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ENERGY AUDIT REPORT

I. Potential first year energy savings: $485.49 18%

The primary areas of opportunity for energy improvement are: Insulate the attic hatch; Insulate the basement bulkhead door; Insulate the hot water pipes; Install interior storm windows on all windows that currently don't have them; Add a heat retaining ventilation system, and seal all air leaks, signified by blue tape.

Projected savings are based on calculated energy losses, based on measurements and tests conducted during the energy audit. These values often differ from fuel usage, which, among other things, may reflect lifestyles and habits we have no way to reliably measure. Thermostat settings and setbacks may differ between heating zones, for example, or from the standard 68ºF indoor comfort temperature we use in calculations. also fuel use data do not account for the amount of fuel already purchased but not yet used at the time of the audit. we have no reliable way to determine the exact contents of oil or gas tanks, for example, yet the amounts can be significant.

Occupant questions, comments and complaints:

1. What is the Carbon footprint of the building? 14,126 CO2 lbs / year

II. Energy Use (per year)

All energy (including heat) is given in terms of kiloWatt-hours (kWh). This is a convenient unit, and does not imply that it is all electricity. 1 kiloWatt-hour is equal to 3412 British Thermal Units (BTU).

A. Primary heating:	Boiler (hot water)		Fuel: Oil		Price:	$2.80	
Used: 547	Gallons	Efficiency: 86%	kWh:	20,744.4	Cost:	$1,530	
D. Domestic Hot Water (estimated)			Fuel: Oil		Price:	$2.80	
Used: 36	Gallons	Efficiency: 90%	kWh:	1,382.1	Cost:	$102	
E. Electricity use:		price: $0.156	kWh:	2,096.5	Cost:	$328	
Total purchased energy:			kWh:	**24,223.0**	**Cost:**	**$1,960**	

F. Total Carbon Dioxide (CO_2) produced: **14,126** pounds per year.

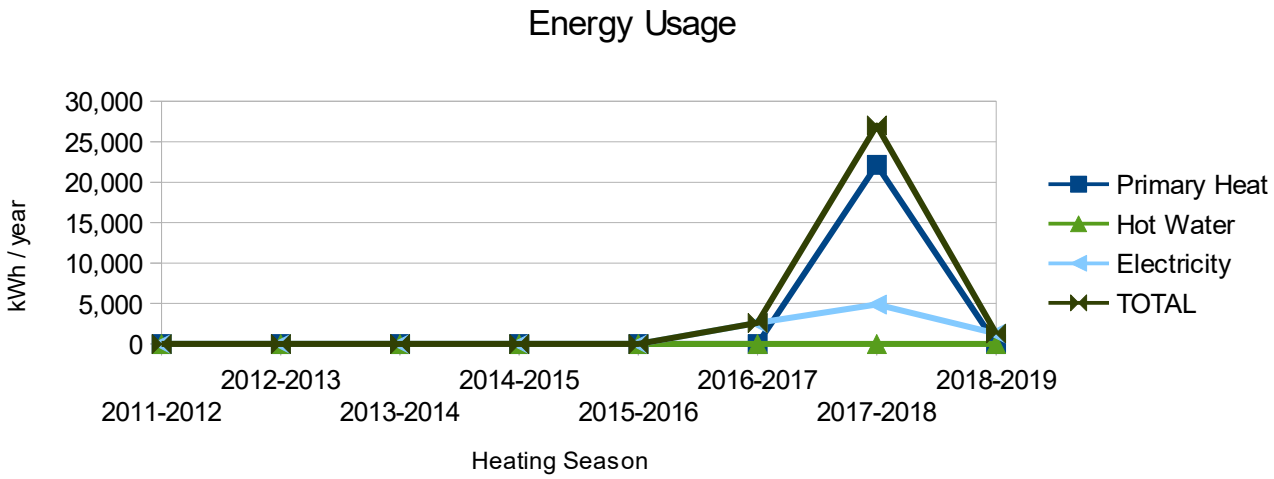
G. Improvement trends (change from previous year):

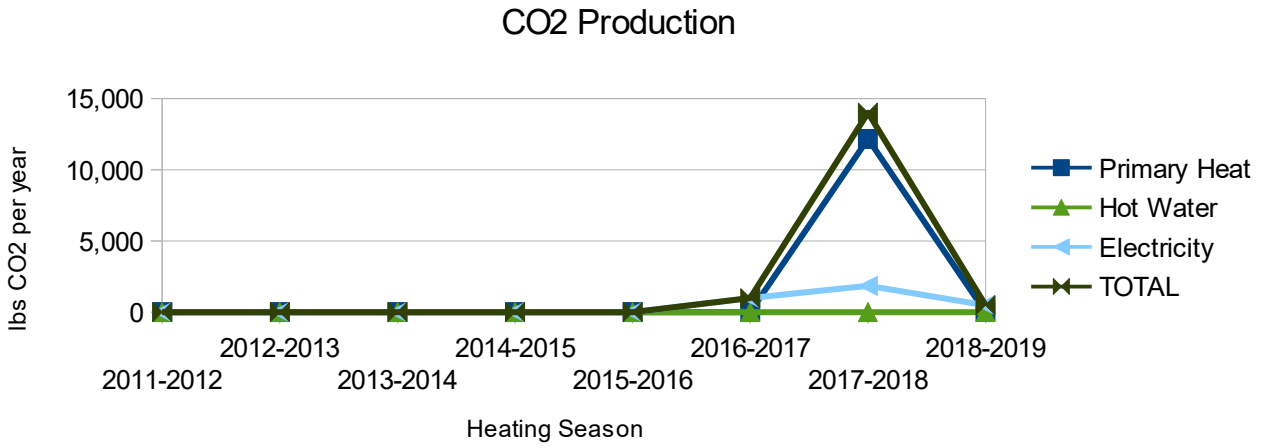
	Heating Energy:	**Total Energy**
Figures are adjusted for 2018-2019	100.0%	97.7%

weather (degree-days).

