



International Conference on Standby Power 2nd – 3rd April 2008 New Delhi, India

Progress of Standards and Labeling programme in India

G.Pandian

Bureau of Energy Efficiency (BEE)

(Ministry of Power, Govt. of India)

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R.K.Puram

New Delhi - 110066

www.bee-india.nic.in

Total Installed Capacity

Fuel	MW	%age
Total Thermal	90,895.84	64.6
Coal	75,002.38	53.3
Gas	14,691.71	10.5
Oil	1,201.75	0.9
Hydro	35,208.76	24.7
Nuclear	4,120.00	2.9
Renewable	10,855.24	7.7
Total	1,41,079.84	

Renewable Energy Sources(RES) include SHP, BG, U&I and Wind Energy.

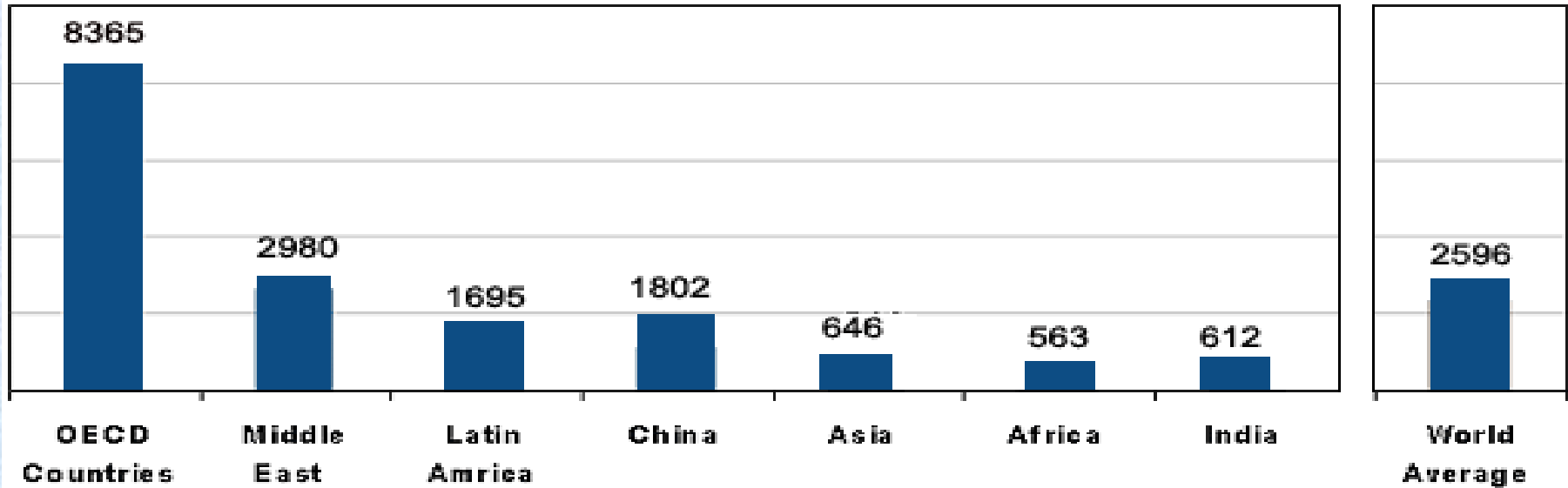
Abbreviation:-

- SHP= Small Hydro Project
- BG= Biomass Gasifier
- BP= Biomass Power
- U & I=Urban & Industrial Water Power
- RES=Renewable Sources.

ENERGY DEMAND AND SUPPLY

- **70% of the total petroleum product demand is being met by imports**
- **Power Shortages**
 - Peak shortage – 14 %**
 - Average shortage – 9 %**
- **Additional 100,000 MW required by 2012**

COMPARATIVE PER CAPITA CONSUMPTION OF ELECTRICITY (kWh)



Source : Key World Energy Statistics (2007)

The per capita consumption in India is too low as compared to developed countries and approx. 20% of the world average. The per capita consumption is targeted to grow to about 1000 kWh per year by 2012

Less than 50% of households have access to electricity, LPG and Kerosene

Goal of Electricity for all by 2012

- **Supply of energy has to increase**
- **The efficient use of energy and its conservation is the least- cost option to mitigate the gap between demand and supply**

**Government of India has enacted the
Energy Conservation Act, 2001
and established the**

Bureau of Energy Efficiency



On

1st March 2002

THE ENERGY CONSERVATION ACT 2001

- **BEE created as a nodal statutory body to improve energy efficiency through:**
 - **Standards and Labeling for equipments/appliances (S&L)**
 - **Energy Conservation Building Codes (ECBC)**
 - **Energy consumption norms for Designated Consumers**
 - **Certification and accreditation of energy auditors and energy managers**
 - **Dissemination of information and best practices**
 - **Capacity Building**
 - **Establish EE delivery systems through Public-Private Partnerships**
- **The Act creates the Bureau of Energy Efficiency (BEE) in the centre, and State Designated Agencies (SDAs) in the states**
- **30 states have created SDAs**

Standards and Labeling

Energy Conservation Act, 2001

- **Act empowers Bureau and Central Government to specify Energy Consumption Standards.**
- **Prohibit manufacture or sale or import of equipments and appliances that do not meet standards**
- **Require display of Energy performance labels on equipments and appliances**

