TOWN OF GILL

MASSACHUSETTS

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SELECTBOARD MEETING MINUTES

December 16, 2013

Call to Order: The Selectboard meeting was called to order at 5:40 PM.

Members Present: John Ward and Randy Crochier
Members Absent: Ann Banash
Others Present: Ray Purington, Admin. Assistant; Claire Chang, Pam Lester, and Janet Masucci – Energy Commission; Pam Shoemaker, Lynda Hodsdon Mayo, and David Detmold.

Energy Audits: The Selectboard met with the Gill Energy Commission to review the recommendations contained in the energy audits for the Town Hall, Slate Memorial Library, and Riverside Municipal Building. Claire Chang, Chair of the Energy Commission, explained that the audits were required before the Town can use any of its Green Community grant money for building-related energy conservation measures. The audits were paid for using a separate grant from the Department of Energy Resources (DOER). (The complete audits are included as part of these minutes.)

For the Town Hall, the audit recommends replacing the oil-fired boiler that was installed in 1999. Three replacement options were considered – a propane-fired condensing boiler with a propane storage tank, an oil-fired boiler with integrated condensing economizer, and a wood pellet-fired boiler with a pellet storage silo. The audit also recommends insulating the attic area. The Energy Commission recommends the propane boiler option ($15,818) and the attic insulation ($8,714). An additional $10,000 is recommended for insulating the walls of the building, but that work will need more investigation.

It is unknown whether the Building Inspector will require a structural engineer and/or architect's involvement before issuing a building permit for insulation work at the Town Hall and the other two buildings. Ray will followup with the Building Inspector.

At the Slate Memorial Library, the main room has a suspended ceiling with a layer of fiberglass insulation above the ceiling tiles. The beauty of the original high ceiling, roof trusses, and balcony are hidden by the ceiling tiles. The walls and roof are covered with pressed tin, which should be preserved in certain non-thermal locations. The audit recommends insulating the walls, attic, and roof, which would require removing the tin, building out to accommodate two inches of foam insulation, and finishing the surfaces with sheetrock. A new propane-fired condensing furnace with a propane storage tank is recommended to replace the existing 1999 oil-fired furnace.

The estimated cost of the propane furnace is $13,490, and the insulation project (walls, top attic, and sloping roof) is $12,187. Both are recommended by the Energy Commission. An additional $5,000 is recommended for energy efficient lighting upgrades to replace the fluorescent lights that are part of the suspended ceiling. It was noted that there will be external costs associated with these improvements, namely, the cost to temporarily relocate the Library to the second floor of Town Hall.

There was a discussion of moisture problems in the basements of the Library and the Town Hall. It was felt that those problems need to be solved ASAP, and prior to doing heating system replacements and insulation work.

Energy Commission member Andy Cole joined the meeting at 6:20 PM. Andy discussed his observations of the water leaks at the Library, and suggested that window wells be installed around both basement windows, and that many areas of the concrete walls need to be re-grouted. More sealing is needed around the new bulkhead.

For the Riverside building, the audit recommends replacing the very old oil-fired steam boiler with a propane-fired condensing boiler with a propane storage tank. The heat distribution system would be converted from steam to

forced hot water, and some of the existing steam radiators could also be converted and re-used. The audit also suggests insulating the attic and first floor walls. Estimated costs total $66,386 (boiler = $52,030, attic = $7828, walls = $6,528). All three are recommended by the Energy Commission.

Ray explained that before the Town can spend its Green Community grant money on any of these projects, they must first be approved by DOER. He will contact DOER to discuss the next steps.

Green Community Annual Report: Ray presented a draft of the annual report the Town must submit to DOER as part of its Green Community designation. When the report is completed later this week, John will sign it so it can be submitted. During the discussion of the report, Ray was asked to send a reminder about the Town's anti-idling policy to all departments with vehicles. Additionally, there are still vehicles that need to have the Idleright devices installed. Pam Lester also reported on a very successful winsert workshop that was held on December 14th.

Riverside Building Boiler: Ray reported that during the recent annual cleaning of the boiler at the Riverside Building, the technician found several pipes with very bad rust and scale, bad enough that if the rust gives out, the boiler will lose its water and the building will be without heat. S&J Jamrog has estimated $1,380 to make the repairs. By consensus the Selectboard authorized the repairs in order to avoid damage and more costly repairs from an unexpected failure.

Claire Chang, Pam Lester, Andy Cole, Pam Shoemaker, and Lynda Hodsdon Mayo left the meeting.

Minutes: Randy made a motion, seconded by John, to approve the minutes from 12/2. The vote was unanimous in the affirmative.

Hampshire Power Electricity: Hampshire Power is still ironing out details of a new Fixed Price electricity supply contract to replace their Profit Sharing Plan. The price of a 3-year contract will not exceed 9.01 cents per kWh, which is less than the current default rate from WMECO. If ready, the contract will be on the agenda for the 12/30 meeting. In response to a question, Ray will find out what it will mean if a Town solar array goes online sometime during the term of the contract.

Sewer Commitment: Randy made a motion, seconded by John, to sign the sewer commitment with a bill date of December 17, 2013 in the amount of $21,255.87. The vote was unanimous in the affirmative.

National Grid Herbicide Application: The Selectboard reviewed a letter from National Grid informing them of the company's intent to selectively apply herbicides along the power line right-of-way that crosses the southern portion of Gill from the Connecticut River to the Falls River.

Fire Department Purchase Order: A purchase order for Rose Ledge for $850 to repair the rear cylinders on the brush truck was reviewed and signed. It was noted that the repairs had already been completed. Ray was asked to remind departments about the importance of submitting purchase orders prior to incurring the expense, except in emergency situations.

Highway Chapter 90 Reimbursements: A Chapter 90 reimbursement request for $96,593.00 was reviewed and signed.

FRCOG DLTA Projects: A list of potential DLTA projects for 2014 has been distributed by the FRCOG. Gill's input on the list is sought by mid-January. The list will be submitted to all departments and committees for their feedback, and the Selectboard will compile a ranked list at its 1/13 meeting.

PEG Access Camera Equipment: Janet Masucci explained a $30,000 quotation from Access A/V for camera equipment that will expand and enhance the quality of video recordings of meetings and other events. Currently recordings are made with one camera, which means a lot of panning from speaker to speaker. Transitions are not smooth, and the resulting video is not "visually interesting." She noted that Montague's Selectboard meetings are recorded using four cameras, which is easier to film and produce, and are more appealing to watch.

The proposed equipment includes two wall-mounted and one tripod-mounted pan-tilt-zoom (PTZ) cameras. These small, discretely placed cameras would be less intrusive than the current camera on its tripod. The HD switch would allow "live" editing of the video stream, instead of the current multi-hour postproduction process. She stressed the importance of creating good quality videos, since they serve as part of the public record.

As the topic was not listed on the posted agenda, it will be included on the agenda for 12/30 and discussed again then.

MMA Annual Meeting: Randy will be attending the Mass Municipal Association's annual meeting on January 25th. John signed the form to designate Randy as the voting representative for the Town of Gill.

David Detmold and Janet Masucci left the meeting at 8:40 PM.

Warrant: The Board reviewed and signed FY 2014 warrant #13.

The meeting adjourned at 9:05 PM.

Minutes respectfully submitted by Ray Purington, Administrative Assistant.

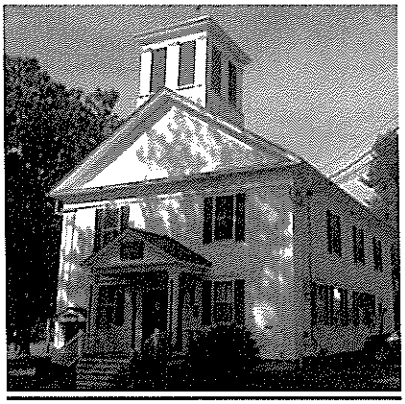
Randy P. Crochier, Selectboard Clerk

BALES ENERGY ASSOCIATES

Date: December 5, 2013

ENERGY STUDY
FOR
GILL TOWN HALL

325 Main Road
Gill, MA 01354



Completed By:

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Introduction

Bales Energy Associates, an energy efficiency engineering firm, was contracted to provide an ASHRAE Level 2 energy audit for Gill Town Hall located at 325 Main Road in Gill , Massachusetts.

Bart Bales, PE, MSME, senior engineer at Bales Energy Associates, visited the site, reviewed energy usage & billing information, examined relevant equipment and systems, and developed energy analyses and recommendations with regard to building's energy related systems.

Executive Summary

Energy Conservation Opportunities Evaluated

Bales Energy Associates has approached the Gill Town Hall in terms of the whole system. Improvements in various systems have interactive impacts with other systems. Key conclusions are the following:

1. **Heating Systems Recommendations**
   a. **Three heating system replacement options were evaluated**
      - **Installation of a propane-fired, premium efficiency condensing boiler with a propane storage tank.**
      - **Installation of an oil-fired boiler with an integrated condensing economizer.**
      - **Installation of a wood pellet-fired boiler with a pellet storage silo.**

   b. **All three boiler replacement options assume installation of an improved microprocessor-based scheduling time-clock** to provide scheduling of occupied and unoccupied periods.

      Install an outdoor air temperature sensor and a space temperature sensor. Use space temperature and outside air sensor inputs sensors to determine when boiler and circulator shall run for daytime temperature maintenance, and unoccupied temperature setback.

2. **Domestic Hot Water System Observations and Recommendations**
   Observations:
   a. Domestic hot water use is very limited in the building; there are two hand-washing sinks and one small kitchenette sink.
   b. The existing tank-less coil water heater leads to undesirable boiler stand-by heating losses during the non-heating season.

   Recommendations
   a. All heating system replacement options assume the **installation of an 8-gallon electric mini-tank to provide hot water for lavatory hand-washing and kitchenette sinks.** Modify piping so that this unit can also serve the kitchenette sink.

3. **Enclosure Improvements** can reduce the building's heat loss characteristics but represent significant capital investments. Options include:
   a. **Increasing the attic floor assembly R-value by R40 was evaluated.** Because the attic is un-floored, a superstructure would have to be added to allow for insulating the attic. This greatly increases the cost to insulate the attic area.

      Insulating the attic requires installation of sub-flooring across the top floor ceiling joists to provide a structure to support cellulose insulation. This subflooring would also serve to limit air transport though the ceiling. Cellulose insulation sufficient to achieve the desired attic floor assembly R-value could then be added. In this approach the existing fiberglass insulation would be retained in place as is. Any bypasses and penetrations in the attic would be air-sealed and floored pathway to the cupola ladder provided. The measure is presented without and with costs to correct attic ventilation deficiencies to allow air flow through the attic properly to maintain proper conditions for humidity control in the attic.

      The attic currently does not have low gable or soffit air intake openings required for proper attic ventilation. The cost to provide proper low ventilation openings is included in ECM 2B. ECM 2B also includes an allowance for the installation of a properly sized, insulated and structurally sound attic access hatch.

      Bales Energy Associates recommends inclusion of elements in ECM 2B. ECM 2A is included in case needed by for grant evaluation purposes by the Division of Energy Resources.

   b. The level and quality of the insulation of the walls at the Town Hall is uncertain. Members of the Energy Committee have expressed interest in using thermal imaging of the building to ascertain areas of greater heat loss. Areas in which the inside of walls such as above and around the former electric heater grills were examined and found to be insulated with dense cellulose insulation.

      Thermal imaging was not included in the scope of the current study. Thermal imaging can be used to identify areas which are poorly insulated or in which insulated has settled to create voids. Areas of high infiltration (air leakage) can also sometimes be identified with thermal imaging. If significant insulation improvement opportunities are identified during such imaging, a wall insulation measure can be evaluated based upon the new information to provide the necessary documentation for inclusion in future Green Communities funding requests.

   c. For long-term capital improvement, consider replacing the building's windows and framing to reduce air leakage and conduction heat losses.

The costs, savings, and economic payback for these energy conservation measures are presented in the following Executive Summary Chart. The values shown in the Executive Summary Table represent the savings with measures taken in the order of economic feasibility shown.

The calculations supporting each measure are included in the appendices.

Executive Summary Chart

	Oil	Electricity	Propane	Wood Pellets
Price	$2.98	$0.162	$2.15	$242.50
Unit	$/Gallon	$/KWH	$/Gallon	$/Ton

ECM #	Energy Conservation Measures	Cost	Incremental Cost ($)	Available Utility Rebates ($)	Total Cost after Rebate ($)	Incremental Cost after Rebate ($)	Oil Savings (Gallons/yr)	Electricity Savings (KWH/yr)	Propane Savings (Gallons/yr)	Wood Pellet Savings (Tons/yr)	Annual Savings ($/yr)	Total Payback (yrs)	Incremental Payback (yrs)	Total Payback Payback after Rebates (yrs)	Incremental Payback after Rebates (yrs)	Life Years
ECM1A	Install Propane-Fired Condensing Boiler & Mini-Domestic Hot Water Tank	$15,818	$8,818	0	$15,818	$8,818	1,000	-470	-1,042		$660	24.0	13.4	24.0	13.4	20+
ECM1B	Install Oil-Fired Boiler w/ Condensing Economizer, & Mini-Domestic Hot Water Tank	$13,718	$6,718	0	$13,718	$6,718	202	-470	0		$526	26.1	12.8	26.1	12.8	20+
ECM1C	Install Wood Pellet-Fired Boiler & Mini-Domestic Hot Water Tank	$26,668	$19,668	6,667	$20,001	$13,001	1,000	-470	0	-7.98	$966	27.6	20.4	20.7	13.5	20+
ECM2A	Insulate & Air-Seal the Attic	$6,525	$6,525	0	$6,525	$6,525		0	144	0.00	$311	21.0	21.0	21.0	21.0	30+
ECM2B	Insulate & Air-Seal the Attic, Add Attic Hatch & Provide Proper Attic Intake Air Venting	$8,714	$8,714	0	$8,714	$8,714		0	144	0.00	$311	28.0	28.0	28.0	28.0	30+
	Totals for ECM1A & ECM2B	$24,532	$17,532	$0	$24,532	$17,532	1,000	-470	-898	0	$971	25.3	18.1	25.3	18.1	
	Totals for ECM1B & ECM2B	$22,432	$15,432	$0	$22,432	$15,432	202	-470	144	0	$857	26.8	18.4	26.8	18.4	
	Totals for ECM1C & ECM2B	$35,382	$28,382	$6,667	$28,715	$21,715	1,000	-470	144	-8	$1,277	27.7	22.2	22.5	17.0	

Existing Conditions

Facility Description

The Gill Town Hall is a moderate sized wood-framed, sloped-roofed building located at 325 Main Road Gill, Massachusetts. The building comprises a basement and first floor of town offices and a second floor meeting hall.

Utility Energy Use

Utility data was collected and is tabulated below. Western Massachusetts Electric Company provides electricity. For heating, the Town Hall uses #2 fuel oil. (Note: WMECO (and its parent company Northeast Utilities, recently merged with NSTAR. As a result, changes in procedures and personnel in charge of related utility programs are in transition.)

Jul 2012-June 2013	Billed Energy Use Table for Electricity & Fuel						
Building Name		Gill Town Hall					
Owner		Town Of Gill, MA					
Account #							
Month		Electricity KWH	Electricity KW	Electricity Total $	Oil Gallons	Oil $	Energy $ Totals
Jul	7/16/2012	1440	5.0	$226			$226
Aug	8/14/2012	1500	4.5	$209			$209
Sept	9/13/2012	600	4.0	$94.33	66.3	$197	$292
Oct	10/12/2012	660	4.0	$121			$121
Nov	11/9/2012	780	4.5	$140	126.3	$376	$516
Dec	12/12/2012	900	5.5	$144	227.4	$677	$822
Jan	1/14/2013	1140	5.5	$191	215.0	$640	$831
Feb	2/12/2013	1080	4.5	$176	96.7	$288	$464
Mar	3/13/2013	1080	4.0	$171	114.9	$342	$513
Apr	4/12/2013	1080	4.5	$179	153.0	$456	$634
May	5/14/2013	840	5.5	$146			$146
Jun	6/14/2013	1320	5.5	$213			$213
Annual (Units)		12,420		$2,011	999.6	$2,977	$4,988
Heating Season (Units)		6,720		$1,122	933.3	$2,780	$3,902
						Energy Use Totals (Mbtu)	
Annual (Mbtu)		42,377			138,644.5	181,022	Energy $ Totals
Heating Season (Mbtu)		22,929			129,448.7	152,377	
$/Energy Unit		$0.16				$2.98	
$/Energy Unit						Totals (Mbtu/sf)	($/sf)
Annual (Mbtu/sf)		8.3			27.2	35.5	$0.98
Heating Season (Mbtu/sf)		4.5			25.4	29.9	$0.77
Building Name		Gill Town Hall			Heated Square Footage		5,100

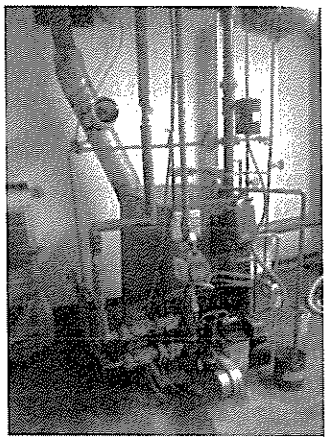
Prescriptive and custom utility incentives are available for some of the measures described. When the report's contents are accepted by the client, the report may be presented to the utilities for review and determination of levels of custom incentives the utilities will offer, if any.

Western Massachusetts Electric Company contacts are: Lynn Ditullio (ditullb@nu.com) and Robert Dvorchik (dvorcrs@nu.com).

Heating, Ventilating & Air Conditioning Systems

Boiler

The building is served by a five-section, oil-fired non-condensing boiler (HB Smith, 8 Series, S/W-5) installed in 1999. This boiler can fire at two levels, high and low, with a maximum output rating of 175,000 Btu/hr. The boiler has a combustion efficiency of approximately 83%.



The design heat load for the building is approximately 76,000 Btu/hr.

Evaluated Boiler Improvement Measures

At the request of the energy committee, three boiler replacement options are evaluated in this study. Energy and dollar savings are evaluated for each option. The three replacement options are:

1. **Installation of a propane-fired, premium efficiency condensing boiler with a propane storage tank.**
2. **Installation of an oil-fired boiler with an integrated condensing economizer.**
3. **Installation of a wood pellet-fired boiler with a pellet storage silo.**

These measures are evaluated in detail in the report's appendices.

Each of the heating system replacement options will significantly reduce heating costs. The greatest

Boiler Water Temperature Controls

The boiler system provides hot water at a constant temperature (180 F) and has no outside temperature sensor. The operating temperature of the water circulated through the boiler is not reset based upon the outside air temperature.

Heating Distribution Systems

The building is a (hot-water based) hydronic heating system comprising three circulation. One loop serves the second floor meeting hall; the other two serves the town offices on the first floor and in the basement. Terminal heating is provided by baseboard convectors.

Building Temperature & Scheduling Controls

Temperatures in the three zones are controlled by manual thermostats located in each zone.

As part of the boiler replacement measure, Bales Energy Associates **recommends Installation of an electronic programmable timeclock and an outdoor air sensor and an indoor space sensor.**

Cooling Systems

Window air conditioning units are used to cool the spaces in the building.

