MINSARATHAI SEMIPPOM

a community-based energy conservation initiative

CONSUMER HANDBOOK

To save electricity and reduce bills

Chennai Partner

CAG
Citizen consumer and civic Action Group

Promoted and Supported By

SOCIETE GENERALE

TIDE 25 @ 2018

ABOUT
MINSARATHAI SEMIPPOM

A community-based energy conservation initiative

The MINSARATHAI SEMIPPOM programme, launched in Chennai, aims to conduct simple energy consumption assessments in households in order to recommend measures to reduce electricity consumption and monthly electricity bills.

This programme is conducted by Citizen consumer and civic Action Group (CAG), in partnership with Technology Informatics Design Endeavour (TIDE). This program is an extension of the very successful VidyutRakshaka program being run in Bangalore by TIDE.

World Resources Institute (WRI) and Technology Informatics Design Endeavour (TIDE) have conceptualised this initiative in response to the ever-widening gap between demand for electricity and supply of electricity in India. Field studies conducted in Bangalore on the potential energy savings through housekeeping and behaviour change showed encouraging results.

Highlights of the program

- Reduce electricity costs without compromising on comforts
- Counter electricity cost inflation through responsible usage
- Savings upto 16% demonstrated in Bangalore (for 48% of the participants)
- Get objective information
- Contribute to environment

Our recommendations, categorized into no-cost, low-cost and medium-cost will be customised based on behaviour and consumption patterns. We will also arrive at neighbourhood averages that can help correct individual usages. This innovative programme will also try to connect consumers to appropriate resources, suppliers and service providers to help implement the recommendations.

At the end of the exercise, cumulative neighbourhood savings will be shared with TANGEDCO to demonstrate demand side management of electricity through community engagement.

www.wri.org
www.tide-india.org
www.cag.org.in

Disclaimer: WRI, TIDE and CAG have used all reasonable efforts to ensure the accuracy of the contents of this booklet but make no representations or warranties about the suitability for any purpose of the contents of this booklet. We recommend taking an expert's opinion where deemed fit and we will not be liable in any way for any loss or damage suffered through use or access to the information in the booklet.

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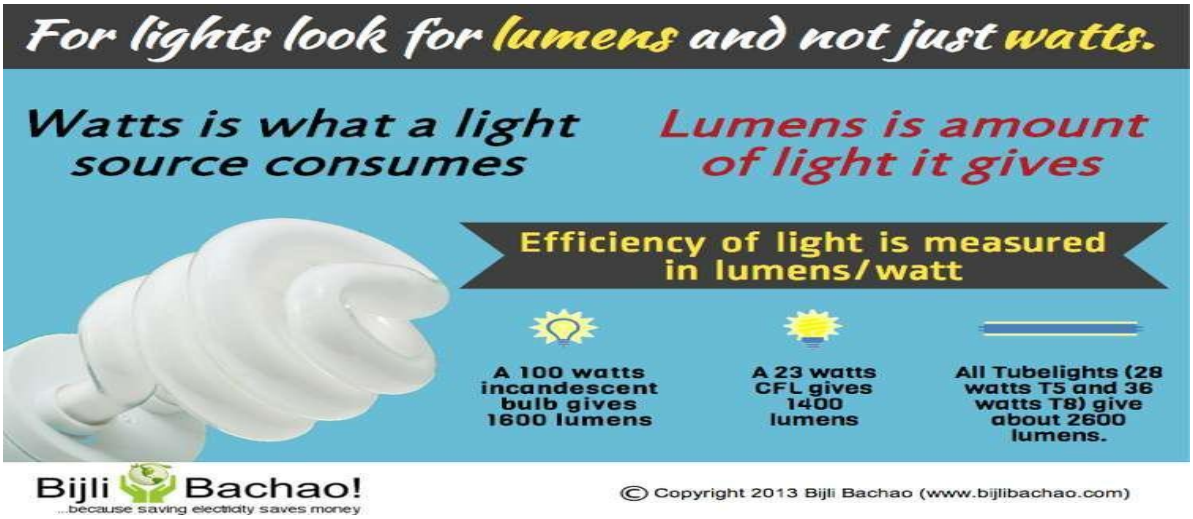
LIGHTING (Lighten your lighting bill)

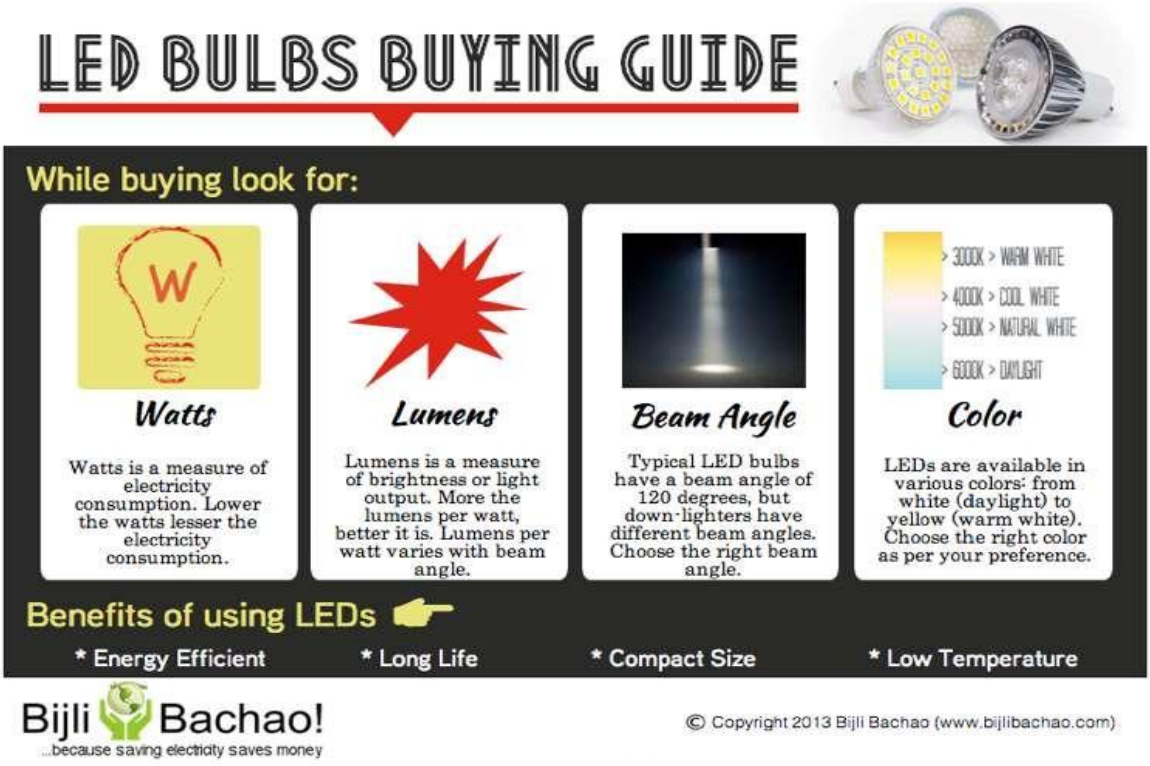
- Turn **OFF** unneeded lights. **Avoid** lighting an empty room.
- **Take advantage of natural light** whenever possible. **Adjust curtains and blinds** to let in as much natural light as possible.
- **Remove unneeded light bulbs.** Disconnect or remove lamps in multiple lamp fixtures.
- **Keep light fixtures clean and dust free.** Dust, grease, and other accumulations on lamps and reflecting surfaces of the fixture can reduce light output by as much as 30%. You may find that you need fewer lamps or lower wattage bulbs.
- **Use task lighting** instead of brightly lighting an entire room. Focus the light where you need it. A reading lamp, for example, lights only reading material rather than the whole room.
- **Avoid dark-coloured surfaces in workrooms.** These reduce the reflected light levels and increase the number of lamps required to illuminate the space.
  Lightly coloured lampshades will give out the most light.
- If possible, **put lamps in corners of rooms**, where they can reflect light from two wall surfaces instead of the one surface they are fixed at.
- **Switch to energy efficient products**. Some replacement options available in the market are shown in the table below.

