STATE OF NEW HAMPSHIRE, DEPARTMENT OF ADMINISTRATIVE SERVICES

STATEWIDE ENERGY CONSERVATION PLAN

RSA 21-I:14-C

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DECEMBER 1, 2012

The State of New Hampshire is currently working toward a goal of reducing fossil fuel consumption by 25 percent by 2025, in state buildings, on a square foot basis, compared to a 2005 baseline. In accordance with RSA 21-I:14-c, Energy Consumption Reduction Goal, Reports; the Department of Administrative Services (DAS) is required to submit an annual report on the State's progress toward reaching its energy reduction goal. Additionally the report shall identify problems which may prevent the state from achieving its goal. State agencies were provided a template that allowed them to report their building inventory, past energy reduction measures implemented, recommendations for future energy reduction methods, and a summary of their accomplishments and goals.

Individual agency reports have been received from all 16 property-owning agencies or institutions (see Appendix A for specific agency plans). The plans varied in the amount of detail and the number of measures documented. Nearly 250 energy conservation measures were proposed by property-owning agencies totaling roughly $40 million. This number was extrapolated based on the details that were given in the individual plans and is subject to change as project specifications are further developed. In addition, non-property owning agencies were provided with a simplified version of the template that allowed them to report on behavioral efforts that contribute to the state's overall goal of energy reduction. 19 plans were received from non-property owning agencies, boards, and commissions (See Appendix B for individual plans). Additionally, the State of New Hampshire Energy Management Annual Report is included as an appendix to this report.

As part of the agency level reports, departments have suggested many no-cost and low-cost measures that should be implemented immediately. Any behavior related changes that can decrease energy use should be strongly encouraged, as should no-cost changes to building operations and building control settings. Some items that should be done as routine maintenance save energy as well. Ignoring this maintenance is not only bad for the equipment, but it can also increase the state's energy costs. Agencies should be encouraged to implement low-cost measures (<$1000) with their operating budgets if these measures pay for themselves in less than 5 years. Many pay for themselves even more quickly than that and can be implemented on a facility by facility basis or through a statewide effort, such as the water cooler timers that were installed several years ago with energy efficiency capital funds. Agencies should be encouraged to learn from what other agencies have done that has been successful. Specific no- and low-cost measures gathered from agencies as part of this plan are detailed in Table 1.

Several commonalities were discovered through the course of this process. Many agencies could benefit from updating outdated HVAC systems. A portion of state buildings still operate heating and air conditioning systems that are 20 or more years old. Not only are these systems failing and working inefficiently due to their age, but technology has improved to a significant degree over the past several decades. Replacing these systems, while a large upfront cost to the state, could save a tremendous amount of energy and money. Fuel switching could also be considered when replacing outdated systems. Many areas of the state are now served by natural gas which is a cheaper and cleaner heating source than fuel oil. Renewable energy sources can and should be considered where appropriate and cost effective. Replacing outdoor lighting, which is often high-intensity-discharge technology, with LED technology is also a commonly sought-after energy efficiency measure. This technology is becoming cost-effective, but implementation should be reviewed on a site-by-site basis.

Additionally, campus-wide retrofits should be considered, as was done on Hazen Drive, to take advantage of economies of scale and standardizing fixture types.

State agencies are also becoming more savvy in their knowledge of energy efficient technologies such as weatherization of buildings. While buildings were constructed years ago with little attention paid to insulation, state staff is now aware that spending a few dollars to seal up a building's envelope can pay for itself in a short period of time. Weatherization is a set of skills that state employees could be trained on and the work done in-house to reduce costs and improve the payback period of projects.

Funds for new construction and major renovation projects are requested separately as capital budget items. All of these large projects should comply with the state's High Performance Design Standard as required by Executive Order 2011-1. Energy efficiency funds have been, and could continue to be, used to make further energy improvements to these projects once the initial budget for the project has been exhausted. Additionally, for facilities that require thorough energy retrofits, performance contracting could be used to install these measures. Several facilities are in the early stages of preparing for performance contracts, including Cannon Mountain and facilities located on Hazen Drive in Concord. Potentially, other performance contracts could be done at various courthouses, and the Department of Safety Troop Stations and Fire Academy. The state is targeting five to seven performance contracts over the next five years adding up to $15 million in energy retrofits. The results of this work could translate into hundreds of thousands of dollars in annual energy savings for the state, all at no up-front cost, as projects are paid for through the energy savings achieved and guaranteed by the vendor.

