

# BEE-Consumers

Best Friend & Guide



# The Action Plan for energy Efficiency



BUREAU OF ENERGY EFFICIENCY

Ministry of Power, Govt of India

# “Conserving energy is our collective responsibility for a better tomorrow.”

## 1. Introduction

The Government of India is committed to meet the growing energy needs at affordable rates required to meet the objectives of economic development.

To deliver a sustained economic growth rate of 8% to 9% through 2031-32 and to meet life time energy needs of all citizens, India needs to increase its primary energy supply by 3 to 4 times and electricity generation capacity about 6 times. As a result energy service demand growth rates will keep on increasing because of accelerated industrialization, urbanization, and an emerging consumer society.

## 2. Energy Conservation Act, 2001 (52 of 2001)

The Energy Conservation Act, 2001 came into force with effect from 1st March, 2002. The Act empowers the Central Government and in some instances the State Governments to:

- Notify energy intensive industries, other establishments and commercial buildings as designated consumers.
- Establish and prescribe energy consumption norms and standards for designated consumers.

- Direct designated consumers to :
  - Designate or appoint certified energy manager in charge of activities for efficient use of energy and its conservation.
  - Get an energy audit conducted by an accredited energy auditor in the specified manner and intervals of time.
  - Furnish information with regard to energy consumed and action taken on the recommendation of the accredited energy auditor to the designated agency.
  - Comply with energy consumption norms and standards, and if not so, to prepare and implement schemes for efficient use of energy and its conservation.
- Prescribe energy conservation building codes for efficient use of energy and its conservation in commercial buildings.
- State Governments to amend the energy conservation building codes to suit regional and local climatic conditions.
- Direct owners or occupiers of commercial buildings to comply with the provisions of energy conservation building codes.
- Direct mandatory display of label on notified equipment and appliances.
- Specify energy consumption standards for notified equipment and appliance.
- Prohibit manufacture, sale, purchase and import of notified equipment and appliances not conforming to standards.





### 3. Establishment of Bureau of Energy Efficiency (BEE)

Established on 1st March, 2002 the mission of the Bureau of Energy Efficiency is to assist in developing policies and strategies with a thrust on self-regulation and market principles, within the overall framework of the Energy Conservation Act, 2001.

Functions of BEE:

- Develop and recommend to the Central Government the norms for processes and energy consumption standards.
- Develop and recommend to the Central Government minimum energy consumption standards and labeling design for equipment and appliances.
- Develop and recommend to the Central Government specific energy conservation building codes.
- Recommend the Central Government for notifying any user or class of users of energy as a designated consumer.
- Take necessary measures to create awareness and disseminate information for efficient use of energy and its conservation.

### 4. Schemes for Promoting Energy Efficiency in India during 2007-2012

- **Bachat Lamp Yojana** to promote energy efficient and high quality CFLs as replacement for incandescent bulbs in households.
- **Standards & Labeling Scheme** targets high energy end use equipments and appliances to lay down minimum energy performance standards.
- **Energy Conservation Building Code (ECBC)** that sets minimum energy performance standards for new commercial buildings.
- **Agricultural and Municipal DSM** targeting replacement of inefficient pumpsets, street lighting, etc.



- **Operationalising EC Act by Strengthening Institutional Capacity of State Designated Agencies (SDAs)**. The scheme seeks to build institutional capacity of the newly created SDAs to perform their regulatory, enforcement and facilitative functions in the respective states.
- **Energy Efficiency in Small and Medium Enterprises (SMEs) Scheme**. The proposal seeks to promote Energy Efficiency in SMEs during the XI plan. Many energy-intensive SMEs clusters located in various states of the country have large potential for energy savings.
- **Contribution to State Energy Conservation Fund (CECF) Scheme**. This scheme is intended to be submitted in FY 2008-09 after the above scheme for institutional strengthening takes off in states. SECF is a statutory requirement and is one of the key elements of the ECAP.
- **Institutional Strengthening of BEE**. The proposal seeks government funding for infrastructure creation that is necessary for BEE to implement 8 new projects/ schemes through the country with an allocation of Rs. 502 crores during the XI plan.

### 5. Policy/Programme Details

#### 5.1 Bachat Lamp Yojana (BLY) Scheme

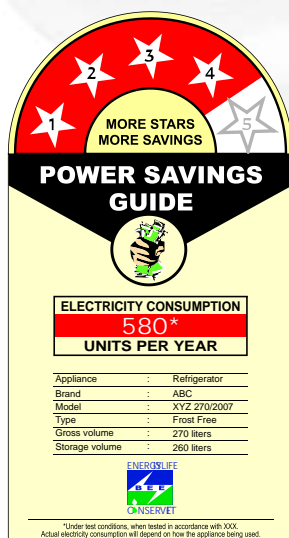
Bureau of Energy Efficiency (BEE), is coordinating voluntary efforts under this scheme to provide high-quality CFLs to domestic consumers for about Rs. 15 per lamp, i.e., at a rate comparable to that of incandescent bulbs. This would remove the barrier of high CFL price (which is currently Rs. 80 to 100 per lamp) which is constraining its penetration into households. It targets replacement of about 400-million incandescent bulbs in use in the country, leading to a possible reduction of about 6,000 MW of electricity demand, and a reduction of about 24 million tones of CO<sub>2</sub> emissions every year. The price reduction would be achieved by utilizing the Clean Development Mechanism (CDM) of the Kyoto Protocol through which the CFL suppliers would earn Certified Emissions Reductions (CERs) on the basis of the CO<sub>2</sub> emissions reductions that would occur because of the low electricity consumption of CFLs compared to incandescent bulbs. BEE has prepared a programme of activities (PoA) covering the entire country to reduce transaction cost and attract private investment for delivery. It is also undertaking the entire monitoring as per the approved CDM methodology (AMS-II.C) and bearing the cost.

### The intended outcomes of the scheme are:-

- The coverage of entire country, based on DISCOM areas, is expected to be completed by 2009-10.
- 14 major CFL manufacturers/suppliers have agreed to participate- more are expected to follow.
- PoA to be submitted for DNA and CDM Executive Board approval by 2008.
- States of Assam, Punjab, Andhra Pradesh, Haryana, Maharashtra, Chattisgarh, Kerala have commenced project preparation. Other states in the process.
- Estimated replacement of about 400 million incandescent light bulbs in household sector.
- Market transformation in favour of energy efficient CFLs in the household sector by high sale volumes and lower retail price.

## 5.2 Standards & Labeling Scheme

The objectives of this program is to provide the consumer an informed choice about energy saving, and thereby the cost saving potential of the marketed household and other equipment. This is expected to impact the energy savings in the medium and long run while at the same time it will position domestic industry to compete in such markets where norms for energy efficiency are mandatory.



