State of New Hampshire
Energy Management Annual Report
for Fiscal Year 2014

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

Annual Energy Report Summary

New Hampshire state government uses energy to provide power and heat to its buildings and to power its vehicle fleet. Executive Order 2011-1, issued by then-Governor John Lynch, established a goal of reducing fossil-fuel use in state facilities by 25 percent over 2005 levels by 2025 as measured on a square-foot basis in accordance with RSA 21-I:14-c. That executive order also required agencies to comply with a Clean Fleet Program as established by the State's energy efficiency committee (currently called the State Government Energy Committee) to improve the operation of state vehicles and improve overall fuel economy of the state fleet.

Highlights

- FY14 was the coldest winter in New Hampshire since FY03 and was 11 percent colder than the 20-year average. This had significant implications for energy use and cost when combined with regional trends.
- Increased regional reliance on natural gas for heat and electrical generation has led to dynamic electrical energy prices with spikes during extended cold spells this past winter.
- The State experienced temporary insulation from energy price increases due to long term energy contracts that are in place and will expire in FY15 and FY16.
- Glencliff is now operating a biomass heat and power plant, and biomass-energy use and costs have been added to its total. Other biomass users among state agencies are harder to track and have not been included in this report.
- An auto-populate feature will be available for some utility accounts to reduce the energy data entry workload in FY15.

New Hampshire state government has been successful in significantly reducing the amount of energy used to power its lights and appliances, heat its buildings and operate its vehicles over the past 10 years. During this same period, energy prices for transportation fuels, heating oil and propane, and for electricity increased dramatically. Since 2005, when the State first began tracking energy usage data, the State has realized a savings of over $8 million due to improvements in efficiency and switching to lower-cost fuels.

Numerous energy-efficiency and fuel-switching opportunities still exist in New Hampshire state government operations. This report, combined with the State Energy Conservation Plan, helps to quantify those potential savings and provide a roadmap for the State to reduce its energy use, reduce emissions, and realize further cost savings for tax payers. The recently released New Hampshire 10-Year State Energy Strategy recognizes the unique role for energy-efficiency improvements in state buildings where such savings not only save taxpayer dollars, but also serve as a highly visible example for the private sector.

Energy Use by New Hampshire State Government
Building Energy Use

The State tracks its building energy use in two ways. First, total thermal and electrical energy consumption is measured in British Thermal Units (Btus) to allow comparison of energy usage both in total and in specific buildings regardless of fuel type. Second, the State tracks the amount of energy derived from fossil fuels as a percentage of total energy use. Building energy use is evaluated on an Energy Use Intensity (EUI) basis by calculating the Btus used per square foot of building space.

As summarized in Table 1 below, between FY05 and FY14, the square footage of building space used by state government has increased by twelve percent while overall energy use has decreased by two percent and the amount of energy derived from fossil fuels has decreased by nine percent. This equates to a reduction in EUI of fourteen percent and a reduction of fossil-fuel EUI of twenty percent. Energy costs have risen substantially in this same time period, resulting in a thirty-four percent increase in total energy expenditures.

In spite of the extremely cold winter and the twelve percent increase in the amount of building area used, the State's fossil fuel energy use did not return to the same level as FY05. This was due not only to the reduction in overall energy use. The fossil fuel energy use dropped even further between FY05 and FY14 as the overall efficiency efforts were complemented by the replacement of fossil fuels (e.g., propane, natural gas, fuel oil) with non-fossil-fuel sources of energy, such as biomass, including wood pellets, wood chips, cord wood, and scrap wood from tree trimming and storms .

Had the State not pursued energy efficiency and fuel-switching opportunities as aggressively, the State's energy costs could have been much higher. Based on an analysis of state energy consumption and cost expenditure data, the State's energy management efforts since 2005 are estimated to have avoided over $8.5 million by FY14, with just over $3 million in estimated avoided costs occurring in FY14 alone.

