Energy Efficiency Checklist for Congregations

Using the Energy Efficiency Checklist:

Use this checklist to help identify areas of energy loss and to create a plan for energy efficiency upgrades. Post the checklist in a public spot to share your progress with your congregation.

The checklist focuses on the most common areas for energy loss and potential energy savings. Each category is divided into sections which reflect general cost and effort required for the efficiency measure; beginning with low cost/ least effort and escalating to high cost/most effort. This format will help your faith community prioritize efficiency measures. For instance, if your congregation hasn't made any upgrades, begin with the low cost/least effort items (e.g. installing programmable thermostats) instead of drastic high cost items (e.g. installing a new furnace).

In the checklist you'll see references to useful calculations used to help gauge energy use. These calculations are simple and helpful but are not required for using the checklist and are certainly not required for making energy efficiency upgrades. If you would like to use the calculations they are presented and explained in the appendix of this document.

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HEATING/COOLING SYSTEM						
	Assessment			**Action**		
Low or No Cost/ Least Effort	Is someone responsible for turning down heat when not in use? That is, are thermostats monitored?	❑ yes	❑ no	If **no**, assign someone the responsibility to monitor or post a notice with instructions about appropriate settings with a schedule. Better yet install a programmable thermostat (see below)	❑ done	*Notes*
	Are heating outlets (e.g., radiators, air intakes, and air diffusers) clear of obstacles?	❑ yes	❑ no	If **no**, clear away obstructions (furniture, etc.) from heating outlets	❑ done	
	If your building has ceiling fans, are they being used for heating and cooling purposes?	❑ yes	❑ no	If **no**, use the existing ceiling fans in the winter months to help prevent heat stratification (heat gathered in ceiling area) and in summer for cooling. Assign someone the responsibility for ensuring consistent use. (Remember to reverse fan in the winter months to pull warm air down).	❑ done	
	Is the building being opened frequently for small groups?	❑ yes	❑ no	If **yes**, limit building hours (and heat use) by consolidating meeting dates (specify days of the week for such meetings).	❑ done	
Low or No Cost/ Some Effort	Are the HVAC air filters clean? (NOTE: you may need to consult w/ a technician to determine this)	❑ yes	❑ no	If **no**, replace or clean HVAC air filters quarterly or monthly during peak heating/cooling months (ask your technician or see manufacturers instructions)	❑ done	
	Are there leaks within the heating distribution system? (e.g., gaps or spaces in the duct work, pipe joints, steam traps, couplings.)	❑ yes	❑ no	If **yes**, repair leaks within the system (e.g. pipes, steam traps, couplings, and duct work).	❑ done	
	Have you conducted an estimated building heating efficiency calculation? See Calculation #1 in Appendix	❑ yes	❑ no	If **no**, gather data and perform the calculation (contact Maine Interfaith Power and Light for assistance).	❑ done	
	Have you conducted a rate of heating fuel use calculation? See Calculation #2 in Appendix	❑ yes	❑ no	If **no**, gather data and perform the calculation (contact Maine Interfaith Power and Light for assistance).	❑ done	

HEATING/COOLING SYSTEM (CONTINUED)						
	Assessment			**Action**		
Low or No Cost/ Some Effort	Are the radiators and heating vents clean and free from dust? (NOTE: a simple visual inspection is all that is usually required)	❑ yes	❑ no	If **no**, clean radiators and heating vents with a vacuum or cloth at the beginning and middle of each heating season.	❑ done	*Notes*
Higher Cost/ Some Effort	Are the thermostats programmable?	❑ yes	❑ no	If **no**, install programmable thermostats	❑ done	
	Has a technician checked the AC refrigeration condensers or coils to ensure they are clean?	❑ yes	❑ no	If **no**, have technician clean AC refrigeration condensers or coils at the beginning and middle of each cooling season.	❑ done	
	Does the building (sanctuary) have high ceilings but no ceiling fans?	❑ yes	❑ no	If **yes** (high ceilings but no fans), install conventional ceiling or Airius fans to regulate heat distribution in rooms with high ceilings (e.g. sanctuaries).	❑ done	
	Do you have a technician inspect and maintain the furnace & AC annually?	❑ yes	❑ no	If **no**, schedule semi-annual furnace & AC maintenance at the beginning of heating season and beginning of cooling season.	❑ done	
Highest Cost/ Most Effort	Does the furnace or boiler need to be replaced? (NOTE: If the system is 25+ years old then yes. Otherwise, consult with a technician for assistance in determining)	❑ yes	❑ no	If **yes**, replace aging, inefficient furnace or boiler with energy efficient model. (Look for models with the Energy Star label).[1]	❑ done	