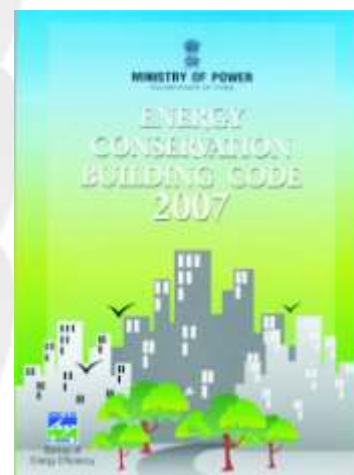
### The intended outcomes of the scheme are:-

- Notification for mandatory labeling.
- Awareness campaign to educate consumers.
- Rating plan for Motors, Ceiling Fans, LPG Stoves, standby power and other equipments.
- Commencement of check testing through Independent Agency M/s. RITES and publication of results.
- Market transformation in favour of energy efficient equipments and appliances that adhere to Minimum Energy Performance Standards (MEPS).

## 5.3 Energy Conservation Building Code & Energy Efficiency in Existing Building Scheme

The government of India launched Energy Conservation Building Code (ECBC) on 27th May, 2007 to set minimum energy standards for commercial buildings.

ECBC is intended for new commercial buildings having a connected load of 500 kW or contract demand of 600 kVA and above. These codes define norms of energy requirement per square meter of area and takes into consideration, the climatic regions of the country where the building is located .the major



components of the building which are being addressed through this code are walls, roofs and windows; lighting systems ,HVAC systems ,electrical distribution systems ,water heating and water pumping systems . Mandatory compliance of the ECBC is expected to yield annual saving of approximately 1.7 billion units .

The state governments have the flexibility to modify ECBC to suit local or regional needs.

### The intended outcomes of the scheme are:-

- Creating adequate technical capacity- pool of ECBC expert Architects/ Engineers.
- Training material in the form of User Guide & Tip sheets.
- Facilities for material testing/ certification.
- Initiation of outreach activities through workshops.
- Providing Technical Assistance for taking up pilot projects in states.
- Training workshops in all climatic zones of the country.
- Simplified compliance procedures for state and local bodies.



- h) Capacity building of state and local government personnel.
- i) Evaluation of code for revision.
- j) Curriculum for Architectural/ Engineering Colleges for capacity building of next generation of architects and engineers.
- k) steps and procedures essential for code compliance.

### EE in Existing Buildings

There is a huge scope of energy savings in the existing buildings. Energy audit studies conducted in several office building, hotels & hospitals indicate energy saving potential of 23% to 46% in end uses like lighting, HVAC etc . Under the first phase of energy efficiency in the government building program, 9 government buildings were covered and the identified energy efficiency measures were implemented through the ESCO route. In Phase-2 of the Programme, 17 Government Buildings have been identified and taken up for implementing Energy efficiency measures.



### The intended outcomes of the scheme are:-

- a) Promotion of Energy Service Companies (ESCOs); particularly for existing buildings.
- b) Accreditation of ESCOs to improve investor confidence.
- c) Standardized performance contract documents for ESCOs.
- d) Innovative financial instruments to promote energy efficiency in existing facilities.
- e) Setting up of partial risk guarantee fund for risk mitigation.
- f) Guideline for conducting investment grade audits in government buildings issued.

## 5.4 Agricultural (Ag DSM) and Municipal (Mu DSM) Demand Side Management (DSM) Scheme

**"Follow these instructions to save electricity and diesel."**  
**Energy Conservation in Agriculture Pumps**

**Which type of foot-valve saves more electricity/diesel?**  
The foot-valve shown in Fig. 1 has a wider mouth and a larger area of opening. This, along with its better design, enables it to open and close more easily than the foot-valve shown in Fig. 2. As a result, the foot-valve shown in Fig. 1 will require less energy to operate than the foot-valve shown in Fig. 2.

**Which type of installation helps save electricity/diesel?**  
The pipe shown in Fig. 3 is installed in a way that allows the water to flow through the pipe without any obstruction. This is the correct way to install the pipe. The pipe shown in Fig. 4 is installed in a way that causes the water to flow through the pipe with an obstruction. This is the incorrect way to install the pipe.

**Which length of delivery pipe helps save electricity / diesel?**  
The pipe shown in Fig. 5 is shorter than the pipe shown in Fig. 6. The shorter pipe will require less energy to operate than the longer pipe. The pipe shown in Fig. 6 is longer than the pipe shown in Fig. 5. The longer pipe will require more energy to operate than the shorter pipe.

**Which type of pipeline arrangement helps save electricity/diesel?**  
The pipe shown in Fig. 7 is arranged in a way that allows the water to flow through the pipe without any obstruction. This is the correct way to arrange the pipe. The pipe shown in Fig. 8 is arranged in a way that causes the water to flow through the pipe with an obstruction. This is the incorrect way to arrange the pipe.

**Which type of bends should be used in a pipeline?**  
The pipe shown in Fig. 9 has a smooth bend. This is the correct way to bend the pipe. The pipe shown in Fig. 10 has a sharp bend. This is the incorrect way to bend the pipe.

**Tip for the following connection:**  
1. Avoid using unnecessary connections in the pipeline.  
2. Use the correct type of pipe and fittings.  
3. Use the correct type of pipe and fittings.  
4. Use the correct type of pipe and fittings.  
5. Use the correct type of pipe and fittings.  
6. Use the correct type of pipe and fittings.

**To ensure a high level of operational efficiency of the diesel powered engine, ensure the following:**  
1. Use the correct type of fuel.  
2. Use the correct type of fuel.  
3. Use the correct type of fuel.  
4. Use the correct type of fuel.  
5. Use the correct type of fuel.  
6. Use the correct type of fuel.

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Ag DSM promises immense opportunity in reducing the overall power consumption, improving efficiencies of ground water extraction and reducing the subsidy burden of the states without sacrificing the service obligation to this sector. It also presents a promising prospect of targeting subsidy to the beneficiary farmer. In terms of electricity saved, given that most of the pilot projects as well as other studies project potential savings of 45-50% by mere replacement of inefficient pumps, the overall electricity savings (from 20 million pumps) is estimated at 62.1 billion units annually.

Mu DSM also assumes significance given that the Municipalities consume 10% of energy overall and the cost input of energy is as high as 60% of the costs incurred by the municipalities. Energy costs constitute up to 60-70 percent of an Indian municipality's total cost of pumping water to its residents. This financial constraint, coupled with inadequate or antiquated infrastructure and the lack of adequate managerial and technical capacities, greatly limits the ability of municipalities to improve water services while allowing inefficient usage of electricity. The electricity bills of the municipalities accounts for a significant part of its expenditure, given that an estimated 10% of electricity is consumed for urban water pumping. The cash saved municipalities are, therefore unable to meet the service delivery standards that are fast growing urban area demands. The fact that efficient water delivery systems can translate into measurable energy savings due to reduced pumping requirements and improved performance is vastly unknown to most of the municipal authorities.