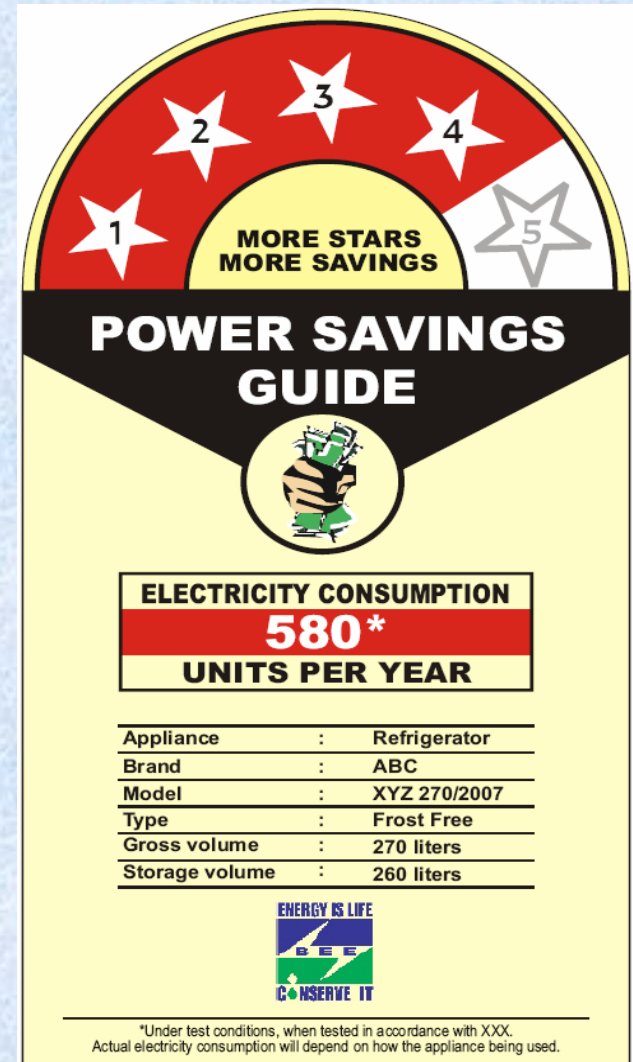
Standards & Labeling

Standard

Energy-efficiency standards are procedures and regulations that prescribe the energy performance of manufactured products, sometimes prohibiting the sale of products that are less energy efficient than the minimum standard, often called Minimum Energy Performance Standards (MEPS).

Label

Energy-efficiency labels are informative labels affixed to manufactured products to describe the product's energy performance (usually in the form of energy use, efficiency, or energy cost); these labels give consumers the data necessary to make informed purchases



Standards & Labeling

The most significant benefits are:

- 1. Provides information on energy use to consumers**
- 2. Enables consumers to reduce energy bills**
- 3. Reduces capital investment in energy supply infrastructure**
- 4. Strengthens competitive markets**
- 5. Mitigates climate change goals**
- 6. Reduces urban/regional pollution**

Standards and Labeling – Worldwide

The first mandatory minimum energy-efficiency standard was introduced in Poland during **1962**.

Russia introduced the efficiency information labels and performance standards from **1960** onwards.

French government introduced standards for refrigerator (**1968**) and for freezers (**1978**).

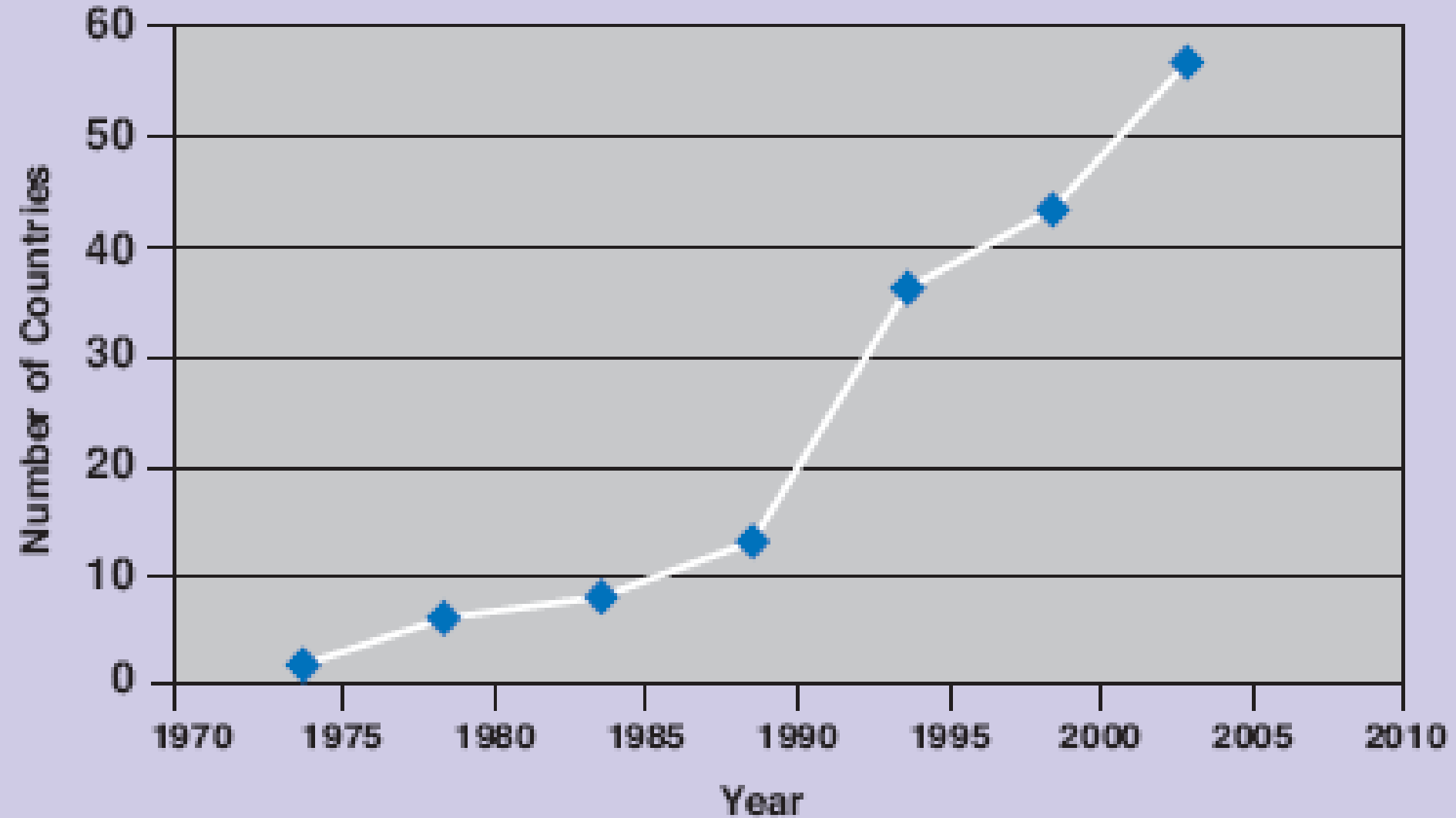
The state of California, U.S introduced the energy-efficiency standards in **1976**

