National Renewable Energy Laboratory
Innovation for Our Energy Future

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:

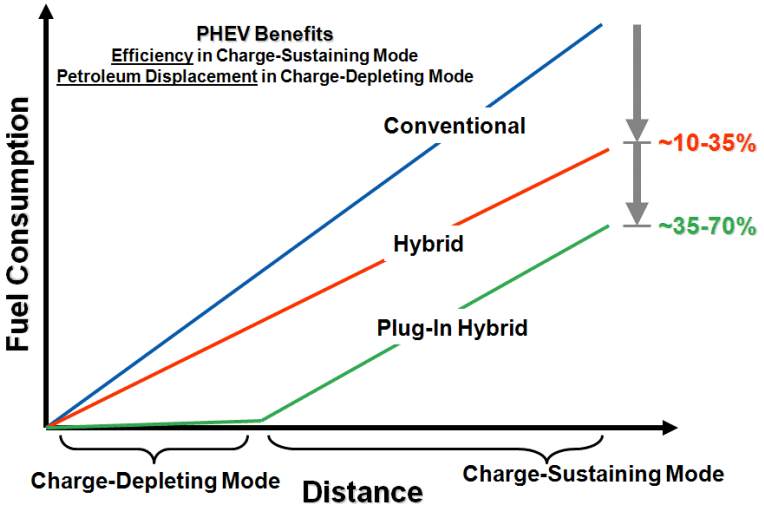
- Build a repository of data sets that provides a breadth of consumer behavior from across the country
- Review and document processing methods
- Develop an agreement for shared access to the data sets

Milestones:

- Summary included in Light-Duty PHEV Analysis Report delivered September ‘08

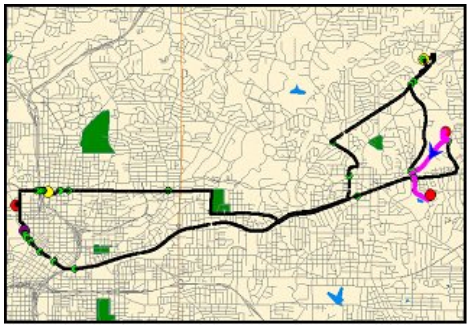
Objectives: Relevance

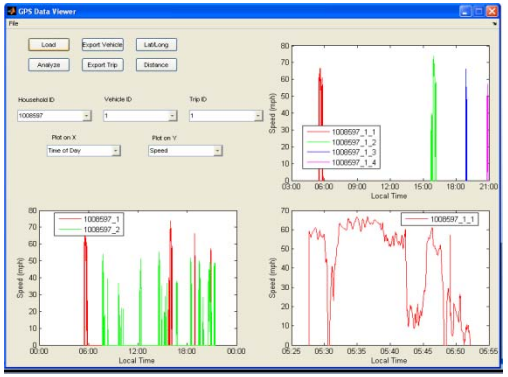
- Enable advanced vehicle system analysis using large number of real-world driving profiles
- Provide clarity on actual needs and submarkets (designing only for extreme cases leads to inefficiency much of the time)
- PHEV benefits are particularly tied to distance, real-world demands and consumer behavior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

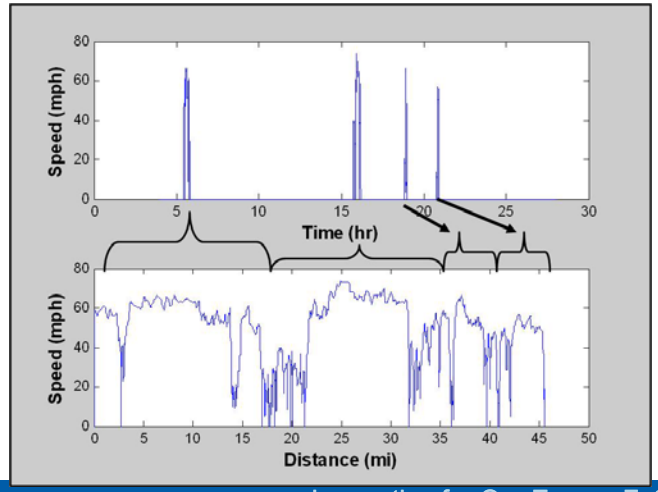
Technical Accomplishments

- 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