### The intended outcomes of the scheme are:-

- Business model linked to subsidy reduction.
- Shelf of bankable DPRs to be prepared -10 in each states to stimulate the market.
- Baseline development, conducive regulatory regime and payment security mechanism being worked out.
- Awareness and outreach to local and municipal bodies.
- Manual for Mu DSM launched to be used to promote standard contract documents to enable easier implementation.
- Risk mitigation measures for encouraging PPP being evolved.
- CDM benefits for the scheme being put in.

## 5.5 Operationalising EC Act by Strengthening Institutional Capacity of SDAs Scheme



State Designated Agencies (SDAs) are statutory bodies set up by states to implement energy conservation measures at state level. SDAs are expected to play three major roles namely:

- As a Development Agency
- As a Facilitator
- As a Regulator / Enforcing body

The main emphasis of the scheme is to build capacity necessary to enable them to discharge regulatory, facilitative and enforcement functions under the Act, given that the institutional capacity is limited both in terms of human and infrastructure resources. Most states have notified SDAs in the last 2 years.

The scheme seeks to develop and implement Energy Conservation Action Plan (ECAP) based on a uniform template evolved for taking measures necessary to build institutional and human capacity, enabling the SDAs to implement energy efficiency programmes and undertake evaluation and monitoring of the Energy conservation activities implemented in the state. ECAPs are being developed for various states and till now 28 states have already completed them.

## 5.6 Energy Efficiency in Small and Medium Enterprises (SMEs) Scheme



The proposed scheme seeks to promote Energy Efficiency in SMEs during the XI plan. Many energy-intensive SMEs clusters located in various states of the country have large potential for energy savings. In quantitative terms, there is little reliable information and data available with respect to their energy consumption and energy saving opportunities. BEE in consultation with Designated State Agencies, will initiate diagnostic studies in 25 SME clusters in the country and develop cluster specific energy efficiency manuals/booklets and other documents to enhance energy conservation in SMEs. The scheme seeks to provide comprehensive energy efficiency solutions to 25 SME clusters by:

- Conducting energy audits in these clusters.
- Preparing DPRs from energy audit studies.
- Enhancing the capacities of service providers in each cluster area.
- Provision of financing for such bankable DPRs.
- Awareness and outreach.



**The intended outcomes of the scheme are:-**

- a) Investment grade energy audits (bankable DPRs) for about 10 units in each of the 25 clusters.
- b) Template for DPR preparation for the balance units in clusters, given their similarities.
- c) Adequate provision of expertise for the local service providers to help reach out to the units.
- d) Availability of financing by capacity building of banking personnel in matters like project appraisal of performance contracting.

- The returns so filed, after due processing, be transferred to the respective state designated agencies as per their respective jurisdiction;
- Providing for due capture of existing data in respect of all other programmes of BEE / SDAs.
- Infrastructure and resource augmentation of BEE / other Energy Efficiency Institutions.
- Support to finance R&D in energy efficiency in IITs and Policy research from ASCI, IIPA, etc.

**5.7 Contribution to State Energy Conservation Fund (CECF) Scheme**

This scheme is to be taken up in FY 2008-09 after the above scheme for institutional strengthening takes off in states. SECF is a statutory requirement and is one of the key elements of the ECAP. The scheme will provide contribution to SECF after it is notified by states and will be pari-passu with the contribution made by the states. The effort will be to create a pool of financially sustainable activities for SDAs (like training programmes, fee for services, etc) which can augment the fund.

**5.8 Institutional Strengthening of BEE and other Energy Efficiency Institutions**

The proposed scheme seeks to provide resources allocated during the XI plan for:(a) Setting up of Energy Conservation Information Center (ECIC) christened BEEnet as a web enabled online data collection and collation system. The project will provide the following facilitation functions that BEE/ SDAs are accredited with:

- Web based online system that facilitates seamless filing of returns by the Designated Consumers as required under section 14 (k) and 14 (l) of the Energy Conservation Act. The notification of the same has been issued by Government in March, 2007 and the returns will be required to be filed before the State Designated Agencies from FY 2008-09.

**5.8.1 Professional Certification and Accreditation**

Bureau has taken a pro-active role in establishing a proper energy management system in the country. In this connection, Bureau has conducted the 5 National certification examinations for energy managers & energy auditors in May 2004, April 2005, April 2006 and twice in 2007 in 23 centers all over the country and prepared guidebooks for the energy professionals.

The response to the programme was very encouraging and till date the examinations have produced a total of 4459 Energy Managers of whom 3444 have also been additionally certified as Energy Auditors.



## State wise data on number qualified Certified Energy Managers and Certified Energy Auditors of National Certification Examination - 2004, 2005, 2006 & April 2007

Name of the State	Examination 2004		Examination 2005		Examination 2006		Examination April-2007		Sub Total	
	Energy Managers	Energy Auditors	Energy Managers	Energy Auditors	Energy Managers	Energy Auditors	Energy Managers	Energy Auditors	Energy Managers	Energy Auditors
Andhra Pradesh	16	28	10	35	22	61	12	40	60	164
Assam	9	2	3	5	2	16	0	6	14	29
Bihar	4	2	1	4	1	5	0	1	6	12
Chhattisgarh	2	9	1	16	7	13	4	22	14	60
Goa	2	2	0	4	1	5	0	2	3	13
Gujarat	53	50	35	78	17	95	25	87	130	310
Haryana	11	15	3	30	10	35	6	33	30	113
Himachal Pradesh	1	0	0	0	0	0	0	1	1	1
Jammu & Kashmir	0	0	0	1	0	1	0	1	0	3
Jharkhand	1	7	1	1	0	13	0	16	2	37
Karnataka	3	20	5	17	3	27	7	31	18	95
Kerala	12	24	5	20	3	29	6	36	26	109
Madhya Pradesh	24	23	8	42	8	45	11	65	51	175
Maharashtra	67	113	44	175	60	189	46	199	217	676
New Delhi	5	17	6	52	4	54	3	58	18	181
Orissa	3	12	3	19	10	26	9	30	25	87
Pondichery	0	1	1	2	1	2	0	4	2	9
Punjab	7	7	3	10	2	6	5	16	17	39
Rajasthan	24	21	6	39	3	49	6	45	39	154
Tamil Nadu	55	52	11	41	26	92	16	116	108	301
Union Territory (Chandigarh)	0	2	0	7	1	5	1	4	2	18
UT of D & NH	3	0	0	1	0	0	0	0	3	1
Uttar Pradesh	27	32	11	64	13	63	4	109	55	268
Uttaranchal	1	2	2	5	1	3	0	5	4	15
West Bengal	20	25	3	18	6	31	9	39	38	113
Others	0	2	0	2	0	2	2	11	4	17
<b>Total</b>	<b>350</b>	<b>468</b>	<b>162</b>	<b>688</b>	<b>201</b>	<b>867</b>	<b>172</b>	<b>977</b>	<b>887</b>	<b>3000</b>





## 5.8.2 Manuals and Codes

The energy performance codes would provide a definite method of field testing of utility equipment in the designated consumer premises. BEE has developed manuals and codes on seven technologies (equipment), namely, lighting systems; dryers; cogeneration plants; electric motors; electric transformers; fluid piping systems (network); insulation and air conditioners/ chillers (HVAC). Manual on Municipal DSM has also been prepared to mainstream the activity.

