

Energy Conservation Tip Sheets from Hoosier IPL

Household Energy Checklist: What matters the most? What pays you back most quickly?

Knowing by how much different actions will reduce your energy use, their cost and how long it will take to recoup that cost with savings can help you prioritize. Many high-impact actions cost nothing. Others cost more but can greatly reduce energy use. Use this checklist to help you plan what you'll do.

NOTE: These are *rough estimates* of how much a typical Indiana household would cut its energy use if it took these measures. Precise figures will depend on your current energy use and the size and features of your home.



High Impact, No or Low Cost, Immediate Savings	Estimated Energy Use Reduction	Approx. Cost	Estimated Payback Period
Don't heat or cool room(s) when they are not in use	5% - 15%	0	Immediate
Drive 1000 fewer miles per year (i.e., 3 less miles per day)	2%	0	Immediate
Air dry clothes	4%	0	Immediate
Lower winter thermostat during day (<i>each</i> 2 degrees)	2%	0 ^{1, 10}	Immediate
Raise summer thermostat during the day (<i>each</i> 2 degrees)	2%	0 ^{1, 10}	Immediate
At night, set heat to 55° (winter)	2%	0	Immediate
When away, set heat to 55° (winter); turn off AC (summer)	1%	0	Immediate
Reduce hot shower time to 5 minutes or less	2%	0	Immediate
Lower water heater setting to 120 degrees	1%	0	Immediate
Wash laundry in full loads. Wash in cold water.	1%	Save \$50 ²	Immediate
Hand wash dishes 2x /week. ⁴ If using dishwasher, air dry.	1%	0	Immediate
Switch from incandescent to CFLs or LEDs (for <i>each</i> six)	1%	\$38 ^{3, 10}	Under 1.5 yrs
Turn off lights when not in use	1%	0	Immediate
Seal windows & doors with weather stripping and caulk	1%	\$50	1 year
Fly 1000 fewer miles (1000 = 1 round trip (RT) to DC; 2000 = 1 RT to MA; 3,000 = 1 RT to FL; 4000 = 1 RT to CA)	1%	0	Immediate
Rarely/never eat beef, lamb, pork, turkey, farmed salmon	3%	0	Immediate
Seal and insulate warm air ducts if outside insulated space	1%	\$100 ¹⁰	about 2 years
Maintain furnace professionally	1%	\$135 ⁸	1 yr
High Impact, Medium Cost, Medium Payback			
Replace furnace with high-efficiency furnace or heat pump	5%	\$1,500 ^{5, 10}	Under 3 yrs
Replace AC unit with high-efficiency unit	5%	\$1,500 ^{5, 10}	Under 3 yrs
Replace pre-2001 fridge with efficient model	2%	\$700 ^{7, 10}	10 years
Seal & increase attic insulation to 14" (R60)	2%	\$1400 ^{6, 10}	about 7 years
Purchase and drive a hybrid car	5%	\$2,100 ⁹	5.5 years
Very High Impact, High Cost, Longer Payback			
Install 5 kW solar array (after federal tax credit)	50%	\$14,000 ¹⁰	15 years
Install geothermal heat pump (after federal tax credit)	40%	\$14,000 ¹⁰	12 years

**** See HOUSEHOLD CHECKLIST NOTES for suggestions, explanations and links ****

HOUSEHOLD CHECKLIST NOTES

¹ Heat and cool people not spaces: Many people find that a programmable thermostat (\$30 if installed yourself) quickly pays for itself by helping them cut out unnecessary heating and cooling, when they are out or in bed. Also, when home during the day in winter, you might comfortably set the thermostat at 62° by dressing appropriately, drinking hot drinks, and using a foot warmer, heated keyboard or heat lamp for a home workstation. In summer 78° can feel comfortable by using fans instead of AC and drinking cool liquids.

² Heating water accounts for 90% of a standard washer's energy use. A utility company might use 5 kW to treat & deliver 1 unit (1000 gallons) of water. So conserving water (wash full loads) and hot water is important. A water-efficient machine uses 35% to 50% less water than a standard top-load machine.

³ Many electric utilities offer free CFLs, lowering the cost and payback period to zero for the first six or more. LEDs vary greatly in price and quality; the cheaper ones may not be as efficient and/or last as long as advertised.

⁴ Older dishwashers heat the water to 130° or 140°, accounting for up to 80% of energy used. Look for an Energy Star[®] dishwasher where length of cycle, water heat boost and heat drying are options; they also use 1/3 less water. (Skipping the electric dry cycle can reduce electricity use by 10% or more.) Hand washing dishes is more efficient only if you use one tub of water for wash and one for rinse.

⁵ This is the difference, before rebates, between a current standard split system (80% furnace, 13.2 SEER 4-ton AC unit) and high-efficiency units (98%, 15.2 SEER). The latter can save \$75/year on utilities.

⁶ Insulation cost & payback depend on existing conditions. EPA recommends R49–R60 (12"–14") attic insulation in central and northern and R38–R60 (10"–14") in southern Indiana. Your utility company may rebate 40% of the cost to insulate attic, walls and ducts if done by an approved contractor. For details, see [http://web.ornl.gov/sci/roofs+walls/insulation/ins_02.html] and H-IPL's Quick Guide to Insulating Your Building Envelope. If sealing basement or crawlspaces, test for radon.

