Multi-disciplinary undertaking seeks to validate potential for transformative transportation system
Control architecture incorporates adaptive learning, and refined incentive and control strategies
Adaptive learning applied to refine
In-app micro surveys of users compile
Project leverages Metropia platform
NREL’s Transportation Secure Data Center and related tools used to determine individual energy
• Additional system model development may be required to refine this to a margin of error that can be
Source: Texas A&M Transportation Institute, 2015 Urban Mobility Scorecard

THE PROJECT
CONNECTED TRAVELER PROJECT OVERVIEW
• Multi-disciplinary undertaking seeks to validate potential for transformative transportation system
energy savings by incentivizing efficient traveler behavior
• Control architecture incorporates adaptive learning, and refined incentive and control strategies
to provide high certainty of adoption
• Metropia platform allows for real-world validation of traveler behavior and assist in refining incentives and control strategies.
• NREL’s Transportation Secure Data Center and related tools used to determine individual energy consumption.
• Individual energy impacts extrapolated to estimate transportation system energy consumption.*

THE MARKET OPPORTUNITY
Transportation system efficiencies represent a substantial and complementary benefit to current efforts to reduce vehicle energy consumption and the carbon intensity of fuels.

The Connected Traveler

CONNECTIVITY/AUTOMATION WILL TRANSFORM TRANSPORTATION
- Vehicle connectivity and automation can substantially impact the effectiveness of investments in increased fuel economy and low-carbon fuels.
- Huge business around increasing utilization and right-sizing of mobility technologies.
- Increased pressure for transportation infrastructure managers to do more with less.

VALIDATING AND OPTIMIZING TRAVELER BEHAVIOR
- Adaptive learning applied to refine control strategies based on energy savings potential and likelihood of adoption by travelers.
- Project leverages Metropia platform to validate incentive-effectiveness and home control strategies.
- In-app micro surveys of users compile data and feedback to tailor presented information and energy estimates.

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. Leverage Existing Tools to Estimate Energy Impact
• DRIVE
FASTSim fuel efficiency simulations over hundreds of thousands of real-world trips from the TSDC illustrate the ability to estimate vehicle fuel economy based on drive cycle characteristics.

DEVELOPMENT PROCESS: RESEARCH QUESTION TO RESULTS
Research Questions
Design Experiments
Online Experiments
Develop Strategy
Integrative Research into Metropia app
Field Test
Analysis System Impact

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AMT Behavioral Economic Task Results
SUBSET OF METROPIA DATA
• More than 200M 1-Hz GPS points from over one year of Metropia user trajectories in Austin, Texas
• High-resolution road network for the greater Austin region
• Metropia’s routing API combines a route generator and predictive traffic data

ESTIMATING ENERGY SAVINGS
• The project team has developed 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.
• Enhanced energy estimation to inform individual users is currently in beta-test and will be fully deployed by Summer 2018.

NREL is a national laboratory of the U. S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.