

“Getting an energy audit for my house”

Any energy auditor in Hyderabad, Andhra Pradesh, carries out an electricity consumption audit on his premises and finds out where he can easily save money

Know your Electricity Bill

A close look at the electricity bill provides a number of clues. The typical tariff structure for domestic consumers in the state of Andhra Pradesh is given in Table 1.

Consumption and payment is in slabs. Restricting electricity consumption to less than 200 units per month will cost Rs 517.50 excluding other charges such as meter rent and exercise. The moment, one crosses 200 units per month, the electricity tariff goes a quantum jump of 55 percent. Controlling one's electricity consumption below 200 kWh/month leads to large savings.

Table-1

Units/month	Tariff Rs./Unit
0-50	1.45
51-100	2.80
101-200	3.05
201-300	4.75
301-400	5.50

How much Energy am I Using?

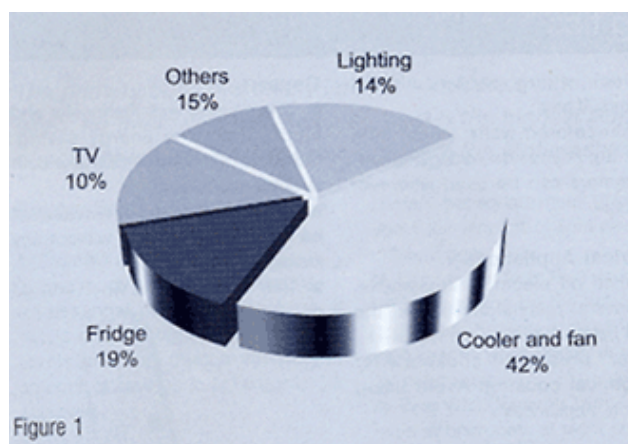
By knowing the electrical rating of different appliances and gadgets such as bulbs, tube lights, fans, televisions, refrigerators, air-conditioners, air-coolers, geysers, mixers and grinders, etc, and usage by hours per day, we can easily calculate our monthly electricity consumption.

After a sample study of my June 2005 bill for Rs 830, I worked out the breakup of power consumption and approximate monthly cost per device. The break-up of power consumption by various household appliances is given in Table-2. By merely changing the operating hours and the rating of the device and the unit cost of electricity, one can work out one's own electricity bill. (See website www.energymanagertraining.com for domestic calculator. Download and use to evaluate your electricity bill).

Table: Electrical energy consumption breakup

Home Appliances	Wattage (in W)	Nos	Operating Hrs / Day	Monthly Operating Hrs	Monthly Power Consumption (in kWh)	Monthly Electricity Bill (in Rs)
Tube Lights	50	5	3.5	12-05	26.3	85
CFL's	18	5	2	60	5.4	17
Incandescent Bulbs	60	2	0.2	6	0.7	2
Night Lamps	10	2	8	240	4.8	15
Fans	75	4	8	240	72.0	232
Television	100	1	9	270	27.0	87
Refrigerator	100	1	16	480	48.0	155
Air-conditioner	2000	0		0	0.0	0
Air-coolers	100	1	12	360	36.0	116
Geysers	2000	1	0	0	0.0	0
Bore Wells	1500	1	0.2	6	9.0	29
Sump Pumps	375	1	0.5	15	5.6	18

Computers	100	1	2	60	6.0	19
Electric Iron	1000	1	0.2	6	6.0	19
Mixer-grinder	500	1	0.2	6	3.0	10
Idly Grinder	1000	1		0	0.0	0
Washing Machine	500	1	0.5	15	7.5	24
Others				0	0.0	0
Exhaust Fan	40	2	0.2	6	0.5	1
Emergency Lamp	20	1	0.2	6	0.1	0
Cell Phone Charger	3	1	0.5	15	0.0	0
Music System	40	0	0	0	0.0	0
Total					257.0	830



Where is your Energy Going?

Once we know how much energy we are using for different appliances, we can find out where much of the energy is going and for which application. See Figure 1 for a break-up of energy cost based on application for a typical summer month. The overall break-up of energy use at my house is summarized below:

Cooling by both an air-cooler and fans consumes 42 percent of the power. This is followed by the refrigerator, for lighting, television, etc. An air-conditioner cooling load, where used, is the highest contributor to the total energy bill. For a 1.5-ton single air-conditioner, one can expect a minimum monthly electricity bill of Rs 2,000-2,500.

