State of New Hampshire

Energy Management Annual Report for State-Owned Buildings Fiscal Year 2010

November 2010

Prepared by the State Energy Manager at the Department of Administrative Services with assistance from the Office of Energy and Planning and the Interagency Energy Efficiency Committee.

Governor's 10% Energy Reduction Challenge is Met

The State of New Hampshire has met the Governor's 2005 Executive Order challenge of reducing energy use in State buildings by 10%. This comes just as the State Legislature has passed legislation setting a goal of reducing the use of fossil fuels in state-owned buildings by 25% by the year 2025, when compared to the usage in fiscal year 2005 (FY05). When measured on a per square foot basis, called energy use intensity or EUI, state energy use has *declined* by 16% since FY05. When measured without considering square footage, the state's gross energy use for state-owned buildings has decreased by approximately 6%. Of the 16 agencies whose energy is being tracked, 14 show decreases in EUI and 10 show decreases regardless of building size (see Table 4 on page 5).

While state employees can be rightly proud of this accomplishment, it is important to note several other contributing factors. The closing of the aging Lakes Region correctional facility, the purchase of less heating fuel in the final quarter due to budget constraints, and a mild winter all helped to keep the state's overall consumption below previous years. Not to be discounted, however, were several state energy efficiency projects, and behavioral changes undertaken as a result of efforts by the Interagency Energy Efficiency Committee and green teams in agencies across state government.

In addition to reducing gross energy use, the state has continued to procure approximately one-fifth of its electricity from renewable energy sources. New Hampshire recently entered into a 24-month electricity contract with Hess for most of its large accounts, which guarantees at least 25% of the energy delivered will be generated from renewable sources. This contract comprises approximately 17% of the state's overall electricity usage in the buildings it owns.