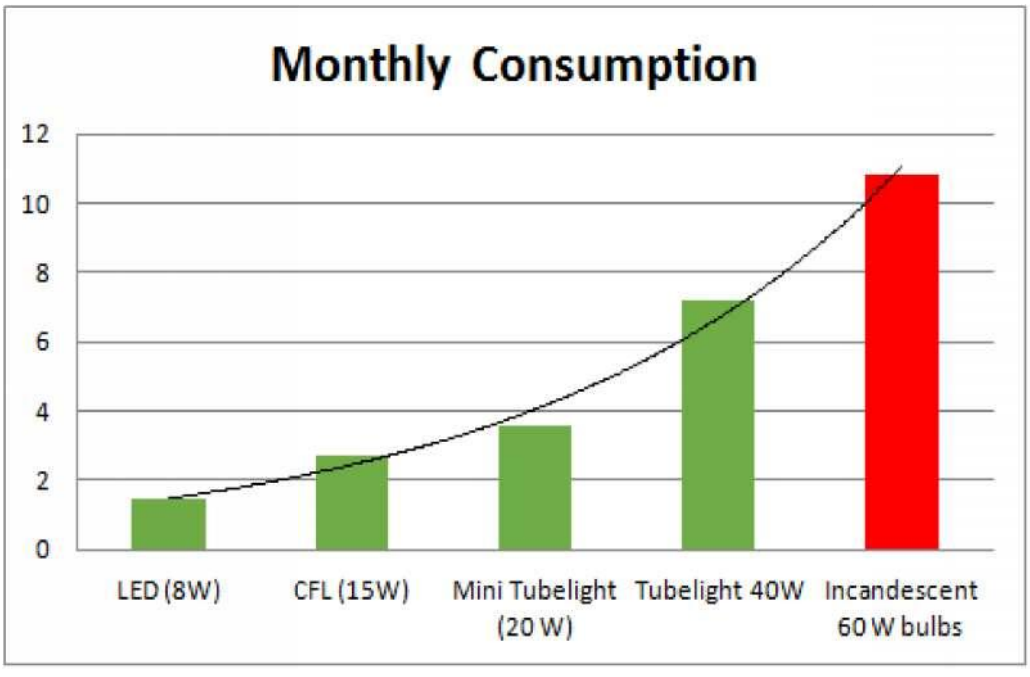
Replacement option	LED	CFL	Incandescent
Life Span (hours)	50,000+	5,000	1,000
Watts used to generate 800 Lumens (W)	8	15	60
Yearly Running Cost (INR)	288	540	2158
Bulb Cost (INR)	450	225	25

Note: Considering per unit cost at Rs. 7.50 and 6 hours of usage per day



- **Buy fixtures that have a dimmer, which allow you to manually adjust the intensity of light in a room.** Because most lights use less electricity at lower settings, you do not need to pay for more light than you need.
- **Use outdoor lights with a photocell unit or a timer** so they will turn off during the day.

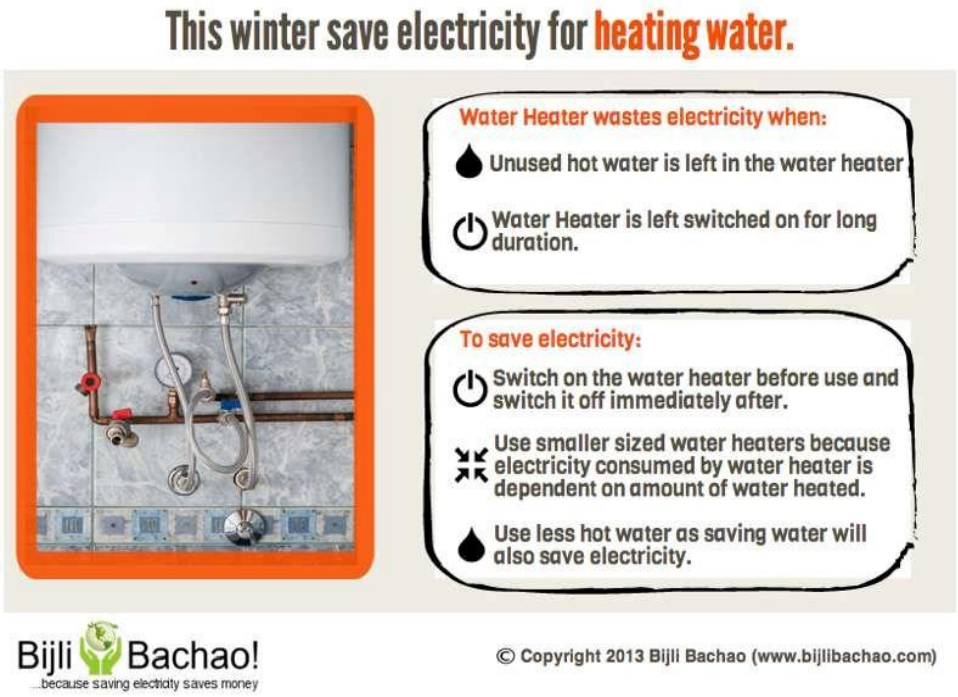




WATER

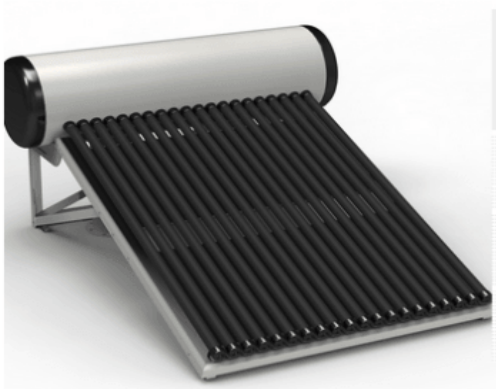
(Avoid pouring money down the drain)

- About 50% of the electricity bill of a residential complex is for the pumping requirements. Always **buy a BEE certified energy efficient pump** (as you can get 55-60% efficiency). Try using a **Variable Speed Drive pump** which adjusts its consumption based on the load on it.
- Make sure that the **pumps are maintained regularly** so that they operate at right efficiency.
- **Do rain water harvesting and make use of the surface stored water to reduce pumping cost**. Do bore well recharge to ensure your bore-well water levels do not go down. This way, you can reduce pumping cost.