Around the world 43 governments have introduced the standards and labeling during 2000 and it is increased to 65 in the year 2007.

Recently, a number of countries have initiated programs of voluntary endorsement labeling for energy efficient products.

Many other countries including Australia, Canada, China, Brazil, Thailand, Japan, and the United Kingdom (U.K.) have subsequently implemented national programs.

Standards and Labeling – Worldwide



Launch of National Energy Labeling Programme

(An initiative aimed at efficient consumption of energy)

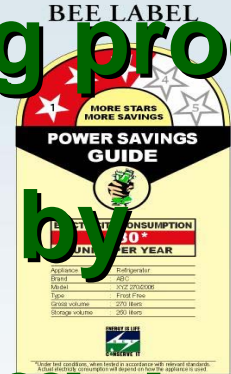
at the hands of

National Energy Labeling programme

- Achievements**
- 311 industrial establishments saved Rs. 959 Crores on energy cost in 2004-05
 - Energy worth Rs. 4000 Crores saved by the participating industries of National Energy Conservation Awards during 1999-2005
 - 880 MW power saved by adoption of energy efficient CFLs and Tube lights during 2002-05
 - Over 20% reduction in electricity consumption achieved in four prestigious central government buildings
 - Sale of Compact Fluorescent Lamps increased from 18 million in 2004 to 2005
- Schedule for launching Energy Labeling**
- Frost Free Refrigerators: May, 2006
 - Fluorescent Tube Lights: May, 2006
 - Direct Cool Refrigerators: September, 2006
 - General Purpose Electric Motors: October, 2006
 - Air Conditioners: November, 2006
 - Ceiling Fans: December, 2006



Shri Sushilkumar Shinde
Hon'ble Union Minister of Power
18th May, 10:00 am, Stein Auditorium,
India Habitat Centre, Lodhi Road, New Delhi - 110003.



Shri R. V. Shabi
Secretary (Power)
Govt. of India

Shri V. V. Rao
Director General
Bureau of Energy Efficiency



The next time you buy a frost free refrigerator or a tube light, look for the BEE Label. BEE Label rates the appliances on energy efficiency - the most energy efficient product gets 5 Stars and the least one gets 1 Star. It helps you make an informed choice, and cut down your electricity bill.

BEE labeled products are expected to be available in the market from July 2006.

Minister of Power

Govt. of India

on

18th May, 2006



Standards and Labeling Technical and Steering committee


- | | | |
|--------------------------------------|---|---------------------|
| 1. Director General | - | Chairman |
| 2. Bureau of Indian Standards (BIS) | - | Member |
| 3. Consumer Organization | - | Member |
| 4. Test Laboratories | - | Member |
| 5. Equipment/appliance manufacturers | - | Member |
| 6. Manufacturers Association | - | Member |
| 7. Technical Experts/consultants | - | Member |
| 8. Officer in-charge | - | Member
Secretary |

Refrigerators

Frost Free




Direct Cool




**MORE STARS
MORE SAVINGS**

**POWER SAVINGS
GUIDE**



ELECTRICITY CONSUMPTION
580*
UNITS PER YEAR

Appliance	: Refrigerator
Brand	: ABC
Model	: XYZ 270/2007
Type	: Frost Free
Gross volume	: 270 liters
Storage volume	: 260 liters



*Under test conditions, when tested in accordance with XXX.
Actual electricity consumption will depend on how the appliance being used.