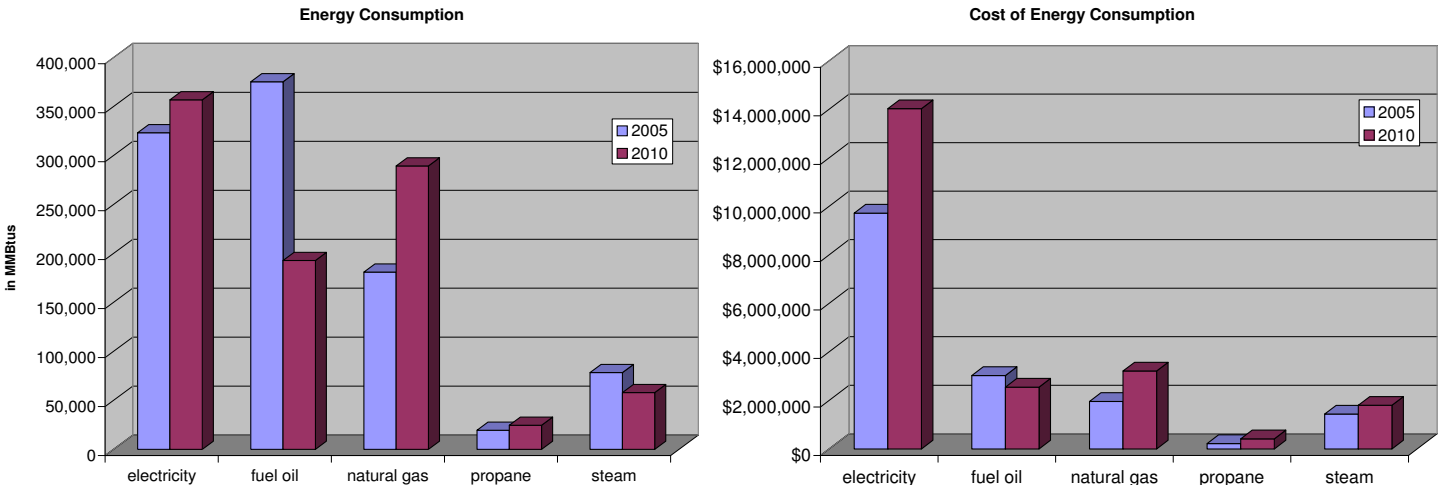
Highlights

- State-owned facilities exceeded Governor's Executive Order goal, reducing energy use on per square foot basis by more than 10%.
- Reporting for the first time, Fish and Game has made significant progress in entering energy and cost data for FY05 and FY10, showing a 7% decrease in energy use per square foot since the baseline year.
- Utilizing both Recovery Act and state capital funds, the state completed over $3 million in projects aimed at energy efficiency, conservation, and on-site generation of electricity in FY10.
- By reducing energy use per square foot in FY10 compared to FY05, the state saved $2.97 million. Additional savings were realized by going out to bid for the state's electricity and natural gas.
- Greenhouse gas emissions from state owned buildings have decreased by nearly 15% since FY05.

Table 1: Statewide Summary

	Total Sq Ft	kBtus used	Total Cost	EUI (kBtu per sq ft)	CUI (cost per sq ft)
FY2005	7,811,035	977,558,319	$16,370,418	120	$1.95
FY2010	8,675,030	921,828,350	$22,007,230	101	$2.37
% Change	11%	-6%	34%	-16%	21%

Figures 1 and 2: Energy Consumption and Cost in State-Owned Buildings, FY05 vs. FY10



Snapshot of Energy Use and Cost in State-Owned Buildings

As shown in Table 1 on page 1, total reported square footage under state ownership has increased by 11% in the past five years[1], while energy use has declined by 6%. This combination has led to a drop in energy use intensity of 16% overall. The state continues to increase its use of electricity, which comprises 64% of the state's total energy bill, but usage has dropped slightly when measured on a per square foot basis. The statewide electricity contract entered into in FY10 is expected to save the tate significant funds over the next two years, while also committing the state to including an increased amount of renewable energy. The cost of fuel oil was lower in FY10 than in recent years, but is expected to rise again as energy prices recover along with the economy. Meanwhile, natural gas prices are at historic lows. According to the data recorded in the statewide energy database, the total bill for energy for state owned buildings was $2.6 million lower in FY10 than in FY09.

Energy Improvements in State-Owned Buildings

Approximately $10 million in American Recovery and Reinvestment Act funds received by the NH Office of Energy and Planning are currently being invested in energy improvements to state buildings. One boiler replacement was completed at the Manchester Readiness Center in early 2010, while over $2 million in other HVAC and building envelope work was underway as of the end of the fiscal year, affecting a dozen state buildings. One notable project is a window restoration project at the Dolloff Building on the old State Hospital complex. Built in 1945, the Dolloff building's windows were in dire need of repair. Under a contract with New Hampshire-based Meridian Corporation, and subcontractor Window Master, based in Dublin, NH, the state has refurbished 200+ existing windows, replacing all the single pane glass with energy efficient, double pane, insulated glass. This work was designed in coordination with the State Historic Preservation Office in order to retain the historic character of the building's original construction.

Using state energy efficiency capital funds, a number of projects were completed in FY10, including the installation of energy efficient washing machines and ozone laundry systems at all state commercial-sized laundry facilities. The value of energy and water savings from the ozone laundry projects alone totals an estimated $250,000 annually.

Other captial funded projects include the installation of low-flow bathroom fixtures at 29 Hazen Drive and at the Concord Liquor Store and Warehouse, the placement of motion-activated power strips at workstations throughout the Walker Building, and the installation of timers on water coolers in many

[1] Data for some agencies is incomplete for FY05, so not all buildings and associated square footage has been captured. However, where there is no square footage for a building, there is also no energy use recorded, so EUI will be accurately reflected.

state buildings. Each water cooler timer installed saves the state approximately 400 kWh per year for an annual savings of about $50, and a return on investment of less than 4 months. With 126 timers installed to date, that's a savings of over $6,000 annually, showing that even the smallest measures can add up to big savings.

