The New Hampshire Municipal Energy Assistance Program

Decision Grade Audit Report

Washington Town Hall
Washington, NH

Prepared for:

Town of Washington, NH

Prepared by:

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Clean Air Cool Planet

Sustainable Energy Resource Group
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Carbon Solutions New England™

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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 Washington 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 the Town of Washington.

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 Washington and the Town Hall (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.

Energy Data Collection:

Name of Building	Area (Sq. Ft.)	Energy Cost ($)	Energy Cost per Square Foot	Energy Emissions (lbs of CO2)	Energy Emissions per Square Foot
Town Hall	5,915	$10,600	$1.79	58,635	10

* The above chart was extrapolated from the Washington Municipal Greenhouse Gas and Energy Use Baseline Report. Emissions data generated by STOCC software

Meter: Electricity

Building: Town Hall

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Fuel Type: Electricity, Grid Purchase (kWh (thousand Watt-hours))

Space(s): Town Hall

Start Date	End Date	Energy Use	Cost - US Dollars
12/1/2008	12/31/2008	960	$170.48
11/1/2008	11/30/2008	1,140.00	$189.77
10/1/2008	10/31/2008	924	$164.52
9/1/2008	9/30/2008	780	$147.35
8/1/2008	8/31/2008	708	$138.23
7/1/2008	7/31/2008	648	$131.23
6/1/2008	6/30/2008	492	$118.07
5/1/2008	5/31/2008	552	$126.38
4/1/2008	4/30/2008	504	$121.57
3/1/2008	3/31/2008	564	$130.51
2/1/2008	2/29/2008	744	$151.55
1/1/2008	1/31/2008	720	$138.66

*Note: The presented data was extrapolated from energy information entered into the EPA's Portfolio Manager.

Name of Building	Fuel Type(s)	Area (Sq. Ft.)	Energy Use: Electricity (million Btu)	Energy Use: Heating Fuel (million Btu)	Total Building Energy Use (million Btu)	Site energy intensity (kBtu/sq ft)[1]	EPA Average Site kBtu/sq ft for building type	NH Average Site kBtu/sq ft for building type
Town Hall	Propane	5,915	29.8	365.32	396	67.1	101.4	69.5

* The above chart was extrapolated from the Washington Municipal Greenhouse Gas and Energy Use Baseline Report. Emissions data generated by STOCC software

Meter: Heat

Building: Town Hall

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Fuel Type: Propane, No fuel generation method associated with fuel type (Gallons)

Space(s): Town Hall

Start Date	End Date	Energy Use	Cost - US Dollars
12/1/2008	12/31/2008	942.2	$2,260.00
11/1/2008	11/30/2008	74.3	$185.60
10/1/2008	10/31/2008	192.9	$501.40
9/1/2008	9/30/2008	189.4	$492.30
8/1/2008	8/31/2008	0	$0.00
7/1/2008	7/31/2008	0	$0.00
6/1/2008	6/30/2008	0	$0.00
5/1/2008	5/31/2008	0	$0.00
4/1/2008	4/30/2008	481.2	$913.80
3/1/2008	3/31/2008	315.7	$599.50
2/1/2008	2/29/2008	552.2	$1,648.00
1/1/2008	1/31/2008	1,256.00	$2,271.00