⁷ Replace your old unit with a fridge that uses 350 kWh or less per year: they are smaller, do not have through-the-door water or automatic ice dispensers and have the freezer unit on top rather than on the side. Energy Star models are 20% more efficient than standard models, and CEE Tier 3 models are 30% more. But beware: An Energy Star fridge can be an energy hog. And don't keep a working fridge in your garage!

⁸ Good maintenance keeps equipment at peak efficiency and extends its expected life. Be sure to replace filters frequently as well.

⁹ This is the difference in cost between a hybrid & comparable car. Savings & payback assumptions:

- Hybrid gets 20 MPG more than a standard car (40% better mileage, like driving 40% fewer miles);
- Car is driven 20,000 miles/year & gas costs \$3.75/ gallon. So gas savings is \$1,000/year;
- An estimated one third of the average household carbon footprint comes from car travel.
- Knowing that your car is more efficient doesn't lead you to drive more!
- See: <http://www.fueleconomy.gov> to calculate payback for vehicles manufactured after 2012.

¹⁰ REBATES AND TAX CREDITS: (Reduced cost and lowered payback period of equipment, appliances and home improvements not included in figures except where noted.)

- Solar & geothermal installations qualify for a 30% federal tax credit and may lower property taxes.
 - HVAC, water heaters, windows, doors & insulation material may also qualify for a 10% tax credit.
- For Energy Star rebates in your area see: <http://www.energystar.gov/rebate-finder>
DSIRE website has a complete list of rebates and incentives at <http://www.dsireusa.org/>
- Home improvement advice: <http://tinyurl.com/ImproveEfficiency>

	H-IPL HOUSE OF WORSHIP ENERGY SAVER CHECKLIST
YES?	Scheduled inspection, operation, and maintenance items
	Are all furnace filters changed at least annually, or better still, twice a year?
	Are all exterior air conditioner compressor fins cleaned annually – after spring pollen and cotton wood seeds have stopped floating and more often during droughts?
	Are the HVAC units serviced at least annually?
	Are set back thermostat programs monitored regularly to ensure they are still as intended?
	Are water fountains on a timer so they provide cold water only when the building is occupied?
	Are water fountains unplugged in the winter months?
	Are soda machines off or on a timer during unoccupied times? ¹
	Are refrigerator and freezer temperatures set at the highest temperature acceptable? ²
	Are refrigerator and freezer door gaskets pliable, in place, and functioning properly? ³
	Are the condenser coils (fins) on refrigerators and freezers clean?
	Are humidifiers functioning properly? ⁴
	Are audio visual systems turned off when not in use?
	Are computers and printers turned off when not in use?
	Are copy machines turned off when not in use? ⁵
	Are all fire place dampers closed when not in use? ¹⁰
	Are portable heaters used to avoid heating zones or rooms - not just for added comfort? ⁶
	Are shades drawn to reflect sun light in air conditioning season?
	Are draperies drawn to keep in heat in heating season?
	Are shades opened to let in sunlight in the heating season?
	Are windows used to ventilate and cool the building when weather conditions are favorable?
	Once and done items
	Are all electric EXIT signs lit by LED bulbs?
	Are all security lights on motion sensors?
	Are all parking lot and exterior architectural effects lights controlled by photo cells and timers? ⁷ Are they operating correctly? Are they LEDs?
	Are all incandescent bulbs replaced by compact fluorescent or LED bulbs?
	Are all 2', 4', and 8' T12 fluorescent tubes replaced by T8 tubes and electronic ballasts? ⁸
	Are all lights and fans in bathrooms controlled by occupancy sensors?
	Are refrigerant lines leading from the outdoor AC unit insulated?
	Are exterior water heater blankets still in place?

	Are the water heaters set at or below 120 degrees? ⁹
	Are water lines leading from the water heater insulated?
	Are there on-demand heaters at the place of use where there are long runs from the nearest water heater?
	Are fireplace gas pilot lights as efficient as possible? ¹⁰
	Are all heat ducts that run outside the insulated space sealed and insulated? ¹¹
	Are all fresh air vents set to the minimum required by code? ¹²
	Are ages, efficiencies, and maintenance records available for HVAC units?
	Are pilot lights on gas stoves adjusted properly? If the stove is seldom used, could the gas be turned off between uses? ¹⁰
	Are back draft dampers for exhaust hoods functioning properly? ¹³
	Are all refrigerators and freezers Energy Star rated? ¹⁴
	Are all old refrigerators or freezers that are no longer necessary disposed of?
	Are fans used to pull hot air off the ceiling in the winter?

