

TO: Marty Bender, Town of Webster, New Hampshire
FROM: Kaj Huld, P.E. and Steven Weisman, Peregrine Energy Group, Inc., for ETAP
DATE: June 24, 2011
RE: Energy Efficiency Considerations for Webster Town Buildings

On May 24th, Peregrine Energy Group met with Marty Bender to discuss and tour several town buildings including the Town Hall, Library, and Public Safety building. Our purpose was to obtain information needed to assess energy use reduction opportunities in these facilities. This assistance to the Town of Webster is being funded by the NH OEP's Energy Technical Assistance and Planning program ("ETAP") with the goal of assisting towns to implement energy efficiency improvements in municipal buildings. This memorandum summarizes our findings and recommendations. Peregrine is available to provide follow-up support to help you implement projects.

1. Town Hall and Library

Webster's Town Hall and Library are now combined in a single structure that used to be a separate church and Grange Hall in the late 1800's. The Town acquired the facility in the early 1990's, installed a new foundation, added the connection between the two buildings, and made renovations including new windows and new mechanical systems.

The Town Hall offices are located in the lower level of the main building with the library on the upper level. In the adjoining Grange Hall portion of the building, there is a multifunctional hall upstairs with downstairs dining room and kitchen. The Town Hall is open weekdays during typical business hours. The Library is open Mondays, Wednesday and Saturdays. The basement kitchen sees very limited use and is mostly used for serving prepared meals versus cooking fresh food.

The wood framed building has no attic space, and we were not able to determine what kind of insulation is in place. Space heating and ventilation is provided by two oil-fired furnaces. These units cycle as needed to maintain space temperature. They probably are not used in the summer to ventilate the building. The Library is above the Town Hall offices and tends to be too hot in the winter. During cold weather, it is common for the librarian to open windows. The library has a ductless split air conditioner with remote control thermostat. The kitchen uses propane cooking equipment. There is also a propane fired backup generator.

Fluorescent T8 lighting at this facility was recently updated under a Unifit program. There are no motion sensors in the building, but staff turns off lights when they aren't needed so sensors wouldn't provide any benefit at this time.

Town Hall / Library Observations and Recommendations

This building has simple systems with minimal air conditioning, and there are limited opportunities to make cost effective updates to reduce energy use. We recommend further analysis of the building's insulation levels and weather tightness, which can usually be improved significantly in older wood framed buildings. The occupants appear to have a high energy awareness and do everything they can to manually reduce energy use. The town is to be commended for its efforts.

We offer a few ideas for additional savings for your consideration:

- Building insulation and weather sealing: As noted above, older wooden buildings often have a plethora of opportunities to tighten the building thermal envelope. Unfortunately, the building's configuration allowed us limited access during our inspection to determine what insulation (if any) is in use. We did note that one of the exterior door seals was damaged.

We recommend inviting a weatherization expert to tour the building to assess the opportunity for air sealing and improved insulation. Air sealing involves installing a blower door to isolate sources of infiltration. Air sealing and insulating a poorly insulated building typically has a surprisingly long payback, but can make the building much more comfortable in colder seasons by eliminating drafts.

- Weatherize windows and add storms: Part of the air sealing effort should involve windows. The building's windows are newer and in generally decent condition. However, there aren't any storm windows to reduce wind losses. The Town indicated interest in adding storms. As part of the air seal project, we recommend a detailed assessment of the current windows to repair and/or update weather seals on sashes. This may be more effective and less costly than adding storm windows.
- Change incandescent lamps: There are a few incandescent lamps still in use. For example in the library restroom and for outdoor building side lights. These old lamps should be changed to compact fluorescent screw-in lamps. Cost is nominal and lamps can be changed by staff as their time allows.
- Install new outside lighting: There are three exterior HID lights for the grounds in front of the building. The only reason to light the front of the building at night is to illuminate the flag on the flag pole. We recommend removing the existing light fixtures and installing a flag pole base mounted LED system. This will require running power to the flag pole. New LED outside fixtures cost \$500 or more each. This project could be handled by Webster's staff or contracted out. Negotiation with Unutil is required since electricity for the outside lights may be billed on a per fixture bases versus metered electricity use.
- Add zone control on main air handler: We recommend adding zone control dampers on the "Grand Marshall" air handling unit. Zone dampers will give better temperature control in the Town Hall and Library areas. With such dampers in place, when the space temperature rises in the library, the zone dampers serving that area will close down to prevent overheating of that area. Each zone damper is independently controlled by thermostat. We estimate the cost for adding three dampers

and associated controls to be \$5,000 to \$10,000. Savings will be on the order of \$500/year. Further review of the duct layout and current system controls is required to develop a specification for an update. ***Peregrine is available to provide additional technical support to Webster to resolve their temperature control issue.***

