



# POWER TO THE PEOPLE

How to fight global warming, lower your utility bills,  
and take a stand for a more sustainable future.

Leaders from around the world are calling global warming the biggest environmental challenge we face. Ice caps are melting; sea levels are rising; birds are returning from their wintering grounds to find their breeding areas transformed; and polar bears are literally drowning as their habitat liquefies. At the same time Americans, despite paying record prices to drive their cars and heat their homes, still spew a quarter of all global greenhouse-gas emissions. Preventing catastrophic climate change falls heavily on the shoulders of world governments, so the most important thing you can do is push lawmakers to impose a limit on U.S. greenhouse-gas emissions and to work with other nations to embrace clean and sustainable energy. Meanwhile, we at *Audubon*, along with the Rocky Mountain Institute ([www.rmi.org](http://www.rmi.org)), would like to offer some practical ways to fight global warming, on any budget, that go beyond turning down the heat this winter. Invest a little time and money and you'll soon be paying less on your energy bills. Invest more, and your utility might end up paying you. Even if some payoff periods are long, you will be doing good by living well, and helping to create a demand that drives down costs. What's more, you will be joining a growing number of Americans who will no longer sit idly by while Washington fiddles with what is possibly the greatest environmental threat of our lifetimes.



# GREEN HOUSE EFFECTS

## THE ECONOMIST

No or Low Cost/Quick Energy Fixes

## THE WEEKEND WARRIOR

Midlevel Investment/Major Energy Savings

## THE MAVEN

High Cost/Approaching Energy Independence

INSULATION

**Seal Air Leaks** The U.S. Department of Energy (DOE) estimates that air leakage accounts for up to 10 percent of a homeowner's annual energy bill, or about \$70 per year for an average U.S. household. Your first priorities are sealing your attic and basement. Then do windows, doors, vents, electrical sockets, and anywhere else air is escaping. If you're having trouble finding leaks, you can hire a professional to pinpoint them with a blower door test or infrared technology. When a home is sufficiently sealed, it's possible to downsize (or avoid upsizing) your heating and cooling systems.  
**Cost:** \$100 (do-it-yourself)–\$600 (professional)  
**Annual savings:** \$60–\$70  
**Payback:** 1.4–10 years

**Put Cash in the Attic** Newton's Fourth Law of Thermodynamics: Heat travels from the warmer to the colder parts of a system. Therefore, properly insulating your home will curtail the flow of heat to the outside—and conversely keep your house cooler in the summertime. Visit [www.eere.energy.gov](http://www.eere.energy.gov) to determine if you need better or supplemental insulation. You can now buy green insulation made from such things as cotton or sheep wool batting; recyclables such as blue jeans, newspapers or other cellulose materials; and soy.  
**Cost:** \$280–\$700  
**Annual savings:** \$68–\$135  
**Payback:** 4–5 years

**Think Big** While an existing home can be retrofitted to make it more energy efficient, a new house should begin with an integrated design that considers the relationships between systems, occupants, and the environment—and uses these connections to develop single solutions to multiple problems (shelter, energy savings, aesthetics, natural daylight, indoor environmental quality, affordability, etc.). One of the basic rules of this concept is sizing your energy requirements appropriately. For instance, when purchasing a home heating system, think about your actual use before you size your equipment.  
**Net cost:** \$300  
**Annual savings:** \$1,600  
**Payback:** 0.2 years

WINDOWS

**Keep Cold Air Out** Windows and doors account for as much as 30 percent of a house's heat loss or gain. If your windows and doors are in good shape (find out at [www.rmi.org](http://www.rmi.org)), it will be cost-effective to boost their efficiency by weather-stripping and caulking, fitting them with storm panels, and installing insulating curtains and blinds.  
**Cost:** \$67–\$320 per window if they are in good shape  
**Annual savings:** \$4–\$8 per window  
**Payback:** 8.2–78.8 years

**Update Old Windows** Upgrading a home's windows is usually recommended only for new construction or for major remodeling projects. Still, in colder regions of the country this tactic can be cost-effective. When buying new windows, always go with the most energy-efficient ones you can afford.  
**Net cost:** \$35–\$260 per window  
**Annual savings:** \$2–\$10  
**Payback:** 15.8–26 years

**Follow the Sun** Passive solar homes in the Northern Hemisphere are oriented along an east-west axis so that their longest walls and largest windows face south, providing the maximum benefits and best control of solar heat and lighting as the sun travels across the sky. This can minimize the need for air-conditioning and heating, and save as much as 30 percent on your energy bills.  
**Cost:** Depends on the scale of new construction  
**Annual savings:** \$225–\$450  
**Payback:** Immediate