## 6. Awareness and Outreach

The Government has launched a National Campaign on Energy Conservation 2005, on 14th December, 2004 to make people aware about the need of energy conservation and benefits to the individual, society and nation as a whole. A postage stamp on energy conservation was also released by the Hon'ble Prime Minister as a part of the national campaign to help create a movement for the energy conservation in the country. A multi-media over arching general awareness campaign is targeting the domestic, commercial, agricultural, industrial and educational sector will be launched. The main M/s will be :

- Spreading information about energy situations, simple energy saving methods that can be applied in everyday life. This is intended to serve as a foundation for project specific campaigns.
- Present a wider variety of energy conservation methods to improve energy consumption behavior, including prevention of energy waste and leakage.
- Information about power and oil situations and its rising prices and effectively meeting this challenge through energy savings and substitution.
- Involvement of SDAs in the outreach programme.

Salient features of action which are being undertaken and/ or planned for this year long program for the various sectors are as under:

### i Industrial Sector

Awareness campaign is focusing on this sector through the organization of workshops, seminars and holding the sector specific programmes in order to provide platform for the industry to exchange information, best practices on energy conservation and updation on the various innovative energy efficient technologies being employed in the country. Top Management of Industry has been encouraged to declare their commitment by declaring their Energy Management Policy. This would greatly help the energy conservation movement.



### ii Commercial Sector

Electricity is used for the lighting as well as for heating & cooling purposes. The issue in the sector will be addressed effectively through print media through insertions on tips to save electricity, organization of small workshops, and demonstration of energy efficient lighting system in the Trade Fairs etc.



### iii Agricultural Sector

Campaign to be taken up with the assistance of Agricultural pump set manufacturers and other stakeholders. Advertisement on the tips to save energy in the agriculture sector has been prepared by the Bureau of Energy Efficiency, which is being used in local languages as well.



### iv Domestic Sector

Help of print media, school children and lighting equipment manufacturers is being sought in organizing the campaign. Brochures on energy efficient lighting systems and simple tips on how to save electricity are printed and being distributed. Tips on saving energy are being uploaded regularly on website [www.bee-india.nic.in](http://www.bee-india.nic.in).



These Awards are a means to institutionalize the energy efficiency movement in the country by identifying and giving recognition to the energy conservation efforts undertaken by different firms and industries. The BEE coordinates the Energy Conservation Awards scheme of the Ministry of Power. The Awards were given away for the first time in December 14, 1991.



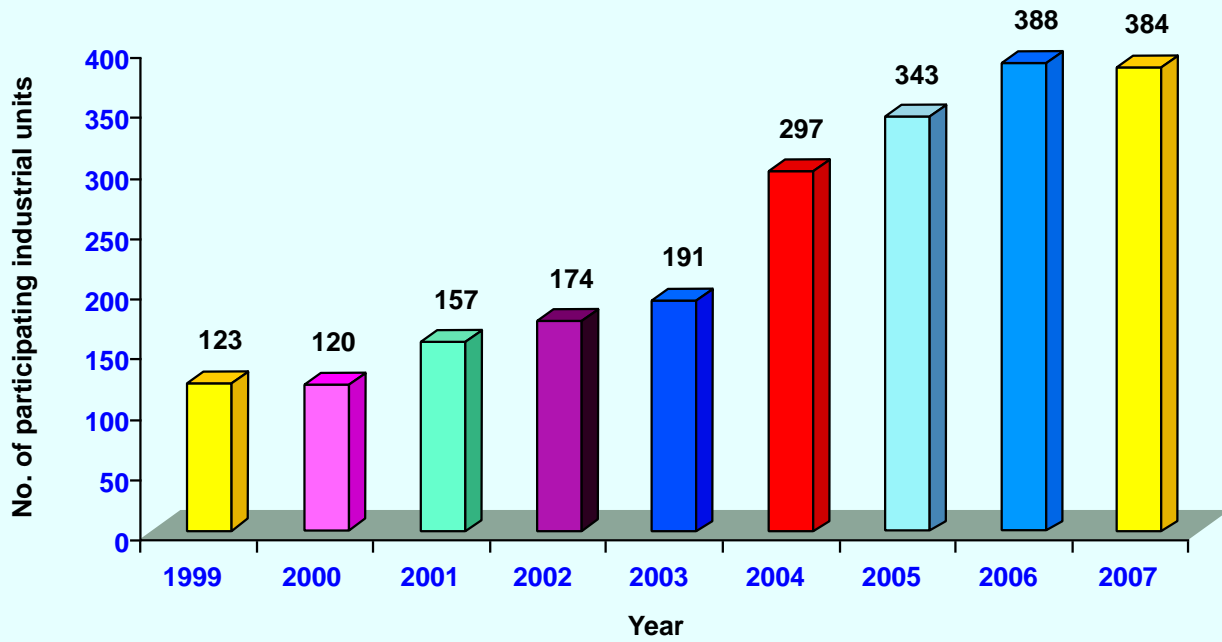
The scheme has become very popular among industrial units, as is evident from increasing participation level (from 120 in 2000 to 384 in 2007). Award scheme includes 33 sub-sectors from large and medium scale industries and 3 sub-sectors from small scale industries. The following new categories in the commercial building sector and Zonal railways are also being included in the current year's Award Scheme:-

