

STATE OF NEW HAMPSHIRE, DEPARTMENT OF
ADMINISTRATIVE SERVICES

2017 STATEWIDE ENERGY CONSERVATION PLAN

RSA 21-I:14-C



Statewide Energy Conservation Plan

RSA 21-I:14-C

JANUARY 15, 2018

In accordance with Revised Statutes Annotated (RSA) 21-I:14-c, Energy Consumption Reduction Goal; Reports, each state department must identify cost-effective measures to reduce fossil fuel consumption by 30 percent by 2020 in state buildings, on a square-foot basis as compared to a 2005 baseline. Each state department must submit an annual report to the Department of Administrative Services (DAS) which details any cost-effective measures it is currently utilizing as well as potential measures, subject to budgetary approval, to comply with the energy consumption reduction goal established by RSA 21-I:14-c. DAS is required to compile all departmental conservation plans to summarize and report on the State's progress toward reaching its fossil fuel reduction goals and identify problems that may prevent the state from achieving these goals. This document is submitted to fulfill DAS's reporting obligation. The State of New Hampshire Fiscal Year 2017 Annual Energy Report provides a summary of the State's progress over the last year, and is included as Appendix C to this report.

State Agency Energy Conservation Plans

Individual agency reports have been received from thirteen of the fifteen large property-owning agencies and institutions (see Appendix A for specific agency plans). Juvenile Justice Services, under the Department of Health and Human Services and Department of Resource and Economic Development did not submit agency plans for 2017. All plans received were reviewed by DAS staff. Collectively, agencies have identified and proposed an estimated \$47 million¹ dollars' worth of energy conservation measures to be completed in their efforts to achieve fossil fuel reduction goals for 2020.

Departments listed 118 energy conservation measures completed in FY17. Of these measures, agencies were able to provide calculated energy savings for 101 measures. The total cost of completing these 101 measures was nearly \$11 million resulting in nearly \$1.2 million in annual avoided energy costs. The 101 projects listed in the plans included one energy saving performance contract. Many of these measures will remain in state facilities for twenty years or more, adding to additional avoided energy costs over time.

Non-property owning agencies were asked to complete a simplified plan consisting of a one-page summary of the efforts that they have made over the past year to reduce energy consumption along with reduction goals for the upcoming year. Eleven non property-owning agencies were required to submit plans based on the criteria listed in Executive Order 2016-03: agencies that occupy more than 5,000 square feet and those that employ at least 15 people. Ten out of the eleven non property-owning agencies met their obligation of submitting a completed Energy Conservation Plan for FY17; with New Hampshire Department of Education not submitting a plan. Two main ideas were consistent throughout non-property-owning agency plans; as tenants in their buildings, non-property-owning agencies see themselves as having limited control over energy improvements to the building(s) they occupy. Secondly, these agencies report that they encourage employee behavior change to reduce energy consumption; however they wish there was more they could do to help meet the State's goals of fossil fuel and energy reductions. All ideas that were included in these non-property owners' plans will be passed along to the department that owns the building for review and possible

¹ Measure costs provided by agencies include non-energy related components of some projects. New construction projects were included at 15% of total cost.

implementation. See Appendix B for a list of departments that do not own property and submitted an energy conservation plan.

Past Energy Management Initiatives

The State Energy Management Office was awarded a total of \$500,000 in capital funds for energy conservation projects for the fiscal biennium 2016/2017. The State Energy Manager and staff took an approach to equitably distribute the funds across property owning departments based on the square footage of building space that each owns. All agencies were able to expend the entire amount of money allocated to them on energy saving projects. The capital allocation fully or partially funded 36 projects resulting in a projection of over \$86,000 in annual avoided energy costs.