Footnotes for H-IPL Energy Saver Checklist

1. Soda machines that are on all the time use about 3500 kWh's a year, depending on the level of use, ambient temperature and more. A Vending Miser can reduce that use by about half. Turning the machine off when not in use also can save a lot.
2. According to the U.S. Government refrigerator temperatures can be as high as 37 degrees and freezers as high as 3 degrees.
3. Close a dollar bill in the door at several places. There should be good resistance to pulling the bill out. Inspect the door gasket. If it is stiff, cracked, torn, or out of place, repair or replace it. Consider wiping it with a light coat of Vaseline.
4. Because dehumidifiers are big users of electricity, they should be used only when necessary – high humidity summer time. Do not set to less than 50% relative humidity. Periodically verify that the setting is correct. Clean filters and coils at least annually. As accuracy of their settings is notoriously low, consider running them only on timers for a few hours a day.
5. Copiers often have low power, off and sleep modes. Decide which is most efficient and acceptable to your operation.
6. Use electric space heaters to heat rooms. Use infrared radiant heaters to heat people.
8. Light controls must be monitored because of daylight savings time, power outages, and photo cell deterioration. Because they are on many hours, these lights are good candidates for retrofitting with LED fixtures.
8. Investigate asking Energizing Indiana and utility companies to financially support replacing inefficient lights.

9. For hand washing, any comfortable temperature will do. So water heaters can be set considerably below the normal recommended 120 degrees.
10. Pilot lights in fireplaces and kitchen stoves use a significant amount of gas - as much as 10 therms per month. And, in the summer, the pilot contributes heat to the air conditioning load. If a fireplace has no pilot and is rarely used, consider installing an inflatable “draft stopper” against the damper.
11. Surprising as it seems, this condition is not uncommon. Finding these situations requires detective work snooping in places that humans don’t go frequently. This should be done very methodically by people with some training and agility to get into tight spaces. If these situations can be found and rectified, large savings can be made. Be careful!
12. There are codes that set the number of air changes per hour desirable in houses of worship. Although these numbers have been reduced, older HVAC systems were designed and installed to meet the older codes. For the normal building used by the typical faith community, we believe that no exterior air need be introduced other than the amount that normally leaks through a building or that results from people coming and going.
13. If there are no back draft dampers in the ducts leading from exhaust fans, there is essentially a hole in the building, and worse, a chimney sucking heated or cooled air out the roof.
14. Energy Star-rated fridges and freezers reduce energy consumption by at least 15% over non rated models. Freezers on the top or bottom are more efficient than side-by-side models.

Tracking Energy Use and Conservation

The following is an example

Month	Gas Therms	\$ Cost for Gas	Electric kWh	\$ Cost for Electricity	Heating Degree Days	Cooling Degree Days	Total Energy Therms/DD
Jan-13	1074.528	515.71	6200	648.55	1083	0	
Feb-13	986.86	470.44	5480	587.76	949	0	
Mar-13	846.72	401.79	5080	551.29	426	0	
Apr-13	397.152	199.45	4640	512.99	120	0	
May-13	122.573	68.18	3520	409.84	120	108	
Jun-13	39.546	23.91	5120	561.19	3	343.00	
Jul-13	13.221	7.67	8680	893.17			
Aug-13	74.314	42.07	7920	820.46			
Sep-13	21.441	11.43	9080	926.72			
Oct-13	51	25.69	6280	688.19			
Nov-13	385.064	193.59	3800	449.62			
Dec-13	915.752	455	5880	643.25			
2013 Total	4928.171	2414.93	71680	7693.03			0
2013 Average	410.680917	201.2441667	5973.3333	641.0858333			#DIV/0!
This chart can be duplicated for successive years							
Month	Gas Therms	\$ Cost for Gas	Electric kwh	\$ Cost for Electricity	Heating Degree Days	Cooling Degree Days	Total Energy Therms/DD
Jan							
Feb							
Mar							
Apr							
May							
Jun							
Jul							
Aug							
Sep							
Oct							
Nov							
Dec							
Total	0	0	0	0			0
Average	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			#DIV/0!

A Quick Guide to Reducing Your Building's Electricity Usage

Find your energy hogs, tame them, and get your congregation on board

Discover: What's using your electricity?

Walk your facility and create a list of outdoor & indoor lights, appliances, computers, etc.

- ✓ Check and list their energy use over time.
- ✓ Note days and hours in use.
- ✓ Note if any are using power while not in use.
- ✓ Note expected annual energy use of any ENERGY STAR® appliances.

How much energy does it use?

- For items that use a plug, use a monitor, such as a [Kill A Watt](#) @ \$25, to see how much they use at any moment and over a period of time.
- For items without plugs such as central AC, a furnace blower or area lights, invest in a "whole house" meter such as the [EUM-2000](#) or [TED](#) @ \$200, which hook into your electric panel.

 **Finding ENERGY HOGS can help cut waste.**

Plan: Where and how to cut?


LOOK FOR YOUR BIGGEST ENERGY USERS

 **ELECTRIC BASEBOARD HEATERS** are hogs:

- ✓ Be sure they are off when no one is in the room. You can use a timer or a sensor.

Other common items that waste energy if no one is using them or spaces are unoccupied should be put on a:

- ✓ timer, or
- ✓ power cord that's on only when needed.


 **DEHUMIDIFIERS** also are energy hogs:

- If your unit runs a lot, figure out why.
- Unless you're certain the unit's humidistat or hygrometer is working, put it on a timer.

Where else can you cut?

