
EXECUTIVE SUMMARY

NORESKO is pleased to have been selected as the City of Newton's partner to audit, engineer, design, and construct energy savings projects throughout its City and School buildings. The following Detailed Energy Audit (DEA) encompasses the second phase of buildings proposed to be completed as part of the NORESKO-City of Newton Initiative to reduce energy use, operating costs, and greenhouse gas emissions.

NORESKO and City of Newton personnel have worked together in a collaborative, thorough and detailed project development process to review and prioritize the energy conservation measures (ECMs) included in the following Detailed Energy Audit (DEA) scope of work. We would especially like to recognize and thank Carol Chafetz, David Tannozzini, and Josh Morse for their commitment to accommodate the scheduling requirements of our engineering analysis of each building, and all the meetings and discussions that were necessary to develop this comprehensive project.

Based on our audit findings and input provided during project development meetings, NORESKO has developed this portfolio of energy, water and cost savings measures that will improve the facility infrastructure, reduce greenhouse gas emissions, and generate significant guaranteed energy and water cost savings that are sufficient to cover the project finance costs. The \$3.6 Million package of energy conservation measures (ECMs) summarized within the tables on the following pages is fully described in the following DEA Report.

We have developed a package of energy conservation measures that are designed to meet the City's needs. This package delivers a wide range of important energy conservation and infrastructure improvements that are funded entirely from the utility cost savings while delivering substantial positive cash flow over the contract term. This package includes:

- **Comprehensive energy management system improvements** to provide for new web-based control of the HVAC systems. In addition to substantially reducing energy consumption, these improvements will provide City of Newton staff with the ability to remotely monitor HVAC systems, provide tighter control of temperature and HVAC devices, and improve occupant comfort;
- **New lighting systems for the Brown and Oak Hill Middle School auditoriums**, which will greatly improve lighting levels in these spaces. With these lighting improvements, the auditoriums will be much brighter, more attractive venues for events such as theatrical and musical performances;
- **Weatherization of exterior doors and roof penetrations** to reduce infiltration and drafts;
- **Attic insulation** to reduce lost heat and provide for a tighter envelope;
- **Thermostatic radiator valves** in City Hall, the Education Center, and the Brown Middle School which will provide better control of the heating systems, saving energy and improving occupant comfort by reducing unnecessary overheating;
- **Comprehensive lighting improvements and occupancy sensors** which will reduce lighting energy use; and
- **Low-flow plumbing retrofits** to reduce water and sewer costs and provide modern plumbing fixtures.

The following table presents a financial summary of the project for the City's consideration:

Financial Summary

	Value
Total Investment	\$ 3,647,456
Annual Savings	\$ 364,602
Utility Rebates	\$ 116,650
Total Bond Payments	\$ 4,778,168
Total Service Payments	\$ 754,505
Total Savings	\$ 6,781,205
Total Net Cash Flow	\$ 1,248,532
Contract Term	15 Years

SUMMARY OF ENERGY CONSERVATION MEASURES

	ECM	Price	Savings	Simple Payback	Estimated Rebates
1a	Lighting Improvements	\$ 584,458	\$ 71,234	8.2 Yrs	\$ 41,124
1b	Lighting Controls	\$ 268,931	\$ 32,265	8.3 Yrs	\$ 22,120
1c	New Lighting in Bigelow & Brown Auditoriums	\$ 124,562	\$ (1,209)	-103 Yrs	\$ -
2	Water Conservation	\$ 218,209	\$ 42,392	5.1 Yrs	\$ -
3	Steam Trap Improvements	\$ 232,368	\$ 55,410	4.2 Yrs	\$ 7,500
4	Thermostatic Radiator Valves	\$ 191,121	\$ 10,347	18.5 Yrs	\$ -
5a	Weatherization	\$ 173,331	\$ 23,131	7.5 Yrs	\$ -
5b	Attic Insulation	\$ 104,354	\$ 7,895	13.2 Yrs	\$ 17,244
-	Control Systems				
6	Energy Management System Improvements (Opt 1)	\$ 1,600,350	\$ 69,259	23.1 Yrs	\$ 22,062
6	Computer Power Management	\$ 86,666	\$ 49,364	1.8 Yrs	\$ -
7	VFDs & PE Motors	\$ 63,106	\$ 4,514	14.0 Yrs	\$ 6,600
TOTALS		\$ 3,647,456	\$ 364,602	10.0 Yrs	\$ 116,650