- By **reducing the temperature setting of water heater from 60^0C to 50^0C**, one could save over 18% of the energy used at the higher setting. Similarly keep your setting to Medium if your geyser has only Low, Medium and High settings.
- **Using less hot water may be easier than you think**. Water conserving shower heads and faucet aerators can cut hot water use by half.
- To help reduce heat loss, **always insulate hot water pipes, especially where they run through unheated areas**. Never insulate plastic pipes.

Solar Water Heaters Types and Benefits



Flat Plate Collectors (FPC) System	Evacuated Tube Collectors (ETC) System
Long lasting as they are metallic. But are expensive	Fragile but cheaper.
Can work in colder regions with sub zero temperature but will need an anti freeze solution.	Very good for colder regions where the temperature is sub zero.
In places with salty water a heat exchanger is required with FPC system.	Require regular cleaning where the water is salty.

Benefits of a 100 lts Solar Water Heater in India.

	Northern Region	Eastern Region	Southern Region	Western Region
Expected no. of days of use of hot water per year	200 days	200 days	300 days	250 days
Expected yearly electricity saving on full use of solar hot water (units of electricity)	1000	1000	1500	1250

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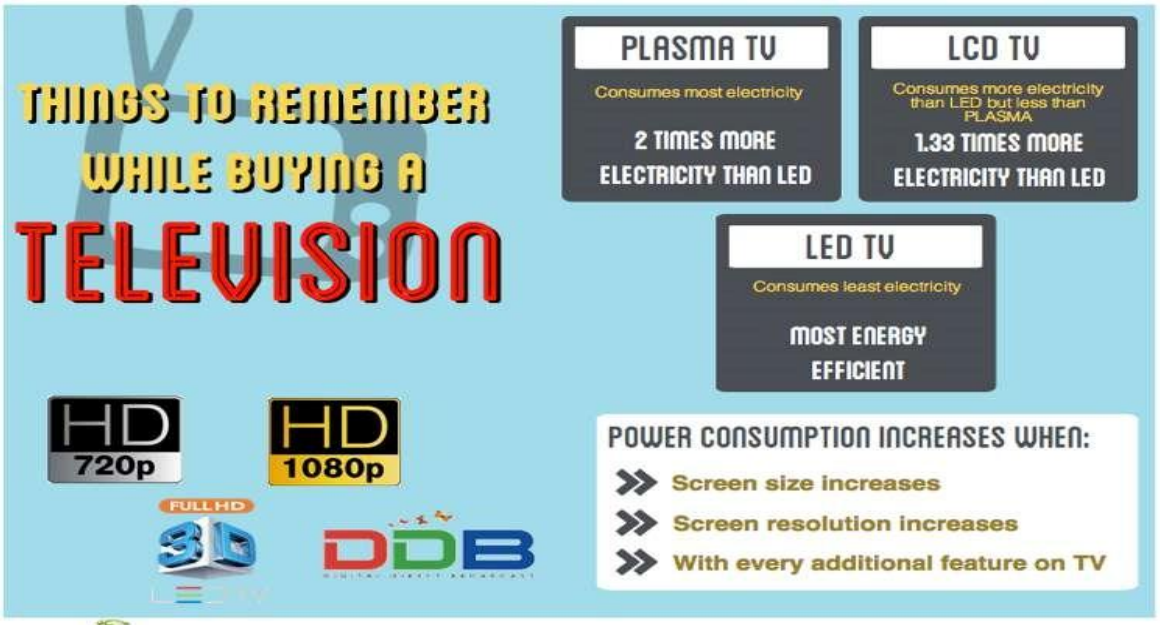
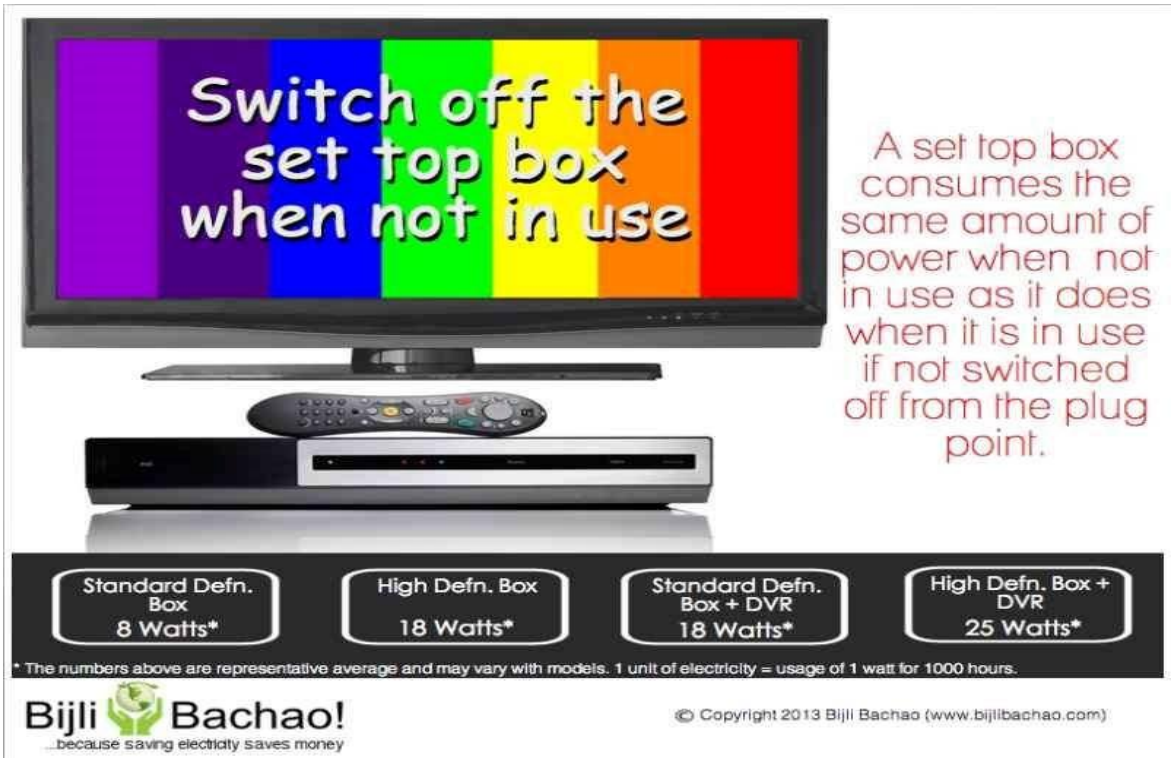
Tips to reduce water usage

