



Personalized Infrastructure: Leveraging Behavioral Strategies for Future Mobility

Behavior, Energy and Climate Change Conference 2017

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Sacramento, California, October 15-18, 2017

NREL/PR-5400-70309

Current Factors to Consider

- **Smartphones are ubiquitous**
 - 96% of young adults in the U.S. use smartphones¹
 - Enable personalized experiences
- **Private car ownership has diminishing appeal**
 - Increasingly, young adults in the U.S. are delaying driving²
- **Viable Smart mobility options are emerging**
 - Mobility as a Service
 - Automated, connected, electric, shared (ACES)

1. <http://www.pewresearch.org/fact-tank/2017/06/28/10-facts-about-smartphones/>

2. Delbosc, A. *Transportation* (2017) 44: 919. <https://doi.org/10.1007/s11116-016-9685-7>

TRANSNET: The Connected Traveler

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

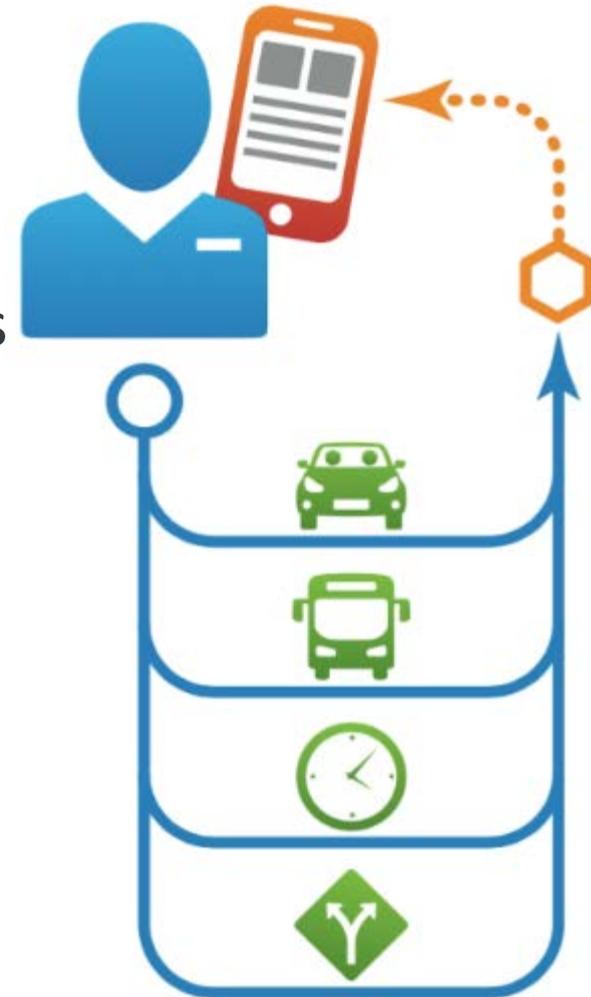
Solution: Team up NREL energy estimation methods, academic partner analytics, and Metropia congestion reduction techniques to promote energy smart travel behavior.