2017-2018	0.0%	0.0%

H. The chart below shows the heating fuel and other energy usage. While periodic fuel deliveries may produce spikes in the chart, you should be able to see if efforts you have been taking are having an effect on you fuel usage.





I. The building used 42% less fuel than the calculations predict. All numbers in the sections below reflect the calculated values.

J. Solar Energy:

1.	Active Thermal (solar heat panels)	0.0	kWh per year		
2.	Passive Thermal (windows)	2,822.5	kWh per year		
3.	Solar Electric (photovoltaic (PV))	463.0	kWh per year		
4.	Total Solar	3,285.6	kWh per year	7.5%	of all energy

K. Solar Availability: (percentage of sunshine not blocked by trees etc.)

a. Windows (South facing windows)

1.	January	85%	2.	February	87%	3.	March	82%	4.	April	84%
5.	May	71%	6.	June	63%	7.	July	60%	8.	August	58%
9.	September	57%	10.	October	73%	11.	November	83%	12.	December	85%

d. Solar Electricity (Photovoltaic panels)

	units	Existing	Rooftop	Ground	Farm
Number of Panels	panels	3	4	0	0
Percent of Current Usage	percent	22%	75%	0%	0%
Meet 100%, Grid-tie	panels	10	4		
Yearly Production	kWh/a	463	1581	0	0
Yearly kWh per Peak Watt	kWh/a/W(p)	1.235	1.235		
Cost per kWh (cash)	$/kWh		$0.068		
Simple Payback (cash)	years		11.4		
Cost per kWh (loan)	$/kWh		$0.082		
Time until Free (loan)	years		13.2	13.6	19.1

e. Time Until Free describes the time until paying off a loan of the total cost of the panels, where the monthly payment exactly matches current electric bill. In other words, as if you locked-in current electric prices, and after this many years, you now pay only the grid-tie minimum payment.

L. Comparisons based on energy use per degree-day.

7327 Degree days per year here (for Wiscasset, Maine).

1.	Your building currently uses:	**3.31**	kWh / Degree Day	
2.	With the improvements suggested:	2.67	kWh / Degree Day	81%
3.	Average of our audited houses	8.37	kWh / Degree Day	253%
4.	Energy efficient house	2.05	kWh / Degree Day	62%
5.	Passivhaus Standard	0.39	kWh / Degree Day	12%
6.	Prototype extremely efficient houses:	0.64	kWh / Degree Day	20%

M. Comparisons of Fuels

	Heater Type	Assumed Efficiency	Units	Price / Unit	Price / MBTU	Price / kWh	CO_2 lbs/ MBTU
3	Electric Resistance	98%	kWh	$0.16	$46.75	$0.16	258
5	Heat Pump electric	300%	kWh	$0.16	$15.27	$0.05	277
8	Oil Burner	85%	Gallons	$2.80	$25.43	$0.09	161
9	Propane Burner	90%	Gallons	$1.66	$21.88	$0.07	139
10	Solar PV, Heat Pump	300%	kWh	$0.068	$6.65	$0.02	9
11	Solar, PV	100%	kWh	$0.068	$19.94	$0.07	26
13	Wood Bricks Burner	80%	Pallets	$265.00	$21.79	$0.07	272
14	Wood Pellets, Stove	80%	Tons	$255.00	$19.92	$0.07	272
15	Wood, Hard, Stove	75%	Cords	$235.00	$12.53	$0.04	256

Note: Green CO_2 numbers reflect renewable carbon sources.