- **Turn off the tap while you're brushing your teeth**. A running tap can waste over 6 litres of water per minute.
- **Get dripping taps fix.** Just one could be wasting up to 5500 litres of water a year.
- Make sure you **know where the main stop valve is** for your property. It could save you a fortune if a pipe springs a leak.
- **Use water sprinkler in the morning or late at night** when less water will evaporate before reaching the roots of your plants

ENTERTAINMENT AND COMMUNICATION





Gaming Consoles

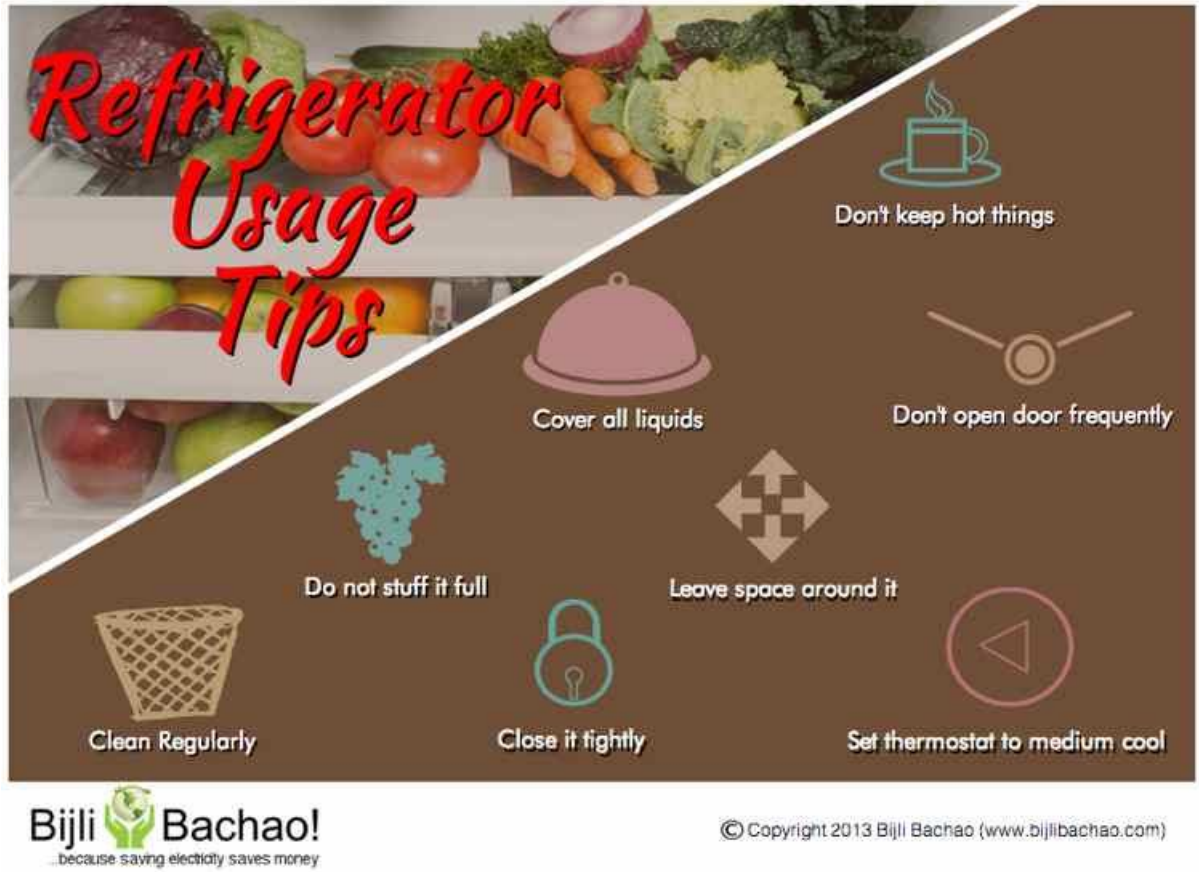
A gaming console, when used a long time (for more than 3-4 hours daily) can lead to a significant increase in the total electricity consumption of a household. The most common brands of current generation gaming consoles are Microsoft's Xbox, Sony's PlayStation and Nintendo Wii (and Wii U), so we have compared these brands to understand their power consumption behaviour. Note that every console has two entries: one is regular and original refers to older models.

Console	Active Power (W)	Standby Power (W)
Original PS3	**189[a]**	**1.1[a]**
PS3 Slim	**85[b]**	**0.5[c]**
Original Xbox 360	**172[a]**	**2.2[a]**
Xbox 360 S	**88[b]**	**0.7[c]**
Nintendo Wii (WiiConnect24 Enabled)	**16[a]**	**9[d]**
Nintendo Wii (WiiConnect24 Disabled)	**16[a]**	**1.9[a]**

[a]Source: Lowering the Cost of Play, Natural Resources Defense Council, Nov. 2008
[b]Source: Power Play: EPRI Analysis Reveals That Video Games Consoles Differ in Energy Consumption, Electric Power Research Institute, Dec. 2010
[c]Source: Green Gaming with Xbox 360/PS3, Gamespot, March, 2011
[d]Source: Xbox 360 vs. PS3 (and Wii) – Power Consumption Report, Hardcoreware.net, Feb. 2007

To minimise electricity consumption in a gaming console, **it is advised that it should be switched off as long as it are not in use, rather than putting it in stand-by mode**; because it still consumes a considerable amount of electricity.

REFRIGERATOR



- **Adjust the refrigerator temperature settings.** Optimum refrigerator range is 37 to 40°F and freezer range is 0 to 5°F. Avoid placing your refrigerator on unreasonably low temperature settings. If the temperature control system does not specify degrees, check the manual for corresponding settings.
- **Minimize door openings as much as possible.** Cool air escapes every time the refrigerator door is opened. The unit then works harder to replace the air. Keep the door open no longer than necessary and be sure to close the door completely. Door openings account for 7% of your fridge energy use, while poor open/close habits waste 50-120 kWh per year.
- **Allow hot foods to cool before placing them in the refrigerator.** Hot food decreases the temperature in the refrigerator temporarily forcing the refrigerator to work harder to keep the air cool. Do no put uncovered liquids in the refrigerator. The liquids give off vapors that add to the compressor workload.
- **Keep the refrigerator full but not overfilled.** A full refrigerator retains cold better than an empty one. If the refrigerator is nearly empty, store water-filled containers inside. The mass of cold items will enable the refrigerator to recover more quickly after the door has been opened. If overfilled, the circulation of cold air gets affected.

