Energy Efficiency Opportunities

For

Fire Department Facilities

West Ossipee, New Hampshire

Preliminary Assessment

October 28, 2011

Prepared by:

Peregrine Energy Group, Inc.

Boston, Massachusetts

Provided by:

New Hampshire's Office of Energy and Planning

Energy Technical Assistance & Planning
For New Hampshire Communities
Funded by the ARRA Energy Efficiency Conservation Block Grant

1.0 Introduction and Executive Summary

Peregrine Energy Group, Inc. ("Peregrine") has prepared this preliminary energy efficiency and renewable energy investment assessment for the facilities we visited on Tuesday, October 11, 2011 in West Ossipee, NH. We've prepared this report on behalf of the New Hampshire Office of Energy and Planning's Energy Technical Assistance & Planning for New Hampshire Communities program ("ETAP"). Funding for this project comes from the American Recovery and Reinvestment Act Energy Efficiency and Conservation Block Grant program of the U.S. Department of Energy. Peregrine gratefully acknowledges the assistance that Greg Howard provided with coordinating our site visits, collecting utility data documentation, and answering questions for our initial assessment.

The primary goal for this report is to identify cost-effective energy efficiency and renewable energy investments that West Ossipee should consider as part of its long-term energy management plan. The report includes Peregrine's recommendations for energy cost reduction projects that West Ossipee may want to pursue and also a summary of building energy use and cost information we were able to collect.

Findings and Recommendations

In order to generate our list of recommendations, Peregrine's site visit and staff interviews focused on:

- Observations of existing facility conditions
- Current operating practices and facility uses
- Short term and long term facility plans
- Potential building and mechanical equipment energy efficiency upgrades
- Potential renewable energy upgrades

After our site visit, Peregrine reviewed utility bill information for each facility to corroborate our site visit observations and ground our recommendations against actual energy consumption.

Drawing on our site visit observations and discussions with Town staff, Peregrine has identified several energy saving opportunities in facilities we visited. Many of our recommendations focus on opportunities to improve energy management practices in day to day operations that the Town can implement within existing town budgets, using existing staff resources.

More capital intensive energy efficiency recommendations that Peregrine identified include:

- Energy efficient lighting and insulation upgrades for the Central Fire Station.

Summarizing our Major Findings and Recommendations:

- **West Ossipee has both the best and the worst performing Fire Stations in the Ossipee Fire District**
- **The boilers in both buildings are very high efficiency.**
- **Lighting upgrades and building envelope upgrades at the Central Fire Station are the highest energy-related priorities for West Ossipee**

Suggested Next Steps

Within the context of the ETAP program, Peregrine can continue to support the Town to help plan and execute these recommendations. All projects indentified in this report will require further development and analysis to obtain firm pricing and confirm savings projections.

Immediate next steps include:

- Select which measures the Town would like to proceed with and establish an implementation schedule.
- Authorize further engineering activity, if necessary, to develop detailed specifications and/or generate more accurate savings projections.
- Develop request for proposal documents and/or select preferred controls, insulation and air sealing vendors.
- Secure quotes for projects and select controls, insulation, equipment, and air sealing contractors.

2.0 Utility Cost and Consumption

Energy Cost

The total energy cost for the buildings Peregrine visited in Ossipee is about $30,564. The cost per square foot varies from a high of $2.38 for the West Central Station in West Ossipee down to $.91 for the West Jewell Hill Station in West Ossipee.

Table 2. Annual utility cost and energy cost intensity

Facility	Square Feet	Electric Cost ($)	Oil Cost ($)	Propane Cost ($)	Total Cost ($)	Cost ($) per Square Foot
West Central Station	2,500	2,452	-	3,504	5,956	2.38
West Jewell Hill Station	7,069	2,072	-	4,380	6,452	0.91
Ossipee Corner	2,820	2,453	2,734	-	5,187	1.84
Center Ossipee	8,654	5,501	-	7,469	12,970	1.50
Total	21,043	$12,477	$2,734	$15,353	$30,564	$1.45

Energy Use

Total energy use for the buildings Peregrine visited in Ossipee is about 67,408 kWh for electricity, 1,058 gallons for oil, and 7,011 gallons for propane. The total energy intensity units are expressed in site[1] kBtu[2] per square foot. Table 4 in Section 5.0 of this report shows how the energy use intensity of these buildings compares to similar buildings that Peregrine has assessed as part of the NH ETAP program.

