

Possibilities of Energy Conservation (100 Tips) In Day-To-Day Life

***Manojkumar U. Borekar, V.S.Sapkal, R.S. Sapkal**

*University Department of Chemical Technology (Heat and Mass Transfer Laboratory),
Sant Gadgebaba Amravati University, Amravati (M.S)-444602, India*

May 2006

Abstract

Energy conservation became important in the late 1970s and early 1980s mainly due to the 1973 oil embargo. In view of tightening energy supplies and sharply rising costs, new approaches to controlling energy consumption were put into effect. Initially, conservation was largely based on operations and maintenance approaches. These are still the most cost effective. It is important to periodically review buildings to be sure they are being operated and maintained in an energy efficient manner. Building commissioning consists of verification and documentation that all building facility systems perform interactively in an efficient manner and that operation and maintenance personnel are well trained. Energy conservation is an important part of the commissioning process. Energy conservation today involves much more in the way of capital improvements than it did a few years ago. There are many proven products and services available to reduce utility costs. Early energy conservation efforts were sometimes seen as a nuisance to building occupants. Today, many of the improvements being made primarily to conserve energy actually improve the attractiveness, comfort, and usefulness of the building. At today's energy prices, the strongest argument for conservation and an energy management program is the cost of not conserving.

Introduction

One of the most effective ways to save energy is to improve operations and maintenance. In many buildings it is possible to save ten to thirty percent of the energy usage by changes in operation and maintenance. In the paper that follows many of the recommendations involve operation and maintenance. This paper covers a possible energy conservation tips applicable in day-to-day life may results in significant amount of household energy. The intensity of energy conservation by different energy conservation tips discussed in this paper may differ according to geographical location, climate condition, and life style.

Keywords: Energy Efficiency Ratio, R-30 insulation, air conditioning, efficiency, heating, cooling, weather stripping

**Corresponding Author: Tel: +919890038262, Email address: conserveenergy@gmail.com, manoienegy@yahoo.co.in*

Energy Conservation Tips

House

1. Consider the installation a heat pump in your home to benefit from the most energy efficient heating system you can buy. You'll also get air conditioning because the heat pump reverses operation in summer to give you cooling comfort.
2. Keep the overhead door of an attached garage closed to block cold air from infiltrating your house. Also, keep the connecting door to the house and heated basement closed.
3. Close hot-air registers and radiator valves in unused rooms with all types of heating systems, except a heat pump. For zoned systems, such as ceiling cable or baseboard, set the thermostat back in unused areas.
4. Make sure draperies and furniture aren't blocking the registers in your house.
5. Open draperies on south-facing windows on sunny winter days to take advantage of available solar heat.
6. Use bath and kitchen exhaust fans only when needed during the heating season. Fans draw heated air out of your home.
7. Set your heating thermostat as low as comfort permits. Each degree over 68 degrees F. can add three percent to the amount of energy needed for heating; each degree below 68 degrees F. can save about the same amount of energy
8. Lower the thermostat a degree or two before you entertain a large group of people.
9. Check your furnace filter at least once a month during the heating season and clean or replace it as needed.
10. Oil the motor and/or fan bearings of your forced-air furnace according to manufacturer's instructions. This will extend the life of the equipment.

Heating

11. Insulate your home to adequate standards. It's the most important single step toward saving energy in the home. Before building a new home, check your utility company for insulation standards, which it may require as a prerequisite for service connections.
12. Add insulation to your existing home where possible. Your home should have a minimum R-30 insulation in the ceiling or attic. For advice on insulating your home, see an insulation contractor.
13. Choose window sizes and types that will not only save you energy but also give optimum light and view. Larger glass areas increase heat loss and gain. Try to hold glass area to 15 percent or less of the square feet of floor space
14. Select low emissive or insulated glass for windows throughout your home. It keeps heat inside during winter and outside in the summer.
15. Install wood- or metal-frame storm windows to provide a second thickness of glass and a layer of still air that retards heat transmission.
16. Replace broken window glass, worn weather stripping, and improperly fitting doors.
17. Install a tight-fitting damper and glass doors on your fireplace, and close them when you're not using the fireplace. When dampers are open, they allow the natural draft of chimneys to pull heated air from inside your home in winter and draw cool air from inside your home in summer. Install an outside air vent on a new fireplace so the fireplace can draw outside instead of inside air for combustion.