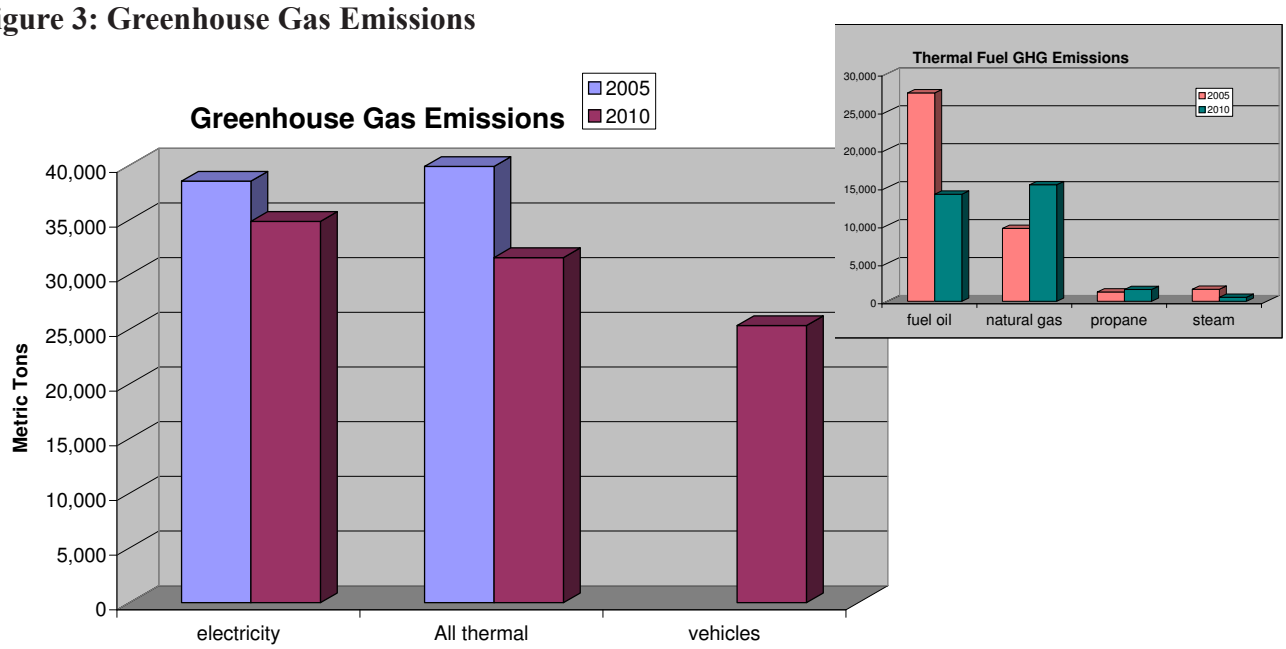
Greenhouse Gas Emissions

State policy calls for significant reductions in the use of fossil fuels in coming years. This policy is embodied in legislation such as the Renewable Portfolio Standard, the Regional Greenhouse Gas Initiative, and by New Hampshire's participation in regional discussions regarding a low carbon fuels standard, which aims to reduce the amount of pollution created by the burning of fuel for transportation. The Northeast Governors' Association, as well as ISO New England, many private companies, and the electric and gas utilities are all working together to transition the region to cleaner, smarter, and ultimately less costly fuels.

Among the many measurements of our progress toward this end is the quantity of greenhouse gas emissions generated from state operations. State-owned buildings account for roughly three-quarters of state government's greenhouse gas emissions, with the other quarter coming from fleets. Because of the significant renewable energy resources that are now included in the state's electricity contract, as well as state efforts to replace oil with natural gas as a heating fuel, and the increased utilization of wood to generate the steam used to heat many of the State's buildings, greenhouse gas emissions have been reduced by nearly 15% since FY05.

The overall emissions can be seen in Figure 3, which compares emissions from FY05 and FY10 for electrcity and thermal (heat) energy types[2]. Because fleet data for FY05 is inconsistent from agency to agency, greenhouse gas emissions from that sector have been estimated for FY10 only. A breakdown of emissions from thermal fuels can be seen in the inset graph. Emissions from natural gas have increased significantly because usage has increased as the state switches from fuel oil, which is far more polluting than natural gas.

Figure 3: Greenhouse Gas Emissions



[2] Conversion factors for various fuel-types are taken from the Energy Informaiton Administration at the Department of Energy as well as ISO New England's 2008 Emissions Report. Calculations have been checked for accuracy by the Department of Environmental Services and New England Carbon Solutions, based at UNH.