Table 3. Annual utility consumption and energy use intensity

Facility	Square Feet	Electric kWh	Oil Gallons	Propane Gallons	Total kBTU	Site kBtu per Square Foot
West Central Station	2,500	15,213	-	1,600	197,842	79
West Jewell Hill Station	7,069	9,161	-	2,000	213,666	30
Ossipee Corner	2,820	10,500	1,058	-	184,011	65
Center Ossipee	8,654	32,534	-	3,411	422,076	49
Total	21,043	67,408	1,058	7,011	1,017,596	48

[1] Site energy = All non-electric fuel consumption in the building plus electric energy measured at the meter.
[2] kBtu = 1,000 British Thermal Units. 1 kilowatt hour of electricity = 3,413 Btus, 1 gallon of #2 oil = 140,000 Btus, 1 gallon of Propane = 100,000 Btus.

3.0 West Jewell Hill Fire Station

West Ossipee's Jewell Hill Fire Station (2010) is new steel frame structure. The facility includes about 7,069 square feet and is used for emergency vehicle and equipment storage and repair services. The hours of operation for the building are random and very limited.

Figure 1. West Jewell Hill Fire Station

Building Envelope

The building envelope consists of a slab on grade foundation, concrete block walls in front and a wood frame addition in back. The garage doors are insulated with small, insulated panes of glass and there's one window in the building that has insulated glass.

Mechanical Systems

The mechanical systems in West Jewell Hill Fire Station include a state of the art propane-fired wall-hung boiler that provides hot water to under floor heat piping and an indirect-fired storage tank for domestic hot water (DHW). The building does not have mechanical ventilation or cooling equipment.

Figure 2. Heating and DHW System

Lighting and Other Electric Loads

Lighting is primarily T12 fluorescent. Lighting contractors have identified problems with the existing lighting that will make an upgrade to energy efficient lighting more difficult. Other electric loads include repair equipment, a refrigerator and water bubbler, and other miscellaneous plug loads.

Figure 3. Apparatus Bay

Recommendations

Peregrine did not identify major capital investments during our site visit that would reduce the facility's energy consumption. However, we did discuss several operational and building maintenance considerations.

Lighting – The Fire Department should consider adding occupancy sensors to the three main light switch circuits. This would be a minor cost upgrade and would help guard against lights being left on by mistake. Occupancy sensors aren't foolproof so the Fire Department should add 2-3 small lights on a separate circuit that remain on if the lights go out.

Temperature - Consider turning temperature down or at least setback at night. The lag time for radiant heating systems is very long – two hours or longer. Either this lag time needs to be anticipated or setback temperatures reduced in order to minimize the potential discomfort factor of people working in the building when the temperature has been set back.

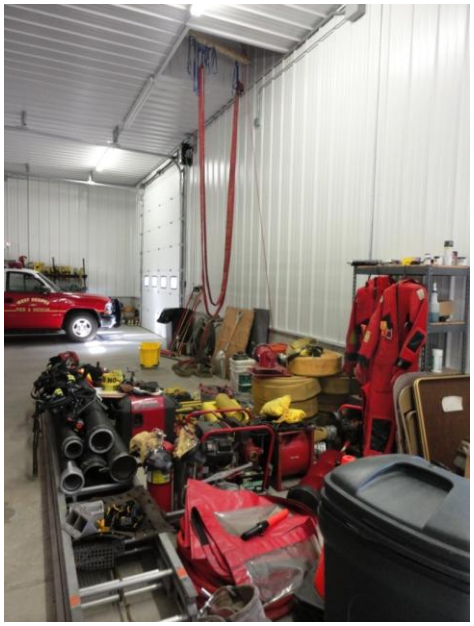
Appliances – It's been a few years since appliance manufacturers sold avocado green refrigerators. Energy consumption for the donated refrigerator in Jewell Hill is a potential concern with energy use in this vintage refrigerator potentially running 1,000 kWh per year or higher. New Energy Star rated refrigerators consume about 600 kWh per year. West Ossipee should measure the consumption of the donated refrigerator with a Kill-A-Watt[3] or similar plug in electric meter to confirm the annual electric use for this appliance. The fire department can measure other appliances as well such as the water bubbler that could potentially be turned when the building is unoccupied. 400 kWh savings per year at the current price of $.23 per kWh is about $90 per year savings with a new energy efficient refrigerator.

