



State of New Hampshire Energy Management Annual Report for Fiscal Year 2012



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

Fiscal year 2012 proved to be another great year for reductions in energy use in state buildings. A mild winter, combined with efficiency efforts, fuel switching, competitive energy supply contracts and several opportunities for state agencies to receive training; have put New Hampshire on the right track toward meeting its current goal of reducing fossil fuel usage in state buildings by 25% by 2025. Energy reductions are not just limited to state buildings; the state vehicle fleet has also seen improvements regarding its energy consumption.

Energy Use and Cost in State-Owned Buildings

As shown in Table 1, total reported square footage under state ownership has increased by 12 percent since FY05, while absolute energy use has declined by 16 percent and absolute fossil fuel energy consumption has dropped by 18 percent. This combination has led to a 26 percent drop

in overall energy use intensity and a drop of 29 percent in terms of fossil fuel energy use intensity. In spite of the success in reducing energy use, the cost of heating and providing electricity to state buildings has increased by 36 percent over the past seven years. Nationally, the energy price index rose 19 percent during FY12, and is projected to continue to increase, making energy conservation, efficiency, and renewable energy a priority for both economic and environmental reasons.

Highlights

- State agencies prepared their first annual energy conservation plans providing valuable information on building stock, energy projects completed, and conservation project ideas for the future.
- A mild winter in FY12 had a significant impact on energy used to heat state buildings.
- State energy staff have started preparing for a performance contracting initiative to take place over the next 5+ years.
- DAS and OEP arranged for and funded an HVAC and basic electricity training course for 32 state employees which was conducted through the Community College System in the winter and spring of FY12 .
- This year's state energy conference was extended from a half day to a full day with more opportunities for staff to attend workshops.

While the numbers clearly show a decrease in energy use in FY12 over the FY05 baseline, there is more to the story. While the winter of FY11 was slightly colder than average, the winter of FY12 was much warmer than average. Heating degree days (an index that compares environmental temperatures to a reference value; the larger the number, the colder the winter) dropped by 13% when compared to the 30 year average and 15% when compared to FY11. While this is excel-

lent news for the State's FY12 budget, the State needs to be prepared in the coming years for energy use and costs to increase slightly after this abnormal period.

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

	Total Sq Ft	kBtus used	Fossil Fuel kBTus Used	Total Cost	CUI (cost per sq ft)	EUI (kBtu per sq ft)	Fossil Fuel EUI (kBtu per sq ft)
FY2005	6,796,070	887,872,008	769,799,020	\$ 14,893,366.76	\$ 2.02	125.0	109.6
FY2012	7,607,058	747,528,603	630,260,262	\$ 18,423,688.50	\$ 2.23	92.2	78.1
% Change	12%	-16%	-18%	24%	10%	-26%	-29%

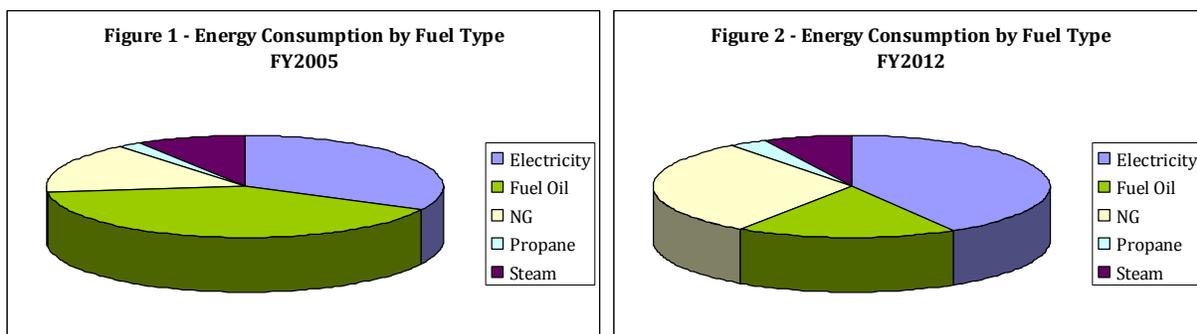
Mitigating Energy Cost Increases through a Multi-Pronged Approach

While state energy costs have increased by 18% between FY05 and FY12, they did not increase as much as they could have due to a three part strategy employed by state staff, primarily those working in the state energy manager’s office. This strategy included not only efficiency, but also fuel switching and solicitation for energy contracts.