Refrigerator

Label Information

Energy Consumption per Year
Appliance

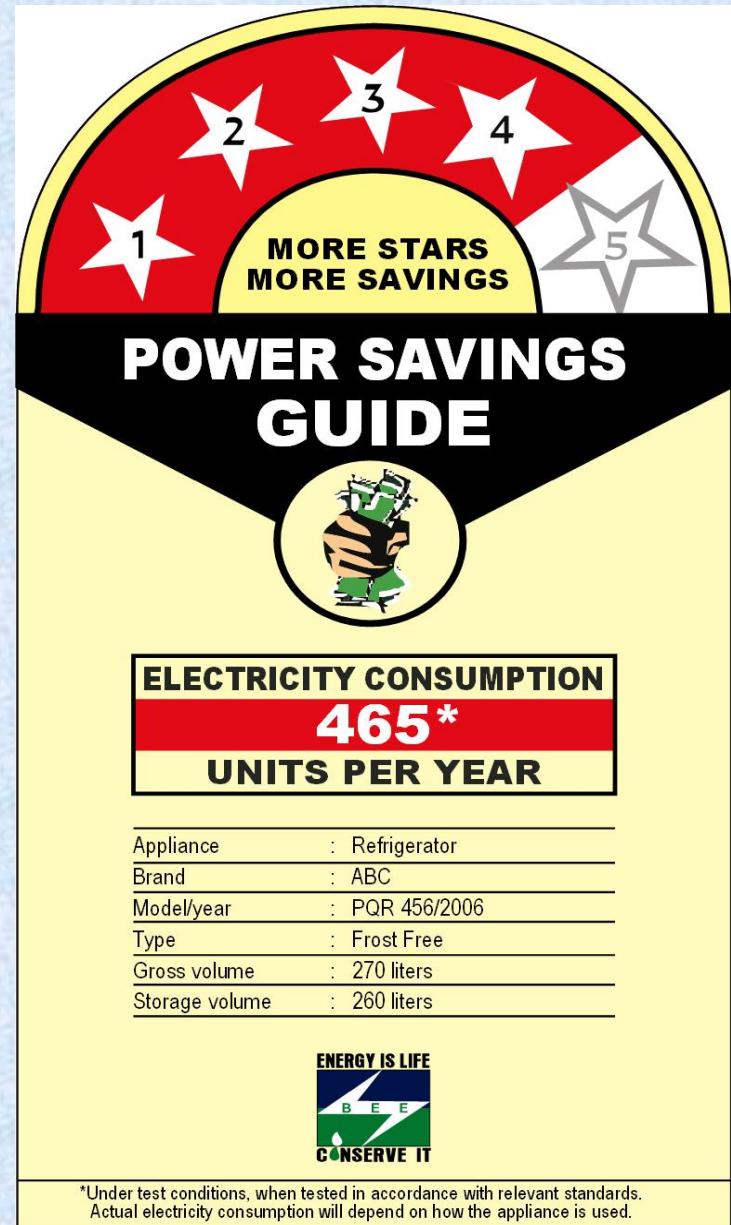
Brand

Model Name/Number, Year of
Manufacturing

Type

Gross Volume

Storage Volume



List of BEE Labeled Frost Free and Direct Cool Refrigerators

Frost Free Refrigerators

Sl.No.	Name of the Manufacturers
1	LG Electronics India Pvt. Ltd.
2	Whirlpool
3	Godrej & Boyce Mfgt. Co. Ltd.
4	Samsung India Elec. Pvt. Ltd.
5	KENSTAR
6	VIDEOCON Industries Ltd.
7	Electrolux
8	TOSHIBA India Pvt. Ltd.
9	SHARP India Limited
10	SANYO India Private Ltd.

Direct Cool Refrigerators

Sl.No.	Name of the Manufacturers
1	LG Electronics India Pvt. Ltd.
2	Whirlpool
3	Godrej & Boyce Mfgt. Co. Ltd.
4	Samsung India Elec. Pvt. Ltd.
5	Electrolux
6	Videocon Appliances Limited
7	Kelvinator
8	Kenstar (Kitchen appliances)
9	Next Retail India Ltd.
10	Haier Appliances (India) P. Ltd.

Estimated Energy and Demand Saving

Refrigerator Sales for the Year 2007-08 (Approx.) Million					4.60	
Refrigerator Capacity (Liters)	Annual Energy Consumption (Approx.)		Energy Saving (Approx.)	Approx. Sales Qty	BEE labeled Qty. (Approx.)	Total annual energy saving MU
	No star	3 Star				
	kWh	kWh	kWh	100%	40%	
170 _ 200	700	500	200	4.60	1.84	442
201 _ 250	800	600	200			
251 _ 300	950	700	250			
301 _ 450	1100	850	250			
451 _ 500	1200	900	300			
Avg.	950	710	240			
Total Energy Saving (MU)					442	
Avoided capacity (MW)					90	

Tubular Fluorescent Lamp



1200 mm up to 40 W, Colour temp 6500 K, 4000 K and 2700 K



POWER SAVINGS GUIDE

BEE STAR RATING PLAN					
STAR RATING	★	★★	★★★	★★★★	★★★★★
Lumens per Watt at 0100 hrs of use	<61	>=61 & <67	>=67 & <86	>=86 & <92	>=92
Lumens per Watt at 2000 hrs of use	<52	>=52 & <57	>=57 & <77	>=77 & <83	>=83
Lumens per Watt at 3500 hrs of use	<49	>=49 & <54	>=54 & <73	>=73 & <78	>=78

Under test conditions when tested in accordance to IS 2418. Actual efficiency will vary as per site conditions.



