

University of Vermont

**UVM ScholarWorks**

---

Transportation Research Center Research  
Reports

Research Centers and Institutes

---

7-27-2007

## The Vermont Transportation Energy Report (2007)

Richard Watts

*University of Vermont, [rwatts@uvm.edu](mailto:rwatts@uvm.edu)*

Karen Glitman

*University of Vermont*

Elaine Wang

*University of Vermont*

Follow this and additional works at: <https://scholarworks.uvm.edu/trc>

---

### Recommended Citation

Watts, Richard; Glitman, Karen; and Wang, Elaine, "The Vermont Transportation Energy Report (2007)" (2007). *Transportation Research Center Research Reports*. 265.

<https://scholarworks.uvm.edu/trc/265>

This Report is brought to you for free and open access by the Research Centers and Institutes at UVM ScholarWorks. It has been accepted for inclusion in Transportation Research Center Research Reports by an authorized administrator of UVM ScholarWorks. For more information, please contact [scholarworks@uvm.edu](mailto:scholarworks@uvm.edu).



A report by the Vermont Clean Cities Coalition & UVM Transportation Research Center

# The Vermont Transportation Energy Report (2007)

---

Report # 07-001 | July 2007



# **The Vermont Transportation Energy Report 2007**

## **Vehicles, Fuels and Fuel Use in 2006**



**In 2006, more than \$1 billion was spent in Vermont purchasing gasoline and diesel, an increase of more than \$500 million since 2002.**

**Submitted by**

**Elaine Wang, Graduate Student Intern, UVM Transportation Center**

**Richard Watts, Ph.D, Senior Research Analyst, UVM Transportation Center**

**Karen Glitman, Clean Cities Coordinator, UVM Transportation Center**

**July 27, 2007**

---

**The Vermont Transportation Energy Report 2007  
Annual Vehicles, Fuels and Fuel Use**

Table of contents:

1. Executive Summary
2. Status: Fuel consumption
  - a. Sales
  - b. Prices
3. Automobiles
  - a. Vehicle Miles Traveled (VMT)
  - b. Emissions data
  - c. Vehicle numbers
4. Alternatives to the Traditional Automobile
  - a. State spending on transportation
  - b. Bus ridership
  - c. Alternative fuel vehicles
  - d. Inducements to drive less
5. Fuel Economy
  - a. Efficient vehicles
  - b. Transportation Demand Management
6. Activities
  - a. State Policies
  - b. Non-profit Sector



---

## Executive Summary

The transportation sector is the largest user of petroleum in Vermont, consuming more petroleum than any other primary end user.

In 2006, more than \$1 billion was spent in Vermont purchasing gasoline and diesel. This is an increase of more than \$500 million dollars since 2002. In these five years, in-state spending on transportation fuels has almost doubled while gasoline and diesel fuel use has remained almost the same. Most of these dollars are exported out of state to purchase the fuel. The reason for the increase in spending is the rapid increase in gasoline prices over the last five years.

Gasoline sales in Vermont decreased between 2002 and 2006 while diesel sales increased about 10 percent during the same time period.

Vehicle registrations and licenses both increased between 2004 and 2005. Registrations increased more than licenses issued, which in turn increased more than the Vermont population, suggesting that more vehicles were bought than new drivers were added to the population.

Purchases of all of top-ranked fuel-efficient new vehicles available for sale in 2006 (i.e. Model Year 2006 and 2007) comprised 6.6 percent of the total new vehicle sales in Vermont in 2006.

In a 2000 Vermont Agency of Transportation survey, two thirds of Vermonters polled said there were no actions that would cause them to drive less. In a matching 2006 survey of 600 Vermonters, the number of Vermonters who said there were no actions that would cause them to drive less had dropped to 37 percent.

In 2007, The University Transportation Center commissioned the Center for Rural Studies to include survey questions related to transportation alternatives in their annual "Vermont Poll." Five hundred sixty-five households were asked what actions, circumstances, or transportation alternatives might encourage them to drive less. The

most number of people responded that they would drive less if public transportation were improved.