Domestic Hot Water Heating Systems

Hot water is provided by a tank-less coil in the boiler. This requires the boiler to remain operational throughout the non-heating months; during this time stand-by losses occur for the boiler to maintain itself in a ready state. Water usage is low in the building; water uses are limited to a small kitchenette sink and two lavatory sinks.

Domestic Hot Water Heating System Recommendation

To minimize stand-by heat losses from the domestic hot water system, **Bales Energy Associates recommends the installation of small well-insulated 8-gallon,mini-tank electric water heaters located near the sinks that they serve. The mini-tank could be located in the boiler room beneath the lavatories and piped to serve the two lavatories and the nearby kitchenette sink.**

Costs and savings for this measure are included in the Appendices.

Heating System Improvement Options

The three options have different costs, benefits, and trade-offs. Factors in addition to energy efficiency and savings may impact the option the Town chooses to implement. Bales Energy Associates discusses key parameters for consideration below. Domestic hot water use (comprising three low-flow sinks) is very limited at the town hall. For all options, Bales Energy Associates recommends the installation of a point-of-use mini-tank electric hot water heater for provision of hot water. This will allow the boiler to be turned off during the non-heating season, thus avoiding large boiler stand-by losses during those months.

Prior to the energy committee's interest in an evaluation of multiple heating system options, Bales Energy Associates tendency was to recommend the propane-fired system. This was due to uncertainty in how to weight the non-technical factors indicated below.

Bales Energy Associates will be happy to participate in a discussion aid the town in evaluating which option to implement.

- **Propane-Fired Condensing Boiler System**

  The propane-fired option will reduce source energy the most and result in the most efficient system. This option requires the installation on a town-owned propane tank. In this measure an underground tank is assumed. (The propane-fired option reduces fuel costs more than the oil-fired option.)

  Condensing boilers are designed and constructed to safely capture the latent energy in boiler exhaust by condensing the water vapor. This condensate contains sulfuric acid. For this reason condensing boilers must be constructed of materials designed to withstand such corrosive condensate. Quality condensing boilers are constructed with a stainless steel heat exchanger and with condensate neutralization to allow for environmentally acceptable disposal of condensate to drain.

  The boiler system should also be installed with sealed combustion. This means that the combustion air is brought from outdoors via a plastic intake pipe to directly provide air to the burner. The low-temperature exhaust may be side-vented from the building typically via plastic pipe as well.

- **Oil-Fired Boiler System with Condensing Economizer**

  The oil-fired option saves less energy than the propane-fired option. The oil-fired option allows the town to use an oil-biodiesel blend (up to 20%), if desired. The oil-fired option has the lowest first cost and the shortest economic payback. As far as the consultant knows, the Buderus oil-fired boiler with condensing economizer assumed in this measure is the only oil-condensing product line available in Massachusetts.

These boilers are designed and constructed to safely capture the latent energy in boiler exhaust by condensing the water vapor in an added economizer section attached to the exhaust of the boiler.

This condensate contains sulfuric acid. For this reason the economizer section must be constructed of materials designed to withstand such corrosive condensate. These boilers are equipped with condensate neutralization to allow for environmentally acceptable disposal of condensate to drain.

The boiler system should also be installed with sealed combustion. This means that the combustion air is brought from outdoors via a plastic intake pipe to directly provide air to the burner. The low-temperature exhaust may be side-vented from the building typically via plastic pipe as well.

According to Orange Oil, the local distributor/contractor providing the propane and oil-fired quotations, Orange Oil is the top provider of this product in the United States. Though sold widely in Europe and there is currently significant quantities of this product currently available, new stock of the Buderus boiler considered is not currently being imported into the United States. Orange Oil has indicated that Buderus has indicated a long-term commitment to providing support and parts for the product in the United States.

- **Wood Pellet-Fired System**

The wood pellet-fired option uses a non-fossil, partially renewable fuel source. It improves system energy efficiency less than the other two options but saves the most on fuel costs. Wood pellets cost substantially less than fossil fuels on a per unit basis for delivered energy.

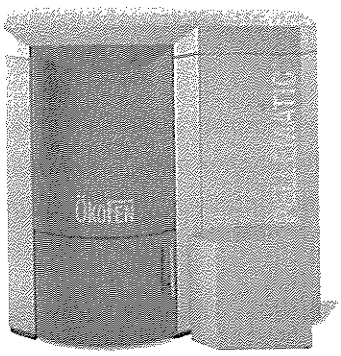
The boiler system should also be installed with sealed combustion. This means that the combustion air is brought from outdoors via a plastic intake pipe to directly provide air to the burner.

Pellets are delivered to a large bulk silo. The system evaluated includes an auto-feed mechanism which delivers pellets without the need for operator oversight. (This system operates equivalently to the oil pump for an oil-fired boiler.) The system includes an ash compression system to increase ash storage capacity and increase the time period between ash removals.

The pellet boiler requires more maintenance attention than the other options. Periodic removal and disposal of ash is required. (The Okofen pellet boiler assumed in this measure is one of the only pellet boilers which meet the Massachusetts Code requirements for pressure vessels.)

A new upcoming state program is slated to provide a rebate of 25% of the installed cost of a pellet boiler system.

Sandri Energy, a local energy provider and contractor for heating, ventilating and air conditioning services, indicates that it has made a significant and long-term financial commitment to providing wood pellet delivery services for commercial and residential clients. Sandri provides and installs Okofen pellet boilers, as well as pellet delivery services.



Costs and savings for all three options are included in the Appendices.

Electrical Systems

Lighting Systems

Most spaces in the building are lighted with four foot fluorescent fixtures equipped with T-8 lamps and compatible electronic ballasts.

Building Enclosure

The finished basement, first, second floors of the Gill Town Hall comprise approximately 5,100 square feet of heated floor area.

Roof and Attic

The Town Hall has a cape-style -roof with a ventilation cupola on top. The attic has no soffit vents around the perimeter of the roof overhang nor does it have gable vents. The attic roof is not insulated.

There is a small floored section of the attic above the stage which is beneath the cupola. The spaces beneath the attic joists and above the drop ceiling is insulated with foil-faced fiberglass batts facing the drop ceiling. The ceiling is unevenly insulated. There are large air bypasses between the attic and the spaces below.

Recommendation for the Attic

Bales Energy Associates recommends that the attic floor joists be treated as the location thermal and air boundary layer. This involves the following steps:

1. Install subflooring (or other sufficient structure) to support the installation of cellulose insulation on top of the attic floor. Seal subflooring to reduce air leaks. Install a permanent hatch for access to the attic. Close off and air-seal all other penetrations.

2. Retain the cupola for ventilation out of the attic.

3. Insulate the attic floor assembly to add an R-40 level of loose-fill cellulose insulation to the attic.

Costs and savings for this measure are included in the Appendices.

APPENDICES

HEATING SYSTEM IMPROVEMENT MEASURES

Option#1: Propane-Fired Condensing Boiler

Space Heating Savings with Propane-Fired Condensing Hydronic Boiler							
			Gill Town Hall Gill, MA			Propane	
Oil Rate ($/gallon)						$/gallon	
$2.98	Existing Condition:			New Condition:		$2.15	
Equipment Type	Space Heating Boiler	Space Heating Boiler		Space Heating Boiler		Space Heating Boiler	
Boiler #	1			1			
Make	HB Smith			Viessmnn			
Model	8 Series S/W-5			Vitodens 200 WB2-8-32			
Type	Atmospheric			Condensing			
Heating Medium	Hydronic			Hydronic			
Control Mode	High-Low			Modulating 4:1			
Maximum Output Mbtu/Hr	175			103			
Steady State Eff	83%			92%			
Input Mbtu/Hr	201			112			
Seasonal Eff	72%			92%			
Percentage of Load	100%			100%			
Installed System Costs				Condensing Boiler			
Boiler	$7,000		Propane-Fired Condensing Boiler	$12,550			
			Propane tank	$2,600			
			Mini-Tank Water Heater	$668			
Totals	$7,000			$15,818			
Annual Building Operating Load (MMbtu/year)	Summary of Existing Building-Related Heat Loads	Existing Oil Heating Usage Gallons	New Propane Heating Usage Gallons	Fuel Cost $		Peak Space Heating Load (Mbtu/hr)	Provide (#) 1 Boilers @ 100% of design Load
99,544	Existing Oil Use	1,000		$2,977		76	76
99,544	New Propane Use		1,042	$2,241			
		KWH					
Electric HW Use	New electricity use	470		$76			
Fuel Energy Before	138,645						
Fuel Energy After	108,200						
Added Electrical Energy	1,603						
Fuel Energy saved	28,841		Savings $	$660		76	

Assuming Existing Boiler Payback Calculation:	Cost	Savings	Payback
Full Equipment Cost Basis:	$15,818	$660	24.0
Incremental Equipment Cost Basis:	$8,818	$660	13.4

Estimate Provider: Orange Oil, New Salem, MA

Proposal

Date: 09-10-13

Name	Gill Town Hall	Phone	413-863-9347
Address	325 Main Road	Job Name	Viessmann 200 Boiler
City, State, Zip	Gill, MA 01354	Job Location	SAME
Submitted by	Robert E. Harris III	Account #	

We hereby submit specifications and estimates for:

Viessmann Vitodens 200 WB2B 35 Boiler; Veissman Low Loss Header; Horizontal Venting Kit; Viessmann Neutralization Kit; Low Loss Sensor Kit; Extrol Package; (3) Grundfos Circulators; (1) Spirovent Air Eliminator; Watts S1156F, 9D; Argo ARM-4 Zone Relay; And all miscellaneous material for job completion.	6,900.00
Permit	150.00
Labor	4,800.00
TOTAL	**$ 11,850.00**

Proposal Does Not Include Wiring By Electrician

We Propose hereby to furnish material and labor – complete in accordance with above specifications, for the sum of:
Eleven Thousand Eight Hundred Fifty and 00/100 Dollars ($11,850.00)

Payment to be made as follows:
50% Down Upon Bid Acceptance ($5,925.00)
With Balance Due Upon Job Completion ($5,925.00)

All material is guaranteed to be as specified. All work to be completed in a substantial workmanlike manner according to specifications submitted, per standard practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control. Owner to carry fire, tornado and other necessary insurance. Our workers are fully covered by Workmen's Compensation Insurance.

Authorized Signature

Note: This proposal may be withdrawn by us if not accepted within 60 days.

Acceptance of Proposal - The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Date of Acceptance: _____

Signature _____

Signature _____

Boiler estimate provided by Orange Oil, 45 Elm Street, New Salem, MA 01355 mail: PO Box 150, Orange, MA 01364 phone: (978)544-3222 or (413)773-0222

Note: Propane tank cost in measure was provided by George Propane of Goshen, MA. Bales Energy Associates has also included an added $500 allowance for wiring boiler by an electrician. These services were not included in Orange Oil's quotation.

Option#2: Oil-Fired Boiler with Condensing Economizer

Space Heating Savings with Oil-Fired Hydronic Boiler with Condensing Economizer Gill Town Hall Gill, MA						
Oil Rate ($/gallon)					Oil $/gallon	
$2.98	Existing Condition:			New Condition:	$2.98	
Equipment Type	Space Heating Boiler	Space Heating Boiler		Space Heating Boiler	Space Heating Boiler	
Boiler #	1			1		
Make	HB Smith			Buderus		
Model	8 Series S/W-5			GB-125 BE		
Type	Atmospheric			Condensing		
Heating Medium	Hydronic			Hydronic		
Control Mode	High-Low			Modulating 4:1		
Maximum Output Mbtu/Hr	175			97		
Steady State Eff	83%			90%		
Input Mbtu/Hr	201			108		
Seasonal Eff	72%			90%		
Percentage of Load	100%			100%		
Installed System Costs				Condensing Boiler		
Boiler	$7,000	Oil-Fired Boiler w/ Condensing Economizer		$13,050		
		Mini-Tank Water Heater		$668		
Totals	$7,000			$13,718		
Annual Building Operating Load (MMbtu/year)	Summary of Existing Building-Related Heat Loads	Existing Oil Heating Usage Gallons	New Oil Heating Usage Gallons	Fuel Cost $	Peak Space Heating Load (Mbtu/hr)	Provide (#) 1 Boilers @ 100% of design Load
99,544	Existing Oil Use	1,000		$2,977	76	76
99,544	New Oil Use		797	$2,375		
		KWH				
Electric HW Use	New electricity use	470		$76		
138,645	Fuel Energy Before					
110,604	Fuel Energy After					
1,603		Gallons Saved				
26,437	Fuel Energy saved	202	Savings $	$526	76	
Assuming Existing Boiler Payback Calculation:						
		Cost	Savings	Payback		
Full Equipment Cost Basis:		$13,718	$526	26.1		
Incremental Equipment Cost Basis:		$6,718	$526	12.8		

Boiler estimate provided by Orange Oil, 45 Elm Street, New Salem, MA 01355 mail: PO Box 150, Orange, MA 01364 phone: (978)544-3222 or (413)773-0222

Estimate Provider: Orange Oil, New Salem, MA

Proposal

Date: 09-10-13

Name	Gill Town Hall	Phone	413-863-9347
Address	325 Main Road	Job Name	Buderus GB125BE/2107
City, State, Zip	Gill, MA 01354	Job Location	SAME
Submitted by	Robert E. Harris III	Account #	

We hereby submit specifications and estimates for:

Buderus GB 125-35 BE Condensing Boiler with Blue Flame Burner; Buderus GB-125 Horizontal Venting Kit; Argo ARM-4 Zone Relay; Buderus HS-2107 Logamatic Control; Buderus BFU RoomSensor; Extrol Package; (3) Grundfos Circulators; (1) Spirovent Air Eliminator; Watts S1156F, 9D: Ball Valves; And all miscellaneous material for job completion.	8,000.00
Permit	150.00
Labor	4,400.00
TOTAL	**$ 12,550.00**

Proposal Does Not Include Wiring By Electrician

We Propose hereby to furnish material and labor – complete in accordance with above specifications, for the sum of:
Twelve Thousand Five Hundred Fifty and 00/100 Dollars ($12,550.00)

Payment to be made as follows:
50% Down Upon Bid Acceptance ($6,275.00)
With Balance Due Upon Job Completion ($6,275.00)

All material is guaranteed to be as specified. All work to be completed in a substantial workmanlike manner according to specifications submitted, per standard practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control. Owner to carry fire, tornado and other necessary insurance. Our workers are fully covered by Workmen's Compensation Insurance.

Authorized Signature

_____

Note: This proposal may be withdrawn by us if not accepted within **60** days.

Acceptance of Proposal - The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Date of Acceptance: _____

Signature _____

Signature _____

Note: Bales Energy Associates has included an added $500 allowance for wiring boiler by an electrician. These services were not included in Orange Oil's quotation.

Option#3: Wood Pellet-Fired Boiler

Space Heating Savings with Wood-Pellet-Fired Boiler						
			Gill Town Hall			
Oil Rate ($/gallon)			Gill, MA	New Condition:	Pellets $/ton	
$2.98	Existing Condition:			Pellet-Fired	$242.50	
Equipment Type	Space Heating Boiler	Space Heating Boiler	Pellets Btu/ton	Space Heating Boiler	Delivered Price	
Boiler #	1		15500	1		
Make	HB Smith			Okofen		
Model	8 Series S/W-5			PE(S)25		
Type	Atmospheric					
Heating Medium	Hydronic			Hydronic		
Control Mode	High-Low			Modulating 3.2:1		
Maximum Output Mbtu/Hr	175			85		
Steady State Eff	83%			87%		
Input Mbtu/Hr	201			98		
Seasonal Eff	72%			77%		
Percentage of Load	100%			100%		
Installed System Costs				Condensing Boiler		
Boiler	$7,000		Pellet-Fired Condensing Boiler	$21,500		
			Outside storage silo with air-based auto feed	$4,500		
			Mini-Tank Water Heater	$668		
Totals	$7,000			$26,668		

Annual Building Operating Load (MMbtu/year)	Summary of Existing Building-Related Heat Loads	Existing Oil Heating Usage Gallons	New Pellet Heating Usage Tons	Fuel Cost $	Peak Space Heating Load (Mbtu/hr)	Provide (#) Boilers @ 100% of design Load
						1
99,544	Existing Oil Use	1,000		$2,977	76	76
99,544	New Wood Pellet Use		7.98	$1,935		
		KWH				
Electric HW Use	New electricity use	470		$76		
138,645	Fuel Energy Before					
129,278	Fuel Energy After					
1,603	Added Electrical Energy					
7,764	Fuel Energy saved		Savings $	$966	76	

Assuming Existing Boiler Payback Calculation:		Cost	Savings	Payback
Full Equipment Cost Basis:		$26,668	$966	27.6
	New Program Rebate	$6,667		
	Net Cost after rebate	$20,001	$966	20.7
Incremental Equipment Cost Basis:		$19,668	$966	20.4
	New Program Rebate	$6,667		
	Net Cost after rebate	$13,001	$966	13.5

Estimated cost of wood pellet boiler and storage silo provided by Sandri Energy of Greenfield, MA. (413) 772-2121, www.sandri.com

MINI-TANK ELECTRIC HOT WATER HEATER (Included with all options)

Bosch GL8Ti Ariston Pro Ti Electric Mini-Tank Water Heater

Ariston ProTi point-of-use electric mini tanks are designed with titanium for longer life. The "Titanium Plus Inside" glass lining protects the tank against leakage. These units can be installed independently or in-line with a larger hot water source eliminating long waits for hot water.

Bosch GL8Ti Ariston Pro Ti Electric Mini-Tank Water Heater offers three different models you can choose from that can be mounted on the wall or floor. Built with titanium for longer life and durable poly-composite housing resists corrosion. Also comes with an 8 year residential and commercial warranty from Bosch.

Bosch GL8Ti Ariston Pro Ti Electric Mini-Tank Water Heater Features:
- 3 Models to choose from (2.5, 4, and 8)
- Adjustable thermostat with thermal cut-out
- Dielectric isolation on inlet/outlet connections
- Units can be wall hung (bracket included) or floor mounted
- Durable poly-composite housing will not dent and resists corrosion
- Temperature/pressure relief valve included (plumb correctly for discharge)
- Simple 120V plug-in connection
- Built with titanium for longer life
- Meets ASHR 90.1 standard
- Mounts on wall or floor
- Three sizes to choose from

Bosch GL8Ti Ariston Pro Ti Electric Mini-Tank Water Heater Specifications:
- Tank Volume - 7.0 gallons
- Dimensions - 17½"x17½"x14½"
- Voltage - 120v
- Amperage - 12.5 amps
- Wire Size - 120v plug
- Heating Capacity - 1500 watts
- Recovery at 90°F Rise - 6.8 gph
- Temperature Range - 65°-145°F
- Water Connections - ¾" NPT
- Operating Pressure - 150 psi
- Product Number: 348486
- Relief Valve - Included

ATTIC INSULATION MEASURE INFORMATION

ECM#2	Summary of Energy Savings				
	Baseline Heat Load Mbtu/hr	After ECM #2 Mbtu/hr	Savings 10E6 Btu/yr	% Reduction	
Fuel Energy Usage (MMBtu/yr)	142.31	122.58	19.73	13.9%	
New Boiler System efficiency	92%	92%			
Fuel Energy Usage (MMBtu/yr)	155	133			

Energy Savings	% Reduction	Propane Use after ECM1a	Gallons Saved	$/Unit	$ Saved
	13.9%	1,042	144	$2.150	$311
				Total Savings ($)	$311

		Measure	Cost $	Savings $	Payback Years
Attic Insulation& Air Sealing Only	$6,525	ECM2A	$6,525	$311	21.0
Including Attic Ventilation Improvements & Hatch	$8,714	ECM 2B	$8,714	$311	28.0

Note:
Cost estimates were developed by BEA based upon quotes by EnergiaUSA

Town Hall

	Location	Measure	Depth	R-Value	# / SF	Cost
1	Attic Floor	Plywood over Joists			1,836	$2,387
2	Attic Floor	Cellulose Open Blow	11	41	1,836	$2,938
3	Attic	Air Sealing	0	N/A	16	$1,200
6	Attic Rim & Band	Vent Soffit	0	N/A	52	$1,456
7	Attic Rim & Band	Propavents	0	N/A	52	$208
8	Attic Hatch	Frame & Insulate Access	0	N/A	1	$525
	Total					$8,714

* Assumes that air sealing hours will be spent mostly on the perimeter where the plywood meets the external wall areas.