The first strategy, energy efficiency, helped to reduce the total energy consumption in state buildings by 16 percent even as the total square footage of state buildings grew by 12 percent. Many projects have been done on state buildings since 2005 using state capital funds, agency operating funds, and one-time grants such as the American Recovery and Reinvestment Act, which provided \$10 million for state building projects between 2009 and 2012. A total of \$500,000 in capital budget funds were allocated to building projects for FY12 and FY13. To date, the majority of these funds have been committed or spent on projects such as lighting retrofits, an energy management system for the Traffic Bureau of NHDOT, a new energy efficient commercial dishwasher for NH Hospital, and a new heating system for Bridges House.

The second strategy, fuel switching, is illustrated in Figures 1 and 2 below. In FY05, the State used nearly 360,000 kBtus of fuel oil, a total that represented fully 41 percent of total energy consumption. This cost the state \$2.9 million representing about 18 percent of total state energy costs. In FY12, fuel oil consumption had dropped by over 60% to 135,000 kBtus, representing only 18% of total state energy use. The cost to the state stood at \$2.8 million, nearly identical to the costs in FY05 due to the surge in fuel oil prices over that time period. Part of that reduction in fuel oil use came from the energy efficiency efforts mentioned above, but a significant reduction was realized by a switch to natural gas and biomass. Most notably, two of the largest fuel oil consumers in the state, the Concord Men’s Prison and the Glencliff Home, both completed projects this fiscal year to switch from #6 fuel oil to natural gas and wood chips respectively.

Figure 1 & 2: Energy Consumption by Fuel Type, FY05 vs. FY12



Between FY05 and FY12, natural gas use grew by 58% as it supplanted fuel oil use. However, total natural gas costs increased by only 34% between FY05 and FY12 as the price of natural gas fell over that time period. Even as the State saw a net increase in the combined cost of fuel oil and natural gas between FY05 and FY12; the State realized a significant “avoided cost,” roughly \$3.8 million, through that fuel switching.

The third strategy was the solicitation of competitive bids for energy supply. The State often uses bulk energy contracts to pay a lower unit cost for energy. Notably, the State has currently signed a 30-month natural gas contract which will begin in December 2012. The energy price for natural gas under this contract is \$0.619 per therm. The combination of a low rate and a long-term fixed price gives the State stability in its energy budget. Additionally the current statewide electricity contract provides electricity supply at \$0.06071 per kWh.

Going forward, the State expects to continue to manage its energy costs through a diverse approach that includes energy efficiency, fuel diversity, and the competitive market. In addition, the State also sees the opportunity for renewable energy sources to be used at its facilities to provide a steady supply

Table 2 - State of NH Energy Consumption by Fuel (FY2005 & FY2012)

	Energy Consumption (kBtu)					
	Electricity	Fuel Oil	Natural Gas	Propane	Steam	Total
FY2005	288,662,701	359,926,582	142,835,050	18,072,994	78,374,681	887,872,008
FY2012	309,779,093	135,136,999	226,269,256	22,918,100	53,425,155	747,528,603
% Change	7%	-62%	58%	27%	-32%	-16%

Table 3 - Summary of State of NH Energy Costs by Fuel (FY2005 & FY2012)

	Energy Costs					
	Electricity	Fuel Oil	Natural Gas	Propane	Steam	Total
FY2005	\$ 8,644,195	\$ 2,857,900	\$ 1,738,632	\$ 204,635	\$ 1,438,130	\$ 14,883,491
FY2012	\$ 11,227,538	\$ 2,778,290	\$ 2,334,034	\$ 440,234	\$ 1,643,593	\$ 18,423,689
% Change	30%	-3%	34%	115%	14%	24%

Energy Conservation Plans

An important new tool in managing state energy consumption and costs will be the energy conservation plans that each agency will submit annually. 2012 marks the first year that agencies were required to submit energy conservation plans in accordance with RSA 21-I:14-c. The Department of Administrative Services and the Office of Energy and Planning worked together to provide several workshops for agencies over the past year to help with their plans. Over the summer DAS and OEP staff met with many agencies to help put the finishing touches on their plans.