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

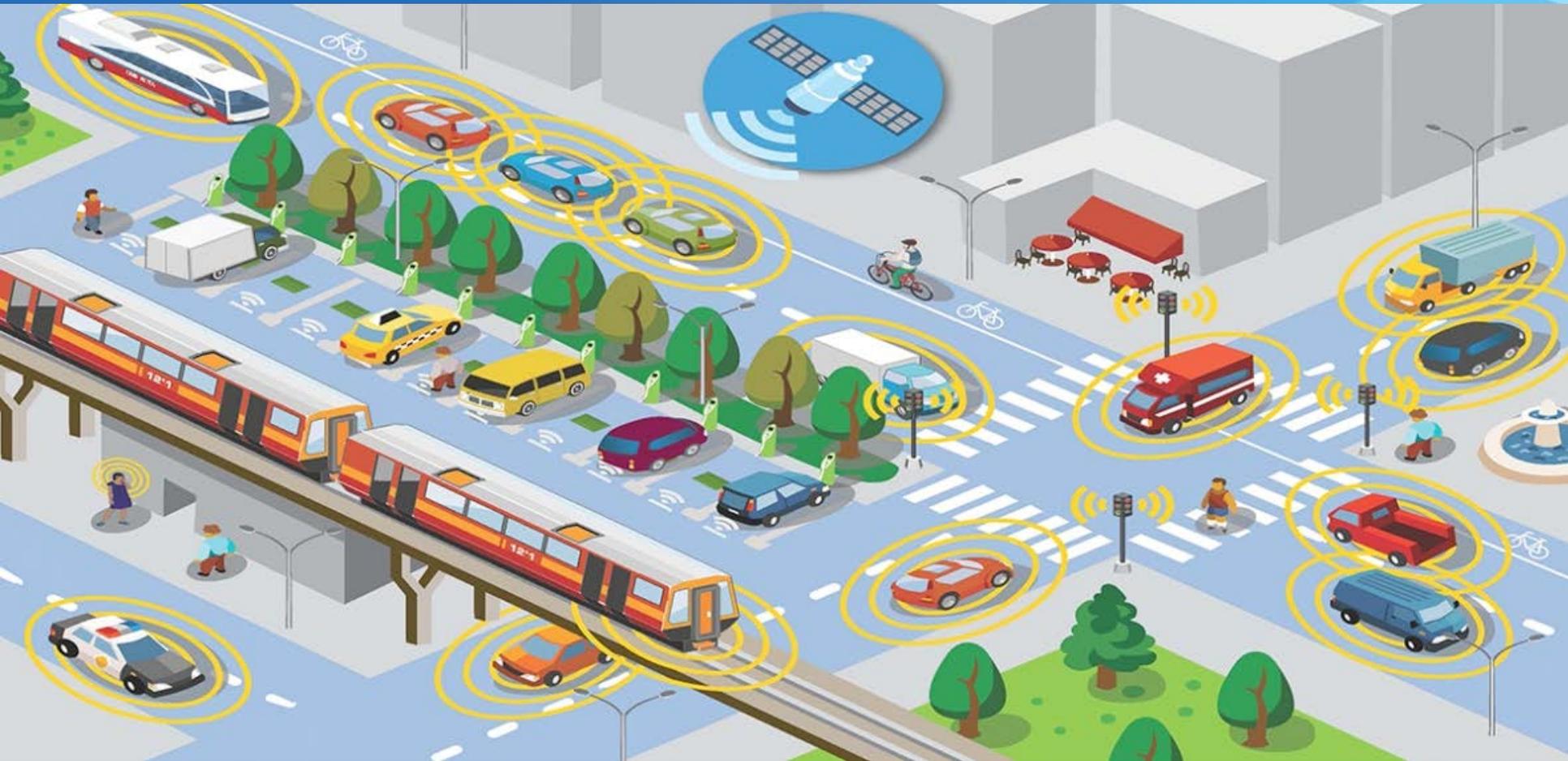
NREL
Metropia
Texas A&M Transportation Institute
University of Washington
University of California – Davis
University of Kansas

TRANSNET: The Connected Traveler

- Smartphone app to nudge behavior
 - Optimized energy: departure time, routes, modes
 - Personalized: learns user preferences
- Estimated energy impact
 - Tools estimate individual energy consumption, response to incentives
 - Collectively estimate system energy



Maximum Mobility, Minimum Energy Future

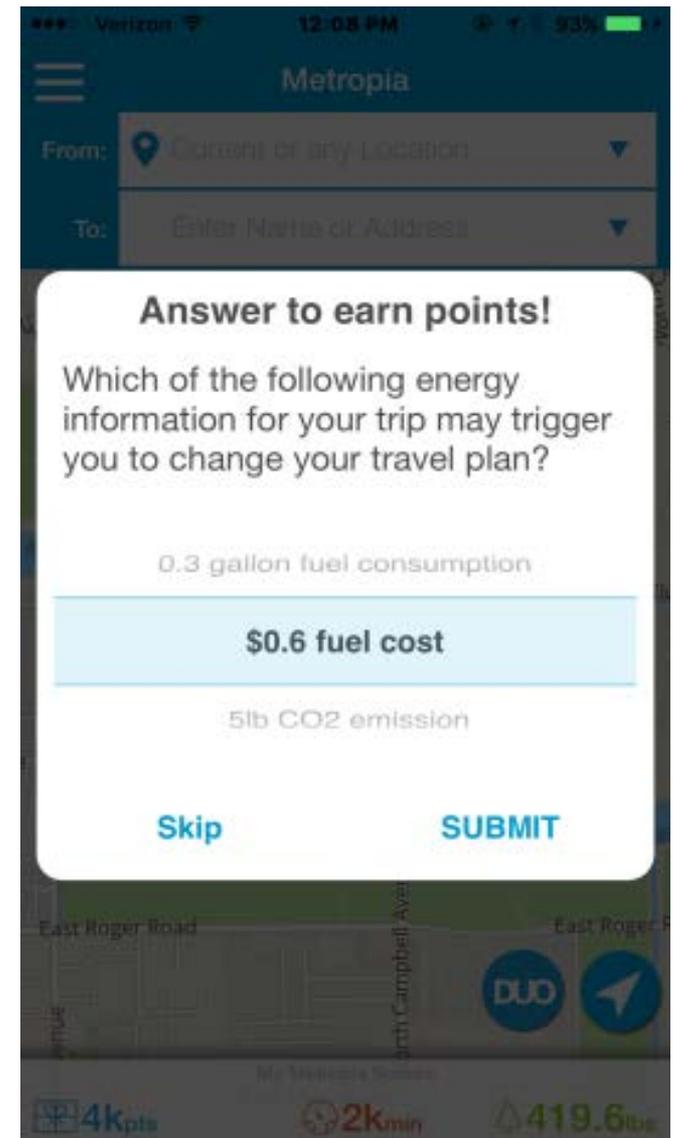


- Multidirectional flow of data and info in real time
- Peer-to-peer, peer-to-network, network-to-network