- **Turn on your refrigerator's "energy saver" switch.** In damp environments make sure that excess condensation does not form on the inside of the unit. If condensation forms, turn the energy saver switch off.
- Refrigerator motors and compressors generate heat, so allow enough space for continuous airflow around the refrigerator by **leaving a gap between the fridge and the walls**. If the heat can't escape, the refrigerator's cooling system will work harder and use more energy.
- **Keep your refrigerator away from heat sources, such as an oven, a dishwasher and direct sunlight from a window.** A 10°F increase in surrounding temperature can result in 20% higher energy consumption.
- **Check door seals (also called the gasket) on the refrigerator.** A broken seal is the same as leaving the door open. Replace seals that are torn or partially missing. To test it, close the door on a single sheet of paper and try to pull it out. If it slides out easily, the gasket needs to be replaced to prevent cold air from leaking out, or consider buying a new unit.
- **Regularly defrost manual-defrost models.** Frost buildup increases the amount of energy needed to keep the motor running. Avoid excessive ice build-up on the interior surfaces of the evaporator.
- **Turn off and recycle your old refrigerator.** Many old refrigerators use as much as 40% more energy than a new model.
- **Buy BEE star labelled refrigerator models only.** They use high efficiency compressors, improved insulation, and more precise temperature and defrost mechanisms to improve energy efficiency.

BEE STAR RATING						
Rating	0	1	2	3	4	5
Energy consumption per year (kWH)	1,100	977	782	626	501	400
Annual Operating cost at 7.5 INR/ kWh (INR)	8,250	7,328	5,865	4,695	3,758	3,000

Source: Compiled from Information on BEE website

CEILING FAN

Economics of Ceiling Fans in India

	Regular Fan	BEE 5 Star Rated Fan	Super Efficient Fan
Price	Rs 1500	Rs 1940	Rs 2600
Regulator Cost	Rs 200	Rs 200	Rs 0
Wattage	75 Watts	50 Watts	35 Watts
Air Delivery	230 cum/min	210-220 cum/min	230 cum/min
Units Consumed Per Year	180 Units	120 Units	84 Units
Electricity Cost Per Year	Rs 900	Rs 600	Rs 420
Electricity Cost For 10 Years	Rs 10800	Rs 7200	Rs 5000

Assumptions: 1) Usage of 12 hours per day for 200 days.
2) Electricity Cost of Rs 5 per unit.
3) Electricity cost to increase by 4% every year for 10 years.
4) Prices as available on Internet on Aug 2013.
5) Calculations are for 1 Fan.
6) Electricity consumption is at top speed.

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- **Replace conventional regulators** with electronic regulators for ceiling fans.

- If the fan is too close to the ceiling, the airflow is restricted and the fan will not be able to draw as much air through its blade as it has the potential to do. The distance that a fan should be mounted form the ceiling is directly correlated with its air moving potential so, **no fan should be mounted with its blade closer than 24 inches to the ceiling.**

- **Replace the fans which are more than 10 years old** as they consume more electricity and better energy efficient products are available today.

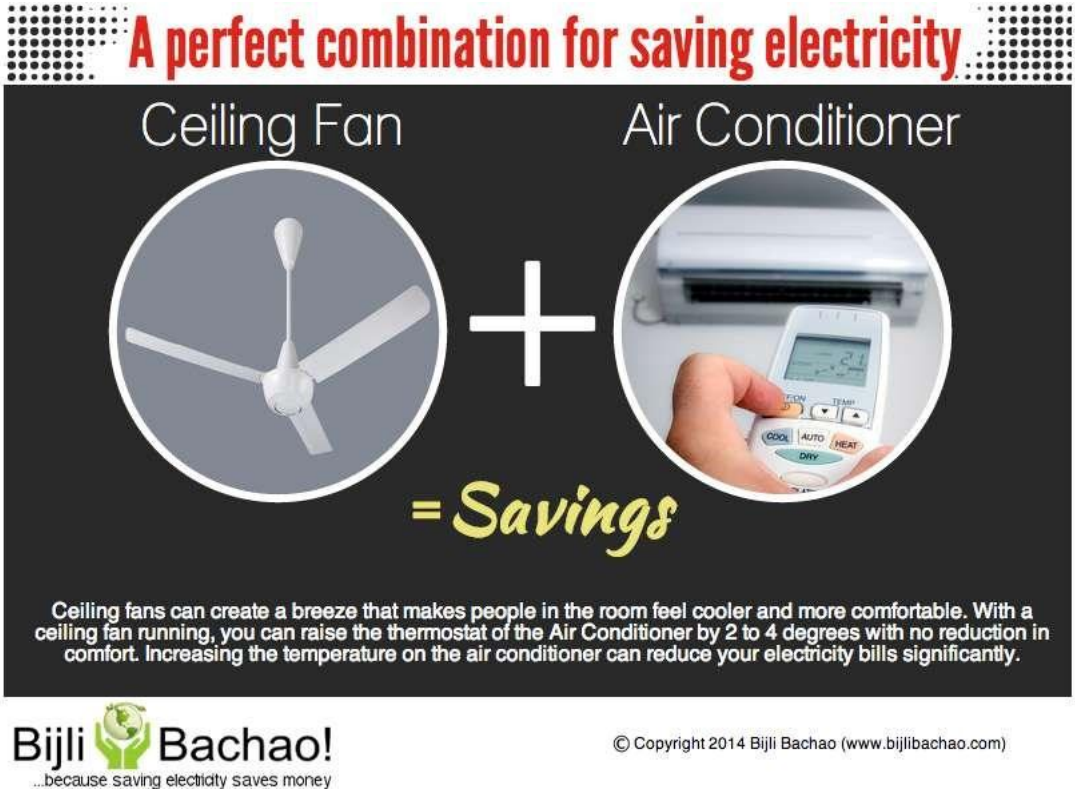
Tips for maintaining the Ceiling Fans

1. Ceiling Fan's motor should be lubricated regularly to ensure smooth operation. Motors with sealed bearing require little or no maintenance and thus no lubrication
2. If the is vibrating or making too much noise then it I not working efficiently. Typically a fan with a metallic container for the motor vibrates less and lasts longer. Efficiency can also be improved by changing the ball bearings inside the fan if it is making a lot of noise.
3. It is also important to keep a check on the electric controls for a ceiling fan to make sure the speeds are varying on change; else it will keep consuming electricity.

AIR CONDITIONER

(Cut your cooling costs)

- **Use ceiling or table fan as first line of defence against summer heat.** Ceiling fans cost less to operate (about 30 paise an hour as against Rs.10.00 per hour with air conditioners) and use less electricity.
- **Using ceiling or room fans allows you to set the AC thermostat higher** because the air movement will cool the room.



- **Save as much as 10% a year on your cooling bills by simply turning your thermostat back 10% to 15% for 8 hours.** Use the automatic setback or programmable thermostat on your air conditioner.
- **Clean filters help keep the air conditioning unit in good working condition.** Dirty filters reduce the efficiency of the air conditioner.
- A good air conditioner will cool and dehumidify a room in about 30 minutes, so **use a timer and leave the unit off for some time.**
- **Have your air conditioning unit checked every year** to ensure it is working efficiently and providing maximum cooling.
- **Buy split ACs instead of window ACs.** They cost more, but they are more energy efficient and consume lesser electricity saving you money in the long run.

