NREL
NATIONAL RENEWABLE ENERGY LABORATORY

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 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 Jeff Gonder at 303-275-4462 or *jeff.gonder@nrel.gov*.

NREL data experts analyze and refine large sets of complex transportation data. Housed at NREL, the Transportation Secure Data Center serves as a centralized repository of detailed transportation data from travel surveys and studies conducted across the nation. Travel data can be combined with demographic, economic, traffic volume, road grade, climate, and land use reference information to support analysis. *Photo by Dennis Schroeder, NREL 35357*

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.

**NREL is a national laboratory of the U.S. Department of Energy,
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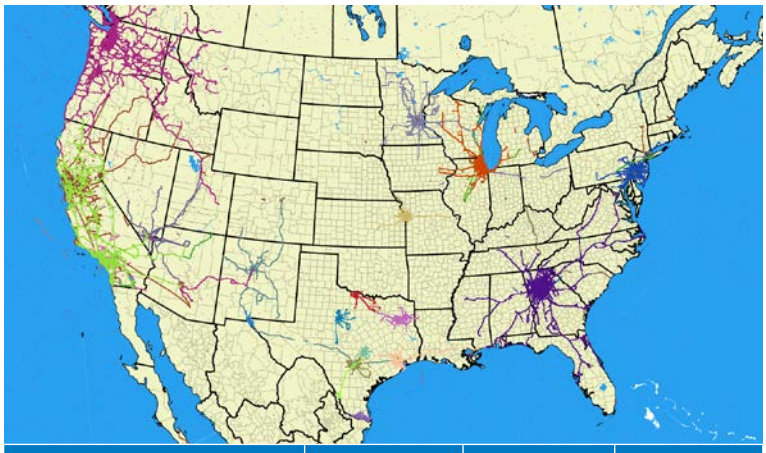
GPS Data Sets



	Second-by-Second Vehicle GPS		Second-by-Second Wearable GPS		Origin/Destination Travel Diary	
	# Vehicles	# Days	# Persons	# Days	# Persons	# Days
2015 Puget Sound Regional Travel Study	-	-	547	3	-	-
2014 Greater Fairbanks Transportation Survey	282	7	-	-	-	-
2014 Southern Nevada Household Travel Survey	-	-	1,694	3	-	-
2002–2014 Texas Regional Travel Surveys (10 total)	3,561	1	-	-	-	-
2013 Mid-Region Travel Survey (Albuquerque)	-	-	1,023	3	5,522	1
2012–2013 Delaware Valley Household Travel Survey	-	-	811	3	20,216	1
2010–2012 California Household Travel Survey	2,910	7	7,574	3	109,113	1
2012 California Household Survey Supplement	625	7	244	3	-	-
2011 Tolling Impact Survey (Atlanta & Seattle)	-	-	-	-	7,534	2
2011 Atlanta Regional Commission Travel Survey	1,653	7	797	3	25,797	1
2010 Travel Behavior Inventory (Minneapolis)	-	-	278	7	18,702	1
2007 Chicago Metropolitan Regional Travel Inventory	408	7	209	7	-	-
2004–2006 Traffic Choices Study (Seattle)	481	540	-	-	-	-
2004 Mid-America Regional Travel Study (Kansas City)	408	2	-	-	-	-
2001–2002 Southern California Regional Travel Survey	583	2	-	-	39,808	1

Total Vehicle-Days of Travel	306,429		
Total Person-Days of Travel (GPS)		41,479	
Total Person-Days of Travel (Diary)			233,883

TSDC Secure Portal Environment Support

Databases
PostgreSQL/PostGIS, ArcGIS Geodatabase, Microsoft Access

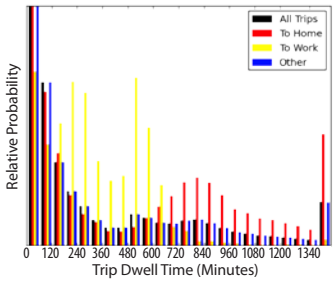
Scripting
Python (arcpy, numpy, scipy, maplotlib, gdal, psycopg2), R, GNU Octave

GIS
Quantum GIS, ArcGIS, GRASS

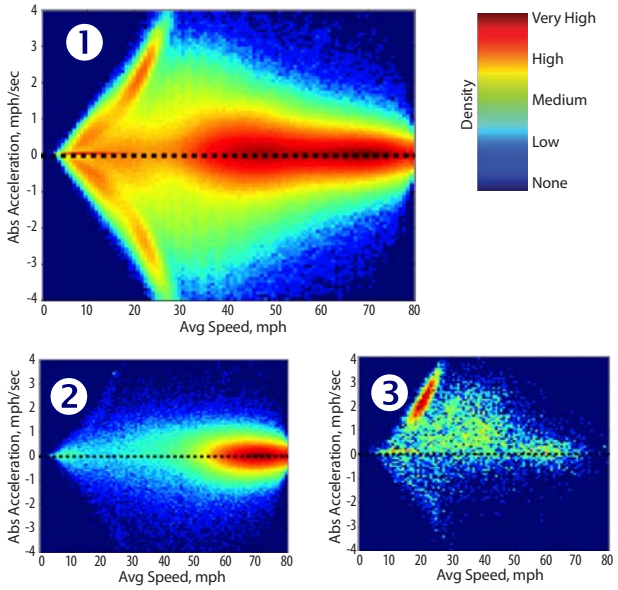
Support Data
Census 2010 demographic and economic data, road network data (including grade and class), region-specific land use data

TSDC Data Analysis Examples

Vehicle Dwell Time
The chart on the right indicates dwell time following trips of different purposes placed in one-hour bins. Applications for this type of analysis include infrastructure placement for electric and other alternatively fueled vehicles.



Speed and Acceleration on Different Road Types
These three density plots show the relative frequency of different speed and acceleration conditions from multiple TSDC data sets on (1) all roads, (2) interstates/freeways, and (3) major arterials after transitioning from a minor arterial or collector road. Applications for this type of analysis include predicting fuel use over potential driving routes.



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