LIGHTING

**Swap Light Bulbs** Replace traditional incandescent light bulbs with compact fluorescent light bulbs (CFLs), which now come in a range of sizes, so they'll fit almost any type of fixture, and styles, including full-spectrum, which mimics natural sunlight.  
**Cost:** \$3–\$9 per bulb  
**Annual savings:** \$7 per bulb  
**Payback:** 0.4–1.3 years

**Replace Light Fixtures** Though you can reap major savings by replacing incandescent bulbs with CFLs, updating light fixtures to those designated exclusively for compact fluorescents can be equally cost-effective—and even more advantageous.  
**Cost:** \$27 per fixture  
**Annual savings:** \$10 per fixture  
**Payback:** 2.8 years

**Design for Daylighting** Scientific research offers clear evidence that natural light from outside improves our well-being. In fact, studies show the effective use of so-called daylighting heightens worker productivity and leads to better overall student performance in schools. For high-quality daylighting, incorporate plans in your home design to eliminate glare and unwanted solar gain, and to distribute the light evenly and effectively.

HEATING

**Tune Up Your Furnace** Improve your boiler or furnace's efficiency through better maintenance and minor modifications: seal leaky ducts on furnaces; insulate supply and return pipes on boilers; during the warmer months turn off the pilot light on boilers or furnaces that are used solely for home heating (not for hot water); clean or change air filters on furnaces; install radiator reflectors on boilers to avoid heat transfer from the radiator to the adjacent exterior wall; clean furnace registers; have furnaces and boilers serviced regularly (every two years for gas, annually for oil); shut the vent damper during the off cycle to prevent heat from being drawn up the flue; install zone-control radiators; and use a programmable thermostat to keep the house cooler when you're sleeping or not home.  
**Cost:** \$215–\$285  
**Annual savings:** \$160–\$236  
**Payback:** 0.9–1.8 years

**Heat the Space You're In** If your central heating system is an electric furnace, you can most likely save money by using an efficient space heater for the parts of the house you use most—the living room, for instance. However, if you have a large family and need more than three space heaters operating at one time, a central heating system is probably more cost-effective. Examples of energy-efficient space heaters include vented gas heaters, pellet or corn stoves, newer models of wood-burning stoves, and electric baseboard heaters. The efficiency of these space heaters varies, as do the environmental consequences of the different types of fuel they use. Wood for instance, can be an environmental choice if it was logged in a sustainable fashion.  
**Cost:** \$379–\$758  
**Annual savings:** \$72–\$192  
**Payback:** 3.9–5.3 years

**Go High, Go Deep** Homeowners can make their own energy by investing in solar or geothermal technologies, which take advantage of a sustainable power supply naturally generated by the sun and the earth's interior. There are two types of solar systems, liquid and active, and both use supplemental electrical equipment (pumps or fans) to move heat around a house. Geothermal heat pumps capture the earth's natural heat energy, channeling it into an indoor air delivery system in winter and doing the reverse to provide natural cooling in summer. A geothermal system operates effectively in any climate, but houses in regions with more extreme heating and cooling requirements (cold winters and hot summers) realize the greatest operational savings.  
**Cost:** \$5,000–\$18,000 (solar); \$7,500–\$15,000 (geothermal)  
**Annual savings:** \$192–\$384; \$183–\$435  
**Payback:** 26–47 years; 17.3–82 years

HOT WATER

**Cheat Your Water Heater** Water heating can account for roughly 19 percent of a home energy bill. The majority of U.S. houses have gas water heaters, but almost 40 percent use doubly expensive electric systems. Make your water heater work more efficiently: wrap it with an insulating jacket; insulate hot water pipes; turn the heater off when you're on vacation; install timer controls that switch off the heater when you're at work or sleeping; add anti-convection valves and loops; turn the temperature down to 120 degrees Fahrenheit or less.  
**Cost:** \$80–\$110  
**Annual savings:** \$57–\$123  
**Payback:** 0.7–1.9 years

