The New Hampshire Municipal Energy Assistance Program

Decision Grade Audit Report

Barrington Town Hall
41 Province Lane Barrington, NH

Prepared for:

Town of Barrington, NH

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Clean Air Cool Planet

Sustainable Energy Resource Group
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Carbon Solutions New England™

This project is made possible with support from the New Hampshire Regional Greenhouse Gas Initiative

2/10/10

The following report was generated as part of the Municipal Energy Assistance Program (MEAP). MEAP is made possible through the New Hampshire Public Utilities Commission and the Greenhouse Gas Emissions Reductions Fund. The program is a collaborative effort to carry out a sequence of greenhouse gas emissions inventories and energy audits for between 24 and 48 geographically diverse communities in New Hampshire, setting the stage for these communities to perform renovations to selected buildings that would reduce energy consumption and greenhouse gas emissions. This report has been generated as a result of the Town of Barrington being selected to participate in this program.

To follow MEAP updates and activities please visit www.nhenergy.org.

Additionally, this report would not be possible without the assistance and input provided by municipal employees and volunteers. We are grateful for the time provided to us by many of the Town of Barrington staff members and volunteers, without which this report would not be as thorough as it is.

For questions regarding this report, please contact:

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Introduction:

MEAP partners are pleased to provide this Decision-Grade Audit Report for the Town of Barrington and the Town and SAU Offices (hereinafter "the building"). This report discusses the findings and subsequent recommendations for energy efficiency improvements at the building. Included within this report are details regarding the walk-through and exploration conducted in the facility and examples that illustrate recommended building alterations and improvements that can reduce energy costs and the building's natural resource footprint. In this report we will provide a set of options that can help achieve real energy savings and carbon dioxide reductions. These recommendations should be viewed as initial avenues to participating in several State level funding opportunities for municipal energy projects. These funds distributed under the aegis of the ARRA (American Recovery and Reinvestment Act) are targeted specifically to towns and cities.

Prior to the audit process beginning, each selected municipality must carry out the MEAP energy inventory process. The inventory process is required in order to receive an energy audit. This report relied on those initial findings to help determine the most appropriate building to conduct an energy audit for, with the intent of maximizing the potential energy savings.

The Audit

The first stage of any audit process is understanding the nature of the system and the objectives of the audit. The use of the building and the Town's goals and objectives are the foundation of a solid audit. In most cases, these objectives combine environmental and economic goals. In the case of public buildings and facilities, comfort and safety are also primary concerns that help guide our analysis and recommendations.

A decision grade audit involves an inventory of heating systems, quantification of energy usage (electrical and heating fuel), and the process of coordinating this information with the goals and objectives of the Town into a decision tool. Under MEAP we look to provide recommendations that will, if carried out, help the Town achieve at least a 30% reduction in energy consumption. The level of detail provided herein is meant to create the basis upon which investment grade audits and decisions can be made. The decision grade audit is meant to filter options and expectations so that the Town can understand the fundamental building system, how changes to the system can result in economic and environmental benefits and how those changes can interact with other policy and philosophical objectives.

The following information will describe the characteristics witnessed during the walk-through and those areas of the building complex where improvements may be made. The objective of these recommendations is to create a series of options the Town can further explore.

On November 5th, 2009 Chris Dundorf and Tobias Marquette of SDES Group toured the Barrington Town and SAU Offices. Based upon visits to the building prior to the MEAP walk-through and review of energy usage data per EPA Portfolio Manager, a web-based energy data analysis tool (http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager), it was

determined that this building provided the greatest energy improvements value. Also noting that the Town Hall has the second highest energy cost, carbon emissions, and site intensity, it was an obvious choice to receive the audit.

Energy Data Collection:
The inventory process provided an opportunity to collect valuable energy data information for the building and is included below to show the witnessed use over a given timeframe.

Facility Name	Baseline Total Site Energy Use (kBtu)	Total Floor Space (Sq. Ft.)	Current Site Energy Intensity (kBtu/Sq. Ft.)	Annual Energy Cost (US Dollars ($))
Community Center	697,854	12,000	65.7	$18,889
Highway Complex	251,928	3,200	85.2	$7,181
Public Safety Building	677,123	13,000	58.4	$17,467
Recycling Center	87,993	1,300	78.1	$2,595
Town Hall	1,497,380	14,000	100.1	$27,464
Trash Compactor Building	6,938	364	21.6	$468
Group Total	3,219,215	43864		$74,064

See Appendix A and B for month by month data. While this information assisted the audit team in identifying which building to conduct the audit, the team also carried out an initial walk-through at Library/Community Building (Gym) to view the building characteristics and make the appropriate selection thereof. The remainder of this report will further explain the building characteristics found at the Town and SAU Offices.

Electrical			
Year	**Energy Use (KWh)**	**Cost (US $)**	**Avg Rate ($/KWh)**
2008	69,900	$11,348	$0.16
2007	77,050	$11,859	$0.15
2006	72,360	$11,265	$0.16

Thermal (Heating)			
Year	**Energy Use (Fuel Oil, Gal)**	**Cost (US $)**	**Avg Rate ($/Gal)**
2008	8283	$19,634	$2.37
2007	7924	$16,458	$2.08
2006	8869	$16,586	$1.87

It is interesting to note that due to boiler failure the heating system was in active for a three months period starting at the beginning of the 2007 heating session resulting in reduced fuel oil usage and higher than normal electrical consumption due to the increased use of plug-in space heaters.

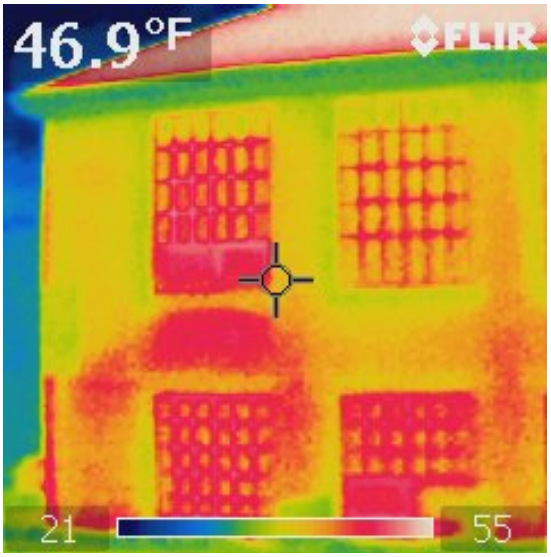
Energy Use (MMBtu)	CO2 Emissions (MtCO2e)	Energy Cost ($)	Heating Fuel Used	Site Energy Intensity (kBtu/Sq. Ft.)
1,497	122.7	27,464	Oil	100.1

