Webinar
On
“Home Electricity Foot-Print”
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Content

1. Basics of electric energy

2. Power consumption by different house hold appliances.

INTRODUCTION – BASICS OF ELECTRICAL ENERGY
What is Energy...???

Energy helps us to do **Work**.
Introduction - Energy

Different Form of Energy

Physical Energy
- To do daily routine i.e. sleep, talk, eat, laugh etc.
- To move the object
- To lift the object

Electrical Energy
- Lighting
- Fan
- Air Conditioning
- Refrigerator
- Water Electric Heater

Thermal Energy
- Gas Stove
- Gas Water Heater
Introduction - Energy

- Component of Electric Energy...???
Introduction - Energy

\[ \text{INPUT POWER (KW)} \times \text{TIME (Hr)} = \text{Electric ENERGY (kWh)} \]

1 Unit of Electric Energy Consumed = 1 kWh

Amount of active power or true power consumed in one hour.
How To Decide Which Appliance Will Consume More Energy

- It will depend on “INPUT POWER” of the appliance.

- It will be written on tag details and measured in **watt (W)** or **Kilo Watt (kW)**

\[
1000 \text{ W} = 1\text{ KW} \\
\text{OR} \\
1\text{ W} = 1/1000 \text{ KW}
\]
POWER CONSUMPTION BY HOUSEHOLD APPLIANCES
Appliances Wise Electrical Energy Consumption – Lighting

1. Florescent Tube Light : 24W, 28W, 36W, 40W
2. LED Tube Light : 18W, 20W, 28W, 30W
3. Incandescent Bulb : 40W, 60W, 75W, 100W
4. LED Bulb : 10W, 13W, 20W, 28W
5. CFL Bulb : 18W, 22W, 30W, 55W
6. Night Bulb : 0.5W

Note: Above mention running watts of appliances is only for reference, actual running watt may vary for different models.
Appliances Wise Electrical Energy Consumption – Kitchen Appliances

I consume the least = 120 Watts

Oh! I consume higher than the refrigerator = 850 Watts

I am definitely the highest consumer here = 1200 Watts

My consumption = 200 Watts

Note: Above mention running watts of appliances is only for reference, actual running watt may vary for different models.
Appliances Wise Electrical Energy Consumption – Kitchen Appliances

Coffee Maker consumption = 1000W

Dish Washer consumption = 1500W

Note: Above mention running watts of appliances is only for reference, actual running watt may vary for different models.
Appliances Wise Electrical Energy Consumption – Entertainment Appliances

TV consumption = 120W

Desktop consumption = 150W

Laptop consumption = 30W

WIFI Router = 5W

Mobile Phones = 3W

Note: Above mention running watts of appliances is only for reference, actual running watt may vary for different models.
Appliances Wise Electrical Energy Consumption – Heating and Cooling Appliances

Water heater = 3000W

Window AC 1 Ton = 1150W
Window AC 1.5 Ton = 1670W

Split AC 0.8 Ton = 800 W
Split AC 1 Ton = 1090 W
Split AC 1.5 Ton = 1560 W
Split AC 2 Ton = 1930 W

Fan = 60W

Note: Above mention running watts of appliances is only for reference, actual running watt may vary for different models.
Appliances Wise Electrical Energy Consumption – Appliances for Cleaning

- **Washing Machine**: 1150W
- **Iron Box**: 1200W
- **Vacuum Cleaner**: 200W

*Note: Above mention running watts of appliances is only for reference, actual running watt may vary for different models.*
Appliances Wise Electrical Energy Consumption – Miscellaneous Appliances

- Printer = 400W
- Water Pump = 250 – 1000W
- Bore well Pump = 1100W

Note: Above mention running watts of appliances is only for reference, actual running watt may vary for different models.
Actual Electrical Energy Consumption

To know actual energy consumption, one need to refer “TAG DETAILS” or “PRODUCT BROCHURE”.

