

The Connected Traveler

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PROJECT TEAM

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metropia

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THE PROJECT CONNECTED TRAVELER PROJECT OVERVIEW

- Multi-disciplinary undertaking will seek to validate potential for transformative transportation system energy savings by incentivizing efficient traveler behavior.
- · Control architecture will be developed that incorporates adaptive learning, and refined incentive and control strategies to provide high certainty of adoption.
- · Metropia platform will allow for real-world validation of traveler behavior and assist in refining incentives and control strategies.
- · NREL's Transportation Secure Data Center and related tools will be used to determine individual energy consumption Individual energy impacts will be extrapolated to estimate transportation system
- energy consumption."

*Additional system model development may be required to refine this to a margin of error that can be used by transportation practitioners

STARTING WITH THE TRAVELER

We need to approach sustainable transportation as a network of travelers, services, and decision points connected by communication technology and decisionmaking tools-rather than just by vehicles and roads-to significantly reduce related energy consumption.

UNDERSTANDING TRAVELER BEHAVIOR AND DECISION MAKING

Control Architecture Control Strategies

	Change in Departure Time Mode Choice Carpooling
	Framing and Refining C Framing the effects of incentivi investigated and refined. Addit be investigated to allow for ad- incorrection of new mobility.
0	Phase I



Alternate Routing

Alternate Destinations

Elimination of Need for Trips

VALIDATING AND OPTIMIZING TRAVELER BEHAVIOR

· Adaptive learning will be applied to refine control strategies based on energy savings potential and likelihood of adoption by traveler.

· Project will leverage Metropia platform to validate incentive effectiveness and hone control strategies.



ITERATING A BASELINE FOR ENERGY CONSUMPTION

Accessing Diverse Transportation Data Sets

NREL's Transportation Secure Data Center houses data from travel surveys and studies conducted using GPS devices. It features millions of data points-second-by-second GPS readings, vehicle characteristics (if applicable), and demographics-for all modes of travel.

Leveraging Existing Tools





DEVELOPMENT PROCESS: RESEARCH QUESTION TO RESULTS





AMT BEHAVIORAL ECONOMIC TASK RESULTS



METROPIA DATASET OVERVIEW

- · ~100M 1 Hz GPS points in Austin, Texas, from July-November 2016
- 876 unique users over the five-month span. ranging from one-time users to near daily users
- · GPS trajectories map-matched to road network for the Austin region
- · Traffic prediction data over the same temporal range, covering ~15% of all road network links, provides link travel time and volume estimates at 15-minute intervals

ESTIMATING ENERGY SAVINGS

- · The project team is in the process of developing modeling tools to estimate the transportation energy use impact of the Connected Traveler project.
- Data to construct the estimation model are collected from several sources, including individual vehicle make and model, GPS driving data, and road network traffic prediction data
- · The objective of this project is to inform individual energy consumption and provide a framework for estimating system energy consumption.



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