LIGHTS:

- Would some areas be fine with less light?
- Have all incandescent and T12 fluorescents been replaced with lower wattage lights?
- If lights in unoccupied areas are often left on, install motion or infrared occupancy sensors – especially in restrooms where exhaust fans run whenever the lights are on.
- Replace lights used the most or are in hard-to-replace areas with efficient, long-lasting LEDs,
- Replaced incandescents in exit signs with LED retrofit kits – quick payback!


 **OUTDOOR LIGHTS THAT ARE ON ALL NIGHT** are energy hogs and may provide **less** security than motion- or infrared-activated lights.

- ✓ Are all your lights useful?
- ✓ Are there lower-watt alternatives?

WATER HEATERS:

- Turn temperature down to 120° when it's used.
- If only used for hand washing, turn to 95°.
- If a water heater is in use only a few days or hours a week, minimize temperature setting the rest of the time.
- If a water heater is warm to the touch or pre-2004, a water heater "blanket" –available at hardware stores– will cut energy waste.
- Install faucet aerators to reduce water waste.

REFRIGERATORS AND FREEZERS:

-  Replace **PRE-2001 MODELS**, which are 40% less efficient than equivalent newer models.
- Clean fan & coils and be sure seals are tight.
- Leave space around so units can "breathe".

Act: Reduce your use!

Propose action plan to decision-makers:

For each item, include up-front costs, annual savings & payback period.

Engage your staff & congregation:

- Highlight why to cut (heeding the faith call to care for our earth, improved health, less pollution, fewer new power plants, less harm to the poor).
- Involve members and youth in collecting and assessing data and taking action.
- Discuss ways to reduce waste and save energy with staff, members and youth.
- ✓ Post signs in problem areas.
- ✓ Write newsletter articles.
- ✓ Make announcements at services.
- ✓ Hold forums between services.



Hoosier Interfaith Power & Light,
"calling together Hoosiers of faith as
stewards of creation in order to
promote energy conservation, energy
efficiency, renewable energy and
related sustainable practices"

A Quick Guide to Saving Energy and Money with Your HVAC Systems

Maintain Equipment for Best Efficiency

Good maintenance can add years to equipment life and increases efficiency.

- Institute or review maintenance policy:
 - Assign someone to monitor maintenance;
 - Review maintenance with your provider;
 - Change filters as often as recommended;
 - Have professional maintenance done regularly.
- If specific areas tend to be uncomfortable:
 - Ask professionals about moving diffusers or balancing the system to better distribute air.
- So outdoor AC units needn't work as hard:
 - Remove barriers to air flow around the units;
 - Increase outdoor AC unit service during drought and high seed & pollen seasons;
 - Plant shade trees on AC units' west side.



Hoosier Interfaith Power & Light,
 “calling together Hoosiers of faith as
 stewards of creation in order to
 promote renewable energy and energy
 conservation and efficiency, as a faith
 response to climate change”

Reduce Use for Greater Savings

Setting a thermostat back 10° to 15° for 8 hours can save 5% to 15% a year on your heating bill.

Reduce use of central heating and AC by using:

- Programmable thermostats (see toolkit);
- Personal & ceiling fans to reduce need for AC;
- Space heaters for individual workstations.

Doing this will affect humidity & temperature.

- Control summer humidity in infrequently-used spaces, especially those below grade:
 - Monitor humidity with a hygrometer.
 - To reduce humidity with the least energy, set programmable thermostat to cool space (thus removing moisture) in the early AM, before outside temperature begins to rise.
 - Consider using a dehumidifier in problem areas to reduce the need to run AC, especially if the AC unit covers a larger area.

- **Organs** (American Institute of Organ Builders)
 - Organs are safe from 40°–100° F.
 - Humidity should stay between 30% & 80%.
 - Lowering the temperature of the space to 40°–55° during the week in winter helps prevent overly-dry conditions.
 - Temperature affects organ tuning, but the tuning will revert back to normal when the temperature returns to original setting.
- **Pianos:**
 - Pianos do best in a fairly consistent environment, so to compensate for high humidity in summer and dryness in winter, install a humidistat (\$500.00 to \$750.00).
 - A floor-length drop cloth can help reduce temperature variations.

Plan for Efficient Upgrades

Purchasing more efficient equipment pays off quickly: the efficiency of HVAC

equipment has increased while the cost difference between economy and high efficiency models has fallen. Even with low natural gas prices, paying the difference may take just 4 to 6 years – followed by pure savings. And, with both furnaces and AC units, rebates from utility companies can help offset the extra upfront cost.

Furnaces: Pre-1995 furnaces were 80% efficient. Now a 96%–98% efficient furnace lowers operating costs.

AC Units: 2005 units were 10 SEER. Now, units are 13 to 20 SEER (Seasonal Energy Efficiency Ratio). A 16 SEER AC unit is 14% more efficient than standard 13 SEER.

Replacing Equipment: Factors to Consider

Lifetime cost = upfront + operating costs

Operating costs are a function of the equipment's efficiency & thermostat settings.

How to decide:

- Designate a property committee member to research the options.
- Get unbiased advice from a professional who will not be installing your equipment.