This report provides policy makers with clear data on the status of fuel consumption, vehicle purchases and public opinion that can be used as a basis for policy discussions and initiatives. The Vermont Clean Cities Coalition will continue to provide this data on an annual basis.

---

## **1. Fuel Consumption**

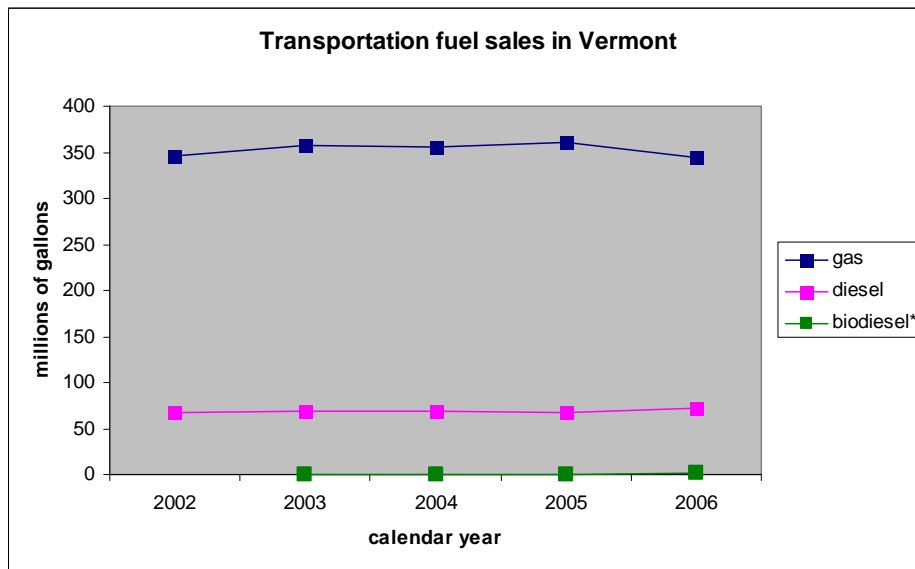
### **1a. Transportation Fuel Sales in Vermont**

The transportation sector is the largest user of petroleum in Vermont, consuming more petroleum than any other primary end user, including; industrial (manufacturing), residential (energy use by homes), and commercial (energy use by commercial buildings).

Gasoline sales in Vermont decreased between 2002 and 2006. Diesel sales increased about 10 percent during the same time period. Although biodiesel sales have increased exponentially since 2004 they remain a small portion of overall transportation fuel sales.

**Table 1. Gallons of Fuel Sold in Vermont by Calendar Year for the Transportation Sector (in millions of gallons.)**

	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
<b>Gas</b>	346	357	355	361	344
<b>Diesel</b>	66.7	68.4	68.3	68.0	72.2
<b>Bio-Diesel<sup>1</sup></b>	NA	0.01	0.06	0.28	1.40
<b>Total</b>	413	425	423	429	418



**Figure 1. Gallons of Fuel Sold in Vermont by Calendar Year for the Transportation Sector (in millions of gallons.)**

*Source: [Joint Fiscal Office](#) and [Vermont Biofuels Association](#)<sup>2</sup>*



