

13 STEPS TO SAVE ENERGY IN FAITH-BASED FACILITIES

These 13 steps will help you reduce your institution's energy usage, save money, and reduce greenhouse gas emissions.

These steps are:

- Inexpensive - with many no-cost activities
- Fast-acting – generating savings within a month, in many cases
- Easy to implement – with most steps requiring no professional support

Boiler, HVAC and Other Major Capital Investments

This guide does not address larger capital investments for energy efficiency such as boiler, furnace or HVAC upgrades. These can contribute substantially to energy savings. However, most institutions make better decisions about these major capital expenses if they have first taken the steps described here.

For information about these more capital-intensive steps, as well as the priorities described in this resource, see the US EPA ENERGY STAR for Congregations website: <http://tinyurl.com/ENERGY-STAR-for-Congregations>.

Directions

Members of your Energy Team should meet to review the 13 Steps described below, along with the Prioritizing Steps and Power Priorities document. Then, complete the Action Plan.

We recommend that Steps 1 - 3 be completed before your Energy Weekend.

The Steps in this resource fall into six categories:

- Laying a foundation
- Facility usage
- Appliances
- Temperature control
- Lighting
- Building Envelope

Category 1: Laying a Foundation

Step 1: Go Public

Public commitments make people more likely to follow through. So –

- Pass a board resolution – see the sample resolution below.
- Publicize your commitment in a sermon, newsletter and other public forums.
- In these statements, name the values from your tradition that motivate you.

Create urgency. Highlight the potential for savings. Communicate that it's a moral responsibility to save energy and money and to fight climate change. Make inaction uncomfortable.

Resolution on Energy Conservation

This resolution was adopted by Congregation Adath Shalom in Morris Plains, NJ in 2011

WHEREAS, the Adath Shalom Board of Directors recognizes that Judaism teaches us that we have a moral responsibility to preserve our environment, and

WHEREAS, the Adath Shalom Board of Directors recognizes that we have a fiduciary duty to operate and maintain our facilities in a fiscally responsible manner,

NOW THEREFORE,

BE IT RESOLVED, that Adath Shalom is committed to incorporating energy conservation into the operation and maintenance of the synagogue;

BE IT FURTHER RESOLVED, that Adath Shalom will promote and encourage energy conservation and awareness in the Adath Shalom community and beyond; and

BE IT FURTHER RESOLVED, that Adath Shalom will emphasize through our religious observance and in other ways the Jewish teachings and traditions to preserve and sustain the environment and promote actions that demonstrate this commitment.

Step 2: Name an Energy Steward (or “Power Broker”)and Energy Team

Naming an Energy Steward (or “Power Broker”) who coordinates your energy efforts is vital to success. When you’ve identified your Energy Steward (or “Power Broker”), convene an Energy Team. The team should include a mix of hard workers and people of influence within your institution. Also try to include someone frugal, someone comfortable with computers, and someone handy. Until you’ve got the right combination of people, don’t move forward.

The Team will establish your baseline energy use, monitor energy usage, identify and oversee conservation measures, and report to your board.

Get Youth Involved

Getting youth involved can be a great way to create an intergenerational commitment to energy conservation. Such involvement can provide an opportunity for a teenager’s *Bar/Bat Mitzvah*, confirmation, or other coming-of-age project. We suggest pairing up an adult leader with members of the youth group to enter your institution’s energy usage into Portfolio Manager. Teenagers can also participate in writing a newsletter article explaining the institution’s carbon footprint to members.

Step 3: Establish a Baseline (Benchmark)

You need a baseline to know if you’ve saved energy.

To establish your baseline:

- Gather your institution’s last two years’ energy bills - electricity, oil, and/or natural gas.

- Enter your monthly energy usage and costs into the EPA’s online Portfolio Manager tool. Directions and trainings for using Portfolio Manager can be found at: <http://www.energystar.gov/buildings/training>. Please use Mozilla Firefox to access Portfolio Manager, as it operates best in that system.
- Calculate the annual greenhouse gas emissions from your energy usage when you create your institution’s Portfolio Manager account. Create and print out charts and graphs of your savings to display to members.
- Be sure to share your building data with GreenFaith through Portfolio Manager. Visit this link to learn how: <http://tinyurl.com/lxfwgk>

Once you’ve calculated your institution’s ENERGY STAR score (1-100) and greenhouse gas emissions, report on this to your board, and keep your Portfolio Manager account updated monthly, which takes less than five minutes. Publicize your energy conservation and savings results to members and board on a regular basis.