Similarly, one finds that the heating load will be higher in the winter months owing to the use of electric geysers. In north India, power consumption from a room heater is a major load contributor during winters.

How to Save Energy?

Where do I reduce the electricity bill? Since cooling/heating, refrigeration and lighting were the major contributors for higher power bills, I made three major changes in my house. First, I changed my old 165-liter single-door fridge (about 15 years ago) to a latest 210-liter model with an energy star rating. Second, I change the conventional ballasts in five tube lights to electronic ballasts. My 40 W tube lights with conventional ballasts used to consume around 48-50W; after the changeover to electronic ballasts, the consumption became 34 W without reduction in lux levels, which meant a savings of almost 30 percent. The third step was replacing the existing electric geyser with an LPG gas geyser. Of course, the gas geyser started giving benefits from July onwards during the rainy season. Geysers are known energy guzzlers. The results of my efforts could clearly be seen in my July 2005 bill, which was for Rs 340 only- an overall reduction of 59 percent. My family cooperated fully in my efforts.

What is an ENERGY STAR® Appliance?

With the introduction of Standards and Labeling systems as apart of the implementation of Energy Conservation Act 2001, by the Bureau of Energy Efficiency (BEE), we now have a choice of buying energy-efficient products from the market. As per the Act, the government can prohibit the manufacture and sale of equipment appliances that do not conform to the minimum energy standards. A 165-L single-door fridge, for example, bought 15 years ago, would have consumed 1,059 units per annum under test conditions, but the same fridge today would consume only 383 units per annum under the same test conditions. Thus, by introducing these mandatory labeling, the consumers can make an informed choice of energy-efficient equipment. In addition to refrigerators, BEE is also implementing S&L systems for air-conditioners, electric geysers, motors, agricultural pump sets, distribution transformers, air-compressors, tube lights, CFLs, ballasts, and other systems.

By careful observation and understanding of the electricity bill tariff structure and energy use through analyzing major contributors to the high electricity bills, one can identify a number of areas fro home energy conservation. With ever-rising costs of energy – electricity, LPG or petrol – the only way to control our energy bill is to start conserving by using all possible means.

Other home energy saving tips

Lights and Fans

- Use natural light and air always. Avoid switching on lights and fans during day time
- Use sunlight to the maximum possible
- Switch off lights and fans when you leave the room
- Use fluorescent or compact fluorescent lights (CFLs) wherever lights are required to be switched on for more than 4 hours a day
- Clean lights, light reflectors and regulators for better illumination
- Use slim tube lights for better light and electricity saving
- Maintain fans and regulators properly
- Open windows fro better ventilation and air circulation
- Use table lamps instead of overhead lights when reading
- House can be designed to achieve maximum sunlight and ventilation
- Check wiring periodically for leakages, if any
- Lights-colored walls reflect light better. So, needs less wattage lamps
- Dimmers can be used wherever possible



Electrical Appliances

- Switch off electrical appliances, computers, televisions etc, at the switch point when they are not used
- Use pressure cookers for economical cooking. Avoid using electrical appliances
- Avoid ironing one or two cloths. Iron in bulk at a stretch
- Avoid opening the oven door unnecessarily during cooking



Cloth Washing and Drying

- Use washing machine to full capacity
- Dry your clothes in the sun instead of using the washing machine



Geysers

- Use geysers with thermostat and timer control for energy saving. Members of the family can take bath in quick succession
- Geyser and piping system should be maintained properly without any leakages
- Turn off the geyser when you go on vacation



Refrigerator

- Avoid opening the refrigerator frequently
- Defrost and clean inside the refrigerator and freezer periodically
- Check the door fittings for tightness
- Keep the refrigerator in a place of good air circulation and cool place
- Make sure to cover the foods before keeping in the refrigerator
- Do not keep hot food in the fridge immediately



References

www.bee-india.com (website of the Bureau of Energy Efficiency)

www.energymanagertraining.com

www.aceee.org (website of the American Council for and Energy-Efficient Economy)

Courtesy: G. Subramanyam, Sr Dy Director, National Productivity Council, Hyderabad

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