Insulation costs were provided by EnergiaUS located in Holyoke, MA.

Energía, LLC
242 Suffolk Street
Holyoke, MA 01040
(413) 322-3111

ANNUAL BUILDING HEAT BALANCE

EXISTING CONDITIONS

HEAT BALANCE			
GAINS AND LOSSES	BTU/HEATING SEASON*1E6		
CONDUCTION LOSSES		-92.6	
INFILTRATION LOSSES		-49.7	**LOSS TOTAL**
VENTILATION LOSSES		0.0	**-142.3**
SOLAR GAIN		24.9	
OCCUPANT GAIN		2.6	
ELECTRICAL GAIN		21.8	
NET HEATING DEMAND		-92.9	

Net Heating Demand (MMbtu)	/Energy Required (MMbtu)	Seasonal Efficiency %
92.9	129	72%

CONDUCTION LOSSES

#	Zone	UA	HOURS/ DAY	DAYS/ -	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	328	8	144	35	13	
		328	16	144	25	19	
		328	24	68	20	11	42.9
2	First Floor	160	8	144	35	6	
		160	16	144	25	9	
		160	24	68	20	5	20.9
3	Second Floor	221	8	144	35	9	
		221	16	144	25	13	
		221	24	68	20	7	28.8
	Total UA	709			Conduction Total		92.6

INFILTRATION LOSSES

0.5

#	Zone	VOLUME	ACH	HRS/ DAY	DAYS/ YR	0.018	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	11,628	0.50	16	144	0.018	25	6.0	
		11,628	0.50	24	68	0.018	20	3.4	
	Occ.	11,628	0.50	8	144	0.018	35	4.2	13.7
2	First Floor	13,005	0.50	16	144	0.018	25	6.7	
		13,005	0.50	24	68	0.018	20	3.8	
	Occ.	13,005	0.50	8	144	0.018	35	4.7	15.3
3	Second Floor	16,065	0.55	16	144	0.018	25	9.2	
		16,065	0.55	24	68	0.018	20	5.2	
	Occ.	16,065	0.55	8	144	0.018	35	6.4	20.8
		40,698					Infiltration Total		49.7

HEAT LOSS COEFFICIENTS						
Zone #	Building Zone		U-Value (BTU/hr-sf-F)	Area (sf)		UA-Value (BTU/hr-F)
1	Basement	Roof	0.054	0		0
		Walls-above grade	0.056	184		10
		Below Grade	0.220	1,092		241
		Doors	0.625	0		0
		Windows	0.550	17		10
		Slab/Floor	0.040	1,700		68
				Wing UA Total	328.4	
2	First Floor	Roof	0.054			0
		Walls	0.056	1,215		68
			0.220	0		0
		Doors	0.400	76		30
		Windows	0.400	154		62
		Slab/Floor	0.040			0
				Wing UA Total	160.0	
3	Second Floor	Roof	0.054	1,700		91
		Walls	0.056	1,215		68
			0.220	0		0
		Doors	0.400	18		7
		Windows	0.400	137		55
		Slab/Floor	0.040			0
				Wing UA Total	220.9	
				Building Total UA:	709.3	

ANNUAL BUILDING HEAT LOADS

AFTER ATTIC INSULATION &

AIR SEALING

HEAT LOAD AFTER ATTIC INSULATION AND AIR SEALING			
GAINS AND LOSSES	BTU/HEATING SEASON*1E6		
CONDUCTION LOSSES		-84.3	
INFILTRATION LOSSES		-38.3	
	TOTAL	**-122.582**	

CONDUCTION LOSSES							
#	**Zone**	**UA**	**HOURS/ DAY**	**DAYS/ -**	**TEMP DIFF**	**LOSSES (* 1E6)**	**Sub Totals**
1	**Basement**	328	8	144	35	13	
		328	16	144	25	19	
		328	24	68	20	11	42.9
2	**First Floor**	160	8	144	35	6	
		160	16	144	25	9	
		160	24	68	20	5	20.9
3	**Second Floor**	157	8	144	35	6	
		157	16	144	25	9	
		157	24	68	20	5	20.6
	Total UA	**646**		**Conduction Total**			**84.3**

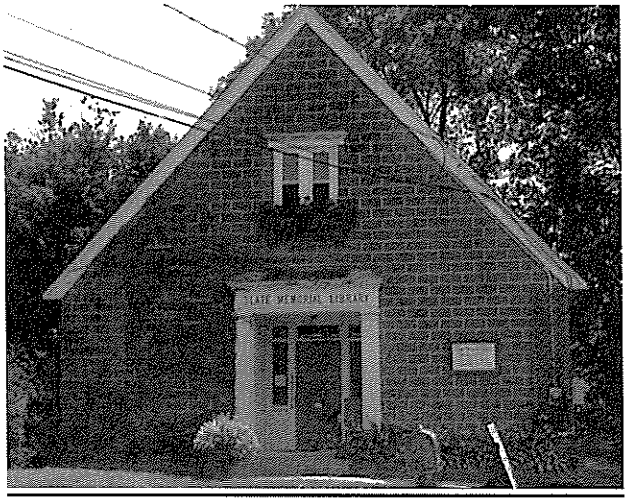
INFILTRATION LOSSES									
0.4									
#	Zone	VOLUME	ACH	HRS/ DAY	DAYS/ YR	0.018	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	11,628	0.40	16	144	0.018	25	4.8	
		11,628	0.40	24	68	0.018	20	2.7	
	Occ.	11,628	0.40	8	144	0.018	35	3.4	10.9
2	First Floor	13,005	0.40	16	144	0.018	25	5.4	
		13,005	0.40	24	68	0.018	20	3.1	
	Occ.	13,005	0.40	8	144	0.018	35	3.8	12.2
3	Second Floor	16,065	0.40	16	144	0.018	25	6.7	
		16,065	0.40	24	68	0.018	20	3.8	
	Occ.	16,065	0.40	8	144	0.018	35	4.7	15.1
	Total	40,698					Infiltration Total		38.257

BALES ENERGY ASSOCIATES

Date: December 5, 2013

ENERGY STUDY
FOR
SLATE LIBRARY

332 Main Road
Gill, MA 01354



Completed By:

Bales Energy Associates
50 Miles Street
Greenfield, MA 01301
www.balesenergy.com
info@balesenergy.com
413-863-5020
Consulting Energy Engineer:
Bart Bales, PE, MSME

TABLE OF CONTENTS

Introduction

Bales Energy Associates, an energy efficiency engineering firm, was contracted to provide an ASHRAE Level 2 energy audit for the Slate Library located at 332 Main Road in Gill, Massachusetts.

Bart Bales, PE, MSME, senior engineer at Bales Energy Associates, visited the site, reviewed energy usage & billing information, examined relevant equipment and systems, and developed energy analyses and recommendations with regard to the building's energy related systems.

Executive Summary

Energy Conservation Opportunities Being Evaluated

Bales Energy Associates was pleased to provide this Energy Study for the Slate Library.

It is noted that, if the roof and walls of the building can be insulated, there is an opportunity to potentially bring the upper balcony of the library back into use and to enhance the beauty and utility of the library.

Bales Energy Associates' study provides the costs and energy and dollar savings for a number of potential improvements. It will be up to the Town, the library committee, and the historic commission to determine which of the measures evaluated would be acceptable changes to the building. Bales Energy Associates will be happy to participate as a technical resource in a meeting to discuss the options.

Bales Energy Associates has approached the Slate Library in terms of the whole system. Improvements in various systems have interactive impacts with other systems. Key conclusions are the following:

1. **Enclosure Improvements** can substantially reduce the building's heat loss characteristics. Recommendations include:
    a. **Insulate the small attic area at the peak of the building to an R-value of R60.** Add sufficient cellulose insulation to achieve the desired attic floor assembly R-value. Air seal bypasses and penetrations in the attic.
    b. **Consider insulating the inside of the concrete block walls, and if the upper loft area of the library is to be re-opened to use, insulate the angled portions of the ceiling** (now above the existing drop ceiling) **with two inches of foam insulation (R14 total).**
    c. As part of this installation, the existing tin on the walls will be removed and two inch furring strips will be installed to allow the installation of sheetrock over the foam. (Depending upon the preferences of the Town, the tin may be left removed or re-installed after the walls have been insulated.)
    d. Extend the proposed wall insulation to include the basement walls.
    e. **A possible alternative would be to insulate the outside of the building with foam insulation and clad with clapboards, hardy plank, or other cladding material**. This would actually have better insulating and moisture management characteristics. **However, the consultant was led to believe that historical consideration with regard to the library might make an exterior insulation approach unacceptable.**

f. For long-term capital improvement, consider replacing the building's windows and framing to renew these important architectural features of the building. This will also reduce air leakage and conduction heat losses and improve occupant comfort.

2. **Heating Systems Observations and Recommendations**
   a. Accomplishing the described envelope improvements will substantially reduce the peak heating load and the annual energy use for heating the building.
   b. **Option 1: Replace the existing oil-fired atmospheric furnace with a sealed combustion, propane-fired, condensing furnace. Install a town-owned propane storage tank.**
   c. **Option 2: Replace the function of the existing oil-fired furnace with an air-source heat pump**. This approach would eliminate the use of fossil fuels at the library. It would have the added benefit of providing air conditioning capability for the library.
   d. **If the furnace is to continue to be used and if the basement area is to be used for storage and not as a regularly occupied space, insulate heating system ductwork in the basement**. This will reduce heat losses to the basement.
   e. **Install an improved microprocessor-based temperature control and temperature sensors.** Install a new programmable microprocessor to provide scheduling of occupied and unoccupied periods.

3. **Domestic Hot Water System Observations and Recommendations**
   Observations:
   a. Domestic hot water use is very limited in the building; there is one lavatory sink in the basement.
   b. The existing 30 gallon electric water heater is oversized to current needs.
   Recommendations:
   To reduce stand-by heat losses, **install a 2.5-gallon electric mini-tank adjacent to the sink in the basement lavatory.**

4. **Basement Moisture Observations and Considerations**
   a. The basement of the Slate Library accumulates water in the center of the basement floor. To maintain healthy conditions for occupants and to render the basement space more useful as storage, eliminating this basement dampness issue should be accomplished.

   Background:

   Until the leaky covered entrance for the exterior basement door was removed and replaced with a new watertight bulkhead door, water leaked into the below grade door entry way and seeped under door. It is the consultant's understanding that with the new bulkhead door in place, such seepage no longer occurs under the door.

   Water staining was also noted around the basement window nearest the basement exterior door. It is the consultant's belief during heavy rains water from the yard behind the building collects next to the basement window and seeps into the basement and then pools at the low spot in the middle of the basement floor.

Remediation Possibilities

Resolving this basement moisture issues is well beyond the scope of the current project. However, the consultant provides the following observations and thoughts for the Town's consideration.

By making limited changes to the landscape behind the building, it may be possible to eliminate this seeping effect. Provision of a proper recessed and graveled bottomed cellar window feature may help remediate this situation. Making minor grading changes so that the yard slopes away from the building (rather than toward the building as it does now. A small overhang located immediately above the basement windows could also aid in directing water or snow away from the area next to the basement window is also an option.

If employing of these simple, low-cost approaches is successful, then more expensive remediation approaches may not be necessary.

If these approaches are not effective in eliminating the pooling of water at the center of the basement floor, then sub-surface water may be contributing to the moisture problem. Resolving such issues would require added professional evaluation.

The costs, savings, and economic payback for these energy conservation measures will be presented in an Executive Summary Chart. The values shown in the Executive Summary Table will represent the savings with measures taken in the order of economic feasibility shown.

The calculations supporting each measure will be included in the appendices.

Executive Summary Chart

Oil: $2.98 $/Gallon — Propane: $2.15 $/Gallon

ECM #	Energy Conservation Measures	Cost	Incremental Cost ($)	Available Utility Rebates ($)	Total Cost after Rebate ($)	Incremental Cost after Rebate ($)	Oil Savings (Gallons/yr)	Propane Savings (Gallons/yr)	Annual Savings ($/yr)	Total Payback (yrs)	Incremental Payback (yrs)	Total Payback Payback after Rebates (yrs)	Incremental Payback after Rebates (yrs)	Life Years
ECM1	Install Propane-Fired Furnace	$13,490	$4,990	0	$13,490	$4,990	545	-617	$296	45.6	16.9	45.6	16.9	20+
ECM2	Option A: Insulate & Air-Seal the Top Attic	$1,256	$1,256	0	$1,256	$1,256		20	$42	29.9	29.9	29.9	29.9	30+
ECM2	Option B: Insulate Top Attic & Sloping Roof	$6,794	$6,794	0	$6,794	$6,794		129	$277	24.5	24.5	24.5	24.5	30+
ECM2	Option C: Insulate Walls, Top Attic & Sloping Roof	$12,187	$12,187	0	$12,187	$12,187		167	$359	33.9	33.9	33.9	33.9	30+
	Totals for ECM1 & ECM2A	$14,746	$6,246	$0	$14,746	$6,246	545	-597	$338	43.7	18.5	43.7	18.5	
	Totals for ECM1 & ECM2B	$20,284	$11,784	$0	$20,284	$11,784	545	-488	$573	35.4	20.6	35.4	20.6	
	Totals for ECM1 & ECM2C	$25,677	$17,177	$0	$25,677	$17,177	545	-450	$655	39.2	26.2	39.2	26.2	

Existing Conditions

Facility Description

The Slate Library is a small concrete block, sloped-roofed building located at 325 Main Road Gill, Massachusetts. Currently, the first floor space is the space actively used for the library's stacks and for library activities. It is mostly an open plan space with a large room and a connected children's room. There are no doors between the two rooms. There is a door separating the small room at the foot of the balcony stairs.

The building was originally designed with an attractive high-arched ceiling with exposed wooden beams and a usable balcony area. This arched ceiling is no longer visible because a drop ceiling was installed at approximately the same level as the ceiling under the balcony. The balcony area is now used for storage.

The basement was originally designed to be a conditioned space but is not much used, even for storage, due to issues of water collecting on the concrete basement floor. The only lavatory in the building is located in the southeast corner of the basement.

The library is open on Tuesdays 2-6 pm, Wednesdays 3-7 pm, Thursdays 2-8 pm, and Saturdays 10 am - 2 pm. It is also open on Fridays for a 10 am story hour. The space is also used occasionally for town-related meetings and for special events.

Utility Energy Use

Utility data was collected and is tabulated below. Western Massachusetts Electric Company provides electricity. For heating, the Slate Library uses #2 fuel oil. (Note: WMECO and its parent company Northeast Utilities, recently merged with NSTAR. As a result, changes in procedures and personnel in charge of related utility programs are in transition.)

Jul 2012-June 2013					
Building Name	**Slate Library**				
Owner	**Town Of Gill, MA**				
Account #					
Month	Electricity KWH	Electricity Total $	Oil Gallons	Oil $	**Energy $ Totals**
July 1, 2012	68	$37			**$37**
Aug	54	$35			**$35**
Sept	90	$56	42.9	$128	**$184**
Oct	25	$15		$0	**$15**
Nov	80	$38		$0	**$38**
Dec	238	$70	104.1	$310	**$380**
January 1, 2013	70	$20	210.0	$625	**$645**
Feb	184	$49	76.3	$227	**$276**
Mar	125	$43		$0	**$43**
Apr	115	$42	111.3	$331	**$373**
May	133	$60			**$60**
Jun	45	$18			**$18**
Annual (Units)	1,227	$482	544.6	$1,622	**$2,104**
Heating Season (Units)	837	$275	544.6	$1,494	**$1,770**
Annual ($/Unit)		$0.393		$2.978	
Heating Season ($/Unit)		$0.329		$2.978	
	Electricity MBtu		Oil MBtu	**Energy Use Totals (Mbtu)**	
Annual (Mbtu)	4,187		75,536.0	79,723	**Energy $**
Heating Season (Mbtu)	2,856		75,536.0	78,392	**Totals**
$/Energy Unit				**Totals (Mbtu/sf)**	**($/sf)**
Annual (Mbtu/sf)	1.4		25.2	**26.6**	**$0.70**
Heating Season (Mbtu/sf)	1.0		25.2	**26.2**	**$0.59**
Htng Season $/Energy Unit					
Building Name	**Slate Library**			Heated SF	**2,994**

Prescriptive and custom utility incentives may be available for some of the measures described. When the report's contents are accepted by the client, the report may be presented to the utilities for review and determination of levels of custom incentives the utilities will offer, if any. Western Massachusetts Electric Company contacts are: Lynn Ditullio (ditullb@nu.com) and Robert Dvorchik (dvorcrs@nu.com).

Heating, Ventilating & Air Conditioning Systems

Hot Air Furnace

The building is served by an atmospheric, oil-fired, non-condensing hot air furnace (Williamson WLBO-105) installed in 1999. This single-firing rate boiler has an output heating capacity of 105,000 Btu/hr. The boiler has a measured combustion efficiency of 82%.

The design heat load for the building is approximately 54,000 Btu/hr.

Bales Energy Associates recommends replacement of the existing oil-fired, atmospheric furnace with a sealed combustion, propane-fired, condensing furnace and the installation of a town-owned propane storage tank.

Given the heat load, the limited use of the library, the level of use of the building, and other factors, installation of an air-source heat pump does not seem justified in terms of energy cost savings.

Heating Distribution Systems

The building is a ducted, forced hot air heating system.

Domestic Hot Water Heating Systems

Hot water is provided by a small well-insulated electric hot water heater located in lavatory in the basement. Water usage is minimal in the building as water uses are limited to a lavatory sink.

Lighting Systems

Most spaces in the building are lighted with four foot fluorescent fixtures equipped with 32 watt, T-8 lamps and electronic ballasts.

Building Enclosure

The finished basement, first, and second floors of the Slate Library comprise approximately 2,210 heated square feet of floor area. The building includes a fireplace which is no longer used. Occupants should assure that the fireplace damper is maintained in the closed position in the heating season. By preventing heated room air from being drawn out of the heated space and up the chimney by thermal buoyancy effects, infiltration of cold outside replacement air into the heated space will be reduced.