18. Locate your heating thermostat on an inside wall away from windows and doors. Cold drafts will cause the thermostat to keep your heating system running, even when the rest of your house is warm.

Water Heating

19. Set the temperature control on your water heater to 120 degrees F., 140 degrees F. if you have a dishwasher. The higher the temperature of the water sitting in the tank waiting for you to use, the more heat it loses.
20. Locate your water heater as close as possible to the point of greatest hot water use. Hot water remaining in a supply pipe after you turn off the tap eventually cools and is wasted. The longer the supply pipe the more heat lost.
21. Insulate long, hot water supply pipes.
22. Use the smallest practical diameter for hot water supply pipes to minimize heat loss and to reduce the volume of trapped water.
23. Install a large capacity no insulated tempering tank in the supply line to the water heater when possible. A tempering tank raises the temperature of water before it enters the water heater. The higher the temperature of the water going into the heater, the less energy it needs to reach the desired temperature.
24. Insulate your water heater with a special insulating kit or by wrapping the tank with R-19 insulation. Remember to leave openings around electrical connections, thermostats, heating elements, gas supply lines, air intake, and the drain valve.
25. Add flow restrictors to showerheads and hot water faucets. These inexpensive and easily installed devices reduce the amount of energy and hot water you use.
26. Repair leaky faucets promptly. A steady drip can waste gallons of hot water per Month.
27. Encourage family members to take short showers instead of tub baths. The average person uses about half as much hot water in a shower as in a tub.
28. Turn off running water when shaving or brushing your teeth and fill a dishpan with rinse water instead of letting the faucet run while you do dishes by hand.
29. Use cold water when operating your garbage disposal. It saves energy and solidifies the grease, which is then ground up and flushed away.

Cooling

30. Consider installing an add-on heat pump in your home to receive air-conditioned comfort in summer and low-cost heating in winter.
31. Insulate your home to keep moderate temperature in room. Your attic should have R-30 insulation. Contact an insulation contractor for insulation standards for the rest of your home.
32. Ventilate your attic to relieve heat buildup caused by the sun. Continuous ridge and soffit venting is better than gable vents alone
33. Improve airflow in the attic of your existing home by adding or enlarging vents, if necessary.
34. Seek professional help in determining the size of cooling equipment you need. Avoid over-sized units. They draw more energy than necessary and cannot properly dehumidify, leaving you with a cold, clammy feeling.
35. Select air conditioning equipment on the basis of its Energy Efficiency Ratio (EER). You can calculate the EER for window units or central systems by dividing the cooling capacity, expressed in BTUH, by the electric power input, expressed in watts. Generally, an EER of 13 or more is excellent; 11 or 12 are good; 10 are just adequate. Avoid equipment with an EER below 10.
36. Locate the compressor units of central air conditioning and heat pump systems in an outside area shaded by the house or by plantings. Keep your unit clean and free of any plant

overgrowth or debris that might interfere with air circulation.

37. Locate window air conditioners on the north side of your house. Direct sunlight on your unit makes it work harder.
38. Set the cooling thermostat as high as comfort permits. The higher the setting, the more energy you save
39. Shut air vents in the rooms if you are cooling with a window unit so cool air can't escape.
40. Close registers and turns off window air conditioners in unused rooms. Keep doors to unused rooms closed. Do not close registers if you have central air conditioning or a heat pump.
41. Draw shades or draperies to block the sunlight during the hottest part of the day.
42. Install awnings over windows exposed to direct sunlight.
43. Run kitchen and bath exhaust fans only long enough to rid the house of unwanted vapor, smoke, and odors during the summer. Running them too long allows cool air to escape.
44. Position heat-producing appliances such as lamps and TV sets away from the cooling thermostat. Heat from equipment may cause the thermostat to read a temperature higher than the true room temperature. It could lead to overcooling the entire house.
45. Check air conditioner filters at least once a month during the summer and clean or replace them as needed.