- **Do not install AC units on the west and south walls** as these are exposed to direct sunlight through a major part of the day during summers.
- **Do not apply dark colours on the external surfaces** (roof and walls) of the house. Dark colours absorb more heat than light colours, leading to increased use of the AC.
- **Ensure that the condenser of the unit has enough space around it** for air to circulate and help the refrigerant dissipate its heat easily.
- **Use BEE star labelled products**

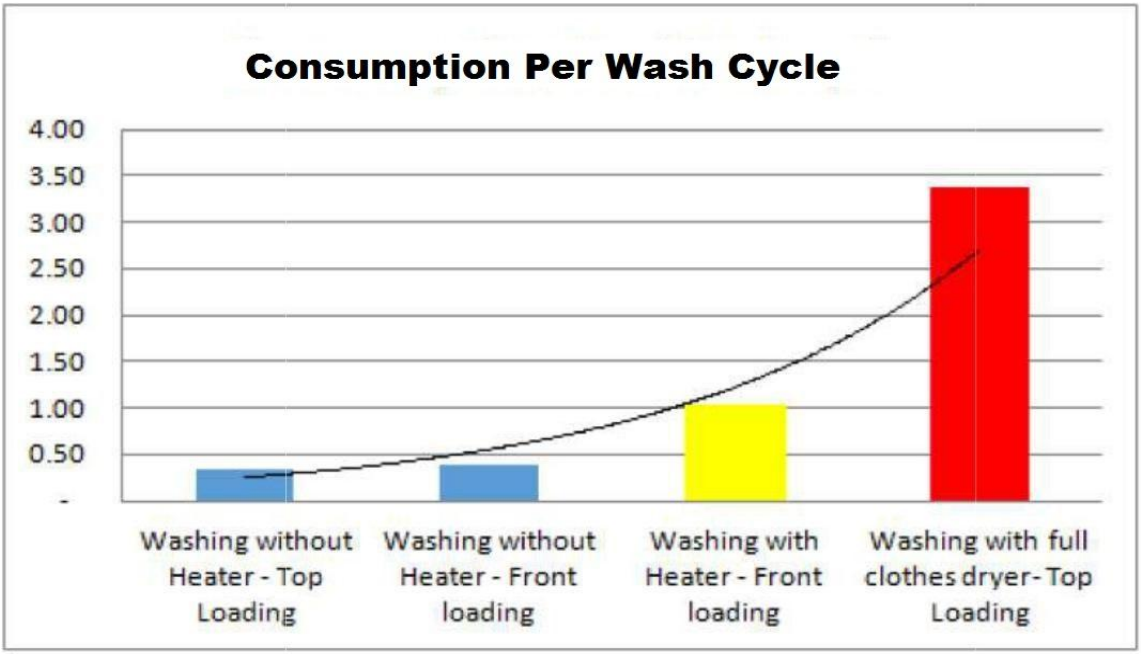
BEE STAR RATING for 1.5 ton AC for 5 months in a year						
Rating	0	1	2	3	4	5
Energy consumption per year (kWH)	3,449	3,300	3,037	2,811	2,617	2,449
Annual Operating cost at 7.5 INR/ kWh (INR)	25,869	24,747	22,776	21,079	19,628	18,369

Source: Compiled from Information on BEE website

WASHING MACHINES

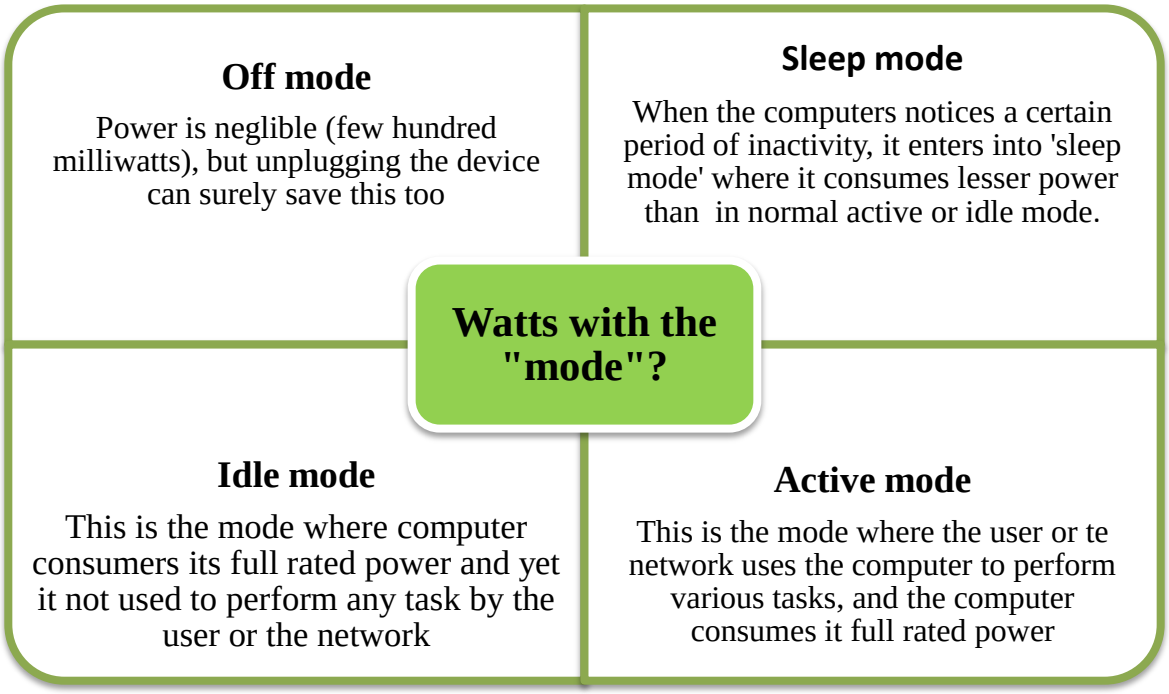
(Do your laundry for less)

- **Wash in cold water.** Today's laundry detergents are made to clean clothes in cold water.
- **Wash full loads.** It takes approximately the same amount of energy to wash a small load as it does a full load. Sort and organize your laundry for full loads, saving both energy and water.
- **Don't overload the washer and dryer.** Your clothes may not get clean and may need to be washed again. Overloading dryers uses excess energy because items take longer to dry. Always use a surge protector on your appliances.
- **Buy the right detergent and use the right amount**. You should always use the detergent recommended by the manufacturer and also the quantity should also be as recommended in the washing machine manual. Adding too much detergent hampers effective washing action and may require more energy in the form of extra rinses.
- **Line-dry clothes whenever possible.** This can save up to **5%** of your energy costs.
- **Clean the lint from the clothes dryer after every load.** The efficiency of the dryer goes down when lint collects over the dryer filter. Run full loads and use the moisture-sensing setting. **Save 5%** on your electric bill.
- **Dry similar types of fabrics together.** For example, put towels together in one load. A lower dryer temperature may be used for certain clothes. See the owner's manual for more information.
- **Presoak or use the soak cycle** when washing heavily soiled garments. You will avoid two washings and save energy.
- **Keep the clothes dryer's outside exhaust clean.** A clogged exhaust lengthens drying time and increases energy use.
- **Choose the right size clothes washer for your needs.** Buying a BEE 5 star rated machine is always recommended.



