MGC Energy Audits
Midcoast Green Collaborative
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2.3.17

SAMPLE
Home
100 Main Street
Edgecomb, Maine 04556

Energy Audit Report

I. Potential first year energy savings: $2,849 85%

II. Your Building

A. Heated living space

1. Floor Area: 2925 Square feet
2. Volume: 23400 Cubic Feet

B. Number of Occupants: 4
C. Number of Smokers: 0
D. Date of audit: Tuesday, October 26, 2010 05:37 PM
E. Conditions at time of audit:

1. Indoor temperature: 68 ºF
2. Outdoor temperature: 32 ºF
3. Relative humidity 31 %
4. Dew Point 36 ºF
5. Wind speed 5 MPH
6. Barometric pressure 30.00 inches of Hg.

F Solar orientation of southern wall of building: 180 degrees. 0 degrees off true.
G Surface area of building 6210 square feet. **G. Surface area of windows:** 417 sq. feet
H. Ratio of window area to floor area (heated): 8.52%
I. Ratio of South facing window area to floor area (heated): 3.15%
J. Building Shape Efficiency 69.8% **Building Volume Efficiency** 28.8%

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. Both are taken as a percentage of a perfect cube.

III. Energy Use (per year)

A. Primary heating: Furnace (hot air) Fuel: Oil Price: $2.70
Used: 1083 Gallons Efficiency: 85.0% BTUs: 150,592,600 Cost: **$2,925.18**
B. Secondary heating: Boiler (hot water) Fuel: Softwood Price: $150.00
Used: 3.9 Cords Efficiency: 75.0% BTUs: 58,500,000 Cost: **$585.00**
C. Tertiary heating: Heat Pump, water Fuel: Electricity Price: $0.16

Used: 0.0 kWh Efficiency: 98.0% BTUs: 0 Cost: **$0.00**

D. Domestic Hot Water (estimated) Fuel: Natural Gas Price: $1.47

Used: 162.0 Therms Efficiency: 85.0% BTUs: 16,200,000 Cost: **$237.98**

E. Electricity use: 13416.5 kWh BTUs: 45,777,098 Cost: **$2,119.81**

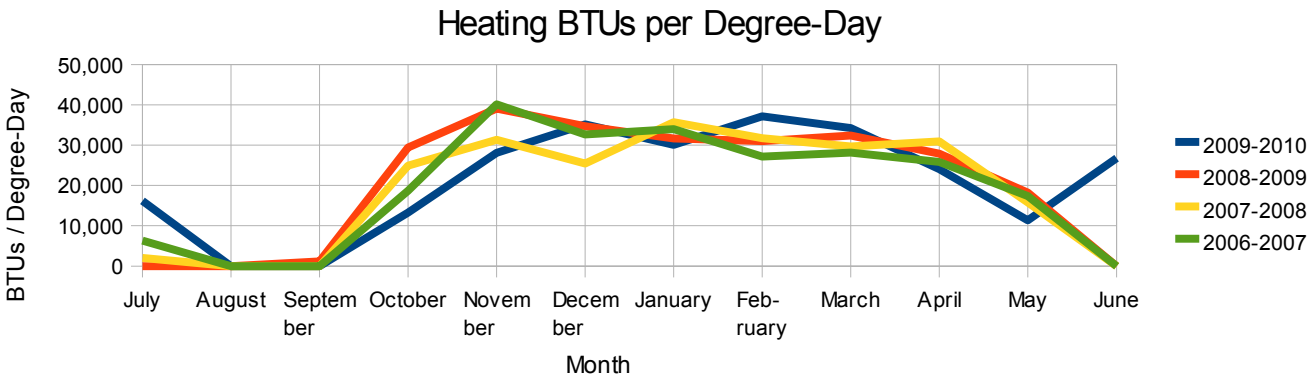
Total purchased energy: BTUs: 271,069,698 Cost: **$5,867.97**

F. Total Carbon Dioxide (CO_2) produced: **51,750** pounds per year.

G. Improvement trends (change from previous year):

Figures are adjusted for weather (degree-days).