How to Pay:

- Set aside a percent of budget;
- Make this part of a capital campaign;
- Reinvest savings from energy conservation.
- Take out a loan: a higher efficiency unit will pay it back with the energy savings.

A Quick Guide to Insulating Your Building's Envelope

After all gaps have been sealed: you may need to add insulation or add storm or replacement windows.

1. Where to insulate and with what?

Start with your attic: Since heat rises, insulating an attic has more impact than insulating walls.

Replace insulation that is damp or soiled – often the case around gaps that have been sealed.

Add insulation where current insulation is not consistently deep enough.

Suggested for attics (according to ENERGY STAR®):



Zone 5: R49-60 (12" – 14")

Zone 4: R38-60 (10" – 14")

Be sure to seal and insulate any ducts running outside insulated areas!

What type to use in attics?

- **Fiberglass batts** are most easily installed.
- **Loose fill** is best added by someone with experience. Machines can be rented.
- "Unfaced" batts (with no paper or foil backing) & loose fill can usually be installed over existing insulation of either type.
- Professionally sprayed foam is expensive but seals as it insulates; good in hard to reach areas.

If Using Volunteer labor:

- Have someone with prior experience supervise.
- Keep Volunteers Safe! (See cautions in the *Guide on Sealing the Building Envelope*.)

2. Watching Out for Wiring & Ventilation

Before insulating attics or crawlspaces, confirm that any **wiring** being covered is not degraded or overloaded.

Prevent moisture problems by not insulating over attic soffit **vents**, which allow outside air into attic.

- To keep soffit vents clear, install rafter vents over them before adding insulation.
- Many rafter vents can be stapled to the roof decking.



Rafter vent—in gray above—installed between rafters where the roof meets the attic floor.

What about existing exterior walls?

- A thermal gun (see *Guide on Sealing the Envelope*) or thermal camera can show where walls are poorly insulated.
- Ask professionals about options for adding insulating materials; incorporate in renovations.
- Insulating hard-to-access walls often have a longer pay back period.

3. How to up the insulating value of windows?

Help keep heat inside in winter or outside in summer

- For decorative windows (e.g. stained glass), add a plain exterior layer of ("storm") glass.
- Replace dual pane windows that have lost their seal. Consider double or triple pane, argon-filled windows with low-emissivity glass.
- If a room has many windows can you replace one or more with an insulated wall? Even triple-pane windows let in and out much more heat than walls.
- When replacing windows, casement or awning styles seal more effectively than sliding.



Hoosier Interfaith Power & Light,
"calling together Hoosiers of faith as
stewards of creation in order to
promote renewable energy and energy
conservation and efficiency, as a faith
response to climate change"

Cost of Different Types of Comparable Lighting

This comparison of similarly-bright lights that can be used in similar applications shows the savings generated by more efficient lighting.

Type of Lamp	Watts	Brightness (lumens) ¹	Color (Kelvins)	Avg. lifetime (hours)	Up-front cost	Operating cost ² (1 year)	Total cost ² (7 years)	Total cost ² (15 years)
STANDARD SCREW-IN LIGHTS ("A type") FOR PENDANTS, FLOOR OR TABLE LAMPS								
Standard incandescent (to be discontinued)	60	800	2700 – 2800	1,000	\$0.75	\$17	\$129	\$276
CFL (compact fluorescent lamp)	13	800	2700 – 6500	8,000	\$3.75	\$4	\$36	\$72
A-Type LED	11	830	2700 – 6500	50,000	\$20	\$3	\$41	\$65
4-FOOT AND RECESSED CEILING LIGHTS								
T12 fluorescent (to be discontinued)	40	2550	2700 – 6500	20,000	\$2.50	\$11	\$80	\$170
T8 fluorescent (with \$15 conversion kit)	32	2500	2700 – 6500	27,500	\$3.00	\$9	\$65	\$138
T5 Fluorescent (with new fixture)	26	2900	2700 – 6500	30,000	\$6.00	\$7	\$56	\$119
T8 Fluorescent: 2x2 recessed (2-lamp)	64	5000	2700 – 6500	20,000	\$125	\$42	\$311	\$664
LED 2x2 recessed	43	4000	3500 – 5000	50,000	\$160	\$22	\$311	\$483
FLOOD LIGHTS FOR RECESSED CANS OR TRACKS								
Halogen PAR 30	40	570	2750	3,750	\$9.00	\$11	\$122	\$255
Fluorescent PAR 30	15	700	2700	8,000	\$8.50	\$4	\$54	\$104
LED PAR 20	9	750	2300 – 4100	37,500	\$21	\$2	\$38	\$58
SPOT LIGHTS FOR TRACKS AND SPECIAL FIXTURES								
Halogen Multifaceted Reflector (MR) 16	35	540	3000	3,000	\$4.00	\$17	\$140	\$300
LED Multifaceted Reflector (MR) 16	10	500	2700 – 4000	37,500	\$25	\$3	\$44	\$66
EXTERIOR LIGHTS								
High Pressure Sodium HID	250	27500	2100	27,000	\$13	\$69	\$494	\$1,057
Mercury Vapor HID	400	23000	3200 – 7000	20,000	\$20	\$110	\$790	\$1,690
Metal Halide HID	330	26400	4000	12,500	\$45	\$91	\$725	\$1,496
Metal Halide HID with fixture	232	19000	4000	15,000	\$630	\$63	\$1,073	\$2,209
LED with fixture	104	8900	4000 – 5000	100,000	\$566	\$28	\$759	\$979

¹ Lamps lose lumens (brightness) over time at different rates. See supporting materials for details.