COMPUTER

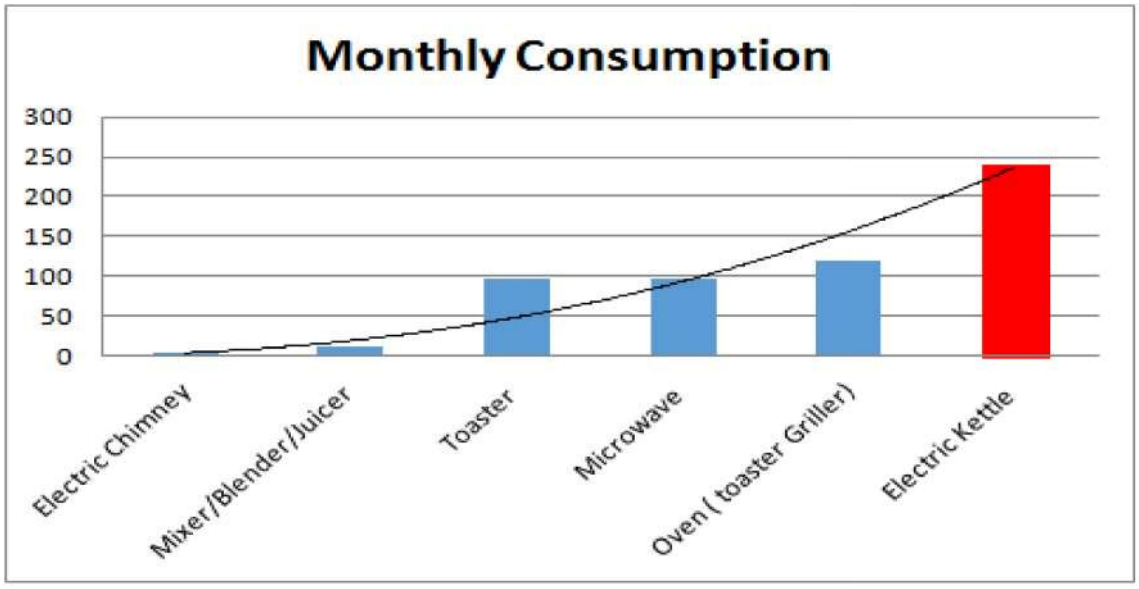
- Screen savers save computer screens, not energy. **Start-ups and shutdown do not use any extra energy**, nor are they hard on your computer components. In fact, shutting computers down when you are finished using them actually reduces system wear and saves energy
- **Setting computers, monitors and copiers to sleep-mode when not in use** helps cut energy costs by approximately 40%.
- **Using the power management settings on computers and monitors** can cause significant savings. Activate and standardize 'power down' on new and existing PCs. Spending a large portion of time in low-power mode not only saves energy but helps the equipment cool down and last longer.
- **If your computer must be left on, turn off the monitor**; this device alone uses more than half the system's energy.
- **Putting your laptop AC adapter on a power strip that can be turned off (or will turn off automatically) can maximize savings**; the transformer in the AC adapter draws power continuously, even when the laptop is not plugged into the adapter.



COOKING

(Cook up some savings)

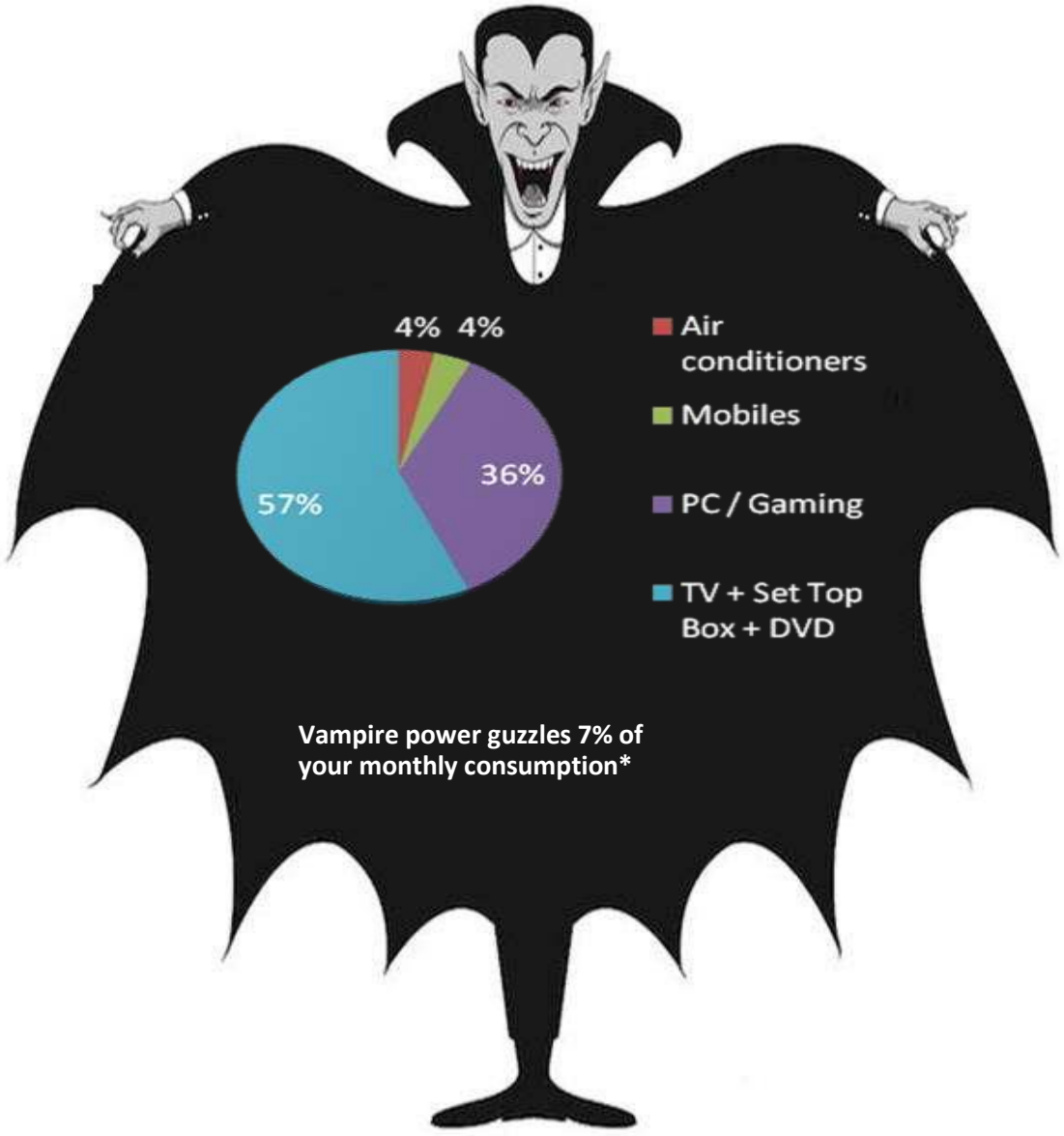
- **Use lids as far as possible.** Cooking with the lid on permits lower temperature settings and leads to less energy consumption.
- **Use appropriate amount of water.** Carefully measure water used for cooking to avoid having to heat more than is needed.
- **Begin cooking on highest heat until liquid begins to boil.** Then lower the heat control settings and allow food to simmer until fully cooked.
- **For large items, stove-top cooking is most efficient**, especially with gas.
- **Use pots and pans that fit the burners.** Pans that fit a burner absorb more of the energy, reducing the amount of heat that is lost.
- **Look for blue flames in natural gas appliances.** Yellow flames indicate the gas is burning inefficiently and an adjustment may be needed.
- **Soak cereals and dals before cooking** to reduce the cooking time as well as the fuel consumption
- The pressure cooker should be loaded two-thirds if the food being cooked is solid and hard and half if loaded with liquid. **Properly used pressure cookers can save up to 50 to 75% of energy as well as time**.