The Energy Management Office introduced a pilot initiative in 2015 called the Small Buildings Energy Efficiency Program (SBEEP). This program focuses on state-owned buildings across all agencies that are 5,000 square feet or smaller. In the past, energy saving opportunities in these smaller buildings has been largely ignored due to the State's focus on larger, more energy-intensive facilities. The SBEEP program conducts high level energy evaluations of qualifying state buildings and provides instant energy savings through turnkey savings measures such as LED lighting, spray foam air-sealing of the building envelope, faucet aerators, and appliance timers. Energy management recommendations and efficiency tips are provided to the agency to implement after the visit has been completed. During site visits, energy efficiency improvement opportunities are commonly identified that are beyond the scope of SBEEP; many of these have been added to the queue of projects to be completed when capital funding becomes available. In 2017, the program is estimated to have achieved over \$1,700 in annual energy savings through immediate simple energy improvements and an additional \$7,000 annual energy savings through completed capital-funded energy efficiency improvement projects identified during site visits.

In FY17, the State completed two (2) energy saving performance contracts (ESPC) (Hazen Drive and Cannon Mountain projects) with one (1) ESPC (for 28 facilities in Concord) currently in contract negotiations. ESPCs are a way for departments to implement energy saving measures in their buildings with no up-front capital expenditures. Agencies pay for measures over time from the energy savings associated with the projects using their utility budgets. Departments see no difference in their total expenditures because the ESPC contract payments are offset by reduced energy bills. The Hazen Drive project covered four (4) buildings and constructed a new biomass plant that serves the building located at 29 Hazen Drive. The estimated energy reduction from this ESPC was 20% with a 71% fossil fuel reduction, and the project is on track to meet those projections. The Cannon Mountain project included replacement of Cannon's main-trunk powerline and upgrading the transformer; construction of a mid-mountain snowmaking booster pump house; installation of 388 high efficiency tower snowmaking guns; and lighting and weatherization upgrades. This project had an original energy savings projection of 30% and is currently exceeding those projections with an estimated 50% energy reduction. Construction on the third project mentioned above, the ESPC for 28 facilities, will likely begin in 2018. The 28 facilities are located in downtown Concord and on the State Office Park South.

Energy Management Staff worked with the US Department of Energy in 2016 to complete an ESPC Champions Toolkit. This toolkit provides agencies with all of the guidance they need to initiate their own ESPCs. The Energy Management team can provide technical assistance with the project as it progresses. This toolkit helps agencies take ownership of their energy saving projects and in turn, the energy reduction goals outlined in Executive Order 2016-03. This also frees up the time of the minimally staffed Energy Management Office and allows more projects to happen. After the presentation of the toolkit to agencies in

October 2016, there has been an increased interest from agencies in ESPC and a fourth project is planned to go forward in early 2018.

In preparation for performance contracting, a facility may elect to defer any energy related upgrades so that they can be included in the overall project. Longer payback items are offset by energy measures with quicker paybacks and the blending of these projects is what makes the initiative successful.

Future Energy Projects

The Energy Management team completed the projects that were funded using the FY16/17 energy capital funds. For a list of projects completed with FY16/17 energy capital funds, please see Table 2. The \$500,000 capital appropriation was allocated based on the square-footage owned by each agency.

Based on the information received in the individual agency conservation plans, the Energy Management team has assembled a list of measures to be pursued in FY18/19. Measures were included in the list (see Table 1) if they met the following criteria:

- Agencies were able to provide project cost and energy savings estimates;
- Payback periods for the projects were reasonable; and
- Agencies indicated that no other source of funding was available to fund the measure.

Additional work could be completed through energy performance contracts. Energy audits and other similar studies can provide agencies with a prioritized plan, often identifying measures that would not be completed otherwise and allowing agencies to see which measures will result in the largest benefit.

While this list serves as an indication of the amount and type of projects that need to be done across the State, situations and technologies change over time and a department's priorities may shift due to these circumstances. The Energy Management Office supports departments in getting critical projects done quickly and also focuses on high energy saving projects that will provide the most benefit to the State. Based on information provided by the departments in their plans, it is evident that many are able to find the funding for smaller (under \$50,000) projects, but often struggle to be able to complete projects in the \$100,000 to \$500,000 range. For example, a small lighting retrofit can often be accomplished within the operating budget of a department, but a full facility lighting retrofit can often run several hundred thousand dollars which makes it unattainable within their biennial budget.