Microwave Oven

Food Processor
Actual Electrical Energy Consumption

To know actual energy consumption, one need to refer “TAG DETAILS” or “PRODUCT BROCHURE”.

TELVISION
Actual Electrical Energy Consumption

To know actual energy consumption, one need to refer “TAG DETAILS” or “PRODUCT BROCHURE”.

Pedestal Fan
How To Calculate Energy Consumption By Household Appliances

Energy Consumption Per Month (kWh) = \frac{\text{Number of Appliances} \times \text{Operating Hours Per Day (Hr.)} \times \text{Rated Watts (W)} \times \text{Number of Days in Month}}{1000}

<table>
<thead>
<tr>
<th>Appliances</th>
<th>Number of Appliances</th>
<th>Operating Hours Per Day (Hr.)</th>
<th>Rated Watts (W)</th>
<th>Energy Consumption Per Month (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling Fan</td>
<td>1</td>
<td>12</td>
<td>60</td>
<td>\frac{(1\times12\times60\times30)}{1000} = 22</td>
</tr>
<tr>
<td>FTL Tube Light</td>
<td>1</td>
<td>8</td>
<td>28</td>
<td>\frac{(1\times8\times28\times30)}{1000} = 7</td>
</tr>
</tbody>
</table>

Total (kWh) = 28

<table>
<thead>
<tr>
<th>Appliances</th>
<th>Number of Appliances</th>
<th>Operating Hours Per Day (Hr.)</th>
<th>Rated Watts (W)</th>
<th>Energy Consumption Per Month (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling Fan</td>
<td>1</td>
<td>12</td>
<td>60</td>
<td>22</td>
</tr>
<tr>
<td>FTL Tube Light</td>
<td>1</td>
<td>8</td>
<td>28</td>
<td>7</td>
</tr>
<tr>
<td>Television</td>
<td>1</td>
<td>4</td>
<td>93</td>
<td>11</td>
</tr>
</tbody>
</table>

Total (kWh) = 39

<table>
<thead>
<tr>
<th>Appliances</th>
<th>Number of Appliances</th>
<th>Operating Hours Per Day (Hr.)</th>
<th>Rated Watts (W)</th>
<th>Energy Consumption Per Month (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling Fan</td>
<td>1</td>
<td>12</td>
<td>60</td>
<td>22</td>
</tr>
<tr>
<td>FTL Tube Light</td>
<td>1</td>
<td>8</td>
<td>28</td>
<td>7</td>
</tr>
<tr>
<td>Television</td>
<td>1</td>
<td>4</td>
<td>93</td>
<td>11</td>
</tr>
<tr>
<td>Washing Machine</td>
<td>1</td>
<td>0.5</td>
<td>465</td>
<td>7</td>
</tr>
<tr>
<td>Refrigerator</td>
<td>1</td>
<td>24</td>
<td>90</td>
<td>65</td>
</tr>
</tbody>
</table>

Total (kWh) = 111
## Electricity Bill Analysis

### Energy Consumed

\[
\text{Energy Consumed (kWh)} = \text{Present Reading (kWh)} - \text{Past Reading (kWh)}
\]

### Energy Charges

First 30 Units: Rs. 3.75
- 30 – 100 Units: Rs. 5.20
- 101 – 200 Units: Rs. 6.75
- Above 200 Units: Rs. 7.80

### Fixed Charges

\[
\text{Fixed Charges} = \text{Connected Load (kW)} \times \text{Load Fixed Charge}
\]

<table>
<thead>
<tr>
<th>Load Fixed Charge</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>For 1\textsuperscript{st} KW</td>
<td>Rs. 60</td>
</tr>
<tr>
<td>For Additional KW</td>
<td>Rs. 70</td>
</tr>
</tbody>
</table>