- office buildings
- hospitals
- hotels
- shopping malls
- zonal railways

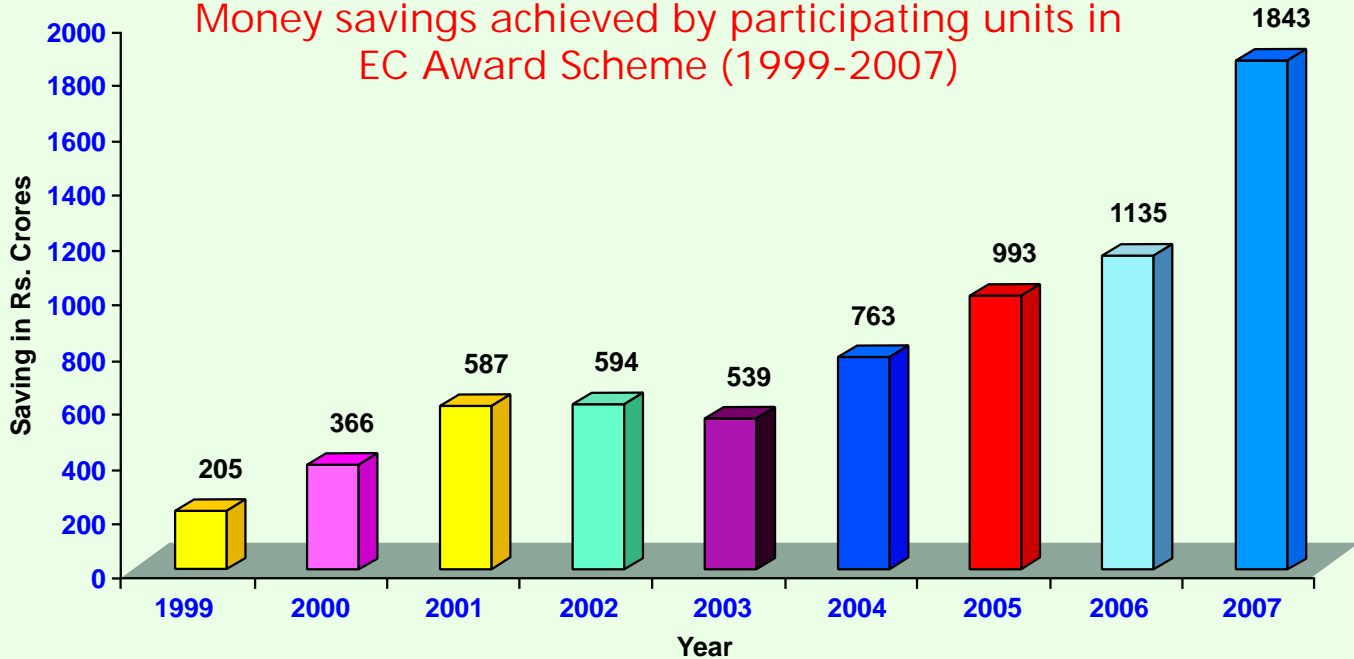
## 6.1. National Energy Conservation Awards

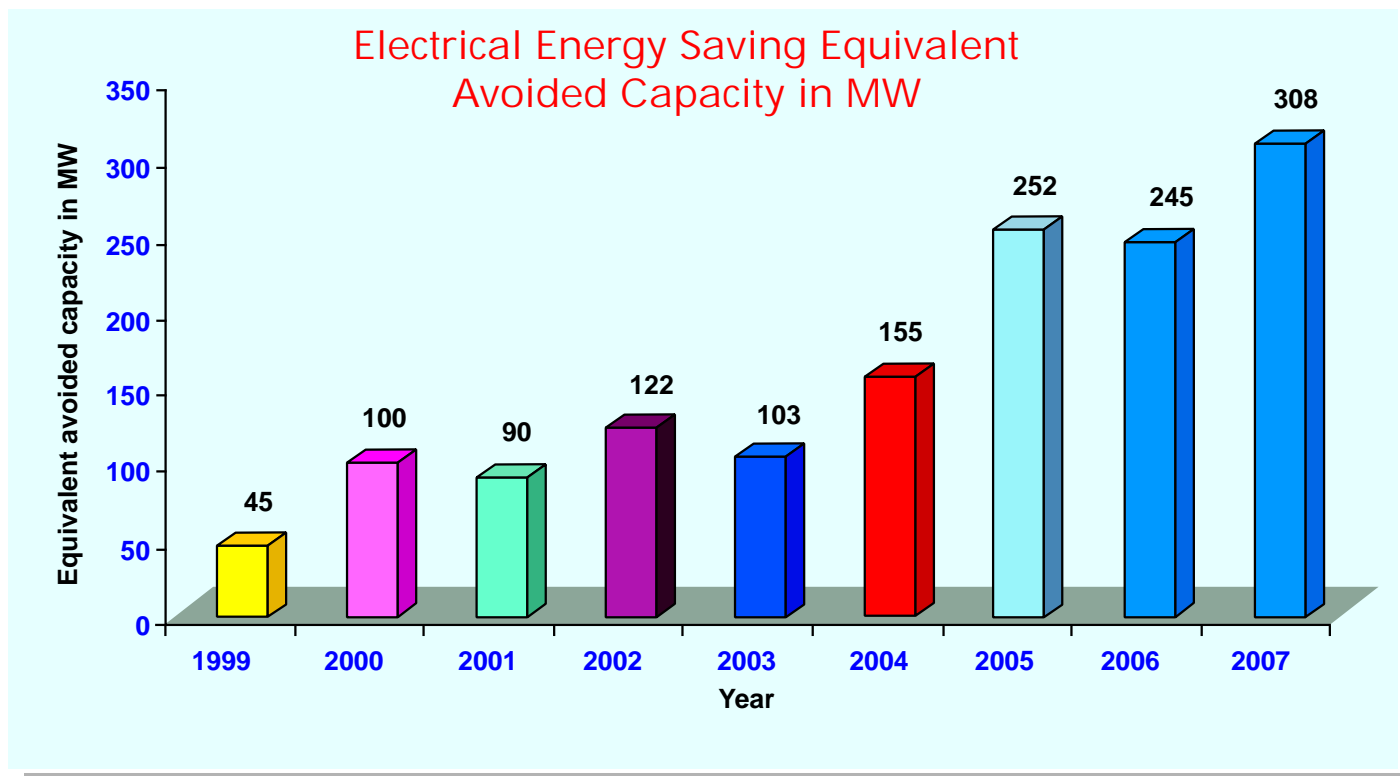
One of the innovative schemes initiated by the Government of India, Ministry of Power over the last decade to promote energy conservation has been the Energy Conservation Awards.

