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 (DOE’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 also 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

To apply for online access to secured TSDC data, visit the website (www.nrel.gov/tsdc). To discuss partnership options or for more information, 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, is readily available for download from the website. This publicly available data includes 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 is 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/processing, and information sharing. NREL has 10-plus 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, DOE 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
**Study Sample**

<table>
<thead>
<tr>
<th>Study Sample</th>
<th># Vehicles</th>
<th># Days</th>
<th># Persons</th>
<th># Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-2012 California Statewide Household Travel Survey</td>
<td>3,910</td>
<td>7</td>
<td>7,574</td>
<td>3</td>
</tr>
<tr>
<td>2011 Atlanta Regional Household Travel Survey</td>
<td>1,653</td>
<td>7</td>
<td>797</td>
<td>3</td>
</tr>
<tr>
<td>2007 Chicago Regional Household Travel Inventory</td>
<td>408</td>
<td>7</td>
<td>209</td>
<td>7</td>
</tr>
<tr>
<td>2004-2006 Puget Sound Traffic Choices Study</td>
<td>484</td>
<td>540</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>2001-2002 Los Angeles Regional Household Travel Survey</td>
<td>624</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>2002-2011 Texas Regional Household Travel Surveys</td>
<td>3,404</td>
<td>1</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

This map illustrates the spatial extent of the TSDC data sets, each of which is assigned a different color.

This timeline shows the vehicle data collection period for each provider. The magnitude of the points on the timeline indicates the proportion of vehicle data sampled by day.

**TSDC SECURE PORTAL ENVIRONMENT SUPPORT**

**DATABASES**

- PostgreSQL/PostGIS
- ArcGIS Geodatabase
- Microsoft Access

**GIS**

- Quantum GIS
- ArcGIS
- uDig

**SCRIPTING**

- Python (arcopy, numpy, scipy, matplotlib, gdal, psycopg2)
- R

**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 in California placed in 1 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.