Personalized Infrastructure:
Leveraging Behavioral Strategies for Future Mobility

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Current Factors to Consider

• **Smartphones are ubiquitous**
  - 96% of young adults in the U.S. use smartphones
  - Enable personalized experiences

• **Private car ownership has diminishing appeal**
  - Increasingly, young adults in the U.S. are delaying driving

• **Viable Smart mobility options are emerging**
  - Mobility as a Service
  - Automated, connected, electric, shared (ACES)

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Problem: Energy effects are not directly connected to the daily commute or the emerging “Mobility as a Service” economy.

Solution: Team up NREL energy estimation methods, academic partner analytics, and Metropia congestion reduction techniques to promote energy smart travel behavior.

ARPA-E TRANSNET: Traveler Response Architecture using Novel Signaling for Network Efficiency in Transportation

NREL
Metropia
Texas A&M Transportation Institute
University of Washington
University of California – Davis
University of Kansas
TRANSNET: The Connected Traveler

• Smartphone app to nudge behavior
  o Optimized energy: departure time, routes, modes
  o Personalized: learns user preferences

• Estimated energy impact
  o Tools estimate individual energy consumption, response to incentives
  o Collectively estimate system energy
• Multidirectional flow of data and info in real time
• Peer-to-peer, peer-to-network, network-to-network

Figure from https://energy.gov/eere/vehicles/energy-efficient-mobility-systems
Behavior: Identifying Leverage Points

- Micro surveys customize information presented to users
- Providing convenience factors and non-monetary incentives enables scaling
- Gamification of incentive strategies is possible
Behavioral Economics: Breakpoint

Population-Level (Aggregate) Analysis

Suggests 1.28 Metropia points per minute delay in departure

Note: Metropia points are the basis for incentives awarded through use of the app.
Initial Outcomes

- In Austin, TX, a majority of users are willing to change departure times, routes, or modes
- High response rate to micro surveys (>90%)
- Ongoing work to develop validation and models
- Market potential: Strong interest for plug-and-play integrated mobility app
Key Takeaways

• Smartphone/transport link is already taking place
  o Challenge is to develop meaningful, coordinated interconnectivity
  o A focused effort is readily scalable
• Multidirectional information flow
  o Empowers behavioral tools and engagement
• Improved energy efficiency potential
  o Individual, community, and system levels
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