### Encouraging response from Indian Industry in the EC Award Scheme (1999-2007)



### Money savings achieved by participating units in EC Award Scheme (1999-2007)





### Year wise energy savings achieved by participating units in Ministry of Power's Energy Conservation Award Scheme (1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006 & 2007)

Year	No. of Participating Units	Annual Savings in Rs. Crores	One time Investment in Rs. Crores	Electrical Energy Saving		Furnance Oil Savings in Lakhs KL	Coal Savings in Lakh Metric Tonnes	Gas Savings in Lakh Cubic Metres
				Million kWh	Equivalent Avoided Capacity in MW			
2007	384	1843	2923	1620	308	1.25	5.86	15379
2006	388*	1135	1266	1288	245	1.19	5.17	29044
2005	343*	993	1319	1327	252	2.40	7.58	13122
2004	297	763	1364	814	155	2.49	5.37	18585
2003	191	539	1071	542	103	2.21	12.65	73181
2002	174	594	691	641	122	1.7	7.4	35588
2001	157	587	659	485	90	2.21	4.79	3929
2000	120	366	630	524	100	1.327	0.64	707
1999	123	205	940	205	45	1.62	2.15	2444
Total 9 yrs.		7,025	10,863	7,446	1,420	16.397	51.61	1,91,979

\* Participating units include industrial units, buildings and other establishments  
1 Crore=10Million, 1 Lakh = 0.1 Million

## 7.1 Painting Competition on Energy Conservation

The Ministry of Power and BEE have taken up an innovative scheme to target children.

Children are an important target group as well as stakeholders in increasing awareness.

The salient features of the scheme are as follows:

- The painting competition is first conducted at the School level and two best paintings from the participating school are included in the concerned State & UT level. First two winners from each State and UTs are invited to participate at the national level.
- The children studying in the standards 4th and 5th are eligible to participate in the painting competition. The winners of State Capital city painting competition level and National painting competition level are suitably awarded with cash prizes and all children participating in the competition at school, state and national level are given certificates of participation.

The painting competitions have been conducted for schoolchildren for 4th and 5th standards, at School, State and National level which have not only made aware the children about the need of conserving energy but at the same time educated and involved their parents as well in the above cause. About 24,300 schools took part in the Competition in 2007.

Till now over 12 lakh children have participated in the competition since 2005.



State wise activities-  
January to December 2005  
& 2006 (under National  
Campaign on EC)



First Prize, Rs. 1,00,000/-: Aritra Sahoo, West Bengal



Second Prize, Rs. 50,000/-: Khanjan Kashyap, Assam



Third Prize, Rs. 25,000/-: Sanpreet Singh Punjab

## 7.2 Energy Efficiency and Conservation in School Education

The Act provides for the preparation of educational curriculum on efficient use of energy and its conservation for educational institutions, boards, universities or autonomous bodies and coordinates with them for inclusion of such curriculum in their syllabus. Under the school education program a pilot Project was undertaken by the Bureau of Energy Efficiency for the school children and as a result of BEE's efforts, NCERT has revised 9th standard science book of the NCERT scheme by incorporating text on the energy conservation.

The Bureau of Energy Efficiency, Government of India implemented a school education programme on energy titled BEACON ( Building Energy awareness on Conservation) in ten states across India. The objective of this programme was to:

- Create awareness amongst children and their parents on energy competitiveness and energy security at the individual level on a smaller scale.
- Provide guidance to teachers in order to maximize excellence in energy education process.
- Enhance learning of students and sensitize them on key energy issues that will impact their lives.

The school education programme also covers other activities such as promoting practice oriented programmes and projects on energy conservation, arranging competitions among schools on energy conservation, conducting essay and painting competitions for school children, instituting awards and prizes for children.



## 8. Promoting Energy Efficiency in Public Procurement.

The Bureau of Energy Efficiency (BEE), an autonomous body under the Ministry of Power is responsible for promoting energy efficiency through various regulatory and promotional instruments and to develop policy and strategies with a thrust on self regulation and market principles, within the overall framework of the Energy Conservation Act, 2001 with the primary objective of reducing energy intensity of the Indian Economy.

An Enabling Policy Framework with Guidance from Ministry of Finance/Power/CVC is being evolved. This includes possible incentive regime of awarding/ recognizing public sector EE procurement initiatives by MOP/BEE. It will also target upscaling of Standards and Labeling programme to provide unambiguous guide to agencies for EE products.

The following road map is being developed:

- Easy to use template including pay back periods for EE products, LCCA, etc.
- Amendment of procurement rules (if necessary) to explicitly mandate EE procurement.
- IT enable tools for analysis of costs.
- Training and capacity building of procurement officers and maintenance personnel.
- Single tender bidding process should be enabled for the efficient products for which there may not be many manufacturers – BEE's labels may be the benchmark for this.
- BEE will come up with draft guidelines for LCC analysis for MOP/MOF/CVC/C&AG.

## Implementation Strategy

- Voluntary initiative by PSU's/ Central Procurement Agencies/ Government to demonstrate efficacy.
- Incentive mechanisms like awards, etc.
- Awareness and education amongst key stakeholders like top management, etc.
- Develop an action plan for promotion of energy efficiency purchase in India.
- Procurement process should be made mandatory in favour of 3 star and above for the products for which standards are available.
- In-house analysis prior to bidding will help to analyze the LCC and decide the costs.
- Formation of workgroup consisting of representatives from Ministry of Power, Finance, CVC, C&AG, DGS&D, CPWD, etc under the coordination of BEE to recommend relevant modifications.

## Monitoring and Verification (M&V)

- Creation and dissemination of standard protocols for M&V.
- Sensitization of key stakeholders like CAG, CVC about the M&V protocols to improve post decision scrutiny for EE procurement.
- O&M best practices for EE products to leverage lowest economic cost.

## 9. List of Designated Agency to coordinate, regulate and enforce the provisions of Energy Conservation Act 2001:

1. **Andaman and Nicobar UT:** Electricity Department, UT of Andaman and Nicobar, Port Blair
2. **Andhra Pradesh:** Non-Conventional Energy Development Cooperation of Andhra Pradesh Ltd. (NEDCAP); <http://www.nedcap.org>
3. **Arunachal Pradesh:** Arunachal Pradesh Energy Development Agency (APEDA); <http://www.apedagency.in>
4. **Assam:** Electricity Department, Government of Assam, Guwahati; <http://www.aerc.gov.in>
5. **Bihar:** Bihar Renewable Energy Development Agency (BREDA), Bihar
6. **Chandigarh (UT):** Superintending Engineer (Electrical), Electrical Circle, UT Chandigarh
7. **Chhattisgarh:** Chhattisgarh State Renewable Energy Development (CREDA), Raipur; <http://www.chhattisgarh.gov.in>
8. **Delhi:** Delhi Transco Limited, Delhi; <http://www.delhitransco.gov.in>
9. **Gujarat:** Gujarat Energy Development Agency (GEDA), Gujarat; <http://www.geda.org.in>
10. **Haryana:** Department of Non-conventional Energy Sources (DNES), Chandigarh; <http://www.hareda.gov.in>
11. **Himachal Pradesh:** Director (Enforcement & Energy Audit), Office of the Chief Engineer (Commercial), H.P. State Electricity Board, Shimla; <http://www.hpseb.com>
12. **Jharkhand:** Chief Engineer-cum-Chief Electrical Inspector, Energy Department, Government of Jharkhand, Ranchi; <http://www.jreda.com>
13. **Karnataka:** Karnataka Renewal Energy Development Limited (KREDL); <http://www.kredl.kar.nic.in>
14. **Kerala:** Energy Management Centre, Kerala, Thiruvananthapuram; <http://www.keralaenergy.gov.in>
15. **Lakshadweep UT:** Department of Electricity, Union Territory of Lakshadweep, Kavaratti; <http://www.lakpower.nic.in>
16. **Madhya Pradesh:** M.P. Urja Vikas Nigam Limited(MPUVNL); <http://www.mprenewable.org>
17. **Maharashtra:** Maharashtra Energy Development Agency (MEDA), Pune; <http://www.mahaurja.com>
18. **Manipur:** Office of the Chief Engineer (Power), Government of Manipur, Secretariat: Power Department, Manipur
19. **Meghalaya:** Senior Electrical Inspector, Government of Meghalaya, Power Department: Electricity Branch, Meghalaya, Shillong; <http://www.meseb.gov.in>
20. **Mizoram:** Chief Engineer (Power), Power & Electricity Department, Government of Mizoram, Mizoram; <http://www.mizoramelectricity.com>
21. **Nagaland:** Electrical Inspectorate, Department of Power, Government of Nagaland, Kohima