The State Energy Management team believes that easily implemented and widespread initiatives are needed to meet the challenging energy reduction targets outlined in Executive Order 2016-03. The State Energy Manager intends to pursue energy saving performance contracts with several state agencies in FY18 and beyond. Departments require resources to achieve these goals, including access to professional studies and audits, training, funding, and staff that are able to assist in the implementation of energy saving measures. All State agencies would benefit from a better funded and staffed DAS Energy Management Office to work with departments on all phases of project implementation and tracking. Departments are clearly spending more on energy and maintenance than they need to. A combination of education, funding, and staff is necessary to improve the energy efficiency of state facilities and divert tax dollars away from departmental energy budgets and towards other areas that are in need.

Appendix A: Agency Conservation Plans, Property Owners

1. The State of New Hampshire Adjutant General's Department
2. New Hampshire Department of Administrative Services
3. New Hampshire Employment Security
4. New Hampshire Department of Environmental Services
5. New Hampshire Fish & Game
6. Department of Health and Human Services - New Hampshire Hospital
7. New Hampshire Liquor Commission
8. New Hampshire Police Standards & Training Council
9. New Hampshire Department of Safety
10. New Hampshire Department of Transportation
11. New Hampshire Veterans Home
12. New Hampshire Department of Corrections²
13. Department of Health and Human Services - Glenciff Home²

Appendix B: Agency Conservation Plans, Non-Property Owners

1. New Hampshire Department of Agriculture, Markets & Food
2. New Hampshire Banking Department
3. Office of Strategic Initiatives
4. Department of Information Technology
5. New Hampshire Insurance Department
6. New Hampshire Department of Justice – Office of the Attorney General
7. New Hampshire Department of Labor
8. New Hampshire Lottery Commission
9. New Hampshire Public Utilities Commission
10. New Hampshire Department of Revenue Administration

Appendix C: Fiscal Year 2017, State of New Hampshire Energy Management Annual Report

² Department of Corrections and Glenciff Home submitted plans after the due date. This report does not reflect information submitted by these agencies.

Table 1: Prioritized Measures for Fiscal 2018/19 (As provided by departments in their agency-level plans)

Agency	Measure Description	Building(s) Impacted	Estimated Measure Cost	Expected Annual Energy Cost Savings	Simple Payback (Years to Recoup Cost)
DAS - Facilities & Asset Management					
	Basement windows panels	Thayer	\$5,000.00	\$800.00	6.3
	Replace Heating System	Thayer	\$100,000.00	\$9,600.00	10.4
	Replace Heating System	Main	\$150,000.00	\$16,000.00	9.4
	Replace Heating System	Dolloff	\$100,000.00	\$12,800.00	7.8
	Replace Heating System	Paint and Carpentry	\$50,000.00	\$5,040.00	9.9
	Replace Heating System	Thayer	\$100,000.00	\$11,200.00	8.9
DAS - General Services					
	Parking lot LED lighting	Dept. of Justice	\$6,145.00	\$2,160.00	2.8
	Exterior LED facility lighting	Supreme Court	\$3,204.00	\$480.00	6.7
	Exterior LED facility lighting	Walker Building	\$4,500.00	\$948.00	4.7
	Exterior LED facility lighting	Londergan Hall	\$3,600.00	\$984.00	3.7
	Exterior LED facility lighting	Spaulding Hall	\$2,900.00	\$792.00	3.7
DAS - Court Facilities					
	Install new Condensing Boilers	Rockingham Cty	\$105,000.00	\$22,000.00	4.8
Dept. of Safety					
	Motion Sensors in conf rooms	James Hayes Bldg - Safety	\$2,000.00	\$360.00	5.6
Employment Security					
	LED lighting	Salem NHES	\$8,000.00	\$1,440.00	5.6
Fish & Game					
	Freezer Preventive Maint.	3 Regional & 1 Hatch	\$1,900.00	\$384.00	
	Lighting Improvements	Warren Hatchery	\$966.00	\$240.00	4.0
	Lighting Improvements	Warren Hatchery	\$157.00	\$60.00	2.6
NH Hospital					
	Upgrade Air Handling Systems	APS	\$2,400,000.00	\$171,000.00	14.0
	Replace steam with Natural Gas Forced Hot Water Boilers with outdoor temperature reset.	Howard Recreation	\$100,000.00	\$11,960.00	8.4
	Replace steam with Natural Gas Forced Hot Water Boilers with outdoor temperature reset.	Pond Place	\$85,000.00	\$9,200.00	9.2
	Install synchronous belts and sheaves on all remaining air handlers	APS and Howard Rec	\$4,856.76	\$2,160.00	2.2
	Install VFD's on AHU's	Howard Recreation	\$2,112.86	\$1,320.00	1.6
NH Veterans Home					
	Convert 3 boilers from #2 heating oil to natural gas	Main residential building	\$38,432.72	\$20,800.00	1.8
Police Standards and Training					
	Replacement of parking lot light poles with LED	PSTC	\$4,000.00	\$1,800.00	2.2
Dept. of Transportation					