### Tax, Arrear & Other Charges

Details not specified in the image.
Sample Electricity Bill

Fixed Load Charge

Energy Charge

Tax, Arrear & Additional Charges

Sanction Load

Present & Past Reading

Total energy Consumed

Total Electricity Bill
### Electricity Bill Analysis

<table>
<thead>
<tr>
<th>Step - 1</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Past Reading</td>
<td>= 45315</td>
</tr>
<tr>
<td>Present Reading</td>
<td>= 45641</td>
</tr>
<tr>
<td><strong>Total Energy Consumed</strong></td>
<td>= <strong>326 kWh</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step - 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Find Sanctioned Load</td>
<td>= 3KW</td>
</tr>
<tr>
<td><strong>Fixed Charges</strong></td>
<td>= (1 x 60) + (2 x 70) = Rs. 200</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step - 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>First 30 Units</td>
<td>= 30 x Rs. 3.75 = Rs. 112.50</td>
</tr>
<tr>
<td>30 – 100 Units</td>
<td>= 70 x Rs. 5.20 = Rs. 364.00</td>
</tr>
<tr>
<td>101 – 200 Units</td>
<td>= 100 x Rs. 6.75 = Rs. 675.00</td>
</tr>
<tr>
<td>Above 200 Units</td>
<td>= 126 x Rs. 7.80 = Rs. 982.80</td>
</tr>
<tr>
<td><strong>Total Energy Charges</strong></td>
<td>= <strong>Rs. 2134.30</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step - 4</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FAC</td>
<td>= Rs. 39.12</td>
</tr>
<tr>
<td>Tax</td>
<td>= Rs. 192.09</td>
</tr>
<tr>
<td>Arrear</td>
<td>= Rs. 31.00</td>
</tr>
</tbody>
</table>

Total Electricity Bill = 2134.30 + 200.00 + 39.12 + 192.09 + 31.00 = **Rs. 2535**
Energy Saving Opportunities in House Hold Appliances
Proper Utilization of House Hold Appliances
Proper Utilization of House Hold Appliances

1. Switch **OFF** Fan, Light, AC and other appliances whenever not using.

How Much Money You Can Save By Switching OFF Fan & Light........????

<table>
<thead>
<tr>
<th>Appliances</th>
<th>Number</th>
<th>Rated Watts (W)</th>
<th>Operating Hours Per Day (Hr)</th>
<th>Unutilized Hours (Hr)</th>
<th>Energy Wastage Per Month (kWh)</th>
<th>Money Wastage Per Month (@Rs. 6.5/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling Fan</td>
<td>1</td>
<td>60</td>
<td>8</td>
<td>2</td>
<td>3.60</td>
<td>23.4</td>
</tr>
<tr>
<td>Tube Light</td>
<td>1</td>
<td>28</td>
<td>8</td>
<td>2</td>
<td>1.68</td>
<td>11.0</td>
</tr>
<tr>
<td><strong>Total Money Wastage (Rs.)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>34.4</strong></td>
</tr>
</tbody>
</table>

Being a good & responsible citizen of India, it is our responsibility to save each and every unit of electricity.
Proper Utilization of House Hold Appliances – Air Conditioner

1. **Set the temperature of AC around 24 - 27 °C.**

By doing so **3-4% power can be saved.** *(Savings in lower temp (<24°C) – 6% for every rise in 1°C and in higher temp (>24°C) – 4% for every rise in 1°C)*

**Example:**

- Let us assume we have 1.5 tons, 5-star rated window AC and it consume 1300 W/Hr.
- AC will operate for 10 hours in a day and 30 days in a month and Electricity cost: Rs.6.5 /kWh

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Total Energy Used (kWh/Day)</th>
<th>Cost of Using AC</th>
<th>% Energy or Money Saved wrt 18°C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rs. Per Day</td>
<td>Rs. Per Month</td>
</tr>
<tr>
<td>27</td>
<td>9.0</td>
<td>58.5</td>
<td>1755</td>
</tr>
<tr>
<td>24</td>
<td>10.5</td>
<td>68.3</td>
<td>2047</td>
</tr>
<tr>
<td>18</td>
<td>13.0</td>
<td>84.5</td>
<td>2535</td>
</tr>
</tbody>
</table>
Proper Utilization of House Hold Appliances – Air Conditioner

• Increase your AC temp from 18°C to 24°C can help you to save around Rs. 3,900 in a year.
• Increase your AC temp from 18°C to 27°C can help you to save around Rs. 6,240 in a year.