² Based on 50 hrs/week use at current electricity rates, 11¢/kWh. Indiana's electricity rates are projected to rise by 30% over the next decade. Also not included are rebates. As a result, this table understates the savings generated from more efficient lighting. (See LED Case Study.)

LED = Light-Emitting Diodes. No ballasts, free of mercury. Best designs last 50000 hrs. and have minimum 5-year warranties.

PAR = Parabolic Aluminum Reflector. Available in narrow to wide beam for spots, down lights and floods.

HID = High-Intensity Discharge. Relatively high efficacy and long life but long start-up times.



Recouping the Cost of LEDs in Less Than Two Years: A Case Study of Trinity's Great Hall

Trinity Episcopal Church of Bloomington replaced fifty-two 80-watt halogen flood lights in their Great Hall with fifty-two 18-watt LEDs. Both the old and the new were PAR 38. The following calculations are based on the lights being used an average of 25 hours/week (1,000 hours/year):

\$1,529	Purchase cost (fifty-two LEDs @ \$29.40 each)*
- \$ 520	less Duke Energy rebate (52 lamps installed @ \$10 rebate each)
\$1,009	Cost of LEDs
\$ 150	Plus installation cost
\$1,159	Total investment cost (for a 20- to 40-year life)
- \$ 371/yr.	savings on electricity at \$0.115/kWh
	.062 kW saved per lamp x 1000 hrs/yr. x 52 lamps = 3224 kWh saved per yr.
	3224 kWh saved per yr. x \$0.115/kWh = \$371
- \$ 335.00/yr.	savings on lamp replacement [cost of replacing the old 80 W lamps every
	two years: (52 lamps x \$10 per lamp) + \$150 labor = \$670 divided by 2 years
\$ 706/yr.	in savings = \$ 59/month

\$ 1,159 cost / \$59 savings per month = 20 months to recoup investment with savings

Trinity will recoup the total costs of its switch to LEDs in just 20 months after which it will save \$ 335 each year – more if electricity rates rise - for the next 18 to 38 years.

*Received this discount by purchasing a minimum of sixty **Toshiba 18P38/27LFL-T** lamps from Lighting Services of Indiana, 1591 North Harding Street, Indianapolis, IN 46202; contact: Travis Belden.



Engaging Your Congregation with Steeply Cutting Energy Bills

"Working with our team is one of the most inspiring and rewarding experiences I've had; we know we're doing something really important and keep each other's spirits up." Creation Care Team member

Technically, slashing your congregation's energy bills is straight-forward. The real challenge? Marshalling the will and people power. From our experience, here's what you can do to engage your congregation.

1. Assemble a Team – and Lead It Effectively

To turn commitments into action requires a core group – a creation care committee or green team.



A team engaged in an effective meeting

- To help the congregation fulfill its commitment, this team will research, propose, and implement energy-saving measures.
- To help households make good on their commitments, the team will develop and implement a plan for encouraging and supporting congregants. This might include monthly informational e-blasts, organizing youth to help older members in their homes, asking clergy to give sermons or simply talk it up, selling energy-saving supplies, informational or celebratory events, and ongoing communication.

To keep the team motivated, be clear about your group's objectives and how you'll accomplish them. Before each meeting, communicate an agenda and timeline and stick to them. Members should commit to what they will do to help achieve the group's objectives and should be expected to follow through. In this way your team's work together will feel satisfying – and team members will come back for more.

2. Have Your Congregation and / or Its Members Make a Commitment

Without a specific commitment, energy conservation can be a vague goal that goes nowhere. Here are some possible commitments:

- A [pledge](#) signed by individuals to reduce their home energy use by a seventh,
- A vote by the congregation to reduce energy use in its house of worship by 25%,
- A grant agreement that commits the congregation to a percent reduction, or
- A [covenant](#) with H-IPL to become a *Seventh Day* congregation.

Creation Care Pledge for Congregational Members

The LORD God took the man
and placed him in the garden of
Eden, to till it and tend it
Genesis 2:15

Our faith calls us to be stewards for the world and to care for it. We are committed to protect
ourselves and the world from the effects of climate change and to live in a way that is
consistent with the values of our faith. We are committed to reduce our energy use and
to live in a way that is consistent with the values of our faith. We are committed to
reduce our energy use and to live in a way that is consistent with the values of our faith.

An effective commitment specifies the target reduction, a timeline, and how this reduction will be measured, for example, using the EPA Portfolio Manager for Congregations or the EPA household carbon footprint calculator.

A household energy
reduction pledge

3. Find and Create Community at Every Level

Your congregation and creation care team need to feel in abundant and excellent company as they undertake and lead the congregation to undertake changes. Community is important at every level:

- Leading your congregation to reduce its energy use is challenging. You may meet resistance. Your creation care team needs to have each other's support and good thinking.