Figure 4. Donated refrigerator and water bubbler

[3] Kill-A-Watt URL: http://www.p3international.com/products/special/P4400/P4400-CE.html

Moisture control – Steel buildings are inherently susceptible to condensation problems in cold weather and from what we understand West Jewell is no exception. The Fire Department's first priority has been to reduce moisture sources. For example, emergency transport vehicles aren't cleaned in the building any more. Opening doors and windows briefly when the relative humidity increases is a good low cost solution. If moisture continues to be a problem, the Town might need to consider installing mechanical ventilation. Ossipee Corner has a ventilation fan installed at the top of the hose drying tower that is very effective. Another option is to install a solar make up air system. Conserval[4] manufactures a durable solar air system that would be a good application at Jewell Hill. The orientation of the building is very good as long as the solar air collector can be mounted far enough away from the tree line

Figure 5. Hose drying location



<u>Next Step</u>: Fire Department staff and town officials can discuss the proposed measures as part of its ongoing capital investment review process of the two town Fire Department facilities.

[4] Conserval URL: http://solarwall.com/en/home.php

4.0 West Ossipee Central Fire Station

West Ossipee's Central Fire Station (1975) is a steel frame building with a split-brick concrete block facade. The facility includes about 2,500 square feet and the Fire Department's headquarters.

Figure 6. Central Fire Station - front

Figure 7. Central Fire Station - back

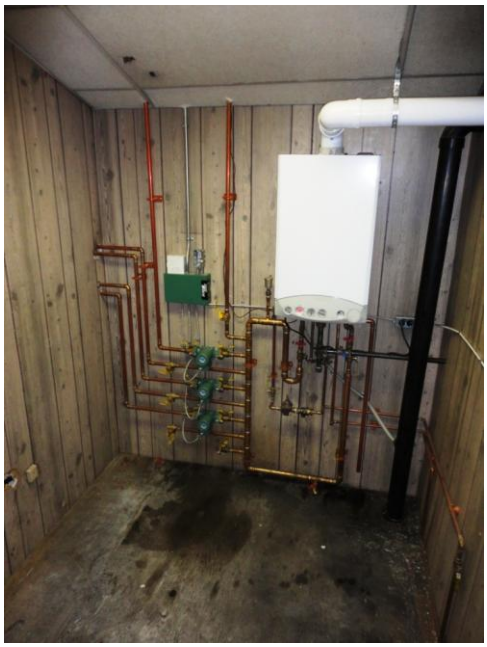
Building Envelope

The building envelope is constructed on an uninsulated slab-on-grade foundation. Steel-framing supports two-story walls with sheetrock and wood paneling interior finish, vinyl-backed insulation pinned between the steel frames and the exterior metal siding. The roof assembly includes steel framing with vinyl-back fiberglass insulation pinned between the metal frame and the exterior roofing. Insulation was installed at some point above the dropped ceilings on the first floor and second floor. However, the insulation's integrity is questionable because large areas of insulation have been removed. Overheating in the second floor is a major problem. Windows are aluminum frame sliders in very poor condition. The garage bay doors are insulated with small insulated panes of glass.

Mechanical Systems

The mechanical systems in the Central Fire Station include a high-efficiency propane-fired, wall-mounted boiler that supplies hot water to ceiling-mounted Reznor unit heaters in the apparatus bay and fin-tube baseboard in the second floor office. A portable air conditioner provides cooling in the office area. A small electric storage tank provides domestic hot water (DHW) to the building.

Figure 8. Boiler

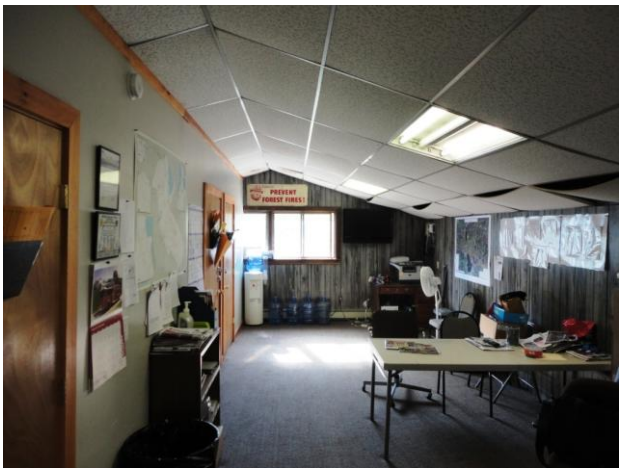


Lighting and Other Electric Loads

Lighting is primarily T12 fluorescent light fixtures. Other electric loads are minimal and include standard office equipment, and other miscellaneous plug loads.