Many agencies have included facility studies and audits in their proposed measures lists. Agencies are in need of help to determine what measures can be done in their buildings and which ones are cost effective. Providing agencies with a resource to get these studies completed in a timely manner and at minimal cost would greatly benefit the state. Several facility-wide audits have been completed recently, leading to positive outcomes for the agencies. In 2009 the Department of Transportation funded an energy audit at its Traffic Bureau campus. As a result of this audit, many of the recommendations were implemented saving the department over $30,000 in energy costs annually. Additionally, in 2008, three New Hampshire buildings were selected to participate in the Greening State Capitols program sponsored by the National Governors Association and Walmart; a free program for state governments to receive energy audits on select buildings. The state has implemented every feasible measure that was identified as a result of this audit, again saving the state over $100,000 dollars annually.

The State has prioritized three years worth of projects, selected from the agency plans, which will contribute to the reduction of fossil fuels in its buildings. Projects that are already underway or already had a dedicated funding source were not included in this prioritization process, as these projects were assumed guaranteed completion without further assistance from DAS. Some of the criteria that were considered when making these determinations were:

- The priority ranking given by the agencies;
- The amount of detail in the project proposal, including costs and energy savings;
- The ability to use state labor for installation;
- The payback period for the project;
- A fair distribution of funding across agencies;
- Consideration to whether a performance contract would be taking place within select buildings in the near future; and

- Other benefits to the agencies, such as reduced maintenance costs and time, more comfortable and better operating buildings and systems, and replacement of equipment that has reached its end of life.

Projects with the best energy savings potential and the most detail provided by agencies were selected as candidates for the 2014 fiscal year. Other projects that were expected to yield high energy savings, but could still use some more planning and research, were moved onto the fiscal year 2015 and 2016 lists. Additionally, over the course of any year, more projects may be identified that take priority over the ones in the original plan for many reasons including equipment failure, emerging technologies, shifts in state building assets, changes in energy costs, and the discovery of "low-hanging fruit." Additionally, priority should be given to lighting retrofit projects where existing lighting no longer meets federal energy regulations and replacement lamps and ballasts have been discontinued.

Roughly one million dollars worth of projects were identified in each of the annual plans going forward. This typically would cover between 10 and 20 projects depending on size. While this represents a small fraction of the work submitted by agencies, there are factors that limit the amount of work that can be completed in any given year. State energy staff assistance is needed to help facilitate these projects, and due to the limited number of members on this team, there is a limit to the number of projects that can be undertaken. Additionally, larger projects often require the assistance of the Bureau of Public Works, which is already stretched thin and has little ability to take on additional work.

One of the deficiencies noted with the agency plans is the ability for agencies to collect detailed information on projects that may or may not come to fruition. Estimating project costs and calculating energy savings requires a lot of effort, time, and knowledge on the part of the agencies. Often these tasks are done by outside vendors for a fee or as a service in hopes of generating future business. Of the large number of proposed measures in the various agency plans, only a fraction include details on cost, energy savings, and payback period. As part of the process of putting together these agency level plans and the final statewide plan, DAS has noted where more resources are needed for agencies and will work to revise and improve the process going forward.

The process of helping non-property-owning agencies put their plans together also demonstrated a few things. One, the energy coordinators of non-property-owning agencies have received a lot less attention, and therefore are less educated in what they can do to help the state save energy. Tenant agencies occupy a variety of spaces, some are state owned, some are not; some pay utility bills and some have their utilities included in their rent. The message that was delivered to these agencies is that no matter what the situation, agencies can have an impact on the energy use in their facilities. Energy savings might have a direct impact on the state's expenditures, or it might be part of a strategy for negotiating lower lease rates.

Agencies took a good first step in 2012 by putting together the first version of their agency conservation plans. More work still needs to be done to further define projects, costs, and payback numbers to determine the total cost for the state to achieve its 25% reduction goal by 2025. In the meantime, agencies can continue to implement the low- and no-cost measures identified to reduce energy use. The DAS has requested $2 million in the FY14-15 capital budget that will be a key element to continuing the state's progress towards fossil fuel reductions. Additionally, performance contracting will be used to complete some of the larger projects identified in this plan.

