Transportation Efficiency in Vermont

Center for Research on Vermont
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Richard Watts, Transportation Research Center

Funding from Vermont Agency of Transportation and Transportation Research Center at UVM

University of Vermont Transportation Research Center

- Founded in Fall 2006 (SAFETEA LU)
- One of 10 National Transportation Centers
- Theme: Sustainable Systems and Advanced Technologies for Northern Communities
- Multi-disciplinary
- Service to Vermont
Graduate Students & Faculty Research

- Research Funding
- Transportation Scholars

Presentation Outline

- Brief history of “automobility”
- Transportation system efficiency – reducing energy use
- Some data
- Recommendations, next steps

- Basic narrative – rural state, car dependent. Need to fundamentally rethink our mobility strategies to reduce energy use in transportation.

- Contributors: Lisa Aultman-Hall, Elaine Wang, Nate Belz, Chen Zhang, Andrew Weeks, Lance Jennings
Mobility and Access

U.S. Motorization: Cars per 1,000 People


Note: Assumes 50 vehicles per 1000 population starting in 1920.
Public transit ridership: % work trips


U.S. Vehicle miles traveled (1925-2009)

Source: Federal Highway Administration Highway Statistic Series
Motorization: Cars per 1,000 People


Vehicles per household increases

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Vermont Vehicle Miles Traveled

Source: Vermont Agency of Transportation.
Passenger Rail & Bus Service

Source: http://www.uvm.edu/landscape/learn/.

Burning the last street car

Burning the last street car in downtown Burlington, Main St. Aug 4, 1929, Courtesy of Special Collections, Bailey Howe Library
Plans to Build More Roads

Main Street

Downtown Master Plan

Burlington Belt Line


Where you live effects how much you drive

Source: National Household Travel Survey, 2001. Analyzed by Damon Lane.
First Car (that worked)

Vermont Travel Behavior – Journey to Work

Journey to Work Mode Split - Vermont

- Drove alone: 75.5%
- Worked at home: 5.7%
- Walked: 5.7%
- Other: 0.4%
- Public Trans: 0.7%
- Carpool: 12.0%

Source: U.S. Census.
Driving Alone Increases


Driving Kids to School Increases

Why should we care?

- Aging Vermonters
- Costs to Vermonters
- Energy dependence
- Green-house gas emissions
- Physical health

Vermonters are Getting Older

Source: Art Woolf: Vermont aging slides PPT, Jan 2007
Driving Costs Per Year

<table>
<thead>
<tr>
<th>Type of Cost</th>
<th>Small Sedan</th>
<th>Medium Sedan</th>
<th>Large Sedan</th>
<th>SUV</th>
<th>Minivan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas &amp; oil/mi.</td>
<td>7.4 cents</td>
<td>9.4 cents</td>
<td>10 cents</td>
<td>12.6 cents</td>
<td>10.6 cents</td>
</tr>
<tr>
<td>Maintenance/mi.</td>
<td>4.5 cents</td>
<td>4.7 cents</td>
<td>5.5 cents</td>
<td>5.5 cents</td>
<td>5.1 cents</td>
</tr>
<tr>
<td>Tires/mi.</td>
<td>0.5 cents</td>
<td>0.8 cents</td>
<td>0.7 cents</td>
<td>0.9 cents</td>
<td>0.7 cents</td>
</tr>
<tr>
<td>Operating costs/mi.</td>
<td>12.4 cents</td>
<td>14.9 cents</td>
<td>16.2 cents</td>
<td>19 cents</td>
<td>16.4 cents</td>
</tr>
<tr>
<td>Insurance</td>
<td>$968</td>
<td>$955</td>
<td>$1,032</td>
<td>$950</td>
<td>$886</td>
</tr>
<tr>
<td>License &amp; registration</td>
<td>$401</td>
<td>$544</td>
<td>$668</td>
<td>$695</td>
<td>$587</td>
</tr>
<tr>
<td>Depreciation</td>
<td>$2,461</td>
<td>$3,394</td>
<td>$4,321</td>
<td>$4,531</td>
<td>$3,899</td>
</tr>
<tr>
<td>Finance charges</td>
<td>$527</td>
<td>$743</td>
<td>$929</td>
<td>$971</td>
<td>$807</td>
</tr>
<tr>
<td>Ownership costs/yr.</td>
<td>$4,357</td>
<td>$5,636</td>
<td>$6,950</td>
<td>$7,147</td>
<td>$6,179</td>
</tr>
<tr>
<td>Total cost for 15,000 miles/yr.</td>
<td>$6,217</td>
<td>$7,871</td>
<td>$9,380</td>
<td>$9,997</td>
<td>$8,639</td>
</tr>
</tbody>
</table>


Average Price of Gas Increases Vermont Gas Sales Declining

![Graph showing average gas prices increasing](image)

![Graph showing gas sales declining](image)

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Costs to Consumers Increases

Source: Joint Fiscal Office, Vermont Legislature

U.S. Oil Use By Sector

Source: Energy Information Administration, Annual Energy Outlook 2005
Data are for 2005
US GHG Emissions by Sector

California

- 1. Vehicle Efficiency (CAFÉ standards, alternative fueled vehicles, anti-idling, etc.)
- 2. Lower carbon fuels (low carbon fuel standard)
- 3. Increasing Transportation System Efficiency (reducing vehicle miles traveled, switching modes, walking, biking, increase vehicle occupancy rates, public transportation, etc.)
Vehicle Efficiency

- The Vermont Low Emission Vehicle Program
- Alternative fueled vehicles
- Vehicle ownership
- Efficient vehicle purchase behavior

Electric Cars in Vermont
Plug in Hybrid Electric Vehicles

Figure 1

Vehicle Type Matters

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Purchases of Efficient Vehicles Increasing (new vehicles)

Source: R.L. Polk Data, Transportation Research Center

Purchases of Efficient Vehicles Increasing (used vehicles)

Source: R.L. Polk Data, Transportation Research Center
Transportation System Efficiency

- Reduce personal VMT by transferring trips to public transportation, van-pools and non-motorized modes
- Increase vehicle occupancy rates
- Increase efficient driving
- Reduce idling

Smart Growth in Lisbon, Maine
Revitalize Existing Buildings
Concentrate Growth

7.10 The neighborhoods of St. Albans City (top) and St. Albans Town (bottom).


Widespread Smart Growth Households (2005 to 2030)

Source: Transportation Research, Education and Innovation for Vermont and Beyond
Residential, Business and Public Facility Locations

Transit-Supportive Areas
CarShareVermont

Our mission is to provide a convenient, affordable, and reliable alternative to private car ownership that enhances the environmental, economic, and social wellbeing of our region and planet.

Slide courtesy of CarShare Vermont

Park and Ride Lots

Jeffersonville

Richmond
Ride-Share Data

Driving habits impact efficiency

Congressional Budget Office based on data from BTS, 2001.
Social Networking
Hinesburg Rides – Local Efforts

The Future?
Recommendations

Vehicle Efficiency

- Focus on programs that increase the efficiency of existing motorized vehicles, (e.g. the adoption of the California LEV standards, incentives to consumers to buy more efficient vehicles and AFVs).

Transportation System Efficiency

- Vermont should focus on programs that increase vehicle occupancy rates, (e.g. car-pooling, ride-sharing, van-pooling, park and ride lots and household and employment based TDM programs).
- Targeted public transit investments in locations with transit viable intra-city routes and inter-city routes.
- Increased education and outreach regarding efficient driving styles and the impact of travel choices.