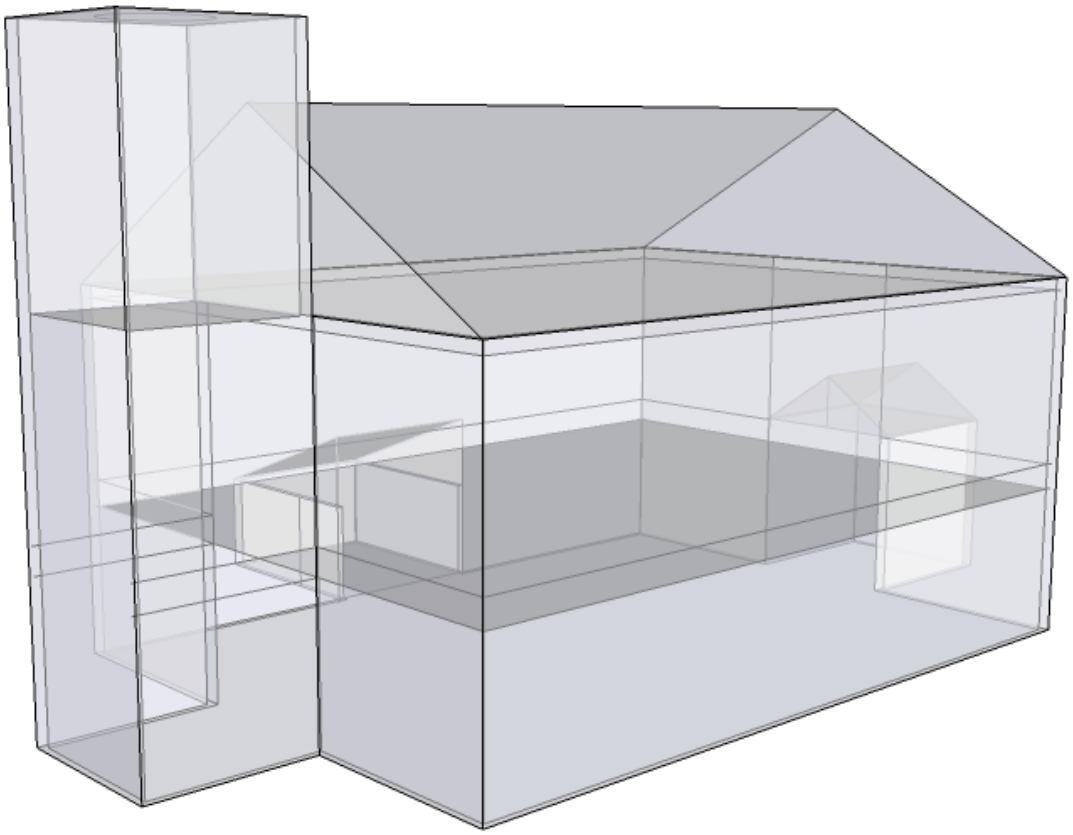
*Note: The presented data was extrapolated from energy information entered into the EPA's Portfolio Manager.

Site energy intensity = amount of energy expended per square foot *on site* to heat, cool, and electrify the area. This measure relates to how much is being used on site and fluctuates directly with how much lighting is being used, how thermostats are kept, etc.

Source energy intensity = amount of energy expended per square foot based on the source of energy (hydropower, nuclear, coal, fuel oil, etc) and the efficiency of that fuel type.

Building Description:

The Town Hall was constructed in 1787. This is a post and beam structure, and little about this building has changed since it was build. The town offices are located on the first floor, with a meeting hall on the second floor that is currently not in use.



Crawl Spaces:

Figure 1

The building sits over a shallow, dirt crawl space that is about 1 ½ to 2 feet below the floor framing. There is no insulation against the foundation, and most of the floor is also uninsulated. See figure 1. Half of the first floor has a thin carpet over the floor boards and the other half has exposed boards which allows for a direct view of the space below between the boards. This inefficient aspect of the building contributes to a large amount of the building's heat-loss. Not only does the heat that is distributed to the space above radiate to the crawl space, but there is a substantial amount of air infiltration coming from this space. As the whole building is under the influence of the stack effect, it is important to understand how much this effects the overall performance of the building.