Agency	Measure Description	Building(s) Impacted	Estimated Measure Cost	Expected Annual Energy Cost Savings	Simple Payback (Years to Recoup Cost)
	Evaluation and change in heating Toll Plazas	All Toll facilities	\$250,000.00	\$195,000.00	1.3
	Replacement of HID lighting with LED lighting	All Toll facilities	\$80,000.00	\$18,600.00	4.3
Totals			\$3,607,774.34	\$517,128.00	7.0

Some work has already begun on the prioritized measures

Table 2: Capital Funded Project Summary FY16/17

AGENCY & BUREAU	LOCATION	DESCRIPTION	EXPLANATION	TOTAL PROJECT COST	CALC. SAVINGS (per year)	YRS. PAYBACK
DAS - General Services						
	Londergan Hall	Steam pipe insulation	replace damaged insulation	\$2,872.00	\$3,000.00	1.0
	Morton Building	Exterior lighting upgrade	replace 38 metal halide wall packs with LED	\$10,064.00	\$2,129.00	4.7
	State House Annex	Insulation gun for SBEEP		\$130.32	\$100.00	1.3
	Storrs Street Parking Garage	Lighting upgrade	incandescent lights upgraded to LED w/ occ sensors	\$36,940.00	\$6,984.00	5.3
	29 Hazen Dr.	Steam pipe insulation	Thermaxx pipe insulation added	\$9,995.85	\$1,624.00	6.2
	Emergency Operations Center	Interior lighting upgrade	replace fluorescent lighting with LED in 911/EOC/State police call center	\$27,904.80	\$9,677.00	2.9
	Emergency Operations Center	Parking lot lighting upgrade	replace 12 metal halide fixtures with LED	\$8,515.00	\$2,548.00	3.3
	Mechanical Services, DOT	Parking lot lighting upgrade	24 MH fixtures upgraded to LED	\$14,256.00	\$1,787.00	8.0
	Storrs Street Parking Garage	missed lights from larger project	upgrade MH pole lights to LED	\$1,638.00	\$213.00	7.7
	Records & Archives	Exterior lighting upgrade	replace MH wall packs with LED	\$4,608.90	\$1,133.00	4.1
	64 South St.	Exterior lighting upgrade	replace MH wall packs with LED	\$5,860.00	\$1,096.70	5.3
	64 South St.	Flagpole lighting	replace halogen lights with LED	\$145.08	\$30.00	4.8
Adjutant General						
	Concord readiness center	Boiler and water heater replacement, various EE upgrades	contributed to larger EE project	\$75,000.00	\$5,542.00	13.5
DAS - Court Facilities						
	Rockingham Superior Courthouse	Parking lot lighting upgrade	replace HID lights with LED	\$23,139.00	\$7,730.00	3.0
	Rochester District Courthouse	Interior lighting upgrade	replace T8 fluorescent with LED	\$2,464.00	\$284.00	8.7
	Carroll County Courthouse	Thermal Curtains	added thermal quilts to large window areas	\$9,497.51	\$3,730.00	2.5
	Lebanon District Courthouse	Thermal Curtains	add custom thermal curtains to large window areas	\$12,224.67	\$2,579.00	4.7
