



State of New Hampshire Energy Management Annual Report for Fiscal Year 2011



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 Sets New Energy Saving Challenge for 2025

Having met the Governor's 2005 Executive Order calling for a 10% reduction in energy use in State buildings, state agencies were given a new mandate at the April 2011 Annual Energy Conference: to reduce fossil fuel use per square foot of state building space by 25% by 2025, compared to FY05. Announced by Governor Lynch at the Conference, Executive Order 2011-1 reinforces the state legislature's July 2010 amendment of RSA 21-I:14. This law requires agencies to develop energy conservation plans that identify cost effective energy efficiency and onsite energy generation measures that will lead to the 25% reduction goal. Cost effectiveness is defined as "a return on investment based on energy savings and reduced operational costs within the expected lifetime of the measure."

In FY10, the state's energy use intensity (energy used per square foot of building space) showed a drop of 16% compared to FY05. In addition to conservation and efficiency measures, such a drop can result from a mild winter, or due to agencies choosing not to top off deliverable fuel stores before the end of a fiscal year. While data on at least one agency are incomplete, calculations show the state's overall energy usage intensity increased slightly from FY10 to FY11, with the state achieving a 13% reduction compared with the baseline year of FY05. When square footage is not considered, the state's gross energy use for state-owned buildings has decreased by approximately 4% compared to FY05. Of the 15 agencies whose energy data are being accurately tracked, 12 show decreases in EUI, and 9 show decreases regardless of building size (for details, please refer to Table 3 on page 5).

Energy costs were somewhat lower in FY11 than in FY10, with the state continuing to procure a majority of its electricity and natural gas from competitive suppliers. As the state continues to switch from heating its buildings with oil to other sources of energy (e.g., natural gas and woody biofuels), its operational efficiency increases, while energy costs and polluting emissions are reduced. In addition to conservation and efficiency, the state continues its commitment to procuring and generating renewable energy where cost effective. The state's current electricity contract ensures that 25% of what is supplied to the state derives from domestically produced renewable sources.

Highlights

- Governor Lynch congratulated state agencies on meeting the 2005 energy efficiency goal, and issued a new Executive Order to reduce fossil fuel use in state buildings by 25% by 2025 compared to 2005.
- With a groundbreaking in May, the Glencliff Home will be the site of largest single energy project funded with Recovery Act funding for state buildings. Fuel switching from oil to wood chips and upgrading the existing hydro-electric plant will make this 250,000 square foot campus almost entirely fossil-free.
- New Hampshire now has a high performance building standard for new state buildings and major renovations, which goes beyond code to deliver long-term energy savings through efficient design and equipment.
- A major upgrade to the State's computer servers is designed to improve the reliability and security of state data, and save money and energy through decreased need for electricity to run equipment and air conditioning.

Table 1: Summary of State Energy Consumption, Cost, and Intensity

	Total Sq Ft	kBtus used	Total Cost	EUI (kBtu per sq ft)	CUI (cost per sq ft)
FY2005	7,846,383	966,788,008	\$16,098,875	119	\$1.91
FY2011	8,581,336	926,208,739	\$21,830,742	103	\$2.38
% Change	9%	-4%	36%	-13%	25%

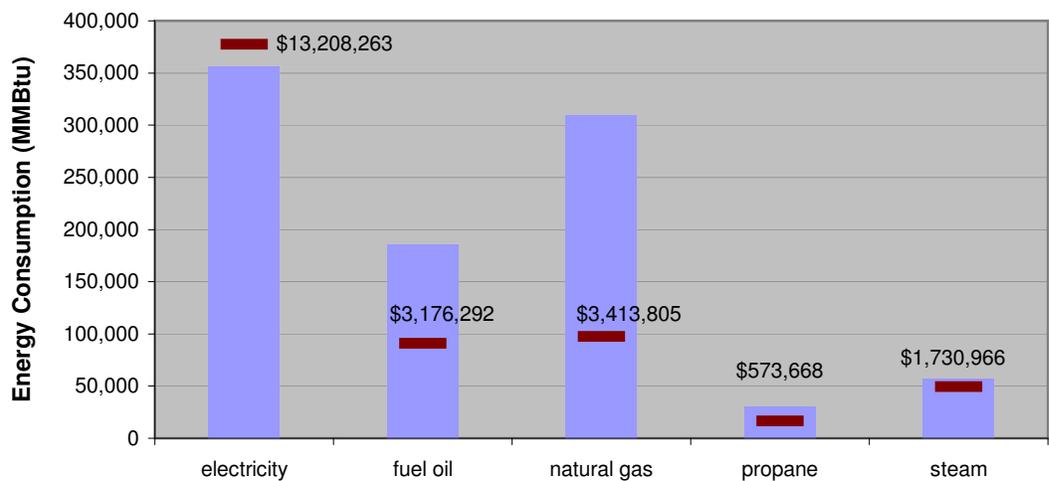
Snapshot of Energy Use and Cost in State-Owned Buildings