[1] Be aware of the heating requirements of your facility if you decide to change the heating method. For example if the sanctuary is currently heated with a furnace (forced hot air), a change to a boiler (hot water radiators) will most likely require a longer time to heat the space

BUILDING ENVELOPE & INSULATION						
	Assessment			**Action**		
Low or No Cost/ Least Effort	Is someone responsible for ensuring that doors and windows in the building are closed after use?	❑ yes	❑ no	If **no**, assign an individual to ensure doors and windows are kept closed. Also, post reminders requesting that they be shut after use.	❑ done	*Notes*
	Is someone responsible for ensuring that in the **winter** storm windows are shut and that the drapes/blinds are closed in the evening and opened for the day?	❑ yes	❑ no	If **no**, in the winter, assign an individual to close storm windows and to close drapes/blinds in the evening and open during the day. Also, post reminders requesting these actions.	❑ done	
	Is someone responsible for ensuring that in the **summer** the storm windows are retracted and drapes/blinds are opened in the evening and closed during the day?	❑ yes	❑ no	If **no**, in the summer, assign an individual to open storm windows and close drapes/blinds during the day and open them in the evening. Also, post reminders requesting these actions.	❑ done	
Low or No Cost/ Some Effort	Are there any drafts, gaps or daylight coming from exterior door and window frames?	❑ yes	❑ no	If **yes**, seal & weather strip windows, storm windows (re-caulk and clean drain holes), and exterior doors (materials readily available at most hardware stores)	❑ done	
	Are the windows single paned?	❑ yes	❑ no	If **yes**, install plastic film over windows (kits are available at most hardware stores) Also, see below for a higher cost solutions.	❑ done	
	Have the doors warped, shrunk or shifted due to the change of seasons or age? (NOTE: If doors are deformed, heat will escape)	❑ yes	❑ no	If **yes**, re-hang/adjust doors that are not closing properly. If beyond repair then replace.	❑ done	

BUILDING ENVELOPE & INSULATION (CONTINUED)						
	Assessment			**Action**		
Higher Cost/ Some Effort	Is the insulation in the attic, crawl spaces, sill plate, etc. damaged (wet or torn)?	❑ yes	❑ no	If **yes**, repair and/or replace damaged insulation. If insulation is wet this may indicate larger issues and consulting with a carpenter is recommended.	❑ done	*Notes*
	Are there any drafts or gaps in the windows frames?	❑ yes	❑ no	If **yes** to either take either of these recommended actions: - Make and install wood framed insulating window inserts (for step by step instructions for building these simple windows please visit: http://www.arttec.net/Thermal-Windows/index.html. - Install storm windows (higher cost of these two options).[2]	❑ done	
	Are the windows single paned?	❑ yes	❑ no		❑ done	
Highest Cost/ Most Effort	Is the attic/roof well insulated? (NOTE: If accessible a simple visual inspection may suffice. Otherwise, an insulation contractor can assess)	❑ yes	❑ no	If **no**, insulate the attic/roof to at least R-48 (an insulating contractor can determine the best means for achieving this).[3]	❑ done	
	Are the exterior walls well insulated? (NOTE: this may be difficult to determine without opening a wall or having a thermal image photo taken)	❑ yes	❑ no	If **no**, have insulation blown into exterior walls (a contractor is highly recommended to do this)	❑ done	
	Is the sill plate insulated (where the foundation meets the building)	❑ yes	❑ no	If **no**, insulate the sill plate by stuffing insulation into the space or spraying in close cell foam (more expensive but more effective).	❑ done	

[2] The Dept of Energy reports that storm windows are almost 80% as effective as new double pane windows.

[3] This will provide the most return on investment in both the summer and the winter by reducing hot air infiltration.

HOT WATER SYSTEM						
	Assessment			**Assessment**		
	Is the hot water heater's temperature set above 120°F?	❑ yes	❑ no	If **yes**, turn down the temperature to 120°F or lower	❑ done	*Notes*
Low or No Cost/ Least Effort	Is the hot water heating system tied to a circulation pump? (NOTE: pumps simply ensure that hot water is available to second story and higher buildings, and use electricity while wasting hot water)	❑ yes	❑ no	If **yes**, turn off the pump which controls the circulation (consult with a technician first)	❑ done	
Low or No Cost/ Some Effort	Are the hot water pipes wrapped or insulated? (NOTE: inspect to determine if pipes are exposed in unconditioned spaces like the basement)	❑ yes	❑ no	If **no**, insulate pipes.	❑ done	
	Is the hot water heater insulated? (a fiberglass blanket wrapping)	❑ yes	❑ no	If **no**, cover the tank with a water heater insulating blanket (available at most hardware stores).[4]	❑ done	
	Do the faucets have aerators?	❑ yes	❑ no	If **no**, install faucet aerators.	❑ done	
	Do the faucets drip? (NOTE: this indicates not only loss of hot water, but water in general)	❑ yes	❑ no	If **yes**, replace washers. If unsuccessful a plumber may be needed.	❑ done	
Higher Cost/ Some Effort	Is the electric hot water heater making hot water all day long? (most electric hot water tanks do)	❑ yes	❑ no	If **yes**, install a seven day timer to control what days and at what times the hot water heater is turned on.	❑ done	
Highest Cost/ Most Effort	Is your water being heated year round by your heating system? (e.g., is it tied into your boiler?)	❑ yes	❑ no	If **yes**, evaluate the installation of an electric hot water heater with a seven day timer or an on demand water heater for the non-heating season.[5]	❑ done	