Agencies recommended a wide variety of energy conservation projects including building envelope measures, lighting upgrades, and boiler replacements. They also presented some unique building energy problems that will need further research before a solution can be implemented. DAS has taken all of the 16 plans submitted by property-owning agencies and another 19 submitted from non-property-owning agencies and compiled them into a statewide plan to be submitted to the Governor’s Office, the State Legislature, and the Energy Efficiency and Sustainable Energy Board by December 1, 2012.

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 77 percent of the vehicles, and use 87 percent of the fuel.

The State's overall fleet size declined slightly in the past year in all categories, with passenger vehicle ownership dropping 3%. Passenger automobiles also travelled fewer miles on fewer gallons of fuel and the fleet average fuel economy remained relatively flat when compared to both the FY09 baseline and FY11. The biggest improvement in fuel economy came in the light duty truck (8,500 lbs and under) category. While heavy duty vehicle use declined likely due to fewer winter storms, passenger vehicles reduced their miles travelled as well and this was likely due to the state's efforts to conserve.

While last year's minimum fuel economy standard resulted in many waivers being issued, it is recommended that the State keep the same standards of 34 mpg for passenger vehicles and 26 mpg for light duty trucks (police vehicles and vehicles over 8,500 lbs exempted). The State expects that improvements within the industry (CAFE Standards) and the inclusion of a fuel efficiency module in the Safe Driver Program will have a positive impact on fuel efficiency during FY13. These changes are expected to result in significant savings over time as older vehicles are retired and new vehicles are added to the fleet.

Table 4: Summary of Fleet Size and Performance

	Number of Vehicles		Annual Miles		Annual Fuel (gal)		Annual MPG	
	FY09	FY12	FY09	FY12	FY09	FY12	FY09	FY12
Passenger Auto.	965	1,009	14,304,221	13,453,773	747,191	703,047	19.14	19.14
Light Duty Trucks ≤8,500 lbs	579	592	7,870,055	7,641,583	500,847	473,451	15.71	16.14
Light Duty Trucks 8,501 – 10,000 lbs	345	396	5,551,098	6,206,701	431,387	493,378	12.87	12.58
Trucks >10,000 lbs	548	626	1,695,835	1,498,548	938,794	939,329	1.81	1.60
State Totals	2,437	2,628	29,421,209	28,800,605	2,618,219	2,609,205		

While the numbers show that the State has met its goal of reducing fossil fuel use by 25%, there is more work to be done. The State needs to be prepared for an increase in energy use if winter temperatures and weather patterns return to normal. Also, while some agencies have met or surpassed the energy reduction goal, others have not. The state should strive for every agency to meet the energy reduction goal independently. As a tool for State agencies to achieve even more savings, DAS is preparing to issue several requests for proposals for performance contracts over the next 5 years. Performance contracts will allow agencies to complete total facility energy retrofits with no up front capital cost. The costs associated with these projects will be paid back over a period of up to 20 years. As energy usage will be reduced, RSA 21-I:19-d allows agencies to use their utility budgets to pay for these projects.

