

Information for Implementation Model ~ BBC ~ October 3, 2014

This table represents a summary of recommended energy saving measures from the Northwrite pilot and retro-commissioning at the Library. It also identifies expected savings, implementation costs and other details.

Recommended ESM Title	Description of recommendations	Location	Expected Annual Savings	Implementation Costs	Implemented? If yes, details. If not, why not.
Reduce Lighting Hours	Walk through showed extremely long lighting hours and opportunities to reduce M-F schedule by 1 hour and weekend hours even more by pulling the janitorial start time to do some items during occupied times.	Library	\$3,253	\$0	Yes. Rescheduled janitorial night crew schedule and reprogrammed lighting controls panels to cut back 1.5 hour spent per day M-Th and 3 hours, Friday-Sunday.
Calibrate Temperature Control Sensors	Check setpoints to ensure they are set for 70 degrees for heating and 74 for cooling. Calibrate sensors.	Library	\$3,112	\$0	Yes, and no complaints received.
Reduce VAV Reheat by 20%	Walk through and analysis picked up a good deal of reheat happening in the VAV system. Given the amount of outside air being brought in, there was a need to be more aggressive in the control strategies so as to reduce the amount reheat of air brought into the facility.	Library	\$3,966	\$0	Yes, Economizer dampers were checked. All VAV box dampers were tested and began meeting minimum air flow requirements for each zone. Return air CO2 sensors were tested ensured to be functioning normally.
Reduce amount of outside air by at least 10%	Walk through and analysis showed carbon dioxide levels were very low, even during peak hours of operation. The demand control CO2 sensor needed to be checked and maybe calibrated. It may not even be controlling the dampers. They recommended calibration of	Library	\$6,100	\$0	Yes, repaired stuck dampers. Considered routine maintenance but was found through CO2 analysis.

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	sensors and checking that dampers are not stuck.				
Retro-Commissioning Investigative Report	Retro commissioning report- Investigative report with the purpose of improving the performance of HVAC equipment, controls, lighting fixtures and lighting controls. This report provided details on opportunities including researched implementation costs, payback, energy savings, etc.	Library	n/a	\$33,500	This report took it 'one step further' to look at detailed energy saving measures. Went beyond low-to-no cost and behavior change provided by Northwrite. For example lighting upgrades were identified and costs of different options analyzed.
Heating and Cooling System Upgrade	Partial heating and cooling monitoring system upgrade. Immediate need due to system failure. No current data on exact savings realized.	Library	Contributed to overall savings but	\$17,500	
Roof and Insulation Upgrade	At the beginning of the pilot program, the library roof was leaking, resulting in wet insulation, wall damages and other repair needs. For these reasons, the library roof was replaced in October 2012 with a new membrane.	Library	Contributed to overall savings		City leadership took the opportunity to purchase much denser, energy efficient insulation. Although this upgrade was done for reasons other than energy efficiency, the project resulted in significant energy savings.
Upgrade LED lighting	Upgraded lighting on 2 nd floor to LEDs	Library	\$2,832	\$8,000	This was itemized in the retro commissioning report , not by Northwrite but is a contributing factor to our savings.

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Reduce Stairwell Lighting Fixture Count			Payback estimated after 3.7 years	\$6,505	There were 35 CFLs. Were replaced with 22 41 W LED fixtures and integral occupancy sensor controls.
Fix Demand Control System	The overall levels of carbon dioxide, even at peak occupancy (100-110%) are too low and indicate that either the CO2 sensors in the demand control system need calibration or the dampers are sticking/stuck.	City Hall	\$12,169	\$0	Partially- CO2 calibration was checked and no change was needed. As of 07/2013 there was 1 damper left to repair but with the move it didn't happen. Other stuck dampers were serviced and operating properly.
Check/Fix VVT Bypass Damper and Pressure sensor locations	One of the major degenerative modes of a VVT system is the bypass damper and its control. This coupled to the location of the pressure sensor in the ducts can lead to a combination of stuck dampers in various positions and causes excessive heating/cooling depending on how the zones voted. Given, we are seeing strange control of the temperatures and the occupants having potential conflicting control, if the dampers stick and our sensors are misplaced or out of calibration, then we have the opportunity to reduce the wasted energy and control times that give rise to the cycling.	City Hall	\$11,425	\$38,000	Yes, Unit # 9 was replaced including vvt , controls and dampers. Replaced 20 ton unit with a 15 ton unit.

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Reduce Baseload by 20%	The baseload is consistently at 120 kW and seems to be a bit high for the size and type of facility it is. Though there is no direct evidence in the load profiles history to indicate the building can operate at a lower overnight KW, our rationale is indicating a sizable amount that is unaccounted for.	City Hall	\$15,113	\$11,000	Yes- Facilities changed the settings on 6 HVAC units to save a total of 14 hours run time per day. Pat reported the addition of a new split system to the computer server room that allowed for shut off of the A/C that ran 24/7 throughout the Finance Dept. A substantial daily savings of at least \$40 was observed.
Adjust Set Point Deadband and Lock out Tenant Control	Set the heating setpoint at 70 during occupied and 60 during unoccupied times. Also set the cooling setpoint at 74 during occupied and 85 during unoccupied times. The control system allows for system wide lockout of the individual zoned control units to keep the tenants and zones from fighting against each other.	City Hall	\$3,779	\$0	No, These set points were changed initially, but caused a large amount of complaints for comfort levels. The set points were changed back to original levels.
Energy Savings Email Blast		Library and City Hall	\$500	\$0	Yes, Mayor sent out
Post Energy Saving Tips in Common Locations		City Hall	Unknown	\$0	Yes, Stevie placed in common break areas

How we prioritized

We prioritized projects that were no-cost first and that could be implemented internally. Then we looked at low-cost, highest return projects and projects that were already included in scopes of work budgeted for that fiscal year. We ended up not pursuing some of the city hall recommendations because we found out mid-way through pilot that we would be moving buildings and so priority shifted away from that location.