

ESTIMATION OF HOUSEHOLD ELECTRIC LOAD AND METHODS OF SAVING ENERGY

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ABSTRACT:

In this technology driven world, more and more people living both in developed and developing countries, are becoming heavily dependent on energy driven appliances for increasing their living standards. Electricity generation and its consumptions both are need of hour. The increased pace of urbanization and rising income levels are also some major factors responsible for the increased demand of electrical appliances. In the present article, energy consumption of a household is estimated in terms of KWH by considering some of the electrical appliances an average Indian household possess. The calculation of electric load by an individual may lead to inculcate energy saving mindset, better use of energy and saving on individual's monthly electric bills. This will also lead to less consumption of electricity and hence saving our precious resources.

Keywords: Electric load, electrical appliances, household, power, KWH and energy.

1. INTRODUCTION

Total power consumed by the electrical appliances in a given household is known as electrical load. As the technology is growing by leaps and bounds use of latest electrical appliances is also increasing day by day and therefore demand of electric energy consumption is also increasing. According to Menezes & Bouchlaghem(2014) laptop computer consumes a fraction of energy as compared to desktop .Green lighting with high efficiency, high stability and long life can definitely increase the work efficiency of people.USA is at first position in carbon emission followed by China and India is at third position in carbon emission. 20% of annual emissions are due to Residential energy consumption (Environmental Protection Agency-2006). All information regarding feedback on energy conservations has attracted researchers for many years (Seligman & Darley 1977). Researchers have found that if we are aware of daily report of energy consumption then this technique can help in at least 20% reductions in energy consumptions in a student dormitory (Chhabra & Singh 2015). According to Mc-Kinsey rising income has also given rise to demand of electrical appliances across all consumer classes both in rural as well as urban India.

2. Methodology

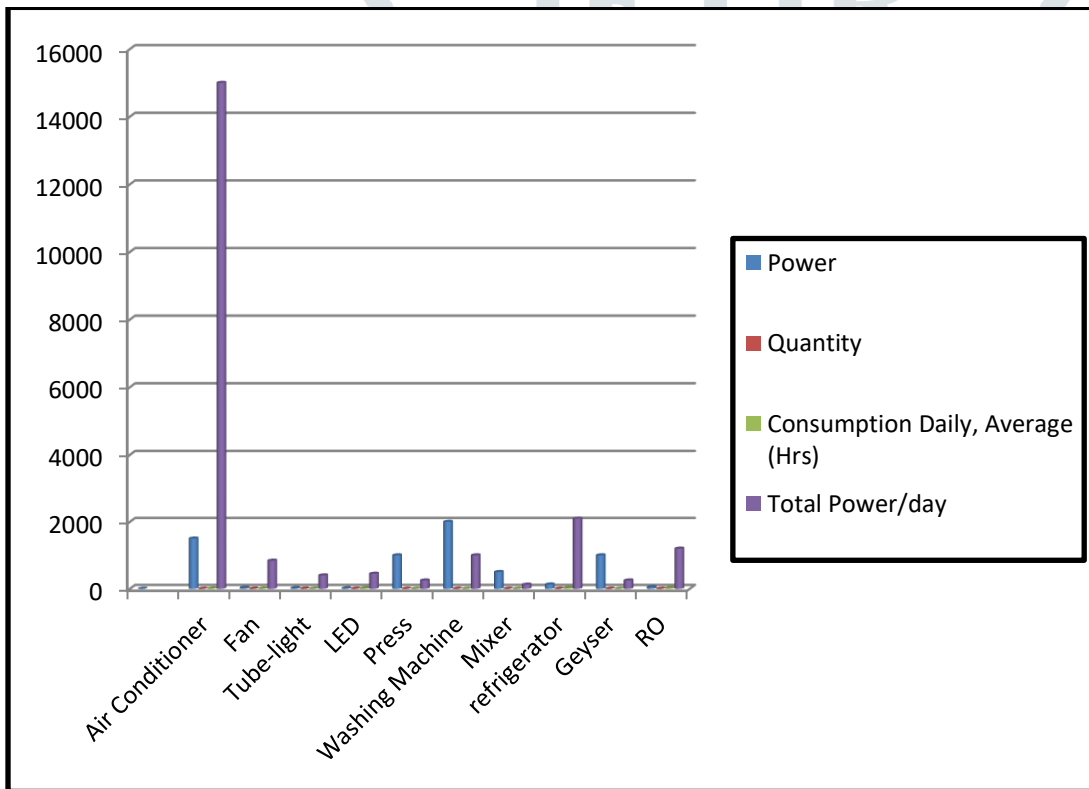
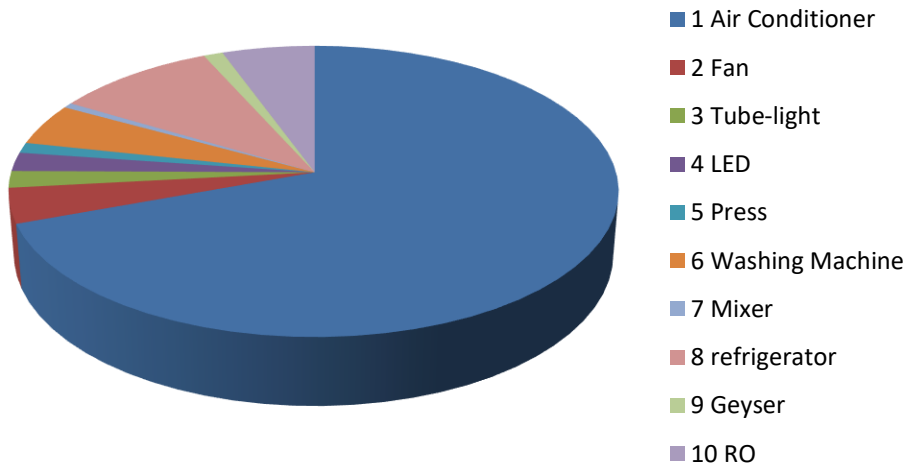
To calculate total power consumed in a household following steps are adopted.