Roof and Attic

The Slate Library has a small inaccessible attic.

The sloped sections of the second story ceiling and the attic area above the center flat section of ceiling are not insulated. Ceilings are covered with decorative tin.

Recommendation for the Attic and Sloped Ceiling Areas:

Bales Energy Associates recommends insulating the attic with cellulose to an R-value of R60.

Bales Energy Associates recommends insulating the sloped section of the ceiling with 3 inches of foam insulation.

(Note: The tin will need to be removed for the insulating of the sloped sections. Given the unique nature and potential historical considerations of the tin ceiling, costs related to tin removal and handling are not included in this report.)

First Floor Ceiling:

Currently there is a t-bar drop ceiling installed to create a lower ceiling for the main reception area. Fiberglass batt insulation has been installed on top of the drop ceiling in an attempt to reduce heat losses to the less heated second floor area.

As already noted in the facility description section, the main circulation room of the library was designed with a high-ceiling with attractive wooden arches. The second floor was originally a balcony overlooking the main reception area. This balcony is located above the current children's room, the entry way and the side room.

Library staff and library committee members have indicated an interest in the potential restoration of the library circulation room to its original high-ceiling configuration. Insulating the upper ceilings will help mitigate energy use impacts of such a restoration.

To further reduce building energy losses, insulation of the first and second floor concrete block walls of the building with 2 inches of foam insulation on the inside of the building has also been evaluated in this report. (At the request of the library committee, exterior insulation was not considered due to the historical nature of the building exterior.)

Installation of rim joist insulation in the basement was included in the added costs for wall insulation. Air sealing of the rim joist was also included.

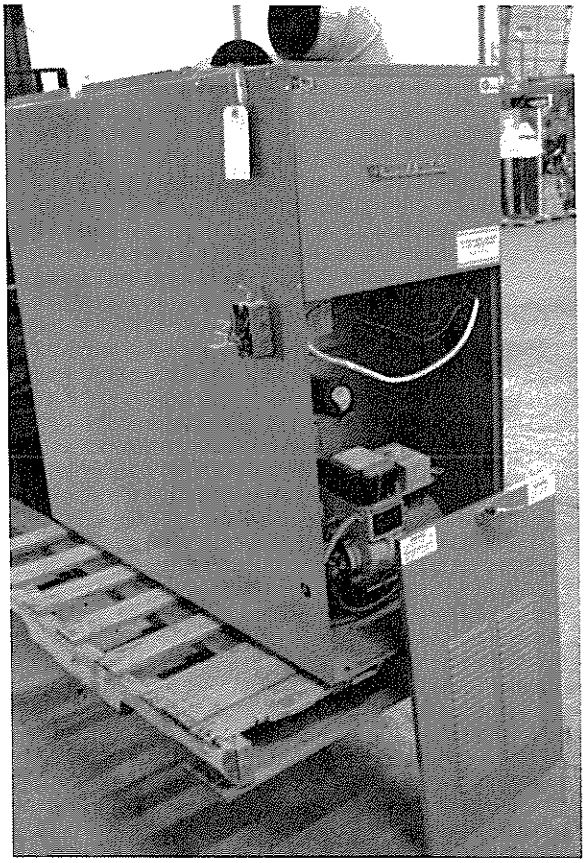
It is assumed that the foam will be covered with sheetrock after insulation. Studs for mounting of the sheetrock will also need to be installed. (Note: Rough costs were carried for the carpentry required for the work. These costs will vary depending upon the exact interior design preferences of the Town. Tin removal and/or reinstallation costs were not included.)

The enclosure improvements were presented as three options:

A. **Insulation and air sealing of flat attic only**
B. **Insulation of sloped ceiling and flat attic**
C. **Insulation of walls, rim joist, sloped ceiling and flat attic**

APPENDICES

EXISTING FURNACE

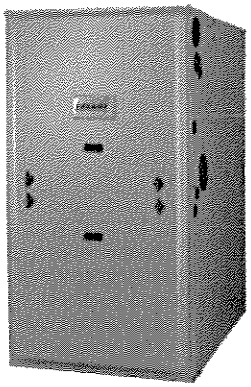


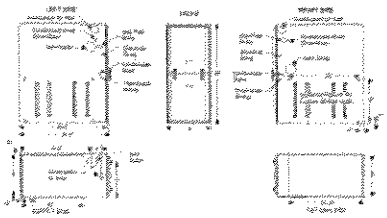
Williamson Furnace of Same Type as Existing Furnace at Slate Library

PROPANE-FIRED CONDENSING FURNACE

York Hot Air Furnace

Gas Furnace TM9V LX Series TM9V060 B12MP11





Details for LX Series TM9V060 B12MP11:

96% 2 Stage Variable Speed Multi-Position Gas Furnace

These compact units employ induced combustion, reliable hot surface ignition and high heat transfer aluminized tubular heat exchangers. The units are factory shipped for installation in upflow or horizontal applications and may be converted for downflow applications.

These furnaces are designed for residential installation in a basement, closet, alcove, attic, recreation room or garage and are also ideal for commercial applications. All units are factory assembled, wired and tested to assure safe dependable and economical installation and operation.

These units are Category IV listed and may be vented either through side wall or roof applications using approved plastic combustion air and venr piping.

Technical details for LX Series TM9V060 B12MP11:

Low Fire Input	39,000 BH
High Fire Input	60,000 BH
Low Fire Output	37,000
High Fire Output	58,000 BH
Efficiency (AFUE)	96 %
Air Temp. Rise Max Input	35-65
Air Temp. Rise Min Input	35-65
Total Unit	9 AMPS
Blower	0.5 HP
Blower Wheel Size	11 x 8
Max Over-Current Protect	15
Cabinet Size	B
Cabinet Dimensions	17.5 X 16.375 X 13.25 INCHES

Tognarelli HEATING & COOLING

85 Pierce Street - Greenfield, MA 01301

PROPOSAL

NAME / ADDRESS
Bales EnergyAssociates Bart Bales PE,MSME 50 Miles St Greenfied, MA 01301

DATE
10/14/2013

DESCRIPTION	QTY	TOTAL
Job Location: Gill Library, Gill	1	18,480.00
Price to install one Mitsubishi (Model#: PUZ-HA36NHA) twinned system with two 18,000 BTU heads. Price is based on prevailing wage and includes all parts and labor.		
Price to install one York (Model#: TM9V060) high efficient two stage variable speed propane furnace. Price is based on prevailing wage and includes all parts and labor.	1	11,390.00
Thank you for your time.	**TOTAL** *Includes sales tax*	$29,870.00

AIR-SOURCE HEAT PUMP INFORMATION

MITSUBISHI ELECTRIC

Mr.SLIM. Split-ductless A/C and Heat Pumps

SUBMITTAL DATA: PKA-A36FAL & PUZ-HA36NHA — 36,000 BTU/H WALL MOUNTED HEAT PUMP SYSTEM

Job Name: Location: Date:

Purchaser: Engineer:

Submitted to: For ☐ Reference ☐ Approval ☐ Construction

Unit Designation: Schedule No.:

GENERAL FEATURES

- Innovative flash technology enables high heating capacity at lower outside temperatures
- Exhibits 100% of rated heating capacity at 5°F; 90% of rated heating capacity at -4°F
- Quiet operation—both indoor and outdoor units
- Wireless remote controller
- Automatic fan speed control
- Auto restart following a power outage
- Self-check function—integrated diagnostics
- Limited warranty: one year on parts and defects and six years on compressor

OPTIONAL ACCESSORIES

Indoor Unit
- L-shaped Connection Pipe for left-side piping connection (PAC-SC84PI-E)

Outdoor Unit
- M-NET Adapter (PAC-SF80MA-E)
- Air Outlet Guide (PAC-SG59SG-E; two pieces are required)
- Wind Baffle (WB-PA2; two pieces are required)

Cooling*
Rated Capacity ..... 34,200 Btu/h
Minimum Capacity ..... 18,000 Btu/h
SEER ..... 16.0 Btu/h/W
Total Input ..... 2,950 W

Heating*
Rated Capacity ..... 38,000 Btu/h
Minimum Capacity ..... 18,000 Btu/h
HSPF (IV) ..... 9.4 Btu/h/W
Total Input ..... 3,100 W

Heating at 17°F*
Rated Capacity ..... 38,000 Btu/h
Total Input ..... 5,300 W

* Rating Conditions (Cooling) - Indoor: 80°F (27°C) DB / 67°F (19°C) WB. Outdoor: 95°F (35°C) DB / 75°F (24°C) WB.
(Heating) - Indoor: 70°F (21°C) DB / 60°F (16°C) WB. Outdoor: 47°F (8°C) DB / 43°F (6°C) WB.
(Heating at 17°F) - Indoor: 70°F (21°C) DB / 60°F (16°C) WB. Outdoor: 17°F (-8°C) DB / 15°F (-9°C) WB.

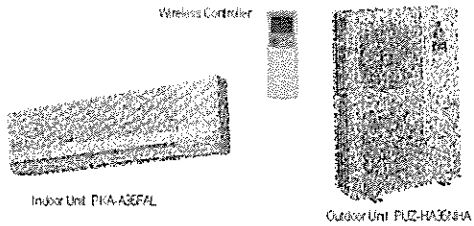
Power Supply ..... 208 / 230V, 1-Phase, 60 Hz
Breaker Size ..... 30 A

Voltage
Indoor - Outdoor S1-S2 ..... AC 208 / 230V
Indoor - Outdoor S2-S3 ..... DC 24V

OPERATING RANGE

		Indoor Intake Air Temp	Outdoor Intake Air Temp
Cooling	Maximum	99°F (37°C) DB, 73°F (23°C) WB	115°F (46°C) DB
	Minimum	66°F (19°C) DB, 59°F (15°C) WB	0°F** (-18°C) DB
Heating	Maximum	83°F (28°C) DB	70°F (21°C) DB, 59°F (15°C) WB
	Minimum	63°F (17°C) DB	-13°F (-25°C) DB, -13°F (-25°C) WB

** With optional wind baffle accessory installed. If not installed, the minimum temperature will be 23°F (-5°C) DB.



Indoor Unit
MCA ..... 1 A
Fan Motor ..... 0.52 F.L.A.
Fan Motor Output ..... 70 W
Airflow (Lo - Hi) ..... 780 - 990 Dry CFM
700 - 890 Wet CFM
Sound Pressure Level (Lo - Hi) ..... 46 - 49 dB(A)

DIMENSIONS	UNIT INCHES / MM
W	66-1/8 / 1,680
D	9-1/4 / 235
H	13-3/8 / 340

Weight (Unit)
lbs. 62
kg 28
Field Drainpipe Size I.D. ..... 13/16" / 20 mm

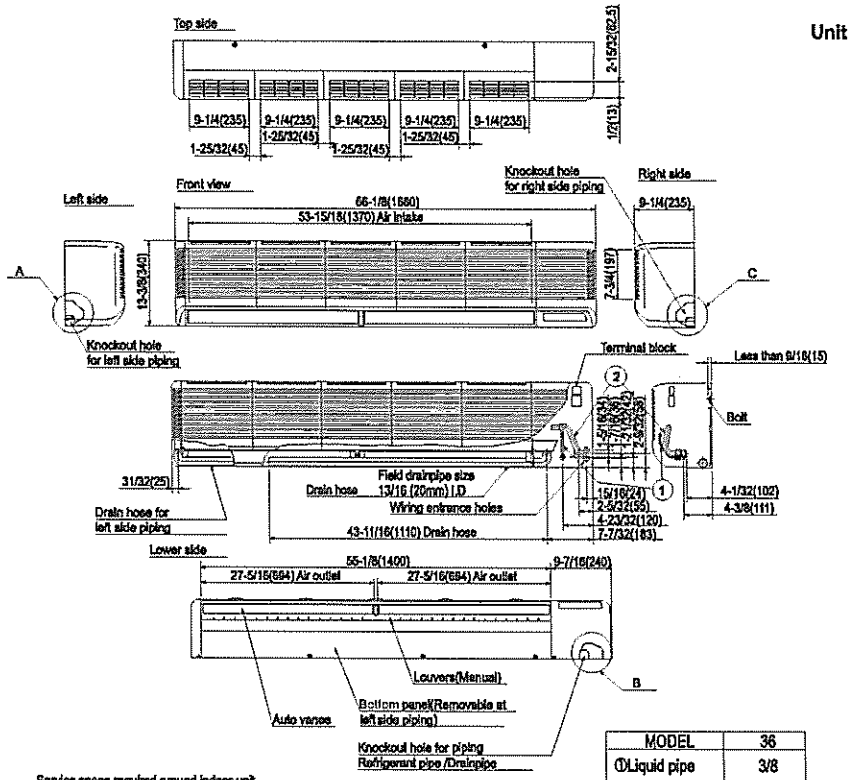
Outdoor Unit
Compressor ..... DC Inverter-driven Scroll
MCA 28
Fan Motor ..... 0.4 + 0.4 F.L.A.
Sound Pressure Level
Cooling ..... 52 dB(A)
Heating ..... 53 dB(A)

DIMENSIONS	INCHES / MM
W	37-3/8 / 950
D	13 + 1-3/16 / 330 + 30
H	53-1/8 / 1,350

Weight ..... 267 lbs. / 121 kg
Refrigerant Type R410A
Refrigerant Pipe Size O.D.
Gas Side ..... 5/8" / 15.88 mm
Liquid Side ..... 3/8" / 9.52 mm
Max. Refrigerant Pipe Length ..... 245' / 75 m
Max. Refrigerant Pipe Height Difference ..... 100' / 30 m
Connection Method ..... Flared

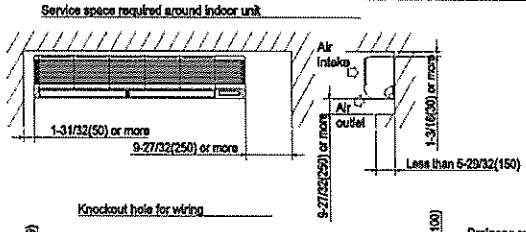
DIMENSIONS: PKA-A36FAL

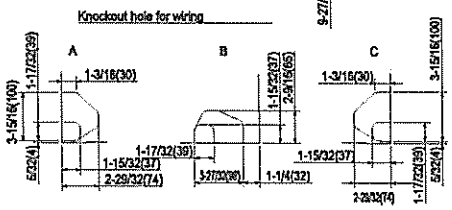
Unit : inch(mm)

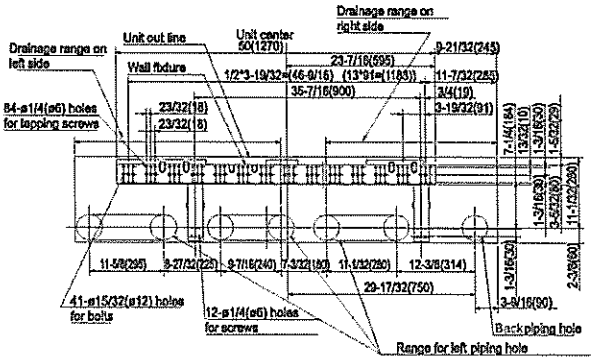


MODEL	36
①Liquid pipe	3/8
②Gas pipe	5/8

Sleeve	Through hole
ø3-17/32 (ø90)	ø3-17/32~ø3-15/16 (ø90~ø100)







INSULATION QUOTE INFORMATION

Slate Library

	Location	Measure	Depth	R-Value	# / SF	Cost
1	Walls	Spray Foam Closed Cell	2	14	1,396	$3,490
2	Attic Slope	Spray Foam Closed Cell	3	21	868	$3,038
3	Attic Floor	Cellulose Open Blow	11	41	388	$620
4	Attic Floor	Cellulose OB to R60 Adder	6	22	388	$136
5	Attic	Air Sealing	0	N/A	6	$450
6	Basement Rim & Band	Spray Foam Closed Cell	2	14	124	$403
	Total					$8,137

* This assumes that the tin is removed and the assemblies are framed-out to accommodate space for insulation. Ideally thermal bridging would be mitigated by leaving a space between the new framing and the old wall.

None of this pricing accounts for permitting costs. Large structures may also require a construction control affidavit from an Architect or Engineer.

Tom Rossmassler
President & CEO
Energía, LLC
242 Suffolk Street
Holyoke, MA 01040
413.322.3111 x20
413.326.1860 cell

CALCULATIONS

Space Heating Savings with Propane-Fired Condensing Hot Air Furnace

Slate Library
Gill, MA

Oil Rate ($/gallon)					Propane $/gallon
$2.98	Existing Condition:			New Condition:	$2.15
Equipment Type	Space Heating Furnace			Space Heating Furnace	
Boiler #	1			1	
Make	Williamson			York	
Model	WLRO-60			TM9VO60	
Type	Non-Condensing			Condensing	
Heating Medium	Hot Air			Hot Air	
Control Mode				Two-Stage, Variable Speed	
Maximum Output Mbtu/Hr	105			60	
Steady State Eff	83%			92%	
Input Mbtu/Hr	127			65	
Seasonal Eff	78%		AFUE	96%	
Percentage of Load	100%			100%	
Installed System Costs				Condensing Furnace	
Boiler	$8,500	Propane-Fired Condensing Furnace		$11,390	
		Propane tank		$2,100	
Totals	$8,500			$13,490	

Annual Building Operating Load (MMbtu/year)	Summary of Existing Building-Related Heat Loads	Existing Oil Heating Usage Gallons	New Propane Heating Usage Gallons	Fuel Cost $	Peak Space Heating Load (Mbtu/hr)	Provide (#) Boilers @ 100% of design Load
						1
58,918	Existing Oil Use	545		$1,622	54	
58,918	New Propane Use		617	$1,326		

Fuel Energy Before	75,536
Fuel Energy After	61,373
Fuel Energy saved	14,163

Savings $	$296

Assuming Existing Boiler
Payback Calculation:

	Cost	Savings	Payback
Full Equipment Cost Basis:	$13,490	$296	45.6
Incremental Equipment Cost Basis:	$4,990	$296	16.9

INSULATION SAVINGS CALCULATIONS

ECM#2A	Summary of Energy Savings - ATTIC INSULATION				
	Baseline Heat Load	After ECM #2A	Savings 10E6 Btu/yr	% Reduction	
Fuel Energy Usage (MMBtu/yr)	58.59	56.74	1.86	3.2%	
New Furnace System efficiency	96%	96%			
Fuel Energy Usage (MMBtu/yr)	61	59			

Energy Savings	% Reduction	Propane Use after ECM1a	Gallons Saved	$/Unit	$ Saved
	3.2%	617	20	$2.150	$42
				Total Savings ($)	$42

		Measure	Cost $	Savings $	Payback Years
Attic Insulation& Air Sealing	$1,256	ECM2A	$1,256	$42	29.9

Note:
Cost estimates were developed by BEA based upon quotes by EnergiaUSA

ECM#2B	Energy Savings -SLOPED CEILING & ATTIC INSULATION				
	After ECM #1	After ECM #2B	Savings 10E6 Btu/yr	% Reduction	
Fuel Energy Usage (MMBtu/yr)	58.59	46.36	12.23	20.9%	
New Furnace System efficiency	96%	96%			
Fuel Energy Usage (MMBtu/yr)	61	48			