BEE

Star marking on the lamp

Bureau of Energy Efficiency

Tubular Fluorescent Lamps

Sl.No.	Name of the Manufacturers
1	Surya Roshni Ltd.
2	Surya Galaxy
3	Philips Electronics India Ltd.
4	Indo Asian Fusegear Ltd.
5	OSRAM India Pvt. Ltd.
6	Wipro limited (Lighting Division)
7	Crompton Greaves
8	Hind Lamps Ltd.
9	Bajaj Electricals Limited
10	Anchor Daewoo Industries Ltd.
11	Myna Electronics Ltd.
12	CEMA
13	General Electric
14	Prestige Onida Ltd
15	Sathe Lighting Pvt. Ltd
16	Jindal lamps (Pvt.) Ltd

Room Air Conditioners Up to 11 kW cooling capacity

Window Air Conditioner



Split Air Conditioner



POWER SAVINGS GUIDE

MORE STARS MORE SAVINGS

ENERGY EFFICIENCY
2.95
EER (W/W)

Appliance/Type	: XX/Split
Brand	: YYYY
Model/Year	: ABC/2007
Cooling Capacity (W)	: XX
Power Consumption (W)	: XX
Variable Speed Compressor	: Yes/No
Heat Pump	: Yes/No

ENERGY IS LIFE
CONSERVE IT

*Under test conditions, when tested in accordance with XXX. Actual electricity consumption will depend on how the appliance being used.

Air conditioner

Label information

Energy Efficiency

Appliance Type

Brand

Model Name/Number, Year
of Manufacturing

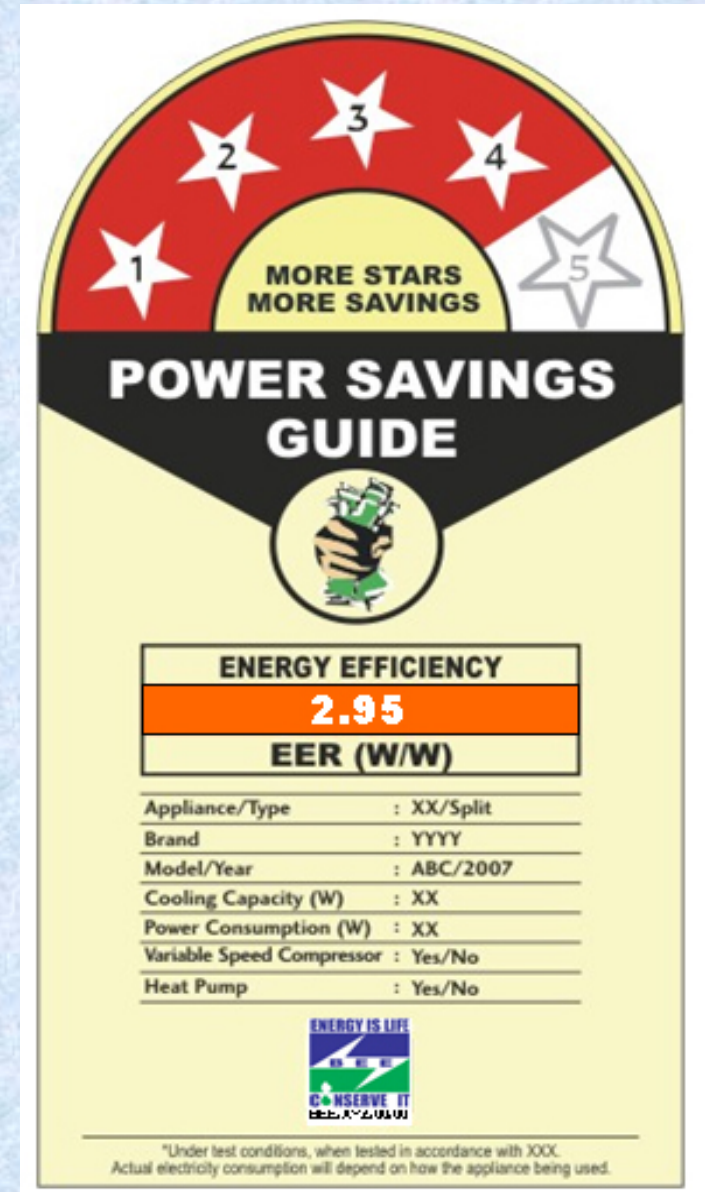
Cooling capacity (W)

Power Consumption (W)

Variable Speed

Compressor

Heat Pump



Air Conditioners

Sl.No.	Name of the Manufacturers
1	Carrier Air conditioning & Refrigeration Ltd.
2	TOSHIBA
2	Voltas Limited
3	LG Electronics India Pvt. Ltd.
4	Daikin AirConditioning India Pvt. Ltd.
5	Samsung India Electronics Pvt. Ltd.
6	Blue Star Limited
7	ONIDA (MIRC Electronics Ltd)
8	Home Solution Retail (India) Ltd
9	Whirlpool of India Ltd.
10	Advantec Coils Pvt. Ltd.
11	ETA General Pvt. Ltd.
12	Videocon Industries Ltd (Brand-Videocon)
13	Videocon Industries Ltd (Brand- Electrolux)

Energy and Demand Saving

Air conditioners Sales for the Year 2007-08 (Approx.) Million						1.73
Cooling Capacity (kW)	EER 2.2 No star	EER 2.80 (Avg.) 3 Star	Energy Saving per AC	Approx. Sales Qty	BEE labeled Qty. (Approx.)	Total annual energy saving kWh
	kWh	kWh	kWh	100%	25%	
2.37	1.08	0.85	0.23	34637	8659	3362841
3.16	1.44	1.13	0.31	398326	99582	51563975
4.75	2.16	1.70	0.46	1177662	294415	228675201
6.33	2.88	2.26	0.62	121230	30307	31386722
				1731854	432964	314988739
Total Energy Saving (MU)						315
Avoided capacity (MW)						64

Distribution Transformer (16, 25, 63, 100, 160 and 200 kVA)



**MORE STARS
MORE SAVINGS**

POWER SAVINGS GUIDE

Total losses at :	
50% loading -	520 Watts
100% loading -	1800 Watts

Equipment :	Distribution Transformer
Type :	Oil filled naturally cooled
Make :	XXX
Capacity :	100 kVA
Voltage :	upto 11kV