- **Bring items taken out of refrigerators (like vegetables, milk etc.) to room temperature** before placing on the gas stove for heating.
- **Use microwave ovens to save energy.** Microwave ovens are about 33% more efficient than convection ovens and 66% more efficient than conventional ovens.
- When preheating an oven for baking, **time the pre-heat period carefully**. Start using the oven as soon as the desired temperature is reached.

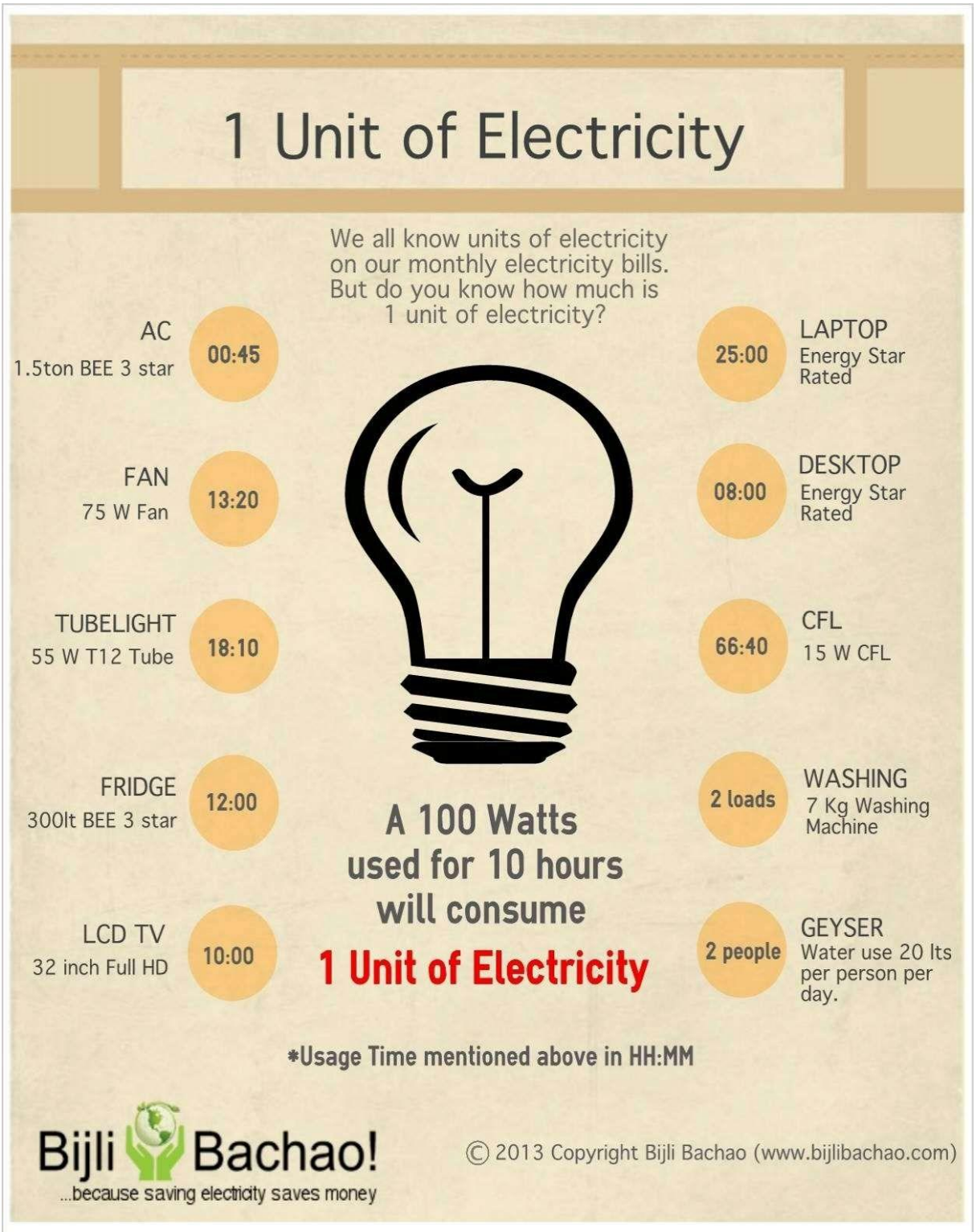
VAMPIRE POWER

(Power consumed during the standby mode)



*Average household with 2 PCs, 1 TV, 2 ACs and 3 Mobiles can save 7% of electricity per month

Modeled on information from Lawrence Berkley National Laboratory
http://standby.lbl.gov/summary-table.html


1 Unit of Electricity
We all know units of electricity on our monthly electricity bills. But do you know how much is 1 unit of electricity?
AC
1.5ton BEE 3 star
00:45
FAN
75 W Fan
13:20
TUBELIGHT
55 W T12 Tube
18:10
FRIDGE
300lt BEE 3 star
12:00
LCD TV
32 inch Full HD
10:00
LAPTOP
Energy Star Rated
25:00
DESKTOP
Energy Star Rated
08:00
CFL
15 W CFL
66:40
WASHING
7 Kg Washing Machine
2 loads
GEYSER
Water use 20 lts per person per day.
2 people
A 100 Watts used for 10 hours will consume
1 Unit of Electricity
*Usage Time mentioned above in HH:MM
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