Transportation Secure Data Center
Real-World Data for Planning, Modeling, and Analysis

The Transportation Secure Data Center (TSDC) at *www.nrel.gov/tsdc* provides free, web-based access to detailed transportation data from a variety of travel surveys conducted across the nation.

While preserving the privacy of survey participants, this online repository makes vital transportation data broadly available to users from the comfort of their own desks via a secure online connection.

Data Available through the TSDC

Maintained by the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) in partnership with the U.S. Department of Transportation (DOT), the TSDC houses data from travel surveys and studies conducted using global positioning system (GPS) devices. It features millions of data points—second-by-second GPS readings, vehicle characteristics (if applicable), and demographics—for all modes of travel.

NREL screens the initial data for quality control, translates each data set into a consistent format, and interprets the data for spatial analysis. NREL's processing routines add information on vehicle fuel economy and road grades and join data points to the road network.

Valuable to Planners, Researchers, and Manufacturers

Using archived data can reduce research costs and save public funds. This valuable transportation data can be used for applications such as:

- Transit planning and travel demand modeling
- Congestion mitigation research
- Emissions and air pollution modeling
- Vehicle energy and power analysis
- Homeland Security evacuation planning
- Alternative fuel station planning
- Validating transportation data from other sources
- Toll and pricing research.

TSDC data by state and region

Two Levels of Access

The TSDC's two-level access approach facilitates data availability for legitimate research while maintaining the anonymity of survey participants.

Cleansed data, with sensitive information suppressed, are readily available for download from the website. These publicly available data sets include high-level summary statistics, vehicle and participant demographic information, second-by-second speed profiles (with latitude/longitude detail removed), and NREL processing results.

Detailed spatial data are made available online through a secure *virtual desktop*. After completing a simple application and obtaining approval, users may work with full data sets using a variety of provided tools and reference data (and may bring in additional tools/reference data, if needed). Although users cannot remove raw data from the secure environment, they can conduct statistical and geographic analyses and generate aggregated results for removal by an administrator.

Secure Data Track Record

The TSDC builds on NREL's extensive experience with GPS data collection and analysis, secure data storage and processing, and information sharing. NREL has more than 15 years of experience collecting and aggregating proprietary manufacturer data related to fuel cell vehicles and hydrogen infrastructure.

The TSDC advisory group and other consulted stakeholders include DOT, regional planning agencies, universities, the U.S. Environmental Protection Agency and air quality management districts, the U.S. Department of Energy and its national labs, auto manufacturers, and other research and regulatory entities.

Contacts

Visit the website (*www.nrel.gov/tsdc*) for more information or to apply for secure online access to TSDC data, or e-mail *tsdc@nrel.gov* to ask questions.

To discuss partnership opportunities, contact NREL's Venu Garikapati at 303-275-4784 or *venu.garikapati@nrel.gov*.

TSDC by the Numbers

Total surveys hosted
35

Number of registered users
~2,300

Publications citing TSDC data
148

Total GPS travel miles
~11,000,000

Secure Portal Environment

Users of the secure portal are provided with a variety of software packages to conduct research.

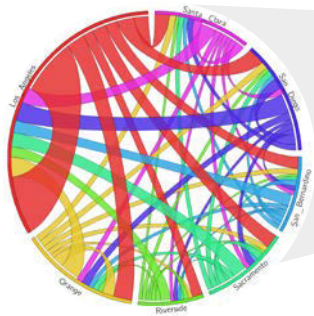|	
ArcGIS	Spyder
PostgreSQL	Python
Octave	R
QGIS	MS Office