Under test conditions when tested in accordance with IS 1180:1989

Star Rating for Distribution Transformers

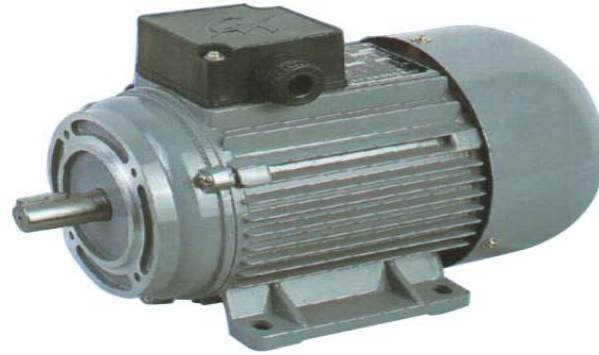
Rating	1 star		2 star		3 star		4 star		5 star	
kVA	Max Losses at 50% (Watts)	Max Losses at 100% (watts)	Max Losses at 50% (Watts)	Max Losses at 100% (watts)	Max Losses at 50% (Watts)	Max Losses at 100% (watts)	Max Losses at 50% (Watts)	Max Losses at 100% (watts)	Max Losses at 50% (Watts)	Max Losses at 100% (watts)
16	200	555	165	520	150	480	135	440	120	400
25	290	785	235	740	210	695	190	635	175	595
63	490	1415	430	1335	380	1250	340	1140	300	1050
100	700	2020	610	1910	520	1800	475	1650	435	1500
160	1000	2800	880	2550	770	2200	670	1950	570	1700
200	1130	3300	1010	3000	890	2700	780	2300	670	2100

Sl.No.	Name of the Manufacturers
1	Vijay Electricals Ltd.
2	M/s. Suvarna Transformers
3	Sree Rayalseema Green Energy Limited
4	Southern Power Equipment Company Pvt. Ltd.
5	Raikar Eletric Company
6	Kailash Transformers Pvt. Ltd.
7	Transcon Industries
8	Hi-Power Electrical Industries
9	Kanya Parameshwari Engg. Ltd.
10	Clasic technolines (P) Ltd
11	Techno Fabs
12	Techno Power Corporation

Energy Saving

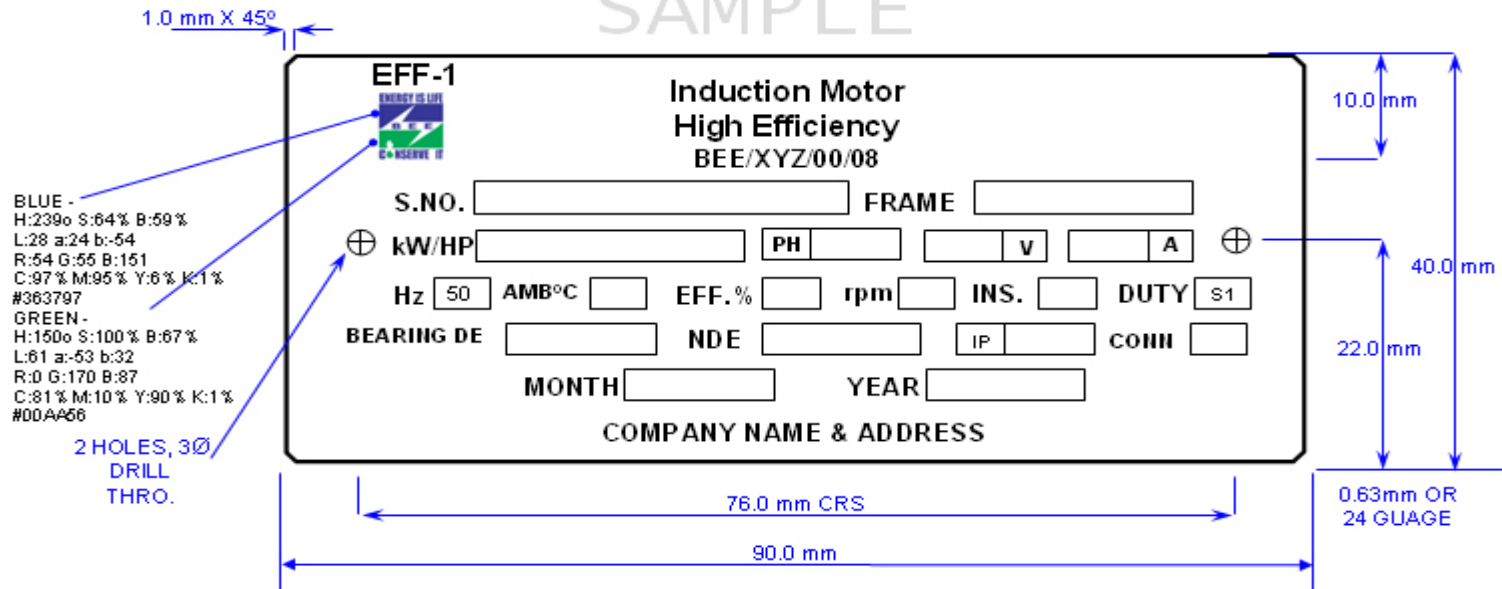
Particulars	Transformer size (kVA)	Annual Sales (MVA)	No Load Losses (Watts)	Load Losses (Watts)	Energy Saving (Million kWh) (Approx.)
			(Weighted Avg.)		
Purchases of year 2007	25	3800	60	620	
	63	4400	163	1180	
	100	7100	200	1700	
	160	300	395	2370	
	200	3500	400	2960	
Energy Conservation case with Star 3 (100% implementation)	25	3800	50	500	46
	63	4400	141	1000	35
	100	7100	160	1400	61
	160	300	240	1900	4
	200	3500	300	2300	35
					181
Energy Conservation case with Star 5 (100% Implementation)	25	3800	25	400	103
	63	4400	70	1000	72
	100	7100	110	1100	128
	160	300	200	1359	6
	200	3500	200	1542	73
					382