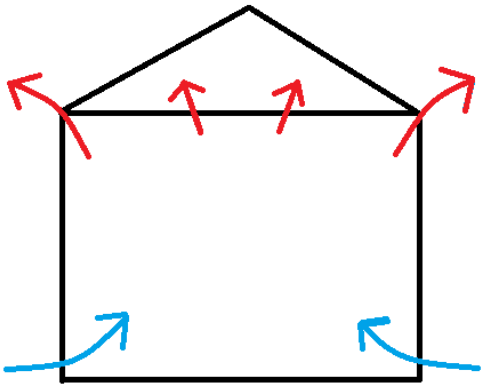


Figure 2

As a result of the stack effect, a building acts like a chimney. Illustrated in figure 2, the stack effect results from when wind passes along the building and along the roof, and draws air from the interior. For every one cubic foot of air that leaves the building, one cubic foot of air will infiltrate at different points, as illustrated in Figure 2 through the blue arrows at the bottom of the figure. Gaining control of the air movement through a building not only has a positive effect on efficiency, but contributes to increased comfort and indoor air quality. In most cases, the stack effect pulls air from less than desirable areas that are not maintained, can grow mold and mildew, and may house unwanted pests. This air is then introduced it to the main occupied sections of the building.

Recommendation:

- The best way to deal with this inefficiency would be to spray the underside of the entire floor with spray foam insulation. This will air seal all of the cracks and penetrations and insulate at the same time. It would be necessary to put some sort a barrier against the floor boards from underneath the section where there is no carpet as the foam will expand into the space above. This could be done with tar paper, stapled to the bottom of the floor boards before spraying. We would recommend spraying 4 inches of closed-cell foam between the floor joists, overlapping the face of all wooden members, and overlapping

the band joists onto the foundation walls. An additional result of performing this work would be a fortified floor structure.

Exterior Walls:

The walls of this building were built with a series of posts, beams and bracing on 45° angles filled in with 2x4 inch studs. The exterior is sided with wooded clapboard siding, then sheathing boards.
The interior is finished with lath and horse hair plaster.
Some time ago, the walls were filled with a blown-in cellulose material. Though this was a great improvement to the efficiency of the building, some wall cavities were missed, and others were not filled very well. At the time this was done, there was likely not a wide spread availability and use of such modern day technologies as infrared (IR) cameras and borrow scopes to help verify the even distribution and denseness of insulation in the cavities. The result is walls that may have a weighted R-value of 11 that allow for a fair amount of air infiltration. See figure 3 - 5 for a visual of a sample weak areas in the building's envelope.