III. Heat Losses

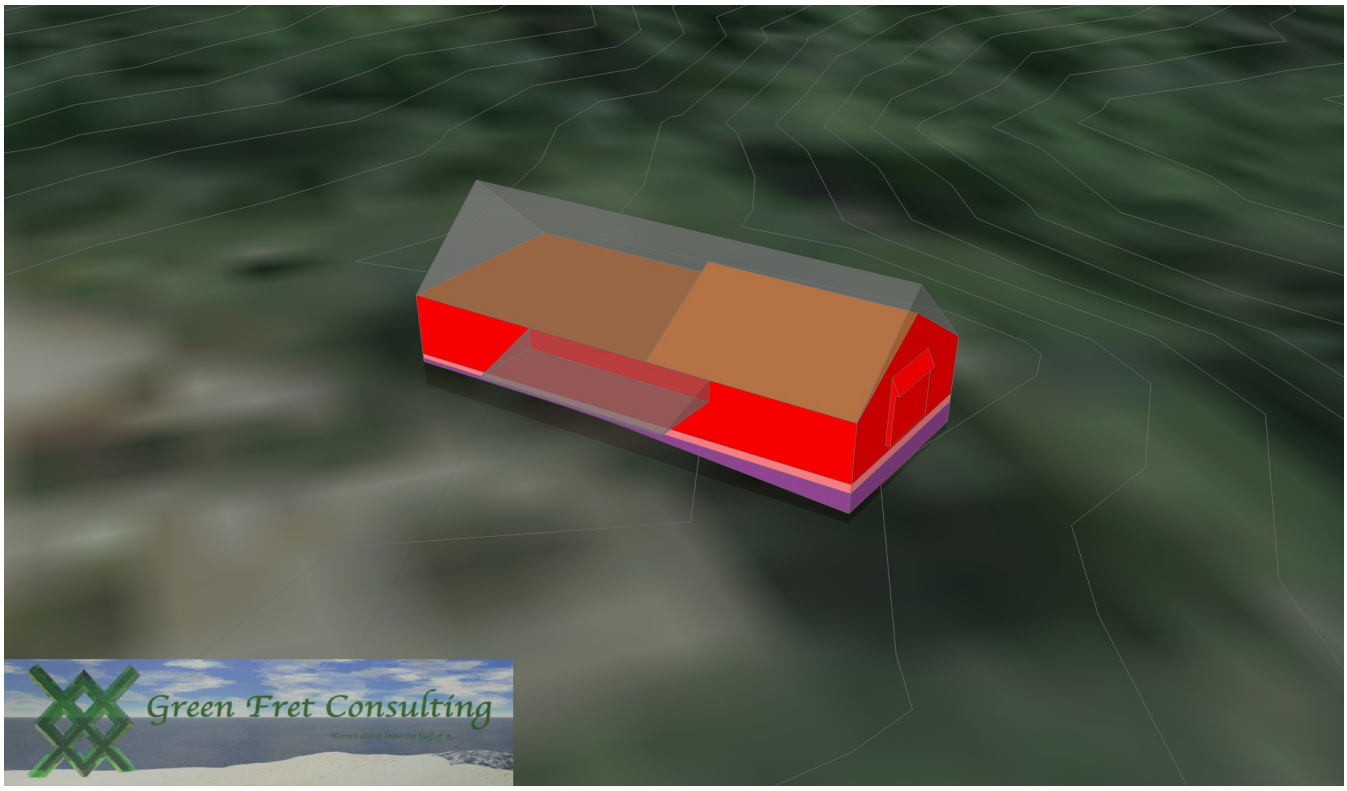
		kWh / year	% of total	Cost / year	Saving 1st yr
1.	**Walls**				
AA	Walls (Main)	6,657.9	18.3%	$491.02	$0.00
	Subtotal	**6,657.9**	**18.3%**	**$491.02**	**$0.00**

2. Attic & Roof

AF	Attic (Main)	3,536.7	9.7%	$260.83	$114.04
	Subtotal	**3,536.7**	**9.7%**	**$260.83**	**$114.04**
3.	**Basement**				
AL	Cellar Ceiling (Main)	2,795.2	7.7%	$206.14	$32.31
	Subtotal	**2,795.2**	**7.7%**	**$206.14**	**$32.31**
4.	**Utilities**				
BE	Pipes, Heating	663.3	1.8%	$48.92	$42.93
BF	Pipes, Hot Water	110.6	0.3%	$8.15	$7.16
	Subtotal	**773.9**	**2.1%**	**$57.07**	**$50.09**
5.	**Windows & Doors**				
BJ	Windows (South facing)	-118.9	-0.3%	-$8.77	$18.48
BK	Windows (other directions)	-275.2	-0.8%	-$20.29	$6.06
BM	Doors	262.6	0.7%	$19.37	$0.15
BN	Attic, Knee Wall Hatches	316.6	0.9%	$23.35	$19.19
BO	Bulkhead Door	1,488.5	4.1%	$109.78	$108.69
	Subtotal	**1,673.7**	**4.6%**	**$123.44**	**$152.57**
6.	**Air Leakage and Ventilation**				
BQ	Infiltration (Whole House)	4,591.0	12.6%	$338.58	$0.00
BR	Ventilation (Whole House)	16,428.2	45.1%	$1,211.57	$106.06
	Subtotal	**21,019.2**	**57.7%**	**$1,550.15**	**$106.06**
7.	**Total**	**36,456.6**	**100.0%**	**$2,688.65**	**$455.06**

Note: Negative numbers above indicate that heat gains through windows exceeds heat losses or changes due to improvements made elsewhere.

Note: Color codes above match the portion of the building in the model below.



IV. Infiltration Analysis:

A. Introduction

While buildings do not need to breathe, humans and pets do; and any combustion appliances also need a supply of fresh air. Established national safety guidelines for ventilation: In a leaky house there may be a sufficient fresh air supply, but because it is dependent on external factors such as weather, it may not be reliable, and a lot of heating energy is wasted. A tight house may require controlled mechanical ventilation which recovers the heat contained in the exhausted air and transfers it to the incoming stream of fresh air. Such a system both conserves energy and provides the requisite amount of fresh air.

B. Whole House

LBL Infiltration Factor 13.8

		50 Pascals (test)		Normal Pressure	
1.	Air changes per hour	3.3	ACH50	0.2	ACH(natural)
2.	Cubic feet per minute air flow	1,127.9	CFM50	81.9	CFM(natural)
3.	Equivalent leakage area: (CGBS)	90.3	square inches	**0.6**	square feet

4. Every square inch of this that you can plug for less than $26.23 is worth doing.

5. Air sealing opportunities of 0% are possible before supplemental ventilation is required to stay within Standard guidelines.

Building tightness limit: 1128 CFM50.

NOTE: The current levels of air leakage are not providing the recommended levels ventilation. Supplemental ventilation should be added before air sealing work is done.

Air changes per hour – ACH(natural) – gives an indication of how much of the air in the building is replaced with outside air every hour.

O. Seal air leaks. Air leaks were marked with removable blue painter's tape during the audit (Representative leaks are marked where many examples exist). In addition to the locations marked, the following should be addressed:

1 All penetrations of the attic ceiling, best done with expanding foam insulation.

2 The attic hatch should be made such that it closes firmly against the jamb, and then that gap should be weatherstripped.