State Fleet Operations

The State's fleet size remained virtually unchanged in FY10 compared to FY09. Given improvements to fleet data management undertaken by the Fleet Policy Workgroup in FY08, and since enhanced by the Department of Administrative Services (DAS), FY09 has been established as the baseline year for measuring changes in fleet size, fuel consumption, and efficiency.

The hiring of a Fleet Policy Analyst at DAS in FY10 has led to greater control over agency fleet information, approval of new purchases, and compliance with various regulations relating to fleets. A change in state law in FY09 resulted in a recalculation of the minimum number of miles that passenger vehicles must meet in order for state ownership of that vehicle to be cost effective, when compared to reimbursing employees for use of their own vehicle at the federal reimbursement rate (currently 50 cents per mile). For FY10, the minimum break-even mileage was calculated at 9,219 miles. DAS will carefully review all passenger vehicles falling below this minimum threshhold and determine which vehicles should be reassigned or surplussed. Also passed by the legislature this year was a law requiring more stringent tracking of the use of state vehicles.

As seen in Figure 4, fuel efficiency decreased in passenger vehicles in FY10 compared to FY09 for the Departments of Transportation, Safety, and State Police, which together comprise 68% of the state's passenger vehicle fleet. Of the 27 remaining agencies that own passenger vehicles, all but 5 show improvements in fuel efficiency for that vehicle type.

The overall number of miles traveled increased by 1% year over year, while fuel use increased by 2%. More than half of the fuel used in state fleet operations is used by DOT, and nearly one-third of state fuel is used by that agency's heavy equipment weighing more than 10,000 pounds. State Police are the next largest consumer of state transportation fuel, accounting for nearly 17% of the total. See Table 3 on page 6 for details.

