Green Home Guide

**2010**

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*A small group of thoughtful people could change the world.*

*Indeed, it’s the only thing that ever has.*—Margaret Mead, American cultural anthropologist

Interest in being good stewards of the Earth’s limited energy and water resources has spread to nations around the world. Governments and citizens, in word and deed, are expressing the sentiment, “I do care about future generations. I want to live in a way that respects and preserves the environment.”

Nations have set high goals for reducing the carbon footprint their economic growth has created. Developed and developing nations struggle to arrive at a new definition of progress that inexorably includes ecological sustainability. But, nations and government are not the only instruments of change; and, perhaps, they are not even the most powerful. Efforts initiated by individuals, like you, to use energy and water more efficiently in their homes can change the world, as the anthropologist Margaret Mead said.

It won’t be easy. In a developed nation like the United States, the leading source of carbon emissions is power plants that generate electricity. Governments counter this trend by mandating utilities to use more renewable energy to generate electricity.

But renewable energy carries a per-unit cost three-to-five times higher for utilities than the fossil fuel sources they use now. In addition, utilities must spend billions of dollars to update aging electric power grids to be able to incorporate renewable energy. Those costs will be borne by utility customers—individuals and households.

Action on “carbon cap and trade” programs aims to hasten the use of renewable energy by placing a higher cost on fossil fuels. Such programs have been adopted in the European Union, Australia, and in a couple regions within the United States. America’s official cost-estimating agency, the Congressional Budget Office, concluded that one proposed nationwide cap and trade program would boost electricity costs by $700 for low-income families and $1,500 for middle income households. Electric rates are set to rise in the next generation.

Global economic and population growth mean that the world must find 50% to 60% more energy than is produced today in a mere 25 years, according to a Harvard University energy expert. Likewise, nations are believed to be entering an era of scarcity for another precious resource: water. Water is vital to agriculture and energy production. Failing to conserve water will have implications for food costs—meat, eggs, milk, and cereal—as well as gasoline and electricity.

# Average household energy and water consumption

Average household energy and water consumption is distributed among major home needs like this:

**Energy Water**

Space heating—31% Toilets—27%

Space cooling—12% Clothes washers—22%

Water heating—12% Showers—17%

Lighting—11% Faucets—16%

Computers and electronics—9% Leaks—14%

Appliances—9% Baths—Less than 2%

Refrigeration—8% Dishwashers—Less than 2%

Other—8% Other domestic uses—2%

A Certified Green Consultant can help you reduce energy and water consumption, increase the comfort and efficiency of your homes, and support reduction of carbon emissions.

A Certified Green Consultant is a trained professional who uses expertise and knowledge of residential and small business construction to identify performance opportunities for improvement in the performance of ecosystems and substructures (heating, cooling, electrical, plumbing, and appliance/equipment usage).

The Certified Green Consultant synthesizes information about energy, building, and technology trends, and using a compassionate and informed sense of the customer’s priorities, presents a strategy to remediate and optimize energy and water use in the home or small business. The emphasis is on cost savings and rapid payback of investment.

The uphill climb of energy and water costs will be a long and tough road. The Certified Green Consultant is dedicated to serving as your trusted source of information and counsel in these matters for years to come. Don’t wait for high-bill season. Get ahead of the curve and help lead change.

# Thermal Envelope

Every house—large or small, old or new—has a thermal envelope, and understanding how it is designed to function is the first step in improving the operational efficiency of the home. In its simplest terms, the thermal envelope is any part of the house that protects its occupants from the outside elements. This includes the walls, roof, attic, foundation, crawlspace, windows and doors.

When the thermal envelope is working properly, there is airtight construction, good ventilation, and a balance in pressure between outside and inside conditions. An out-of-balance thermal envelope creates negative pressure that allows air to flow in, but not out, exposing occupants to exhaust gases, moisture, and mold.