3 The bulkhead door should be sealed. This entails weatherstripping on the door itself, improving the locking mechanism to ensure that it seals tightly against the weatherstripping, and then adding and sealing foam board insulation either at the top stair level or at the foundation wall.

4 Replace recessed lights with lights that can be sealed (either IC rated recessed lights or fixtures within the living space). Alternatively the lights can be insulated by making a box at least 3" inches away from the lights, and insulating and sealing that box.

5 All outlets and switches should have foam gaskets installed behind the wall plate. Childproof caps should be used in all outlets not currently in use; the leftover 'holes' from the gaskets can be inserted onto the childproof caps to make them more airtight.

P. Air sealing before ventilation is required: Safe reduction percentage: 0%

Savings: $0 For 7 years: $0 Per square inch: $26.23

Q. Air sealing with supplemental ventilation:

Savings: $106 For 7 years: $742 Per square inch: $26.23

R. Total:

Savings: $106 For 7 years: $742 Per square inch: $26.23

S. Recommended Ventilation:

We recommend a Heat Retaining Ventilator (HRV) or Energy Retaining Ventilator (ERV).

Mechanical ventilation should be considered in light of the anticipated level of infiltration, after fixes have been made. Minimum recommended ventilation for the purposes of fresh air is 375.0 CFM continuously.

V. Moisture Analysis:

A. Estimated equilibrium humidity:

Current	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Winter	
RH	75%	75%	45%	31%	21%	18%	18%	19%	24%	33%	47%	64%	24%	%
Dew	60	60	55	46	36	27	23	24	30	38	47	55	30	°F
Fixed	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Winter**	
RH	74%	74%	63%	44%	30%	21%	17%	18%	23%	32%	46%	63%	24%	%
Dew	60	60	55	46	36	26	21	23	29	37	46	55	29	°F

B. Wall sheathing below dew point; condensation in walls:

Air leakage through the walls of the building has the potential to deposit water in the wall cavity, which leads to mold, rot, and other problems. In the current state of the building, this can happen in the winter when the dew point of the interior air is above 30ºF, which equates to 24% Relative Humidity (RH) at the thermostat setting of 68ºF. Given the tested air leakage and the amount of water added into the building by daily activities, this can amount to 3.7 gallons per day.

After air sealing and other recommended fixes are made to the building. the situation will be altered, as additional insulation changes the dew point at which water condenses in the walls. In general, insulation on the exterior of surfaces increases the allowable dew point, while insulation inside the walls decreases it. Reducing the air leakage will reduce the potential amount of water. With the

recommended fixes, the maximum allowable dew point is 29.4ºF which translates to a Relative Humidity (RH) of 24% at the thermostat setting of 68ºF. Reducing the air leakage to what we think is an achievable level, the amount of water which might potentially condense in the walls would be reduced to 0.5 gallons per day.

Humidity levels in the building should be kept below the dew point indicated. Note that the relative humidity is the most common measure of humidity, however it varies with temperature, while the dew point does not. If the temperature of the building is different from the thermostat setting given above, the relevant relative humidity will also be different. If the humidity is excessive, it can be lowered by reducing the amount of water being put into the building, say, by reducing use of humidifiers; increasing ventilation of areas such as kitchens and bathrooms when humidity is being created in those and so on.

If humidity remains high, this indicates that it is time to install a heat retaining ventilator (HRV) or Energy Retaining Ventilator (ERV), to vent the humidity while retaining about 85% of the heat in outgoing air.

C. Other surfaces which may condense water:

Interior surfaces can also become so cold that they also condense water from the air. This leads to a similar set of problems as above, and can additionally cause the glass seals in multiple pane windows to fail prematurely.

In its current state, the building requires that the moisture in the house not increase to the point that the dew point exceeds 52ºF (57% relative humidity, at thermostat temperature 68ºF) to prevent condensation on any surface.

In its current state, the building requires that the moisture in the house not increase to the point that the dew point exceeds 58ºF (72% relative humidity, at thermostat temperature 68ºF) to prevent condensation on any surface.

D. Ventilation:

One method of controlling humidity levels is to increase the ventilation in the building. Since, ventilation is nearly the same thing as air leakage, and causes a similar loss of heat energy, we recommend a heat retaining ventilator, which will prevent 85% of that heat loss. These ventilation levels are not required to be additive, the maximum level, for current conditions, will satisfy all requirements.

Since there is currently no ventilation system in the building, humidity will need to be controlled by other means.

After fixes have been made, we recommend a minimum of 86 CFM of continuous ventilation, for the purpose of keeping the humidity below the levels specified above.

To maintain the humidity below the maximum desired level (50% Relative Humidity), the ventilation level should be kept at least at 0 CFM, for current building conditions, and after fixes have been accomplished, at 1 CFM.

In order to satisfy building science recommendations for fresh air, ventilation of 375.0 CFM is required.

NOTE: Due to the occasional high occupancy of the building we recommend a supplemental ventilation system in line with code requirements.

VI. Recommendations:

A. Recommendations with 7 Year Simple Payback

Our recommendations below are presented in order of logical progression and in what we predict will be a decreasing order of return on investment. We try to give as many recommendations as possible, with an eye toward achieving a maximally efficient building. Some recommendations may not currently meet the general guideline of the cost not exceeding 7 times the projected first year savings, but might in the future if fuel prices rise (or if the work is combined with other maintenance or renovations). All savings numbers are given in terms of a single year at fuel prices at the time of the audit (see 7 year savings by the largest amount. Some alternatives may also be given, obviously savings assume only one alternative is chosen.

0 Fix Systemic Issues.

• Fill missing insulation. Localized areas of missing insulation in the basement ceiling were identified during the audit, these should be filled with roxul or fiberglass insulation.