Induction Motors - Three Phase Squirrel Cage (0.37 kW to 15 kW)



Energy Efficient Induction Motors-Three Phase Squirrel Cage Label

SAMPLE



Induction Motor Label Details – EFF1

Estimated Energy and Power savings due to penetration of Energy Efficient Motor (<15 kW)

Year	Sales in Millions (Approx.)	Hrs.of operation Per Year (Approx.)	Power saving per unit (kW)	Annual savings Million kWh	Avoided capacity MW
2008	0.39	4020	0.1295	83	20
2011	0.40	4020	0.1295	113	23
2015	0.42	4020	0.1295	217	57
2020	0.65	4020	0.1295	340	70

Check Testing of BEE labeled Equipments/appliances

Bureau has appointed M/s. RITES for conducting check testing of BEE labeled equipments / appliances

City	Refrigerator	Air Conditioner	Tubular Fluorescent Lamps
Delhi	4	2	2
Jaipur	4	2	1
Mumbai	4	2	1
Vadodara	3	1	1
Kolkata	3	1	1
Guwahati	3	1	1
Chennai	3	1	1
Bangalore	3	1	1
Total	27	11	9
		47	

Standards and Labeling Campaign and consumer awareness

S & L Advertisement in Print and Electronic (TV & Radio) media

**If Rising Electricity Bills Are Bothering You.
Switch to Electrical Appliances with BEE Label
Reading the label.**

Labels For Refrigerators

Labels For ACs

Labels for refrigerators and ACs are shown with arrows pointing to key information: star ratings (More Stars, More Savings), energy consumption (Lower kWh means lower electricity bills), and the BEE logo (See the BEE logo for authenticity of the label).

Energy and Cost saving for 200 litres frost free refrigerator at different Star Rating

Star Rating	Energy Consumption Per Hour (kWh)	Per Unit Charge (Rs. (approx.))	Electricity Cost (Rs. per day)	Total Energy (kWh) for one Year (365 days)	Relating to Total Cost (Rs. (approx.))	Cost Difference (Rs.)	Per Hour Savings (Rs.)
1 Star	0.50	1.00	15.00	182.5	18250	0	0
2 Star	0.45	0.90	13.50	165.75	16575	1675	0.05
3 Star	0.40	0.80	12.00	146.0	14600	3650	0.10
4 Star	0.35	0.70	10.50	128.75	12875	5375	0.15
5 Star	0.30	0.60	9.00	110.25	11025	7225	0.20

Energy and Cost saving for 1.5 Ton. Windows or Split Air conditioner at different Star Rating

Star Rating	Minimum Cooling Capacity (kW)	Minimum Energy Efficiency Ratio (EER)	Best EER (kW)	Units consumption / Day (kWh)	Per Unit Charge (Rs. (approx.))	Electricity Cost (Rs. per day)	Cost Saving (Rs. Per Hour (approx.))
1 Star	1.5	2.5	3.0	4.5	9.0	45.0	0
2 Star	1.5	2.6	3.1	4.4	8.8	44.0	1.0
3 Star	1.5	2.7	3.2	4.3	8.6	43.0	2.0
4 Star	1.5	2.8	3.3	4.2	8.4	42.0	3.0
5 Star	1.5	2.9	3.4	4.1	8.2	41.0	4.0

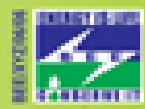
Note: Assuming 8 hrs. operation per day for two months in a year

Label For Tubular Fluorescent Lamps



Label	1 Star	2 Star	3 Star	4 Star	5 Star
Lumens per Watt at 2500 hrs of use	>81	>87 & <87	>87 & <88	>88 & <88	>89
Lumens per Watt at 2000 hrs of use	>82	>82 & <87	>87 & <87	>87 & <88	>88
Lumens per Watt at 1000 hrs of use	>88	>88 & <88	>88 & <88	>88 & <88	>88

Under test conditions when tested in accordance to IS 2418. Actual efficiency will vary as per site conditions.



Reduce rising electricity bills and help India to increase the availability of electricity for every people, simply by buying Refrigerators, ACs & Tubular Lamp that bear BEE Star-based Energy Efficiency Label.

The BEE Star Energy Efficiency Label has been created to standardize the energy efficiency ratings of different electrical appliances and indicate energy consumption under standard test conditions. The BEE label indicates the energy efficiency levels through the number of stars (highlighted in yellow on the label). The BEE Star Label includes the Rating System that ranges from One Star (best energy efficient, the best money spend) to Five Stars (least energy efficient, the best money saved).