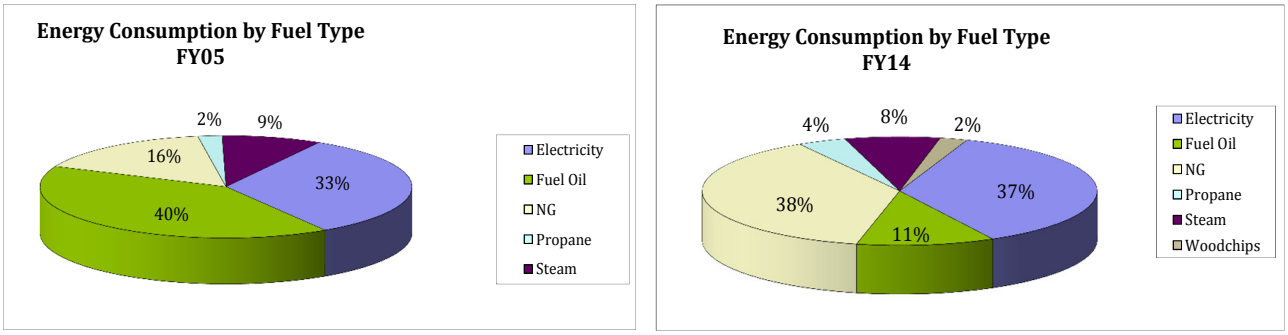
Table 1 - Summary of State of NH Energy Consumption (FY05 & FY14)

	Total Sq Ft	kBtus used	FF KBTUs Used	Total Cost	CUI ($ per sq ft)	EUI (kBtu per sq ft)	FF EUI (kBtu per sq ft)
FY05	6,890,482	895,640,814	810,053,155	$15,092,715	$2.02	124.7	112.7
FY14	7,717,716	874,863,789	736,484,029	$20,170,791	$2.41	107	90.1
% Change	12.0%	-2.3%	-9.1%	33.6%	19.1%	-14.2%	-20.0%

Over the past three years there has been significant variation in annual energy use as compared to the 2005 baseline. For example FY12, which had an unusually warm winter, showed a much greater reduction in energy use than the current FY14, during which an abnormally cold winter occurred. It is clear that "heating degree days", an index that compares environmental temperatures to a reference value (the larger the number, the colder the winter) directly influences energy use in state buildings. Therefore, in future annual reports the State will include an evaluation of heating degree days and is considering averaging data over a three-year period to more accurately reflect trends in state energy use.

Figure 1 below depicts how the fuel source in New Hampshire government facilities has changed since 2005 as lower-cost natural gas replaced electricity, fuel oil, and propane; and renewable energy resources were brought online.

Figure 1: Energy Consumption (Btus) by Fuel Type, FY05 vs. FY14



The Future of Energy Costs

As discussed above, annual energy costs have increased since 2005 due to higher costs per unit of energy, but implementation of energy efficiency measures and introduction of renewable energy resources have reduced state expenditures from a "business as usual" case. As has been highlighted in numerous reports and articles in recent months, New Hampshire's energy costs are expected to continue to rise as the region experiences a constraint in the natural gas supplies used to generate the majority of electricity in the region and increasingly used for heating. By calendar year 2018, it is anticipated that some of the constraints on natural gas supply will be alleviated by the installation of additional pipeline capacity into northern New England.

Due to long-term energy contracts that were in place during the very cold winter of FY14, the State of NH was somewhat insulated from electric-energy price increases experienced around the region. However, these contracts will expire in FY15 and FY16. It is anticipated that the regions increased reliance on natural gas for heat and electric generation and last winter's extreme cold will result in higher priced contracts, at least for the near term.

The State has already seen an indication of where energy prices are going. The State went out to bid twice for a new electricity contract for Cannon Mountain and was unable to obtain a rate that was low enough to lock in. As a result, Cannon Mountain has returned to default service with Public Service of New Hampshire. The price for the supply portion of its electric bill has increased nearly 50 percent over its previous independent supply contract. The State is bracing for similar price increases when the statewide electrical contract expires in October of 2015 (extended from June). Natural gas prices are also expected to rise when the contract expires in June 2015.