[4] Most newer hot water units are very well insulated and do not require a insulated blanket

[5] If you are considering a tankless unit be aware of additional electrical or fuel requirements. Determine your hot water usage. Typically an electric water heater will meet the needs of the faith community facility and can be installed at a cost of approximately 75% less than a tankless water heater. Tankless water heaters are typically installed when there is a large requirement for hot water such as showers.

LIGHTING						
	Assessment			**Action**		
Low or No Cost/ Least Effort	Is someone responsible for ensuring that lights are turned off after use?	❑ yes	❑ no	If **no**, assign the responsibility to monitor or post notice with instructions on all light switches and exit doors.	❑ done	*Notes*
	Are lights used on otherwise bright days?	❑ yes	❑ no	If **yes**, use natural lighting instead of electric when possible—open blinds and shades for optimal light.	❑ done	
	Are lights being used that aren't required?	❑ yes	❑ no	If **yes**, remove or disconnect unnecessary lights.	❑ done	
	Is there decorative lighting?	❑ yes	❑ no	If **yes**, eliminate/reduce such lighting	❑ done	
Low or No Cost/ Some Effort	Have incandescent bulbs been replaced with CFL's?	❑ yes	❑ no	If **no**, switch out incandescent bulbs with CFL's (there are now dimmable CFL bulbs available)	❑ done	
	Are lighting fixtures and the ceilings & walls around the fixture dusty and dirty?	❑ yes	❑ no	If **yes**, clean lamps, lighting fixtures, ceiling, and other reflective surfaces regularly.	❑ done	
	Is natural light available to office work stations?	❑ yes	❑ no	If **yes**, move work stations closer to exterior windows	❑ done	
Higher Cost/ Some Effort	Are lights left on in little used areas such as bathrooms and hallways?	❑ yes	❑ no	If **yes**, install motion detectors in lesser used areas (apply for Efficiency Maine rebate for sensors).	❑ done	
	Are exit signs energy efficient LED?	❑ yes	❑ no	If **no**, convert exit signs to LED (light emitting diodes).	❑ done	
	Are holiday lights energy efficient LED?	❑ yes	❑ no	If **no**, use LED holiday lights	❑ done	
Highest Cost/ Most Effort	Are fluorescent fixtures T12 types?	❑ yes	❑ no	If **yes**, replace T12 ballasts with T8 or the entire fixture. (Apply for Efficiency Maine rebate for new ballast or new fixture).	❑ done	
	Are the exterior lights energy efficient high pressure sodium or metal halide? (an electrician can assist with this assessment)	❑ yes	❑ no	If **no**, convert exterior lighting to high-pressure sodium or metal halide. Or replace with sensor operated spot lights with CFL or LED bulbs.	❑ done	
	Are ceiling tiles light and reflective?	❑ yes	❑ no	If **no**, clean, paint white or replace ceiling tiles to render a light, reflective surface.	❑ done	
	Are the carpets and walls dark colored?	❑ yes	❑ no	If **yes**, install light colored carpeting and wall treatments to reflect light.	❑ done	