Feeling HOT at 27°C

Set the temperature of AC at 27°C and use ceiling fan at optimum speed.
Proper Utilization of House Hold Appliances – Air Conditioner

<table>
<thead>
<tr>
<th>Appliance</th>
<th>Status</th>
<th>Total Energy Used (kWh/Day)</th>
<th>Cost of Using AC Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan</td>
<td>OFF</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AC</td>
<td>21°C</td>
<td>11.5</td>
<td>74.75</td>
</tr>
</tbody>
</table>

**TOTAL (Rs.)** 74.75

<table>
<thead>
<tr>
<th>Appliance</th>
<th>Status</th>
<th>Total Energy Used (kWh/Day)</th>
<th>Cost of Using AC Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan</td>
<td>ON</td>
<td>0.6</td>
<td>3.9</td>
</tr>
<tr>
<td>AC</td>
<td>27°C</td>
<td>9</td>
<td>58.5</td>
</tr>
</tbody>
</table>

**TOTAL (Rs.)** 62.4

Saving
- Per Day - Rs. 12
- Per Month – Rs. 360
- Per Year – Rs. 1,800
2. Always set the **TIMER** to automatically switch **OFF** AC after certain duration of time.

### CASE – 1 (AC SWITCH ON TIME – 8:00 PM TO 6:00AM)

<table>
<thead>
<tr>
<th>Appliance</th>
<th>Status</th>
<th>Total Energy Used (kWh/Day)</th>
<th>Cost of Using AC Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan</td>
<td>ON</td>
<td>0.6</td>
<td>3.9</td>
</tr>
<tr>
<td>AC</td>
<td>27°C</td>
<td>9</td>
<td>58.5</td>
</tr>
<tr>
<td><strong>TOTAL (Rs.)</strong></td>
<td></td>
<td></td>
<td><strong>62.4</strong></td>
</tr>
</tbody>
</table>

### CASE – 2 (AC SWITCH ON TIME – 8:00 PM TO 4:00AM)

<table>
<thead>
<tr>
<th>Appliance</th>
<th>Status</th>
<th>Total Energy Used (kWh/Day)</th>
<th>Cost of Using AC Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan</td>
<td>ON</td>
<td>0.6</td>
<td>3.9</td>
</tr>
<tr>
<td>AC</td>
<td>27°C</td>
<td>7.2</td>
<td>46.8</td>
</tr>
<tr>
<td><strong>TOTAL (Rs.)</strong></td>
<td></td>
<td></td>
<td><strong>50.7</strong></td>
</tr>
</tbody>
</table>

**Saving**
- Per Day - Rs. 12
- Per Month – Rs. 360
- Per Year – Rs. 1,800
Proper Utilization of House Hold Appliances – Air Conditioner

- By increasing the temperature of AC from 21°C to 27°C and using fan cost saving of **Rs. 12** per day is possible.

- By putting timer and reducing the operating time from 10 hours to 8 hours a cost saving of **Rs. 12** per day is possible.

3. Reduce the heat load of room.
   - By putting curtain on windows.
   - Close door and windows.
   - Arrest air leakage near door and windows.
   - Avoid ironing of clothes in AC room.
Proper Utilization of House Hold Appliances – Refrigerator

- Do not open door frequently.
- Don't leave the fridge door open for longer than necessary, as cold air will escape.
- Do not overload the refrigerator.
- Avoid putting hot or warm food straight into the fridge.
- Cover liquids and wrap foods stored in the refrigerator. Uncovered foods release moisture and make the compressor work harder.
- Regularly defrost manual-defrost refrigerators and freezers; frost build-up increases the amount of energy needed to keep the motor running.
- Leave enough space between your refrigerator and the walls so that air can easily circulate around the refrigerator.
- Don't keep your refrigerator or freezer too cold. The thumb rule is that you set the temperature of the fridge between 2.5 and 4.5 degrees Centigrade. The freezer chamber should be set at an ideal range of -15 to -17.5 degrees Centigrade.
Proper Utilization of House Hold Appliances – Other Appliances