22. **Orissa:** Electricity-cum-Principal Chief Electrical Inspectorate, Bhubaneswar; <http://www.orierc.org>
23. **Pondicherry:** Renewable Energy Agency of Pondicherry (REAP), Pondicherry
24. **Punjab:** Punjab Energy Development Agency, Chandigarh
25. **Rajasthan:** Rajasthan Renewable Energy Cooperation, Jaipur
26. **Tamil Nadu:** Electrical Inspectorate Department, Chennai; <http://www.trei.tn.gov.in>
27. **Tripura:** Department of Power, Tripura, Agartala; <http://www.tripura.nic.in>
28. **Uttarakhand:** Electricity Safety Department, Government of Uttarakhand, Haldwani; <http://www.uttarakhand.in>
29. **Uttar Pradesh:** Non-Conventional Energy Development Agency, Lucknow, Uttar Pradesh
30. **West Bengal:** West Bengal State Electricity Board, Kolkata; <http://www.wbsedcl.in>

#### 10. Designated Consumers Notified by Government:

1. Thermal Power Stations-30,000 metric tonne of oil equivalent (MTOE) per year and above.
2. Fertilizer-30,000 metric tonne of oil equivalent (MTOE) per year and above.
3. Cement-30,000 metric tonne of oil equivalent (MTOE) per year and above.
4. Iron and Steel-30,000 metric tonne of oil equivalent (MTOE) per year and above.
5. Chlor-Alkali-12,000 metric tonne of oil equivalent (MTOE) per year and above.
6. Aluminium-7,500 metric tonne of oil equivalent (MTOE) per year and above.
7. Railways:

(a) The electric traction Sub-section (TSS) in each Zonal Railway having maximum energy consumption as per the table given below:-

TABLE

Railway Zone	List of TSS
Central Railway	Wardha
Eastern Railway	Titagarh
East Central Railway	Koderma
East Coast Railway	Simhachalam North
Northern Railway	Narela
North Central Railway	Mathura
Southern Railway	Avadi
South Central Railway	Krishna Canal
South Eastern Railway	Balichak
South Western Railway	Bangarapet
South East Central Railway	Bilaspur
Western Railway	Makarpur
West Central Railway	Bina

(b) the diesel loco shed in each Zonal Railway as per table given below:-

TABLE

Railway Zone	Loco Shed
Central Railway	Kalyan
Eastern Railway	Undal
East Central Railway	Patratu
East Coast Railway	Vishakhapatnam
Northern Railway	Ludhiana
North Central Railway	Jhansi
North Eastern Railway	Gonda
Northeast Frontier Railway	New Guwahati
North Western Railway	Abu Road
Southern Railway	Erode
South Central Railway	Kazipeth
South Eastern Railway	Kharagpur
South East Central Railway	Raipur
South Western Railway	Hubli
Western Railway	Valva
West Central Railway	New Katni Jn.

(c) All six production units i.e. Integral Coach Factory (ICF), Rail Coach Factory (RCF), Chittaranjan Locomotive Works (CLW), Diesel Locomotive Works (DLW), Diesel Component Works (DCW) and Rail Wheel Factory (RWF);

(d) Workshops on Indian Railways having total annual energy consumption of 30,000 MTOE or more.

8. Textile-3,000 metric tonne of oil equivalent (MTOE) per year and above.
9. Pulp and Paper-30,000 metric tonne of oil equivalent (MTOE) per year and above.



# If Rising Electricity Bills Are Bothering You, Switch to Electrical Appliances with BEE Label

Reading the label...

## Labels For Refrigerators

**POWER SAVINGS GUIDE**

Count the stars within the coloured strip. More Stars, More Savings

Know the number of electricity units consumed in one year

See the BEE logo for authenticity of the label

**ELECTRICITY CONSUMPTION UNITS PER YEAR**  
6.60\*

APPLIANCE TYPE: REFRIGERATOR  
MODEL NO.: ABC  
MANUFACTURED IN: INDIA  
DATE OF MANUFACTURE: 15/01/2010  
SERIAL NO.: XYZ  
STARS: 6.60  
ELECTRICITY CONSUMPTION UNITS PER YEAR: 660

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Count the stars within the coloured strip. More Stars, More Savings

Know the number of electricity units consumed in one year

See the BEE logo for authenticity of the label

**ELECTRICITY CONSUMPTION UNITS PER YEAR**  
5.80\*

APPLIANCE TYPE: REFRIGERATOR  
MODEL NO.: ABC  
MANUFACTURED IN: INDIA  
DATE OF MANUFACTURE: 15/01/2010  
SERIAL NO.: XYZ  
STARS: 5.80  
ELECTRICITY CONSUMPTION UNITS PER YEAR: 580

## Labels For ACs

**POWER SAVINGS GUIDE**

Count the stars within the coloured strip. More Stars, More Savings

Know the Energy Efficiency Ratio (Higher EER means More Savings)

See the BEE logo for authenticity of the label

**ENERGY EFFICIENCY EER (W/W)**  
2.95\*

APPLIANCE TYPE: SPLIT  
MODEL NO.: ABC/DEF  
MANUFACTURED IN: INDIA  
DATE OF MANUFACTURE: 15/01/2010  
SERIAL NO.: XYZ  
STARS: 2.55  
ENERGY EFFICIENCY RATIO (EER): 2.95