Appendix A: Agency Conservation Plans, Property Owners

1. The New Hampshire Adjutant General's Department
2. Department of Administrative Services
3. New Hampshire Department of Corrections
4. New Hampshire Employment Security
5. New Hampshire Department of Environmental Services
6. New Hampshire Fish and Game
7. New Hampshire Department of Health and Human Services
    a. Glencliff Home
    b. Juvenile Justice Services
    c. New Hampshire Hospital
8. New Hampshire Liquor Commission
9. McAuliffe-Shepard Discovery Center
10. New Hampshire Police Standards and Training Council
11. New Hampshire Department of Resources and Economic Development
12. New Hampshire Department of Safety
13. New Hampshire Department of Transportation
14. New Hampshire Veterans Home

Appendix B: Agency Conservation Plans, Non-Property Owners

1. New Hampshire Department of Agriculture, Markets, and Foods
2. New Hampshire Banking Department
3. New Hampshire Board of Dental Examiners
4. New Hampshire Department of Education, Services for the Blind and Visually Impaired
5. New Hampshire Office of Energy and Planning
6. New Hampshire Executive Council
7. Family Mediator Certification Board
8. New Hampshire Department of Health and Human Services (non-owned facilities)
9. New Hampshire Commission for Human Rights
10. New Hampshire Insurance Department
11. New Hampshire Joint Board of Licensure and Certification
12. New Hampshire Judicial Branch
13. New Hampshire Judicial Council
14. New Hampshire Department of Labor
15. New Hampshire Lottery Commission
16. New Hampshire Board of Medicine (Optometry, Podiatry, and Examiners of Nursing Home Administrators)
17. New Hampshire Board of Mental Health Practice
18. New Hampshire Board of Pharmacy
19. New Hampshire Board of Tax and Land Appeals

Appendix C: Fiscal Year 2012, State of New Hampshire Energy Management Annual Report

Table 1: No-cost/low-cost Measures								
Agency/Bureau	**Measure Description**	**Building(s) Impacted**	**Measure Cost**	**Self install or contractor**	**proposed source(s) of funding**	**Life of measure (in years)**	**Expected annual cost savings over alternative (energy and maintenance)**	**simple payback (years to recoup cost - should be less than life of measure to justify expense)**
DAS	Relace Steam Traps	Grounds	$300	Self	BFAM	5		
DAS General Services	Install motion sensors in 4 bathrooms	EOC	$100	Self	General Services	10+		4
DAS General Services	Install timers on water fountains	AOC	$240	Self		10+		3
DAS General Services	Add time clock to exhaust fans	Justice	$300	Self	General Services	10+		3
DAS General Services	Add time clock to Hot Water Heater	State House	$300	Self	General Services	10+		3
DAS General Services	Add time clock to Hot Water Heater (old section)	12 Hills Ave	$300	Self	General Services	10+		3
DAS General Services	Split lights up onto 2 separate switches in Mech Room/ Office	EOC	$500	Self	General Services	20+		6
DAS General Services	Install remote photocell(s) for 3 lights that stay on during cloudy and winter days	EOC	$900	Self	General Services	20+		10
DES	Incorporate EE driving into Defensive Driving course	N/A	N/A	Self		1		
DES	Develop, pilot, and then roll out behavioral change program for agencies	All	N/A	Self		1		
DOT	Install setback timers on electric water heaters	Sheds 206, 207	$200.00		Class 20, 3007	10	$134.08	2
DOT	Decommission Boiler	Building C	$500.00		48-3060	N/A	$4,843.62	N/A
DOT	Insulate Windows	Bldg C - Main Building	$500.00		47-3060	5	N/A	N/A
DOT	Occupancy Sensor	Shed 304	$1,000.00		DAS Capital EE Funds	10	$120.00	7
DOT	Remote Controls for Overhead Doors	Multiple	$1,500.00		DAS Capital EE Funds	10		2 (est. 50%)
DOT	Replace hand dryers with presence-sensing on-off	Rest Areas	$1,600.00		DAS Capital EE Funds	10	To be Determined	4
DOT	Building Tune-Ups (clean furnaces)	All	$5,000		Class 020, 3007			
DOT	Reduce Thermostat Temperature	All Buildings	N/A	Self	N/A	11		0
DOT	Reduce Temperature	Bldg C - Main Building	N/A	Self	N/A	11	N/A	N/A
DRED	Energy Improvements - efficient hand dryers, and small items	Rest Areas	<$1000		None Identified	10		

