

Energy Management Tips for Churches

1. Overview

One of the areas in which churches waste money is in their use of energy. It can happen because of shortcuts during construction, poor maintenance of systems, wasteful setting of thermostats and lack of diligence in turning things off.

So, how are energy bills lowered?

1. Purchase energy that costs less.
2. Turn things off when they are not being used.
3. Improve the efficiency of equipment.

2. How a building is used makes a difference

Every building or part of a building is either being used or it is unoccupied. Houses and apartments are used 7 days a week. Improvements in efficiency are typically a good investment because the space is used most of the time.

Churches, however, are intermittently-used. A typical church is occupied only 20% to 30% of the week. This changes the approach for managing energy. Turning things off usually makes more sense than improving efficiency.

3. Everything must be replaced eventually

When something breaks it makes sense to consider purchasing an energy efficient replacement. The slight increase in cost is usually justified.

By federal law, many incandescent bulbs and larger diameter fluorescent bulbs will be discontinued beginning in 2010. When buying new fixtures make sure they meet updated Department of Energy guidelines.

4. An Energy Conservation Process

Most churches are not aware they waste energy. Wise energy use requires diligence, effort, and, in some cases, changing old habits. The following steps can help a church use energy more efficiently.

Step 1. A single person should accept responsibility

In congregations with lower energy costs, there is usually one person who accepts the responsibility for conserving energy. The first step in reducing energy usage is to enlist one person and give him authority to initiate change. We will call him the Energy Captain.

2. Purchase the least expensive energy

The first activity for the Energy Captain is to determine if energy is being purchased at the lowest possible cost.

Most utilities have several rates. With information about the schedule, the kind of heating and cooling equipment, the amount of energy used and how systems are controlled, the utility company can recommend the best rate structure for the church. They can also recommend some changes in equipment or processes that will allow the church to qualify for a better rate.

In many states, tax exempt organizations do not have to pay state tax on energy. If that is the case in your state and you are paying state taxes, request that the taxes be removed. Some states even allow a rebate of taxes paid over the last 3 years.

Step 3. Change the conditions of unoccupied buildings

Next the Energy Captain should visit the buildings very early in the morning, once in the winter and once in the summer. Here are the kind of items to look for:

- Space temperatures unnecessarily cool or warm.
- Pumps for perimeter heating or domestic hot water on.
- Unnecessary (not security related) lights burning.
- Non-dairy vending machines operating.
- Range, furnace or water heater pilot lights too high.
- Empty refrigerators and freezers running.

Some persons believe it is most efficient to have cooling or heating systems operating 24 hours per day. Continual cooling or heating is a waste of church dollars. The only reason for cooling or heating is human comfort, to get rid of harmful humidity and protect pipes from freezing.

Step 4. Reduce heat and moisture getting inside the building

a. Re-lamp long-burning fixtures with efficient lights

Lamps add heat to a building. If you reduce your lighting bill by a dollar, you also reduce your cooling bill by 30 cents.

Here are the annual operating hours for various types of lights:

24-hour security and exit lights	8760 hours
Outdoor photocell-controlled lights	4400 hours
Lights used eight hours each day	2900 hours
Lights used four hours per week	260 hours

b. Reduce other heat produced inside the building

- Turn off unnecessary inside lights and office machines.
- Insulate domestic water heaters and piping.
- Turn off the boiler during the summer.
- Turn off circulators that pump hot water to the faucets.
- Turn off pilot lights in boilers and furnaces.
- Do not run air handler fans or ceiling fans when building is vacant. (All fans add heat to the air.)

c. Keep the heat from coming into the building

If possible, insulate attic spaces (code recommends R30).
Insure ventilation of the attic.
Caulk and weather strip hatches and doors to the attic.
Keep storm windows closed.
When replacing windows, use Low E double glazing.

d. Reduce heat produced in the kitchen

Lower gas pilot lights to minimum heights.
Cook with the microwave.
Cook on outside grilles.
Exhaust moisture from boiling water and cooking.
Consolidate refrigerated items into fewer refrigerators or freezers.

Step 5. Provide and maintain efficient systems

A study of air conditioning systems found that 75% of the condenser coils were dirty, 70% had an improper charge of refrigerant, 55% had dirty evaporator coils, 45% had dirty blower wheels, and 35% had significant duct leakage. Heating systems have similar problems.

a. Improve condenser efficiency

Have a technician check for proper charge of refrigerant.
Keep condenser coils clean. Don't blow grass clippings into the coils. Clear the area two feet around unit.
Keep the condenser out of direct sunlight (shaded, but not under a roof or cover).
Make certain that the large refrigerant pipe outside is insulated.

b. Improve cooling distribution efficiency

Change filters regularly. Keep evaporator coils clean. Keep the air handler motor and fan blades clean.
Check ductwork for crimps and disconnected sections.
Don't obstruct the supply of air with furniture, draperies, etc.
Limit the outside air flowing into central air systems.
Seal leaks in ductwork.
Isolate rooms with window air conditioners by closing doors to non-cooled areas.
Insulate ducts running through unconditioned areas.

c. Buy efficient heating and cooling equipment

Get a SEER of 14.0 or higher for replacement air conditioning units.
Place all systems on timed thermostats. Lock thermostats.
Inquire about utility rebate programs for more efficient new or replacement systems.
Install window units to cool occupied rooms within large unoccupied zones served by central cooling systems.
When changing to a more efficient outdoor condensing unit, always replace the interior evaporator unit at the same time.
Have larger systems designed by a mechanical engineer licensed in your state.
Consider multiple compressors and variable speed fans to match varying cooling loads. Such systems require staged thermostats.
Consider chilled storage to assure off-peak operation.

d. Avoid complicated energy control systems

When thinking about control systems, assume that the

instruction manual will be lost within a month. There are no "smart" controls, only smart building operators.

e. Avoid cutting-edge technology

New technology costs more. Choose technology that has been around for at least 5 years. Choose readily available, long-lasting, easily replaceable systems.

Step 6. Reduce the air flowing from the building

While in some areas ventilating buildings at night can reduce cooling costs, in most cases air flowing from the building wastes energy. As a result, when air conditioning or heating systems are operating, close all openings that allow air to escape. Some examples are:

Fireplaces with open flues	Air shafts
Exhaust Fans	Belfry doors
Holes in the ceilings	Open ventilation grilles
Open boiler room doors	Leaking attic hatchways
Elevator shafts	

Step 7. Reduce peak use of electricity

If your church has a rate that bills you for peak use (demand), shifting some systems to off peak can save money. Time clocks can be used to shift loads like these to off-peak periods:

Electric water heaters	Ice machines
Oversized compressors	Soda machines
Kilns	Thermal storage

Step 8. Change personal habits

a. Change personal dress

Dress in light-weight clothing in summer and wear coats in winter.
Rethink heavy clergy and choir robes in summer.
Natural fabrics often feel cooler than synthetics.

b. Instead of cooling the air, move it with fans

While this works in classrooms, it does not work in worship centers with high ceilings.

c. Change scheduling in warm weather

Move summer morning worship to earlier in the morning.
Work during the cooler times of the day.

Step 9. Reduce energy for domestic hot water

The temperature of the domestic hot water should be 110F degrees or less. If hotter water is needed in the kitchen, provide a small tankless water heater for that area.

Step 10. Adjust and clean electric water coolers

Make sure the thermostat is set at 55F or above. Clean the coils each year.

Step 11: Stay informed

The Energy Captain should be alert to new products, new rates, and new ways to reduce energy use. An excellent source for information is www.interfaithenergy.com.