A green team sings a hymn
playfully re-written to ask
congregants to conserve energy

- Your creation care team leaders will get ideas and support from creation care leaders from other congregations. If your city has a H-IPL affiliate, take advantage of its support. If it doesn't, you may want to create one that can bolster your and others' efforts.
- Members of your congregation who are cutting their energy use need a place to share their challenges, questions, and successes. Create opportunities – a potluck, a special worship service, an evening discussion or group time after services - for them to talk with each other.
- Knowing that congregations across Indiana are doing what you're doing will be motivating. Let them know about H-IPL, its monthly newsletter and the Task of the Month newsletter.

4. Ask Your Clergy Person or Lay Leaders to Lift This Up – and Lead by Example

Energy conservation is a faith issue: an issue of caring for our neighbors and the most vulnerable, of being prudent stewards of God's gift of creation, of not wasting. When faith leaders convey this in sermons, prayers, newsletters and by example, they have a powerful impact on their congregations. Resources to help them are easy to find on the web. Your governing body and clergy should be asked early on to sign a household pledge – and you should help them walk their talk.

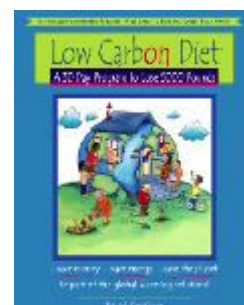


A pastor modeling Earth-friendly transport

5. Provide Tools and Guidance

Your congregation and congregants need to know what to do. Provide them with the information and tools they need to make good on their commitments. Such tools are easily available:

- H-IPL's Task of the Month toolkit, a program for whole congregations that breaks household energy reduction into twelve bite-size pieces and provides technical and peer support for each;
- *Low Carbon Diet* workbook, a playful self-led guide for groups to reduce home energy use: exceptional for gathering a team & getting it on the same page;
- H-IPL's household energy reduction checklist;
- H-IPL's Using Energy Prudently toolkit;
- The EPA Carbon Footprint Calculator and guide to home energy conservation



The *Low Carbon Diet* workbook

6. Tie Energy Conservation to Solar Panels

Congregations are excited by solar panels but, because congregations don't benefit from the solar tax credit, panels are costly and have a long payback period. Congregations are less excited by energy conservation, which costs much less and quickly pays back its cost with savings. Tying solar panels to deep cuts in energy use is a motivating combination: it excites congregations and is cost-effective. For more information, contact H-IPL at SeventhDayInitiative@gmail.com.

7. **Communicate, communicate, communicate!** To succeed, your community needs to hear about this over and over – in newsletters and sermons, on a bulletin board, from your youth, during religious education and weekly announcements, at congregational and committee meetings, through films and from speakers. In this way, energy conservation will become part of your congregation's culture. Keep your members informed of progress, provide them with tips, share challenges, remind them why all this is important. Keep it in front of their eyes! Above all, celebrate your successes - in community!



The Wrap (your water heater) Rap – a mission moment during worship services

"This is doable -- it has to be, and it is!" Creation Care Team member



Hoosier IPL Task of the Month Program

September: Seal Large Air Leaks

Task: Stop air leaks with caulking, foam and weatherstripping.

A house with thermal leakage is like a ship with a small hole in the bottom. Some might decide to ignore the hole and instead bail a little every morning, but the wise person realizes that laboring a little bit every day will eventually waste more energy than putting in one day of work. (<http://planetgreen.discovery.com/home-garden/sealing-thermal-envelope.html>)

Advanced: Improve insulation, windows, or other problem area in your home.

Tips for sealing air leaks: *Note: for comprehensive advice on sealing air leaks, please see http://www.energysavers.gov/your_home/insulation_airsealing/index.cfm/mytopic=11240 and follow the links for detecting air leaks, caulking, weatherstripping, etc. Also see http://www1.eere.energy.gov/consumer/tips/air_leaks.html*

- The most common places for air leaks are around doors and windows, but leaks can also be found around chimneys, recessed lights and light fixtures, attic entrances, electric wires and boxes, vents and fans, plumbing utilities, water and furnace flues, and electrical outlets.
- Walk around the exterior and look closely at doors, windows, and places where pipes and wires enter your house. Large gaps can be filled with expanding foam (recommended: Great Stuff for Windows and Doors -- it won't expand quite as much as regular Great Stuff). Caulk is best for cracks and gaps less than ¼" wide. A bead of caulk will stop air flow, but does not insulate.
- Inside, use a stick of incense on a windy day to detect places where air is getting through. Check around windows and doors, and also around can lights in the ceiling. Caulk around windows. If doors are leaky, check to see if weather stripping is worn. Replace it with the same kind: note the make and model of the door, if possible, and/or take a sample of the existing weather stripping along with you to your local hardware store. Note that the press-on foam weather stripping available everywhere will wear out quickly and need to be replaced often.