- **Install programmable thermostats:** The existing thermostats at this building are conventional non-programmable types. We recommend new thermostats with time of day and day of week programming capability. Space temperature should be allowed to drop to 55-60°F during unoccupied periods in the winter. In the summer, air conditioning in the Library space can be reduced to some degree depending on how much moisture removal is needed to prevent book damage. Some facilities can turn their air conditioners off at night and the building remains dry where others might need to maintain full air conditioning mode. We recommend experimenting to see what works for this building. The Town can select and install new thermostats, which are widely available.
- **Consider Electronic Ignition Kitchen Range:** The propane range in the kitchen has a standing pilot. Pilots use a small amount of fuel continuously. This kitchen sees very limited use and therefore the portion of fuel used for the pilot versus cooking is significant. We recommend investigating if electronic ignition conversion is possible. Otherwise, it may serve to shut off the pilots for extended periods when the kitchen isn't going to be in use.

2. Public Safety Building

Webster's Public Safety building houses police and fire protection functions. The building was constructed in 2003 and is in excellent condition with original equipment. The building has separate offices for the police and fire departments with a common lounge and kitchen area with electric cooking equipment. The Police Station has a small Sallyport and holding cell area. The Fire Department has a moderate sized apparatus bay. The Police Department is occupied daily, but is unoccupied between 11 p.m. and 7 a.m. except during an emergency. The Fire Department is volunteer staffed with a full time chief. Their area sees very limited daily use, but with regular Thursday night activities such as training and vehicle maintenance.

The building has four high efficiency Rheem furnaces with DX cooling coils. These units are controlled by programmable thermostat. Staff diligently manages space temperature and resets whenever possible. The Sallyport has a gas-fired unit heater. The apparatus bay has gas-fired radiant heating. Both bays are kept at about 50-55°F in the winter. Lighting is provided by T8 fluorescent. The apparatus bay has 400 watt metal halide fixtures.

Public Safety Building Observations and Recommendations

This newer building has excellent lighting and mechanical systems. The Town and Public Safety staff are very knowledgeable about how the building works and are to be commended for their commitment to

running this building as efficiently as possible, including minimizing use of heating and air conditioning and turning off lights when not needed. A few additional ideas that could result in further savings:

- Exterior lighting control: There may be an opportunity to limit outside lighting late at night with a timer. Full lighting should resume during an alarm event. The current system has photocell control and may be able to be programmed. However, we recommend that some of the lights stay on all night for security purposes, and therefore, rewiring and addition of separate control will probably be required.
- Change metal halide fixtures: Lighting in the apparatus bay could be improved by installing fluorescent fixtures which are more efficient and can be started instantly (versus waiting a few minutes for the lamps to warm up as required by current fixtures). We understand that the use of lights in the bay is highly limited (to the extent, we were told, that crew often don't bother to turn lights on during an alarm!). At some point, if lights are used more regularly, it would be worth considering changing to a T5 or T8 fluorescent system that operated on motion sensors.
- Apparatus Exhaust System: The apparatus bay doesn't have a truck engine exhaust collection system as is common at other fire stations. The current area exhaust system has an interlock with the doors so that wall exhaust fans kick on when the doors are open. This seems counter intuitive in that it would encourage more time with the doors open, although we don't know if this is the case. Having a direct engine exhaust collection system allows vehicles to operate in the bay with the doors closed. Adding an exhaust collection system should be considered to be a safety and comfort project as well since energy savings alone will not justify the considerable expense.
- Domestic Hot Water Timer: Staff is willing to shutdown the domestic hot water heating system at night to save energy. We recommend adding a time of day controller to automatically restart the system for morning warm up.