1 Add insulation to attic hatch.

The attic hatches should have 2-4" of foam board insulation affixed to the back or above it. Commercial ones are available if they can be made to fit, otherwise a custom build will work.

Savings,1st Year: $20 Break Even Price: $142 Per Square Foot: $26.66

2 Insulate the Basement bulkhead door.

The bulkhead door should be insulated with foam board, or spray foam.

Savings,1st Year: $115 Break Even Price: $806 Per Square Foot: $60.46

3 Insulate Hot Water hot water pipes.

We recommend at least 5/8" thick ozone friendly foam pipe insulation, sized to snugly fit the pipes on all pipes in unheated spaces.

Savings,1st Year: $9 Break Even Price: $150 Per Linear Foot: $7.51

4 Insulate Heating hot water pipes.

We recommend at least 5/8" thick ozone friendly foam pipe insulation, sized to snugly fit the pipes on all pipes in unheated spaces.

Savings,1st Year: $51 Break Even Price: $901 Per Linear Foot: $3.76

5 Install interior storm panels (Not South).

The non-southern windows will benefit from having interior storm panels installed. These are available finished, in kit form, or can be made at home from instructions on our website: http://www.midcoastgreencollaborative.org/storms.html

Savings,1st Year: $6 Break Even Price: $45 Per Square Foot: $1.03

6 Install interior storm panels (South).

The Southern windows will benefit from having interior storm panels installed. These are available finished, in kit form, or can be made at home from instructions on our website: http://www.midcoastgreencollaborative.org/storms.html

Savings,1st Year: $19 Break Even Price: $137 Per Square Foot: $5.76

7 Remove window screens for the winter.

Allow more solar heat in; also a good time to clean the windows. Also ensure that any exterior storm windows are closed tightly, and the windows are fully closed and locked.

Savings,1st Year: $1 Break Even Price: $1

8 Insulate the Main basement ceiling.

After sealing air leaks, add a vapor barrier against the warm side, and install insulation between the joists to fill the area where it is currently missing or failing. Roxul is a good insulation for this application.

Savings,1st Year: $34 Break Even Price: $599 Per Square Foot: $0.30

B. Additional Recommendations for Consideration (not included in total savings)

9 Add heat retaining ventilator (HRV), and continue air sealing.

Add supplemental ventilation, preferably a Heat Retaining Ventilator (HRV). This will allow further air sealing (see Air Sealing section) while both maintaining adequate fresh air for occupants and at the same time saving around 85% of the heat in the outgoing air.

Savings,1st Year: $112 Break Even Price: $1,965 Per Square Inch: $27.62

10 Further insulate the Main attic.

After the air sealing has been accomplished in the attic, insulation should be added to bring the total up to at least R-60 (roughly 20" total). Insulating the attic without properly air and vapor sealing it first, can exacerbate moisture issues, and actually make matter worse, so seal first then insulate.

Savings,1st Year: $119 Break Even Price: $2,101 Per Square Foot: $0.90

C. Simple Payback and Break Even Price

The First Year Savings multiplied by 7 years gives what is called the 7 year simple payback (with no fuel price inflation). It is one measure of whether the cost of a given investment is worthwhile.

The Break Even Price is another such measure. It computes the maximum that you can spend on a given investment and still pay less per month overall than you currently are paying. (i.e. mortgage or rent plus heating and cooling). This number assumes that you will take a loan, (or lose interest you could earn) at 3.0%, for a period of either the life expectancy of the item in question or 25 years (whichever is smaller). this assumes no fuel inflation. thus improvements which cost less than the break even point will provide positive cash flow immediately.

If consideration of fuel inflation is desired, then that rate ,as well as the time frame needs to be considered. For example, if inflation of heating fuel is predicted to be 7 percent, and the heating system will be replaced when the price of fuel doubles, which will be in 10 years, then the Break Even Price should be multiplied by the 1.48 factor from the table below to find the actual break even point.

Years	1%	2%	3%	4%	5%	6%	**7%**	8%	9%	10%
5	1.03	1.05	1.08	1.11	1.14	1.17	**1.20**	1.23	1.27	1.31
10	1.05	1.11	1.17	1.24	1.31	1.40	**1.48**	1.58	1.68	1.80
15	1.08	1.17	1.28	1.40	1.54	1.70	**1.88**	2.09	2.32	2.59
20	1.11	1.24	1.40	1.60	1.83	2.10	**2.43**	2.83	3.30	3.86
25	1.14	1.32	1.55	1.83	2.19	2.65	**3.21**	3.92	4.81	5.92
30	1.17	1.41	1.71	2.12	2.66	3.37	**4.31**	5.53	7.13	9.22

VII. Your Building

A. Heated living space

1. Floor Area: 2,070 Square feet
2. Volume: 20,700 Cubic Feet

B. Number of Occupants: 1

C. Number of Smokers: 0

D. Date of audit: Sunday, November 11, 2018 02:24 PM

E. Conditions at time of audit:

1. Indoor temperature:	70 ºF	2. Outdoor temperature:	50 ºF
3. Relative humidity:	62%	4. Dew Point:	56 ºF
5. Wind speed:	9 MPH	6. Barometric pressure:	29.66 inches of Hg.