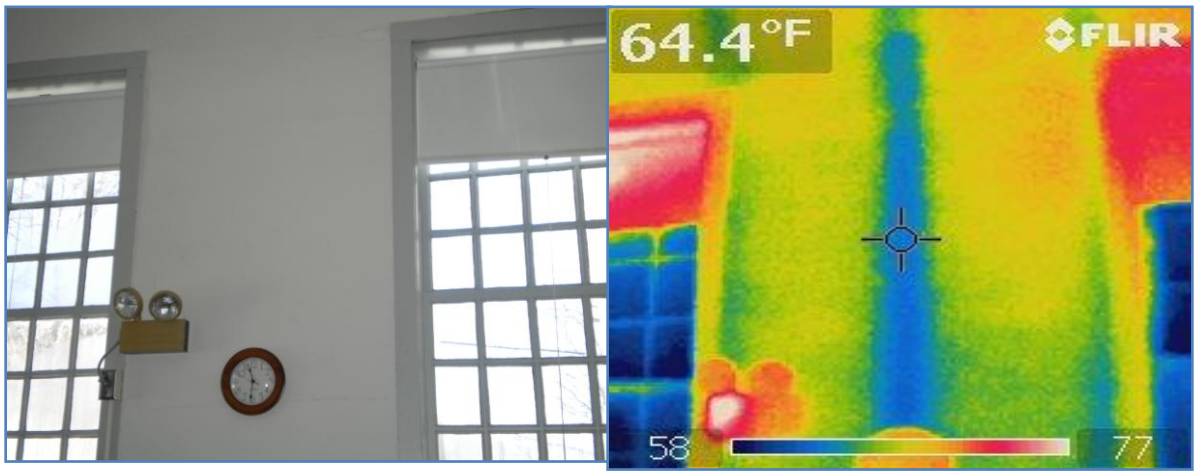


Figure 3

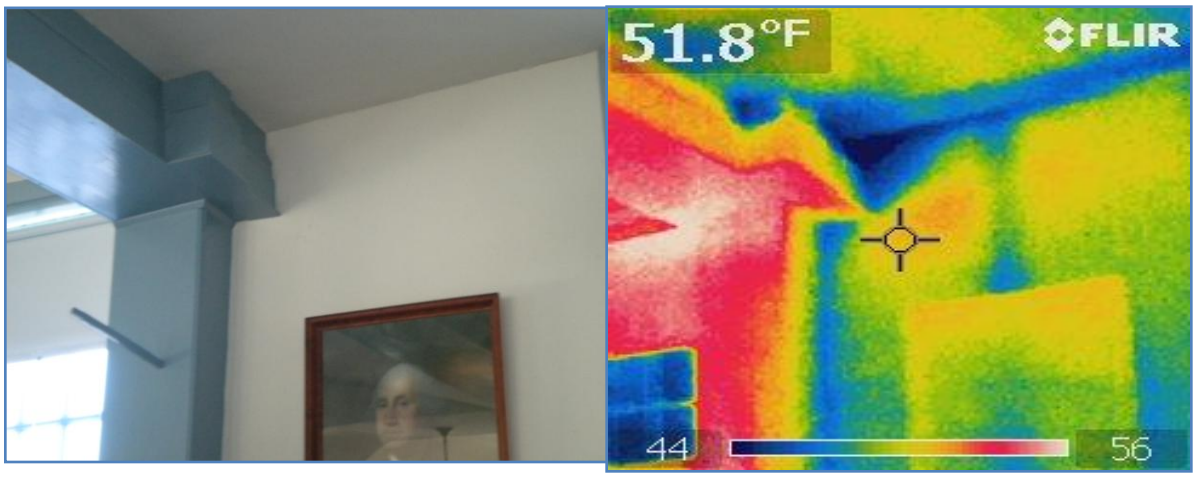


Figure 4

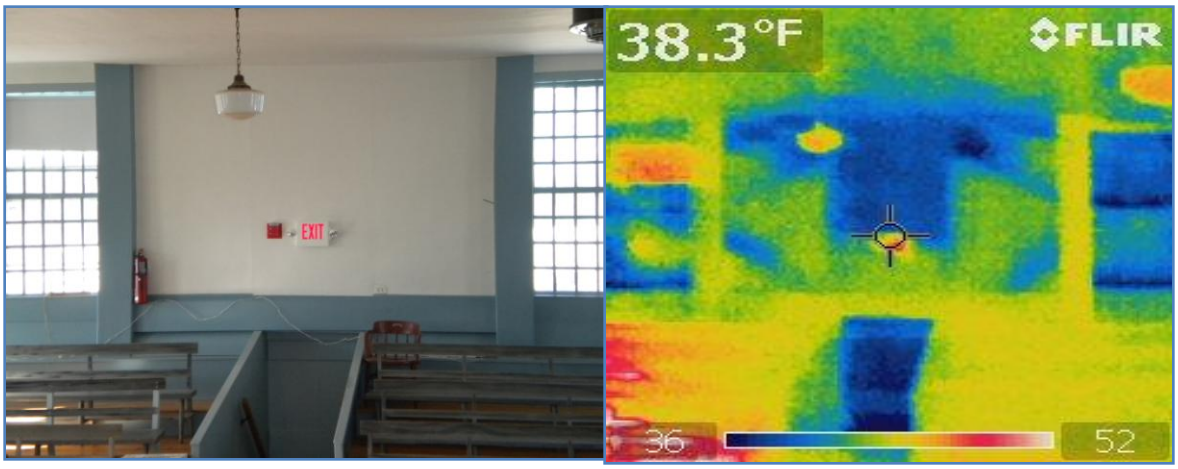


Figure 5

The lath and plaster does not function as a good vapor barrier, but does serve as a good interior air barrier. The plaster is cracked in many areas, which allows for the passage of air flow between the conditioned space, wall cavities, and the exterior. Refinishing these weak spots in the plaster would not only serve to maintain aesthetics, but also structural health and efficiency.