As shown in Table 1, total reported square footage under state ownership has increased by 9% since FY05, while energy use has declined by 4%. This combination has led to a drop in energy use intensity of 13% overall. Data for Fish and Game in FY11 are incomplete and have, therefore, been left out of statewide comparisons with the baseline year. In spite of the success in reducing energy use, the cost of heating and providing electricity to state buildings has increased by 25% over the past six years. Nationally, the energy price index rose 19% during just the last year, and is projected to continue to increase, making energy conservation a priority for both economic and environmental reasons.

Electricity and fuel are needed to heat and cool state buildings and to ensure our roads and highways remain safe for travel. The more severe the weather, the greater the demand for energy. Common measures of weather severity are counts of heating and cooling degree days, which indicate the number of days above or below a certain reference temperature, and the magnitude of the difference. In FY11, there were 8% more heating degree days than in FY10. This past fiscal year was on par with FY05. With record high temperatures in the summer of FY11, the number of cooling degree days (indicating the need for air conditioning) was 34% higher than in FY10, yet electricity usage remained steady. This indicates that thermal efficiency measures the state has undertaken are working effectively to keep state buildings the ‘right’ temperature in both the summer and winter months.

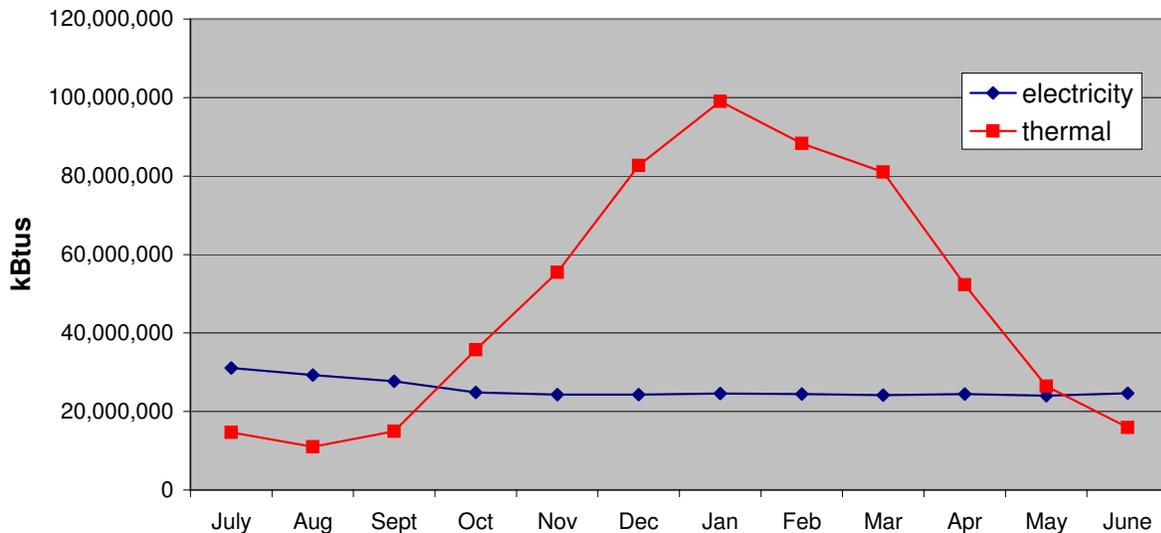
Figure 1 shows the relationship between total energy consumed by energy type (blue bars, corresponding to the left axis), and the total cost of that energy in FY11 (horizontal red lines). Electricity use in state buildings accounts for 38% of overall energy consumption, but 60% of energy cost, whereas natural gas accounts for 33% of energy consumption, but only 15% of the cost. Taking advantage of the fact that state government is the single largest consumer of energy in New Hampshire, the Department of Administrative Services has been able to effectively manage the state’s electricity and natural gas costs by procuring much of the state’s supply through competitive bid.