F. Solar orientation of southern wall of building: 128° (52º off true South)

G. Orientation and slope of best solar roof: 128° (52º off true South) 45° Slope.

H. Surface area of building 6577.54 sq feet. **I.** Surface area of windows: 295 sq. feet

I. Ratio of window area to floor area (heated): 6.9%

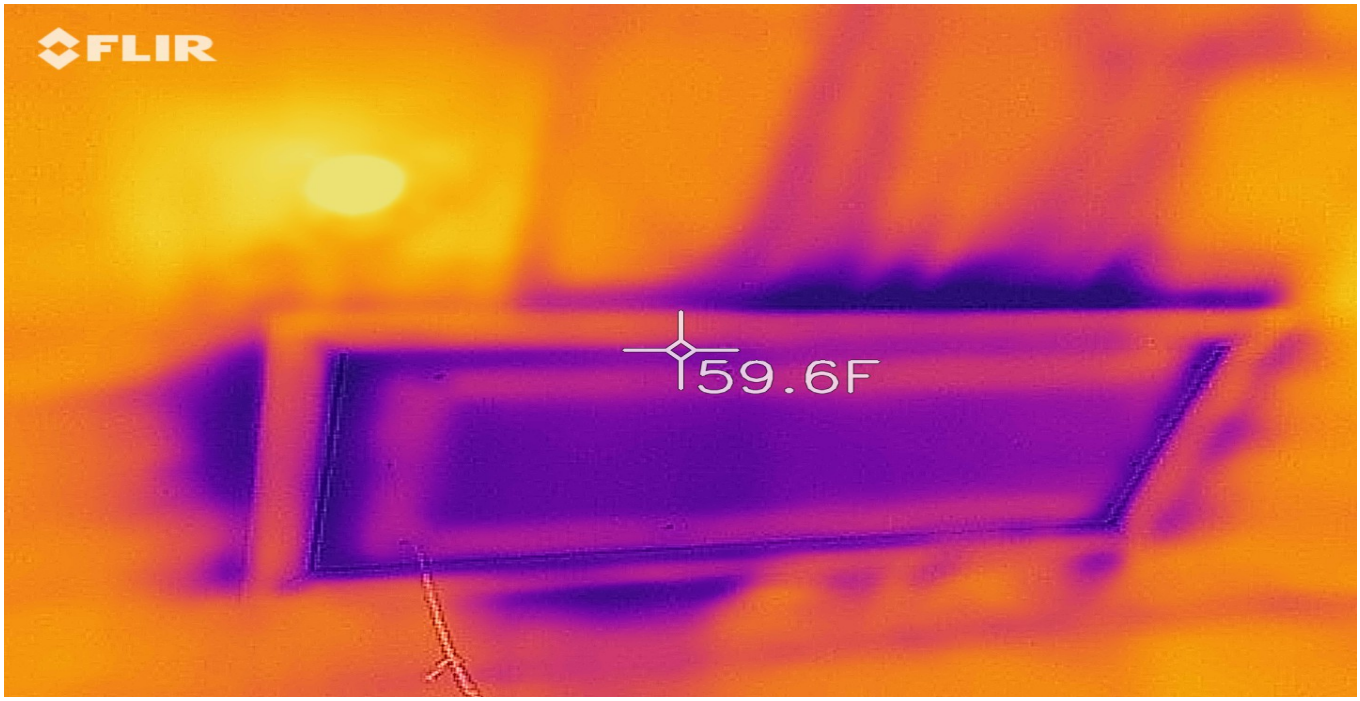
J. Ratio of South facing window area to floor area (heated): 2.1%

K. Building Shape Efficiency 84% **Building Volume Efficiency** 57%

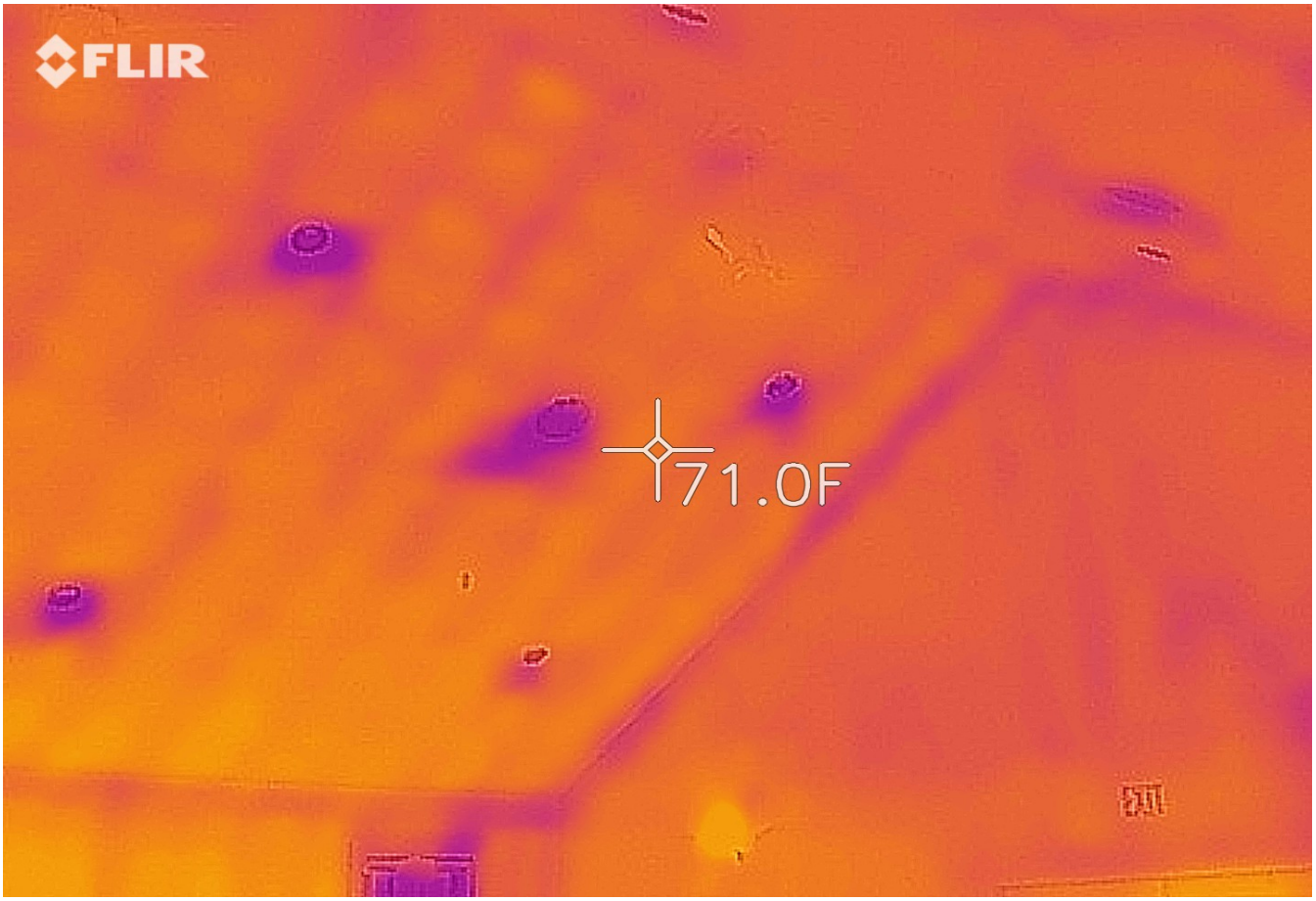
Shape efficiency refers to the fact that heat loss is related to surface area, and that different shapes have different wall surface areas, for a given floor area (i.e. usable square footage). Volume efficiency is similar but considers the usable volume rather than the usable square footage of the building, and thus adjusts for multiple floors. Both are taken as a percentage of a perfect cube.