Figure 9. Apparatus Bay lighting

Figure 10. Second floor lighting



Recommendations

1. Install energy efficient lighting

Based on our count on site, there are 11 two-bulb, eight-foot, T12 fluorescent light fixtures on the first floor and 8 two-bulb, four-foot, T12 fluorescent light fixtures on the second floor. These lights are good candidates for energy efficient light fixture upgrades to T8 fluorescent light fixtures with electronic ballasts.

Peregrine recommends replacing the eight-foot lighting fixtures on the first floor with four four-foot energy efficient T8 light fixtures. The cost per fixture for four-foot T8 light fixtures is about $60[5] plus the cost of light bulbs. This measure will pay for itself in about 3-4 years depending on the number of hours that the lights are on in the apparatus bays.

Peregrine didn't discuss this on site, but, we believe, upon reflection that West Ossipee should consider removing the ceiling light fixtures and install energy efficient wall mounted light fixtures. This would allow the Fire Department to improve the lighting system efficiency and improve the thermal envelope. The existing dropped ceiling and recessed lighting fixtures are a very poor thermal boundary for the building and should be upgraded.

Next Step: Purchase replacement light fixtures for the apparatus bay and review light fixture options on the second floor.

2. Upgrade the building envelope

As discussed onsite the building's thermal envelope is in poor condition. The existing insulation has been removed in random locations and damaged by condensation and roof water leaks elsewhere. Water damage from roof leaks may be an issue still and the low pitch of the roof may be an ongoing concern. Peregrine found a useful website that discusses water leak problems in similar roof

[5] URL: http://www.homedepot.com/Lighting-Fans-Indoor-Lighting-Industrial-Shop-Lighting-Strip-Fluorescents/h_d1/N-5yc1vZbvm3Z1z10p31/R-202193133/h_d2/ProductDisplay?langId=-1&storeId=10051&catalogId=10053

systems that West Ossipee can review[6]. The other good resource online is an insulation company that specializes in steel structures[7].

The other major variable with the building envelope is the use of dropped ceilings to define the thermal boundary. Dropped ceilings are very porous and allow significant air movement at joints and through the panels themselves. In addition many panels are in poor condition and fit poorly in the support framing.

Peregrine recommends replacing the dropped ceilings with a more permanent/ rigid thermal boundary solution such as gypsum board and to fill the voids between the interior and exterior surfaces with insulation. The challenge with this recommendation is to make sure that potential moisture damage doesn't compromise the building's integrity as an unintended consequence of the additional insulation. The three specific concerns we have about adding insulation in the Fire Station include potential problems with condensation on the cold metal frame members, condensation on the vinyl backing of the existing insulation, and moisture damage from water leaks. Building Science Corporation has an excellent website that discusses these concerns (and more)[8]. The right approach for this building will most likely require a combination of different insulation techniques.

Potential energy savings from improving the building thermal envelope are significant – on the order of a 30% heating load reduction or about 500-600 gallons of propane per year. Peregrine recommends using Ossipee Center's energy use index number (36 kBtu/ SF for propane) as a good performance target. Jewell Hill's energy use index is even lower (26 kBtu/ Sf for propane). Installation cost will vary significantly depending on related capital investments like roof repairs and other moisture control measures that might be required.

Next Step: Discuss air sealing and insulation options with a knowledgeable local weatherization contractor. Peregrine can review the contractor's recommendations as part of our ETAP technical assistance as long as program funding remains available.

[6] URL: http://www.lexiscoatings.com/metal/roof-leaks/
[7] URL: http://steelbuildinginsulation.com/
[8] URL: http://www.buildingscience.com/

5.0 Building Performance

The chart below provides an opportunity for Ossipee Fire District to compare the performance of its buildings against comparable buildings that Peregrine has assessed as part of the NH ETAP program. The score is based on total energy use per square foot (1,000 Btus per Square Foot or kBtu/ SF). The higher the energy use per square foot the more inefficient the building is. In addition to total use, the chart includes the energy use per square foot for each major utility.

As the chart shows, West Ossipee's fire stations are both the best (30 kBtu/ square foot/ year) and the worst (79 kBtu/ square foot/ year) performing facilities in the Ossipee Fire District.

