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

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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

Contending with Passenger Induced Demand

- VMT Fee
- Access (Bridge) Fee

Table:

<table>
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<tr>
<th></th>
<th>Drive Alone</th>
<th>Shared Ride</th>
<th>Small Trucks*</th>
<th>Large Trucks</th>
<th>Sub-Total</th>
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<td>0.52%</td>
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Graph: Reductions in Vehicles Hours Traveled
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?