Energy Savings	% Reduction	Propane Use after ECM1	Gallons Saved	$/Unit	$ Saved
	20.9%	617	129	$2.150	$277
				Total Savings ($)	$277

		Measure	Cost $	Savings $	Payback Years
Attic Insulation& Roof Slope & Air Sealing , including Installation of studs to support sheet rocking over new insulation	$6,794	ECM2B	$6,794	$277	24.5

Note1: Does not include removal of decorative tin or its reinstallition
Note 2: Insulation cost estimates were developed by BEA based upon quotes by EnergiaUSA

ECM#2C Energy Savings: WALL, SLOPED CEILING & ATTIC INSULATION

	After ECM #2	After ECM #2C	Savings 10E6 Btu/yr	% Reduction	
Fuel Energy Usage (MMBtu/yr)	58.59	42.73	15.87	27.1%	
New Furnace System efficiency	96%	96%			
Fuel Energy Usage (MMBtu/yr)	61	45			

Energy Savings	% Reduction	Propane Use after ECM1	Gallons Saved	$/Unit	$ Saved
	27.1%	617	167	$2.150	$359
				Total Savings ($)	$359

	Measure	Cost $	Savings $	Payback Years
Air Sealing , including Installation of studs to sup $12,187 sheet rocking over new insulation	ECM2C	$12,187	$359	33.9

Note1: Does not include removal of decorative tin or its reinstallation nor removal, storage, or handling of existing books and bookshelves.
Note 2: Insulation cost estimates were developed by BEA based upon quotes by EnergiaUSA

HEAT BALANCE- EXISTING CONDITION

HEAT BALANCE		
GAINS AND LOSSES	BTU/HEATING SEASON*1E6	
CONDUCTION LOSSES	-74.7	
INFILTRATION LOSSES	-12.8	
VENTILATION LOSSES	0.0	
SOLAR GAIN	20.7	
OCCUPANT GAIN	5.5	
ELECTRICAL GAIN	2.7	
NET HEATING DEMAND	-58.6	

Net Heating Demand (MMbtu)	/Energy Required (MMbtu)	Seasonal Efficiency %
58.6	76	78%

CONDUCTION LOSSES

#	Zone	UA	HOURS/ DAY	DAYS/ -	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	26	4	120	20	0	
		26	20	120	15	1	
		26	24	92	15	1	2.0
2	Main Library Area	366	4	120	35	6	
		366	20	120	27	24	
		366	24	92	20	16	46.0
3	Room at Base of Stairs	66	4	120	25	1	
		66	20	120	23	4	
		66	24	92	20	3	7.3
4	Loft Storage Area	174	4	120	25	2	
		174	20	120	23	10	
		174	24	92	20	8	19.4
	Total UA	631		Conduction Total			74.7

INFILTRATION LOSSES									
		0.4							
#	Zone	VOLUME	ACH	HRS/ DAY	DAYS/ YR	0.018	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	6,054	0.35	20	120	0.018	15	1.4	
		6,054	0.35	24	92	0.018	15	1.3	
	Occ.	6,054	0.35	4	120	0.018	20	0.4	3.0
2	Main Library Area	6,541	0.40	20	120	0.018	27	3.1	
		6,541	0.40	24	92	0.018	20	2.1	
	Occ.	6,541	0.50	4	120	0.018	35	1.0	6.1
3	Room at Base of Stairs	935	0.35	20	120	0.018	23	0.3	
		935	0.35	24	92	0.018	20	0.3	
	Occ.	935	0.35	4	120	0.018	25	0.1	0.7
4	Loft Storage Area	4,325	0.35	20	120	0.018	23	1.5	
		4,325	0.35	24	92	0.018	20	1.2	
	Occ.	4,325	0.35	4	120	0.018	25	0.3	3.0
							Infiltration Total		12.8

HEAT LOSS COEFFICIENTS

Zone #	Building Zone		U-Value (BTU/hr-sf-F)	Area (sf)		UA-Value (BTU/hr-F)
1	Basement	Roof	0.059	0		0
		Walls		0		0
		Walls - Below Grade	0.021	868		18
		Doors	0.400	0		0
		Windows	0.550	0		0
		Slab/Floor	0.008	961		8
				Wing UA Total	25.6	
2	Main Library Area	Ceiling to Loft	0.033	961		22
		Walls	0.082	664		54
				0		0
		Doors	0.400	23		9
		Windows	0.550	210		116
		1st Floor to Basement	0.171	961		165
				Wing UA Total	365.8	
3	Room at Base of Stairs	Roof	0.033	961		32
		Walls	0.082	153		13
				0		0
		Doors	0.400	0		0
		Windows	0.550	39		21
		Slab/Floor	0.171			0
				Wing UA Total	65.7	
4	Loft Storage Area	Roof	0.059	372		22
		Walls Vertical	0.082	190		16
		Sloped Roof Area	0.145	868		126
		Doors	0.400	0		0
		Windows	0.550	20		11
		Slab/Floor	0.008			0
				Wing UA Total	174.3	
				Building Total UA:	631.4	

HEAT LOADS AFTER ECM2A
ATTIC INSULATION

HEAT LOADS AFTER ECM2A		
GAINS AND LOSSES	BTU/HEATING SEASON*1E6	
CONDUCTION LOSSES	-73.0	
INFILTRATION LOSSES	-12.7	
VENTILATION LOSSES	0.0	
SOLAR GAIN	20.7	
OCCUPANT GAIN	5.5	
ELECTRICAL GAIN	2.7	
NET HEATING DEMAND	-56.7	

CONDUCTION LOSSES

#	Zone	UA	HOURS/ DAY	DAYS/ -	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	26	4	120	20	0	
		26	20	120	15	1	
		26	24	92	15	1	2.0
2	Main Library Area	366	4	120	35	6	
		366	20	120	27	24	
		366	24	92	20	16	46.0
3	Room at Base of Stairs	66	4	120	25	1	
		66	20	120	23	4	
		66	24	92	20	3	7.3
4	Loft Storage Area	158	4	120	25	2	
		158	20	120	23	9	
		158	24	92	20	7	17.6
	Total UA	615		Conduction Total			73.0

INFILTRATION LOSSES									
0.4									
#	Zone	VOLUME	ACH	HRS/ DAY	DAYS/ YR	0.018	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	6,054	0.35	20	120	0.018	15	1.4	
		6,054	0.35	24	92	0.018	15	1.3	
	Occ.	6,054	0.35	4	120	0.018	20	0.4	3.0
2	Main Library Area	6,541	0.40	20	120	0.018	27	3.1	
		6,541	0.40	24	92	0.018	20	2.1	
	Occ.	6,541	0.50	4	120	0.018	35	1.0	6.1
3	Room at Base of Stairs	935	0.35	20	120	0.018	23	0.3	
		935	0.35	24	92	0.018	20	0.3	
	Occ.	935	0.35	4	120	0.018	25	0.1	0.7
4	Loft Storage Area	4,325	0.34	20	120	0.018	23	1.5	
		4,325	0.34	24	92	0.018	20	1.2	
	Occ.	4,325	0.34	4	120	0.018	25	0.3	2.9
							Infiltration Total		12.7

HEAT LOADS AFTER ECM2B
SLOPING CEILING & ATTIC INSULATION

HEAT LOAD AFTER ECM2B		
GAINS AND LOSSES	BTU/HEATING SEASON*1E6	
CONDUCTION LOSSES	-62.6	
INFILTRATION LOSSES	-12.7	
VENTILATION LOSSES	0.0	
SOLAR GAIN	20.7	
OCCUPANT GAIN	5.5	
ELECTRICAL GAIN	2.7	
NET HEATING DEMAND	-46.4	

CONDUCTION LOSSES							
#	Zone	UA	HOURS/ DAY	DAYS/ -	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	26	4	120	20	0	
		26	20	120	15	1	
		26	24	92	15	1	2.0
2	Main Library Area	366	4	120	35	6	
		366	20	120	27	24	
		366	24	92	20	16	46.0
3	Room at Base of Stairs	66	4	120	25	1	
		66	20	120	23	4	
		66	24	92	20	3	7.3
4	Loft Storage Area	65	4	120	25	1	
		65	20	120	23	4	
		65	24	92	20	3	7.3
	Total UA	522		Conduction Total			62.6

HEAT LOSS COEFFICIENTS

Zone #	Building Zone		U-Value (BTU/hr-sf-F)	Area (sf)		UA-Value (BTU/hr-F)
1	Basement	Roof	0.059	0		0
		Walls		0		0
		Walls - Below Grade	0.021	868		18
		Doors	0.400	0		0
		Windows	0.550	0		0
		Slab/Floor	0.008	961		8
				Wing UA Total	25.6	
2	Main Library Area	Ceiling to Loft	0.033	961		22
		Walls	0.082	664		54
				0		0
		Doors	0.400	23		9
		Windows	0.550	210		116
		1st Floor to Basement	0.171	961		165
				Wing UA Total	365.8	
3	Room at Base of Stairs	Roof	0.033	961		32
		Walls	0.082	153		13
				0		0
		Doors	0.400	0		0
		Windows	0.550	39		21
		Slab/Floor	0.171			0
				Wing UA Total	65.7	
4	Loft Storage Area	Roof	0.016	372		6
		Walls Vertical	0.082	190		16
		Sloped Roof Area	0.038	868		33
		Doors	0.400	0		0
		Windows	0.550	20		11
		Slab/Floor	0.008			0
				Wing UA Total	65.2	
				Building Total UA:	522.3	

HEAT LOADS AFTER ECM2C
WALL, SLOPING CEILING & ATTIC INSULATION

HEAT LOAD AFTER ECM3C		
GAINS AND LOSSES	BTU/HEATING SEASON*1E6	
CONDUCTION LOSSES	-59.5	
INFILTRATION LOSSES	-12.4	
VENTILATION LOSSES	0.0	
SOLAR GAIN	20.7	
OCCUPANT GAIN	5.5	
ELECTRICAL GAIN	2.7	
NET HEATING DEMAND	-43.0	

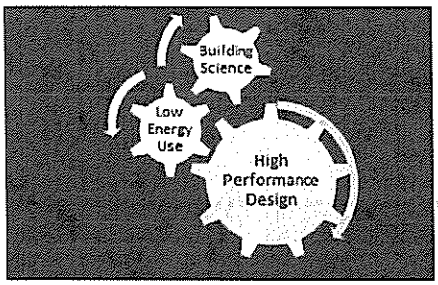
CONDUCTION LOSSES

#	Zone	UA	HOURS/ DAY	DAYS/ -	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	26	4	120	20	0	
		26	20	120	15	1	
		26	24	92	15	1	2.0
2	Main Library Area	349	4	120	35	6	
		349	20	120	27	23	
		349	24	92	20	15	43.9
3	Room at Base of Stairs	62	4	120	25	1	
		62	20	120	23	3	
		62	24	92	20	3	6.9
4	Loft Storage Area	60	4	120	25	1	
		60	20	120	23	3	
		60	24	92	20	3	6.7
	Total UA	496		Conduction Total			59.5

HEAT LOSS COEFFICIENTS

Zone #	Building Zone		U-Value (BTU/hr-sf-F)	Area (sf)		UA-Value (BTU/hr-F)
1	Basement	Roof	0.059	0		0
		Walls		0		0
		Walls - Below Grade	0.021	868		18
		Doors	0.400	0		0
		Windows	0.550	0		0
		Slab/Floor	0.008	961		8
				Wing UA Total	25.6	
2	Main Library Area	Ceiling to Loft	0.033	961		22
		Walls	**0.056**	664		37
				0		0
		Doors	0.400	23		9
		Windows	0.550	210		116
		1st Floor to Basement	0.171	961		165
				Wing UA Total	348.8	
3	Room at Base of Stairs	Roof	0.033	961		32
		Walls	**0.056**	153		9
				0		0
		Doors	0.400	0		0
		Windows	0.550	39		21
		Slab/Floor	0.171			0
				Wing UA Total	61.7	
4	Loft Storage Area	Roof	***0.016***	372		6
		Walls Vertical	**0.056**	190		11
		Sloped Roof Area	***0.038***	868		33
		Doors	0.400	0		0
		Windows	0.550	20		11
		Slab/Floor	0.008			0
				Wing UA Total	60.4	
				Building Total UA:	496.5	

INFILTRATION LOSSES									
0.4									
#	Zone	VOLUME	ACH	HRS/ DAY	DAYS/ YR	0.018	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	6,054	0.33	20	120	0.018	15	1.3	
		6,054	0.33	24	92	0.018	15	1.2	
	Occ.	6,054	0.00	4	120	0.018	20	0.0	2.5
2	Main Library Area	6,541	0.40	20	120	0.018	27	3.1	
		6,541	0.40	24	92	0.018	20	2.1	
	Occ.	6,541	0.50	4	120	0.018	35	1.0	6.1
3	Room at Base of Stairs	935	0.35	20	120	0.018	23	0.3	
		935	0.35	24	92	0.018	20	0.3	
	Occ.	935	0.35	4	120	0.018	25	0.1	0.7
4	Loft Storage Area	4,325	0.34	20	120	0.018	23	1.5	
		4,325	0.34	24	92	0.018	20	1.2	
	Occ.	4,325	0.34	4	120	0.018	25	0.3	2.9
							Infiltration Total		12.2



BALES ENERGY ASSOCIATES

Date: December 5, 2013

ENERGY STUDY
FOR

Riverside/ Four Winds School
54 French King Highway
Gill, MA 01354

Completed By:

Bales Energy Associates
www.balesenergy.com
50 Miles Street
Greenfield, MA 01301
413-863-5020

Consulting Energy Engineer:
Bart Bales, PE, MSME
bart.bales@balesenergy.com

TABLE OF CONTENTS

Introduction

Bales Energy Associates, an energy efficiency engineering firm, was contracted to provide an ASHRAE Level 2 energy audit for Riverside/Four Winds School located at 54 French King Highway in Gill, Massachusetts.

Bart Bales, PE, MSME, senior engineer at Bales Energy Associates, visited the site, reviewed energy usage & billing information, examined relevant equipment and systems, and developed energy analyses and recommendations with regard to building's energy related systems.

Executive Summary

Energy Conservation Opportunities Evaluated

Bales Energy Associates has approached the Riverside/Four Winds School in terms of the whole system. Improvements in various systems have interactive impacts with other systems. Key conclusions are the following:

1. **Heating Systems Recommendation**
   - **Convert the existing steam system to hydronic operation using existing piping where feasible**
   - **Re-use existing radiators in the classrooms and historical room**
   - **Replace radiators not compatible with hydronic operation (in the hallway and office) with radiative panel convectors**
   - **Install a propane-fired, premium efficiency condensing hydronic boiler (with propane fuel storage tank capacity) to provide hot water to the building. Install necessary pump capacity to deliver heating water to the radiators and convectors serving building**
   - **Boiler replacement includes installation of microprocessor-based scheduling time-clock capabilities** to provide scheduling of occupied and unoccupied periods. Install an outdoor air temperature sensor and a space temperature sensor. Use space temperature and outside air sensor inputs sensors to determine when boiler and circulator shall run for daytime temperature maintenance, and unoccupied temperature setback.
2. **Enclosure Improvements** can substantially reduce the building's heat loss characteristics. Recommendations include:
   - **Insulate the attic area of the building to achieve an R-value of R60.** Add sufficient cellulose insulation (15 inches of blown cellulose to add approximately R55 to the existing ceiling assembly) to achieve the desired attic floor assembly R-value (R60). Air seal bypasses and penetrations in the attic. Seal off no longer used natural ventilation ductwork where it penetrates the ceiling.
   - **Install dense pack cellulose in the building walls cellulose (4 inches, R14).**

The costs, savings, and economic payback for these energy conservation measures are presented in the following Executive Summary Chart. The values shown in the Executive Summary Chart represent the

savings with measures taken in the order of economic feasibility shown. The calculations supporting each measure are included in the appendices.

Executive Summary Chart

	Oil	Propane
	$2.98	$2.15
	$/Gallon	$/Gallon

ECM #	Energy Conservation Measures	Cost	Incremental Cost ($)	Available Utility Rebates ($)	Total Cost after Rebate ($)	Incremental Cost after Rebate ($)	Oil Savings (Gallons/yr)	Propane Savings (Gallons/yr)	Annual Savings ($/yr)	Total Payback (yrs)	Incremental Payback (yrs)	Total Payback Payback after Rebates (yrs)	Incremental Payback after Rebates (yrs)	Life Years
ECM1	Install Propane-Fired Condensing Boiler	$52,030	$17,138	0	$52,030	$17,138	1,777	-1,678	$1,689	30.8	10.1	30.8	10.1	20+
ECM2	Insulate & Air-Seal the Attic	$7,828	$7,828	0	$7,828	$7,828		308	$661	11.8	11.8	11.8	11.8	30+
ECM3	Insulate the First Floor Walls	$6,528	$6,528	0	$6,528	$6,528		851	$1,830	3.6	3.6	3.6	3.6	30+
	Totals	$66,386	$31,494	$0	$66,386	$31,494	1,777	-519	$4,180	15.9	7.5	15.9	7.5	

Existing Conditions

Facility Description

The Riverside/Four Winds School is a moderate sized wood-framed, sloped-roofed building located at 54 French King Highway, in Gill, Massachusetts. The building comprises a basement (currently used only for storage) and a first floor with two large classrooms, a former classroom now used by the historical society and administrative offices.

The building is owned by the town and currently leased to the Four Winds School.

Utility Energy Use

Utility data was collected and is tabulated below. Western Massachusetts Electric Company provides electricity. For heating, the Riverside/Four Winds School uses #2 fuel oil. (Note: WMECO (and its parent company Northeast Utilities, recently merged with NSTAR. As a result, changes in procedures and personnel in charge of related utility programs are in transition.)

Jul 2012-June 2013ergy Use Table for Electricity & Fuel					
Building Name	Riverside Building				
Owner	Town Of Gill, MA				
Account #					
Month	Electricity KWH	Electricity Total $	Oil Gallons	Gas $	Energy $ Totals
Jul	109	$24			$24
Aug	122	$27			$27
Sept	212	$47	64.0	$191	$237
Oct	442	$97		$0	$97
Nov	422	$93	205.0	$611	$703
Dec	411	$90		$0	$90
Jan	544	$120	320.0	$953	$1,073
Feb	412	$91	695.0	$2,070	$2,161
Mar	375	$83	197.0	$587	$669
Apr	426	$94	296.0	$882	$975
May	325	$72			$72
Jun	237	$52			$52
Annual (Units)	4,037	$888	1,777.0	$5,292	$6,181
Heating Season (Units)	3,032	$667	1,777.0	$5,102	$5,769
				Energy Use Totals (Mbtu)	
Annual (Mbtu)	13,774		246,469.9	260,244	Energy $ Totals
Heating Season (Mbtu)	10,345		246,469.9	256,815	
$/Energy Unit				Totals (Mbtu/sf)	($/sf)
Annual (Mbtu/sf)	2.3		40.3	42.6	$0.87
Heating Season (Mbtu/sf)	1.7		40.3	42.0	$0.83
Htng Season $/Energy Unit					
Building Name	Riverside Building		Heated Square Footage		6,114

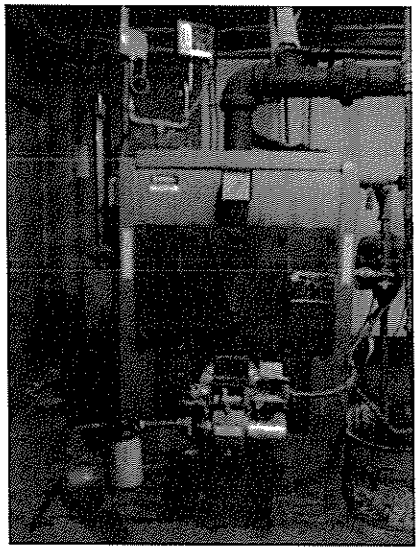
Prescriptive and custom utility incentives are available for some of the measures described. When the report's contents are accepted by the client, the report may be presented to the utilities for review and determination of levels of custom incentives the utilities will offer, if any.