Figure from <https://energy.gov/eere/vehicles/energy-efficient-mobility-systems>

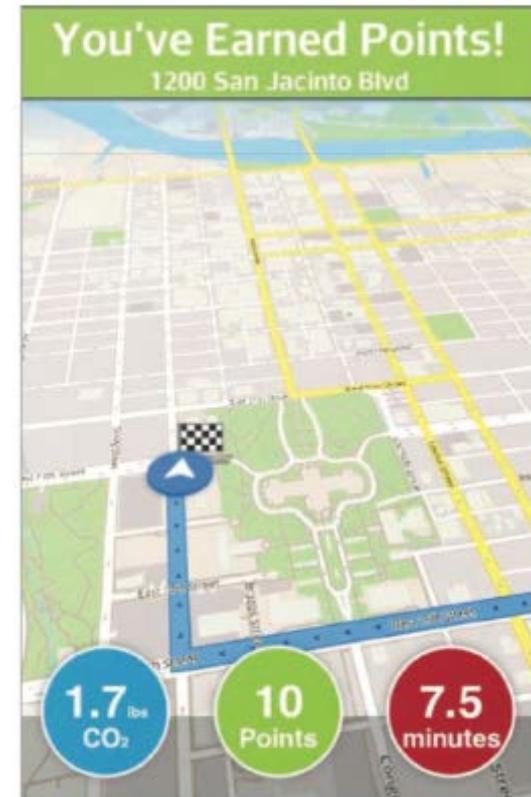
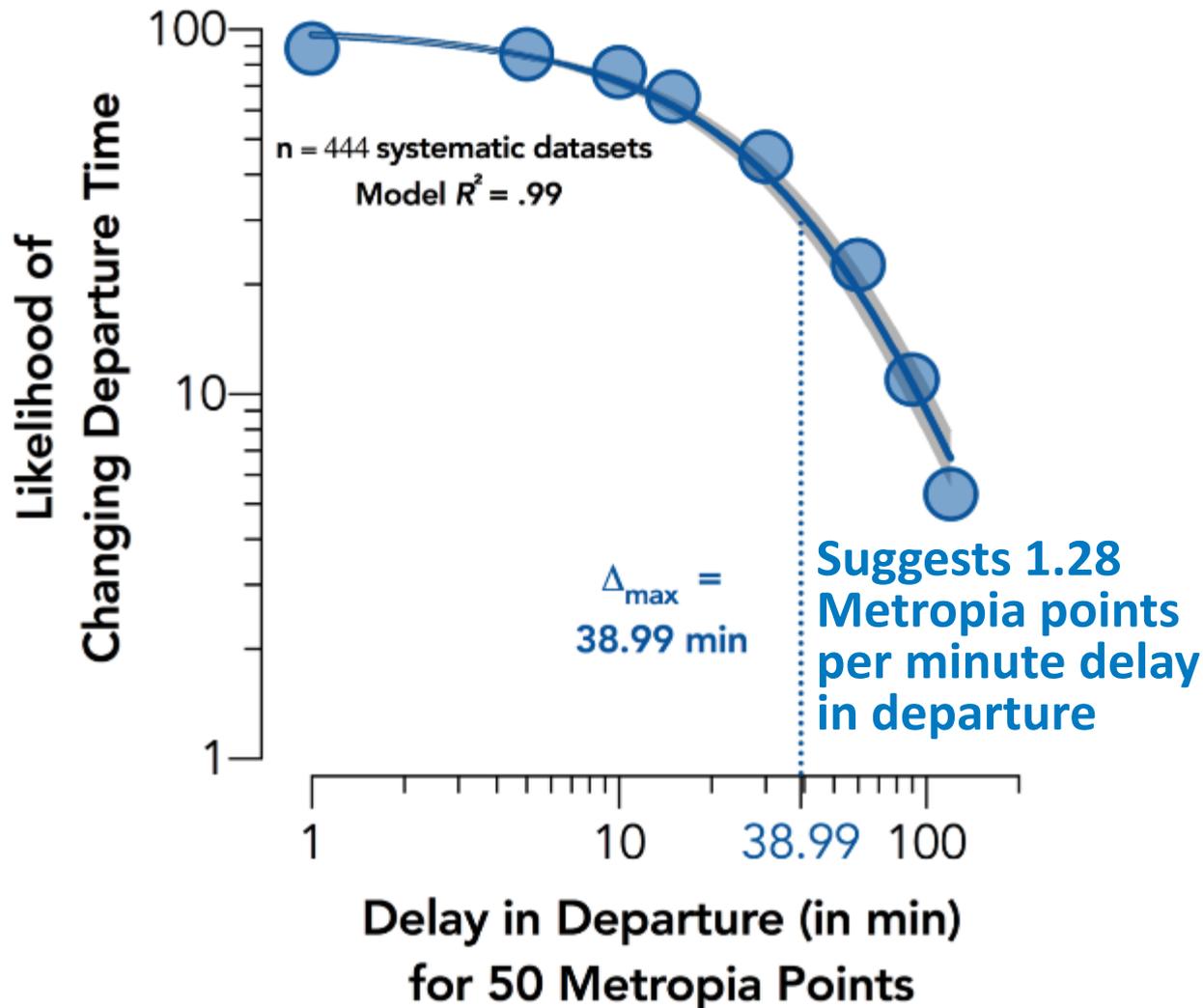
Behavior: Identifying Leverage Points