1. Electric Iron
   - Select iron boxes with automatic temperature cut-off.
   - Use appropriate regulator position for ironing.
   - Do not put more water on clothes while ironing.
   - Do not iron wet clothes

2. Washing Machine
   - Run washing machine only with full load.
   - Use optimal quantity of water.
   - Use timer facility to save energy.
   - Use the correct amount of detergent.
   - Prefer natural drying over electric dryers.
Proper Utilization of House Hold Appliances – Other Appliances

3. Geyser
   • Switch off when not required.
   • Reduce thermostat setting from 60° to 50° C.

4. Mixture
   • Dry grinding in food processors (mixers and grinders) takes longer time and as such consumes more energy than liquid grinding.

5. Microwave Oven
   • Consumes 50 % less energy than conventional electric / gas stoves.
   • Do not bake large food items.
   • Don't open the oven door too often to check food condition as each opening leads to a temperature drop of 25° C.
Technology Upgradation
STAR RATING OF ELECTRICAL APPLIANCES

• Enable consumers to compare energy efficiency of products between different models

• Have information on:
  ➢ Energy consumption
  ➢ Energy efficiency

• Helps consumers to:
  ➢ Reduce energy bills
  ➢ Use less energy

• Helps manufacturers to:
  ➢ Improve energy efficiency of their products
  ➢ Create competition amongst themselves to produce more energy efficient models

• Helps Nation - in conservation of energy and thus have a positive impact for the future
STAR RATING OF ELECTRICAL APPLIANCES

Stars (1-5) display the relative efficiency of the product.

Daily/annual Power consumption is used for comparing the actual energy use between different models.

Important product specifications like brand, model, type, capacity, efficiency (EER), etc.

The more the number of stars on the label, the higher is the efficiency of the appliance.
Don’t let your electricity bill weigh you down
Always look for the BEE Label

**Label For Electric Storage Water Heaters (Geyser)**
- Count the stars within the colored strip: more savings
- Know the efficiency rating of your geyser
- See the BEE logo for the authenticity of the label

**Label For ACs**
- Count the stars within the colored strip: more savings
- Know the efficiency rating of your AC
- See the BEE logo for the authenticity of the label

**Label For Refrigerators**
- Count the stars within the colored strip: more savings
- Know the efficiency rating within one year
- See the BEE logo for the authenticity of the label

**Label For TVs**
- Count the stars within the colored strip: more savings
- Know the actual units consumed within one year
- See the BEE logo for the authenticity of the label

**Label For Ceiling Fans**
- Count the stars within the colored strip: more savings
- Know the efficiency of your fan
- See the BEE logo for the authenticity of the label

**Label For Tube Lights**
- Count the stars within the colored strip: more savings
- Know the efficiency of your tube lights
- See the BEE logo for the authenticity of the label
Technology Upgradation

Man Who Bring Stars To Your Home....!!!

Dr. Ajay Mathur
Replace the conventional incandescent bulb and CFL bulb with LED lamp.

<table>
<thead>
<tr>
<th>Incandescent Bulb</th>
<th>CFL Bulb</th>
<th>LED Bulb</th>
</tr>
</thead>
<tbody>
<tr>
<td>40W</td>
<td>12W</td>
<td>7W</td>
</tr>
<tr>
<td>60W</td>
<td>18W</td>
<td>10W</td>
</tr>
<tr>
<td>75W</td>
<td>22W</td>
<td>13W</td>
</tr>
</tbody>
</table>

- Hence, by replacing 40W incandescent bulb with 7W LED bulb electricity consumption will reduce by 75% to 80%.
- Also, under various scheme, electricity distribution companies are distributing LED bulbs at subsidized cost.
Replace the conventional FTL tube light with LED tube lights.