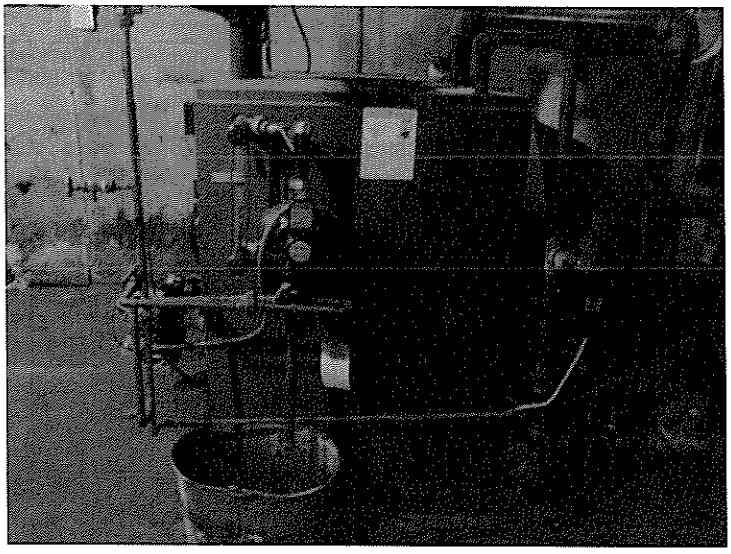
Western Massachusetts Electric Company contacts are: Lynn Ditullio (ditullb@nu.com) and Robert Dvorchik (dvorcrs@nu.com).

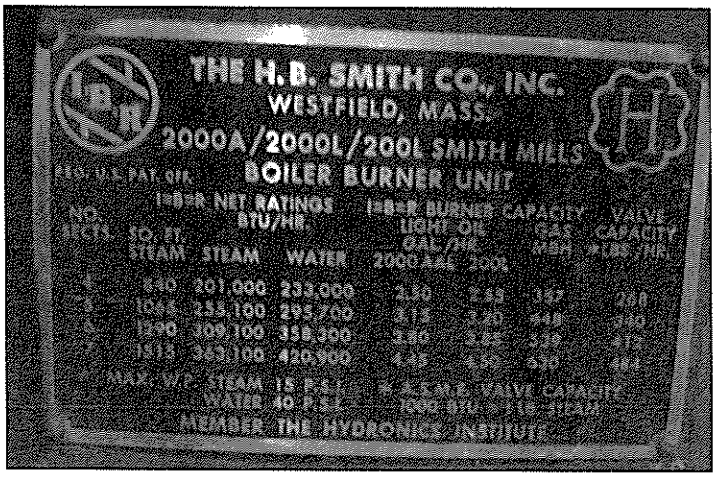
Heating, Ventilating & Air Conditioning Systems

Boiler

The building is served by a very old five-section, oil-fired, atmospheric steam boiler (HB Smith, 2000A/2000L/200L Mills) with a rated steam output capacity of 255,100 Btu/hour. The boiler has an estimated combustion efficiency of approximately 80%. (The most recent combustion test tag indicated performance at 65%, but the boiler appears to have been equipped more recently with a new Carlin burner.) There no outside air intake through the boiler wall to provide combustion air.







Recommended Boiler Improvement Measure

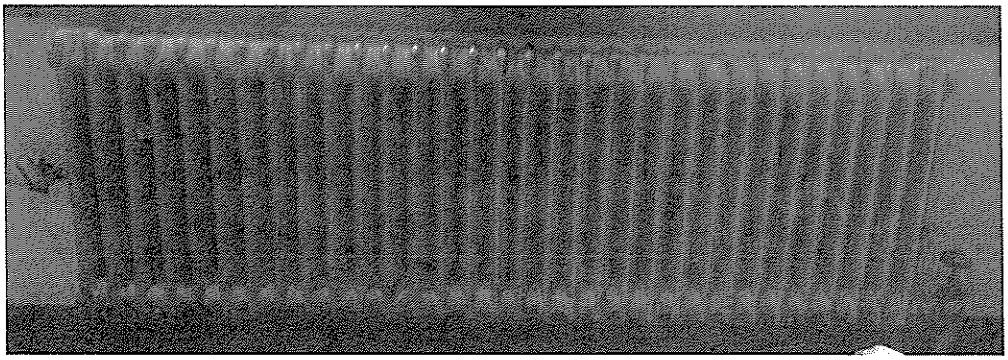
- **Convert the existing steam system to hydronic operation using existing piping where feasible**
- **Re-use existing radiators in the classrooms and historical room**
- **Replace the four radiators not compatible with hydronic operation (in the hallway and office) with radiative panel convectors**
- **Install a propane-fired, premium efficiency condensing hydronic boiler (with propane fuel storage tank capacity) to provide hot water to the building. Install necessary pump capacity to deliver heating water to the radiators and convectors serving building**
- **Boiler replacement includes installation of microprocessor-based scheduling time-clock capabilities** to provide scheduling of occupied and unoccupied periods. Install an outdoor air temperature sensor and a space temperature sensor. Use space temperature and outside air sensor inputs sensors to determine when boiler and circulator shall run for daytime temperature maintenance, and unoccupied temperature setback.

Heating Distribution Systems

The building is a one-pipe steam heating system (with a "drip leg" at the end of the supply line to allow condensate to return to the boiler (below the boiler's "water-line"). Given the convenient location of the steam piping running all the way around the perimeter of the building and the central location of the boiler, it is possible for the existing steam piping to be considered for re-use to deliver water as a heating medium with a limited amount of added piping required.

Prior to implementation of re-use of the steam pipe for water distribution pipe, it is recommended that the pipe be air-tested at elevated pressures to assess the potential presence of any leaks. (A hydronic system works at higher pressures than a steam system; a hydronic system might be expected to operate at approximately 60 psig, while a low-pressure steam system such as the one at the Riverside School would be expected to typically operate at pressures of 5 to 10 psig.)

Terminal heating is provided by radiators in all areas except one. The type of radiator found in the classrooms is shown below. It may be seen to be a one-pipe radiator with a steam valve on one end and an air relief valve on the other. The presence of screw fitting on the top and bottom manifolds of each end of the radiator indicate that these radiators were designed for use with either steam or hot water and that they are potentially able to be converted to hydronic operation.



Ceiling mounted radiators of similar function and slightly different configuration serve the seldom-used basement lavatories.

The four radiators in the office and the front hallways do not have top manifolds that connect the sections and are not equipped with screw fittings. These radiators are not as readily converted for use in a hydronic system. Thus, in converting the building to hydronic operation, these radiators would be recommended for replacement with convective radiator panels.

In one basement storage area (former cafeteria of many years ago) a length of ceiling mounted fin-tube radiation. This radiation may be potentially re-used for hydronic operation to provide heat to the storage area.

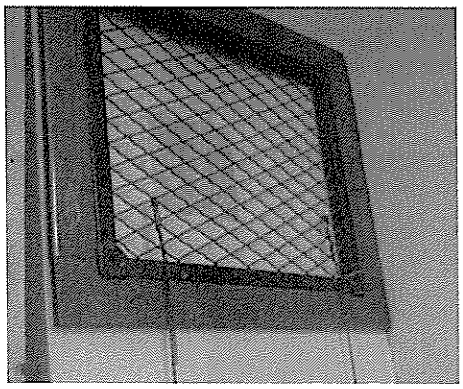
In the other large storage area in the basement (at one time used by the police department), it appears that a section n of radiation has been removed. In the final conversion of this building, an assessment of whether to add radiation to this area or not should be made.

Ventilation Considerations

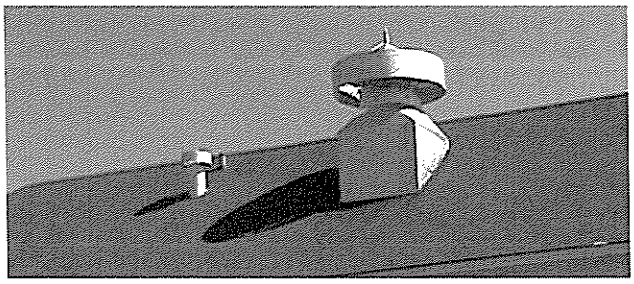
The building was designed for thermally driven "natural" ventilation. Radiators located in ducts would provide sufficient heating of air in the ducts that it would rise to leave the building via large ducts leading to the large cupola on the top of the building. The air leaving the building would be replaced by un-tempered outside air leaking into the building through various elements of the building construction.

This system stopped being used when energy prices increased. One of the radiators in the ducts was noted to have been removed. Another duct radiator remained in place but the valve served it was locked closed. With no thermal energy to drive the process, cool air would sometimes "drop" down the ducts and bring cool air into the space to which it was attached.

In the picture below, it may be seen that the exhaust grill has been blocked with a rectangle of foam board to block the air flow.



Note that the metal ducts attached to this ventilation system are large and that they penetrate the ceiling and continue on into the unheated attic and then connect to the large metal cupola at the peak of the attic. In effect, these ducts located inside the building's thermal envelope, serve as fins to conduct thermal energy from the heated space to the unheated attic and also to the outdoors.



Since these ducts are no longer being used for ventilation, it may be useful to consider sealing the location where they pass through the ceiling. Though not an energy-savings measure in this particular case, the Town may wish to consider installing an energy-recovery ventilator to provide a more assured supply of outside air to the two classrooms when the air sealing and insulation measures are being completed. (Alternately, the spaces can continue to use the operable windows if added ventilation air is felt to be required.)

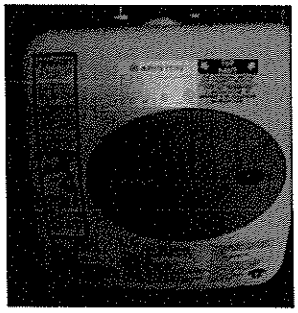
Building Temperature & Scheduling Controls

Operation of the boiler is controlled by a single manual thermostat serving the building.

As part of the boiler conversion replacement measure, Bales Energy Associates **recommends Installation of an electronic programmable timeclock capacity and an outdoor air sensor and an indoor space sensor.** Hydronic supply water temperatures would be reset to different levels depending on the outside air temperature. Outdoor temperature reset capability is critical to allow a boiler designed for condensing operation to actually condense the water vapor out of its exhaust to capture a greater percentage of the total energy available from the fuel being burned.

Domestic Hot Water Heating Systems

Hot water is provided by a 2.5 gallon mini-tank tank electric water heater (Ariston Model 2.5 Ti). Given eh very low water use in the building, this is an efficient way to provide the limited quantities of warm water that are required. Water usage is low in the building; water uses are limited to a lavatory sink on the first floor. Other than encouraging the town to insulate the three feet of un-insulated ½ inch domestic hot water pipe leading from the mini-tank in the basement to the lavatory on the floor above, Bales Energy Associates makes no recommendations with regard to domestic hot water system improvements.



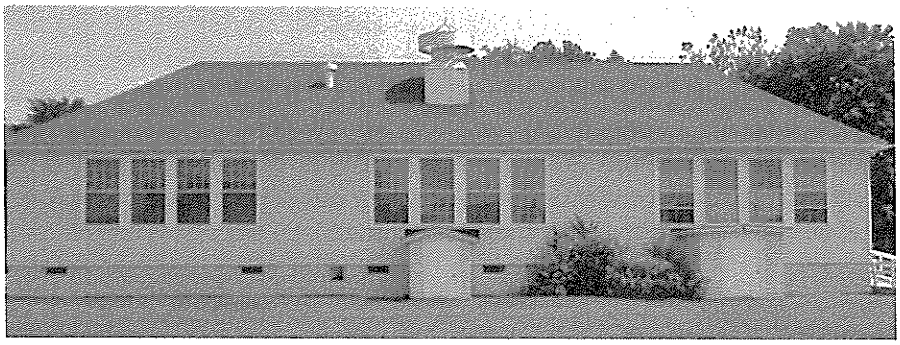
Electrical Systems

Lighting Systems

Classrooms and offices in the building are lighted with four foot fluorescent fixtures equipped with T-8 lamps and compatible electronic ballasts.

Building Enclosure

The partially finished basement and first floor of the Riverside/Four Winds School comprise approximately 6,114 square feet of heated floor area. All school activities take place on the first floor which comprises two classrooms and administrative offices, plus one classroom which is used by ht e historical society.



The basement is currently only used for storage.

Roof and Attic

The Riverside/Four Winds School has a sloped-roof with a metal ventilation cupola on top.

The attic is unfloored and has 2 to 3 inches of rock wool insulation in place. Large metal ductwork designed for use by the heat-driven natural ventilation system penetrates the first floor ceiling and continues on through the attic to the metal exhaust cupola on the roof. The ducts represent a large air bypasses. There also bypasses from the first floor to the attic through the spaces around the duct work.

Recommendation for the Attic

Bales Energy Associates recommends that the attic floor joists be treated as the location thermal and air boundary layer. This involves the following steps:

1. Retain the cupola for ventilation out of the attic.
2. Insulate the attic floor assembly to add approximately 15 inches of loose-fill cellulose insulation (R55) to the attic to achieve a roof assembly value of R-60.
3. Air-seal the attic area to reduce infiltration.

Costs and savings for this measure are included in the Appendices.

Walls

The walls of the Riverside/Four Winds School are poorly insulated.

Recommendation for the Wall

Bales Energy Associates recommends that insulating the four inch wall assembly with approximately four inches of high-density cellulose (R14) insulation.

Costs and savings for this measure are included in the Appendices.

APPENDICES

HEATING SYSTEM IMPROVEMENT MEASURES

Conversion of System to Hydronic (Hot Water) Operation & Installation of Propane-Fired Condensing Hydronic Boiler

Space Heating Savings with Propane-Fired Condensing Hydronic Boiler						
		Gill Riverside/Four Winds School			Propane	
Oil Rate ($/gallon)		Gill, MA			$/gallon	
$2.98	Existing Condition:			New Condition:	$2.15	
Equipment Type	Space Heating Boiler			Space Heating Boiler	Space Heating Boiler	
Boiler #	1			1		
Make	H B Smith			Lochinvar		
Model	2000A/2000L/200L Mills			Knight		
Type	Atmospheric			Condensing		
Heating Medium	Steam			Hydronic		
Control Mode				Modulating 5:1		
ximum Output Mbtu	255			150		
Steady State Eff	80%			92%		
Input Mbtu/Hr	319			163		
Seasonal Eff	65%			92%		
Percentage of Load	100%			100%		
stalled System Costs		High-Performance Heating System				
Boiler	$34,892	Propane-Fired Condensing Boiler with 4 new		$40,030		
		radiators, conversion of other existing radiators,				
		circulator, controls and required piping changes				
		Propane tank		$7,000		
		System Configuration Contractor Oversight		$5,000		
Totals	$34,892			$52,030		
Annual Building Operating Load (MMbtu/year)	Summary of Existing Building-Related Heat Loads	Existing Oil Heating Usage Gallons	New Propane Heating Usage Gallons	Fuel Cost $	Peak Space Heating Load (Mbtu/hr)	Provide (#) 1 Boilers @ 100% of design Load
160,205	Existing Oil Use	1,777		$5,295	150	150
160,205	New Propane Use		1,678	$3,607		
		KWH				
Fuel Energy Before	246,470					
Fuel Energy After	174,136					
uel Energy saved	72,334		Savings $	$1,689		

Payback Calculation:			
	Cost	Savings	Payback
Full Equipment Cost Basis:	$52,030	$1,689	30.8
Incremental Equipment Cost Basis:	$17,138	$1,689	10.1

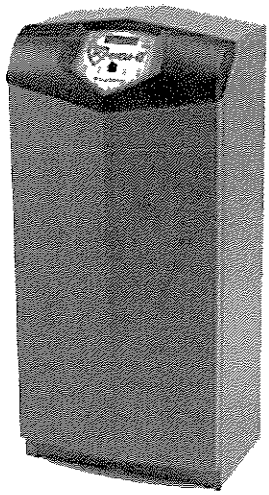
LOCHINVAR BOILERS

For more than 80 years, Lochinvar has played a legendary role in commercial water heating. Now we're bringing that proven performance to the condensing market with the KNIGHT—today's most advanced fully modulating high-efficiency condensing boiler.

The KNIGHT is an installer's dream: lightweight and compact, with key components that are easy to access. The Lochinvar KNIGHT offers PVC venting versatility, rugged reliability, seven models with inputs ranging from 80,000 to 500,000 Btu/hr, and 93% DOE AFUE. And you'll love the SMART SYSTEM[a] control, which includes a service indicator, contractor accessible password protection, and a 2-line display with simple fault descriptions, not codes. Best of all, the KNIGHT offers more standard features than any other heating boiler available today—including outdoor reset and a boiler circulating pump supplied with every KB 080-285 unit. Plus every KNIGHT is backed by an outstanding 12-year warranty.

1.1 FEATURES

- Stainless steel heat exchanger
- Fully modulating burner w/5:1 turndown
- PVC venting - up to 100 ft.
- Boiler circulating pump included
- Direct vent, sealed combustion

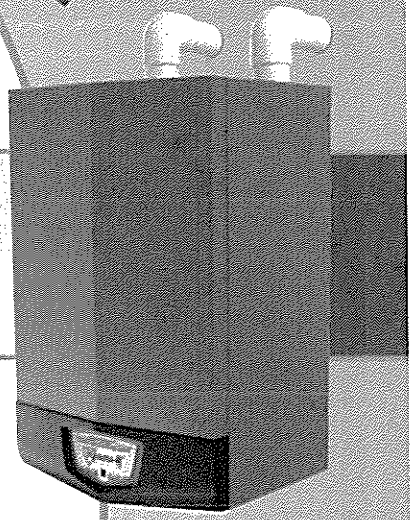


is joined at the Round Table

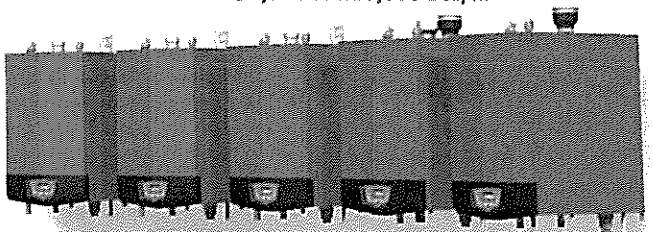
KNIGHT™ WALL MOUNT BOILER

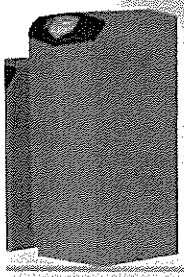
"Why do I like the KNIGHT? I don't know where to begin. The direct venting with 100 feet of intake and exhaust eliminates a lot of problems. I also like the low voltage features, and the SMART SYSTEM's outdoor reset capability. The internal sequencer is tremendously powerful and ideal for multiple boiler installations. It's also great-looking, and aesthetics are important to my customers. When I install KNIGHT, my customers know they are getting a highly efficient state-of-the-art system, and they've all been completely satisfied."