Many of the trim pieces around the windows have sagged and pulled away from each other over the years, or are in general disrepair as seen in figures 6 and 7. Not only is there a considerable amount of air infiltration from the window sashes themselves, but from the window frames and trim. At a minimum, smaller gaps should be filled with caulking to eliminate air passage. A more thorough correction would be to remove and resituate this trim work. If this were done, it may allow for further air sealing and insulating before the trim is reinstalled. This would also likely create new gaps between the plaster and the new trim position. Therefore, it may be best to take this action before the other plaster cracks are dealt with. In addition, some of the rotten or broken trim should be replaced.

Figure 6

Figure 7

Recommendation:

- Consult with an insulation contractor to explore the potential opportunity to blow more insulation into the walls.

- Make repairs to the trim work as needed, and seal all the cracks between trim work and in the plaster wall. Eliminating air infiltration from the walls will result in major efficiency gains.

Ceilings:

Figure 8

The ceiling above the first floor appears to be insulated. To what extent exactly is unknown. We were able to peer into a few sections of this area, but not all. Figure 8 shows the area under the stage where fiberglass batts were found. Given that the space above the first floor is rarely used, it is a good idea to keep these two sections of the building separated as much as possible. Treating the ceiling above the first floor as if it were exposed to attic conditions would be very beneficial. With the allowance of the Town, SDES would be happy to dig a little deeper into the investigation of insulation levels between the floors, though it would possibly involve removing floor boards, and drilling small holes.

The ceiling above the second floor has some considerable penetrations into the attic space that would be relatively easy to fill, and would result in substantial efficiency gains. There is 8 to 10 inches of cellulose insulation in the attic above the second floor which is fairly effectively slowing heat transfer. Figure 9 shows this space, an attic hatch that is not insulated, and light from the space below depicts the amount of air leakage from this weak spot in the building's envelope. We do recommend, where possible, achieving R-60 in ceilings to obtain maximum efficiency. This could be done easily with additional inches of cellulose insulation.

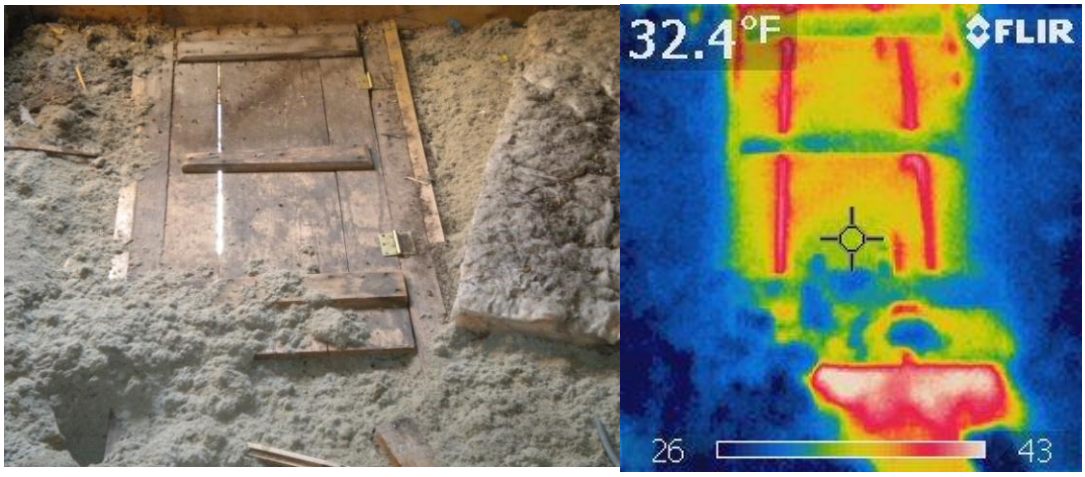


Figure 9

Recommendation:

- Determine how much insulation is present between the 1st and 2nd floors. If possible, try to achieve at least an R-30 between the two floors.
- Seal any penetrations between the 1st and 2nd floor, and the 2nd floor and the attic space.
- Blow an additional amount of loose fill cellulose into the floor of the attic to achieve an R-60.
- Air seal and insulated the attic hatch.

Doors and Windows:

The windows are old, wooden, single-pane, operable, and contributing greatly to the heat-loss of the building. There are replacement windows available that would look very similar to these originals, but we understand that maintaining certain historic characteristics may be important to the community. If replacing the windows is not currently in line with the community's goals, we would highly recommend maintaining these windows to perform to the best of their capability. This includes making sure that the individual panes of glass are sealed, the windows have a fresh coat of paint every 3 years or as needed, and that they are properly sealed every heating season. Sealing the windows could be done with rope caulking that would be removable in the warmer months. Plastic sheets are very effective.
In addition, we suggest that the Town consider replacing the storm windows. At the time of installation, the current storm windows may have been the best option.

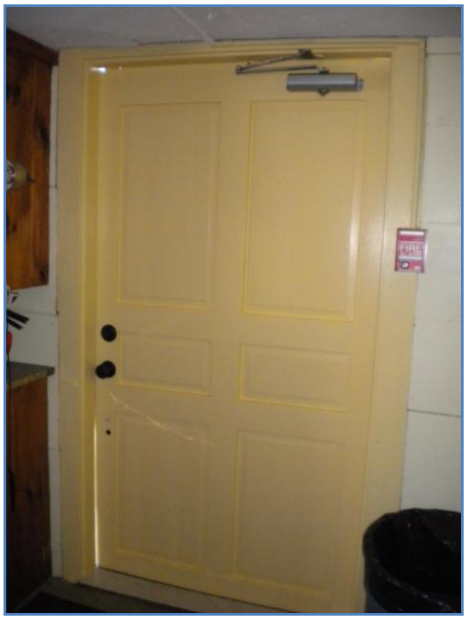


Figure 10

However, there are much more efficient storm windows available on the market today, and their replacement would contribute greatly to the efficiency of the building.
There are two exterior doors that either need to be replaced, or need to be sealed. The first is the handicapped access door which has sizable gaps along the edges allowing for a great deal of air infiltration. In figure 10, light from the exterior is clearly visible from around the door.
The other is the door leading into the bell tower. This door is also a large contributor to air leakage in the building, and as seen in figure 11, snow is even capable of infiltrating. With the introduction of bulk moisture in and around doorways comes the threat of damage to the wooden structures below.
It would also be beneficial to seal three of the interior doors. These are: the door that leads from the bell tower to the second floor space; the door in the stairwell that leads to the unconditioned portion of the bell tower; and the door that leads from the open space of the first floor to the bell tower. Eliminating the passage of air flow through these doors will help reduce the overall stack effect and heat-loss in the building.

Recommendation:

- Consider replacing the windows with new more efficient units. If the windows are not to be replaced, replace the storm windows with new high-performance units. In the interim, take careful measures to insure that they are well sealed from air leaks, with extra steps in the winter using rope caulking and/or plastic sheeting.
- Consider replacing previously mentioned doors; if replacement is not an option, at least ensure that when the doors are shut, that they are sealed well.