- Hence, by replacing 38W florescent tube light with 20W LED tube light electricity consumption will reduce by 45% to 50%.

<table>
<thead>
<tr>
<th>Appliances</th>
<th>Number of Appliances</th>
<th>Operating Hours Per Day (Hr)</th>
<th>Rated Watts (W)</th>
<th>Energy Consumption Per Month (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTL Tube Light</td>
<td>1</td>
<td>10</td>
<td>38</td>
<td>11.4</td>
</tr>
<tr>
<td>LED Tube Light</td>
<td>1</td>
<td>10</td>
<td>20</td>
<td>6.0</td>
</tr>
<tr>
<td><strong>SAVING</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>47%</strong></td>
</tr>
</tbody>
</table>
Technology Upgradation – Ceiling Fan

Replace the conventional ceiling fan with energy efficient BLDC fan.

<table>
<thead>
<tr>
<th>Fan Speed</th>
<th>BLDC Fan</th>
<th>Traditional Fan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6 W</td>
<td>16 W</td>
</tr>
<tr>
<td>2</td>
<td>10 W</td>
<td>27 W</td>
</tr>
<tr>
<td>3</td>
<td>14 W</td>
<td>45 W</td>
</tr>
<tr>
<td>4</td>
<td>19 W</td>
<td>55 W</td>
</tr>
<tr>
<td>5</td>
<td>28 W</td>
<td>75 W</td>
</tr>
</tbody>
</table>

- BLDC motor fans consume less power as compared to the traditional ceiling fans.
- These fans come with a remote control unit thereby allowing you to switch on and off the fans easily.
- These BLDC motor fans come with a Timer and Sleep mode that will enable you to set a specific time limit (number of hours) while sleeping.
# Technology Upgradation – Ceiling Fan

## How Much Money I Can Save......????

<table>
<thead>
<tr>
<th></th>
<th>Regular Fan</th>
<th>BLDC Motor Fan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Approximate Cost</strong></td>
<td>₹ 1600</td>
<td>₹ 3300</td>
</tr>
<tr>
<td><strong>Consumption of power</strong></td>
<td>75 Watts</td>
<td>28 Watts</td>
</tr>
<tr>
<td><strong>Hourly Consumption</strong></td>
<td>0.075 units</td>
<td>0.028 units</td>
</tr>
<tr>
<td><strong>Daily Consumption (@15 Hr/Day)</strong></td>
<td>1.125 units</td>
<td>0.42 units</td>
</tr>
<tr>
<td><strong>Yearly Consumption (200 Days)</strong></td>
<td>225 units</td>
<td>84 units</td>
</tr>
<tr>
<td><strong>Costs (₹ 6.5 per unit)</strong></td>
<td>₹ 1462.5</td>
<td>₹ 546</td>
</tr>
</tbody>
</table>
Replace the old non-inverter AC with new energy efficient inverter AC.
## Technology Upgradation – Air Conditioner

### How Much Money I Can Save......????

<table>
<thead>
<tr>
<th>1 Ton AC</th>
<th>Energy Consumption</th>
<th>Running Cost</th>
<th>MRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Star AC (mostly non Inverter)</td>
<td>843</td>
<td>5480</td>
<td>21,400</td>
</tr>
<tr>
<td>2 Star AC (mostly non Inverter)</td>
<td>800</td>
<td>5200</td>
<td>29,500</td>
</tr>
<tr>
<td>3 Star AC (Inverter)</td>
<td>747</td>
<td>4856</td>
<td>36,400</td>
</tr>
<tr>
<td>4 Star (mostly Inverter)</td>
<td>645</td>
<td>4193</td>
<td>39,900</td>
</tr>
<tr>
<td>5 Star (mostly Inverter)</td>
<td>554</td>
<td>3601</td>
<td>41,500</td>
</tr>
</tbody>
</table>