If your ENERGY STAR score is above 75, consider applying for ENERGY STAR building status. This program requires verification of your building’s footprint from an outside professional. There is free verification support available to non-profits: <http://tinyurl.com/verification-report>. If you don’t find a free professional engineer or architect in your area, contact GreenFaith for more information.

Category 2: Temperature Control

Step 4: Install Programmable Thermostats and Set Meaningful Temperature Setbacks

Research shows that this step provides the single greatest opportunity for energy savings.

Install Programmable Thermostats Programmable thermostats allow you to manage your facility’s temperature more precisely than manual thermostats and to adjust the temperature independently in each of your building’s temperature zones. When choosing and installing thermostats:

- Use 7-day (not 5 day/2 day) programmable ENERGY STAR rated thermostats - available for ~\$50 in most hardware stores.
- Site the thermostats in a location that enables accurate measurement – e.g. not by a radiator or a door that is frequently opened.

Set Meaningful Temperature Setbacks/Setups In winter/colder climates, many faith-based institutions overheat their space when not in use. The reverse is true in summer/hotter climates. Establishing proper temperature “setbacks” or “setups” – the temperature to which a thermostat is set when the space is not used – represents one of the biggest opportunities for savings.

- Increase setbacks to as close to 45 degrees Fahrenheit in winter, and 85 degrees in summer or hotter climates as possible.
- Program thermostats to turn on the heating or AC far enough in advance to ensure that the space is at the desired temperature when in use.
- Make sure that lower winter temperature setbacks do not create the danger of frozen pipes, and that the higher summer temperature setups do not lead to mold. Check your programming quarterly.

Test different setback or setup levels to determine the amount of time required to bring the facility to a comfortable temperature, as this will vary from site to site.

According to the Smithsonian Institution, lower temperatures do not harm, and may even preserve, *Torah* scrolls and organs. It's in fact humidity, and not temperature, which is of concern. In addition, according to the Organ Builder's Association, temperature does not have any adverse effect on organs; organs must simply be tuned at the temperature they will be played: <http://greenfaith.org/files/organ-temperature-control>.

Step 5: Tune Heating and Cooling Equipment for Efficiency

Maintaining your boiler, furnace, or HVAC system helps ensure its efficiency. Ask your contractor to provide you with:

- The performance specifications which your heating and cooling equipment should meet.
- The levels at which your heating and cooling equipment actually performs after being serviced.
- Where available, printouts or readings of the test results used to determine your system's performance.

If your institution has an annual service contract, there should be no charge for this.

Be sure to change HVAC filters (or clean them if reusable) every month during peak cooling or heating season. Dirty filters create poorer indoor air quality and make your equipment work less efficiently.

Category 3: Facility Usage

Step 6: Be "Schedule Smart"

Most faith-based facilities have multiple temperature zones. First, identify exactly where the temperature zones are located in your facility. Write this information down, and keep it on file in your institution's office.

Then, examine the scheduled use of your facility. Are meetings scheduled within one temperature zone whenever possible – allowing you to heat or cool one zone instead of several? Are small meetings scheduled in small rooms, avoiding the waste of energy to light and heat a large space for a small number of people? Might there be an opportunity to "go dark" on particular nights of the week when the building is hardly used? Scheduling decisions can make a big energy impact – so review these decisions quarterly. Adjust your temperature setbacks to reflect any changes.

Category 4: Lighting

Regardless of the type of light, focus first on retrofitting lights that are on for 15 or more hours a week.

Step 7: Retrofit Tubular Fluorescent Lamps from T-12s to T-8s

New tubular fluorescent light bulbs (called T-8s because they are 8/8ths of an inch, or 1 inch, thick) are more efficient than their T-12 predecessors (which are thicker—12/8ths of an inch). Many older religious buildings still have T-12 lighting. Changing lighting to T-8s requires a small investment, but has a quick payback if the lights are used for over 15 hours per week. Retrofitting T-12s with T-8s is the most important lighting efficiency opportunity in most sites. T-12's will no longer be made as of 2014, so the prices on them will continue to increase. Now is the time to make your changes.