Figure 1: Energy Consumption and Cost in State-Owned Buildings by Fuel Type, FY11



As shown in Figure 2, the state’s electricity usage remained fairly steady throughout FY11, with the exception of the summer months, which are on average about 20% higher than the rest of the year. Thermal energy use (oil, gas, propane, and steam), is typically limited in the summer (agencies sometimes order fuel at the beginning or end of the fiscal year for budgetary reasons) and peaks in January. Strategies for managing electricity use typically differ from those used for keeping heating use under control, and depend on many factors. The Department of Administrative Services and the Office of Energy and Planning will be working with agencies in coming months to continue to identify cost-effective opportunities for energy conservation, efficiency, and on-site renewable energy generation.

Figure 2: Electricity and Heating Use in FY11 by Month



Energy Improvements in State-Owned Buildings

More than \$10 million in American Recovery and Reinvestment Act (ARRA) funds are being invested in state buildings to reduce energy use and cost. Received by the NH Office of Energy and Planning from the federal Department of Energy, these funds are being invested by the Bureau of Public Works in cost effective improvements to building envelopes (windows and insulation), HVAC systems (outdoor wood boilers, replacement of aging oil and gas boilers, etc.), renewable energy projects (solar hot water, upgrade of existing hydroelectric capacity), and other initiatives such as virtual servers installed by DoIT on behalf of multiple state agencies. Estimates are that during the first phase of the virtual server project, more than 100 existing servers can be retired and replaced by just six ‘virtual’ servers, saving energy both through the use of fewer units, and also through reduced air conditioning needed to keep the units cool. This project has been so successful that an additional phase of the server virtualization project has been initiated, helping to bring New Hampshire in line with current standards for data center modernization.

A number of energy-saving capital projects overseen by the State Energy Manager were also undertaken during the two year biennium that ended June 30, 2011. These include a cooling optimization project at the Department of Information Technology performed in conjunction with the server upgrades described above. For just over \$30,000, the State retained a contractor to model the space for optimal air flow and cooling needs. Air conditioning flow into and out of the server rooms was manipulated by moving air vents and grates in order to more efficiently and effectively cool the units. As a result of these changes, ambient room temperature was raised by approximately 10 degrees Fahrenheit with no detrimental impact to the computer equipment. It is estimated that these changes will save the state more than \$100,000 per year in cooling costs alone.

State Fleet Operations

A total of thirty-three state agencies or administrative units own one or more state vehicles. Of these, just five agencies (Departments of Transportation, Resources and Economic Development, Safety, Fish and Game, and the State Police) own 75% of the vehicles, and use 85% of the fuel.

The State's overall fleet size remained virtually unchanged in FY11 compared to FY09 (the first year for which consistent, reliable data are available). Table 2 data for FY11 includes surplussed vehicles, whereas FY09 data included active vehicles only. All agencies are striving for greater fuel efficiency, and most are achieving it. While Table 4 (page 6) shows a decline in the average number of miles per gallon achieved by the state's fleet, this number does not tell the whole story. Given the long snowy winter of FY11, DOT's heavy vehicle fleet increased the number of miles traveled by 14% compared to FY09. The relatively poor fuel economy of these vehicles brought down the average number of miles travelled per gallon of fuel for the whole state. Removing DOT's heavy vehicles (over 10,000 pounds) from the equation shows fuel economy virtually unchanged for the remainder of the fleet, at 16.2 miles per gallon.

The State's Clean Fleets Policy requires that new passenger vehicles being purchased must meet or exceed 32 mpg as rated by the manufacturer (law enforcement vehicles are excluded), and light duty trucks must meet or exceed a standard of 24 mpg. These state-mandated minimum fuel economy guidelines are revised as federal standards are updated. These changes are expected to result in significant savings over time as older vehicles are retired and new vehicles are added to the fleet. Additional requirements for energy efficient fleet management are included in the Executive Order 2011-1, which is overseen by the Interagency Energy Efficiency Committee (IEEC). The Fleet Managers Workgroup was expanded in FY11 to include more fleet managers, which has improved the ability of the state to identify and improve vehicle management practices, improve inter-agency communication, and increase fleet efficiency.

With Recovery Act funds, the state-owned compressed natural gas (CNG) station in Concord was overhauled and modernized this year. In addition, the Department of Environmental Services is using these funds to cover the incremental cost of CNG vehicles for state agencies, the University of New Hampshire, and the City of Concord, which have access to CNG stations in Concord and Durham. Within the next two years, DES will be working with DOT and the Office of Energy and Planning to transfer operation of the station to a private entity. An additional CNG station in Nashua will help to make the cleaner burning, less expensive natural gas a viable alternative to diesel and gasoline in the southern part of the state.