Conversely, as the State introduces renewable biomass for thermal energy, a drop in energy costs per unit of energy is achieved. As additional opportunities arise, further investment in biomass and other renewable energy systems may present an opportunity to further insulate the State against volatile regional and global energy prices.

House Bill 1129

In 2014, the New Hampshire State Legislature passed House Bill 1129, which requires a report on the status of state agencies' compliance with Executive Order 2011-1 and an evaluation of RSA 21:1-14:c and RSA 21:1-19, relative to energy efficiency in state government buildings and fleets. An interim report was issued by the New Hampshire Office of Energy and Planning on November 3, 2014. The report included recommended changes to the relevant RSA's, as well as information on what further research and analysis would be done before the July 1, 2015 deadline for submitting the final report.

Fleets

Since FY09 the state passenger auto and truck fleet has reduced mileage by approximately 5 percent, or 1.4 million miles, as shown in Table 2 below. Unfortunately, fuel costs have increased by approximately $2.3 million, or 36 percent over the same time period. In FY14 almost all components of the passenger automobile fleet saw improved fuel economy; however, the overall average miles-per-gallon is lagging behind FY09 by 0.4 MPG.

As with prior years, the state is encouraging the use of conference calls and online meetings to replace face-to-face meetings when possible. Using these technical resources, when appropriate, can save vehicle fuel energy whether by reducing fleet vehicle or personal vehicle usage.

Table 2: Summary of Fleet Size and Utilization

	Number of Vehicles		Annual Miles Travelled		Annual Fuel (gal)	
	FY09	FY14	FY09	FY14	FY09	FY14
Passenger Automobiles	965	945	14,304,221	12,967,415	747,191	692,716
Light Duty Trucks (≤8,500 lbs)	579	617	7,870,055	7,310,354	500,847	442,020
Light Duty Trucks (8,501 to 10,000 lbs)	345	409	5,551,098	6,015,950	431,387	505,858
Medium Duty Trucks (10,001 to 14,000 lbs)	62	77	442,817	608,446	46,615	58,318
Heavy Duty Trucks (>14,000 lbs)	483	550	1,232,502	1,146,621	890,008	1,026,342
State Totals	2,434	2,598	29,400,693	28,048,786	2,616,048	2,725,254

***FY09 does not contain vehicles that were surplused at the end of that year. If surplused vehicles were added back, the total number of vehicles for FY09 and FY14 would be almost identical. In addition, the miles travelled and fuel consumed for those vehicles is not reported here affecting the results shown in the table.**

Potential for Additional Energy and Cost Savings

Significant potential exists for additional cost-savings by the State by implementing more energy efficiency measures and switching to renewable energy in certain state-owned facilities, as well as by investing in a more efficient vehicle fleet. However, such investments require both research and project oversight. The few state staff dedicated to energy management can only provide proper oversight for a limited number of projects each year. The State Energy Manager and one energy project manager are responsible for all tracking and reporting on the State's energy use and progress toward its goals; implementing energy reduction projects using capital funds, energy efficiency funds, and energy performance contracts; purchasing energy through statewide contracts; developing energy conservation plans with state agencies; providing education and outreach to state staff on energy efficiency; and many other tasks related to energy use by the State. If greater reductions in energy use and fossil fuel use are desired, more resources, including staff, need to be assigned to this effort. Improved efficiency in state government is more important than ever as agencies are being asked to do more with less. Energy efficiency and renewable energy are investments that pay for themselves and coincide well with the overall goal of the State to reduce and eliminate waste.