1. Make a list of all electrical devices, mentioning their numbers and also write their power rating as written on instrument.
2. Now write number of hours per day a particular device is used to consume power i.e Operating hours of a device.
3. Now multiply power of that device with their number and their operating hours to get total power consumed daily by each device.
4. Now add total power per day consumed by each device and then divide it by 1000 to convert it into KWH.
5. After calculating total power consumed by a household in KWH per day, calculate 60% of this power to get total power consumed daily and then multiply this by number of days in a month to get total power consumed in a month. Here we have taken number of days in a month as 30 days because most of the electricity companies provide electrical bills based on 30 days to a household electricity consumer.
6. This calculation will certainly help to calculate electrical bill of a house with maximum 5% error. (sources of error are mentioned in this article)

3. Results

S.No	Name of Appliance	Power (Watt)	Quantity	Consumption Daily, Average (Hrs)	Total Power/day
1.	Air Conditioner	1500	1	10	15000
2.	Fan	30	4	7	840
3	Tube-light	20	4	5	400
4	LED	15	2	15	450
5	Press	1000	1	¼	250
6	Washing Machine	2000	1	½	1000
7	Mixer	500	1	¼	125
8	refrigerator	129	1	24	2096
9	Geyser	1000	1	¼	250
10	RO	50	1	24	1200

Total Power/day Watt-hour



Total Power /Day = 15000+840+400+450+250+1000+125+2096+250+1200=20611=20611/1000

=20.611KWH

1KWH= 1 unit

Energy Consumption =20.611 units per day

Total Power / Month= 20.611x30=618.33KW/Hx60/100=370.9KWH

Energy Consumption =370.9 units per month

Energy Saving Methods

To save money, resources and for conservation of ecology we should adopt the following methods to save energy. These small steps can make a big difference.

1. Install a rooftop solar system at home.
2. Use LED bulbs and tube lights instead of ordinary bulbs and CFL.
3. Turn off electrical appliances and unnecessary lights when they are not in use.
4. Avoid using washing machine dryer as much as possible.
5. Purchase only energy efficient star label appliances.
6. Houses should be environmental friendly and should have proper ventilation and proper passage for sun light.
7. Refrigerator should be placed away from heat source.
8. Defrost refrigerator should be regularly and don't open the door unnecessarily.
9. Proper and timely services of all electrical appliances should be followed and Faulty circuits should be replaced.
10. Air conditioner should be regularly serviced and its operating should be at 25⁰c.
11. Regular dusting and cleaning of light fixtures should be practiced.
12. Walls of houses should be painted with light colours.
13. Use of hot water to wash clothes should be minimum.
14. Put screen on while working on laptop or PC.
15. Promote mechanical work instead of heavy dependence on electrical gadgets.

Sources of Error

1. It may not be possible to account for all the factors responsible for the energy consumption.
2. Sometimes Wattage is not properly mentioned on the gadgets.
3. Incorrect information's give poor measurement.
4. Very old gadgets and irregular servicing lead to wrong results.

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