REFRIGERATION & OTHER AREAS OF NEED						
	Assessment			**Action**		
Low or No Cost/ Least Effort	Is your refrigerator/ freezer's temperature too low or too high?	❑ yes	❑ no	If **yes**, set refrigerator and freezer temps appropriately.	❑ done	*Notes*
	Do you have more than one freezer or refrigerator?	❑ yes	❑ no	If **yes**, determine if you can consolidate into one unit.	❑ done	
	Is the freezer icy?	❑ yes	❑ no	If **yes**, make sure condensers/ coils are clean and unclogged.	❑ done	
	Is the kitchen equipment monitored?	❑ yes	❑ no	If **no**, assign someone to unplug unused appliances and turn off exhaust fans. Post reminders for others.	❑ done	
	Does office equipment have a 'standby mode'?	❑ yes	❑ no	If **yes**, activate the 'standby mode.'	❑ done	
Low or No Cost/ Some Effort	Is office equipment turned off and unplugged when not in use?	❑ yes	❑ no	If **no**, be sure to unplug electronics to avoid 'phantom loads'. To make it easy: Plug electronics into a power strip and simply turn the power strip off.	❑ done	
	Is the office copier frequently used for small items?	❑ yes	❑ no	If **yes**, try copying less frequently, in batches. This will decrease the amount of time the copier is in high-powered mode.	❑ done	
	Are the computers' monitors programmed for the sleep mode?			If **no**, program computers' monitors for the sleep mode and turn off at the end of the day.	❑ done	
Higher Cost/ Some Effort	Are the office computer monitors flat-screen LCD?	❑ yes	❑ no	If **no**, replace with an energy efficient LCD monitor (look for the Energy Star label).[6]	❑ done	
Highest Cost/ Most Effort	Are the refrigerators more than ten years old?	❑ yes	❑ no	If **yes**, replace with an energy efficient model with the Energy Star rating.[7]	❑ done	
	Does the office use traditional desk-top computers?	❑ yes	❑ no	If **yes**, limit or replace desk-top computer with a notebook/lap-top computer.[8]	❑ done	

SPECIAL NOTE: Thanks to Illinois Interfaith Power and Light for providing some checklist content

[6] A typical computer uses approximately 100 watts and a flat screen uses approximately 75 watts
[7] An older refrigerator uses approximately $175 of electricity a year a new unit of the same size will use approximately $75 a year.
[8] A laptop uses approximately 75 watts vs. 175 watts for a desk top.

Energy Efficiency Checklist for Congregations Appendix

CALCULATION #1: This calculation is a quick way to get a snapshot of the overall efficiency of the building. The lower the number the better. The average for houses of worship is between .25-.3.

Calculating estimated building heating efficiency:

$$\frac{\text{Annual Fuel Use (gallons)}}{\text{Square Footage of Building}}$$

Example:

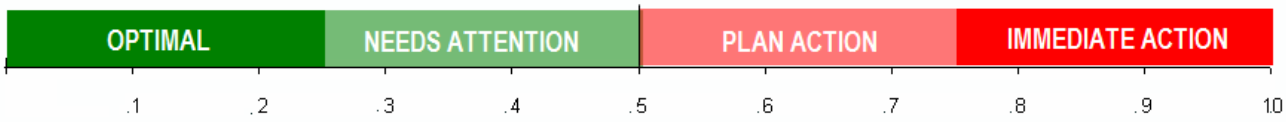
$$\frac{5946 \text{ gallons}}{21000 \text{ sq ft}} = .283$$

Attention Natural Gas Users: *Before you can calculate the estimated building heating efficiency, you must convert therm's/Ccf's into Gallons.*

Conversion from therms/Ccf's into Gallons: $\frac{\#\text{of Terms X 10}}{14}$

Example: $\frac{62 \text{ X } 10}{14} = 44 \text{ gallons}$

What the numbers mean:



.1 *to* .25 : **efficient heating system & well insulated building: little to no action needed**

.25 *to* .5 : **investigate heating system efficiency & insulation: likely action needed**

.5 *to* .75 : **inefficient system or poor insulation: plan for action**

.75+: **ALERT! You're heating the outdoors: take action immediately!**

CALCULATION #2: This calculation allows you to create a baseline for your fuel use for a given time period (e.g., one week, one heating season, etc.). Using a data logger (Data loggers are available at www.enmco.com) one can track the length of time the furnace/boiler has fired over the course of a week. The more one uses this calculation the more aware one will be of abnormal fuel use.

Number hours logged on data logger X boiler firing rate

To gather the data necessary for this calculation one will need a data logger. This is a $50 device to determine hours that a heating unit fires over a period of time (e.g., 1 week). The logger is placed on the furnace/boiler and is activated when the furnace/boiler fires. (Data loggers are available at www.enmco.com)

Example:

–data logger records 35 hours over a seven day period

–boiler fires at a rate of 2 gallons per hour (gph)

35 hours x 2 gph = 70 gallons (over 7 days)

This tells us that :

–the boiler burns an average of 10 gallons of fuel per day (70 gallons / 7 days)

–the boiler fires for an average of 5 hours per day (10 gallons per day / 2 gph)

What the numbers mean:

Data logger fuel rate calculation can provide baseline fuel use for a typical winter week or month. Excessive fuel use above this baseline calculation may indicate:

- Boiler or furnace is out of calibration
- Manual thermostat was left on after need for heat
- Programmable thermostat not programmed correctly
- Inefficient use of the faith community facility
- have been turned off
- Outdoor temperature sensor (if installed) has failed
- A window or door has been left open
- Ceiling fans