Table 3 Annual Energy and Cost Detail for Baseline Year vs. Fiscal Year 2014

Quarterly Energy Report

Baseline FISCAL YEAR 2005 Versus Last-4-Quarters ending 06/30/2014

Energy Use, Intensity, and Costs Summary

	Area (Square Footage)		Total kBtu			EUI (Energy Per Square Foot)			Total Cost			CUI (Cost Per Square Foot)		
Department	FISCAL YEAR 2005	06/30/2014	FISCAL YEAR 2005	06/30/2014	% Change	FISCAL YEAR 2005	06/30/2014	% Change	FISCAL YEAR 2005	06/30/2014	% Change	FISCAL YEAR 2005	06/30/2014	% Change
Corrections	959,275	740,422	221,827,306	153,230,768	-31%	231	207	-11%	$2,542,059	$2,464,818	-3%	$2.65	$3.33	26%
Health and Human Services	583,353	566,751	127,488,331	120,469,399	-6%	219	213	-3%	1,577,526	1,909,128	21%	$2.70	$3.37	25%
Juvenile Justice Services	*102,542*	*173,932*	*35,676,835*	*45,197,787*	27%	348	260	-25%	*$311,796*	*$641,182*	106%	$3.04	$3.69	21%
NH Hospital	*314,471*	*201,269*	*64,502,714*	*39,388,679*	-39%	205	196	-5%	*$1,052,875*	*$774,309*	-26%	$3.35	$3.85	15%
Glencliff Home[1,2]	*162,035*	*172,029*	*26,832,476*	*35,882,308*	34%	166	209	26%	*$202,979*	*$492,325*	143%	$1.25	$2.86	128%
HHS	*0*	*19,521*	*0*	*625*	N/A	N/A	0	N/A	*$0*	*$1,311*	N/A	N/A	$0.07	N/A
Behavioral Health	*4,305*	*0*	*476,306*	*0*	-100%	111	N/A	N/A	*$9,876*	*$0*	-100%	$2.29	N/A	N/A
NH Veterans Home	172,600	189,900	21,070,445	23,763,008	13%	122	125	3%	$400,689	$632,959	58%	$2.32	$3.33	44%
Police Standards & Training[3]	57,100	57,100	4,548,100	6,023,047	32%	80	105	32%	$54,578	$68,992	26%	$0.96	$1.21	26%
Administrative Services	2,584,971	3,193,064	265,878,418	321,060,518	21%	103	101	-2%	$5,580,568	$8,382,779	50%	$2.16	$2.63	22%
DOT	677,287	712,892	82,836,806	67,548,905	-18%	122	95	-23%	$1,391,310	$1,629,044	17%	$2.05	$2.29	11%
Liquor Commission	181,559	202,054	14,217,778	16,103,987	13%	78	80	2%	$293,732	$444,701	51%	$1.62	$2.20	36%
Fish & Game Commission	189,281	158,825	14,560,401	12,534,586	-14%	77	79	3%	$294,030	$362,131	23%	$1.55	$2.28	47%
Environmental Services	15,419	15,519	1,277,019	1,197,124	-6%	83	77	-7%	$31,702	$44,084	39%	$2.06	$2.84	38%
Wastewater Treatment Operations[4]			13,566,494	12,935,707	-5%				$433,321	$457,816	6%			
Employment Security	150,448	225,448	16,647,383	16,698,287	0%	111	74	-33%	$368,240	$440,671	20%	$2.45	$1.95	-20%
Dept of Safety	245,611	258,772	18,705,833	17,852,925	-5%	76	69	-9%	$381,387	$460,841	21%	$1.55	$1.78	15%
DRED	269,281	391,932	22,551,981	21,805,299	-3%	84	56	-34%	$358,894	$721,444	101%	$1.33	$1.84	38%
Cannon Mountan[5]			22,896,097	34,320,568	50%				$712,733	$1,064,945	49%			
Adjutant General	772,580	973,320	47,508,099	47,721,747	0%	61	49	-20%	$670,946.00	$1,041,546.00	55%	$0.87	$1.07	23%
Dept of Agriculture	31,717	31,717	60,323	62,278	3%	2	2	3%	$999	$3,195	220%	$0.03	$0.10	220%
Total:	6,890,482	7,717,716	895,640,814	873,328,153	-2%	125	107	-14%	$15,092,714	$20,129,095	33%	$2.02	$2.41	19%