Consider the following:

- T-12 bulbs and ballasts can be replaced with T-8s without replacing the light fixtures.
- Often custodial staff can change the lighting without needing to hire an outside contractor.
- Change lights in rooms that are lit 15 hours per week or more. You'll see greater savings than in rooms lit for fewer hours.
- Many states offer rebates for switching to T-8 lighting. Check with your utility, state public utilities office, or your electrician.
- Recycle your old fluorescent tubes. Contact town officials to identify hazardous waste drop-off sites, or ask your electrician to recycle your old tubes.

Step 8: Replace Incandescent Bulbs with CFLs or LEDs

Change your incandescent light bulbs to CFLs or LEDs— with the potential exception of sanctuary lighting (see below) and bulbs that are on less than 15 hours/week. Note that regular incandescent bulbs are no longer sold.

Compact Fluorescent Bulbs (CFLs) – which are available for most incandescent light fixtures - produce the same amount of light as incandescent bulbs, with $\frac{1}{4}$ of the energy, and last much longer. Although LEDs cost significantly more, they are preferred because they use 90% less energy than an incandescent bulb, and last for decades if properly used. Many utilities offer significant incentives to customers who purchase CFL/LED bulbs and fixtures. Stores can also offer good prices during sales events.

CFLs and Mercury CFLs contain tiny amounts of mercury. Don't throw CFLs in the trash - take them to retailers which offer CFL recycling. If you break a CFL, follow the EPA's guidelines for clean-up: <http://tinyurl.com/EPA-CFL-guidelines>

If you go the route of LEDs, use ENERGY STAR because they are more efficient, longer lasting and higher quality.

Exit Signs Older emergency exit signs use two 15-watt incandescent light bulbs, and can be retrofitted with inserts that use two 2-watt Light Emitting Diodes (LEDs). Many religious buildings still have these older emergency exit signs. Switching to LED inserts – which cost approximately \$25/lamp insert - produces quick results.

Some institutions choose to replace emergency exit lamp fixtures instead of replacing the bulbs with inserts. This achieves the same energy savings, but creates a longer payback period.

Sanctuary lighting We recommend that houses of worship change sanctuary lighting in consultation with lighting professionals. Sanctuary lighting must meet important aesthetic criteria, and sanctuary lights are usually lit less than 15 hours/week, making them a low priority for retrofitting for energy savings purposes. Focus your efforts on lights that are on for more than 15 hours/week.

Step 9: Outdoor Lighting

Outdoor lighting is used for safety and also for information/appearance purposes. Safety is always first, but you may be using more light than needed during overnight hours. Ask your police department how much light is needed to keep your facility safe. Then you can take steps to eliminate excessive light. Here are some recommendations to keep in mind:

- If you (and not your utility) own the light poles and fixtures, consider more efficient lights. For example, LED lights use less than ½ the watts of metal halide or high pressure sodium lamps. Check into other types of efficient lighting. The Industrial Ecology Co LLC may be a good resource <http://www.industrialecologyllc.com/>.
- Be sure to put light only where you need it. Are your lights shining too broadly or worse, up into the sky?
- We recommend dusk-to-dawn outdoor lighting for security reasons — use lighting sensors or photocells. However, if you light outdoor signs, steeples, stain glass, or other beautiful features of your facility, control this type of lighting with a timer. Adjust the timer every 2 months to reflect the changing daylight hours. Keep in mind that this type of lighting rarely needs to be on later than 10:30 pm. If you use solar to light steeples, signs, or the like, there are LED installs that use digital programs to dim the lights during the late night, a good way to conserve battery charge.
- Consider solar for other outdoor lighting, especially if you have lights that are far away from your buildings. This avoids the need for excess wiring.

Category 5: Appliances

Step 10: Use Refrigerators as Efficiently as Possible

Refrigerators are a significant energy user in a faith-based institution. To make your refrigerator run as efficiently as possible, take the following steps:

- Move the refrigerator 3 inches or more from the wall.
- Vacuum dust from its coils and vents annually.
- If your institution uses more than one refrigerator, consolidate contents and shut one or more refrigerators off until needed. To avoid mold problems, leave the doors open to fridges that are shut off.
- Schedule an annual tune-up if your institution has a walk-in refrigerator or freezer.