**Rank Your Tank** When you're suddenly faced with replacing your water heater, a gas model might cost a few hundred dollars more than electric, but it can save you upwards of \$100 annually on your energy bill. All things being equal, the smaller the tank, the more efficient the water heater. The most efficient new gas tanks have energy factor (EF) ratings of 0.68. Those that have electric pilot lights save even more. Demand water heaters are at least 8 to 14 percent more efficient than gas, but they may provide only a portion of a home's needs.  
**Net cost:** \$50–\$350 (gas); \$400–\$1,683 (demand)  
**Annual savings:** \$142–\$167; \$179–\$216  
**Payback:** 0.4–2.1 years (gas); 2.2–7.8 years (demand)

**Sun Bathe** There are many types of solar water-heating systems. The climate where you live will generally determine which one is right for you. A solar hot water heater can save energy and money over the long term. It's usually used to preheat water for a conventional water heater that finishes the job (and covers on cloudy days). For additional information, visit [www.eere.energy.gov/RE/solar\\_hotwater.html](http://www.eere.energy.gov/RE/solar_hotwater.html).  
**Cost:** \$2,500  
**Annual savings:** \$150–\$225  
**Payback:** 11.1–16.7 years

EFFICIENCY

**Wash Wisely** Dishwashers, washing machines, and dryers are among a home's most energy-intensive appliances. There are many ways to cut costs and save energy: wash only full loads of dishes and clothes (use detergents formulated for cold water); insulate exposed pipes on your washing machine; dry clothes outside on a line when the weather is nice; dry two or more wash loads in a row to make use of the hot air already in the dryer; locate the dryer in a heated space; clean the fluff out of the dryer filter before each load and regularly clear lint.  
**Cost:** 0  
**Annual savings:** \$52–\$71  
**Payback:** Immediate

**Wish Upon an Energy Star** Updating appliances to energy-efficient models can cut your utility bills by as much as a third, with similar savings on greenhouse-gas emissions. When buying new appliances, look for the Energy Star logo; this means they have met strict energy-efficiency guidelines set by the EPA and the DOE. Additionally, side-by-side refrigerator/freezers use roughly 10 percent more energy than similarly sized freezer-on-top models; automatic icemakers typically increase refrigerator energy use by 10 to 20 percent.  
**Net cost:** \$289–\$1,312 (refrigerator/freezer)  
**Annual savings:** \$21–\$40  
**Payback:** 13.5–32.5 years

**Shop Locally** Buying appliances and building materials locally saves energy that would be spent on transportation costs, sometimes makes them more affordable, and increases the chances that you will be able to donate them for reuse or recycling—measures that also save energy that would otherwise be spent on producing new material. Incorporating salvaged materials—doors, tubs, sinks, wood—in your green home design adds further energy, environmental, and cost savings.

CONSERVATION

**Slay Vampires** An energy vampire is an electronic device—a television, phone, fax, computer, or cell phone charger—that draws energy even when it's not in use or when it's in "standby mode." These vampires can suck up to seven watts of energy per hour. How do you conquer them? Buy energy-efficient appliances that in standby mode use one watt or less of energy per hour. You can also plug computers into smart strips, which sense when you shut down and turn off the power to select receptacles. Ordinary power strips paired with entertainment systems and the like can also easily be switched off when electronics are not in use.  
**Cost:** \$0  
**Annual savings:** \$5–\$34  
**Payback:** Immediate

**Cool It** Use energy-efficient ceiling fans to circulate air. Tune-up air-conditioning units and change the filters annually. Open windows at night to cool the home by flushing out heat and moisture that accumulates during the day. Reflect heat from a roof with special whitening paint, and install proper ventilation. Deciduous trees planted on the south side of a home can also help reduce solar radiation absorbed by the house in summer, while still allowing the sun to naturally heat the home in winter.  
**Cost:** \$125–\$3,550 (ceiling fan); \$1,074–\$2,138 (passive cooling, existing home)  
**Annual savings:** \$12–\$24; \$67–\$134  
**Payback:** 5.3–300 years

**Top It Off** A green roof is a plant-filled rooftop that offers an attractive and energy-saving alternative to a conventional one. Though the most common reason for installing a green (eco-, living, or vegetated) roof is to absorb rainwater, natural cover overhead can also help save energy by providing a living layer of insulation that also absorbs sunlight. Learn more at <http://greenroofs.com>.  
**Net cost:** \$8,270 more than a conventional roof  
**Annual savings:** \$39–\$59  
**Payback:** 140–210 years

These energy savings are based on information and calculations provided by the Rocky Mountain Institute ([www.rmi.org](http://www.rmi.org)). Calculations relied on the following assumptions about annual costs: heating = \$480; cooling = \$197; water heating = \$300. In regions where energy costs exceed these assumptions, savings will be greater and payback periods shorter.