– Paul Rohrs, Biggerstaff Radiant Solutions, Lincoln, NE



KNIGHT lineup now includes 5 space-saving Wall Mount models from 50,000 to 210,000 Btu/hr

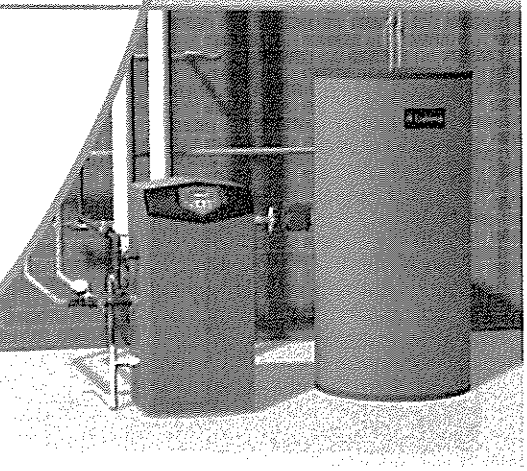




The KNIGHT floor-standing lineup features 5 small footprint designs from 80,000 to 285,000 Btu/hr

LOW NOx Certified

All KNIGHT Boilers meet or exceed the highest federal emissions requirements.



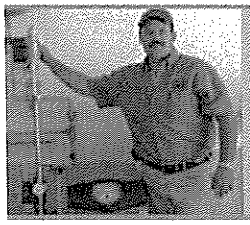
KNIGHT plus SQUIRE delivers domestic hot water for less!

The KNIGHT boiler's DHWP feature means you can easily install it with Lochinvar's new SQUIRE indirect water heater. With this winning combination, homeowners will get high-efficiency space heating from KNIGHT, plus all the domestic hot water they need from SQUIRE. Equipped with a stainless steel tank and heat exchanger, SQUIRE will provide more hot water with lower water heating costs compared to a standard gas or electric water heater.

SMART SYSTEM

& the Industry's Smartest Design

SMART SYSTEM is the industry's most advanced operating control. Right out of the box, it gives you unequaled control and monitoring functions that are easy to understand and use.



"I really like the KNIGHT Boiler because it's very simple to install and program. The SMART SYSTEM control is great and I really like being able to troubleshoot with the pocket PC. My customers choose KNIGHT for its high efficiency and state-of-the-art design, and they're all thrilled that KNIGHT operates so quietly and makes their home much more comfortable."

– Chad Padilla, TLC Plumbing, Albuquerque, NM

2-Line, 16-Character LCD Display
Displays setup and diagnostic information in words, not codes

Password Security
Dual passwords for installer and user

Product Service Indicator
Program reminders for cycle count, operation hours or last service

Pump Relay w/Freeze Protection
Ensures water temperature does not fall below 40°F

Low-Water Flow Indicator
Protects against high temperature differential in the heat exchanger with reduced modulation or shutdown

Outdoor Reset
Outdoor temperature monitor guides the reset schedule to meet load

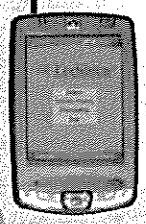
Night Setback
Program a heating loop water temperature setback for any time of the day, each day of the week

Building Management System (BMS) Control
0-10 VDC, BMS-driven input for modulation rate or temperature control

DHWP with Pump Control
On call for hot water, SMART SYSTEM overrides outdoor reset and starts DHWP pump to the indirect. Runtime can alternate between heating and domestic hot water to meet demand simultaneously

System & Boiler Pump Controls
Provides power to both system and boiler pumps based on a call for heat. Programmable delay allows pumps to operate after a call has been satisfied

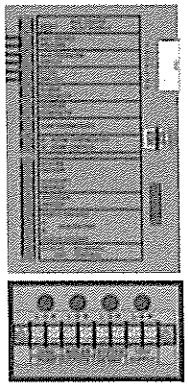
In/Out Temp. Sensors and Display
Allows installer to select which sensor controls the boiler setpoint



PC Connection –
Can be used with KNIGHT PC or Pocket PC software to troubleshoot and program SMART SYSTEM functions and to track historical data, including faults, trends and energy consumption.

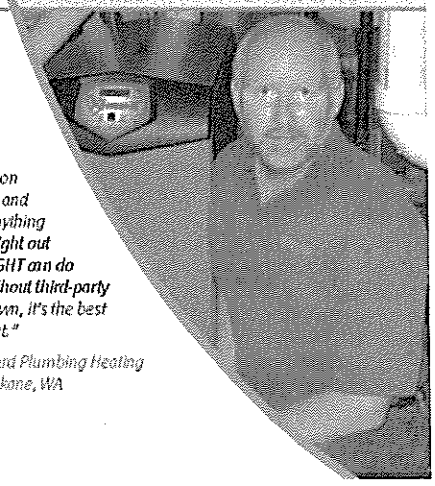
Field Connection Versatility
User-friendly terminal strip allows for 28 low-voltage field connections. Plus, 4 line voltage connections supply power to the unit, and up to three pumps operated by the SMART SYSTEM.

Built-in Cascading Sequencer
SMART SYSTEM includes a built-in sequencer for 2–8 units, eliminating the cost and labor of a third-party sequencer. On demand, one boiler acts as lead unit and modulates with demand to meet capacity. The additional load then "cascades" to the next boiler in line and continues all are operating or demand is satisfied. When demand drops, the process reverses.

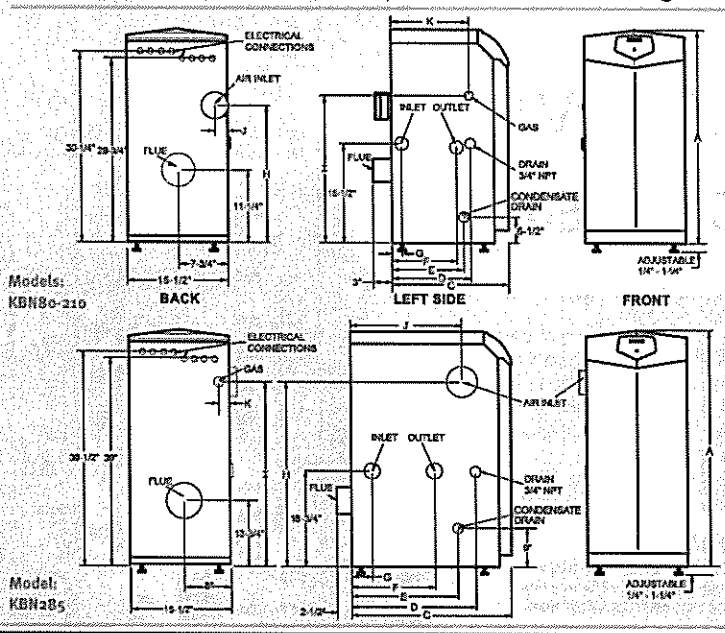


"The control system on the KNIGHT is head and shoulders above anything else available. Straight out of the box, the KNIGHT can do anything I need without third-party controls. Hands-down, it's the best boiler on the market."

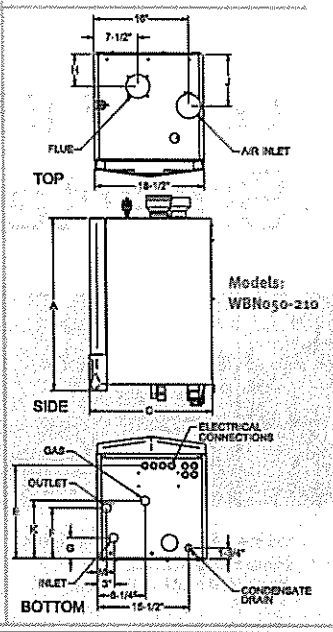
– Don Smet, Standard Plumbing Heating Controls Corp., Spokane, WA



Knight Heating Boiler Dimensions & Specifications– Floor Standing Models



Wall Mount Models



KNIGHT Heating Boiler						Dimensions and Specifications														
Model Number	Input Min MBH	Input Max MBH	AFUE %	Heating Capacity MBH	NET I=B=R MBH	A	C	D	E	F	G	H	I	J	K	M	Gas Conn.	Water Conn.	Air Inlet	Vent Size	Shipping Weight
WBN050	10	50	95.3	45	39	29-1/4"	15-3/4"	NA	10-3/4"	10-3/4"	2"	6-3/4"	NA	3-1/4"	4-1/4"	2-3/4"	1/2"	1"	2"	2"	130
WBN080	16	80	95.3	72	63	29-1/4"	15-3/4"	NA	10-3/4"	10-3/4"	2"	6-3/4"	NA	3-1/4"	4-1/4"	2-3/4"	1/2"	1"	2"	2"	130
WBN105	21	105	95.4	97	82	29-1/4"	15-3/4"	NA	10-3/4"	10-3/4"	3-1/2"	5-1/2"	NA	3-1/4"	4-1/4"	2-3/4"	1/2"	1"	2"	2"	134
WBN150	30	150	95.5	135	119	29-1/4"	20-3/4"	NA	15-3/4"	8-1/2"	3-1/2"	5-1/2"	NA	8-3/4"	9-3/4"	1-1/2"	1/2"	1"	3"	3"	162
WBN210	42	210	95.7	190	165	29-1/4"	25"	NA	20"	12"	3-1/2"	5-1/2"	NA	13"	14"	1-1/2"	1/2"	1"	3"	3"	177
KBN080	16	80	95.3	72	63	33-1/4"	14"	7"	5-3/4"	5"	3"	20-1/2"	22"	1-3/4"	6-1/2"	NA	1/2"	1"	3"	3"	125
KBN105	21	105	95.4	97	82	33-1/4"	14"	6-1/2"	5-3/4"	4-1/2"	1-1/2"	20-1/2"	22"	1-3/4"	6-1/2"	NA	1/2"	1"	3"	3"	129
KBN150	30	150	95.5	135	119	33-1/4"	18"	12-1/4"	11-1/2"	10"	1-1/2"	21-1/4"	23"	1-3/4"	12"	NA	1/2"	1"	3"	3"	157
KBN210	42	210	95.7	190	165	33-1/4"	22-1/4"	16-1/2"	15-3/4"	14-1/4"	5-1/4"	21-1/4"	23"	1-3/4"	16-1/4"	NA	1/2"	1"	3"	3"	172
KBN285	57	285	96.0	269	226	42-1/2"	19-3/4"	12-3/4"	13-1/2"	6"	2"	24"	31"	11-3/4"	4-1/4"	NA	3/4"	1-1/4"	4"	4"	224

Notes: Performance data based on manufacturer's test results. Indoor installation only. All information subject to change. Change "N" to "L" for LP gas models.

Standard Features

*Standard features in **BOLD** text indicate equipment you would pay extra for on competing models.*

- ENERGY STAR® Qualified
- Modulating Burner with 5:1 Turndown
- ASME Stainless Steel Heat Exchanger
- Gasketless Heat Exchanger Design
- 30 psi Relief Valve
- **SMART SYSTEM™ Operating Control, with:**
  - **Digital Operating Control**
  - **2-Line, 16-Character LCD Display**
  - **Password Security**
  - **Outdoor Reset**
  - **Built-in Sequencing for 2-8 Boilers**
  - **0 – 10 Vdc Input Control**
  - **Product Service Indicator**
  - **Time Clock**
  - **PC Connection Port**
- Inlet & Outlet Temperature Sensors
- Easy-Access Terminal Strip
- Low-Water Flow Indication
- Automatic Reset High Limit
- **Contacts on Any Failure**
- **3-Pump Control (Boiler, System and DHWP)**
- Pump Relay with Freeze Protection
- **Boiler Circulating Pump** (KBN080-285) (WBN050-210)
- Direct-Spark Ignition
- Low-NOx Operation
- Natural to LP Gas Conversion Kit
- Direct-Vent Sealed Combustion
- PVC Venting up to 100 Feet
- Sidewall Vent Terminals
- Zero Clearance to Combustibles
- Adjustable Leveling Legs (KBN Models only)
- Wall Mount Bracket (WBN Models only)
- 12-Year Limited Warranty (See Warranty for Details)

Optional Equipment

- Adjustable High Limit with Manual Reset
- Flow Switch
- Low-Water Cutoff with Manual Reset and Test
- Alarm Bell on Any Failure
- SMART SYSTEM™ PC Software
- Concentric Vent Kit
- Condensate Neutralization Kit
- Multi-Stack Frame (KBN Models only)

Lochinvar®
High Efficiency Water Heaters, Boilers and Pool Heaters

300 Maddox Simpson Parkway, Lebanon, TN 37090 | 615-889-8900 | fax: 615-547-1000 | www.lochinvar.com

KBN-04 (Replaces KBN-03 8/07) MK-20M-208-Printed in U.S.A.

WALL & ATTIC INSULATION MEASURE INFORMATION

School

	Location	Measure	Depth	R-Value	# / SF	Cost
1	Walls	Cellulose Net & Blow	4	14	3,264	$6,528
2	Attic Floor	Cellulose Open Blow	9	33	3,260	$4,727
3	Attic Floor	Cellulose OB to R60 Adder	6	22	3,260	$1,141
4	Attic	Air Sealing	0	N/A	20	$1,400
5	Attic	Duct Capped & Sealed	0	N/A	6	$660
6					0	$0
	Total					$14,456

* Assumes that ductwork will be removed to the attic floor and left clean for air sealing.
Insulation costs were provided by EnergiaUS located in Holyoke, MA.

Energía, LLC
242 Suffolk Street
Holyoke, MA 01040
(413) 322-3111

ECM#2	Summary of Energy Savings Due to Attic Insulation				
	Baseline Heat Load MMBTU	After ECM #2 MMBTU	Savings 10E6 Btu/yr	% Reduction	
Fuel Energy Usage (MMBtu/yr)	159.43	130.20	29.23	18.3%	
New Boiler System efficiency	92%	92%			
Fuel Energy Usage (MMBtu/yr)	173	142			
Energy Savings	% Reduction	Propane Use after ECM1	Gallons Saved	$/Unit	$ Saved
	18.3%	1,678	308	$2.150	$661
				Total Savings ($)	$661

			Cost	Savings	Payback
Attic Insulation&		Measure	$	$	Years
Air Sealing	$7,828	ECM2	$7,828	$661	11.8

Note:
Cost estimates were developed by BEA based upon quotes by EnergiaUSA

ECM#3 Summary of Energy Savings Due to Wall & Attic Insulation

	Baseline Heat Load MMBtu	After ECM #2 MMBtu	Savings 10E6 Btu/yr	% Reduction	
Fuel Energy Usage (MMBtu/yr)	130.20	49.31	80.89	62.1%	
New Boiler System efficiency	92%	92%			
Fuel Energy Usage (MMBtu/yr)	142	54			

Energy Savings	% Reduction	Propane Use after ECM1 &	Gallons Saved	$/Unit	$ Saved
	62.1%	1,370	851	$2.150	$1,830
				Total Savings ($)	$1,830

		Measure	Cost $	Savings $	Payback Years
Wall Insulation	$6,528	ECM3	$6,528	$1,830	3.6

Note:
Cost estimates were developed by BEA based upon quotes by EnergiaUSA

ANNUAL BUILDING HEAT BALANCE

EXISTING CONDITIONS

HEAT BALANCE		
GAINS AND LOSSES	BTU/HEATING SEASON*1E6	
CONDUCTION LOSSES	-184.7	
INFILTRATION LOSSES	-51.6	
VENTILATION LOSSES	0.0	
SOLAR GAIN	60.5	
OCCUPANT GAIN	6.6	
ELECTRICAL GAIN	9.8	
NET HEATING DEMAND	-159.4	

Net Heating Demand (MMbtu)	/Energy Required (MMbtu)	Seasonal Efficiency %
159.4	246	65%

CONDUCTION LOSSES

#	Zone	UA	HOURS/ DAY	DAYS/ -	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	264	6	0	20	0	
		264	18	0	20	0	
		264	24	212	20	27	26.9
2	First Floor Main	1,008	6	140	35	30	
		1,008	18	140	25	63	
		1,008	24	72	20	35	127.9
3	First Floor Office	236	6	140	35	7	
		236	18	140	25	15	
		236	24	72	20	8	29.9
	Total UA	1,507			Conduction Total		184.7

INFILTRATION LOSSES									
0.4									
#	Zone	VOLUME	ACH	HRS/ DAY	DAYS/ YR	0.018	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	20,758	0.40	18	0	0.018	20	0.0	
		20,758	0.40	24	212	0.018	20	15.2	
	Occ.	20,758	0.40	6	0	0.018	20	0.0	15.2
2	First Floor Main	31,136	0.45	18	140	0.018	25	15.9	
		31,136	0.45	24	72	0.018	20	8.7	
	Occ.	31,136	0.48	6	140	0.018	35	7.9	32.5
3	First Floor Offic	3,758	0.45	18	140	0.018	25	1.9	
		3,758	0.45	24	72	0.018	20	1.1	
	Occ.	3,758	0.48	6	140	0.018	35	1.0	3.9
							Infiltration Total		51.6

HEAT LOSS COEFFICIENTS

Zone #	Building Zone		U-Value (BTU/hr-sf-F)	Area (sf)		UA-Value (BTU/hr-F)
1	Basement	Roof	0.097	0		0
		Walls	0.302	675		204
		Below grade	0.000	1,240		0
		Doors	0.625	42		26
		Windows	0.400	27		11
		Slab/Floor	0.008	2,883		23
				Wing UA Total	264.1	
2	First Floor Main	Roof	0.097	2,883		205
		Walls	0.279	2,119		591
			0.000	0		0
		Doors	0.625	36		23
		Windows	0.400	473		189
		Slab/Floor	0.040	0		0
				Wing UA Total	1007.7	
3	First Floor Offices	Roof	0.097	348		34
		Walls	0.279	548		153
			0.000	0		0
		Doors	0.625	0		0
		Windows	0.400	88		35
		Slab/Floor	0.040	348		14
				Wing UA Total	235.6	
				Building Total UA:	1507.4	

Riverside Building

Window Solar Heat Gain

Window Orientation	Solar Heat Gain Factor (BTU/SF) Heating Season 40 N Latitude	Window Area	Shading Factor (Max = .52)	Total BTU per Heating Season *E6
North	37,730	220	0.49	4.1
Northeast	58,231	0	0.49	0.0
South	315,304	363	0.49	56.1
Southeast	256,605	0	0.49	0.0
East	150,216	0	0.49	0.0
Northwest	58,231	0	0.49	0.0
West	150,216	5	0.49	0.4
Southwest	256,605	0	0.49	0.0
	Totals	588		60.5