Table 4. Building performance use per square foot scores for fire stations

Building	SF	Building Type	Total Site kBtu/ SF	Elec Site kBtu/ sf	Oil Site kBtu/ SF	Propane Site kBtu/ SF	Natural Gas Site kBtu/ SF
Uptown Fire Station	5,988	Fire Station	150				
Fire Station	3,236	Fire Station	131	9	122		
Public Safety Complex	15,914	Fire Station	123	49			75
Safety Complex	7,510	Fire Station	121	46	76		
Fire Station	5,070	Fire Station	112	16	97		
Mirror Lake Fire Station	2,402	Fire Station	111	21	91		
East Fire Station	725	Fire Station	110	6		104	
Fire Station	5,125	Fire Station	98				
Company 1	1,189	Fire Station	95	7		88	
Fire Station	3,040	Fire Station	93	7	86		
Fire Station	2,080	Fire Station	88	7	81		
Central	2,500	Fire Station	79	21		58	
Fire Station	5,204	Fire Station	78	24	54		
ES Fire Station	2,438	Fire Station	77	10	67		
Fire Station - Contoocook	5,543	Fire Station	77	17	60		
Fire Station	6,800	Fire Station	77	20	57		
Fire/ Police Station	6,688	Fire Station	76	22	44	10	
Fire Station/ Rescue	3,072	Fire Station	75	11		64	
Company 2	1,201	Fire Station	70	7	64		
Fire Station	7,000	Fire Station	69				
Fire Station	3,000	Fire Station	68	3	65		
Fire Station	2,820	Fire Station	65	13	53		
Volunteer Fire Station	6,579	Fire Station	63		53	10	
Public Safety	13,000	Fire Station	58	21	37		
Fire Station	6,773	Fire Station	57	5	53		
Fire Station	13,783	Fire Station	54	10	45		
Fire Station	9,300	Fire Station	54				
Public Safety Building	4,848	Fire Station	51	13		37	
Fire Station - Central	6,442	Fire Station	50	10		40	
Ridge Fire House	3,488	Fire Station	50	0	50		
Fire Station	8,654	Fire Station	49	13		36	
Fire Station	6,960	Fire Station	49	11	38		
Fire Station	4,958	Fire Station	49	10		39	
Fire Station	5,878	Fire Station	46	12		34	
Ws Fire Station	3,960	Fire Station	45	11	34		
Fire Station	4,260	Fire Station	43	13	30		
Fire Department	8,740	Fire Station	42	17		25	
Company 3	2,500	Fire Station	42	7	36		
Public Safety	19,716	Fire Station	41	13	28	1	
Pingree Hill Station	4,780	Fire Station	38	10	27		
Narrows Fire House	3,136	Fire Station	38	11		27	
Fire Station	4,000	Fire Station	34	5	29		
Fire Station	9,000	Fire Station	33	3	30		
Jewell Hill	7,069	Fire Station	30	4		26	
Fire Station	5,896	Fire Station	30	4	25		
Union Fire Station	3,264	Fire Station	28	5	23		
East Fire Station	4,608	Fire Station	23	1	22		
Old Fire Station	2,160	Fire Station	1	1			

6.0 Light Levels

Measured and Target Light Levels

Following are sample light levels for several types of buildings and tasks we see in municipal building portfolios.

Table 5. Sample light level recommendations for municipal facilities

Office private w/o task light level	50 FC
Office open w task light level	35 FC
Office computer work	30 FC
Hallway light level	20 FC
Library reading light level	50 FC
Library stack light level	35 FC
Library circulation light level	75 FC
Garage parking light level	15-30 FC
Garage body work light level	80 FC
Gymnasium General	30 FC
Gymnasium Matches	50 FC

Suggested Strategies for Reducing Energy Use and Increasing Energy Efficiency in Local Operations

Prepared by

Energy Technical Assistance & Planning For New Hampshire Communities

Funded by the ARRA Energy Efficiency Conservation Block Grant

Introduction

Whether you represent a City, Town, or County that is trying to reduce its energy use and expenses, adhering to the simple principles and processes described here will greatly increase the likelihood of both near term and long term success. Sections 2-4 give you specific steps you should take to move the process forward in your community. Section 5 outlines the broad steps for putting together a comprehensive Energy Management Plan.