Table 5: Annual Energy and Cost Detail for Baseline Year vs. Fiscal Year 2012

Department	Area (Square Footage)		Total kBtu		EUI (Energy Per Square Foot)		Total Cost		CUI (Cost Per Square Foot)		% Change
	FISCAL YEAR 2005	06/30/2012	FISCAL YEAR 2005	06/30/2012	FISCAL YEAR 2005	% Change	FISCAL YEAR 2005	06/30/2012	FISCAL YEAR 2005	06/30/2012	
Corrections	959,275	740,422	221,827,306	147,440,759	231	-34%	\$2,542,059.42	\$2,855,103.85	\$2.65	\$3.86	46%
Health and Human Services	673,917	702,283	127,012,025	103,353,907	188	-19%	\$1,567,650.69	\$2,067,012.10	\$2.33	\$2.94	27%
Juvenile Justice Services	102,542	178,728	35,676,835	43,011,327	348	21%	\$311,796.37	\$694,828.96	\$3.04	\$3.89	28%
NH Hospital	314,471	248,540	64,502,714	35,802,920	205	-44%	\$1,052,875.25	\$733,187.48	\$3.35	\$2.95	-12%
Glenciff Home	256,904	255,494	26,832,476	24,536,988	104	-8%	\$202,979.07	\$637,835.18	\$0.79	\$2.50	216%
HHS	0	19,521	0	2,662	N/A	N/A	\$0.00	\$1,162.48	N/A	\$0.06	N/A
NH Veterans Home	172,600	187,931	21,070,445	19,972,369	122	-5%	\$400,688.77	\$584,462.70	\$2.32	\$3.11	34%
Employment Security	150,448	150,448	16,647,383	13,621,337	111	-18%	\$368,240.08	\$376,840.73	\$2.45	\$2.50	2%
Police Standards & Training	57,100	57,100	4,548,100	4,782,627	80	5%	\$54,577.71	\$43,135.55	\$0.96	\$0.76	-21%
McAuliffe Shepard Discovery Center	10,890	44,890	1,392,947	3,768,620	128	84%	\$28,124.53	\$96,476.87	\$2.58	\$2.15	-17%
Administrative Services	2,584,971	3,253,566	270,219,518	271,287,968	105	0%	\$5,628,728.47	\$7,152,549.01	\$2.18	\$2.20	1%
Liquor Commission	181,559	204,773	14,217,778	15,888,197	78	12%	\$293,732.01	\$432,000.25	\$1.62	\$2.11	30%
Environmental Services	15,419	15,667	1,277,019	1,137,243	83	-11%	\$31,702.17	\$42,742.66	\$2.06	\$2.73	33%
Wastewater Treatment Operations			13,566,494	15,333,305	13%		\$433,321.00	\$548,338.00			
DOT	678,874	719,420	84,224,234	50,256,340	124	-40%	\$1,409,245.16	\$1,399,041.72	\$2.08	\$1.94	-6%
Dept of Safety	245,611	248,853	18,864,621	14,782,386	77	-23%	\$383,025.34	\$394,221.33	\$1.56	\$1.58	2%
DRED	256,804	349,805	22,539,619	16,728,578	88	-46%	\$357,717.21	\$551,757.80	\$1.39	\$1.58	13%
Cannon Mountain			22,896,097	30,795,854	35%		\$712,733.00	\$931,762.00			
Adjutant General	772,580	900,183	47,508,099	38,327,117	61	-19%	\$670,946.00	\$952,868.00	\$0.87	\$1.06	22%
Dept of Agriculture	31,717	31,717	60,323	51,997	2	-14%	\$999.13	\$2,838.94	\$0.03	\$0.09	184%
Total:	6,791,765	7,607,058	887,872,008	747,528,604	125	-16%	\$14,883,490.69	\$18,431,151.51	\$2.02	\$2.23	10%

Fish & Game Commission ¹	183,552	0	11,506,507	0	63	N/A	\$234,255.27	\$0.00	\$1.28	\$0.00	N/A
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¹ Fish and Game Commission data are incomplete for FY12 and are therefore not included in the statewide calculations.

Table 6: Fleet Detail for Fiscal Years 2009 (Baseline) and 2012

Passenger Automobiles

Agency Name	Number of Vehicles		Annual Miles		Annual Fuel (gal)		Annual MPG		% Change		Annual Fuel Cost		Cost/Mile		% Change
	2009*	2012	2009*	2012	2009*	2012	2009*	2012	2009*	2012	2009*	2012	2009*	2012	
DOT	120	145	1,888,904	2,104,222	67,002	73,631	28.19	28.58	1%		\$159,466	\$230,362	\$0.084	\$0.109	30%
DRED	22	19	251,014	281,399	9,248	10,175	27.14	27.66	2%		\$22,619	\$32,255	\$0.090	\$0.115	27%
Fish & Game	8	5	98,561	44,047	3,810	1,722	25.87	25.58	-1%		\$8,573	\$5,424	\$0.087	\$0.123	42%
Safety	155	140	2,021,746	1,919,032	108,393	101,500	18.65	18.91	1%		\$237,595	\$311,640	\$0.118	\$0.162	38%
State Police	339	420	5,840,581	5,803,385	389,274	387,632	15.00	14.97	0%		\$867,588	\$1,202,889	\$0.149	\$0.207	40%
Other	321	280	4,203,415	3,301,688	169,464	128,387	24.80	25.72	4%		\$392,185	\$398,926	\$0.093	\$0.121	29%
State Total	965	1,009	14,304,221	13,453,773	747,191	703,047	19.14	19.14	0%		\$1,688,025	\$2,181,496	\$0.118	\$0.162	37%