Table 2: Summary of Fleet Size and Performance

	Number of Vehicles		Annual Miles		Annual Fuel (gal)		Annual MPG	
	FY09	FY11	FY09	FY11	FY09	FY11	FY09	FY11
Passenger Automobiles	965	1,042	14,304,221	13,974,650	747,191	729,477	19.14	19.16
Light Duty up to 8,500 lbs	579	608	7,870,055	7,412,718	500,847	466,481	15.71	15.89
Light Duty 8,501-10,000 lbs	345	417	5,551,098	6,948,721	431,387	531,913	12.87	13.06
Trucks >10,000 lbs	548	631	1,695,835	1,987,263	938,794	1,041,622	1.81	1.91
State Total	2,437	2,698	29,421,209	30,323,352	2,618,219	2,769,493	11.24	10.95

Table 3: Annual Energy and Cost Detail for Baseline Year vs. Fiscal Year 2011

Department	Area (Square Footage)		Total Energy Use (kbtu)			Energy Use Per Square Foot (Energy Use Intensity or EUJ)			Total Cost (Dollars)			Cost Per Square Foot (Cost Use Intensity or CUJ)		
	FISCAL YEAR 2005	FISCAL YEAR 2011	FISCAL YEAR 2005	FISCAL YEAR 2011	% Change	FISCAL YEAR 2005	FISCAL YEAR 2011	% Change	FISCAL YEAR 2005	FISCAL YEAR 2011	% Change	FISCAL YEAR 2005	FISCAL YEAR 2011	% Change
Corrections	959,275	740,422	221,827,306	147,875,313	-33%	231	200	-14%	\$2,542,059.42	\$2,811,501.10	11%	\$2.65	\$3.80	43%
Health and Human Services	696,990	718,442	127,590,279	109,420,235	-14%	183	152	-17%	\$1,578,659.75	\$2,060,905.12	31%	\$2.26	\$2.87	27%
Juvenile Justice Services	121,310	178,728	35,778,783	43,600,321	22%	295	244	-17%	\$312,929.84	\$737,305.12	136%	\$2.58	\$4.13	60%
NH Hospital	314,471	258,984	64,502,714	39,060,005	-39%	205	151	-26%	\$1,052,875.25	\$789,566.97	-25%	\$3.35	\$3.05	-9%
Glendiff Home	256,904	256,904	26,832,476	25,770,103	-4%	104	100	-4%	\$202,979.07	\$508,200.96	150%	\$0.79	\$1.98	150%
Behavioral Health	4,305	4,305	476,306	385,267	-19%	111	89	-19%	\$9,875.59	\$11,075.81	12%	\$2.29	\$2.57	12%
HHS	0	19,521	0	604,539	N/A	0	31	N/A	\$0.00	\$14,756.26	N/A	\$0.00	\$0.76	N/A
NH Veterans Home	172,600	183,600	21,070,445	21,899,605	4%	122	119	-2%	\$400,688.77	\$579,152.87	45%	\$2.32	\$3.15	36%
Community College System of NH	997,025	1,114,339	75,685,143	119,741,764	58%	76	107	42%	\$1,195,594.06	\$2,578,450.08	116%	\$1.20	\$2.31	93%
Employment Security	150,448	150,448	16,647,383	15,278,482	-8%	111	102	-8%	\$368,240.08	\$419,358.34	14%	\$2.45	\$2.79	14%
DOT	668,847	714,943	85,072,873	72,880,876	-14%	127	102	-20%	\$1,369,831.94	\$1,785,345.34	30%	\$2.05	\$2.50	22%
McAuliffe Shepard Discovery Ctr.	10,890	44,890	1,392,947	4,312,132	210%	128	96	-25%	\$28,124.53	\$100,210.15	256%	\$2.58	\$2.23	-14%
Liquor Commission	181,559	184,773	14,217,778	17,288,601	22%	78	94	19%	\$293,732.01	\$538,370.81	83%	\$1.62	\$2.91	80%
Administrative Services	2,614,971	3,158,091	271,839,502	289,998,528	7%	104	92	-12%	\$5,673,117.21	\$7,468,963.04	32%	\$2.17	\$2.37	9%
Police Standards & Training	57,100	57,100	4,548,100	4,710,055	4%	80	82	4%	\$54,477.71	\$55,429.20	2%	\$0.96	\$0.97	2%
Environmental Services	15,419	15,443	1,277,019	1,088,778	-15%	83	71	-15%	\$31,702.17	\$39,714.61	25%	\$2.06	\$2.57	25%
Wastewater Treatment Operations			13,566,494	14,521,540	7%				\$433,321.00	\$468,070.46	8%			
Dept of Safety	245,611	248,853	18,864,621	17,564,478	-7%	77	71	-8%	\$383,025.34	\$466,010.63	22%	\$1.56	\$1.87	20%
Adjutant General	772,580	900,183	47,508,099	45,330,405	-5%	61	50	-18%	\$670,946.00	\$1,043,644.00	56%	\$0.87	\$1.16	33%
DRED	271,351	318,092	22,780,562	14,660,084	-36%	84	46	-45%	\$363,799.07	\$445,186.55	22%	\$1.34	\$1.40	4%
Cannon Mountain			22,839,134	29,578,433	30%				\$710,457.00	\$967,589.73	36%			
Dept of Agriculture	31,717	31,717	60,323	59,430	-1%	2	2	-1%	\$999.13	\$2,840.16	184%	\$0.03	\$0.09	184%
Total:	7,846,383	8,581,336	966,788,008	926,208,735	-4.20%	119	103	-13.31%	\$16,098,875.19	\$21,830,742.15	36%	\$1.91	\$2.38	25%
Fish & Game Commission¹	183,552	186,438	11,553,924	3,000,176	-74%	63	16	-74%	\$234,255.27	\$98,615.04	-58%	\$1.28	\$0.53	-59%