Figure 4: Fuel Efficiency in Agency Passenger Vehicle Fleets

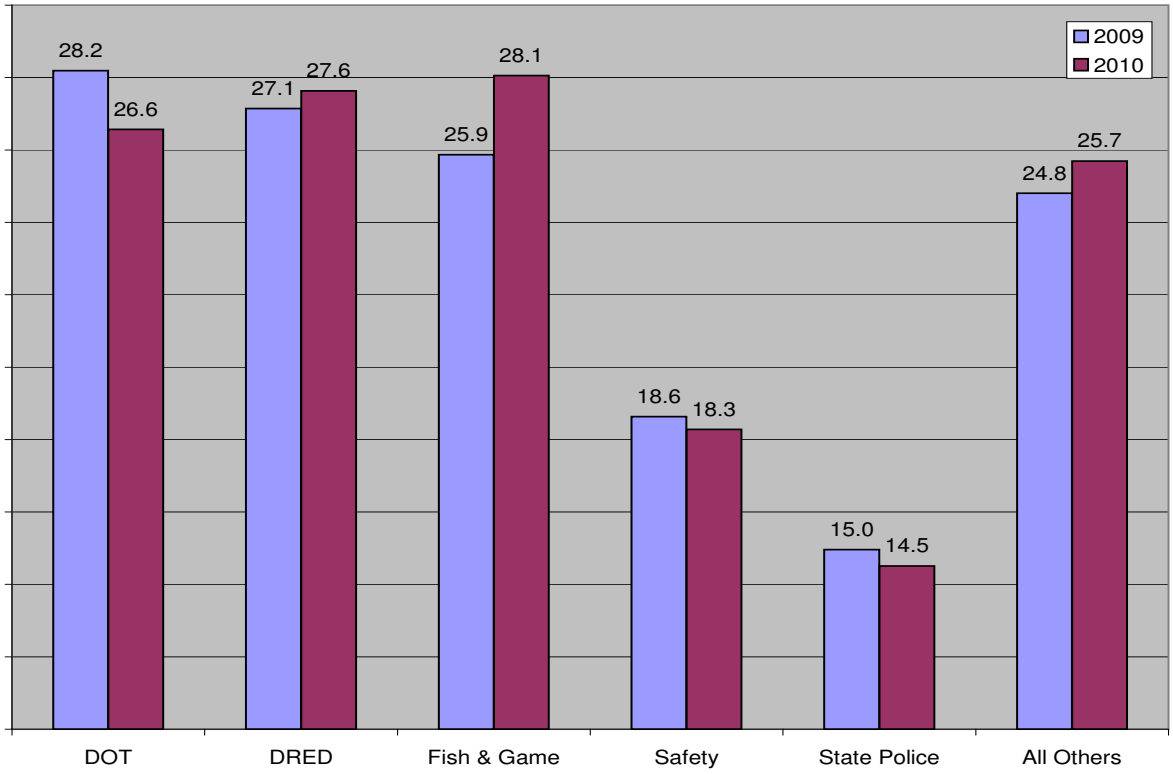


Table 2. Annual Energy Report for State-Owned Buildings

Energy Use, Intensity, and Costs Summary

Baseline Fiscal Year 2005 Versus Fiscal Year 2010 (July 1, 2009 - June 30, 2010)

	Area (Square Footage)		Total kBtu			EUI (Energy Per Square Foot)			Total Cost			CUI (Cost Per Square Foot)		
Agency / Department	FISCAL YEAR 2005	06/30/2010	FISCAL YEAR 2005	06/30/2010	% Change	FISCAL YEAR 2005	06/30/2010	% Change	FISCAL YEAR 2005	06/30/2010	% Change	FISCAL YEAR 2005	06/30/2010	% Change
Corrections	959,275	736,892	221,827,306	149,083,484	**-33%**	231	202	**-13%**	$2,542,059	$2,827,624	**11.23%**	$2.65	$3.84	**45%**
Health and Human Services	703,490	738,644	127,590,280	111,250,261	**-13%**	181	151	**-17%**	$1,578,660	$2,106,384	**33.43%**	$2.24	$2.85	**27%**
Juvenile Justice Services	*129,310*	*195,167*	*35,778,783*	*44,648,929*	***25%***	*277*	*229*	***-17%***	*$312,930*	*$773,536*	***147.19%***	*$2.42*	*$3.96*	***64%***
NH Hospital	*312,971*	*262,747*	*64,502,714*	*41,571,227*	***-36%***	*206*	*158*	***-23%***	*$1,052,875*	*$923,978*	***-12.24%***	*$3.36*	*$2.54*	***-24%***
Behavioral Health	*4,305*	*4,305*	*476,306*	*504,448*	***6%***	*111*	*117*	***6%***	*$9,876*	*$13,017*	***31.81%***	*$2.29*	*$3.02*	***32%***
Glencliff Home	*256,904*	*256,904*	*26,832,476*	*23,901,399*	***-11%***	*104*	*93*	***-11%***	*$202,979*	*$384,051*	***89.21%***	*$0.79*	*$1.49*	***89%***
HHS	*0*	*19,521*	*0*	*624,258*		*0*	*32*		*$0*	*$11,802*		*$0.00*	*$14.62*	
NH Veterans Home	172,600	183,600	21,070,445	21,236,419	**1%**	122	116	**-5%**	$400,689	$500,410	**24.89%**	$2.32	$2.73	**18%**
Department of Transportation	673,045	722,732	85,142,753	78,701,143	**-8%**	127	109	**-14%**	$1,423,070	$1,540,187	**8.23%**	$2.15	$2.13	**-1%**
Employment Security	150,448	150,448	16,647,383	14,663,765	**-12%**	111	97	**-12%**	$368,240	$431,990	**17.31%**	$2.45	$2.87	**17%**
Community College System of NH	997,025	1,094,094	75,685,143	104,635,101	**38%**	76	96	**26%**	$1,203,168	$2,368,375	**96.84%**	$1.21	$2.16	**79%**
Administrative Services	2,410,863	3,057,352	271,839,502	287,728,504	**6%**	113	94	**-17%**	$5,673,117	$7,896,615	**39.19%**	$2.35	$2.58	**10%**
McAuliffe Shepard Discovery Center	10,890	44,890	1,392,947	4,026,524	**189%**	128	90	**-30%**	$28,125	$105,494	**275.10%**	$2.58	$2.35	**-9%**
Liquor Commission	181,559	184,773	14,217,778	15,511,387	**9%**	78	84	**7%**	$293,732	$397,120	**35.20%**	$1.62	$2.15	**33%**
Police Standards & Training	57,100	57,100	4,548,100	4,179,503	**-8%**	80	73	**-8%**	$55,642	$50,311	**-9.58%**	$0.97	$1.66	**71%**
Fish & Game Department	157,661	191,434	10,700,430	12,141,410	**13%**	68	63	**-7%**	$209,245	$356,739	**70.49%**	$1.36	$0.17	**-88%**
Department of Safety	245,611	249,171	18,864,621	16,070,784	**-15%**	77	64	**-16%**	$383,025	$414,233	**8.15%**	$1.56	$1.66	**6%**
Environmental Services (buildings)	15,419	15,001	1,277,019	917,419	**-28%**	83	61	**-26%**	$31,702	$32,642	**2.97%**	$2.06	$1.77	**-14%**
Wastewater Treatment Plants and Pump Stations			13,566,494	15,560,652	**15%**				$433,321	$515,825	**19.04%**			
Adjutant General	772,580	900,183	47,508,099	45,531,188	**-4%**	61	51	**-18%**	$671,035	$1,080,930	**61.08%**	$0.87	$1.20	**38%**
Department of Resources and Economic Development	271,752	316,999	22,780,562	13,253,876	**-42%**	84	42	**-50%**	$364,130	$422,504	**16.03%**	$1.25	$1.05	**-16%**
Cannon Mountain operations			22,839,134	27,277,174	**19%**				$710,457	$957,073	**34.71%**			
Department of Agriculture	31,717	31,717	60,323	59,757	**-1%**	2	2	**-1%**	$999	$2,774	**177.60%**	$0.03	$0.09	**200%**
Total:	**7,811,035**	**8,675,030**	**977,558,319**	**921,828,350**	**-5.7%**	**120**	**101**	**-15.9%**	**$16,370,418**	**$22,007,230**	**34.43%**	**$1.95**	**$2.37**	**21%**