• • • Sachat ke pitare • • •

BUREAU OF ENERGY EFFICIENCY
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New Delhi-110066, India - www.bee-india.nic.in

The Bureau of Energy Efficiency (BEE), Ministry of Power, Government of India and the International Energy Agency (IEA) are organizing the International Conference of Standby Power on the 2nd and 3rd April, 2008 in Stein Auditorium, India Habitat Centre, New Delhi, India. For more details please visit www.bee-india.nic.in and www.energymanagertraining.com

Next Products in the queue

Agricultural pump sets

Ceiling fans

Compact Fluorescent Lamps (CFL)

Technical evaluation study initiated for the following equipments / appliances for labeling

LPG Stoves

Colour TVs

Set top boxes

Transport Sector

Future – Equipments / appliances for Standards & Labeling

Water Heaters

Washing Machines

Electronic Ballast

Computer Monitors

Kerosene Stoves

Consumer Electronics

Uninterrupted Power Supply (UPS)

External Power Supplies (EPS)

Battery Chargers (BCs)

Motor systems

Motor & compressors

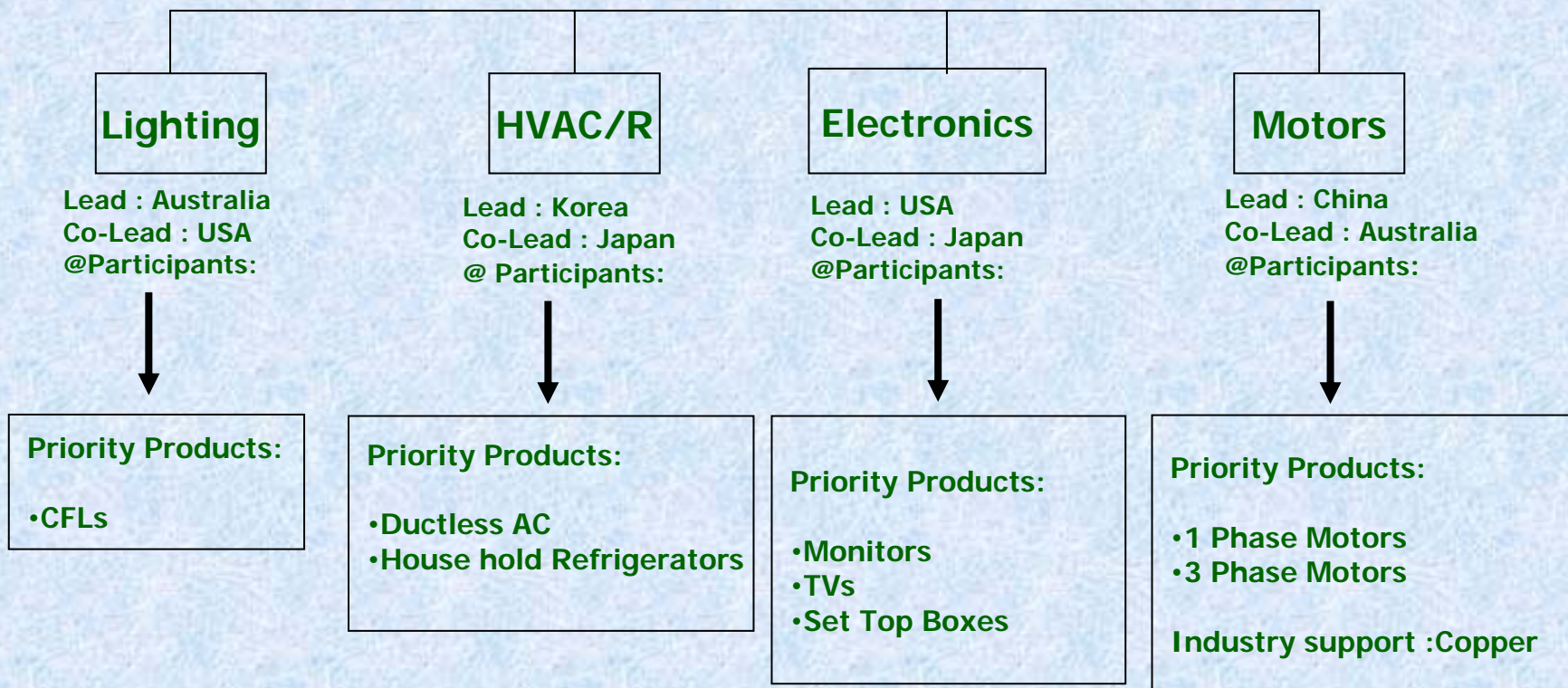
Industrial Fans & Blowers

Standards & Labeling Programme

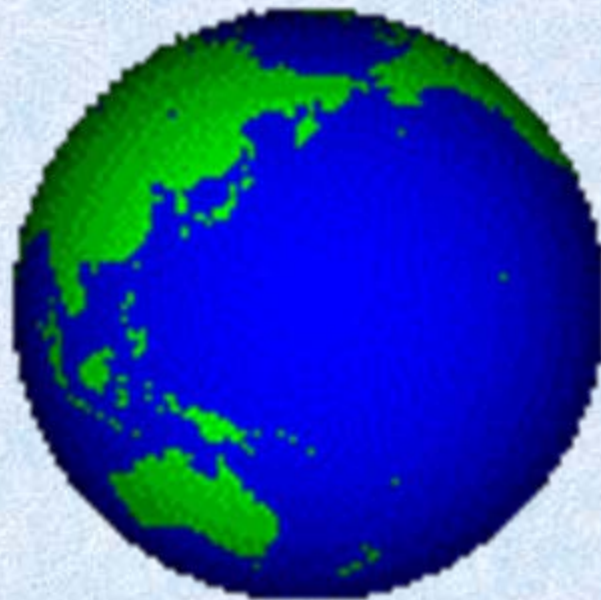
**To reduce overall energy
consumption by use of such
equipments / appliances
18 BU by 2012 (~3000 MW)**



Lead : Korea/US/Japan
Participants : Australia/China/India



Government



Industry

Consumer

Save Energy

Thank

You