1 - Glencliff's energy data now includes woodchips burned for heat and electricity in its new boiler.
2 - An error was discovered in the Glencliff Boiler House square footage going back to the baseline year. The corrected numbers are reflected in this report.
3 - Police Standards and Training has recently started tracking its electricity usage and it has been included here under FY14. Previously, electric usage was reported under the Community College System which is no longer included in this report.
4 - Wastewater Treatment Operations are listed as part of the Department of Environmental Services, but energy is not measured on a per-square-foot basis due to the uniqueness of the usage profile.
5 - Cannon Mountain is listed as part of the Department of Resources and Economic Development, but its energy is not measured on a per-square-foot basis due to the uniqueness of its usage profile.

Table 4 Fleet Detail for FY09 (Baseline) and FY14

Governor's Annual Energy Report - Fleet Data 2014**

Fiscal Year 2009 Baseline Vs. Fiscal Year 2014 Q4 (Jul 1, 2013 - Jun 30, 2014)

Data Sources: FY2009 Report and FY2014 Fleet Report

Passenger Automobiles

Agency Name	Number of Vehicles		Annual Miles		Annual Fuel (gal)		Annual MPG		% Change	Annual Fuel Cost		Cost/Mile		% Change
	2009*	2014	2009*	2014	2009*	2014	2009*	2014		2009*	2014	2009*	2014	
DOT	120	125	1,888,904	1,912,592	67,002	68,284	28.19	28.01	-1%	$159,466	$210,383	$0.084	$0.110	30%
DRED	22	20	251,014	217,584	9,248	7,818	27.14	27.83	3%	$22,619	$24,409	$0.090	$0.112	24%
Fish & Game	8	4	98,561	20,469	3,810	733	25.87	27.92	8%	$8,573	$2,267	$0.087	$0.111	27%
Safety	155	113	2,021,746	1,340,755	108,393	72,779	18.65	18.42	-1%	$237,595	$220,458	$0.118	$0.164	40%
State Police	339	385	5,840,581	6,334,007	389,274	419,500	15.00	15.10	1%	$867,588	$1,287,155	$0.149	$0.203	37%
Other	321	298	4,203,415	3,142,008	169,464	123,602	24.80	25.42	2%	$392,185	$369,086	$0.093	$0.117	26%
State Total	965	945	14,304,221	12,967,415	747,191	692,716	19.14	18.72	-2%	$1,688,025	$2,113,758	$0.118	$0.163	38%

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*	2014	2009*	2014	2009*	2014	2009*	2014		2009*	2014	2009*	2014	
DOT	122	112	1,849,714	1,969,454	113,737	118,139	16.26	16.67	3%	$273,495	$365,815	$0.148	$0.186	26%
DRED	80	101	827,977	772,950	52,776	48,253	15.69	16.02	2%	$131,743	$149,828	$0.159	$0.194	22%
Fish & Game	83	80	1,371,476	1,097,269	92,761	72,342	14.79	15.17	3%	$208,708	$224,204	$0.152	$0.204	34%
Safety	74	70	1,053,903	915,511	68,334	54,589	15.42	16.77	9%	$151,592	$165,802	$0.144	$0.181	26%
State Police	43	57	507,688	646,498	31,498	41,660	16.12	15.52	-4%	$66,015	$126,007	$0.130	$0.195	50%
Other	177	197	2,259,297	1,908,672	141,741	107,037	15.94	17.83	12%	$330,895	$320,148	$0.146	$0.168	15%
State Total	579	617	7,870,055	7,310,354	500,847	442,020	15.71	16.54	5%	$1,162,448	$1,351,804	$0.148	$0.185	25%