	Conway Courthouse	Thermal Curtains	install thermal curtains in lobby and offices	\$8,647.37	\$1,258.26	6.9
Police Standards and Training						
	Dorm/offices	replace two old boilers	upgrade to HE condensing boilers	\$45,000.00	\$3,002.00	15.0
Corrections						
	Women's Prison - Concord	Renewable project for new construction	100kW p.v. rooftop array	\$40,000.00	\$2,353.00	17.0
Dept. of Transportation						
	Traffic - Building B	Boiler replacement	HE gas boiler	\$40,000.00	\$5,714.00	7.0
Juvenile Justice Services						
	Sununu YSC	Retro commissioning study		\$36,000.00	\$5,000.00	7.2
DRED						
	Forestry Nursery	Barn/Office lighting upgrades	replaced old fluorescent lighting with LED	\$4,425.00	\$479.00	9.2
	Monadnock S.P bathouse	lighting upgrade	replace t12 fluorescent w/ vapor sealed LED	\$1,905.00	\$339.00	5.6
	White Lake State Park	(Phase 1) lighting upgrade	replace old fluorescent / incandescent lighting in several buildings with LED	\$8,459.02	\$1,320.96	6.4
	Colmen State Park - Managers cabin	lighting upgrade (RETURNED)	upgrade T-12 fluorescent lighting to LED, add dimmable controls	\$3,960.00	\$856.32	4.6
	White Lake State Park	(phase 2) lighting upgrade	LED upgrade in various buildings	\$5,370.26	\$1,347.05	4.0

AGENCY & BUREAU	LOCATION	DESCRIPTION	EXPLANATION	TOTAL PROJECT COST	CALC. SAVINGS (per year)	YRS. PAYBACK
	Colmen State Park - rec hall	lighting upgrade	Upgrade all t12 fluorescent lighting to LED, with dimmable controls	\$4,433.92	\$683.65	6.5
Dept. of Safety						
	Troop A	LED lighting upgrade	upgrade T12 fluorescent to LED	\$13,400.00	\$1,535.00	8.7
Employment Security						
	Portsmouth Office	Interior Lighting upgrade	Fluorescent Troffers upgrade to LED	\$11,776.50	\$1,800.00	6.5
Liquor Commission						
	Retail Store HQ and Warehouse	exterior lighting upgrade	wall packs and canopy lights upgraded to LED	\$6,743.60	\$2,533.00	2.7
NH Veterans Home						
	NH Vets Home	exterior lightin upgrade	replace 9 halogen bollard lights w/ LED	\$5,091.03	\$776.00	6.6
	NH Vets Home	Clothes dryer upgrade	replace old gas dryer with HE dryer	\$7,705.00	\$1,776.00	4.3
Fish & Game						
	F&G Headquarters	Lighting upgrades	replace T12 lighting in coference room with LED	\$9,250.00	\$2,581.00	3.6
	F&G Headquarters	Wall pack upgrades	replaced 7 additional halogen wall packs with LED	\$1,643.04	\$570.00	2.9
DES						
	Air Monitoring Stations	Security lighing upgrade	Replace halogen with LED & occ sensors	\$993.90	\$1,983.00	0.5
Totals				\$500,058.77	\$86,093.94	5.8