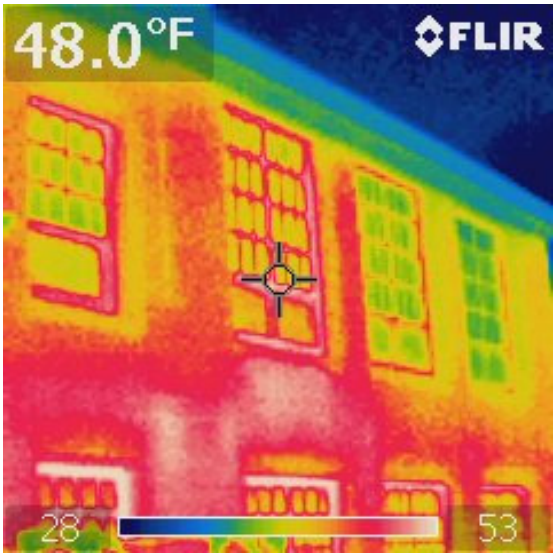
Building Description

The original structure was built in the 1930's and was roughly doubled in size in the 1950's by the addition of an annex on the west side. The two story structure totals about 14,000 square feet. It is constructed of brick and concrete block exterior walls. The original structure, used for the town offices, has an attic and sloped roof and is. The annex, used for the town administrative (SAU) offices, has a rubber membrane flat roof. Inside spaces are partitioned mostly with concrete block construction into offices and meeting rooms. Except for the attic floor there is little to no evidence of any insulation. Unfortunately, like many buildings of its time this is a typical scenario but also presents a tremendous opportunity for improvements in occupant comfort, energy savings and CO2 emissions reduction.

Exterior Walls

All exterior walls are constructed with concrete block and faced with brick. Typically this style construction includes a small air gap between the brick and concrete block providing a small degree of insulation by way of a *conductive thermal break* but also allows for air to circulate within the cavity robbing heat away from the warm interior wall and allowing air infiltration often felt by the occupants as drafts. Both conditions can be a significant source of heat loss. As mentioned earlier there is no insulation within the walls. This assertion is supported by discussion with the facility manager and by thermal imaging of the building's exterior in which the walls are generally the same temperature as window panes. Note the large red region between the 1st and 2nd floor windows. This warm region aligns with a wall-mounted radiator inside of the office space.





Recommendation

Insulate the walls of the building wherever feasible. Insulation should be added to the interior side of the walls as it would be unrealistic to apply insulation to the exterior brick face.

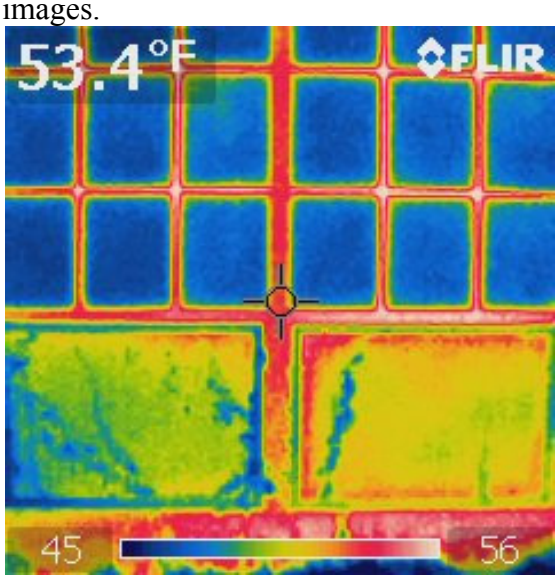
Two recommended methods:

1. Use pre-insulated drywall panels such as Structural Insulated Panels (SIPs). Panels are secured to the wall and window and door openings are cut-out and finished.
2. Frame-in 2x4 walls spaced slightly away from the existing concrete block wall, providing a thermal break, add electrical wiring as required, insulate with a 1" thick air sealing layer of polyurethane spray foam then add fiberglass batts, blown-in insulation or additional spray foam and cover with drywall.

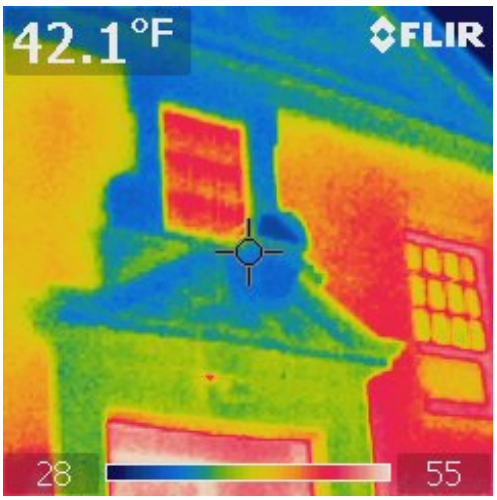
The 1st floor meeting room among others could be a good candidate for this improvement. Naturally, consideration must be given to the expense of relocating electrical fixtures and impact to heat deliver components. The later may be less of an issue should the building be refitted to forced hot air HVAC at which time radiators could be removed giving better access to wall surfaces.

Windows & Doors

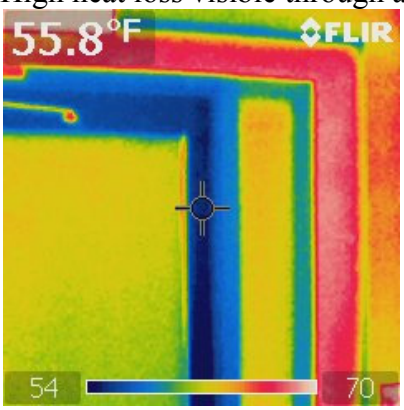
The windows were replaced in the early 1980's with an atypical construct consisting of 2 layers of milky white translucent fiberglass sheet separated by an air gap and held together with divided-light aluminum frames. Most of the window units also have two lower open-able sections providing limited ventilation. A significant number of the open-able units no longer provide a view to the outside as in many cases are now supporting air conditioning units year round. Air sealing and insulation around and within the AC units is less than ideal. Although the pure fiberglass portions of the window units are thermally slightly superior to their glass counterparts, the aluminum frames sandwiched in between the fiberglass panels are a large source of heat loss. Note the high temperatures (orange, red and white) indicated in the thermal images.



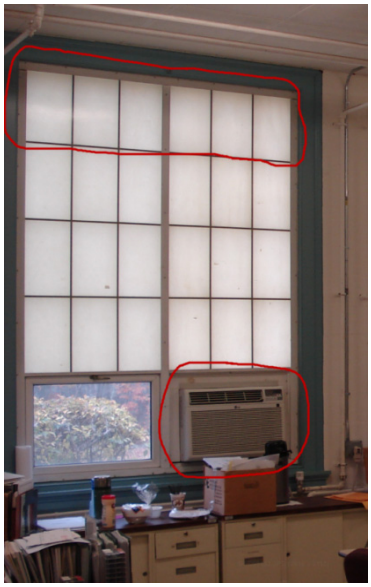
Other high heat loss areas, including single pane glass window, brick exterior wall and aluminum window divides.



High heat loss visible through aluminum door frames.



The between-glass seals of a number of the open-able window units have failed, allowing condensation to form between the panes.



Typical air conditioner installation and desired location for top-of-the-window ventilation

Buildings with an east-west orientation and good solar exposure can make use of sunlight in the form of passive solar heating to offset use of heating oil. Incorporation of fixed metal awnings reduce summer sunlight heating saving on energy to run air conditioners. Going a step further is to construct the awning itself of solar electric (Photovoltaic) panels.