Here are just a few tips to help keep your home’s thermal envelope in balance and functioning well:

* Caulk around windows and doors inside where they meet up with the wall, and around baseboards and fireplaces between masonry and trim to close gaps and reduce air filtration.
* Remove electric switch plates and install a foam gasket and then replace the cover, or use a childproof cover that also keeps air from leaking. Replace old recessed light fixtures with air tight ones.
* Outside the house, check overhangs. If the material underneath is wood, caulk gaps. At the bottom edge of the walls where the siding meets the foundation, there can be gaps that should be caulked with 100 percent silicone, pushing the tip of the caulk gun as far in as possible.
* Open drapes, shades, or blinds during times of maximum sunlight to capture an abundance of the sun’s heat through south-facing windows. Increase the home’s thermal storage from the sun through use of interior design elements and materials, such as masonry, clay, and double layers of drywall.
* Take a look at the composition of your doors. A modern steel and fiberglass-clad door with an R value of 5 to 6 without a window provides five times the insulating value of a solid wood door, if both are 1-1/2 inch thick.
* Make it a family habit never to carelessly leave doors and windows open. Many practices that cost nothing, but make a substantial contribution to lower costs and more efficient heating and cooling.

# Energy Savers: Insulation and Programmable Thermostat

Heating and cooling represent more than 40% of the average household energy bill. Insulation that meets recommended industry standards and modern programmable thermostats are essential to improving the operational efficiency of heating and cooling systems. Here are some important tips:

* Insulation improves the home in four ways: heat control (keeping the house cool in the summer and warm in the winter); sound control; moisture control (insulation can be installed with a vapor retardant); and residential ecosystem pressure balance through an optimal tight thermal envelope.
* Insulation isn’t just for attics. Check ceilings, walls, cathedral ceilings, unheated garages and porches. Insulation can loosen, droop, and become torn or wet and flat. An inspection can show if you are achieving the insulation power you believe.
* All household members understanding proper operation of the thermostat is money in the bank. Energy data shows an average household could reduce a $2,200 annual energy bill by $180 if thermostat functions were better understood by the entire family.
* A couple of longstanding myths about thermostat operation have led people to misusing this important device. Setting a higher temperature will not heat or cool a house more quickly. And frequently turning the heating or cooling system on and off will not reduce energy consumption.
* A programmable thermostat with pre-set times and temperatures can reduce “impulse” energy use caused by immediate reaction to personal comfort level when coming in from extreme heat or cold.
* Settings of thermostats (and furnaces and water heaters) should be reduced during vacations and other long absences.
* New air conditioners use from 30% to 50% less energy than their counterparts in the 1970s. Also, older heating and cooling systems are larger than needed. Homeowners could choose smaller sized systems and reduce costs, while having greater efficiency.

# Appliances

Household appliances—kitchen, refrigeration, and laundry -- plus home electronics represent 26% of average household energy use, the second largest usage for households on average. Eco-conscious habits can achieve maximum appliance efficiency at no cost. Here are some tips:

* If your household changes, adjust your appliances to fit. If the kids are grown or gone to college, the full-sized washer and dryer might not be needed anymore. Look into purchasing smaller, even stackable versions of these appliances.
* Give the oven a rest in hot months. Heat up leftovers in the microwave or use the outdoor grill as often as possible.
* Leave appliance heat cycles off during the summer. Air-dry dishes and clothes. Also, a cold-water wash for clothes works fine. If heat is a must, run appliances early or late in the day.
* Keep your stovetop clean and shiny. Blackened burner pans can absorb a lot of heat, reducing burner efficiency. Reduce cooking time by defrosting frozen foods in the refrigerator and keep pre-heating times to a minimum.
* Clean the refrigerator coils monthly (pet owners more often) with a $3 coil brush and make sure the door seals are tight.
* Avoid using refrigerator features like door ice and water dispensers that use more energy; purchase a refrigerator thermometer to allow monitoring the temperature; and don’t keep an old refrigerator running as a backup. It’s no more efficient in the garage than it was in the kitchen.
* Inspect appliance vents regularly to make sure they are free-flowing and not clogged.
* Many electronics continue to use electricity when they are plugged in, but not in active use. It’s called phantom electric load. Shutting off these devices at the plug or power strip when not in use can save a couple hundred dollars each year.

# Indoor Air Quality

Inadequate ventilation, excess air filtration, dirty filters, and pilot lights that are never checked can trap noxious combustion gases and particulates inside the home. That can lead to a host of health symptoms resulting from indoor air pollution.