If you purchase 5 Star AC in place of 3 Star AC, a yearly saving of Rs. 1255 is possible at extra cost of Rs. 5100.
## Technology Upgradation – Air Conditioner

<table>
<thead>
<tr>
<th></th>
<th>0.75 ton</th>
<th>1 ton</th>
<th>1.5 ton</th>
<th>2 ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Star AC (mostly non Inverter)</td>
<td>627</td>
<td>843</td>
<td>1246</td>
<td>1648</td>
</tr>
<tr>
<td>2 Star AC (mostly non Inverter)</td>
<td>596</td>
<td>800</td>
<td>1184</td>
<td>1626</td>
</tr>
<tr>
<td>3 Star AC (mix of Inverter and non Inverter)</td>
<td>542</td>
<td>747</td>
<td>1104</td>
<td>1448</td>
</tr>
<tr>
<td>4 Star (mostly Inverter)</td>
<td>464</td>
<td>645</td>
<td>945</td>
<td>1293</td>
</tr>
<tr>
<td>5 Star (mostly Inverter)</td>
<td>450</td>
<td>554</td>
<td>840</td>
<td>1113</td>
</tr>
</tbody>
</table>

Annual Electricity Consumption (Units or kWh for 1600 hrs) based on data from BEE
Technology Upgradation – Solar Water Heater

Replace Electric Water Heater With Solar Water Heater OR Gas Water Heater

1. **Electric Water Heater**
   - Convert electric energy into heat energy.
   - Easy installation, Less expensive & require less maintenance.
   - Operating cost is high and don’t give instant hot water

2. **Gas Water Heater**
   - Natural gas or LPG is burnt. This combustion produces heat energy.
   - Provide instant heat.
   - Cheaper to run as gas is cheap. Hence, suitable for large families.
   - Release carbon monoxide.

3. **Solar Water Heater**
   - The light radiations from the sun are converted into heat energy.
   - Operation cost is ZERO. As sun rays are FREE.
   - Hot water is available even during power cut.
   - Need additional rooftop space and also required annual maintenance.
Technology Upgradation – Solar Water Heater

Replace Electric Water Heater With Solar Water Heater OR Gas Water Heater
A 100-litre per day water heater can save yearly electricity units in various parts of India as per the table mentioned below:

<table>
<thead>
<tr>
<th>Region</th>
<th>Expected no. of days of use of hot water per year</th>
<th>Expected yearly electricity saving on full use of solar hot water (units of electricity)</th>
<th>Expected Cost Saving (Rs. 6.5/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Region</td>
<td>200 days</td>
<td>1000</td>
<td>6500</td>
</tr>
<tr>
<td>Eastern Region</td>
<td>200 days</td>
<td>1000</td>
<td>6500</td>
</tr>
<tr>
<td>Southern Region</td>
<td>300 days</td>
<td>1500</td>
<td>9750</td>
</tr>
<tr>
<td>Western Region</td>
<td>250 days</td>
<td>1250</td>
<td>8125</td>
</tr>
</tbody>
</table>

Stand-By Power

Vampire Power

Ghost Power
Stand-By Power

- Standby **power** is electrical **power** that a device consumes when not in use, but plugged in to a source of **power** and ready to be used.

Example:

1. TV is OFF with remote but main power supply is ON.
2. TV is OFF but set-top box is ON.
3. Not using microwave but it is ON from main power supply.
4. Not using internet but modem is ON.
Stand-By Power

TOP 5 ENERGY VAMPIRES

1. Computer equipment
2. TVs
3. Surround sound systems
4. Cable or satellite TV boxes
5. Household items with a clock (e.g. microwave, DVD player, etc.)
Stand-By Power