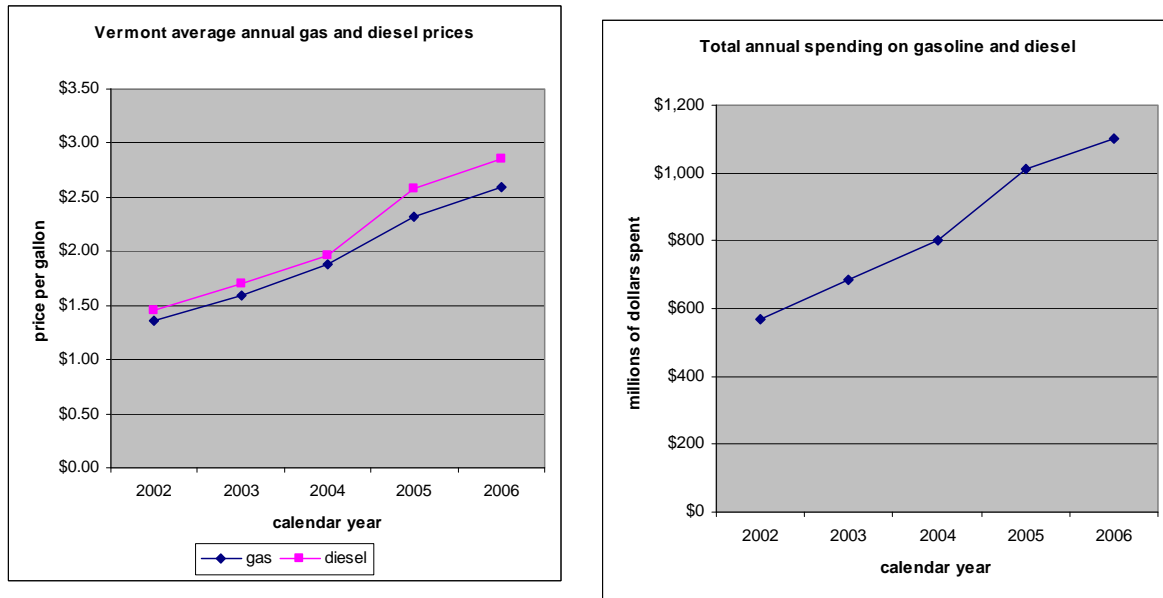
### 1b. Transportation Fuel Prices

In 2006, more than \$1 billion was spent in Vermont purchasing gasoline and diesel. This is an increase of more than \$500 million since 2002. In five years, in-state spending on transportation fuels has almost doubled while gasoline and diesel fuel used has remained almost the same. Most of these dollars are exported out of state to purchase the fuel. The reason for the increase in spending is the rapid increase in gasoline prices over the last five years.

**Table 2. Average Annual Costs for the Purchase of Petroleum in Vermont by Calendar Year**

	2002	2003	2004	2005	2006
<b>Gas Price/ gallon</b>	\$1.36	\$1.59	\$1.88	\$2.31	\$2.59
<b>Diesel Price/gallon</b>	\$1.45	\$1.71	\$1.97	\$2.58	\$2.86
<b>Total Spent*</b>	\$567 million	\$686 million	\$802 million	\$1.01 billion	\$1.10 billion

\*Petroleum sales times avg. cost per gallon.



**Figure 2. Average Annual Costs for the Purchase of Petroleum in Vermont by Calendar Year**

Source: [DPS Fuel Price Report](#) and Joint Fiscal Office.

## 2. Automobiles

### 2a. Vehicle Miles Traveled (VMT) in Vermont

Vehicle miles traveled per person declined between 2004 and 2006.

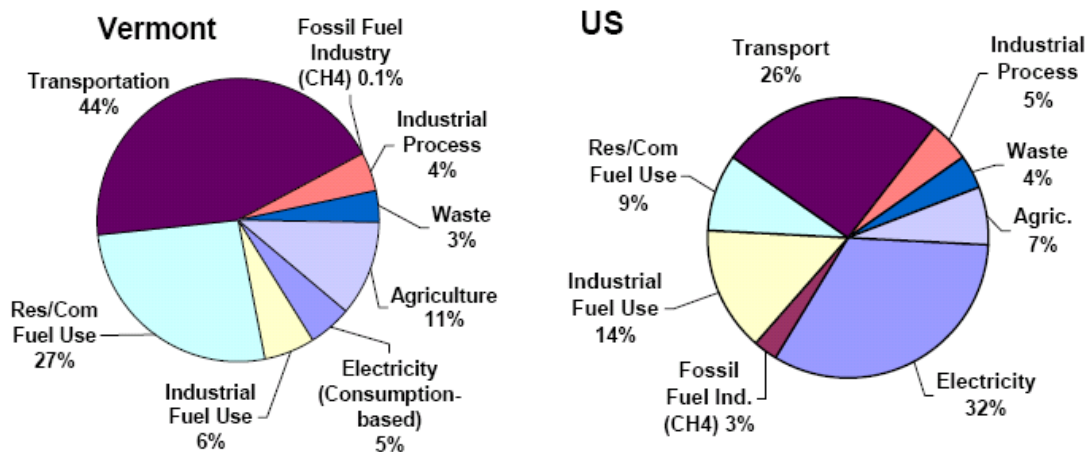
**Table 3. Average Annual VMT by Calendar Year**