The best tip here: Follow the maintenance tips on the last page faithfully, guard against gaps and air leaks, and make sure vents and ducts are in good repair, clean, and working properly.

Here is what the U.S. Environmental Protection Agency has to say:

*“Indoor pollution sources that release gases or particles into the air are the primary cause of indoor air quality problems in homes. Inadequate ventilation can increase indoor pollutant levels by not bringing in enough outdoor air to dilute emissions from indoor sources and by not carrying indoor air pollutants out of the home. High temperature and humidity levels can also increase concentrations of some pollutants.”*

The health effects of indoor air pollution can include:

* Irritation of the eyes and throat
* Dizziness
* Fatigue
* Symptoms that mimic a cold
* Asthma: The chronic constriction of the muscles surrounding the airways and inflammation or swelling and irritation of the airways themselves
* Hypersensitivity pneumonitis, or HP, also called extrinsic allergic alveolitis: Inflammation of the lungs caused by repeatedly breathing in organic dust, fungus or mold
* Humidifier fever: A benign (or non-life threatening) variant of allergic alveolitis caused by exposure to amoeba, bacteria, and fungi found in air conditioning systems, humidifiers, or aquariums.

# Water Use and Water Heating

On average, a family of four uses about 400 gallons of water each day. But, the potential for savings is enormous. If even just 10% of U.S. homes upgraded to WaterSense water-efficient fixtures, water use could be reduced nationally by 120 billion gallons, saving $800 billion a year. Here are some other tips.

* Fix leaks. The U.S. Environmental Protection Agency estimates that 5% to 10% of American homes waste in excess of 90 gallons of water daily due to leaks.
* If you are in the market for a new water heater, get a contractor to assess whether the tank size you have now is what you really need. A smaller tank that meets current energy standards may operate more efficiently that the larger, older tank you have now.
* Unless your water heater tank was manufactured with insulation of an R-24 value of higher, a water heater insulation blanket can reduce standby heat losses by 25% to 45%. That means a 4% to 9% reduction in water heating costs.
* Set the temperature of the water heater between 120 to 130 degrees Fahrenheit, making sure not to exceed the high or the low.
* In the kitchen, wash full loads in dish and clothes washers or, wash a smaller load only if adjusting water levels appropriately. Keep cold water in the refrigerator so family members won’t need to run the tap for long periods of time to get a cold drink.
* Install faucet aerators. Standard kitchen (and bathroom) water faucets use from 4 to 7 gallons per minute. Thus, one time of washing dishes (using a faucet without an aerator) can use up to 120 gallons of water.
* Approximately 73% of the water used in a typical shower is hot water. Inexpensive and simple-to-install, low-flow showerheads and faucet aerators can reduce home water consumption and water heating costs by as much as 50%.
* Investigate high-efficiency toilets, which use just 1.28 gallons of water per flush. That’s about 20 percent less water use than a standard toilet and 37 percent less than older toilets that used 3.5 gallons of water per flush.
* Reduce outdoor water use by adopting water-efficient landscaping techniques, making sure hoses aren’t cracked, ensuring sprinkler heads are in good condition, and minimize water hose use by taking the car to the car wash and using a broom instead of water force to clean the driveway.

# Lighting

On average, residential lighting can account for about 20% of the household electricity bill. Despite this significant cost, many homeowners never give lighting much thought, either in terms of whether they are using lighting strategically or the environmental and cost impacts of whatever kind of lighting product they are purchasing.

Here are some tips:

* Adopt purpose driven lighting. Use a full palette of lighting options instead of a wide assortment of lamps or overhead lights. A mix of task lighting, ambient lighting, and in-between lighting not only can reduce energy costs, but create a more inviting ambiance.
* Install compact fluorescent lights, which are about 70% more energy efficient and eight to ten times more long-lasting than even the most enduring standard incandescent. A CFL bulb can do in 7 to 10 watts what it takes an incandescent bulb 40 watts to do.
* Use light emitting diode (LED) lighting for interior accent lighting and indoor and outdoor holiday lighting. These lights use tiny amounts of electricity and, although small in size, they can be grouped together for light intensity.
* Use natural lighting when possible. Open draperies or blinds on a sunny day. Rearrange furniture so that it does not block any natural light.
* Where possible, install dimmers on light switches to have better control over light intensity and energy usage. Occupancy sensors can be employed to turn off lights when no one is in the room.
* Finally, turn off the lights when they are not in use. The most conspicuous lighting-associated energy wastage occurs when the lights in a room are blazing—and no one is there.