	Heating Energy:	Total Energy
2009-2010	6.4%	-8.2%
2008-2009	-7.1%	5.6%
2007-2008	-0.6%	2.5%



H. This chart shows the heating fuel usage after adjusting for varying weather conditions. While periodic fuel deliveries will 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 3% more 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 BTU per year		
2.	Passive Thermal (windows)	9,937,528 BTU per year		
3.	Solar Electric (photovoltaic (PV))	0 BTU per year	0	kWh / year
4.	Total Solar	9,937,528 BTU per year	4.8%	of all energy

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

a. Windows (South facing windows)

1. January	73%	2. February	77%	3. March	77%	4. April	82%
5. May	81%	6. June	78%	7. July	78%	8. August	80%
9. September	68%	10. October	72%	11. November	73%	12. December	74%

L. Comparisons based on energy use per climatic need.

7494 Degree days per year here (for Wiscasset, Maine).

1.	Your building currently uses:	36,172	BTU / Degree Day
2.	With the improvements suggested:	4,801	BTU / Degree Day
3.	Average of our audited houses	28,572	BTU / Degree Day
4.	Energy efficient house	7,000	BTU / Degree Day

5.	Passivhaus Standard	1,856	BTU / Degree Day
6.	Prototype extremely efficient houses:	2,200	BTU / Degree Day

IV. Heat Losses

		BTU / year	% of total	Cost / year	Savings, 1st year
1.	**Walls**				
A	Walls, Main	7,812,899	3.9%	$131.16	$73.36
B	Walls, Addition	4,858,247	2.4%	$81.56	$0.00
C	Walls, Family Room	2,662,973	1.3%	$44.71	$0.00
	Subtotal	15,334,120	7.7%	$257.42	$73.36
2.	**Attic & Roof**				
F	Attic, Main	14,065,599	7.1%	$236.13	$177.38
G	Attic, Addition	3,062,234	1.5%	$51.41	$35.58
H	Attic, Family Room	2,693,088	1.4%	$45.21	$23.30
	Subtotal	19,820,921	9.9%	$332.75	$236.26
3.	**Basement**				
M	Basement Ceiling, Addition	20,421,547	10.2%	$342.83	$309.87
O	Foundation, exposed, Main	9,265,268	4.6%	$155.54	$143.51
R	Foundation, buried, Main	9,514,264	4.8%	$159.72	$158.62
U	Slab, Main	25,447,025	12.8%	$427.20	$384.96
W	Slab, Family Room	18,984,968	9.5%	$318.71	$305.81
	Subtotal	39,201,079	19.7%	$658.10	$611.99
4.	**Utilities**				
ZA	Pipes,	1,890,584	0.9%	$31.74	$27.85
ZC	Ducts,	14,447,385	7.3%	$242.54	$210.45
	Subtotal	16,337,969	8.2%	$274.28	$238.30
5.	**Windows & Doors**				
ZE	Windows (South facing)	1,309,888	0.7%	$21.99	$61.03
ZF	Windows (other directions)	6,183,840	3.1%	$103.81	$75.22
ZG	Skylights	1,579,040	0.8%	$26.51	$14.40
ZH	Doors	709,476	0.4%	$11.91	$2.07
	Subtotal	9,782,243	4.9%	$164.22	$152.72
6.	**Air Leakage and Ventilation**				
ZI	Infiltration	54,351,167	27.3%	$912.43	$464.16
ZJ	Ventilation				$381.03
	Subtotal	54,351,167	27.3%	$912.43	$845.19
H.	**Total**	**199,259,492**	**100.0%**	**$3,345.10**	**$2,848.59**

Note: Negative numbers above indicate that heat gains through windows exceeds heat losses.

V. Infiltration Analysis:

LBL Infiltration Factor 13.8

A. Air changes per hour at 50 pascals of pressure: 9.8 ACH50

B. Cubic feet per minute air flow through blower door 3,826 CFM50

C. Natural air exchanges per hour 0.71 ACH(natural)

D. Natural air flow (Cubic feet per minute) 277.8 CFM(natural)

E. Air sealing opportunities before supplemental ventilation is needed (to stay within ASHRAE Standard guidelines) **51%**

F. Equivalent leakage area: 343.6 square inches 2.4 square feet (CGBS)

G. Every square inch of this that you can plug for less than $18.59 is worth doing.

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

1 The area surrounding the chimney should be sealed whenever it passes through a surface (floor or ceiling). High temperature materials are required.