Examples of Maintenance-Free Awnings Systems:

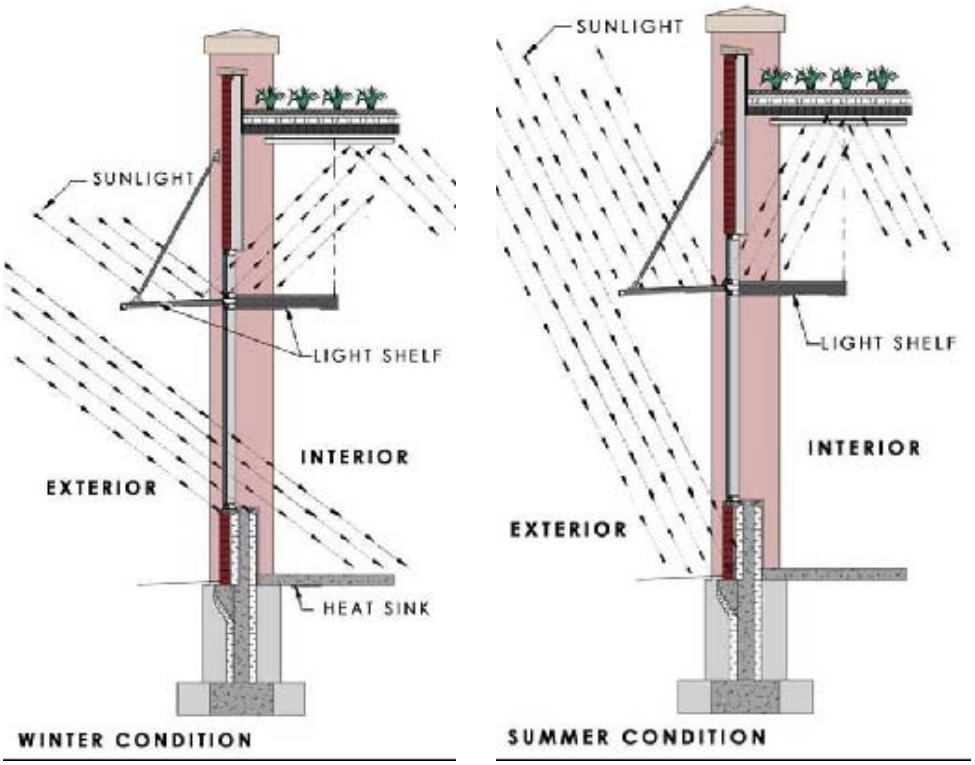
Recommendation

1. Utilize awnings and windows supporting installation of "Light Shelves" to provide diffused interior lighting. See Lighting Section.
2. Replace all window units with double or triple paned, low-e, argon filled, fiberglass framed units for high R value glass and frames.
3. Consider ability for upper and lower portions of windows to be open-able allowing for natural ventilation and cooling in the summer months.
4. Use high solar heat gain factor (SHGF) glass on south-side windows to maximize passive (no moving parts or liquids) solar heating, so long as shading is provided in the summer months.
5. Use fixed and maintenance-free awnings that allow low-angle winter sunlight to enter and heat the building space yet block-out high-angle direct sunlight from entering, reducing cooling loads.

Lighting

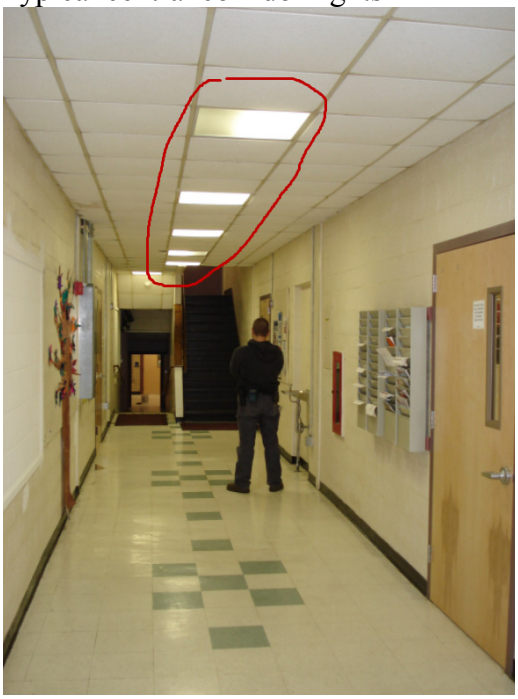
Most florescent light fixtures were converted to more energy efficient T8 units in the early 2000s. Today new products exist to boost energy efficiencies even further including the use of daylight harvesting to bring-in and disperse diffused sunlight into work spaces.

Light Shelf Operation, Winter and Summer Conditions



Typical lights one the ground floor

Typical central corridor lights

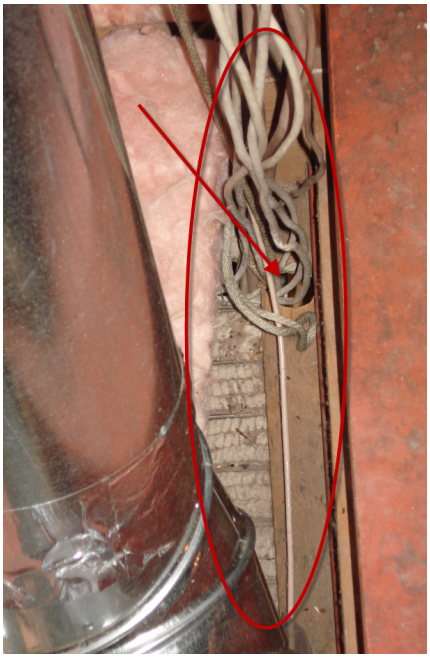


Recommendation

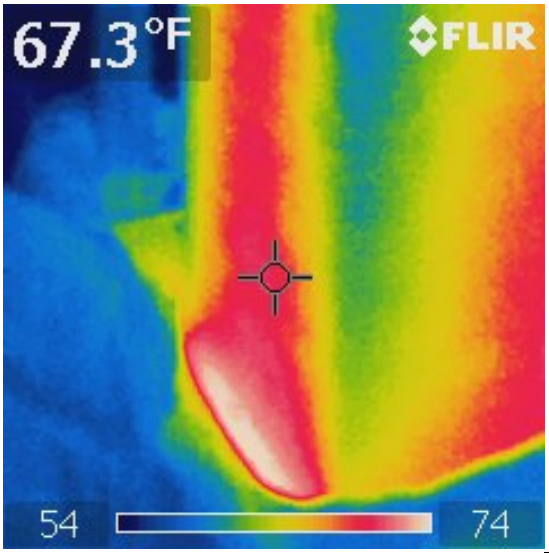
1. Replace remaining low efficiency interior light fixtures with T8 or T8 Super fixtures.
2. Run analysis and explore rebates for converting existing T8 lighting to T8 Super.
3. Incorporate occupancy sensors in high energy load spaces.
4. Incorporate Smart Lighting control systems in high energy load spaces to progressively reduce light fixture output when daylight is available. Typically, lights closest to windows will operate at reduced levels or shut off completely providing energy savings whenever sunlight is available. There are number of configurations available to maximize the energy savings from daylight harvesting
5. Install occupancy sensors to turn off lighting in high load areas when spaces are unoccupied.
6. Incorporate window-mounted light shelves to direct and diffuse sunlight into interior spaces.
7. Consider installation of solar light tubes for high-use inner office spaces not adjacent to exterior windows.