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*	2014	2009*	2014	2009*	2014	2009*	2014		2009*	2014	2009*	2014	
DOT	193	223	4,328,381	4,465,685	331,143	378,122	13.07	11.81	-10%	$753,414	$1,171,623	$0.174	$0.262	51%
DRED	50	47	325,354	317,341	29,813	27,176	10.91	11.68	7%	$71,327	$85,138	$0.219	$0.268	22%
Fish & Game	15	35	91,534	418,577	6,533	33,020	14.01	12.68	-10%	$14,697	$132,778	$0.161	$0.317	98%
Safety	14	21	143,460	197,781	11,522	15,562	12.45	12.71	2%	$25,454	$46,307	$0.177	$0.234	32%
State Police	2	7	2,380	56,644	196	4,796	12.14	11.81	-3%	$417	$14,155	$0.175	$0.250	43%
Other	71	76	659,989	559,922	52,180	47,182	12.65	11.87	-6%	$123,391	$148,232	$0.187	$0.265	42%
State Total	345	409	5,551,098	6,015,950	431,387	505,858	12.87	11.89	-8%	$988,699	$1,598,233	$0.178	$0.266	49%

Medium Duty Trucks (pickup trucks, vans, minivans and SUVs from 10,001 lbs to 14,000 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*	2014	2009*	2014	2009*	2014	2009*	2014		2009*	2014	2009*	2014	
DOT	16	22	210,015	347,304	16,910	29,368	12.42	11.83	-5%	$48,133	$94,211	$0.229	$0.271	18%
DRED	13	15	68,589	75,578	7,326	8,466	9.36	8.93	-5%	$20,594	$27,313	$0.300	$0.361	20%
Fish & Game	2	3	8,211	16,932	1,092	1,179	7.52	14.36	91%	$2,459	$3,655	$0.299	$0.216	-28%
Safety	1	4	5,853	16,750	580	2,043	10.09	8.20	-19%	$1,449	$6,564	$0.248	$0.392	58%
State Police	0	3	0	0	0	28	0.00	0.00		$0	$84	$0.000	N/A	
Other	30	30	150,149	151,882	20,707	17,234	7.25	8.81	22%	$49,162	$51,670	$0.327	$0.340	4%
State Total	62	77	442,817	608,446	46,615	58,318	9.50	10.43	10%	$121,797	$183,497	$0.275	$0.302	10%

Trucks Greater than 14,000 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*	2014	2009*	2014	2009*	2014	2009*	2014		2009*	2014	2009*	2014	
DOT	415	467	947,714	835,841	853,347	985,537	1.11	0.85	-24%	$2,361,833	$3,359,643	$2.492	$4.019	61%
DRED	11	11	46,455	41,508	6,416	5,809	7.24	7.15	-1%	$19,381	$19,639	$0.417	$0.473	13%
Fish & Game	19	20	94,240	72,615	10,316	7,951	9.14	9.13	0%	$23,584	$24,657	$0.250	$0.340	36%
Safety	12	11	20,388	32,802	3,088	4,882	6.60	6.72	2%	$9,388	$16,535	$0.460	$0.504	9%
State Police	3	4	10,846	15,479	1,254	1,878	8.65	8.24	-5%	$3,117	$6,359	$0.287	$0.411	43%
Other	23	37	112,859	148,376	15,587	20,285	7.24	7.31	1%	$39,628	$69,604	$0.351	$0.469	34%
State Total	483	550	1,232,502	1,146,621	890,008	1,026,342	1.38	1.12	-19%	$2,456,931	$3,496,437	$1.993	$3.049	53%

*Number of Vehicles for 2014 includes surplus vehicles, which when subtracted from the total, bring the number of vehicles active in FY2014 to a number comparable to the FY2009 fleet total. The data for 2009 does not include any energy utilization by vehicles surplussed prior to the end of FY2009.

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