	2004	2005	2006
<b>VMT</b>	7,717.2 mil	7,611.3 mil	7,688.4

*Source: VTTrans Highway Research, Division of Policy & Planning.*

### 2b. Emissions data

About 20 lbs of CO<sub>2</sub> is produced for every gallon of gasoline consumed (Vermont Agency of Natural Resources, Air Pollution Division).



**Figure 3. Emissions data**

*Source: [Governor's Commission on Climate Change: Inventory and Forecast](#) (Retrieved June 2007)*

### 2c. Vehicle Numbers

Vehicle registrations and licenses both increased between 2004 and 2005. Registrations increased more than licenses issued, which in turn increased more than the Vermont population, suggesting that more vehicles were bought than new drivers were added to the population. Data is not yet available for 2006.

---

**Table 4. Vehicle Registrations and Drivers Licenses in Vermont by Calendar Year**

	<b>2004</b>	<b>2005</b>	<b>2006</b>
<b>Registrations*</b>	606,807	614,552	n/a
<b>Licenses</b>	556,821	561,338	n/a
<b>Vermont Population</b>	620,795	622,387	623,908

\*Registrations include state vehicles, municipal vehicles, trucks, and autos. Does not include buses, agricultural vehicles dealers, handicap placards, motorcycles, or trailers.  
*Source: Vermont Department of Motor Vehicles, U.S. Census Bureau Annual Population Estimates.*

Nearly 36,000 vehicles were purchased in 2006 in Vermont. Of these, most were gasoline-powered vehicles (94%). Only 2% were diesel. Of note is that over 900 vehicles which can be run on either ethanol or gas (“flex fuel”) were purchased in the state, although ethanol is not commercially available for fueling vehicles in Vermont.

**Table 5. Used and New Vehicle Purchases in 2006 by Fuel Type**

<b>Fuel</b>	<b># sold (used &amp; new)</b>	<b>% of total sold</b>
<b>Gas</b>	33,547	94%
<b>Diesel</b>	886	2%
<b>Flex fuel (ethanol/gas)</b>	939	3%
<b>Hybrid</b>	420	1%
<b>Electric</b>	5	<1%
<b>natural gas</b>	1	<1%
<b>Total</b>	<b>35,798</b>	

*Source: RL Polk report commissioned by the University Transportation Center February, 2007*

Of vehicles purchased, over 25% were smaller vehicles, over 40% were medium-sized, and over 30% were larger vehicles.

**Table 6. Vehicle Purchases in 2006 by Size Class**

Size class	# sold (used & new)	% of total sold
<b>Smallest</b> <sup>1</sup>	4,367	16%
<b>Small</b> <sup>2</sup>	3,419	12%
<b>Medium</b> <sup>3</sup>	11,143	41%
<b>Large</b> <sup>4</sup>	7,737	28%
<b>Largest</b> <sup>5</sup>	700	3%

<sup>1</sup>“Smallest” includes size classes basic economy and entry level.

<sup>2</sup>“Small” includes size classes basic luxury, basic sporty, and compact pickup

<sup>3</sup>“Medium” includes size classes heavy duty station wagon, lower middle, mid luxury, mid sporty, midsize pickup, mini sport utility, minivan (cargo), and minivan (passenger)

<sup>4</sup>“Large” includes size classes full-size pickup, full-size van (cargo) prestige luxury, prestige sporty, roadster, sport utility and traditional large.