Refrigeration

46. Select refrigerator and freezer sizes that are just large enough for your family's needs. Anything larger uses more energy than necessary.
47. Keep refrigerators and freezers filled to capacity, but don't overcrowd to the point where air cannot circulate freely around food.
48. Clean the vacuum condenser coils in the back or at the bottom of your refrigerator every three months or so. Dust-covered coils impair the efficiency of compressor operation and increase energy usage.
49. Make sure refrigerators and freezers have tight-fitting door gaskets to prevent infiltration to warm air. Check your gasket by placing a 150-watt trouble light inside your refrigerator. If you see light shining through to the darkened room, your door requires adjustment or a new gasket.
50. Use the yellow Energy Guide labels found on new refrigerators or freezers to help you buy the most energy -efficient models. The energy labels compare average annual operating costs of various models.
51. Use the power-save switch for your refrigerator. This will allow you to turn off the heating elements imbedded in the walls of your refrigerator that prevent condensation on the exterior surface. Generally, moisture forms only in humid weather, so activate the elements during summer months if needed. Check your use-and-care manual for specific instructions.
52. Turn down your refrigerator and remove perishables before going on an extended vacation
53. Do not place-uncovered liquids in your refrigerator. In addition to absorbing undesirable flavors, the liquids give off vapors that add to the compressor workload.
54. Remove all ingredients for a meal from the refrigerator or freezer at one time. Each time you open the door the compressor has to run a bit longer to replace the cool air that spills out. A chest-type freezer is less likely than an upright freezer to lose cold air when you open the door.
55. Discourage leisurely open-door inspections of refrigerator contents by family members looking for snacks.
56. Locate refrigerators and freezers away from direct sunlight and other warm-air sources such as water heater, oven, and dishwashers.
57. Do not allow ice to accumulate more than one-fourth inch on manual defrosts of refrigerators and freezers.

Lighting

58. Check the wattages of the incandescent light bulbs in your house. In many cases, you can substitute lower wattage bulbs and get lighter for the same amount of energy. Look for the lumens of a bulb instead of watts. Lumens indicate the brightness of the bulb. Watts only tell you the amount of power it takes to make the bulb work.
59. Use long-life bulbs only when advantageous, such as in hard-to-reach places. They give less light than standard incandescent bulbs of the same wattage.
60. Urge everyone to turn off lights when leaving a room. Having wall switches in convenient places help everyone remember.
61. Select lighting fixtures on the basis of their efficiency. Fluorescent lamps produce about four times as much light per watt as incandescent bulbs.
62. Install fixtures on two or three separate circuits in large rooms where you may need high levels of lighting periodically but not all the time.
63. Use three-way switches or dimmer control switches to keep lighting levels low whenever possible.
64. Install photoelectric controls and timers to turn off outdoor lights during the day.
65. Clean lighting fixtures regularly. Dust on lamps, reflectors and light bulbs impairs Lighting efficiency.
66. Locate floor, table and wall lamps in the corner of a room rather than against a flat wall. Lamps in corners reflect light from two wall surfaces instead of one, and therefore, give you more light.
67. Choose light colors for walls, ceilings, floors, and furniture. Light colors reflect light. Dark colors absorb light and require higher bulb wattages.

Laundering

68. Sort clothes and schedule laundering so you can wash only full loads. It takes almost as much electricity to run a small load as it does a full one.
69. Set the water selector on your washer to warm or cold for most loads. Very few loads require hot water for washing. Tests indicate that cold-water detergents thoroughly clean most fabrics in warm or cold water with considerable savings on the energy required for water heating.
70. Always use cold water for rinse cycles.
71. Use the amount of laundry detergent manufacturers recommend. Over dosing hampers effective washing action and may require extra rinsing which uses more energy.
72. Dry only full loads in your dryer but don't overload. It causes excessive wrinkling.
73. Avoid over drying. This wastes energy and harms fabrics as well.
74. Remove clothes from the dryer as soon as it stops, before wrinkles have time to set. Clothes you promptly fold or place on hangers require little or no ironing so you can save electricity as well as your own energy.
75. Clean the lint filter after each drying cycle.
76. Locate your dryer in a place ventilated with fresh, dry air. Circulating humid air through the machine increases drying time and the energy needed to run it.