Data in the TSDC
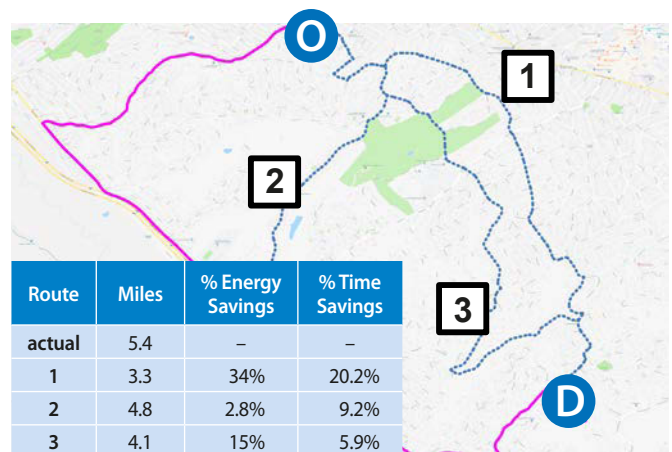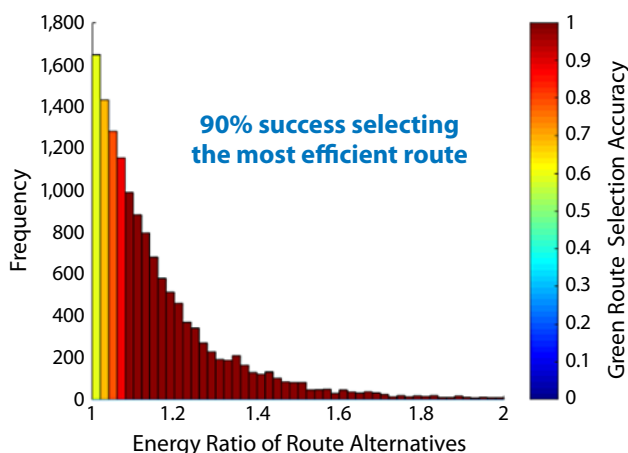

Origin/destination flows from the California Household Travel Survey
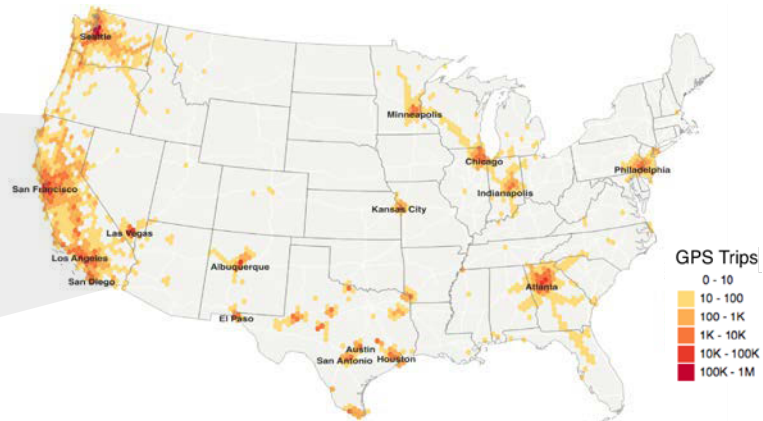
TSDC GPS data coverage (excludes Alaska and Hawaii)

GPS Trips
- 0 - 10
- 10 - 100
- 100 - 1K
- 1K - 10K
- 10K - 100K
- 100K - 1M

TSDC Data Analysis

Leveraging real-world drive cycles from the TSDC as well as NREL's RouteE tool, which predicts energy consumption for specific vehicles over proposed routes, researchers developed innovative algorithms providing route guidance enabling various vehicle types (i.e., conventional, hybrid electric, all-electric, etc.) to achieve better fuel efficiency.

90% success selecting the most efficient route

Route	Miles	% Energy Savings	% Time Savings
actual	5.4	–	–
1	3.3	34%	20.2%
2	4.8	2.8%	9.2%
3	4.1	15%	5.9%

The chart on the left plots the energy consumption of real trips versus alternative routes and the probability of NREL's algorithms selecting the most efficient routes. The map on the right provides an example of an origin/destination pair and the relative energy savings of each alternative route.