IJournals: International Journal of Software & Hardware Research in Engineering
ISSN-2347-4890
Volume 4 Issue 2 February, 2016

Electrical Energy Conservation of Home Appliances

Ayan Ghosh[1]; Anjana Sengupta[2]; Snehashis Das[3]

Department of Electrical Engineering, Technique Polytechnic Institute, Hooghly, West Bengal, India[1,2,3]

Email id: ayan0589@gmail.com[1];anju.aeccrj@gmail.com[2];snnehashis@gmail.com[3]

Abstract

Different forms of energy are used for the industrial, commercial and day to day activities.Out of all forms of energy, electrical energy is most important one as it can be generated efficiently, transmitted easily and utilized ultimately at a very reasonable cost. So the present society has become very much dependent on electrical energy. As a result the demand of electrical energy is increasing day by day. In case of generation of electrical energy we are very much dependent on the conventional sources like coal, diesel, natural gases etc. The conventional sources have limitations in availability. As we are not so much dependent on the renewable sources like sun, wind, water etc, the shortfalls of electrical energy has already started. Though we have started to use renewable sources to generate the electrical energy, there are some limitations like high initial cost, efficiency, availability etc. The improvement of those parameters is in research level. Under these circumstances we can only reduce the consumption of electrical energy. If we can reduce our unwanted usage of electricity we can enlarge the life of conventional sources.

Keywords:Conservation, Appliances, Consumption,Electrical energy.

1. Introduction:

Electricity shortfalls occur when the demand of electricity by the consumer does not meet with the generation of electricity. Prolonged electricity shortfalls create uncertainty in electricity supply and increase electricity costs. Electricity shortfalls can be caused due to insufficient or compromised energy inputs, generation, transmission or distribution. The cause of an electricity shortfall should be understood to promote energy-saving measures, as effectiveness of each measure can vary depending on the nature of an electricity shortfall. A country facing a capacity shortage during peak hours should focus on measures that decrease electricity consumption during those key times [2]. For example, In Japan the industries are shifting operations to evenings and weekends when electricity demand is lower. Though such load shifting reduces the demand during peak-power periods, but does not decrease overall electricity consumption [2].

2. Process to reduce electrical energy consumption:

Right in our own home, we have the power to save money and energy. Saving energy reduces our nation's overall demand for resources needed to make energy, and increasing our energy efficiency is like adding another clean energy source to our electric power grid. A lot of energy is wasted regularly through leaky windows or ducts, old appliances, or inefficient heating and cooling systems. When we waste energy in our homes, we are throwing away money that could be used for other things. The Domestic Sector accounts for 30% of total energy consumption in the country. There is atremendous scope to conserve energy by adopting simple measures.If we can follow some processes for saving energy in home appliances we will save energy and money which ultimately help to conserve our natural resources. By following these simple processes for each and every appliance one can save energy to a large extent.

2.1Lighting:

The lights should be turned off when not in use. Advantage of daylight should be taken by using light-colored, loose-weave curtains on the windowsto allow daylight to enter the room. Also, decoration should be done with lighter colors that reflectdaylight. De-dust lighting fixtures to maintain illumination. Task lighting should be used instead of brightly lighting an entire room, focus the light whereit is required. Use of Compact fluorescent light increases energy efficiency by four times than incandescent bulbs providing the same lighting[1]. LED bulbs offer similar light quality to traditional incandescent, last 25 times as long, and use even less energy than CFLs [1]. Electronic chokes in place of conventional copper chokes save electricity.

2.2 Electric Fan:

Conventional regulators should be replaced with electronic regulators for ceiling fans. Exhaust fans installed at a higher elevation than ceiling fans gives proper cooling with low energy consumption.

2.3 Electric iron:

Electric iron should have automatic temperature cutoff.Appropriate regulator position should be used for ironing.Wet clothes should not be used for ironing.

2.4 Microwaves oven:

It consumes 50% less energy than conventional electricor gas stoveslarge food items should not be baked. Preheating is not required unless breads or pastries are baking. The oven door should not be opened too often to check food condition as each opening leads to atemperature drop of 25°C.

