvements in passenger travel from implementation of freight demand management programs

Paper presented at the 2016 Transportation Research Board Conference

Other Projects/Ideas

Electrification of drayage trucks (near-dock, off-dock, and transloading movements)

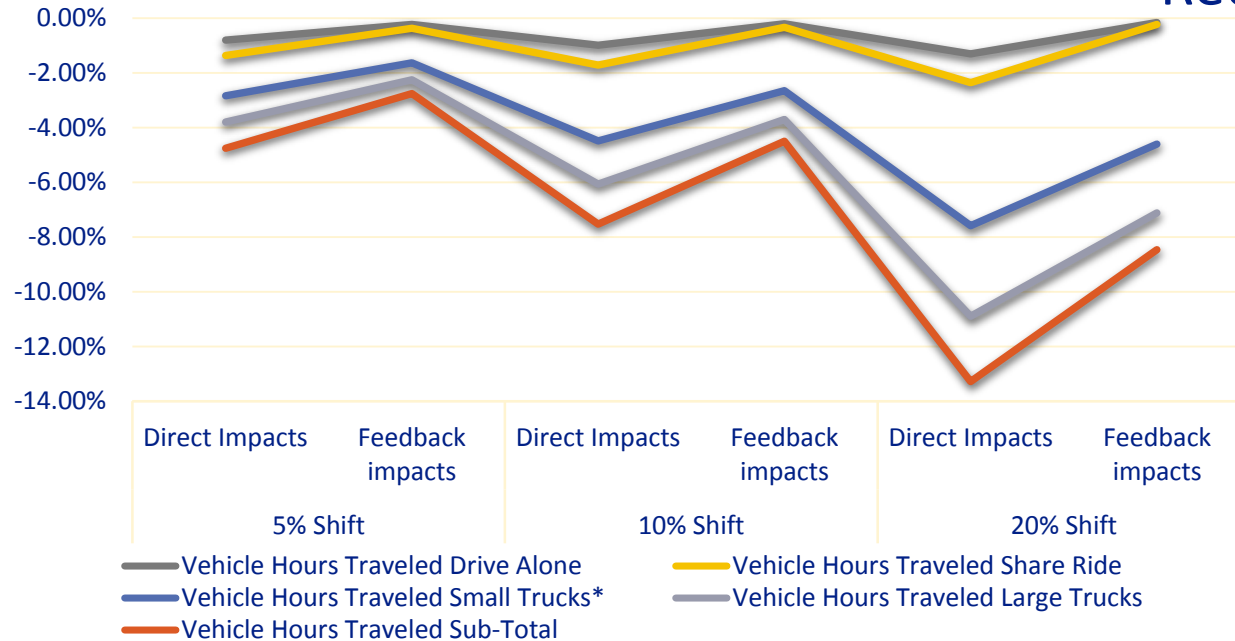
Preliminary results presented at the 2016 Transportation Research Board Conference

Energy and environmental impacts of logistics sprawl

On-demand economy and sustainable freight operations

EARLY RESULTS: Demand Management Programs

Reductions in Vehicles Hours Traveled



Contending with Passenger Induced Demand

- VMT Fee
- Access (Bridge) Fee

		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%

QUESTIONS FOR DISCUSSION

- **Analysis of potential improvements in passenger travel from implementation of freight demand management programs**
 - Demand management: passenger vs. freight, passenger and freight?
 - Who should pay?
- **Electrification of drayage trucks**
 - Technological vs operational challenges
 - Market penetration? Incentives?
 - Infrastructure
- **Energy and environmental impacts of logistics sprawl**
 - What is the role of land use planning?
 - What about incentives programs that attract warehouses and distribution center facilities to specific locations?
- **On-demand economy and sustainable freight operations**
 - Sustainability: brick-n-mortar vs e-retailing?
 - What are the economic, environmental and social impacts generated by the growth of residential deliveries?
 - Are there any trends that contribute positively/negatively?
 - What can we do at the operational, technology and policy level to mitigate such impacts?

Truck Technology Studies

- Truck Decision Choice
 - Determine how fleets make decisions on which technologies to purchase
 - Identify factors that influence these choices and how important they are
 - Identify policy levers that can align purchases with sustainability goals
- Transition Scenarios
 - Model various market penetration scenarios through 2050 for LDVs, HDVs, and other sectors
 - Calculate GHGs reductions and total costs (capital, fuel, and infrastructure) for these scenarios
- Natural Gas Trucks
 - Understand NG fuel infrastructure issues
 - Understand actual GHG reductions for NG trucks

QUESTIONS FOR DISCUSSION

- What role should CNG and LNG trucks play in market scenarios?
- How does capital cost of conventional trucks increase due to criteria pollutant regulations and climate change goals (fuel economy)?
- What is reasonable market penetration for new trucking technologies – both timing and market shares?
- Conventional vehicle ranges greatly exceed range of new technology trucks. What must range be for market penetration for various applications – MD delivery, long haul, drayage or short haul?