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		% Change		Annual Fuel Cost		Cost/Mile		% Change
	2009*	2012	2009*	2012	2009*	2012	2009*	2012	2009*	2012	2009*	2012	2009*	2012	
DOT	122	118	1,849,714	2,149,300	113,737	125,591	16.26	17.11	5%		\$273,495	\$393,842	\$0.148	\$0.183	24%
DRED	80	83	827,977	751,584	52,776	47,937	15.69	15.68	0%		\$131,743	\$150,882	\$0.159	\$0.201	26%
Fish & Game	83	98	1,371,476	1,459,990	92,761	95,285	14.79	15.32	4%		\$208,708	\$300,148	\$0.152	\$0.206	35%
Safety	74	70	1,053,903	935,787	68,334	58,819	15.42	15.91	3%		\$151,592	\$181,291	\$0.144	\$0.194	35%
State Police	43	40	507,688	347,421	31,498	22,398	16.12	15.51	-4%		\$66,015	\$68,118	\$0.130	\$0.196	51%
Other	177	183	2,259,297	1,997,501	141,741	123,421	15.94	16.18	2%		\$330,895	\$387,600	\$0.146	\$0.194	32%
State Total	579	592	7,870,055	7,641,583	500,847	473,451	15.71	16.14	3%		\$1,162,448	\$1,481,881	\$0.148	\$0.194	31%

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		% Change		Annual Fuel Cost		Cost/Mile		% Change
	2009*	2012	2009*	2012	2009*	2012	2009*	2012	2009*	2012	2009*	2012	2009*	2012	
DOT	193	237	4,328,381	4,712,434	331,143	379,152	13.07	12.43	-5%		\$753,414	\$1,189,063	\$0.174	\$0.252	45%
DRED	50	43	325,354	283,613	29,813	24,382	10.91	11.63	7%		\$71,327	\$77,427	\$0.219	\$0.273	25%
Fish & Game	15	16	91,534	123,997	6,533	10,719	14.01	11.57	-17%		\$14,697	\$33,765	\$0.161	\$0.272	70%
Safety	14	19	143,460	264,459	11,522	19,739	12.45	13.40	8%		\$25,454	\$59,835	\$0.177	\$0.226	28%
State Police	2	6	2,380	28,074	196	2,240	12.14	12.53	3%		\$417	\$6,755	\$0.175	\$0.241	37%
Other	71	75	659,989	794,124	52,180	57,146	12.65	13.90	10%		\$123,391	\$174,631	\$0.187	\$0.220	18%
State Total	345	396	5,551,098	6,206,701	431,387	493,378	12.87	12.58	-2%		\$988,699	\$1,541,476	\$0.178	\$0.248	39%

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

Agency Name	Number of Vehicles		Annual Miles		Annual Fuel (gal)		Annual MPG		% Change		Annual Fuel Cost		Cost/Mile		% Change
	2009*	2012	2009*	2012	2009*	2012	2009*	2012	2009*	2012	2009*	2012	2009*	2012	
DOT	432	504	1,173,842	963,878	871,416	875,687	1.35	1.10	-18%		\$2,413,915	\$2,908,530	\$2.056	\$3.018	47%
DRED	24	25	115,044	121,951	13,742	13,598	8.37	8.97	7%		\$39,975	\$43,879	\$0.347	\$0.360	4%
Fish & Game	21	22	102,451	95,214	11,408	10,926	8.98	8.71	-3%		\$26,043	\$34,418	\$0.254	\$0.361	42%
Safety	13	16	26,241	54,894	3,668	6,481	7.15	8.47	18%		\$10,836	\$21,018	\$0.413	\$0.383	-7%
State Police	3	4	10,846	17,198	1,254	2,288	8.65	7.52	-13%		\$3,117	\$7,561	\$0.287	\$0.440	53%
Other	55	55	267,411	245,413	37,306	30,349	7.17	8.09	13%		\$91,639	\$94,338	\$0.343	\$0.384	12%
State Total	548	626	1,695,835	1,498,548	938,794	939,329	1.81	1.60	-12%		\$2,585,524	\$3,109,744	\$1.525	\$2.075	36%

*Number of Vehicles for 2012 includes surplus vehicles, which when subtracted from the total, bring the number of vehicles active in FY2012 to a number comparable to the FY2009 fleet total. The data for 2009 does not include any energy utilization by vehicles surplus prior to the end of 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).