Ceiling to Roof Region (Town Offices)

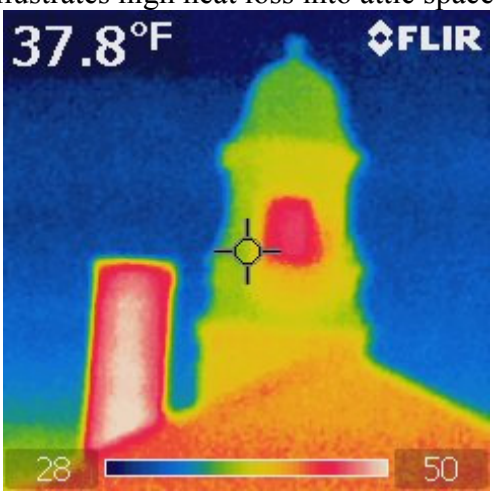
The attic above the original building is currently insulated with batts of R-30 fiberglass insulation placed in-between attic floor joists and above old drywall and plaster from the original ceiling. Beneath this is a space above the existing hung ceiling. Although the fiberglass batts are an important step for reducing the movement of warm air, significant heat loss is still occurring as evidence by thermal images and numerous visible gaps between insulation, joists, chimney and other structural features. Rooftop snow melt patterns also indicate high heat loss. Fortunately attic spaces of this layout provide good access for additional insulation and energy savings measures to be implemented.



Gaps between chimney and structure allow significant heat loss.



Heat escaping from the cupola illustrates high heat loss into attic space.



Recommendations

1. Reposition existing insulation batts to close gaps and fill-in voids.
2. Air seal using code-approved materials passageways into the attic floor.
3. Add an additional R-30 of blown-in fiberglass or cellulose insulation on top of the existing fiberglass batts.

Ceiling to Roof Region (SAU Offices)

The SAU offices side of the building has flat rubber membrane style roof. It is unclear if insulation is installed beneath the membrane. If present, it is likely to be 1 or 2" rigid foam with an R value of 5 or 10 respectively. The rubber membrane appears to be in good condition. Beneath this region and above the suspended ceiling is a several foot high space for structural steel roof beams, electrical cabling and duct work. Hot water supply pipes running in this space are uninsulated.

Recommends

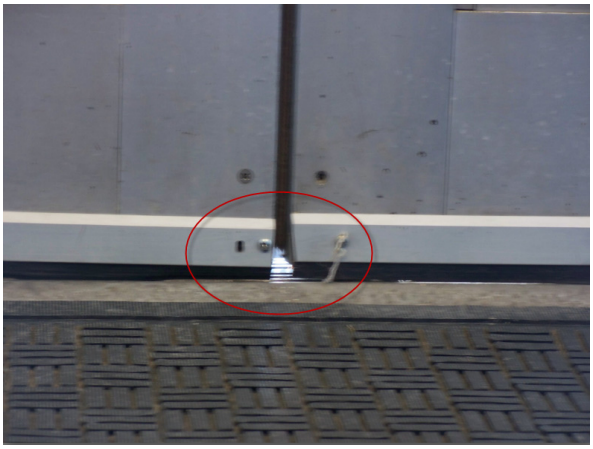
1. Insulate forced hot water piping running through space above the suspended ceiling.
2. Apply closed cell spray foam insulation to the underside of the roof decking.
   Note: Although possible, laying fiberglass batts directly on the acoustic ceiling tiles is generally not the preferred means to insulate.
3. Although not needed at this time, when the roof membrane is to be replaced, rigid foam insulation should be added.

General Air Sealing

Air drafts and direct-to-outdoors ventilation systems are significant sources of heat loss throughout the building and provide an opportunity for large energy efficiency improvements. In response, buildings today are being constructed more air tight than ever, existing buildings with unwanted air leakage typically receive sealing treatments where drafts and leaks are present, most of which cost little to implement.

Unused and open ventilation damper

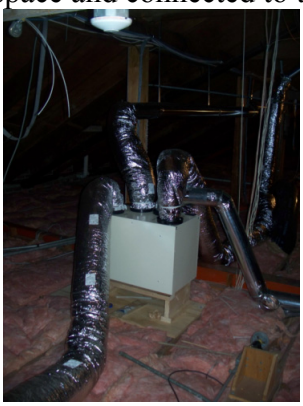
Gap between exterior doors



Ventilation and Air Conditioning

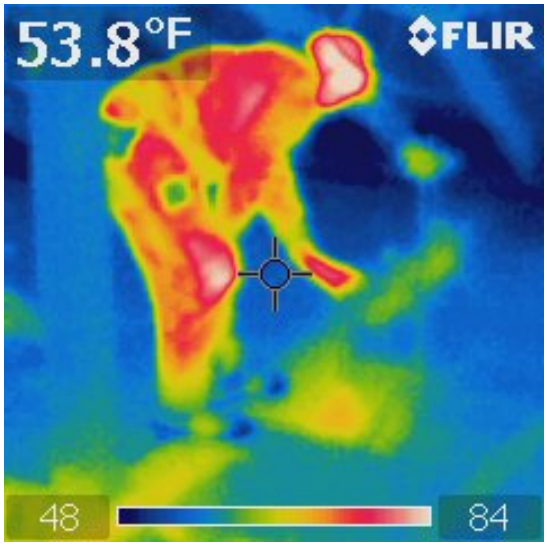
Ventilation systems draw in fresh air, filter-out particulates, circulate it throughout the occupied spaces and exhaust stale air to the outside. Heating and cooling elements can be added to the network of ducting, blowers and controls providing a complete climate control system. Energy efficient systems make use of heat recover ventilators (HRVs) to preheat incoming winter air with warm out going air through an air-tight heat exchanger.

Some fresh air ventilation is provided by 2 heat recovery ventilators (HRVs) located in the attic space and connected to the air handling and evaporator units also located in the attic.

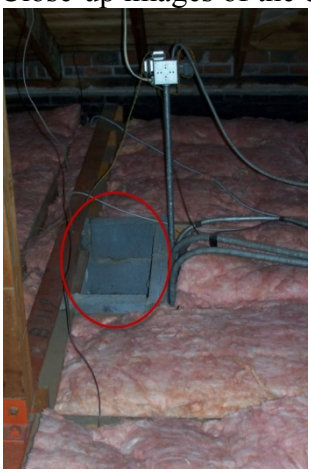


Outside condenser units on the town offices side.