**Power Use in Off or Standby Mode**

<table>
<thead>
<tr>
<th>Device</th>
<th>Off</th>
<th>Standby Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD Player</td>
<td>10 Watts</td>
<td></td>
</tr>
<tr>
<td>Audio System</td>
<td>24 Watts</td>
<td></td>
</tr>
<tr>
<td>Microwave</td>
<td>5 Watts</td>
<td></td>
</tr>
<tr>
<td>Coffee Maker</td>
<td>2 Watts</td>
<td></td>
</tr>
<tr>
<td>Laptop Computer</td>
<td>50 Watts</td>
<td></td>
</tr>
<tr>
<td>Desktop Computer &amp; Screen</td>
<td>12 Watts</td>
<td></td>
</tr>
<tr>
<td>Surge Protector</td>
<td>6 Watts</td>
<td></td>
</tr>
<tr>
<td>Multifunction Inkjet</td>
<td>10 Watts</td>
<td></td>
</tr>
<tr>
<td>DVR</td>
<td>48 Watts</td>
<td></td>
</tr>
<tr>
<td>Cable Box</td>
<td>30 Watts</td>
<td></td>
</tr>
<tr>
<td>Rear Projection TV</td>
<td>48 Watts</td>
<td></td>
</tr>
</tbody>
</table>
Stand-By Power

- In a survey it was found that in 85% houses set-top box and TV was not switch OFF from main supply during night time.
- It was also found that in 30% houses computer was not switched OFF from main supply after use.

<table>
<thead>
<tr>
<th>Appliances</th>
<th>Hours/Day</th>
<th>Days/Year</th>
<th>Watt</th>
<th>kWh/Year</th>
<th>Money Wasted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set-Top Box</td>
<td>16</td>
<td>365</td>
<td>10</td>
<td>58</td>
<td>377</td>
</tr>
<tr>
<td>TV</td>
<td>16</td>
<td>365</td>
<td>7</td>
<td>41</td>
<td>267</td>
</tr>
<tr>
<td>Computer</td>
<td>22</td>
<td>365</td>
<td>9</td>
<td>72</td>
<td>468</td>
</tr>
</tbody>
</table>

It is recommended to switch OFF the appliances from plug point.
Thank You
Complete The Task, Earn a Certificate
Task: Identify energy saving opportunities to reduce your electricity bill

1. Take a latest electricity bill copy and identify the following:
   - Monthly electricity consumption
   - Monthly fixed charges
   - Monthly energy charges
   - Taxes etc.

2. From monthly electricity consumption, calculate daily consumption

3. Calculate appliance wise energy consumption
   - Observe your daily appliance usage pattern
   - Prepare a summary of appliance wise power consumption
   - Use the formula shared earlier to make this calculation

4. By observing your daily usage pattern, try to identify opportunities to reduce your electricity bill
## Task Submission-Sample

### 1. Electricity bill details
- Monthly energy consumption: 48.4 kWh
- Fixed Charges: Rs. 50
- Energy Charges: Rs. 290
- Taxes: Rs. 3

### 2. Daily energy consumption
- : 1.612 kWh

### 3. Calculating Daily Energy Consumption

<table>
<thead>
<tr>
<th>Appliance</th>
<th>Numbers</th>
<th>Power, W</th>
<th>Operating Hours per day</th>
<th>Daily Energy Consumption, Wh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan</td>
<td>2</td>
<td>65</td>
<td>10</td>
<td>1300</td>
</tr>
<tr>
<td>Tube light</td>
<td>3</td>
<td>36</td>
<td>6</td>
<td>312</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>1612 (1.612kWh)</td>
</tr>
</tbody>
</table>

### 4. Strategies to reduce consumption
Task Submission

Email us all the details with a photo of your electricity bills to the below mentioned email address:

y.sharma@teri.res.in
arjun.shetty@teri.res.in

Participants completing the task will be issued certificates

Your email address, personal information and electricity bill information will not be shared with any third party organization. Your email address and other personal information will only be used by Webinar organizer to communicate with you.
Thank you for participating in this webinar:

**TERI Team:**
Sabreen Ahmed  
Arjun D Shetty  
Yatharth Kumar Sharma  
Apoorva B A  
Saltanat Kazi  
Satish S Kumar

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