L. Pictures

1. Insulation falling down from the basement ceiling. Return to place, or replace this insulation with Roxul. The vapor barrier should be against the warm surface, NOT as it is here, against the cold air.



2. Leaks around the attic hatch. Air is leaking not only between the hatch and the trim, but also where the trim meets the ceiling. Weatherstrip the hatch, and caulk the trim.



3. Air and heat leaking though the recessed can lights. Replace with surface mounted LED lights.

VIII. Heating and Cooling Profiles

These charts show when, as opposed to how much, energy is used to make the building comfortable. The numbers represent the predicted temperature inside the building on an average day in the month given (with heating, cooling, and open windows included in the calculation). The window option uses a simplistic rule, it doesn't look ahead to what the weather might be in a few hours (and so should not be used as a guide). This is a general, not specific, guide. The 'setback' at the front of a row indicates that thermostat energy savings are in effect.

A. Existing conditions

	TIME	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
setback	01:00	71.7	70.7	67.1	63.8	62.3	60.1	58.8	60.0	61.8	63.4	67.2	69.9	°F
setback	02:00	70.7	69.6	66.4	62.6	60.9	58.2	56.5	58.1	60.2	62.2	66.3	68.8	°F
setback	03:00	69.6	68.4	65.6	61.5	59.5	56.3	55.0	56.2	58.7	61.0	65.5	67.6	°F
setback	04:00	68.7	67.4	64.9	60.3	58.1	55.0	55.0	55.0	57.3	59.9	64.7	67.1	°F
setback	05:00	67.9	67.0	64.2	59.3	56.8	55.0	55.0	55.0	56.0	58.8	64.0	66.8	°F
setback	06:00	68.1	66.9	63.6	58.3	55.7	55.0	55.0	55.0	55.0	58.2	63.8	67.0	°F
setback	07:00	68.3	67.4	63.6	57.6	55.0	55.0	55.0	55.0	55.0	58.1	64.0	67.5	°F
setback	08:00	68.9	68.1	64.0	57.6	55.0	55.0	55.0	55.0	55.0	58.2	64.3	68.1	°F
setback	09:00	69.6	68.7	64.6	57.9	55.0	55.0	55.0	55.0	55.0	58.4	64.7	68.4	°F
	10:00	70.4	69.5	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	69.1	°F
	11:00	71.3	70.5	68.8	68.4	68.0	68.0	68.0	68.0	68.0	68.0	68.3	69.8	°F
	12:00	72.3	71.6	69.8	68.9	68.2	68.0	68.0	68.0	68.0	68.1	68.7	70.5	°F
	13:00	73.3	72.7	70.7	69.5	68.3	68.0	68.0	68.0	68.0	68.2	69.2	71.3	°F
	14:00	74.5	73.9	71.6	70.0	68.3	68.0	68.0	68.0	68.0	68.4	69.8	72.3	°F
	15:00	75.0	75.0	72.4	70.4	68.2	68.0	68.0	68.0	68.0	68.7	70.5	73.3	°F
	16:00	75.0	75.0	73.1	70.6	68.0	68.0	68.0	68.0	68.0	69.0	71.1	74.3	°F
	17:00	75.0	75.0	73.3	70.2	68.0	68.0	68.0	68.0	68.0	69.0	71.6	75.0	°F
	18:00	75.0	75.0	73.1	69.6	68.0	68.0	68.0	68.0	68.0	68.6	71.7	75.0	°F
	19:00	75.0	75.0	72.8	69.0	68.0	68.0	68.0	68.0	68.0	68.0	71.3	74.8	°F
	20:00	75.0	74.8	72.5	68.3	68.0	68.0	68.0	68.0	68.0	68.0	70.8	74.3	°F
	21:00	74.8	74.4	72.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	70.2	74.0	°F
setback	22:00	74.3	73.7	70.8	67.1	66.6	66.1	65.7	66.0	66.5	66.9	69.5	73.2	°F
setback	23:00	73.6	72.9	69.4	66.1	65.2	64.1	63.4	64.0	64.9	65.8	68.8	72.2	°F
setback	00:00	72.7	71.9	68.7	65.0	63.8	62.1	61.1	62.0	63.3	64.6	68.0	71.1	°F
	Average	**72.1**	**71.5**	**68.8**	**65.3**	**63.8**	**63.0**	**62.8**	**63.0**	**64**	**64.8**	**68.0**	**70.9**	

Legend: Red = Heating, Blue= Cooling, Green = Windows Open, Black = Normal.