Replace refrigerators bought before 2001 (or certainly 1990) with ENERGY STAR (www.energystar.gov) rated models, which ensures that the refrigerator is among the most efficient in its class. A new ENERGY STAR fridge will normally pay for itself in 5 years if it replaces a unit from 2001 or earlier.

Step 11: Save Energy with Your Water Heater

Conventional water heaters, which heat water to a consistent temperature 24/7, use lots of energy. Many institutions' heaters are set higher than necessary.

To reduce the amount of energy your water heater uses:

- Set your hot water heater no higher than 110 degrees (unless your facility provides showers, in which case set it at 120 degrees).

- Check your state’s health standards for water temperature if your institution runs a preschool, and comply with those.
- If hot water is only needed 2-3 days/week, turn the heater temperature down on the days when no hot water is needed.
- Many faith-based institutions have larger hot water heaters than they need. Consider replacing your 40 gallon unit (or larger) with a 15-30 gallon unit. Or - consider installing an on-demand hot water heater which heats water only when needed. Consult with an electrician for advice.
- For heaters manufactured before 2004, cover them with an insulation blanket -available from hardware stores.
- Insulate the first 3 feet of the heated water “out” pipe on all heaters.

Step 12: Go ENERGY STAR, Cut Vampire Load

ENERGY STAR is the national rating system for US appliances – and appliances which earn this rating use less energy than non-rated counterparts. Consider the following actions:

- Create a policy that requires all new institutional appliances and office equipment to be ENERGY STAR-rated.
- Replace refrigerators older than 2001 with ENERGY STAR models. See the above refrigerator section for more details.
- If your institution has older window unit air conditioners, consider replacing these with new, more efficient ENERGY STAR models.

Vampire load is the electric power used by some appliances even when they are off or in standby mode. Other terms for this are phantom load or plug load. The problem is that vampire load adds up over time. Use power strips for equipment that is often left on, especially where there are clusters of equipment. Power strips make it easy to turn off several appliances with one flip of the switch. GreenFaith recommends 4 power strips:

- Office Manager/secretary – computer, printer, copy machine
- Clergy office – computer, printer
- Sanctuary – sound system (which uses a lot of energy when left on)
- Kitchen (if needed) – microwave, coffee maker

Category 6: Building Envelope

Step 13: Weather-strip Doors and Windows

Drafty windows and doors are common in faith-based institutions, particularly older ones. These windows and doors can be weather-stripped to minimize energy loss.

Many institutions have window air conditioning units that are old and poorly sealed, or left in the window, in the winter. Make sure any window units are properly sealed or covered.

Some indicators of drafty windows and doors include:

- Air-flow that you can feel when you place your hand by a window or door.

- Daylight visible through cracks surrounding the door or window.
- Dust lines around door jams/window sills, which may indicate air flows.

Should you insulate? One opportunity could be attic space. However, insulating sanctuary space is often not possible due to architectural design; the sanctuary is also not used as often as other rooms. Weather-stripping leaky windows and doors usually represents the best opportunity to tighten the building envelope in worship spaces. For information on insulating faith-based facilities, see the *Putting Energy into Stewardship: ENERGY STAR Guide for Congregations* at: <http://tinyurl.com/ENERGYSTAR-Congregation>.

Professional Energy Audits for Religious Institutions

In many areas, utilities or government agencies make free or low-cost energy audits available to religious institutions, households, and small businesses. We have several recommendations for faith-based institutions considering such an audit:

- Confirm that the auditor has experience auditing religious institutions. Many utility or government-sponsored audits apply a residential or small business energy audit model to houses of worship. With their unique architecture and usage patterns, audits based on these models may not offer the best results for a house of worship.
- Make sure the audit accurately reflects your facility usage. Knowing how many hours/week your facility is in use is vital to determining efficiency and conservation measures. Some audits routinely assume that all lights are turned on for 40 hours/week – regardless of actual use.
- Make certain that the auditors are certified by the Building Performance Institute (BPI), or can provide evidence of successful experience conducting energy efficiency efforts at faith-based facilities. Always check referrals. To search for companies with BPI Certified professionals on staff: <http://tinyurl.com/BPI-Certified-Pro>
- Pay attention to the energy management strategies described in this document. Most auditors focus on technological improvements such as new lighting or heating/cooling systems. These technological improvements always deliver better results when coupled with strong energy management practices – like the ones described in this resource.