- 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

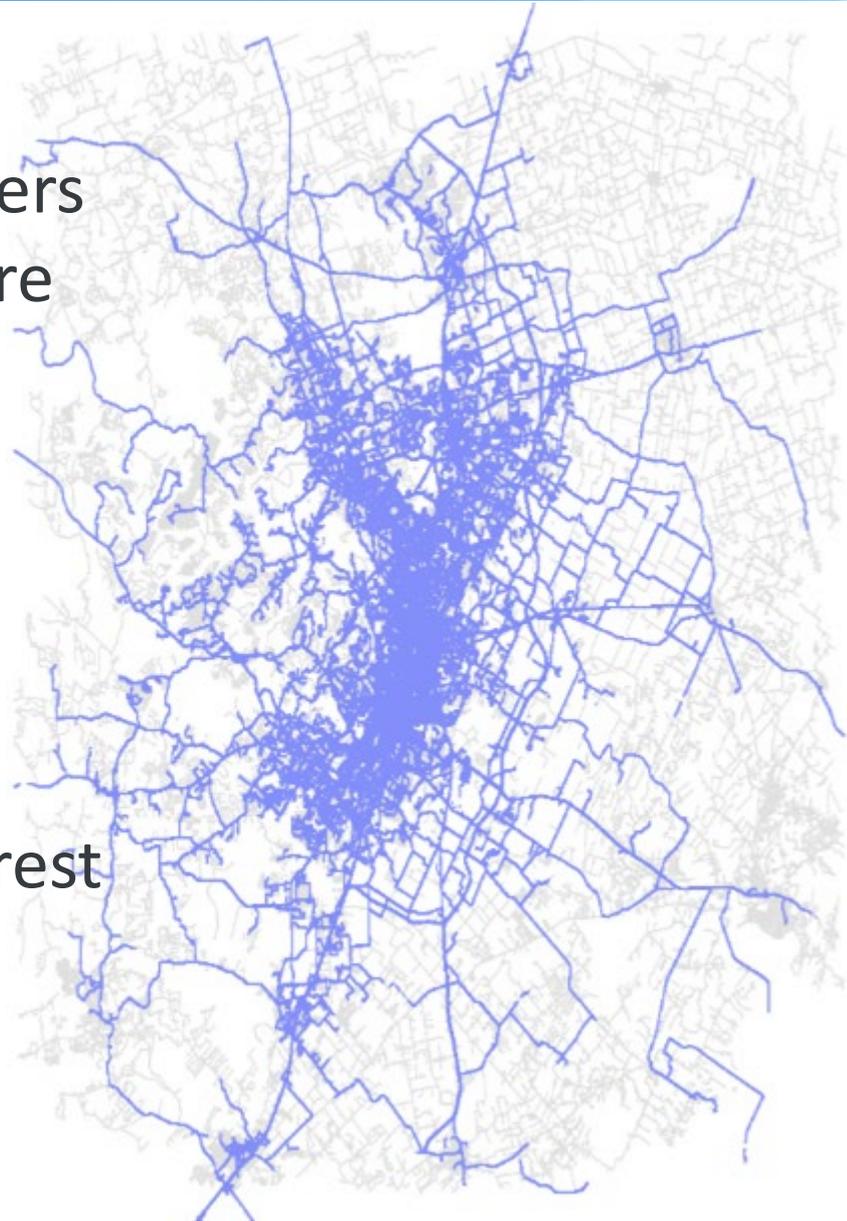
Population-Level (Aggregate) Analysis



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
 - Challenge is to develop meaningful, coordinated interconnectivity
 - A focused effort is readily scalable
- Multidirectional information flow
 - Empowers behavioral tools and engagement
- Improved energy efficiency potential
 - Individual, community, and system levels

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