¹Fish and Game Commission data are incomplete for FY11 and are therefore not included in statewide calculations.

Table 4: Fleet Detail for Fiscal Years 2009 and 2011

Passenger Automobiles

Agency Name	Number of Vehicles		Annual Miles		Annual Fuel (gal)		Annual MPG		Annual Fuel Cost		Cost/Mile	
	2009*	2011	2009	2011	2009	2011	2009	2011	2009	2011	2009	2011
DOT	120	148	1,888,904	2,158,544	67,002	76,833	28.19	28.09	\$159,466	\$220,936	\$0.084	\$0.102
DRED	22	20	251,014	257,268	9,248	9,702	27.14	26.52	\$22,619	\$27,835	\$0.090	\$0.108
Fish & Game	8	6	98,561	61,842	3,810	2,099	25.87	29.46	\$8,573	\$6,048	\$0.087	\$0.098
Safety	155	153	2,021,746	2,031,499	108,393	108,195	18.65	18.78	\$237,595	\$299,280	\$0.118	\$0.147
State Police	339	404	5,840,581	5,953,921	389,274	396,550	15.00	15.01	\$867,588	\$1,119,016	\$0.149	\$0.188
Other	321	311	4,203,415	3,511,576	169,464	136,098	24.80	25.80	\$392,185	\$379,335	\$0.093	\$0.108
State Total	965	1,042	14,304,221	13,974,650	747,191	729,477	19.14	19.16	\$1,688,025	\$2,052,449	\$0.118	\$0.147

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

Agency Name	Number of Vehicles		Annual Miles		Annual Fuel (gal)		Annual MPG		Annual Fuel Cost		Cost/Mile	
	2009*	2011	2009	2011	2009	2011	2009	2011	2009	2011	2009	2011
DOT	122	132	1,849,714	1,777,200	113,737	103,706	16.26	17.14	\$273,495	\$298,197	\$0.148	\$0.168
DRED	80	82	827,977	699,727	52,776	45,888	15.69	15.25	\$131,743	\$131,457	\$0.159	\$0.188
Fish & Game	83	103	1,371,476	1,356,940	92,761	92,923	14.79	14.60	\$208,708	\$263,824	\$0.152	\$0.194
Safety	74	72	1,053,903	1,009,889	68,334	64,686	15.42	15.61	\$151,592	\$180,879	\$0.144	\$0.179
State Police	43	34	507,688	421,016	31,498	26,266	16.12	16.03	\$66,015	\$69,958	\$0.130	\$0.166
Other	177	185	2,259,297	2,147,946	141,741	133,012	15.94	16.15	\$330,895	\$380,120	\$0.146	\$0.177
State Total	579	608	7,870,055	7,412,718	500,847	466,481	15.71	15.89	\$1,162,448	\$1,324,435	\$0.148	\$0.179

Light Duty Trucks 2 (pickup trucks, vans, minivans and SUVs from 8,501 lbs to 10,000 lbs)