# Maintenance of the Residential Eco-System

The Certified Green Consultant is working to transform the way homeowners view the houses they occupy. Certainly, this is the center of the family’s universe and often the biggest household investment. But, it also is something more. A house is a residential eco-system, a living, breathing biological system of elegant design in which each part and each system serves a vital. A house is not unlike the human body.

A house has: A body has:

Temperature control A hypothalamus to regulate temperature

Wiring A brain

Lighting Eyes

Thermal envelope Skin

Ventilation Circulatory system, lungs

Plumbing Plumbing

Here’s one final comparison between a house and a body. When your body is out of shape; when there is congestion in your sinuses and lungs; when poisons feel like they are coursing through your veins, and your physical exterior is sliding into decay, will you be performing at your best?

It’s the same with a house. A house needs care; it and all its subsystems need regular maintenance to perform at its best. Here are some of the leading maintenance tips to follow:

# Forced Air Unit for Central Heating and Cooling

* Change the furnace filter once a month, or in accordance with manufacturer recommendations
* Have an HVAC (heating, ventilation and air conditioning) specialist conduct a comprehensive system maintenance inspection each fall and spring to examine the fan motor, fan-and-limit control, pilot light (if there is one) and other controls, to clean hoses and vents, and thoroughly service the compressor and evaporator. Clean all parts and adjust the air-fuel mix of the gas pilot light, if needed.

# Heat Pumps

Here are the top maintenance concerns:

* Remove dirt from the coils; a garden hose works for this purpose
* Check for signs of standing water in the refrigerant pan, which could indicate a valve is clogged
* Clean the air filter to enable the fan to blow sufficient air over the indoor coils to warm them adequately

A professional with the proper diagnostic equipment can do much more than the homeowner:

* Check the refrigerant level
* Measure the temperature and performance in various parts of the system
* Check for leaks
* Recharge the system if the refrigerant level is low

# Pool Heater Thermostat

* Have a technician inspect the swimming pool heater once a year before use

# In-Home Thermostat

* Ensure the thermostat cover has not been jarred or jammed into the device incorrectly
* Pull off the cover and clean the contacts with a soft dry brush. Turn the dial to clean in all the crevices.
* Clean the switch contacts: remove the screws holding the thermostat body, pull out the body, gently pull back on the fan control lever, slip a piece of white bond paper behind it and slide the paper back and forth to clean the contact behind the lever.
* Clean the mode control lever, if there is one, in the same fashion
* The most common reason for thermostat malfunction is dirt interring with the device’s calibration and operation. If the calibration is off even just three degrees, this can increase the fuel bill 7%.

# Weatherstripping Windows and Doors

* Make sure window sashes are clean and dry before weatherstripping
* Ensure it’s not too cold for pre-formed V-strip weatherstripping to stick to surfaces
* Measure a length of weatherstripping against the window sash height and cut two strips of weatherstripping about an inch longer than the sash height
* Peel off the weatherstripping backing and insert it between the window sash stile and the window jamb, pressing it firmly in place
* Drive finishing nails into the weatherstripping material and three points, equally spaced, to ensure the weatherstripping does not slip. Do this for each of the two strips (one on each side of the window)
* Raise the bottom window sash and adhere the adhesive side of the weather stripping to the bottom of the window. The pressure when the window is closed will form a seal

This same material can be used to weather-strip around doors. There are a couple of other considerations for weatherizing doors:

* Any door crack in wood doors should be caulked or repaired with wood filler tinted to match the color of the wood
* If there is a gap where air can enter between the bottom of the door and the threshold, install a bristle sweep on the bottom of the door A gasket can be installed between the door and the threshold to further ensure the air tightness of the door

# Contact Information

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