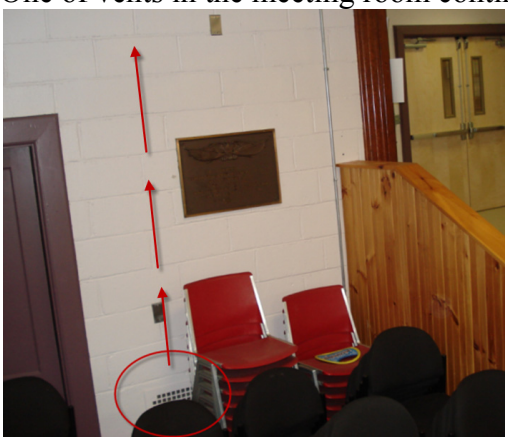
Also on the town offices side of the building are several intentional direct ventilation pathways between the ground level conditioned spaces and the unconditioned attic. Such pathways provide a very large source of energy loss 24 / 7 as evidence by the thermal image depicting warm air rising from opening in the attic.

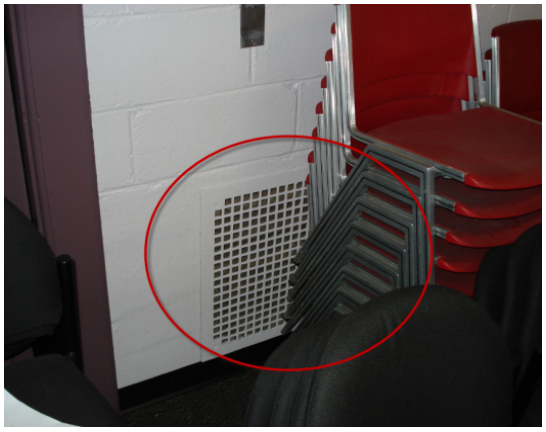


Close-up images of the ductwork. Note the concrete block construction.



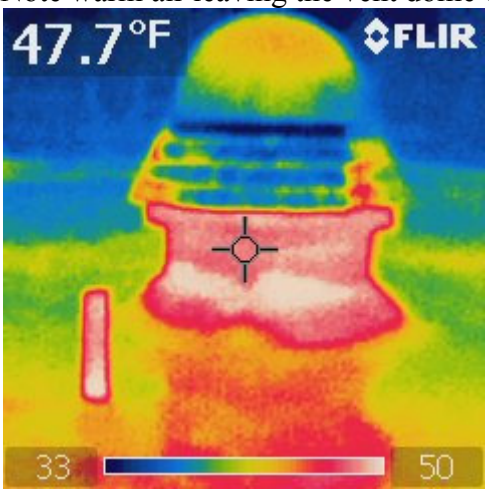
One of vents in the meeting room continuously delivers warm air into the attic space above.



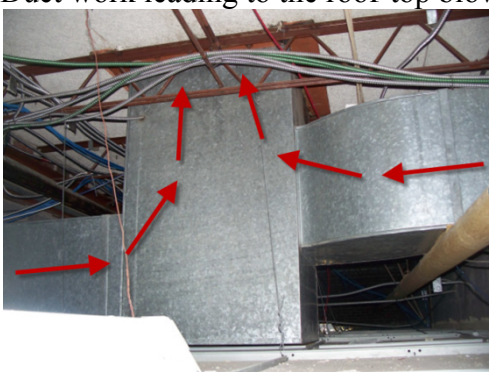


On the SAU side of the building a large rooftop blower runs 24/7 also removing warm air from the conditioned spaces regardless of need for fresh air and without any form of heat exchange.

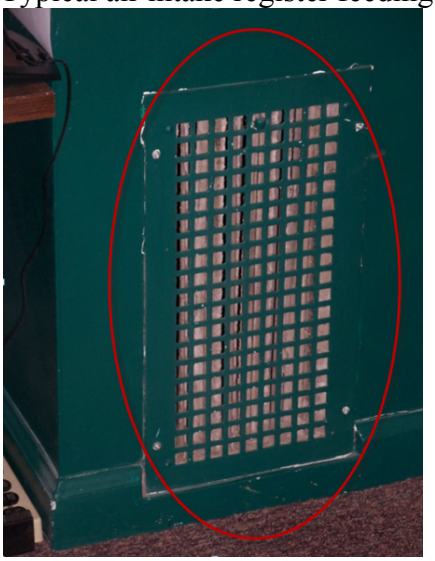
Note warm air leaving the vent dome on the SAU-side roof.



Duct work leading to the roof-top blower.



Typical air intake register feeding the the roof-top blower



Recommendations

1. Run supply and return HVAC air ducting through as much of the building as possible. Unfortunately cost will likely prevent whole building modifications from being realized in which case consideration should to given to refitting solely the SAU portion of the building for central AC. If possible reconfigure existing exhaust ventilation ductwork for reused as supply ducting. Such a system would allow the removal of 12 generally low efficicency window-mounted air conditioning units. Removal of window-mounted AC units also help in reducing winter heating load due to their poor insulating and air sealing properties
2. Seal off ventilation pathways leading directly to the unconditioned attic space.
3. Determine fresh air requirements based upon the building's air tightness and usage patterns then provide adequate ventilation using HRVs, CO2 sensing controls and night setbacks.
4. Place each of the heating zones on programmable thermostats to reduce fuel usage while spaces are unoccupied.

Heating System

The building is heated by forced hot water supplied by two oil-fired boilers installed in late 2007 feeding wall-mounted cast iron radiators along the exterior the building. The building is devided into 6 heating zones. The units are functioning properly and are in good working condition.

Recommendations

1. Add additional individually programable heating zones to delivery appropriates levels of heat when and where it's needed.
2. Install an outdoor reset function (outdoor temperature sensor) to reduce boiler loop water temperature during the shoulder months and other times of reduced heat load.

Renewable Energy Opportunities

Of number of renewable energy (RE) opportunities presented themselves at the building. There are also a number of means to financing

Recommendations

1. Use south facing windows for passive solar heating of building. (See Windows and Doors section)
2. Daylight harvesting through use of light shelves on south-side windows (See Windows and Doors section)
3. Install a roof-mounted drain-back Solar Water Heating (SWH) system for year round use but especially in summer months for near 100% of bathroom, kitchenette and cleaning hot water needs. The south facing sloped roof of the town offices is an ideal

unobstructed location for 2 flat panels or a rack of evacuated tubes. Mounting solar collectors in view to travelers on Route 9 shows the town support of renewable energy.

4. Investigate installation of a Photovoltaic (PV) system for grid-tied electrical generation.
    a. PV Panels can be mounted on sloped roof of town offices or on non-penetrating surface mount racks on the flat roof of the SAU offices.
    b. PV Panels can also be incorporated into an awning system to block summer sunlight from directly entering the building.

Envelope Efficiency:

The single largest area for improvement in building efficiency involves the building envelope. The best ways to increase an envelope's performance is to complete air-sealing and insulation work. In this building, the only area where any insulation was found is in the floor of the town offices side attic. There is little to no insulation in the rest of the building. Although it would be a major undertaking to air-seal and insulate the building, the resulting benefit would be equally significant.

From a building efficiency standpoint, air-sealing and insulating can be thought of as a different species of project and investment when compared to items like heat systems, appliances, and alternative energy systems. In the case of the latter, these types of energy investments have a shelf life. A boiler may only last 20 years, or 40 years before possibly needing to replace a PV array, but building envelope efficiency has a lasting positive impact long after equipment need to be replaced. This is an important consideration when factoring in the true life cycle cost of the implemented solution.

