GPS Travel Survey Data Collection and Analysis

Tony Markel
(Tony.Markel@nrel.gov)
Jeff Gonder, and Matt Thornton

National Renewable Energy Laboratory

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Project Overview
GPS Travel Survey Data Collection and Analysis

**Timeline**
- Ongoing support effort initiated in FY06

**Budget**
- FY06-FY07 (DOE) – $200K
- FY08 (DOE) – $75K
- Future (DOE) – $100K/yr for 3 years

**Barriers**
- Valuable vehicle systems analysis depends on representative input data
- Real world profiles address limitations of standard test profiles for PHEV analysis

**Collaboration**
- Non-proprietary data shared with GM for analysis of plug-in concepts (2008 SAE publication)
- Metropolitan Planning Organizations (MPO) providing data access
- NuStats/GeoStats/Battelle/FHWA providing data set background
Objectives and Milestones

Critical Issues:
- The usage profile provides information on potential vehicle design optimization and robustness

Objectives:
- Build a repository of data sets that provides a breadth of consumer behavior from across the country
- Review and document processing methods
- Develop an agreement for shared access to the data sets

Milestones:
- Summary included in Light-Duty PHEV Analysis Report delivered September ‘08
Objectives: Relevance

- Enable advanced vehicle system analysis using large number of real-world driving profiles
- Provide clarity on actual needs and submarkets (designing only for extreme cases leads to inefficiency much of the time)
- PHEV benefits are particularly tied to distance, real-world demands and consumer behavior with location details
Objectives: Description

- This project focuses on the collection and processing of travel survey data from across the United States for use in vehicle systems simulations.
- Addresses limitations of standard drive cycles.
- Useful for PHEV analysis and other applications.
Approach

• Maintain contact with MPOs throughout the US to access GPS datasets collected in conjunction with Travel Surveys

• Process data
  – Remove invalid data
  – Complete event data

• Analyze regional characteristics, investigate multi-day/week/month use variation

• Store and use data for vehicle analysis
Approach: Barriers Addressed

• Distribution and variability of consumer vehicle usage is not fully understood

  Travel pattern analysis provides insights to improve vehicle design and consumer education

• Reluctance of organizations to share the data given confidentiality concerns

  Establish relationships and protocols for sharing data while guaranteeing respondent anonymity
Technical Accomplishments

• Obtained datasets from 4 new cities
• Processed Los Angeles data set (over 1000 profiles)
  – Shared with General Motors for SAE Paper
  – Applied to opportunity charging analysis at NREL
• Planning for collection of data from cities with multi-day data sets
  – Washington DC/Baltimore
  – Chicago
  – Puget Sound
• Documenting processing methods
Technical Accomplishments
Benefits and Market Potential Analysis

Travel survey data is valuable for,

- Market segmentation
- Understanding actual consumer needs, inputs for vehicle design
- Opportunities for recharge of plug-ins
- Detailed vehicle system simulation
- Evaluation of grade and location details, geographic variation
- Utility grid impacts analysis
Collaboration

• Able to share LA data with GM for analysis of several plug-in concepts (2008 SAE Paper)

• Metropolitan Planning Organizations have been cooperative partners in providing data access

• NuStats/GeoStats/Battelle/FHWA providing contact information

• Activity valuable to many stakeholders
  – Developing approach to share data with others without violating privacy rights
Future/Ongoing Work

- Document processing methods

- Focus with new data sets is to capture/assess,
  - Characteristics of multi-day/week/month data
  - Geographic diversity
  - Include influences of changes in road grade

- Support further use of the database for expanded analysis of electrified vehicles
Summary

• Duty cycle data is one of the most valuable data elements for vehicle system simulation

• Travel survey data is collected under other programs and can be accessed for advanced technology simulations

• Over 2000 unique travel profiles have been prepared and applied to advanced vehicle technology evaluation