Table 2: Prioritized Measures for Fiscal Year 2014								
Agency	**Measure Description**	**Building(s) Impacted**	**Measure Cost**	**Self install or contractor**	**proposed source(s) of funding**	**Life of measure (in years)**	**Expected annual cost savings over alternative (energy and maintenance)**	**simple payback (years to recoup cost - should be less than life of measure to justify expense)**
Adjutant General	Spray in foam insulation	Center Strafford Admin	$50,000		Combination of state and federal	35	Unknown	Unknown
Adjutant General	Boiler replacements	Building F, Building M, Hillsborough, Milford and Portsmouth	$500,000		Combination of state and federal	20	Unknown	Unknown
DAS	Insulate steam piping in steam room	64 South Street	$4,000	Self	DAS Capital EE Funds	20+		2
DAS	CTI reprogram and eliminate motor use	EOC	$6,000	Contractor	DAS Capital EE Funds	20+		2
DAS	Replace OutDoor HID Fixtures with LED	Brown Building	$15,000	Self	BFAM	16		
DES	High-Efficiency Air-Source Electric Heat Pumps	Keene Air Monitoring Station (1 unit)	$1,400	Contractor	Supplemental Environmental Project (SEP) Funding	15	$480	2.9
DES	High-Efficiency Air-Source Electric Heat Pumps	Lebanon Air Monitoring Station (1 unit)	$1,400	Contractor	Supplemental Environmental Project (SEP) Funding	15	$480	2.9
DES	High-Efficiency Air-Source Electric Heat Pumps	Portsmouth (Pierce Isld) Air Monitoring Station (1 unit)	$1,400	Contractor	Supplemental Environmental Project (SEP) Funding	15	$480	2.9
DOT	Replace existing 400W metal halide lights (14 units) with compact fluorescent lights	Satellite Garage	$2,500			16	$628	2 (est. 50%)
DOT	Upgrade 224 (old) (Remove skylights, board up end OHD, replace pass door, upgrade interior lighting)	224 (old)	$3,500		DAS Capital EE Funds	16	To be Determined	n/a
DOT	Used Oil Furnace/Burner	Twin Mtn. (2nd one)	$8,150			20	unavailable	
DOT	Upgrade Ceiling Insulation	201, 210, 211, 212, 214 (old), District Office, LRA	$12,250		DAS Capital EE Funds	20	$200	7 (est. 15%)
DOT	Roof insulation envelop	527 - Manchester	$20,000		DAS Capital EE Funds			
DOT Traffic	Upgrade Facility Lighting	All	$10,500			10 yrs	$1,500	3.5 yrs
DRED	Mt Washington Weatherization	Sherman Adams	$100,000					
Vets Home	Expansion of Domestic Solar	Tarr North and Tarr South	$250,000		35% General 65% Federal	50 years		Unknown
		TOTAL	**$986,100**					

Table 3: Prioritized Measures for Fiscal Year 2015								
Agency	**Measure Description**	**Building(s) Impacted**	**Measure Cost**	**Self install or contractor**	**proposed source(s) of funding**	**Life of measure (in years)**	**Expected annual cost savings over alternative (energy and maintenance)**	**simple payback (years to recoup cost - should be less than life of measure to justify expense)**
Adjutant General	Lochnivar natural gas boilers	Rochester (Brock St.)	$125,000		Combination of state and federal	20	Unknown	Unknown
F&G	Retrofit remaining T12 fixtures to T8	All locations						
Glencliff	Convert from #2 boiler to steam	LaMott		Contractor	Capital Project Funds	15	$60,000	
Glencliff	Convert small out buildings from #2 to electric heat	Birchwood, Carpentry shop, Dr. Cottage		Contractor	Maintenance Budget			
Juvenile Justice	Change outside lighting to LED	Entire campus						
Juvenile Justice	Change lighting for Gym to LED	SYSC						
Juvenile Justice	Change lighting to T8	Admin Building						
Juvenile Justice	Complete installation of light se	SYSC						
Liquor	Adding EE Measures to New Construction	Manchester						
Liquor	Adding EE Measures to New Construction	Bedford						
		Total (approximately)	$1,000,000					

Table 4: Prioritized Measures for Fiscal Year 2016								
Agency	**Measure Description**	**Building(s) Impacted**	**Measure Cost**	**Self install or contractor**	**proposed source(s) of funding**	**Life of measure (in years)**	**Expected annual cost savings over alternative (energy and maintenance)**	**simple payback (years to recoup cost - should be less than life of measure to justify expense)**
DOT	Alternative Fuel Heater	Patrol Shed 10	$5,000		Bur 58 Energy and Environmental Funds	20		
DOT	Insulated windows, wall and ceiling insulation, siding, entry doors	512 - Londonderry	$15,000		DAS Capital EE Funds			
Emp Sec	Repalce HVAC Units	Berlin (2 Units)	$75,000					
Emp Sec	Repalce HVAC Units	Laconia (2 units)	$80,000		Agency Funding			
Liquor	New Construction	Store 66 - I-93 North			Liquor			
Liquor	New Construction	Store 67 - I-93 South			Liquor			
NHH	Upgrade htg w/ actuators & monitoring via EMS*	How Rec	$5,000		DAS Capital EE Funds		$5,000	1
Police Standards	Boiler Upgrades	Administrative Building	$75,000		DAS Capital EE Funds			
	Other measures to be prioritized prior to FY16		$750,000					
			$1,005,000					