Getting Organized for Energy Efficiency

The goal of the ETAP program is to assist communities take action to reduce their energy usage. Like any other project you might undertake at work or at home, knowing where you are and where you hope to get to and agreeing on the roles and responsibilities of the members of your team will make your efforts more fruitful.

Decide who is in charge: Designate an Energy Lead

Your community should have a single person responsible for monitoring energy use, tracking your progress in increasing energy efficiency, and measuring progress against goals. Ideally this should be an individual who has both the responsibility and the authority to affect policy and move your goals forward. This will help guarantee that energy efficiency initiatives stay on track and are an integral part of all policy and decision making.

Establish an Energy Committee and Share Information about Energy Use and Cost

A successful energy cost reduction strategy requires the involvement and commitment of elected officials, local government managers and departments, building users, and maintenance staff. Bringing them together to confirm policies, goals, and strategies, to determine resources needed, to establish timelines and responsibilities, and to measure and communicate progress is critical to your success.

You can't manage what you don't measure: Monitor Monthly Energy Use

Track energy use and cost for each building both month to month and year to year. Using the Inventory Tool offered by ETAP is an easy way to get an overview of this use and cost and to measure your progress toward reaching the energy efficiency goals you set.

Inform town employees that energy reduction is a priority and solicit suggestions

Town employees often have good ideas for how to reduce energy use. But no one ever asks them for their opinion. Get employees involved in energy efficiency discussions and ask for their ideas on how improvements can be made in your programs and policies.

Finding Resources to Implement Energy Projects

While many energy use reduction opportunities are low cost or even no cost, others will require the investment of funds for major capital projects.

Look for and secure utility rebates and incentives

New Hampshire's utility companies often offer incentives to encourage their customers to adopt and install energy efficiency technologies. Even when you purchase electricity or natural gas from a competitive supplier, you still qualify for incentives offered by the distribution company that delivers your supply to you. Before proceeding with any upgrades or renovations, contact your utility to see what is being offered and how you can qualify. If you've taken advantage of lighting upgrade programs in the past, you may qualify for additional incentives to upgrade lighting again with more efficient fixtures.

Plan for the inevitable replacement of older equipment: Include funding in CIP or in reserve funds for energy systems replacement when equipment is 50% of useful life

It is a typical for a municipality or county to use a piece of equipment, vehicle, or building energy system until it fails and needs to be replaced. But the time to think about improving the energy efficiency of equipment is not that January day when the heating system in the Town Building stops functioning. Bring in contractors to review the condition of your system and research what alternatives might be available. You might find out that it will pay to replace a system sooner with new efficient equipment and avoid the costly repairs that aging systems can require. Consider putting funds away yearly beginning when equipment gets to its half-life to minimize the budget impacts of its replacement.

Engage citizens in energy efficiency planning and policy making

Where there may not be needed expertise within the town, city or county government to address energy efficiency issues, there may be concerned or interest citizens willing to help and lend their expertise. If your town does not have a Local Energy Committee, reach out to interested citizens to form one. This not only will help you optimize how local government uses energy, but will give you a conduit to citizens when you need to secure their support for capital projects and procurements.

Establishing Policies that Encourage Energy Efficiency

Use building renovations as an opportunity to improve energy efficiency

Every building upgrade should be viewed as a chance to improve how the building operates, including how it uses energy. Consider adding insulation when wall are being opened. Be sure that new doors or windows are purchased with efficiency in mind.

Consider life cycle energy costs when purchasing any new equipment

When purchasing any new system that uses energy to operate (such as boilers, ventilation, air conditioning units, street lights, or vehicles) don't only consider the "first cost" or sticker price of the equipment or system, but compare and consider the "total cost" of different equipment, including it operation and maintenance over its expected life. It may be that the least expensive system will have a far greater impact on annual operating budgets than a more expensive, but energy efficiency alternative. This should be a standard principal in budgeting for any item with uses energy.

Creating an Energy Management Plan

The goal of the ETAP program is to not only to help communities identify specific actions it can take to reduce energy waste, but also to support ongoing energy management and planning to make buildings, systems and processes more energy efficient.

There are general principles and methods that are pertinent to any community to move them along the path towards energy efficiency. These are set forth in *New Hampshire Handbook on Energy Efficiency & Climate Change, Volume II* (2009), developed by the NH Carbon Coalition, Clean Air-Cool Planet, and Sustainable Development & Energy Systems (SDES) along with the Local Energy Committee Working Group of the NH Energy Efficiency and Sustainable Energy (ESSE) Board. These documents lay out an energy efficiency planning "roadmap" that municipalities can follow to understand their energy usage, plan for increased energy efficiency and work with their community to educate and implement effective energy efficiency solutions.