Insulation and other building envelope projects are investments that are permanent, require little or no active maintenance, and will stand with the building during its lifetime. These investments secure baseline improvements that in turn provide a foundation for other investments. Lowering the amount of heat needed for a building is the best way to insure that a new and efficient heating plant provides the most savings.

Financial Considerations and Options:

A common occurrence across many communities within New Hampshire is the challenge of obtaining the necessary capital funds to carry out the recommended retrofits found within the audit. The following information is an attempt to provide some assistance with understanding some concepts and pathways to acquiring public or private funds to carry out an energy efficiency or generation project. Also, portions of the following information have been taken from the New Hampshire Handbook on Energy Efficiency and Climate Change – Volume II.

Life Cycle Costing –

The National Institute of Standards and Technology (NIST) Handbook 135, 1995 edition, defines Life Cycle Cost as "the total discounted dollar cost of owning, operating, maintaining, and disposing of a building or a building system" over a period of time. Life Cycle Cost Analysis is an economic evaluation technique that determines the total cost of owning and operating a facility over period of time.

Since municipal buildings are funded in their initial year through bonds and/or capital outlays, they generally fall victim to an inordinate focus on the bottom line cost of construction instead of the lifetime cost to operate the building. This is a critical misstep in particular with energy

concerns for municipal buildings because they are placed in service for a significant period and are subject to extended energy pricing. A more efficient building could save the costs of initial investments several times over during its lifespan.

Energy Price Stability –

The second most important concern about energy costs is the volatility. Municipalities budget on a yearly cycle and must predict energy costs over the year – sometimes over pricing the cost in the case of high lock in prices or subjecting the municipality to risk where a cost (+ some percentage) contract is used for the year. When prices go up budgets go up, when the go down, budgets tend to go down. Changes result is wide variation in predictability and thus lead to fund shortages or balances, and general frustration on all sides of the discussion.

The concept of stability in the context of energy prices is achieved through on-site distributed generation with effective predictive modeling and most importantly, efficiency. The cheapest energy available is the energy you don't need. The less you buy the less amount of appropriations are subject to the price swings.

"Green" Building Cost Myths –

A perception that all energy-efficient construction costs more than conventional construction persists. We have been unable to find valid research that supports this conclusion - especially where choices made about efficiency are evaluated in a realistic context considering the life cycle cost to operate the facility. To the contrary, we have found several sources, from government facility agencies, that show not only that in most cases costs are in fact lower but that any increased cost is almost immediately realized through lower operating expenses.

State Grant Program under American Recovery and Reinvestment Act (ARRA)

A significant opportunity that the town should consider looking into that is coming up very shortly is opportunities to acquire funding through the New Hampshire Office of Energy and Planning (OEP) The following information can be found on the OEP's website at the following link - http://www.nh.gov/oep/recovery/news/122309.htm#sa1. The site discusses the announcement of available funding to municipalities under the Energy Efficiency and Conservation Block Grant program.

> The New Hampshire Office of Energy and Planning (OEP) announces the availability of $6.6 million through the Energy Efficiency and Conservation Block Grant (EECBG) program. This grant program will fund projects that reduce energy use and fossil fuel emissions, and improve energy efficiency. OEP is currently targeting the following timetable:
>
> - **Grant Application Released: January 8, 2010**
> - **Intent to Bid Letter Due: January 15, 2010**
> - **Applications Due: February 15, 2010**

- **Grants Awarded: March 10, 2010**

In conjunction with the January 8, 2010 release of the EECBG Subgrant Application, OEP will also release a program guidance document and guidelines for the format of the "Intent to Bid" submission. EECBG will entail a competitive application process and funds will be awarded based on the value of the project and the benefit to the public. Selection criteria include, but are not limited to, projected energy savings, greenhouse gas emission reductions, and the ability to implement projects expeditiously. Eligible applicants are local governments and local government partnerships.

Eligible uses of this funding include projects such as: energy efficiency retrofits; energy audits; transportation efficiency measures; solid waste/wastewater treatment; energy distribution technologies; financial incentive programs; and renewable energy technologies for local government buildings. Each community will be eligible to receive funding up to 100% of the project cost with a limit of $400,000 per applicant.

For more information please contact Dari Sassan, (603) 271-1765, or visit the EECBG Web site.

Additionally, a terrific resource to understand what type of incentives are available for both energy efficiency and generation is the "Database of State Incentives for Renewables & Efficiency", or DSIRE. This site, funded by the US Department of Energy, provides a list of the potential financial incentives found within New Hampshire and the Federal Government. To see what is available within New Hampshire go to www.dsireusa.org and click on New Hampshire.

Utility Programs:

Many utilities provide rebates for various types of efficiency measures that can be carried out at a municipal facility. PSNH offers the Municipal Smart Start Program. This program offers the opportunity for municipalities to go forward with the installation of approved measures at no upfront cost to the municipality. A town simply pays for the energy improvements with the savings from reduced energy usage until the project is paid off.

For more information please contact Kathleen Lewis, (603) 436-7708 ext. 5628, or visit http://www.psnh.com/Business/Efficiency/Paysave.asp

Third-Party Financing Options

The most important part to understanding the potential in third-party is the ability to address up front capital costs and access tax benefits. Additional benefits are potential operations and maintenance savings where the implementation is owned by a third-party. In the three-party model, new businesses create an income stream and take over the insurance, performance assurance, and maintenance of the renewable energy system. New jobs and local investment follow. The business secures stable and long-term funding enabling expansion to other facilities for similar projects.

There are several benefits that appear for the municipality that is considering a third-party financing strategy.

Ability to Monetize Federal Tax Incentives. Federal tax incentives for some projects can equal 30% of the installed capital cost. Under the current law, this 30% is payable in the form of a grant from the Department of Treasury. In addition, businesses can accelerate the depreciation of the cost of some systems and installations using a five-year schedule. Together, these two incentives can have a tremendous impact on both the cost of and the financial returns on a project. Local governments, however, cannot directly benefit from these incentives. The third-party ownership model introduces a taxable entity into the structure that can benefit from the federal tax incentives, lowering the overall cost to the non-taxable entity.

*Low/No Up-front Cost*s. Even with programs to provide support to municipalities, such as rebates and grants, the need to reduce this amount, the up-front cost is significant. Given the current economy and budget constraints, a large initial investment is difficult to achieve regardless of the return on the investment. A third-party structure places the responsibility of the increased initial cost on to the investor/developer of the project.

Predetermined Energy Pricing. In a project that involves efficiency or distributed generation, the portion of conservation or generation that is met by the project can be considered "fixed" at a particular price in the terms of the contract. This can be in the form of a fixed-priced power purchase agreement (with a predetermined escalation rate).
This predictability offers stable pricing for the portion of the entity's load served by the project. In most cases, the price of electricity in power purchase agreement is usually set at or below the customer's current retail rate for the first year, and then escalates annually for term of the contract (in a solar PPA, these terms are usually 20 – 25 years). For solar projects, an annual price escalator of 3-3.5% is common.

