Energy Conservation

What is energy? Capacity to do work.

FORMS

Thermal - Heat
Radiant- Light
Kinetic- Motion
Electrical
Chemical
Nuclear
Potential- Gravitational
Hydro-Electricity

CLASSIFICATIONS

Primary energy-- sources
Coal, Oil, Natural Gas
Radioactive Substances
Geo-thermal energy &
Hydro-electricity

Secondary energy
Primary energy is converted into secondary ie steam & electricity.
More useful form

Renewable & non-renewable energy

Renewable energy resources are in-exhaustible like wind ,Sun, Hydel-energy-- can be harnessed without polluting the environment.

Non renewable sources are conventional fossil fuels like coal Oil & gas which will deplete over time.

Global Energy Scenario

According to EIA (Energy Information Administration)

At present rate of consumption our existing energy reserves are expected to last for -

Oil- 45 yrs. Gas- 65 yrs. Coal- about 200 years.

But global demand will increase by 50% by next 25 Yrs.

Asia alone will consume more than half the world energy by 2030 (Population Building & Industry)

Organisation's interest in energy efficiency

- Controlling Cost.
- Protecting global climate.
- Good Corporate image among customers.

Major Need for Energy Conservation ?

CLIMATE

Coal & oil contain sulphur which is converted into Sulphur dioxide & Nitrogen Oxide gases when burnt. These gases when mixed with rain, causes acid rain which spoils the water. This may occur any where even far away from source of generation.

Combustion of fossil fuels releases CO_2 (green house gases- 1% in atmosphere)

CO_2 in Atmosphere-

Pre Industrial times- 280 ppm (parts per milliom)

2005 - 385 ppm

Exp. green house gases in long term-1000 ppm

Result- Serious health & environment problems

At 450 ppm Global temp will rise by 2°C

At 550 ppm it will rise by 3°C

Ener.Effic, technique offers max. scope for limiting CO_2

(Global temp. rise is 0.6°C in last 100 years)

Energy Efficiency – to cut down the amount of energy required for a given work/output- process improvement & technological progress

Energy Conservation- to reduce wastage- Changing behaviour of people.

Energy Conservations Vs Energy Efficiency

Energy Efficient Equipment uses less energy for same output and reduces CO_2 emissions

Incandescent Lamp
60 W

CO_2 Emission – 65 g/hr

Compact fluorescent Lamp
15 W

CO_2 Emission – 16 g/hr

Figure 1.14

Energy Conservation Act 2001 (Amendt. 2010)

Demand of electricity & fuel oils are increasing day by day. Energy consumption & cost can be reduced to a great extent by adopting energy efficiency measures. It will reduce the need to mobilise the huge resources as well as environment benefits in terms of reduced greenhouse gas emissions.

Accordingly energy conservation Act 2001 was formed for efficient use of energy and its conservation under a statutory body called bureau of Energy Efficiency (BEE). Prior to this an society, under society Reg. Act 1860 was doing this work.

OBJECT & POWERS

1. Specify norms for processes and energy consumption standards for any equipment or appliance which consumes, generates or transmit energy.
2. Specify the particulars to be displayed on the equipment / appliances.
3. Prescribe energy conservation building codes for efficient use of energy and its conservation in the buildings or complex. (100 KW conn. Load)
4. Create awareness for efficient use of energy & its conservation.
5. Develop testing & certification procedures and to promote testing facilities for certification and testing for energy consumption of equipment & appliances.

6 Promote innovative financing for energy effi. projects.
7 To promote energy efficiency processes & equipts.
8 Direct designated consumers to appoint energy managers, in charge of activities for energy conserva
9 Direct designated consumers to prepare schemes & implement the same for efficient use of energy.
10 To appoint Energy auditors for time to time audit.
11 Direct designated consumers to get energy audit by authorized energy auditors.
12 To prepare educational curriculum on efficient use of energy & its conservation for educational institutes, Board & Universities and Co-ordinate with them for inclusion of the same in their syllabus.
13 Prohibit manufacture or sale or purchase of equip. or appliances which do not confirm to the prescribed energy consumption standards.

14 Strengthen energy consultancy services in the field of energy conservation.

15 Implement inter-national Co-operation programes in the respective field.

16 Impose penalties in case of contravention of the proposed legislation & prescribe the procedure for appeal to the high court in case of any dispute.