CASH FLOW TABLE

Year	Bond Payments	M&V Service Payments	O&M Service Payments	Software Maintenance Fee	Total Expected Savings	Guaranteed Savings	Net Cashflow	Utility Rebates	Cashflow after Rebates
0	\$0				\$0	\$0	\$0		\$0
1	\$386,630	\$12,480	\$0	\$8,320	\$364,602	\$364,602	(\$42,828)	\$62,441	\$19,613
2	\$376,904	\$12,886	\$0	\$8,590	\$375,540	\$375,540	(\$22,840)	\$22,940	\$100
3	\$367,177	\$13,304	\$22,922	\$8,870	\$386,806	\$386,806	(\$25,467)	\$25,567	\$100
4	\$357,451	\$13,737	\$23,667	\$9,158	\$398,410	\$398,410	(\$5,602)	\$5,702	\$100
5	\$347,724	\$14,183	\$24,436	\$9,455	\$410,363	\$410,363	\$14,564		\$14,564
6	\$337,998	\$14,644	\$25,230	\$9,763	\$422,674	\$422,674	\$35,039		\$35,039
7	\$328,271	\$15,120	\$26,050	\$10,080	\$435,354	\$435,354	\$55,833		\$55,833
8	\$318,545	\$15,611	\$26,897	\$10,408	\$448,414	\$448,414	\$76,953		\$76,953
9	\$308,818	\$16,119	\$27,771	\$10,746	\$461,867	\$461,867	\$98,413		\$98,413
10	\$299,091	\$16,643	\$28,674	\$11,095	\$475,723	\$475,723	\$120,220		\$120,220
11	\$289,365	\$17,184	\$29,606	\$11,456	\$489,995	\$489,995	\$142,385		\$142,385
12	\$279,638	\$17,742	\$30,568	\$11,828	\$504,694	\$504,694	\$164,918		\$164,918
13	\$269,912	\$18,319	\$31,561	\$12,212	\$519,835	\$519,835	\$187,831		\$187,831
14	\$260,185	\$18,914	\$32,587	\$12,609	\$535,430	\$535,430	\$211,135		\$211,135
15	\$250,459	\$19,529	\$33,646	\$13,019	\$551,493	\$551,493	\$234,841		\$234,841
	\$4,778,168	\$236,413	\$363,615	\$157,610	\$6,781,200	\$6,781,200	\$1,245,395	\$116,650	\$1,362,045

Notes


1. NORESKO is committed to working on City’s behalf to obtain utility rebates, incentives and other subsidies that can reduce the project’s net cost, and deliver added value to the City. The current utility rebates are estimated based on NSTAR electric and NGRID natural gas rebate programs, and are subject to utility approval. Utility rebates will be paid directly to the City.
2. “Bond Payments” include interest and principal and assume a bond coupon of 4.0%, which is estimated based on rates obtained by the City on recent projects.
3. “M&V Service Payments” are associated with NORESKO’s annual savings measurement and verification activities.
4. “O&M Service Payments” are associated with NORESKO’s annual Steam Trap Service & Maintenance Program which commences in year 3.
5. “Software Maintenance Fees” are for computer power management software annual license renewals. These fees are paid by the City directly to the software company.
6. “O&M Savings” include maintenance savings associated with the Lighting Improvements. Under the Lighting Improvements, NORESKO will install new energy efficient lighting systems, which will deliver maintenance cost savings due to reduced lamp and ballast replacement costs.
7. Assumes an average energy escalation rate of 3.0% per year starting year one after completion of the project’s construction.
8. Project pricing presented in this DEA is valid through October 31.


Environmental Impact of Proposed Energy Conservation Measures

NORESCO is a proud member of the U.S. Green Building Council, Clinton Climate Initiative, and a long-time EnergyStar Business Partner. In addition to the direct positive economic benefit this project will have to the City, perhaps even more importantly, this project will provide significant environmental benefits to the City and the surrounding community. Quantified in the table below is the greenhouse gas emission reductions that will occur as a result of new higher efficiency equipment replacing the existing old, less efficient systems; as well as new controls that will limit the equipment's use to when only needed by the building occupants.

Energy Savings		
Energy Source	Energy Units	Value
Electricity	kWh	1,020,778
Natural Gas	Therms	91,147
Water & Sewer	Kgal	1,834

Emissions Reductions		
Emission Type	Emissions Units	Value
CO ₂	Lbs	2,419,039
NO _x	Lbs	5,678
SO _x	Lbs	3,541

Equivalent Number of Acres of Trees Planted		362 Acres
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Equivalent Number of Cars Removed from the Roads		292 Cars
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Other Measures Considered

NO RESCO considered several additional energy conservation opportunities. However, in general these measures are not included in the project because these ECMs have long paybacks and the overall program cash flow does not support the costs of these improvements.

- Plug Load Controllers
- New Windows at the Police Annex
- Electric Heat Alternatives at Oak Hill Middle School
- Exhaust Fan Repairs at City Hall
- Solar Domestic Hot Water Systems

Summary

Now that the time intensive process of accurately developing the project scope has been completed, we look forward to completing the steps that will result in another successful project. NO RESCO is confident that, with the continued commitment of the City, the project will be very successful and meet your highest expectations.

NO RESCO offers the strength of a New England based national energy services company (ESCO) that specializes in and has implemented more performance contracts than any other ESCo in the Northeast for more than 20 years. NO RESCO's strong local roots, experience with the Commonwealth of Massachusetts ESCO program, and product-neutral national reputation combine to offer the City of Newton an outstanding resource to meet its performance-based energy improvement goals. We look forward to a continued partnership with the City.