Several additions are included for the first time in this year's annual energy report:

Fish and Game Department has been helped this year by an intern from the Lakes Region Community College who has researched energy data going back to FY05 and entered it into the state's Enterprise Energy Database. While significant progress has been made, some data for FY05 is still being researched, resulting in both the square footage and the energy use in FY05 being undercounted. For those buildings whose energy use is measured, Fish and Game's energy usage is down by 7% per square foot.

Cannon Mountain is owned by the Department of Resources and Economic Development, and is a major consumer of energy, using more than the rest of the agency's facilities combined. Cannon's energy use remained virtually unchanged in FY10 compared to the baseline year, but is apt to change from year to year because of its dependency on the weather, including the electricity used for snow making. In December 2009, Cannon Mountain entered into an independent electric supply contract, which was estimated to save $190,000 over the fiscal year when compared to the cost of default electricity service.

Wastewater Treatment Plant and Pump Stations owned and operated by the Department of Environmental Services are also included for the first time in this energy report. Electricity usage at these facilities is directly related to the amount of wastewater processed, and is difficult to control with energy efficiency measures.

Table 3: Annual State Fleet Energy and Cost Summary

Fiscal Year 2009 Versus Fiscal Year 2010 (July 1, 2009 - June 30, 2010)

Passenger Automobiles

	Number of Vehicles		Annual Miles Traveled		Fuel Used		Annual Fuel Costs		MPG		Cost/Mile		CO2 (metric tons)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
DOT	120	126	1,888,904	2,087,315	67,002	78,563	$159,466	$163,120	28.19	26.57	$0.084	$0.078	589	691
DRED	22	22	251,014	223,728	9,248	8,096	$22,619	$17,000	27.14	27.63	$0.090	$0.076	81	71
Fish & Game	8	8	98,561	62,755	3,810	2,237	$8,573	$4,722	25.87	28.06	$0.087	$0.075	34	20
Safety	167	156	2,118,318	2,038,984	113,678	111,552	$250,112	$224,156	18.63	18.28	$0.118	$0.110	1,000	981
State Police	394	453	6,292,514	6,116,741	420,536	421,690	$953,977	$859,669	14.96	14.51	$0.152	$0.141	3,700	3,710
Other	321	317	4,203,415	3,806,606	169,464	148,172	$392,185	$304,193	24.80	25.69	$0.093	$0.080	1,491	1,304
State Total	1,032	1,082	14,852,726	14,336,129	783,738	770,310	$1,786,932	$1,572,860	18.95	18.61	$0.120	$0.110	6,895	6,777