Penalty:-

- Up to Rs10 Lac max.
- Rs10000/ every day during which the failure continues
- Any nominated member of the state commission (adjudicating officer) will heard the case before imposing penalty and no appeal tries in any court
- Any party aggrieved by any order of adjudicating officer or C/Govt. or State Court may pray an appeal to the appellate tribunal for energy conservation after depositing the penalty as imposed only within 45 days.Or after 45 days if tribunal finds fit according to sufficient reasons to ne recored.

List of Energy Intensive Industries and other establishments

1. Aluminum
2. Fertilizers
3. Iron & Steel
4 Cement
5. Pulp & Paper
6. Chlor Alkali
7. Sugar
8. Textile
9. Chemicals
10. Railways
11. Port Trust
12. Transport Sector
13. Petrochemical
14. Thermal Power Stations
15. Commercial Buildings or establishments.

Labels on Tubular Fluorescent Lamps:-

IMP. Particulars

- Logo of the Bureau of energy efficiency
- Size of fluorescent lamp & colour / temp.
- Trade, name & year of manufacturing
- Power consumption
- authority no
- Star Level

(Labels with permission of the BEE- fees Rs. 1000/-
& label Security fee 1 Lac
Verification by the bureau time to time.)

BEE Particulars & manners of their display on labels of room air conditioners

- Logo of the BEE
- Type of AC
- Trade, name & year of manufacturing/ import
- Model
- Authority no
- Cooling capacity in watts
- Power Consumption in watts
- Star level of AC
- Variable speed or not
- Energy efficiency ratio

(cooling capacity in watts/power consumption in watts)

BEE particular on labels of distribution Transformers (regulation 2009.)

Standard Ratings 16,25,63,100,160 & 200 KVA

11 KV-3 Phase

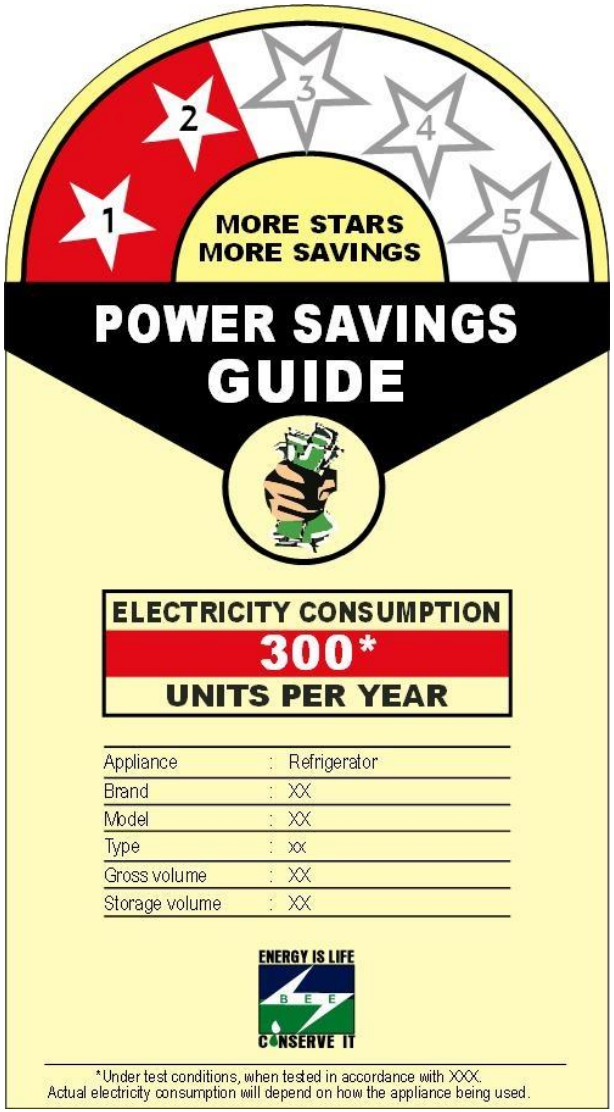
- Logo of the Bureau
- Oil filled or Natural cooled
- Trade, name & year of manufacturing.
- Capacity in KVA
- Voltage up to 11 KV
- Total losses at 30% loading in watts
- Total losses at 100 % loading in watts
- Authority no

BEE particulars on labels of House hold Frost free refrigerators

- Logo of BEE
- Name of manufacturer
- Gross Volume
- Storage Volume
- Modal & year of mfg.
- Authority No.
- Electricity consumption in units per year
- Star Level

A TYPICAL COMPARATIVE LABEL

Sample Labels



Refrigerator

Tubular Fluorescent lamp


Thank You