What else you can do:

- Make foam boxes to cover attic stairs, whole-house fans, and other large openings to the attic.
- Install a chimney pillow or other device to stop air flowing in and out of your chimney when fireplace is not in use. (<http://www.chimneyballoon.us/chimneyballoon.html>)

The U.S. Department of Energy estimates that air leakage can add 10 percent to your annual energy bill. This equates to about \$70 per year for the average home.

NON-ENERGY BENEFITS OF SEALING HOME AIR LEAKS

<http://homeenergysaver.lbl.gov/consumer/help-popup/content/~consumer~nebs~nebs-air-leaks>

Having a professional seal your home's air leaks can make your home more comfortable, reduce the risk of moisture damage, improve indoor air quality and fire safety, and help to prevent frozen water pipes.

A properly -sealed and -ventilated home can:

- Improve comfort. Leaky homes are uncomfortable, both in winter and summer.
- Reduce drafts and moisture problems. Sealing leaks reduces infiltration into your home, which helps to reduce drafts and the frequently associated moisture problems.
- Reduce annoying phenomena such as mysterious door slamming. Well-sealed homes also can avoid "pressure imbalances", which are created when more air is being exhausted than resupplied, or vice versa.
- Improve indoor air quality and fire safety. Pressure imbalances can lead to more serious situations in which furnace or combustion appliance exhausts are not removed fully from the home, or in which combustion flames are pulled down and out of their safe containment areas, potentially leading to house fires. Pressure imbalances can also increase the rate of radon entry into a home, particularly in basements.
- Keep your home comfortable and habitable longer during power outages. A well sealed home can remain comfortable and habitable longer than the ordinary home during power outages.
- Help prevent damages caused by frozen water pipes by reducing the infiltration of cold air into the house.
- Reduce your heating and/or cooling needs so that you may be able to get by with smaller, less expensive, heating or cooling equipment.

Detecting Air Leaks

- Hold a lit incense stick or piece of string near doors, windows, vents, and other seams or openings. Drafts will become apparent as the incense or string moves with the air current.
- Mark these points with chalk and determine if caulking(the sealing of spaces in non-moving surfaces, such as gaps in walls around ducts and electrical outlets) or weatherstripping (the sealing of the edges of moving surfaces like windows and doors) is required.
- For best results choose a cool, windy day and turn on exhaust fans, the furnace, and the clothes dryer. This will draw air out of the house and prompt outside air to come in at leakage points and replace it.
- Your local utility or building contractor might also offer a blower door test. This uses infrared technology to pinpoint air leakage locations while pressurizing your home with a blower door.



No-Cost and Low-Cost Sure Energy Savers



Help your congregation save energy, save money and protect the environment:

1. Commit to Energy Stewardship

Become an ENERGY STAR partner and commit to better stewardship at www.energystar.gov/JoinBuildings

2. Assess Current Performance

Benchmark your worship facility's baseline energy use, costs, and emissions with EPA's free, online Portfolio Manager® tool. Learn more at www.energystar.gov/Benchmark

3. Set Savings Goals using Portfolio Manager

Work with key staff and decision makers to integrate energy stewardship goals into congregational priorities.

4. Create an Action Plan

Download the **ENERGY STAR Action Workbook for Congregations** at www.energystar.gov/Congregations

5. Implement the Action Plan

Find free ENERGY STAR training webinars at www.energystar.gov/buildings/training and ENERGY STAR qualified products at www.energystar.gov/Products

6. Evaluate Progress

Highlight your savings and progress made through Portfolio Manager's standard or custom reports.

7: Recognize Achievements

Acknowledge everyone who helped, share your success story with ENERGY STAR, and consider achieving facility certification.

Lighting

- Turn off lights (and all equipment) when not in use.
- Install "occupancy sensors" to automatically turn lighting off and on as people need them.
- Replace incandescent bulbs with ENERGY STAR qualified compact fluorescent lamps (CFLs) and/or light emitting diodes (LEDs). CFLs cost about 75% less to use; last about 10 times longer. LEDs last about 20 times longer.

Office and Kitchen Equipment

- When necessary to buy new equipment for office or kitchen, always look for ENERGY STAR qualified products.

Heating, Ventilation, and Air Conditioning

- Keep exterior doors closed while running heating, ventilation, and air-conditioning (HVAC).
- Clean or change HVAC filters every month during peak cooling or heating season. Dirty filters waste energy, overwork the equipment, and cause poor indoor air quality. New filters are inexpensive.
- Install a quality programmable thermostat to optimize HVAC system operation on a "24/7" basis for savings, comfort and convenience.
- Use fans. Fans can help delay or reduce the need for air-conditioning by making a higher temperature feel more comfortable.
- Plug air leaks with weather-stripping and caulking to control ventilation and stop outside air infiltration. Check around windows and doors. Leaks in HVAC ducts, attics, basements, and crawlspaces can be even more costly.
- "Tune-up" your HVAC system each season to protect performance and longevity.

Water

- Buy EPA WaterSense® certified water fixtures.
- Fix leaks. Small leaks add up to many gallons and dollars wasted—especially for hot water.
- Buy an ENERGY STAR qualified water heater if a new one is needed. A "tankless" heater reduces "standby" energy storage costs.
- Set water temperature at about 110 – 120 degrees to prevent dangerous scalds and save money.