Operations and Maintenance. Another attractive feature of the third-party ownership structure is the fact that new equipment can result in lower operation and maintenance expenses and in the case of some systems, the entire cost and responsibility can shift to the project developer.

Eventual Ownership. As a final issue, third-party structures can be pre-crafted to permit and even encourage local government buyout provisions. This allows the municipality to consider advanced purchase options if circumstances change in a way that makes this pathway more beneficial. If for instance a grant program becomes available, such funds can be used to accelerate the ownership path and provide for a more immediate "vesting" of full savings opportunities.

Otherwise, these arrangements usually provide for a number of options at the end of the term, the three likely scenarios for the host would be to: 1) extend the arrangement, 2) purchase the facility, or 3) ask that the improvements be removed.

Conclusion:

As a result of this audit, the Town has several options available to increase the efficiency of the building. We highly encourage the that the Town pursue these recommendations described in this report and to utilize the further assistance provided under this program to help develop plans for implementation – including possible identification of contractors who will provide the services needed to carry out the recommendations. SDES Group will provide the Town a total of twenty-five hours of Community Energy Advocate service to assist with further efforts under the MEAP program in an effort to bring the recommendations outlined in the report to fruition. A further explanation of these additional services will be provided during the audit presentation.

Appendix A

Meter: Electric			
Building: Barrington Town & SAU Offices			
Fuel Type: Electricity, Grid Purchase (kWh (thousand Watt-hours))			
Space(s): Entire Facility			
Start Date	**End Date**	**Energy Use**	**Cost - US Dollars**
3/19/2009	4/23/2009	6,880	$1,107.94
2/19/2009	3/19/2009	5,480	$921.40
1/21/2009	2/19/2009	6,020	$995.89
12/26/2008	1/21/2009	5,220	$888.09
2008 Total		**69,900**	**$ 11,348.82**
11/20/2008	12/26/2008	7,080	$1,088.37
10/23/2008	11/20/2008	4,720	$760.07
9/22/2008	10/23/2008	4,640	$861.51
8/21/2008	9/22/2008	6,140	$1,080.94
7/22/2008	8/21/2008	5,780	$1,046.65
6/24/2008	7/22/2008	7,460	$1,270.13
5/21/2008	6/24/2008	6,100	$1,079.75
4/24/2008	5/21/2008	5,040	$775.80
3/21/2008	4/24/2008	5,820	$851.38
2/22/2008	3/21/2008	5,360	$797.39
1/24/2008	2/22/2008	5,620	$838.76
12/21/2007	1/24/2008	6,140	$898.07
2007 Total		**77,050**	**$ 11,859.71**
11/21/2007	12/21/2007	6,180	$1,077.85
10/23/2007	11/21/2007	6,940	$1,140.49
9/20/2007	10/23/2007	7,020	$1,144.26
8/21/2007	9/20/2007	6,190	$937.96
7/23/2007	8/21/2007	8,400	$1,272.84
6/22/2007	7/23/2007	8,060	$1,246.07
5/22/2007	6/22/2007	6,920	$1,022.75
4/24/2007	5/22/2007	5,300	$860.29
3/22/2007	4/24/2007	5,800	$810.52
2/20/2007	3/22/2007	5,600	$805.49
1/22/2007	2/20/2007	5,300	$769.65
12/21/2006	1/22/2007	5,340	$771.54
2006 Total		**72,360**	**$ 11,265.69**
11/15/2006	12/21/2006	5,360	$770.50
10/24/2006	11/15/2006	4,740	$691.02
9/19/2006	10/24/2006	5,120	$737.69
8/17/2006	9/19/2006	6,240	$944.04
7/21/2006	8/17/2006	10,580	$1,447.72
6/21/2006	7/21/2006	9,200	$1,319.50
5/18/2006	6/21/2006	6,360	$1,187.81
4/21/2006	5/18/2006	5,360	$920.12
3/22/2006	4/21/2006	4,720	$837.80
2/21/2006	3/22/2006	4,780	$816.86
1/20/2006	2/21/2006	5,160	$871.51
12/22/2005	1/20/2006	4,740	$721.12

Appendix B

Meter: Heating Oil
Building: Town Offices and SAU Building
Fuel Type: Fuel Oil (No. 2), No fuel generation method associated with fuel type (Gallons)
Space(s): Entire Facility

Start Date	End Date	Energy Use	Cost - US Dollars
2009 Partial			
4/7/2009	4/17/2009	268.3	$458.79
4/3/2009	4/7/2009	110.4	$189.88
3/31/2009	4/3/2009	88.6	$153.27
3/24/2009	3/31/2009	182	$300.30
3/19/2009	3/24/2009	161.3	$285.50
3/17/2009	3/19/2009	103.2	$173.37
3/13/2009	3/17/2009	120.4	$180.60
3/9/2009	3/13/2009	175.5	$266.76
3/6/2009	3/9/2009	84	$126.84
3/3/2009	3/6/2009	156.2	$226.49
2/27/2009	3/3/2009	203.4	$296.96
2/24/2009	2/27/2009	173.8	$276.34
2/20/2009	2/24/2009	176.5	$261.22
2/17/2009	2/20/2009	139	$209.89
2/13/2009	2/17/2009	199.6	$319.36
2/10/2009	2/13/2009	154.8	$250.77
2/3/2009	2/10/2009	389.5	$646.57
1/30/2009	2/3/2009	180.9	$302.10
1/27/2009	1/30/2009	203.9	$354.78
1/23/2009	1/27/2009	202.6	$352.52
1/20/2009	1/23/2009	163.1	$251.17
1/16/2009	1/20/2009	217.6	$393.85
1/13/2009	1/16/2009	196.2	$357.08
1/9/2009	1/13/2009	254.8	$458.64
1/5/2009	1/9/2009	287.6	$532.06
12/31/2008	1/5/2009	311.8	$561.24