Light Duty Trucks 1 (pickup trucks, vans, minivans, and SUVs up to 8,500 lbs)

	Number of Vehicles		Annual Miles Traveled		Fuel Used		Annual Fuel Costs		MPG		Cost/Mile		CO2 (metric tons)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
DOT	122	101	1,849,714	1,736,381	113,737	111,629	$273,495	$230,976	16.26	15.55	$0.148	$0.133	1,001	982
DRED	80	82	827,977	753,571	52,776	47,707	$131,743	$102,090	15.69	15.80	$0.159	$0.135	464	420
Fish & Game	83	92	1,371,476	1,428,479	92,761	86,562	$208,708	$182,767	14.79	16.50	$0.152	$0.128	816	762
Safety	76	70	1,062,266	983,591	69,170	62,682	$153,958	$126,636	15.36	15.69	$0.145	$0.129	609	551
State Police	44	32	510,567	290,380	31,730	19,010	$66,765	$36,279	16.09	15.27	$0.131	$0.125	279	167
Other	177	193	2,259,297	2,263,769	141,741	138,980	$330,895	$299,589	15.94	16.29	$0.146	$0.132	1,247	1,223
State Total	582	570	7,881,297	7,456,171	501,915	466,570	$1,165,564	$978,337	15.70	15.98	$0.148	$0.131	4,416	4,105

Vehicle Totals (passenger vehicles, light duty trucks, plus all medium and heavy duty trucks)

	Number of Vehicles		Annual Miles Traveled		Fuel Used		Annual Fuel Costs		MPG		Cost/Mile*		CO2 (metric tons)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
DOT	867	901	9,240,841	9,716,731	1,383,298	1,438,683	$3,600,290	$3,464,380	6.68	6.75	$0.390	$0.357	13,698	14,243
DRED	176	176	1,519,389	1,477,949	105,579	101,142	$265,664	$221,715	14.39	14.61	$0.175	$0.150	984	947
Fish & Game	127	136	1,664,022	1,695,807	114,512	107,593	$258,020	$227,149	14.53	15.76	$0.155	$0.134	1,030	970
Safety	270	263	3,350,285	3,323,942	198,038	199,362	$440,360	$403,720	16.92	16.67	$0.131	$0.121	1,762	1,786
State Police	443	492	6,813,428	6,424,836	453,484	442,375	$1,023,526	$899,570	15.02	14.52	$0.150	$0.140	3,994	3,894
Other	624	644	7,390,112	7,064,476	400,691	382,797	$938,110	$809,978	18.44	18.45	$0.127	$0.115	3,639	3,489
State Total	2,507	2,612	29,978,077	29,703,740	2,655,602	2,671,952	$6,525,970	$6,026,512	11.29	11.12	$0.218	$0.203	25,106	25,331

0.16556264

Fleet data was compiled by the Fleet Policy Analyst at the Department of Administrative Services from reports provided by each agency or department owning one or more vehicles.
"Number of Vehicles" includes surplus vehicles (approximately 210), which when subtracted from the total, bring the number of vehicles active in FY10 to a number comparable to the FY09 fleet total.

Snowmobiles, ATVs, motorcycles, boats, and immobile equipment are not included in the Report for State Fleet because reporting of fuel usage for these categories is not mandated by the state and is not consistently tracked by agencies. Given major changes to the way vehicles are categorized according to weight and use over the past two years, it is expected that FY09 will remain the baseline year for purposes of tracking fuel efficiency and greenhouse gas emissions.