2 Where the balloon framed walls meet the attic, the gap should be sealed. A plastic bag stuffed with insulation makes a good cap.

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

4 All penetrations of the basement ceiling, best done with expanding foam insulation.

5 The gaps between floorboards, above basement, should be sealed. This can be done from below, and possibly as part of insulating the basement ceiling.

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

7 The area above the suspended ceiling has leaks, the panels should be removed temporarily and the space above made into the limit of the heating envelope (i.e. where the air, vapor and temperature barriers begin).

8 Remove the pulleys, and fill the space where the weights were with low expanding foam insulation. The space can be accessed by removing the parting strip. See our website for details.

9 Plug up any unused (either temporarily or permanently) chimneys or fireplaces.

10 Seal any gaps above the inside of the closet doors.

11 Seal all leaks in the space between floors, around the perimeter of the building. This can be done by either filling the entire space between floors with an air tight insulation, or doing so only at the wall with methods such as the bag trick (see our website).

12 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.

13 All intersections between dissimilar materials (for examples brick and wood) should be sealed with caulk.

14 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.

15 External doors, including the basement and attic doors, should be weatherstripped, and ensure that the close tightly against that weatherstrip.

16 Windows should be weatherstripped. All window should close and lock firmly against the weatherstrip.

Savings: **$464** For 7 years: **$3,249** Per square inch: **$18.59**

I. Recommended Ventilation: Unlikely needed, Unbalanced only

Until sealing is done, no decision should be made on the need for mechanical ventilation.

VI. Recommendations:

A. 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 seven (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 above).

1 **Fix Issues.**
• Plug any leaks of water into the basement.
Savings: **unknown**

2 **Winterize building when empty.** When the building is left for a period of more than a week, it should be shut down, and winterized (drain or add antifreeze to heating system, drain water pipes, etc).
Savings: **$17** per day shut down. (this will encompass much of the savings below.)

3 **Lower Water Temperature**. Lower the the temperature of the hot water heater to 120ºF.
Savings: **$30**

4 **Remove window screens in the winter.**
Savings: **$41**

5 **Seal air leaks.** Air leaks should be addressed before most other issues because they require access to areas which will be covered once the other fixes are made. See the Section V. H. for locations of places for improvement.
Savings: **$464** For 7 years: **$3,249** Per square inch: **$18.59**

6 **Insulate hot water pipes in the basement.** We recommend at least 5/8" thick ozone friendly foam pipe insulation, sized to snugly fit the pipes.
Savings: **$28** For 7 years: **$195** Per linear foot: **$0.93**

7 **Insulate basement ceiling**. After air sealing is done, and a vapor barrier added against the bottom of the floor above. Insulation should be added to fill the area between the joists.
Savings: **$310** For 7 years: **$2,169** Per square foot: **$7.23**

8 **Further insulate the attic.** After the air sealing has been accomplished in the attic, a vapor barrier should be added, and then insulation added to bring the total up to at least 20" (R-60). 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: **$236** For 7 years: **$1,654** Per square foot: **$0.86**

9 **Install interior storm windows.** The windows and sky lights 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: **$153** For 7 years: **$1,069** Per square foot: **$2.57**

10 **Insulate exterior walls.** The uninsulated walls should have cellulose insulation blown into them either from the outside or inside (which ever is more convenient).
Savings: **$73** For 7 years: **$514** Per square foot: **$0.72**

11 **Continue air sealing and add heat retaining ventilator (HRV).** Air sealing beyond the amount recommended above will necessitate adding fresh air. This is an opportunity to use an HRV to supply that air while maintaining 85% of the heat in it.

Savings: **$381** For 7 years: **$2,667** Per square inch **$18.59**

VII. Additional Recommendations

A. These recommendations may not meet seven year payback, however they can be worth doing if, for instance, work is already being done in the area, for comfort reasons, or for ethical or environmental considerations.