Figure 11

Mechanical:

The building is heated with two liquid propane (LP) fire boilers that feed hot water to a series of fan coils and radiators. These boilers have a rated BTU output of 175,000 each, and are likely running at about 80-82% efficiency. See figure 12. Flue dampers have been installed, as well as a modulating aquastat (outdoor reset). Both of the devices are designed to help the system operate more efficiently. We feel that the location of the outdoor temperature sensor, connected to the outdoor reset, could have been more appropriately

Figure 12

located. It is currently fasted to the exterior of the boiler room on the north side of the building. Though the north side of the building is the proper place to put this sensor, the boiler room is very warm, and the amount of heat conducting through the wall may be misinterpreting the temperature of ambient conditions.
The domestic hot water (DHW) for the building is produced with an independent LP fired hot water heater. This unit is fairly new, and is relatively efficient compared to other types of DHW heaters.
The supply and return copper piping runs underneath the first floor in the crawl space and is uninsulated.

The fan coils are old units, each with two fans. See figure 13. The motors which operate the fans likely use more electricity than motors found in newer models. Also, the filters in these units were found to be quite dirty and in need of replacement. Changing these filters is important for a couple reasons. First, the filters are designed to protect the equipment, not clean the air. When there is a build-up of dust on the coils, it reduces the rate that BTUs are pulled away and blown into the space resulting in a longer boiler run time each time there is a call for heat. Therefore, keeping dust off the hot water coils will help distribute heat more efficiently. Second, the more the filters are clogged with dust, the harder the already inefficient fan motors have to work. Collectively, all these fans serve to add to the cost of heating the building in the form of electric use.

Figure 13

There are two large copper pipes, one supply and one return, that run vertically against the north wall extending all the way to the attic. Once in the attic, the pipes branch off and feed 4 fan coils situated against the ceiling of the 2nd floor. These pipes have little to no insulation. The system was circulating hot water through the 2nd floor loop until it was recognized that these pipes should be drained, and the zone shut off from the main system. Taking this action was a very smart decision, and should save a good deal of energy this winter.

The two boilers have pilot lights running continuously, even during the warmer months when heat is not needed. We can't know for sure how much propane is being unnecessarily burned year round because of the pilot lights. It's possible that they could be going through 30 – 60 gallons or more of LP gas a year. This might only equal a 1-2% loss, but any waste of energy should be avoided.

Recommendation:

- Replace the two current gas boilers with one modulating/condensing LP gas boiler. How the current boilers function is simple; they are either on or they are off. Even with a modulating aquastat (outdoor reset), the efficiency of a modulating/condensing propane boiler far exceeds that of the current boilers.
  A modulating/condensing boiler has the ability to ramp-down its output to accommodate the shoulder months when lower temperatures are needed to heat the building. With a non-modulating boiler you are unable to reduce the BTU output and therefore are operating less efficiently during those slightly warmer months.

- Insulate all of the pipes in the system. Doing this will certainly result in large savings.

- Consider installing panel radiators to replace the old fan coils and radiators in the 1st floor. These are able to keeps spaces warm at lower temperatures, and will not contribute to the electric bill.

- Take out the entire zone for the second floor, including the suspended fan coils. Find a different route for supply and return pipes to this space and install one air handling unit. Be sure to also keep this loop isolated when the room is not in use.

- Relocate the temperature sensor for the outdoor reset to a location on the north side of the building where its readings will not be affected by the building temperature.

If the recommended air-seal and insulation work is completed, it may be necessary to provide fresh air to the building. A blower door test would determine how tight the building is as a result of the efficiency upgrades, if there is a need for fresh air, and how much air to introduce per hour.
The most efficient way to provide fresh air in this case would be with an energy recovery ventilator (ERV). An ERV functions by removing a percentage of the stale air from the return plenum, and then introducing charged, fresh air to the return plenum right before the air-handler. In the winter, warm/stale air being removed from the building will charge the incoming fresh air with a heat exchanger located inside the ERV. Conversely, in the summer months the exhausted cool/stale air from the interior will cool down the hot/humid air from the exterior before entering the air-handler. An ERV has a desiccant wheel as well. This allows for the transfer of moisture. In the winter months, moisture in the exhaust air will be transferred to the incoming dry air to help maintain occupancy comfort. In the summer, dry/conditioned air from the interior will remove, at least a portion of, the moisture from the humid incoming air - see Figure 18.