The aspects of this Roadmap are illustrated in Figure 1 briefly described in the following sections. You may already be following some or all of these steps in your community, if so congratulations! If not these steps are a strong foundation to use for thinking and acting on energy efficiency objectives.

Figure 1 Energy Efficiency Roadmap

Energy Baseline and Benchmarking

An inventory process can help establish a baseline of energy data describing the current performance of each building, as well as other areas needing attention, such as transportation and street lighting. For buildings, this involves collecting and organizing energy use information over a number of years to be able to look at annual, monthly, and seasonal patterns of energy consumption. The ETAP program provides assistance in collecting, maintaining and utilizing this information. If you have not taken advantage of this free ETAP service, contact your Regional Planning Commission for more information.

Establishing Priorities

Reviewing the baseline and benchmarking information can help a community target its energy efficiency initiative. One approach to setting priorities is to focus on buildings that are larger energy users or that have the higher energy use per square foot of floor area. Another approach focuses on buildings that are older or are known to have older systems or systems that have required frequent or costly repairs or have a record of occupant comfort complaints. We recommend a combination of approaches that looks at each building individually, recognizes that different types of building uses result in different energy profiles, and that high energy use can reflect envelope and equipment inefficiencies, poor maintenance practices, conscious choices by building

occupants, opportunities for behavior modification, or the inherent energy requirements of the use to which a building is put.

Buildings Assessments/Audits

Once buildings are identified as being the high priority targets, a building assessment by a qualified specialist should be arranged to determine what steps could be taken to reduce energy use without conflicting with the business for which a building is used.

For buildings with systems which perform like residential buildings (such as former homes converted to office space), there are standards from the Building Performance Institute (BPI) for conducting audits. Commercial buildings have different systems and The American Society of Heating Air Conditioning and Refrigeration Engineers (ASHRAE) has developed standard energy audit levels for these types of buildings. For all such assessments, regardless of building type, the cost will vary with the level of detail and type of information sought. This can range from relatively inexpensive high level "scoping audits" which identify opportunities with ranges of costs and savings to help screen investment alternatives to extensive and expensive "investment grade audits" which provide exact costs and savings estimates and identify replacement equipment to be installed with design requirements.

Prioritizing and Implementing Recommendations

Building assessments will usually generate a range of recommendations that include relatively quick and easy changes or improvements as well as capital intensive projects. Some measures will have relatively quick paybacks on investment, while others will have long paybacks and may be best implemented as part of long term equipment replacement process.

Regardless, it is important to review all the recommendations and understand the implications of acting now or later on each one in terms of cost and savings; and further, to develop a formal plan, with responsibilities assigned and actions identified for proceeding with each recommendation of interest.

In many cases, the limiting factor in proceeding will be securing funding. While it is tempting to look for grant sources and wait until grant money is secured for projects, it may make more sense to commit and invest local funds now to gain efficiencies and savings as well as the peace of mind and greater comfort that new systems will create. If a significant energy cost savings can be documented, consider finding the funding for the work through loans programs such as the Municipal Energy Reduction Fund offered by the Community Development Finance Authority, or bonding. If the audits include lighting, HVAC or motor and drive upgrades, utilities may offer incentives that help pay for improvements.

Measurement/Assessment

Continue to monitor energy usage and savings achieved. If you've spent hard-won taxpayers dollars on these energy saving measures, you want to document how this work made a difference, and if not, determine why expected benefits are not being realized.

Reprioritize and Continue Improvements

Very seldom will one round of energy efficiency upgrades cover all the work that could be done to maximize energy savings. Establish the next set of priorities and begin the process of implementing these changes as well.

References

- New Hampshire Handbook on Energy Efficiency & Climate Change, Volume II (2009), developed by the NH Carbon Coalition, Clean Air-Cool Planet, and Sustainable Development & Energy Systems (SDES) along with the Local Energy Committee Working Group of the NH Energy Efficiency and Sustainable Energy (ESSE) Board. Copies of this document can found at http://www.nhenergy.org
- Information on building audits can be found at http://www.bpi.org and http://www.ashrae.org/
- Information on the Municipal Energy Reduction Fund can be found at http://www.nhcdfa.org/web/erp/merf/merf_overview.html .