Cooking

77. Use pots and pans with absolutely flat bottoms on your range. To cook efficiently, heat must transfer directly from the surface element to the pan. Warped bottoms leave an air gap, which provides an escape route for heat.
78. Select pots and pans that are the right size to completely cover the surface element. When any part of the surface element is exposed, you're wasting heat and energy.

79. Keep reflector pans beneath surface elements shiny and clean. Shiny pans reflect heat rays onto pan bottoms; dull pans absorb the heat.
80. Develop the habit of "lids on" cooking. Tight-fitting lids help keep heat in a pan, permitting you to use lower temperature settings and shorter cooking times.
81. Heat only the amount of water you need for cooking. The water will boil faster if you cover it with a lid.
82. Start vegetables on high heat in a covered pan. When steam appears around the lid, lower the heat setting and allows food to simmer until done.
83. Plan one-dish meals in a slow cooker. Such meals require less energy than those calling for the use of the oven plus two or three surface elements.
84. Make more use of your pressure cooker. It cuts cooking time to one-third that of conventional methods
85. Consider cooking small quantities of food in appliances such as an electric toaster oven, skillet, or grill instead of your oven. Portable appliances generally use about one- third the electricity of your oven. Also, consider using smaller coffee makers if you only want one or two cups of coffee.
86. Use your microwave oven instead of your conventional electric oven whenever possible. Microwaves can cook food in one-fourth or less the normal cooking time.
87. Prepare your whole meal in the oven at the same time. Often you can simultaneously cook foods that have different cooking temperatures. Variations of 25 degrees usually produce favorable cooking results.
88. Carefully time your preheat period when baking. Generally, five to eight minutes is sufficient. There is no need to preheat for boiling, roasting or cooking most casseroles.
89. Rearrange oven shelves before turning on the oven to prevent wasteful heat escape.
90. Avoid opening the oven door for a "peek" when baking. Each time you open the door, a considerable portion of the heat escapes.
91. Activate the self-cleaning cycle on your electric oven only when the oven is heavily soiled. Start the cycle right after using the oven while it is still hot.
92. Never use an oven to heat the kitchen or dry clothing. It wastes energy and can be hazardous.

General

93. Clean or replace air filters on exhaust fans, humidifiers, and other electric appliances. Clogged filters impair performance and cause units to run longer.
94. Turn off the television when nobody's watching.
95. Iron fabrics that require a cooler iron first and work up to those requiring higher heat. An iron heats faster than it cools, so it's quicker to go from low to high than the reverse. You'll use less energy.
96. Turn off the iron a few minutes before you finish ironing and complete the rest of your clothes with the heat remaining in the iron.
97. Turn off the iron when the telephone or doorbell interrupts your work.
98. Store dirty dishes in the dishwasher until you have a full load. Dishwashers draw the same amount of power whether you operate them full or half empty.
99. If your dishwasher has a power-save switch, use it to bypass the drying cycle. The electric heating element for drying uses a considerable amount of energy
100. Dry your hair with a towel instead of blow-drying it. Many hair dryers consume as much energy as an electric toaster, plus you use them for longer periods.

How much energy can be saved

Perhaps your next question may be, "How much energy can be saved?" The following is a list of several measures with their estimated energy savings.

Energy Conservation Opportunities	Estimated Energy Savings*
Turn back temperature to 68° F in winter	5% of heating cost for each degree set back
Turn up temperature to 78° F in summer	3% of cooling cost for each degree raised
Maintain furnace at maximum efficiency by annual checkups and adjustments	10% of heating cost
Maintain air-conditioning units by annual checkups and adjustments	15% of cooling cost
Set back domestic water heater from 140° F to 110 F	6-12% of hot water cost
Maximize use of daylight	50 - 60% of lighting cost
Improve lighting maintenance	10% of lighting cost
Turn off unnecessary lights	17% of lighting cost
Reduce lighting	15-28% of lighting in existing buildings 25-50% of lighting in new buildings
Use insulating glass	10-13% of cooling and heating costs
Insulate hot water pipes and storage tanks	15% of water heating costs
Provide adequate insulation for wall and roof	20% of heating and cooling cost

** % savings is estimated value. the savings varied depend on different cases*