<sup>5</sup>“Largest” includes size class’ utility.

*Source: RL Polk report commissioned by Clean Cities Vermont*

**Table 7. Number of Vehicles per household in 2006**

# of vehicles	Households with # of vehicles
0	3%
1	24%
2	45%
3	17%
4+	11%
Avg # people/household	2.6
Avg # vehicles/household	3.9

*Source: Center for Rural Studies: Vermonter Poll*

### **3. Alternatives to the Traditional Automobile**

#### **3a. State spending on Transportation<sup>3</sup>**

The State of Vermont’s overall transportation budget increased between 2004 and 2006. Certain increases within that budget promote strategies and physical infrastructures that reduce petroleum dependence and reliance on single occupancy vehicles (SOV).

Spending for alternatives decreased from fiscal years 2004 to 2005 and then increased slightly in 2006. The table below includes selected traditional transportation spending items for comparison and line items for categories that may reduce reliance on SOV.

Spending on public transit has remained constant. Spending has decreased for pedestrian and bicycle facilities and rail, and increased for park and ride facilities.

**Table 8. Total Spent by Fiscal year<sup>4</sup>**

Budget line items*	FY 2004	FY2005	FY2006
Paving +maintenance	24%	24%	29%
Roadway	7%	19%	14%
Bridges (including maintenance of)	6%	8%	9%
Town Programs	17%	15%	15%
Finance, Planning, DMV	10%	11%	11%
<b>Public transit</b>	<b>4%</b>	<b>4%</b>	<b>4%</b>
<b>Ped &amp; bike</b>	<b>2%</b>	<b>1%</b>	<b>1%</b>
<b>Park &amp; ride</b>	<b>&lt;1%</b>	<b>1%</b>	<b>1%</b>
<b>Multi-modal</b>	<b>&lt;1%</b>	<b>&lt;1%</b>	<b>&lt;1%</b>
<b>Rail</b>	<b>4%</b>	<b>3%</b>	<b>3%</b>
Total transportation budget	\$345 million	\$359 million	\$371 million
<b>% spent on alternatives</b>	<b>10.4%</b>	<b>8.4%</b>	<b>9.0%</b>

\*Items in bold within the table are considered line items for alternatives to the SOV.

*Source: Joint Fiscal Office*

### 3b. Bus Ridership

Public transit ridership increased between 2005 and 2006.

**Table 9. Bus Ridership in Fiscal Years 2005 and 2006.**

	<b>FY 05</b>	<b>FY 06</b>	<b>% Increase</b>
<b>Total</b>	<b>3,757,248</b>	<b>3,923,502</b>	<b>9.3%</b>

### 3c. Alternative Fuel Vehicles

In 2006 there were a total of 2,677 known alternative fuel vehicles in the state. Data for all fuel categories except for hybrid electric vehicles (HEVs) were obtained via phone survey of fleets. The survey may not have covered all fleets or vehicle owners. Data for HEVs was obtained from the Vermont Department of Motor Vehicles. The data for biodiesel has an unknown, but probably significant, margin of error, due to the fact that any diesel vehicle can use biodiesel without any authorities being aware of it. Vehicles which run on recycled vegetable oil (also known as 'grease') are not characterized below because it is not a reported fuel type and typically used by private vehicle owners.

**Table 10. Alternative Fuel Vehicles (AFV) in 2006**

Fuel type	Vehicle type	# in the state
B100 (100% Biodiesel)	Light-Duty	0
B20 (20% Biodiesel)	Light-Duty	38
B20 (20% Biodiesel)	Heavy-Duty	101
Electricity	Light-Duty	4
LPG (Liquefied Petroleum Gas)	Light-Duty	13
NEV (Neighborhood Electric Vehicle)	Light-Duty	9
LPG (Liquefied Petroleum Gas)	Heavy-Duty	107
CNG (Compressed Natural Gas)	Light-Duty	8
CNG (Compressed Natural Gas)	Heavy-Duty	6
Plug-in Hybrid	Light-Duty	1
H2 (Hydrogen)	Light-Duty	1
HEV (Hybrid Electric Vehicle)	Light-Duty	2,389
Total		2,677