Temperature & Schedule Information

Building Name: Riverside Building

Total Heating Days	212	Floor SF	
Outdoor Winter Temperature	35	6,114	

	Wing name	Occupied Temp.	Unoccupied Temp. Night	Unoccupied Temp. Off days	Htg System Occ. Hrs per day *	Includes 1.5 warm-up period Schedule	Occ Level Heating Days
1	Basement	55	55	55	6	not in use	0
2	First Floor Main	70	60	55	6	in use 5 days per week	140
3	First Floor Offices	70	60	55	6	in use 5 days per week	140

ANNUAL BUILDING HEAT LOADS

AFTER ATTIC INSULATION &

AIR SEALING

HEAT LOAD AFTER ATTIC INSULATION		
GAINS AND LOSSES	BTU/HEATING SEASON*1E6	
CONDUCTION LOSSES	-159.5	
INFILTRATION LOSSES	-47.7	
VENTILATION LOSSES	0.0	
SOLAR GAIN	60.5	
OCCUPANT GAIN	6.6	
ELECTRICAL GAIN	9.8	
NET HEATING DEMAND	-130.2	

CONDUCTION LOSSES

#	Zone	UA	HOURS/ DAY	DAYS/ -	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	264	6	0	20	0	
		264	18	0	20	0	
		264	24	212	20	27	26.9
2	First Floor Main	837	6	140	35	25	
		837	18	140	25	53	
		837	24	72	20	29	106.3
3	First Floor Office	208	6	140	35	6	
		208	18	140	25	13	
		208	24	72	20	7	26.3
	Total UA	1,309			Conduction Total		159.5

INFILTRATION LOSSES

#	Zone	VOLUME	ACH	HRS/ DAY	DAYS/ YR	0.018	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	20,758	0.40	18	0	0.018	20	0.0	
		20,758	0.40	24	212	0.018	20	15.2	
	Occ.	20,758	0.40	6	0	0.018	20	0.0	15.2
2	First Floor Main	31,136	0.40	18	140	0.018	25	14.1	
		31,136	0.40	24	72	0.018	20	7.7	
	Occ.	31,136	0.43	6	140	0.018	35	7.1	29.0
3	First Floor Offic	3,758	0.40	18	140	0.018	25	1.7	
		3,758	0.40	24	72	0.018	20	0.9	
	Occ.	3,758	0.43	6	140	0.018	35	0.9	3.5
						Infiltration Total			47.7

HEAT LOSS COEFFICIENTS						
Zone #	Building Zone		U-Value (BTU/hr-sf-F)	Area (sf)		UA-Value (BTU/hr-F)
1	Basement	Roof	0.015	0		0
		Walls	0.302	675		204
		Below grade	0.000	1,240		0
		Doors	0.625	42		26
		Windows	0.400	27		11
		Slab/Floor	0.008	2,883		23
				Wing UA Total	264.1	
2	First Floor Main	Roof	0.016	2,883		34
		Walls	0.279	2,119		591
			0.000	0		0
		Doors	0.625	36		23
		Windows	0.400	473		189
		Slab/Floor	0.040	0		0
				Wing UA Total	837.0	
3	First Floor Offices	Roof	0.016	348		6
		Walls	0.279	548		153
			0.000	0		0
		Doors	0.625	0		0
		Windows	0.400	88		35
		Slab/Floor	0.040	348		14
				Wing UA Total	207.5	
				Building Total UA:	1308.6	

ANNUAL BUILDING HEAT LOADS

AFTER WALL INSULATION &

ATTIC INSULATION &

AIR SEALING

HEAT LOAD AFTER WALL & ATTIC INSULATION		
GAINS AND LOSSES	BTU/HEATING SEASON*1E6	
CONDUCTION LOSSES	-78.6	
INFILTRATION LOSSES	-47.7	
VENTILATION LOSSES	0.0	
SOLAR GAIN	60.5	
OCCUPANT GAIN	6.6	
ELECTRICAL GAIN	9.8	
NET HEATING DEMAND	-49.3	

CONDUCTION LOSSES

#	Zone	UA	HOURS/ DAY	DAYS/ -	TEMP DIFF	LOSSES (* 1E6)	Sub Totals
1	Basement	111	6	0	20	0	
		111	18	0	20	0	
		111	24	212	20	11	11.3
2	First Floor Main	428	6	140	35	13	
		428	18	140	25	27	
		428	24	72	20	15	54.4
3	First Floor Office	102	6	140	35	3	
		102	18	140	25	6	
		102	24	72	20	4	12.9
	Total UA	641			Conduction Total		78.6

HEAT LOSS COEFFICIENTS

Zone #	Building Zone		U-Value (BTU/hr-sf-F)	Area (sf)		UA-Value (BTU/hr-F)
1	Basement	Roof	0.015	0		0
		Walls	0.075	675		51
		Below grade	0.000	1,240		0
		Doors	0.625	42		26
		Windows	0.400	27		11
		Slab/Floor	0.008	2,883		23
					Wing UA Total	111.0
2	First Floor Main	Roof	0.016	2,883		34
		Walls	0.086	2,119		182
			0.000	0		0
		Doors	0.625	36		23
		Windows	0.400	473		189
		Slab/Floor	0.040	0		0
					Wing UA Total	428.3
3	First Floor Offices	Roof	0.016	348		6
		Walls	0.086	548		47
			0.000	0		0
		Doors	0.625	0		0
		Windows	0.400	88		35
		Slab/Floor	0.040	348		14
					Wing UA Total	101.7
					Building Total UA:	641.1

TOWN OF GILL

MASSACHUSETTS

www.gillmass.org

OFFICE OF THE BOARD OF SEWER COMMISSIONERS
Sewer Use Charges and Inspection Fees

To: Town Accountant

You are hereby notified that COMMITMENT(S) as shown below has (have) this day been made by the Board of Sewer Commissioners to Veronica LaChance, Tax Collector (Town Collector) and Collector of Sewer Charges. Bill date is December 17, 2013.

To: Veronica LaChance, Tax Collector (Town Collector) and Collector of Sewer Charges for the Town of Gill in the County of Franklin:

You are hereby required to collect from the several persons named in the list dated November 27, 2013, herewith committed to you the amount of the sewer usage charges assessed therein to each such person, with penalties, the sum total of such list being Twenty One Thousand Two Hundred Fifty Five and 87/100 Dollars ($21,255.87).

Given under our hands the Sixteenth day of December, 2013.

John R. Ward

Randy Crochier

Ann H. Banash

Board of Sewer Commissioners of the Town of Gill

Telephone 413-863-9347 325 Main Road, Gill MA 01354 Fax 413-863-7775

nationalgrid

Dawn Travalini
Lead Vegetation Strategy Specialist
Vegetation Strategy
40 Sylvan Road, Waltham, MA 02451
781-907-2448

December 4, 2013

CERTIFIED MAIL—Return Receipt Requested

Chair
Board of Selectmen
325 Main Road
Gill, MA 01354

Dear Board of Selectmen:

In compliance with 333 CMR 11.07, *21 day herbicide application notification*, this letter is to inform you that National Grid (New England Power Company and/or Massachusetts Electric Company) intends to selectively apply herbicides along power line rights-of-way that pass through your municipality.

As detailed in National Grid's Five Year Vegetation Management Plan (VMP) and Yearly Operational Plan (YOP), this treatment is conducted as a component of an integrated vegetation management (IVM) program that also utilizes mechanical and natural control techniques. National Grid's current Five Year Vegetation Management Plan (2014-2018) is posted at the following website (hard copy available upon request):

http://www.nationalgridus.com/non_html/National%20Grid%20VMP%202014%20-%202018.pdf

The current YOP is posted at the following website (hard copy available upon request):

http://www.nationalgridus.com/non_html/2014%20FINAL%20YOP.pdf

As described in the VMP and YOP, the program will consist of a late winter-spring mechanical control, cut surface (CST) or basal treatment; a summer selective foliage, and, as necessary, summer and fall CST and basal treatments.

Treatment Periods*

January 13, 2014 – June 2, 2014	June 2, 2014 - October 17, 2014	October 17, 2014 – December 31, 2014
CST	Foliar	CST
Basal	CST	Basal
	Basal	

* The exact treatment dates are dependent upon weather conditions and field crew progress.

In compliance with 333 CMR 11.06-11.07, no herbicide applications will occur before the conclusion of the 45 day YOP review period, the 21 day treatment notice and the 48 hour newspaper notice. At the end of these review periods, which can run concurrently, no application shall commence more than ten days before nor conclude more than ten days after the treatment periods listed above.

Commonwealth of Massachusetts recommended herbicides for use in *sensitive areas* listed in Section 7 (pages 13-15) of the YOP will be selectively applied to target vegetation by

experienced, Massachusetts' licensed/certified applicators that walk along the rights-of-way using backpack equipment. Copies of the manufacturers' herbicide labels and fact sheets are also included in the YOP, Appendices 7 and 8.

The work will be performed by one of the following companies:

Vegetation Control Service, Inc.
2342 Main Street
Athol, MA 01331
(978) 249-5348

Lewis Tree Service, Inc
300 Lucius Gordon Drive
West Henrietta, NY 14586
(585) 436-3208

Lucas Tree Experts
12 Northbrook Drive
Falmouth, ME 04105
(800) 339-8873

Stanley Tree
662 Great Road
North Smithfield, RI
(401) 765-4677

This informational 21-day notification is in compliance with Chapter 132B, section 6B of the Massachusetts General Laws, 333 CMR 11.05-11.07 Rights of Way Management and Chapter 85, Section 10 of the Acts of 2000. National Grid's vegetation management program is subject to federal and state regulations only. By statute, local permits or rulings are not applicable.

For inquiries concerning safety of the herbicides, please contact:

Director of Rights-of-Way Programs
Massachusetts State Pesticide Bureau
Department of Agricultural Resources
251 Causeway Street, Suite 500
Boston, MA 02114-2151
Telephone: (617) 626-1781

Please contact me if you have any questions about the application and monitoring of the vegetation control program.

Sincerely,

Dawn Travalini
Lead Vegetation Strategy Specialist

CC: Board of Health
Conservation Commission
Lewis Tree Service or Lucas Tree Experts or Vegetation Control Service or Stanley Tree
Massachusetts Pesticide Bureau

Municipality: Gill
ROW#(S): 1332

MassDOT
Massachusetts Department of Transportation
Highway Division

CHAPTER 90 – REIMBURSEMENT REQUEST

updated 8/2012

City/Town: GILL Project: _____

Project request was approved on August 13, 2013 for $ 97,000

at 100% Reimbursement Rate = $ 97,000.

1) Attached are forms which document payment of approved expenditures totaling $ 96,593.00 for which we are requesting $ 96,593.00 at the approved reimbursement rate of 100%.

2) The amount expended to date on this project is $ 96,593.00.

3) Is this request for a FINAL payment on this project? ☒ Yes ☐ No

4) Remarks:

CERTIFICATION

A. I hereby certify under penalties of perjury that the charges for labor, materials, equipment, and services itemized and summarized on the attached forms are true and correct, and were incurred on this project in conformance with the MassDOT Highway Division Policies and established Municipal Standards that were approved for this project.

Mitchell A. LaClaire (Signed) | Hwy Supt (Municipal Highway Official Title) | 12-16-13 (Date)

B. I/we certify under penalties of perjury that the items as listed or summarized on the attached forms were examined; that they are in conformity with our existing wage schedule, equipment rates, and all applicable statutes and regulations; that they are properly chargeable to the appropriation(s) designated for this work; and that Executive Order No. 195, dated April 27, 1981 and Chapter 11, Section 12 is acknowledged as applicable.

REVIEWED AND APPROVED FOR TRANSMITTAL

by _____ Signed: John P. Ward

Joy M. Cobb Accountant
(Accounting Officer's Title)

(Duly Authorized)

DATE 12/16/13

Submit this Chapter 90 Form to the District Highway Director

MassDOT
Massachusetts Department of Transportation
Highway Division

CHAPTER 90 - MATERIALS - HED 454 FORM

City/Town of Gill

MATERIALS for period beginning August 13, 2013 and ending 11-1-13
both inclusive, on account of Contract No. _____ with MassDOT Highway Division,
under Section 34, Clause 2(a). of Chapter 90 of the General Laws.

VENDOR NAME	ITEM	QTY.	UNIT	UNIT PRICE $	AMOUNTS $	CHECK #	REMARKS
All States Asphalt		1			$ 95,788.00	15513	
A lot of Lines		1			$ 805.00	15514	
					$ -		
					$ -		
					$ -		
					$ -		
					$ -		
					$ -		
					$ -		
					$ -		
					$ -		
					$ -		
					$ -		
					$ -		
					$ -		
					$ -		
					$ -		
					$ -		
					$ -		
					$ -		
TOTAL					$ -		

"To the best of my knowledge the purchases of materials or services appearing on this sheet are not in conflict with Chapter 779 of the Acts of 1962. Signed under the penalty of perjury."

Mitchell L. LaClaire 12-16-13
Supervisor / Foreman — Date

Town Accounting Approval — Date 12/16/

HED-454 (R)

Janet Mancuso
Town of Gill
325 Main St
Gill, MA 01354

SONY

For Budget Planning

ACCESS A/V
AUDIO • VIDEO
SALES & INSTALLATIONS
8 Integra Drive • Concord, NH 03301
Phone: 603-224-2300 • Fax: 603-224-2308
www.accessavnh.com

Date: 12/13/2013

Qty.	Mfgr / Model #	Description	List:	Cost:	Ext. Cost
		Mobile Studio			
1	Sony AnyCast Touch AWS750	6 input SD/HD portable switcher, CG, Rec, PC in	$ 19,995.00	$ 15,995.00	$ 15,995.00
1	Gator G-MIX-L 1618A	padded carry bag for switcher	$ 150.00	$ 91.00	$ 91.00
1	Decimator 2	HDSDI to analog and HDMI converter	$ 495.00	$ 488.00	$ 488.00
3	Sony EVIH100S	HD PTZ camera	$ 10,289.00	$ 2,594.00	$ 7,782.00
2	Sony wall mount	camera wall mount	$ 298.00	$ 99.00	$ 198.00
1	Sony CPTIV48	Sony/Telemetrics camera controller	$ 1,199.00	$ 997.00	$ 997.00
3	Sony VISCA to cat5 adaptor	camera adaptor	$ 387.00	$ 97.00	$ 291.00
1	Davis and Sandford XG13	tripod for 3rd PTZ	$ 225.00	$ 179.00	$ 179.00
1	Custom Cable for PTZ	custom 25' cable and control for tripod PTZ	$ 239.00	$ 188.00	$ 188.00
1	Custom Wall Box for PTZ	BNC, and Visca wall box connections to PTZ on tripod	$ 389.00	$ 329.00	$ 329.00
1	Magnavox MDR535H/F7	DVD,/HDD Recorder	$ 399.00	$ 267.00	$ 267.00
1	JVC PROHD-4601	HDMI to SDI converter for existing camcorder (4th cam)	$ 265.00	$ 245.00	$ 245.00
1	Cables + Misc Supplies	Cables, wire mold + Misc Supplies	$ 788.00	$ 788.00	$ 788.00
1	Custom Design, Installation, tech support, loaner program + Training estimate		$ 2,970.00	$ 2,160.00	$ 2,160.00
		Optional			$ -
1	Chase Cam	composite/MPEG2 recorder for Playback Server			

Quotes good for 30 days
shipping not included
submitted by Robert Haigh

LIST: $ 38,088.00 COST: $ 29,998.00

Install Notes:

Mount 2 PTZs - wall paneling present - wire mold to DC
3rd Cam is PTZ on Tripod at stage
4th camera is existing Camcorder- may beed conversion for longer distances
Custom Wall plate at stage to accept 3rd PTZ camera to feed rear cable bundle- 25' HD Video / control / power
Walls are paneling...will need to go with short Wiremold up to ceiling
Has existing audio
All cables to terminate in color coded cable umbilical for AnyCast Inputs
Electrical for cameras to be install by town

Ray Purington/Gill Selectboard

From: Janet. Masucci [janetmasucci@gmail.com]
Sent: Monday, December 16, 2013 8:26 AM
To: Ray Purington/Gill Selectboard
Subject: Re: Gill Meeting Room AV

Yes, the quote does include $3,000 for installation and support. Tim from MCTV has been dealing with this co for years and says their support is very valuable.

Sent from my iPad

Janet Masucci
64 French King Highway
Gill, MA 01354

Www.JanetMasucci.com
413-863-8694

On Dec 16, 2013, at 8:16 AM, "Janet. Masucci" <janetmasucci@gmail.com> wrote:

> Ray,
> I have been in discussion with this company and gone to Concord twice to look at and discuss a system for Gill and they have finally sent me a quote for the equipment to do the job we have been discussing. Two PTZ cameras would be wall mounted and one on a tripod on the stage. They would be controlled robotically from the back of the room. The Anycaster will show all the images and let the operator select what goes into the feed, it's called "live editing". This piece of equipment is not just a switcher, it is a computer of sorts. You can make titles with it and load in PowerPoint presentations, images, such as reports and short B rolls (pre-recorded videos such as public service announcements, etc) and mix them in as you go, avoiding the need for any post production. If we also get the DVD recorder, it can record directly to DVD, meaning that you have a record of the meeting the minute the meeting is over.
> I believe that Robert can arrange for installation (except electrical), although I don't know if that is included in the quote. The Anycaster is on sale now, I was hoping we would get the quote in time. He seemed to like another system better, but it takes up more physical room and has many individual components and frankly, we would either have to build a small room for it or the set up time would be longer. I don't like the idea of moving each piece so many times.
> I am imagining that we would set this up on the desk at the back of the room, have the cables more or less in place most of the time, cameras on the wall permanently installed.
>
> If it is not too late, I would like to bring this to the SB meeting tonight.
>
> See ya real soon,
>
> Janet
>
> Sent from my iPad
>
> Janet Masucci
> 64 French King Highway
> Gill, MA 01354
>
> Www.JanetMasucci.com

413-863-8694

On Dec 16, 2013, at 6:56 AM, "Robert Haigh" <rbhaigh@comcast.net> wrote:

Hello Janet

Attached is a Budgetary quote based on the equipment we have discussed during your visits to our offices and by email. I do believe this equipment meets your objectives for portability and hi-definition cameras.

If you find this budget to be more than anticipated, we can discuss staying with good quality, standard-definition PTZ cameras and a SD switcher which will greatly reduce your costs but not be quite as portable.

Thanks for allowing Access A/V to play a role in your planning and I hope we can move forward with this project. Let me know how we can be of further assistance.

Best

Robert Haigh
Product & Facilities Specialist
Access A/V, LLC
8 Integra Drive
Concord, NH 03301

(603) 224-2300 / phone
(508) 572-2224 / cell

E-Mail: robert@accessavnh.com
WEB: www.accessavnh.com

<image001.gif>

<Gill AnyCast Portable 12-15-2013.xls>

Massachusetts Municipal Association
Annual Business Meeting
Saturday, January 25, 2014

Credential Vote Form

Note: Please fill out if you, as the eligible voting member, **cannot** attend the MMA Annual Business Meeting and wish to designate another person from your community to vote in your place.

__X__ I cannot attend the MMA Annual Business Meeting on Saturday, January 25, 2014.

Signature John R. Ward

Municipality Town of Gill

I authorize the following person to vote in my place:

Name Randy Crochier

Title Select board member

Please Return By January 10, 2014 To:
Victoria Sclafani
MMA
One Winthrop Square
Boston, MA 02110