**POWER SAVINGS GUIDE**

Count the stars within the coloured strip. More Stars, More Savings

Know the Energy Efficiency Ratio (Higher EER means More Savings)

See the BEE logo for authenticity of the label

**ENERGY EFFICIENCY EER (W/W)**  
2.95\*

APPLIANCE TYPE: SPLIT  
MODEL NO.: ABC/DEF  
MANUFACTURED IN: INDIA  
DATE OF MANUFACTURE: 15/01/2010  
SERIAL NO.: XYZ  
STARS: 2.95  
ENERGY EFFICIENCY RATIO (EER): 2.95

Energy and Cost saving for 250 Litres Frost Free Refrigerator at different Star Rating

Star Rating	Energy Consumption Per Year (Approx.)	Per Unit Charge Rs. (Approx.)	Electricity Cost per Year (Approx.)	Total Saving (w.r.t. No Star) per Year (Rs.)	Refrigerator Cost in Rs. (Approx.)	Cost Difference in Rs.	Pay Back Period in Years
NO STAR	1100	2.50	2750	0	14000	0	0
1 (One)	977	2.50	2443	308	15000	1000	3.25
2 (Two)	782	2.50	1955	795	15500	1500	1.89
3 (Three)	626	2.50	1565	1185	16500	2500	2.11
4 (Four)	501	2.50	1253	1498	17500	3500	2.34
5 (Five)	400	2.50	1000	1750	18500	4500	2.57

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

Star Rating	Maximum Cooling Capacity (Watts)	Minimum Energy Efficiency Ratio (EER)	Input Power (Watts)	Units consumption /Day (kWh)	Per Unit Charge Rs. (Approx.)	Electricity Cost/ Month Rs.	Cost Saving Rs. Per Year (w.r.t. No star) (Approx.)
NO STAR	5200	2.20	2364	9.45	2.50	709	0
1 (One)	5200	2.30	2261	9.04	2.50	678	308
2 (Two)	5200	2.50	2080	8.32	2.50	624	851
3 (Three)	5200	2.70	1926	7.70	2.50	578	1313
4 (Four)	5200	2.90	1793	7.17	2.50	538	1712
5 (Five)	5200	3.10	1677	6.71	2.50	503	2059

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

## Label For Tubular Fluorescent Lamps

STAR RATING	Lumens per Watt at 01000 hrs of use	Lumens per Watt at 2000 hrs of use	Lumens per Watt at 3500 hrs of use
★	<61	<52	<49
★★	>=61 & <67	>=52 & <57	>=49 & <54
★★★	>=67 & <86	>=57 & <77	>=54 & <73
★★★★	>=86 & <92	>=77 & <83	>=73 & <78
★★★★★	>=92	>=83	>=78

Count the stars within the coloured strip. More Stars, More Savings

**POWER SAVINGS GUIDE**

Count the stars within the coloured strip. More Stars, More Savings

Know the Lumens per watt. More Lumens mean More Light

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



See the BEE logo for authenticity of the label

You can reduce your electricity bills and help India to increase the availability of electricity for more people, simply by buying Refrigerators, AC & Tubelights that bear BEE's Star-Rated Energy Efficiency Labels.

The BEE Star Energy Efficiency Labels have been created to standardise the energy efficiency ratings of different electrical appliances and indicate energy consumption under standard test conditions. These labels indicate the energy efficiency levels through the number of Stars highlighted in colour on the label. The BEE Star Labels include a Star Rating System that ranges from One Star (least energy efficient, thus least money saved) to Five Stars (most energy efficient, thus most money saved).

For more details please visit [www.bee-india.nic.in](http://www.bee-india.nic.in) and [www.energymanagertraining.com](http://www.energymanagertraining.com)

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★ ★ **Bachat ke sifare** ★ ★ ★

Calling Architects, Engineers, Design professionals, Builders,  
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## “Let’s learn about the new ECBC”

**Energy Conservation Building Code (ECBC)** aims at increasing awareness about efficient use of Energy and its conservation in new Commercial Buildings with a connected load of 500 kW or contract demand of 600 kVA.

ECBC incorporates energy efficiency factors at the design stage itself to reduce the long-term operating energy costs of the buildings.

### **Savings all the way...**

If the nearly 21.50 million sq. mtrs. Commercial space constructed in India every year conforms to ECBC norms, energy consumption can be cut down by 30-40%.

**Saving : Approx.**

Rs. 1,000 crore in capital investment in a 250 MW power plant plus 1.7 billion units of electricity annually, year after year !

### **ENERGY CONSERVATION BUILDING CODE**

**Energy saving for the Nation...  
Money saving for you !**

### **What does ECBC do ?**

ECBC defines the norms of energy requirement per sq. metre of area and takes into consideration the climatic region of the country, where the building is located.

Norms have been developed to cater to 5 different climatic zones in India— composite, hot and dry, warm and humid, moderate and cold.

### **What is included in ECBC ?**

ECBC details the parameters of various building materials to be used in walls, windows, glass, ceilings and floors, to minimize heat gain and thus the cooling cost.

ECBC also covers Lighting, Heating, Ventilation, Air-conditioning, Electrical Distribution, Water Heating and Pumping systems.

Compliance with ECBC norms is voluntary now but soon it will become mandatory.

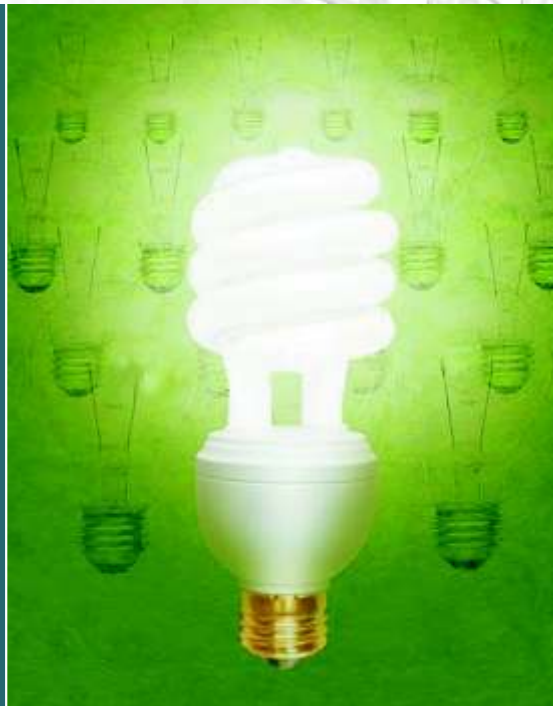
To obtain a copy of the 'Energy Conservation Building Code-2007' Manual, please send a crossed Bank Draft for Rs. 200/- + Rs. 25/- for postage charges, favouring 'Bureau of Energy Efficiency', payable in New Delhi, to the following address :



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