Start Date	End Date	Energy Use	Cost - US Dollars
2008 Total		**8283.7**	**$ 19,634.34**
12/23/2008	12/30/2008	254.1	$406.56
12/19/2008	12/23/2008	350.9	$575.48
12/16/2008	12/19/2008	122.5	$214.38
12/15/2008	12/16/2008	55.3	$99.54
12/9/2008	12/15/2008	193.5	$346.36
12/3/2008	12/9/2008	265.5	$469.93
11/28/2008	12/3/2008	213.8	$397.66
11/25/2008	11/28/2008	141	$284.82
11/21/2008	11/25/2008	185.3	$365.04
11/18/2008	11/21/2008	127.5	$251.17
11/14/2008	11/18/2008	101.9	$212.97
11/7/2008	11/14/2008	202.5	$435.37
10/30/2008	11/7/2008	198.1	$437.80
10/16/2008	10/30/2008	318.6	$732.78
6/27/2008	10/16/2008	225.6	$552.72
6/6/2008	6/27/2008	17	$44.20
5/16/2008	6/6/2008	114	$296.40
5/9/2008	5/16/2008	81.8	$212.68
5/2/2008	5/9/2008	114.8	$298.48
4/25/2008	5/2/2008	105.4	$274.04
4/18/2008	4/25/2008	59.8	$155.48
4/15/2008	4/18/2008	51.1	$132.86
4/11/2008	4/15/2008	106.7	$277.42
4/8/2008	4/11/2008	79.2	$205.92
4/4/2008	4/8/2008	125.6	$326.56
4/1/2008	4/4/2008	75.4	$196.04
3/28/2008	4/1/2008	166.3	$432.38
3/25/2008	3/28/2008	76.8	$199.68
3/21/2008	3/25/2008	190	$494.00
3/18/2008	3/21/2008	108.5	$282.10
3/14/2008	3/18/2008	162.5	$422.50
3/11/2008	3/14/2008	109.1	$283.66
3/7/2008	3/11/2008	172.1	$447.46
3/4/2008	3/7/2008	118.3	$307.58
2/29/2008	3/4/2008	204	$530.40
2/26/2008	2/29/2008	141.9	$368.94
2/22/2008	2/26/2008	184.1	$478.66
2/19/2008	2/22/2008	183.7	$477.62
2/15/2008	2/19/2008	168.4	$437.84
2/12/2008	2/15/2008	126	$327.60
2/8/2008	2/12/2008	221.4	$575.64
2/5/2008	2/8/2008	151.4	$393.64
2/1/2008	2/5/2008	438.3	$1,139.58
1/29/2008	2/1/2008	112	$291.20
1/25/2008	1/29/2008	244.4	$635.44
1/22/2008	1/25/2008	170.8	$444.08
1/18/2008	1/22/2008	200.1	$520.26
1/10/2008	1/18/2008	100.8	$262.08
1/8/2008	1/10/2008	81.3	$211.38
1/4/2008	1/8/2008	415.4	$1,080.04
1/2/2008	1/4/2008	149.2	$387.92

Appendix B (Continued)

Meter: Heating Oil
Building: Town Offices and SAU Building
Fuel Type: Fuel Oil (No. 2), No fuel generation method associated with fuel type (Gallons)
Space(s): Entire Facility

Start Date	End Date	Energy Use	Cost - US Dollars
2007 Total		**7924.1**	**$ 16,458.18**
12/28/2007	1/2/2008	223.6	$581.36
12/21/2007	12/28/2007	96.2	$250.12
12/18/2007	12/21/2007	171	$444.60
12/14/2007	12/18/2007	453.6	$1,179.36
12/7/2007	12/14/2007	160.4	$417.04
12/4/2007	12/7/2007	171.5	$445.90
11/1/2007	12/4/2007	355.6	$924.56
6/1/2007	11/1/2007	178	$462.80
5/18/2007	6/1/2007	139	$290.51
5/11/2007	5/18/2007	102	$221.34
5/4/2007	5/11/2007	58.4	$120.89
4/27/2007	5/4/2007	150.1	$309.21
4/20/2007	4/27/2007	110.6	$233.37
4/13/2007	4/20/2007	241.4	$490.04
4/11/2007	4/13/2007	99.3	$210.52
4/6/2007	4/11/2007	193.8	$401.17
4/3/2007	4/6/2007	138.4	$286.49
3/30/2007	4/3/2007	123.5	$256.88
3/27/2007	3/30/2007	88	$186.01
3/23/2007	3/27/2007	127.2	$253.13
3/20/2007	3/23/2007	127.4	$245.88
3/16/2007	3/20/2007	206.1	$397.77
3/14/2007	3/16/2007	88.1	$170.91
3/9/2007	3/14/2007	160.6	$311.56
3/1/2007	3/9/2007	195.2	$394.30
2/27/2007	3/1/2007	372.3	$750.90
2/23/2007	2/27/2007	215.3	$439.21
2/19/2007	2/23/2007	209.7	$417.30
2/16/2007	2/19/2007	177.7	$335.85
2/13/2007	2/16/2007	222.1	$419.77
2/9/2007	2/13/2007	274	$542.52
2/8/2007	2/9/2007	227.4	$447.98
2/6/2007	2/8/2007	366.5	$601.06
2/2/2007	2/6/2007	279.9	$526.21
1/31/2007	2/2/2007	133.2	$251.75
1/26/2007	1/31/2007	328.6	$607.13
1/23/2007	1/26/2007	146.9	$254.14
1/12/2007	1/23/2007	377.9	$661.33
1/9/2007	1/12/2007	169	$273.78
1/4/2007	1/9/2007	143	$241.67
1/2/2007	1/4/2007	121.6	$201.86

Start Date	End Date	Energy Use	Cost - US Dollars
2006 Total		**8869.3**	**$ 16,586.74**
12/29/2006	1/2/2007	137.5	$242.00
12/26/2006	12/29/2006	170.6	$305.37
12/22/2006	12/26/2006	163	$298.29
12/19/2006	12/22/2006	106.7	$196.33
12/15/2006	12/19/2006	152	$279.68
12/13/2006	12/15/2006	109.6	$209.34
12/8/2006	12/13/2006	228.2	$422.17
12/6/2006	12/8/2006	116	$221.56
11/24/2006	12/6/2006	445	$858.85
11/17/2006	11/24/2006	262.2	$471.96
11/10/2006	11/17/2006	137.1	$245.41
11/3/2006	11/10/2006	218.5	$408.59
10/27/2006	11/3/2006	205.4	$361.50
10/18/2006	10/27/2006	213.2	$392.28
6/28/2006	10/18/2006	281.5	$520.77
6/16/2006	6/28/2006	34.8	$66.12
5/30/2006	6/16/2006	109.2	$207.48
5/12/2006	5/30/2006	274.6	$521.74
4/24/2006	5/12/2006	363.5	$690.65
4/17/2006	4/24/2006	184.7	$350.93
4/5/2006	4/17/2006	295.7	$561.83
3/31/2006	4/5/2006	192.1	$226.29
3/24/2006	3/31/2006	223.7	$425.03
3/21/2006	3/24/2006	117.2	$222.68
3/17/2006	3/21/2006	245.8	$467.02
3/14/2006	3/17/2006	125.9	$239.21
3/10/2006	3/14/2006	128.3	$243.77
3/7/2006	3/10/2006	163.5	$310.65
3/3/2006	3/7/2006	181.1	$344.09
2/28/2006	3/3/2006	185.2	$351.88
2/24/2006	2/28/2006	272.7	$518.13
2/21/2006	2/24/2006	174.6	$331.74
2/17/2006	2/21/2006	250.7	$476.33
2/14/2006	2/17/2006	146	$277.40
2/8/2006	2/14/2006	362.3	$688.37
2/2/2006	2/8/2006	276.8	$525.92
1/31/2006	2/2/2006	99.2	$188.48
1/27/2006	1/31/2006	189.9	$360.81
1/25/2006	1/27/2006	99.8	$189.62
1/20/2006	1/25/2006	242	$459.80
1/17/2006	1/20/2006	153.5	$291.65
1/13/2006	1/17/2006	213.3	$405.27
1/10/2006	1/13/2006	128.9	$244.91
1/6/2006	1/10/2006	236.8	$449.92
1/3/2006	1/6/2006	184.4	$350.36
1/2/2006	1/3/2006	219.4	$416.86
12/27/2005	1/2/2006	155.3	$295.07