Agency Name	Number of Vehicles		Annual Miles		Annual Fuel (gal)		Annual MPG		Annual Fuel Cost		Cost/Mile	
	2009*	2011	2009	2011	2009	2011	2009	2011	2009	2011	2009	2011
DOT	193	251	4,328,381	5,374,390	331,143	409,364	13.07	13.13	\$753,414	\$1,178,022	\$0.174	\$0.219
DRED	50	47	325,354	341,747	29,813	30,164	10.91	11.33	\$71,327	\$85,945	\$0.219	\$0.251
Fish & Game	15	16	91,534	119,066	6,533	10,338	14.01	11.52	\$14,697	\$29,787	\$0.161	\$0.250
Safety	14	17	143,460	250,934	11,522	19,338	12.45	12.98	\$25,454	\$52,299	\$0.177	\$0.208
State Police	2	6	2,380	62,316	196	4,584	12.14	13.59	\$417	\$12,144	\$0.175	\$0.195
Other	71	80	659,989	800,268	52,180	58,125	12.65	13.77	\$123,391	\$162,281	\$0.187	\$0.203
State Total	345	417	5,551,098	6,948,721	431,387	531,913	12.87	13.06	\$988,699	\$1,520,477	\$0.178	\$0.219

Trucks Greater than 10,000 lbs [fuel assumed to be diesel]

Agency Name	Number of Vehicles		Annual Miles		Annual Fuel (gal)		Annual MPG		Annual Fuel Cost		Cost/Mile	
	2009*	2011	2009	2011	2009	2011	2009	2011	2009	2011	2009	2011
DOT	432	507	1,173,842	1,337,639	871,416	974,297	1.35	1.37	\$2,413,915	\$2,931,857	\$2.056	\$2.192
DRED	24	25	115,044	100,382	13,742	11,648	8.37	8.62	\$39,975	\$33,912	\$0.347	\$0.338
Fish & Game	21	21	102,451	99,364	11,408	11,844	8.98	8.39	\$26,043	\$34,116	\$0.254	\$0.343
Safety	13	17	26,241	51,470	3,668	6,453	7.15	7.98	\$10,836	\$19,230	\$0.413	\$0.374
State Police	3	4	10,846	12,442	1,254	1,793	8.65	6.94	\$3,117	\$5,593	\$0.287	\$0.449
Other	55	57	267,411	385,966	37,306	35,587	7.17	10.85	\$91,639	\$103,754	\$0.343	\$0.269
State Total	548	631	1,695,835	1,987,263	938,794	1,041,622	1.81	1.91	\$2,585,524	\$3,128,462	\$1.525	\$1.574

State Totals

Agency Name	Number of Vehicles		Annual Miles		Annual Fuel (gal)		Annual MPG		Annual Fuel Cost		Cost/Mile	
	2009*	2011	2009	2011	2009	2011	2009	2011	2009	2011	2009	2011
DOT	867	1,038	9,240,841	10,647,773	1,383,298	1,564,200	6.68	6.81	\$3,600,290	\$4,629,012	\$0.390	\$0.435
DRED	176	174	1,519,389	1,399,124	105,579	97,402	14.39	14.36	\$265,664	\$279,150	\$0.175	\$0.200
Fish & Game	127	146	1,664,022	1,637,212	114,512	117,204	14.53	13.97	\$258,020	\$333,775	\$0.155	\$0.204
Safety	256	259	3,245,350	3,343,792	191,917	198,672	16.91	16.83	\$425,477	\$551,688	\$0.131	\$0.165
State Police	387	448	6,361,495	6,449,695	422,222	429,193	15.07	15.03	\$937,137	\$1,206,710	\$0.147	\$0.187
Other	624	633	7,390,112	6,845,756	400,691	362,822	18.44	18.87	\$938,110	\$1,025,489	\$0.127	\$0.150
State Total	2,437	2,698	29,421,209	30,323,352	2,618,219	2,769,493	11.24	10.95	\$6,424,698	\$8,025,824	\$0.218	\$0.265

*Number of Vehicles for 2011 includes vehicles that were surplus (approximately 235 in total). When these vehicles are subtracted from the total, the number of vehicles active in FY2011 is comparable to the FY2009 fleet total.

Overall fleet MPG has decreased from FY2009 to FY2011 due to a greater proportion of miles being driven by large vehicles, whose gas mileage is lower than that of light duty vehicles. When considered within each vehicle category, fuel economy has improved since FY2009.

Fleet data was compiled by the Fleet Management Analyst at the Department of Administrative Services from reports provided by each agency or department owning one or more vehicles (excluding Component Units).