2.5 Computer:

Computers of the home and office should be turned off when not in use. A computer that runs 24 hours aday, for instance, uses - more power than an energy-efficient refrigerator. If the computer is to be left on, the monitor should be turned off because this device alone uses more than half the system's energy. Setting computers, monitors, and copiers to use sleep-mode when not in use helps cut energy costs by approximately 40%. Screen savers save computer screens, not energy. Start-ups and shutdowns do not use any extra energy, nor are they hard on the computer components. In fact, shutting computers down when the work is finished using them actually reduces system wear and saves energy.

2.6 Refrigerator:

The Energy Guide label on new refrigerators tells how much electricity in kilowatt-hours (kWh) a particular model uses in one year [1]. The smaller the number, the less energy the refrigerator uses and the less it will cost to operate. In addition to the Energy Guide label, the ENERGY STAR label should be noticed. A new refrigerator with an ENERGY STAR label uses at least 20% less energy than required by current federal standards and 40% less energy than the conventional models sold in 2001 [1].The refrigerators and freezers should be defrosted regularly as the frost buildup increases theamount of energy needed to keep the motor running. The space between the refrigerator and the walls should be kept enough so that air can easilycirculate around the refrigerator. The refrigerator or freezer should not be kept too cold. The refrigerator door seals must be airtight.Liquids should be covered and foods should be wrapped while storing in the refrigerator because uncovered foods release moisture and make the compressor work harder.The doors of the refrigerators should not be opened frequently. The fridge door should not be left open for longer than necessary, as cold air will escape.It is better to use smaller cabinets for storing frequently used items. Putting hot or warm food straight into the fridge should be avoided as much as possible.

2.7 Washing machine:

It is better to run the machine with full loads always.Optimal quantity of water should be used. Modern washing machines with timer facility save energy.Excess amount of detergent consume extra energy. Hot water should be usedonly for very dirty clothes and cold water in case of the rinse cycle. Natural drying are Preferred over electric dryers.

2.8 Air Conditioner:

Buying a bigger room air conditioner won't necessarily make us feel more comfortable during the hot summer months. In fact, a room

air conditioner that's too big for the area it is supposed to cool will perform less efficiently and less effectively than a smaller, properly sized unit [1]. Central air-conditioning systems need to be sized by professionals [1].The air conditioners having automatic temperature cut off are alwayspreferred.The regulators should be kept at "low cool" position. The ceiling fan should be operated in conjunction with the window air conditioner to spread thecooled air more effectively throughout the room and operate the air conditioner at highertemperature. The doors and windows should be sealed properly. Enough space between the air conditioner and the walls should be kept to allow better aircirculation. A roof garden can reduce the load on Air Conditioner. Windows with sun films/curtains can also be used. The thermostat should be set as high as comfortably possible in the summer. The less differencebetween the indoor and outdoor temperatures, the lower will be energy consumption. The thermostat should not be set at a colder setting than normal when the air conditioner is in turn on condition. It will not cool the home any faster and could result in excessive cooling. Lamps or TV sets should not be placed near the air-conditioning thermostat. The thermostat sensesheat from these appliances, which can cause the air conditioner to run longer thannecessary. Trees or shrubs may be planted to shade air conditioning units but not to block the airflow. A unitoperating in the shade uses as much as 10% less electricity than the same one operatingin the sun.

2.9 Electronic Devices:

TV and Audio Systems should not be powered on when they are not in use because idle operationleads to an energy loss of 10 watts/device. Battery chargers, such as those for laptops, cell phones and digital cameras, draw power whenever they are plugged in and are very inefficient. So the plug should be pulled to save energy.

2.10 Mixer:

Dry grinding in the food processors (mixers and grinders) should be avoided as ittakes longertime than liquid grinding.

3. Conclusion:

Electrical energy is being wasted regularly due to the unwanted usage of our home appliances. As a result demand of electrical energy is increasing day by day. If it continues in this way, very soon the cost of electricity will reach such a level that all of us cannot afford it. But if we remember the above processes to reduce the electrical energy consumption and apply them, it will take time to reach such level. Ultimately we will be beneficial in future from our present activities.

4. References:

[1] "Energy Savers"- U.S Department of energy", December 2011

[2] "Saving Electricity in a hurry"- Sara Bryan Pasquier, June 2011

[3] Burki, S. (2009), "Cost of Power Outages to the Pakistan Economy" - *Daily Dawn*, 11 May 2009

[4] "Principle of Power System" – V.K Mehta & Rohit Mehta