

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 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
- Climate change impact studies
- Homeland Security evacuation planning
- Alternative fuel station planning
- Validating transportation data from other sources
- Toll and pricing research.

Contacts

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

To discuss partnership options, contact NREL's Jeff Gonder at 303-275-4462 or Jeff.Gonder@nrel.gov; or DOT's Elaine Murakami at Elaine.Murakami@dot.gov.

Two Levels of Access

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

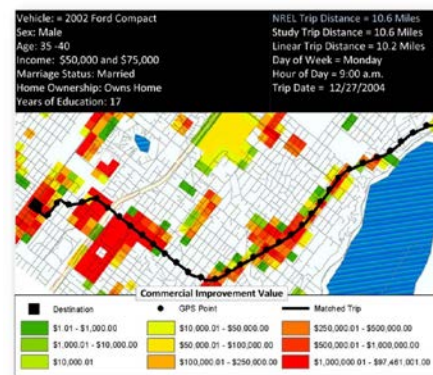
Cleansed data, with sensitive information suppressed, are readily available for download from the website. These publicly available data sets include high-level summary statistics, vehicle and participant demographic information, second-by-second speed profiles (with latitude/longitude detail removed),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

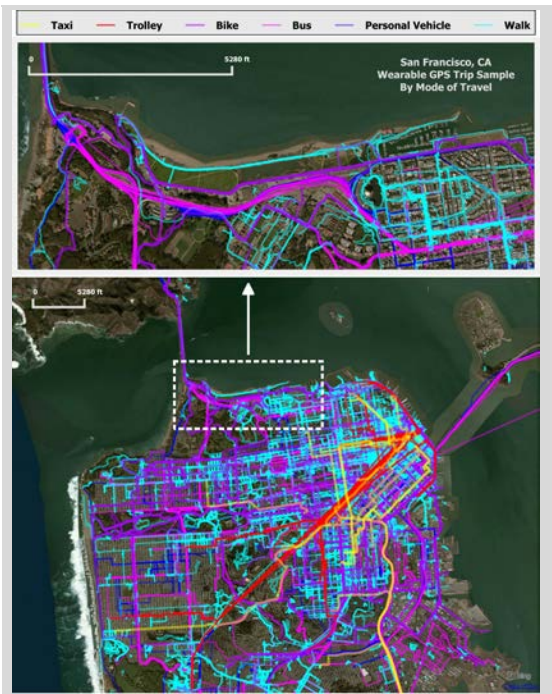
The TSDC builds on NREL's extensive experience with GPS data collection and analysis, secure data storage and processing, and information sharing. NREL has more than 10 years of experience collecting and aggregating proprietary manufacturer data related to fuel cell vehicles and hydrogen infrastructure.

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.



Travel data can be combined with demographic, economic, and land use reference information to support analyses. *Figure from NREL/TSDC*

Example GPS Data Sets	# Vehicles	# Days	# Persons	# Days
2013 Mid-Region Council of Governments (Albuquerque) Travel Survey	NA	NA	931	3
2010–2012 California Statewide Household Travel Survey	2,910	7	7,574	3
2011 Atlanta Regional Household Travel Survey	1,653	7	797	3
2010 Metropolitan Council (Minneapolis/ St. Paul) Travel Behavior Inventory	NA	NA	174	7
2007 Chicago Regional Household Travel Inventory	408	7	209	7
2004–2006 Puget Sound Traffic Choices Study	484	540	NA	NA
2004 Mid-America Regional Council (Kansas City) Regional Travel Study	408	2	NA	NA
2001–2002 Los Angeles Regional Household Travel Survey	624	2	NA	NA
2002–2011 Texas Regional Household Travel Surveys	3,404	1	NA	NA



Color-coded routes illustrate travel mode trip segmentation.
Note: Does not include Bay Area Rapid Transit data.

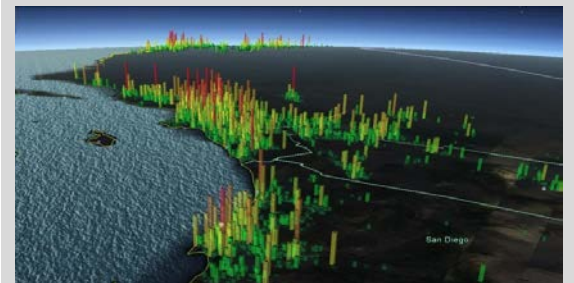
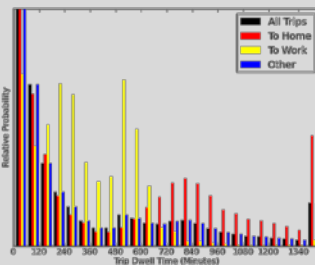
TSDC SECURE PORTAL ENVIRONMENT SUPPORT

DATABASES	GIS	SCRIPTING	SUPPORT DATA
PostgreSQL/PostGIS ArcGIS Geodatabase Microsoft Access	Quantum GIS ArcGIS GRASS	Python (arcypy, numpy, scipy, matplotlib, gdal, pycppg2) R	Census 2010 demographic and economic data Road network data (including grade and class) Region-specific land use data

TSDC DATA ANALYSIS EXAMPLES

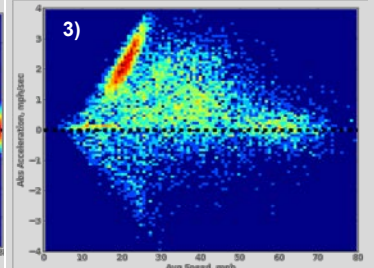
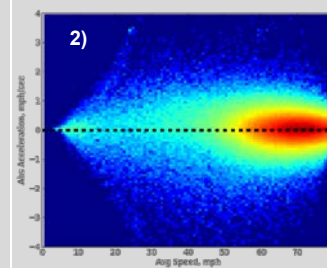
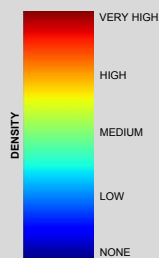
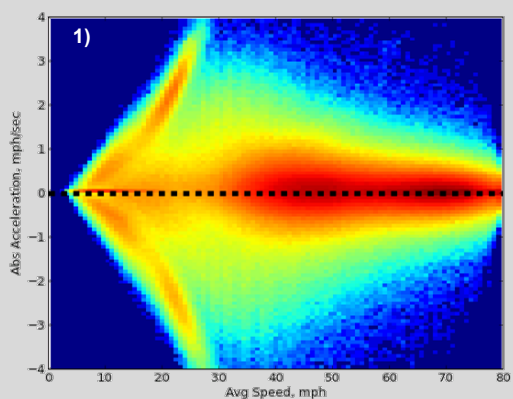
Vehicle Dwell Time

The chart on the right indicates dwell time following trips of different purposes in California placed in one-hour bins. The image on the right shows 3D columns distributed over a 2D grid of southern California, with the height of each column proportional to the cumulative vehicle dwell time at non-home and non-work locations. Applications for this type of analysis include infrastructure placement for electric and other alternatively fueled vehicles.



Speed and Acceleration on Different Road Types

From left to right, these three density plots show the relative frequency of different speed and acceleration conditions from multiple TSDC data sets on (1) all roads, (2) functional class 1 roads, and (3) functional class 3 roads after transitioning from a functional class 4 road. Applications for this type of analysis include predicting fuel use over potential driving routes.



National Renewable Energy Laboratory
15013 Denver West Parkway
Golden, CO 80401
303-275-3000 • www.nrel.gov

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