*Source: Vermont Clean Cities Coalition: Annual Alternative Fuel Vehicle Fleet Survey (conducted in January 2007), except for HEV data from Vermont DMV<sup>5</sup>.*

### **3d. Inducements to Drive Less**

Vermonters expressing a willingness to try alternatives to the automobile have steadily increased according to public opinion surveys. In a 2000 VTrans survey, two thirds of the Vermonters polled said there were no actions that would cause them to drive less. In a matching 2006 survey of 600 Vermonters also coordinated by VTrans, the number of Vermonters who said there were no actions that would cause them to drive less had dropped to 37 percent. Alternatives mentioned included 22 percent said better public transit and 7 percent mentioned commuter rail, for a total of 29 percent transit. Another 17 percent mentioned higher gasoline taxes.

In 2007, The University Transportation Center commissioned the Center for Rural Studies to include survey questions related to transportation alternatives in their annual Vermont Poll. Five hundred sixty-five households were asked what actions, circumstances, or transportation alternatives might encourage them to drive their car less. The highest number of people responded that they would drive less if public transportation were improved. Out of the available choices, the least number of people indicated that increased gas prices would encourage them to drive less.

**Table 11. Inducements to drive less**

<b>Option</b>	<b>% respondents</b>
Improved Public Transportation	34%
Alternative Forms of Transportation	15%
Increased Gas Prices	11%
OTHER	15%
Don't know/nothing	26%

*Source: Center for Rural Studies: Vermonter Poll, February, 2007*



#### **4. Fuel Economy**

##### **4a. Most Efficient New Vehicles Available in 2007**

Dealerships typically have available each Model Year (MY) from its release in the fall or winter of the previous calendar year (CY) until the end of the MY. For example in 2006, new MY 2006 vehicles were available most of the CY and MY 2007 vehicles became available in the last quarter of the CY. Also, MY vehicles tend to sell out by the end of their CY, such that there were probably no MY 2005 vehicles sold from dealerships in CY 2006.

The top three most fuel efficient vehicles of MY 2006 were hybrids. The fourth most fuel efficient vehicle was a diesel car, which cannot be purchased new in Vermont. Of the ten most efficient, 7 were cars and 2 were hybrid SUVs.

The top four most fuel efficient vehicles of MY 2007 were hybrids, including a sports utility vehicle (SUV). Of the ten most efficient, 8 were cars and 2 were hybrid SUVs.

Purchases of all of these top-ranked fuel-efficient new vehicles available for sale in 2006 (i.e. MY 2006 and 2007) comprised 6.6 percent of the total new vehicle sales in Vermont in 2006 (source: RL Polk report commissioned by Vermont Clean Cities Coalition).

**Table 12. Top Ten Most Efficient New Vehicles Available in 2006 (MY 2006 and 2007)**

Rank 2006	Vehicle	City/Hwy MPG	Type	Rank 2007	Vehicle	City/Hwy MPG	Type
1	Honda Insight (hybrid)	60/66	car	1	Toyota Prius (hybrid)	60/51	car
2	Toyota Prius (hybrid)	60/51	car	2	Honda Civic Hybrid	49/51	car
3	Honda Civic Hybrid	49/51	car	3	Toyota Camry Hybrid	40/38	car
4	Volkswagen Golf/New Beetle TDI*	37/44	car	4	Ford Escape Hybrid	36/31	SUV
5	Volkswagen Jetta	36/41	car	5	Toyota Yaris	34/40	car
6	Ford Escape Hybrid	36/31	SUV	6	Honda Fit	33/38	car
7	Mercury Mariner Hybrid	33/29	SUV	7	Toyota Corolla	32/41	car
8	Lexus RX 400h (hybrid)	33/28	SUV	8	Mini Cooper	32/40	car
8	Toyota Highlander Hybrid	33/28	truck	9	Hyundai Accent	32/35	car
9	Toyota Corolla	32/41	car	9	Kia Rio	32/35	car
10	Scion xA	32/37	car	10	Mercury Mariner Hybrid	32/29	SUV

\*Both the Volkswagen Golf and New Beetle TDI are diesel vehicles.