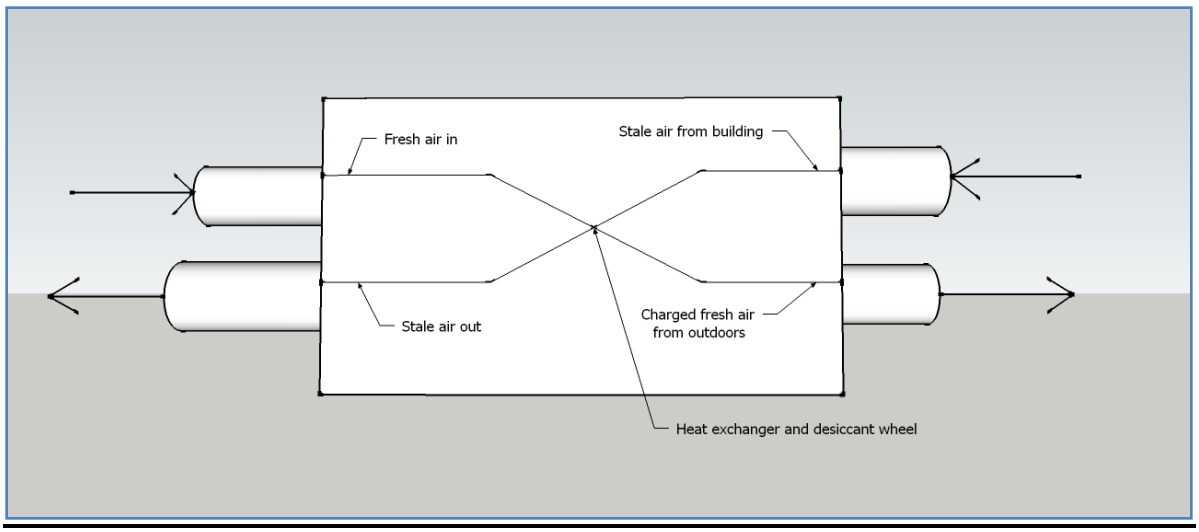


Figure 14

Electric Usage:

The electric usage in this building is relatively low. The Town has taken great steps with upgrading to more efficient lighting, and there seems to be a general awareness in the offices to conserve.

Recommendation:

- Make sure that all devices are plugged into power strips, and that power is cut to all devices, when they are not in use. Just because it's powered down does not mean that it is not drawing electricity.
- When appropriate, replace the refrigerator and other electric equipment with efficient Energy Star products.
- Install a photovoltaic system onsite. After the electrical consumption is better controlled through conservation and efficiency, onsite production of electricity is always a great option.

Blower Door Test Results:

CFM50 = 18,534 (the amount of air infiltration measured in cubic feet per minute while the building was under un-natural negative pressures)

ACH50 Pa = 14.96 (18,534 divided by the building's volume)

CFM50/ft² = 3.19 (18,534 divided by the square footage of floor space)

MLR = 1.4 (18,534 divided by the square of all the surface space of the building envelope; floors, walls and ceiling)

This is baseline data that will not only help track improvements to the building envelope, but also help us create a baseline energy model of the structure. CFM50 is the standard measure of air infiltration which needs to be reduced. The following figures help normalize the data in a way that is useful to compare with other buildings.

What these figures show is that considerable improvements can be made to the structure in regards to air leakage.

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. 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; conversely, a 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 up front 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 Sue Blothenburg, (603) 357-7309 ext. 5115, 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 Town Hall. 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 an additional 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.