1. If air sealing is done such that the 51% figure is exceeded then in order to ensure continued healthy indoor air an HRV is likely to be required to bring in fresh air while retaining up to 85% of the heat in the outgoing air.
2. All surfaces which are insulated should have a vapor barrier on the inside (warm side). For existing installations, the easiest way to do this is to use a vapor barrier paint on the surface (e.g. BIN).
3. The exterior walls could have insulation added. If other renovation is being done, such as residing, or removal of interior wall surfaces, extra insulation should be added to the walls.
4. Whenever insulation is being put into a previous empty cavity ensure that there is no exposed or knob and tube wiring. This could be a fire hazard.

VIII. General Recommendations

Materials

Caulk: For best performance select a caulk based on expected lifetime; 25-30 year caulk is available. At the moment, our recommendations are that silicone (non-paintable, so choose an appropriate color, or clear) or siliconized acrylic latex (paintable) are the best ready available options. Caulk should be be worked in with a tool or finger to ensure a good bond and proper shape and appearance.

Backer Rod: For spaces where caulk is needed, and the gap exceeds 1/4", backer rod is recommended. This is a foam rod which is used to fill the space, to reduce the amount of caulk required and to ensure that it forms the proper profile.

Foam Sealant: For holes which will see no movement between the various components, expanding foam sealant is often the best option. The proper amount of expansion can be purchased depending on the job; low expansion for doors and windows (to avoid warping the frame and impeding closure), Large expansion for big holes, and normal for the rest. The stuff is sticky beyond measure, and care, gloves, safety glasses and old clothes are recommended. It also helps to identify sufficient areas which need fixing in order that an entire can is used all at once; it does not keep, as the straw gets filled with hardened product. Great Stuff® and Pūr® are two brands.

Plastic Sheeting: For vapor barriers, 6 mil Polyethylene sheets are sufficient. For spaces (such as crawl spaces) which may see hard use or foot traffic thicker, and protection with something hard such as planks, is recommended.

A. Windows

1. In the Fall, clean your windows, and all surfaces where they meet.

2. In the Fall, remove all screens, and air conditioners. They reduce the passive solar gains by as much as 30% for screens and 100% for air conditioners.
3. Close all windows and lock them shut, when you turn on your furnace.
4. Keep basement windows closed at all times, except when the basement is wet and the weather is very dry (dew point below 50°).

B. Doors

1. Weatherstrip all doors (including the door to the basement and the hatch to the attic).
2. Install storm doors on doors without them.
3. Cover doors unused in the winter with insulation or heat shrink plastic.
4. Bulkhead doors are huge energy losers. They leak air, and heat. Seal them tight, and insulate.

C. Electric Usage

1. Replace all incandescent bulbs with compact fluorescent bulbs. They are available in large and small versions, flood lamps, 3 way, dim-able, or almost anything you need. They have a return on investment of around 300%
2. Eliminate or reduce phantom appliance loads. Standby-mode, plug-in transformers use electricity even when the appliance is "off".
3. Turn off computers when not in use. Set the energy saving "power options" to suit your needs.
4. Put any plug containing a transformer (heavy cubical plugs) on a power strip, and switch it off, or unplug them when not in use.
5. Clean out dryer vents regularly to ensure that they close when not in use.
6. Post a graph or list of monthly electrical usage where all users of the building can see it.

D. Heat Energy Usage

1. Maintaining and,if need be, replacing heating systems can yield up to ~15% equipment-efficiency improvement. We encourage our clients to have their heating equipment inspected at least annually and maintained by a qualified HVAC technician who can also offer advice about any improvements to those systems. An annual boiler or furnace inspection should include a simple system efficiency test, the results of which should be posted on a tag or label near the equipment.
2. Get your chimney examined and cleaned every year.
3. Set the thermostat down several degrees while you sleep and when you are away or or install a programmable thermostat that will do this for you. You can save up to 2% of your heating energy for every degree of setback. Recommended setback for your house is: 58ºF
4. Replace the filter on you furnace at least every few months. Clean the fuel filter on your furnace or boiler regularly (as per manufacturer's instructions)

E. Cooling Energy Usage

1. When the outside air is warmer than the desired inside temperature, close all the windows. When the temperature inside is too warm and the outside is cooler, open some windows. Open windows, low on the windward side of the building for incoming air, and windows high on the leeward side of the building for outgoing air. Open twice as much window area for incoming air as outgoing air.
2. Turn off all unneeded electrical appliances. (see electrical usage suggestions).
3. Use fans aimed at human bodies to promote evaporate cooling. Don't leave fans running in unoccupied rooms (it will make them hotter).