Heating Set Point: 68 ºF Setback: 55 ºF Cooling Set Point: 75 ºF Setback: 99 ºF

Given the expected humidity levels, (see VI. A.) we recommend a setback temperature no lower than: 46.3ºF to avoid condensation issues.

The predicted energy saving for the given thermostat setbacks are: Heating 9.7% Cooling 0.0%.

B. After all recommended fixes are made.

	TIME	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
setback	01:00	72.1	71.2	68.6	65.2	63.7	62.0	61.0	61.9	63.3	64.6	68.1	70.1	°F
setback	02:00	71.2	70.2	68.0	64.3	62.6	60.5	59.2	60.4	62.1	63.6	67.4	69.1	°F
setback	03:00	70.2	69.1	67.4	63.4	61.5	59.0	57.4	58.9	60.9	62.7	66.8	68.1	°F
setback	04:00	69.3	68.2	66.7	62.5	60.4	57.6	55.7	57.4	59.8	61.8	66.1	67.1	°F
setback	05:00	68.6	67.3	66.2	61.6	59.4	56.2	55.0	56.0	58.7	60.9	65.6	66.9	°F

setback	06:00	68.4	67.3	65.6	60.8	58.4	55.0	55.0	55.0	57.6	60.4	65.4	67.1	°F
setback	07:00	68.5	67.7	65.7	60.2	57.5	55.0	55.0	55.0	57.2	60.3	65.6	67.5	°F
setback	08:00	68.9	68.3	66.0	60.2	57.0	55.0	55.0	55.0	57.1	60.4	65.9	68.1	°F
setback	09:00	69.5	68.8	66.5	60.4	57.0	55.0	55.0	55.0	57.1	60.6	66.2	68.4	°F
	10:00	70.2	69.5	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	69.0	°F
	11:00	71.0	70.3	68.8	68.5	68.2	68.0	68.0	68.0	68.0	68.1	68.3	69.6	°F
	12:00	71.9	71.3	69.6	69.0	68.5	68.0	68.0	68.0	68.0	68.2	68.7	70.2	°F
	13:00	72.7	72.2	70.5	69.6	68.7	68.0	68.0	68.0	68.1	68.5	69.2	70.9	°F
	14:00	73.7	73.2	71.3	70.1	68.9	68.0	68.0	68.0	68.1	68.7	69.7	71.8	°F
	15:00	74.8	74.2	72.0	70.5	68.9	68.0	68.0	68.0	68.2	69.0	70.3	72.6	°F
	16:00	75.0	75.0	72.6	70.8	68.5	68.0	68.0	68.0	68.1	69.3	70.9	73.4	°F
	17:00	75.0	75.0	72.8	70.5	68.0	68.0	68.0	68.0	68.0	69.4	71.3	74.0	°F
	18:00	75.0	75.0	72.7	70.1	68.0	68.0	68.0	68.0	68.0	69.1	71.3	74.3	°F
	19:00	75.0	75.0	72.5	69.6	68.0	68.0	68.0	68.0	68.0	68.5	71.1	74.1	°F
	20:00	75.0	74.8	72.3	69.0	68.0	68.0	68.0	68.0	68.0	68.0	70.7	73.8	°F
	21:00	74.8	74.5	71.9	68.4	68.0	68.0	68.0	68.0	68.0	68.0	70.3	73.6	°F
setback	22:00	74.4	73.9	70.9	67.7	67.0	66.5	66.3	66.5	66.9	67.2	69.8	72.9	°F
setback	23:00	73.8	73.1	69.7	67.0	65.9	65.1	64.5	65.0	65.7	66.4	69.3	72.1	°F
setback	00:00	73.0	72.2	69.2	66.1	64.8	63.6	62.8	63.5	64.5	65.5	68.7	71.1	°F
	Average	**72.2**	**71.6**	**69.4**	**66.4**	**64.8**	**63.6**	**63.2**	**63.6**	**64.5**	**65.7**	**68.5**	**70.7**	

Legend: Red = Heating, Blue= Cooling, Green = Windows Open, Black = Normal.

Heating Set Point: 68 ºF Setback: 55 ºF Cooling Set Point: 75 ºF Setback: 99 ºF

Given the expected humidity levels, (see VI. A.) we recommend a setback temperature no lower than: 38.9ºF to avoid condensation issues, once the recommended changes have been made. Or alternatively, an increase in ventilation during those setback times when the temperature is below our recommended level.

The predicted energy saving for the given thermostat setbacks are: Heating 7.8% Cooling 0.0%.

IX. Closing remarks

The focus of this energy audit is the thermal performance of the building envelope and some basic measures such as eliminating the wasteful use of electricity. It is possible to expand the scope of energy audits (as many do) to include other features and a much more time consuming (and costly) investigation. It is our conviction, based on experience, that simple improvements to the building envelope yield the best return on investment and that the potential benefits of the numerous “whistles and bells” with which the scope of an energy audit could be embellished would, at best, be marginal.

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