*Source: [Edmunds.com](http://Edmunds.com). Mileage is given for base models and manual transmission where available.*

#### **4b. Transportation Demand Management**

Way to Go! is an annual week-long program which markets alternatives to SOV to Vermont commuters and schoolchildren. Participation is voluntary and results are tabulated for registrants, but not verified. There has been a steady increase in program participation between 2005 and 2007.

**Table 13. Way to Go results**

	2005	2006	2007
# registrants	628	1,175	1,880
total gas gallons saved	2,437	3,780	12,385

*Source: [Way to Go!](#)*



---

## **5. Activities**

Many activities were undertaken in 2006 that would reduce petroleum consumption from transportation but do not collect petroleum data, or are geared to future reductions. Some of these efforts are summarized below.

### **5a. State Policies**

The Vermont State Government affected transportation energy in 2006 on a few fronts.

The Vermont legislature passed legislation in the spring 2007 session which has the effect of reducing petroleum consumption from transportation. Act 48 prohibits the idling of school bus engines on school property and encourages schools to enact policies to reduce idling by other vehicles on school grounds as well.

Safe Routes to Schools is a federal program administered by states, intended to benefit children in primary and middle schools. It includes evaluation of existing conditions and attitudes and activities to encourage schoolchildren to walk and bike to school on a regular basis. In 2006 and 2007 the number of participating schools was increased to 28.

**Table 13. Schools Participating in Safe Routes to Schools Programs by Region**

<b>Region</b>	<b># of schools</b>
Addison County Regional Commission	3
Bennington County Regional Commission	1
Chittenden County Metropolitan Planning Organization	7
Central VT Regional Planning Commission	4
Lamoille County Planning Commission	1
Northwest Regional Planning Commission	2
Northeast VT Development Association	2
Rutland Regional Planning Commission	2
Southern Windsor County Regional Planning Commission	1
Two Rivers Ottauquechee Regional Commission	2
Windham Regional Commission	3
total # schools participating	28

*Source:* [Vermont Safe Routes to School](#)

---

### State Planning Initiatives

There are a number of state planning initiatives related to petroleum consumption and transportation.

**Table 14. State Planning Initiatives Related To Transportation**

<b>Planning Initiative</b>	<b>Lead Agency</b>	<b>Expected Completion Date</b>	<b>Last Plan Completed</b>	<b>Contact</b>
Vermont Comprehensive Energy Plan	DPS	Fall 2007	July, 1998	Riley Allen
Vermont Long Range Transportation Plan	VTrans	May 2008	Jan., 2002	Scott Bascom
Climate Change Action Plan	ANR	Dec. 2007	n/a	Harold Garabedian
Climate Neutral Working Group	ANR	none	April, 2007	Jeff Merrell

*Source: Snelling Center*

### **Non-profit sector activities**

See the Vermont Clean Cities Coalition eNewsletter archive.

---

<sup>1</sup> Includes biodiesel blends and B100 volumes.

<sup>2</sup> Data is available on a monthly basis per distributor. Gasoline sales include any gasoline sale in Vermont, while diesel purchases for non-road applications exempt from the tax are not included. These reports are used to levy the fuel tax, (26 cents per gallon for diesel and 20 cents per gallon for gasoline (DMV Commercial Vehicle Department and DMV Auditor Doug Bessette.)

<sup>3</sup> This data is actual spending, not authorized amounts.

<sup>4</sup> The state fiscal year (SFY) runs from July 1 to June 30.

<sup>5</sup> DMV data was cross-checked with RL Polk data (see Table 8)