4. Reduce activities which produce steam, showering, cooking, etc. Use covers on pots.
5. Ceiling fans should be set to direct air downward (in summer; in winter, the opposite).
6. Use the microwave instead of the stove when possible.
7. Put air conditioner in a shaded (north) window, and only run it with all windows shut.

F. Hot Water Energy Usage:

1. Reduce the tank temperature to 120ºF. Savings: $30
2. Close the tub-drain while showering; drain the water only after it has cooled; the still warm water will help heat your building (cool weather only of course).
3. Wrap your tank water heater in insulation. A kit is often available for the asking from your utility. Also available at the hardware store.
4. Wash clothes in **cold** water. With proper detergents, clothes will get just as clean.
5. Regularly check (or have checked) the sacrificial anode rod in your hot water tank, and replace it if needed
6. Regularly release a bucket or so of water from the bottom of your water tank, to clean out sediment which settles there. Let it cool down before dumping it.
7. Reduce the use of hot water.

G. Water Usage: (Pumps are large users of electricity, so this is energy (and money) as well).

1. Turn off water while shaving, brushing teeth, etc.
2. Avoid using a garbage disposal. They significantly reduce the life of your septic tank and leach field. Compost your kitchen waste instead.
3. Consider a composting toilet, or at least a low volume toilet, to conserve water. Flush toilets are the biggest water wasters in most buildings.

H. Composting and Recycling

1. You will save energy because recycled materials take less energy to make than new.
2. You will save energy because less waste will have to be trucked away.
3. You will save tax money because it costs over $90 per ton to process solid waste.
4. You will save on oil based fertilizers when using compost in the garden.

IX. Heating and Cooling Profiles

A. Existing conditions

	TIME	Jul	Aug	Sep	Oct	Nov	Dec	**Jan**	Feb	Mar	Apr	May	Jun	
setback	01:00	67.1	67.0	66.0	64.5	63.6	62.2	61.4	61.9	63.0	64.2	65.4	66.5	°F
setback	02:00	66.3	65.9	64.1	61.3	60.0	60.0	60.0	60.0	60.0	60.8	62.9	65.0	°F
setback	03:00	65.4	64.9	62.3	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.6	63.6	°F
setback	04:00	64.6	63.9	60.7	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	62.3	°F
setback	05:00	64.1	63.1	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	61.4	°F
setback	06:00	64.1	62.8	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	61.1	°F
	07:00	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	°F
	08:00	68.3	68.1	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	°F
	09:00	68.9	68.5	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	°F
	10:00	69.9	69.3	68.1	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.3	°F
	11:00	71.0	70.4	68.2	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.8	°F
	12:00	72.0	71.6	68.7	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	69.5	°F
	13:00	72.0	72.0	69.4	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	70.5	°F

	14:00	72.0	72.0	70.3	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.2	71.5	°F
	15:00	72.0	72.0	71.1	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.3	72.0	°F
	16:00	72.0	72.0	71.6	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.2	72.0	°F
	17:00	72.0	72.0	71.6	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.1	72.0	°F
	18:00	72.0	72.0	71.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	72.0	°F
	19:00	72.0	72.0	70.2	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	71.9	°F
	20:00	72.0	72.0	69.3	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	71.3	°F
	21:00	71.9	71.6	68.1	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	70.4	°F
	22:00	71.5	70.9	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	69.2	°F
setback	23:00	70.7	69.9	66.6	65.2	64.1	62.8	62.0	62.5	63.5	64.8	65.9	67.9	°F
setback	00:00	69.6	68.7	65.0	62.4	60.5	60.0	60.0	60.0	60.0	61.7	63.8	66.7	°F
	Average	**69.6**	**69.2**	**67.3**	**65.9**	**65.7**	**65.5**	**65.5**	**65.5**	**65.6**	**65.8**	**66.1**	**68.2**	

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

Heating Set Point: 68 ºF Setback: 60 ºF Cooling Set Point 72 ºF Setback: 78 ºF

B. After making recommended changes.

	TIME	Jul	Aug	Sep	Oct	Nov	Dec	**Jan**	Feb	Mar	Apr	May	Jun	
setback	01:00	67.6	67.6	67.3	66.7	66.4	65.9	65.6	65.8	66.2	66.6	67.0	67.5	°F
setback	02:00	67.3	67.2	66.5	65.5	64.8	63.9	63.3	63.6	64.4	65.3	66.1	66.9	°F
setback	03:00	66.9	66.8	65.8	64.3	63.3	61.9	61.1	61.6	62.7	64.0	65.1	66.3	°F
setback	04:00	66.6	66.4	65.0	63.1	61.9	60.0	58.9	59.6	61.0	62.7	64.2	65.7	°F
setback	05:00	66.3	66.0	64.4	61.9	60.5	58.3	58.0	58.0	59.5	61.5	63.4	65.3	°F
setback	06:00	66.6	65.9	63.7	60.9	59.2	58.0	58.0	58.0	58.0	60.7	63.1	65.4	°F
setback	07:00	67.0	66.2	63.7	60.1	58.0	58.0	58.0	58.0	58.0	60.3	63.1	65.7	°F
setback	08:00	67.7	66.8	64.1	60.0	58.0	58.0	58.0	58.0	58.0	60.2	63.2	66.2	°F
setback	09:00	68.5	67.7	64.8	60.5	58.0	58.0	58.0	58.0	58.0	60.4	63.6	66.8	°F
setback	10:00	69.5	68.7	65.7	61.1	58.4	58.0	58.0	58.0	58.3	60.7	64.2	67.6	°F
setback	11:00	70.5	69.8	66.7	61.9	58.9	58.1	58.0	58.2	58.6	61.2	64.7	68.4	°F
setback	12:00	71.6	70.9	67.7	62.7	59.5	58.2	58.0	58.4	58.9	61.6	65.3	69.2	°F
setback	13:00	72.7	72.1	68.8	63.6	60.1	58.4	58.1	58.8	59.3	62.2	66.1	70.1	°F
setback	14:00	73.9	73.3	69.8	64.5	60.7	58.6	58.2	59.1	59.8	62.8	66.8	71.1	°F
setback	15:00	75.0	74.4	70.8	65.3	61.1	58.5	58.1	59.3	60.2	63.4	67.6	72.1	°F
setback	16:00	75.9	75.3	71.5	65.7	60.9	58.0	58.0	59.1	60.4	63.7	68.2	72.9	°F
	17:00	76.7	76.0	71.7	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.4	73.6	°F
	18:00	77.3	76.2	71.4	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.4	74.0	°F
	19:00	77.2	76.0	71.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	73.9	°F
	20:00	77.0	75.7	70.5	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	73.4	°F
	21:00	76.6	75.3	69.8	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	72.8	°F
	22:00	76.0	74.6	69.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	72.1	°F
setback	23:00	75.3	73.8	68.0	67.0	66.6	66.1	65.9	66.0	66.4	66.8	67.3	71.2	°F
setback	00:00	74.4	72.9	67.4	65.9	65.2	64.3	63.7	64.0	64.8	65.6	66.4	70.2	°F
	Average	**71.8**	**71.1**	**67.7**	**64.5**	**62.9**	**62.0**	**61.8**	**62.1**	**62.5**	**64.1**	**66.0**	**69.5**	

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

Heating Set Point: 68 ºF Setback: 58 ºF Cooling Set Point 78 ºF Setback: 78 ºF

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. This is a general, not specific, guide. The setback at the front of a row indicates that thermostat energy savings are in effect.

X. Closing remarks

The focus of this energy audit is the thermal performance of the building envelope and some basic, common sense measures 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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