

## **Schemes for Promoting Energy Efficiency in India during the XI Plan**

Energy is an important input required for economic and social development. India ranks the world's sixth largest energy consumer accounting for about 5% of the world's total annual energy consumption, but, per capita consumption of energy is very low at 631kwh as compared to world consumption of 50% of per capita economy demand of the world which needs to be increased to meet the goals of economic and social development. The installed power generation capacity has grown 94 times since independence and the total installed capacity of power generation in India has reached 1,69,749 MW (as on 31.12.2010). However, there is still a peak demand shortage of around 10.5% and an energy deficit of 8.2% in the country. To mitigate shortage of energy in general and electricity in particular, in addition to augmenting the capacity of energy supply, its efficient use and conservation is also essential. Keeping this in view and to maintain GDP growth of 8 to 10%, the government has initiated several policy measures to accelerate power generation and promote energy efficiency to meet power requirements.

The conventional sources of energy such as Thermal, Hydro and Nuclear are major sources of generation of electricity in India. Conventional sources of energy are valuable, because their formation takes millions of years whether it is oil or coal. Moreover, the conventional sources of energy are exhaustible. Energy prices may rise in the long run to reflect the relative scarcity and high cost of exploration and extraction. Hence, all initiation has to be taken to optimal use of the available resources so that they can continue for a long duration. Energy Efficiency improvements not only reduce the energy consumed per unit products and services made available but also improve energy security of the country to ensure sustained availability of energy resources at affordable price.

In order to institutionalize energy conservation efforts in the country, the Government has passed the Energy Conservation Act in 2001, and established the Bureau of Energy Efficiency, under Ministry of Power, Government of India, on 1st March 2002 to promote the efficient use of energy and its conservation. Ministry of Power, through BEE, has initiated a number of energy efficiency initiatives through a range of measures, including the launch of Energy Conservation Building Code for large, new commercial buildings; the launch of energy labeling scheme for appliances; the initiation of process for the development of energy consumption norms for industrial sub sectors and an annual examination to certify energy auditors and energy managers. However, the effectiveness of this and other measures ultimately depends on their adoption by all energy users and consequently on their awareness of the energy savings opportunities around them. Keeping this in view, Ministry of Power has initiated National Campaign on Energy Conservation and National Painting Competition on Energy Conservation for school children.

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The "**Bachat Lamp Yojana**" aims at the large scale replacement of incandescent bulbs in households by CFLs. It seeks to provide CFLs to households at the price similar to that of incandescent bulbs and plans to utilize the Clean Development Mechanism (CDM) of the Kyoto Protocol to recover the cost differential between the market price of the CFLs and the price at which they are sold to households. The "Bachat Lamp Yojana" is designed as a public-private partnership between the Government of India, private sector CFL suppliers and State level Electricity Distribution Companies (DISCOMs). The CFL suppliers would distribute high quality CFLs to households at a price of Rs. 15 per CFL within a designated project area in a DISCOM region of operation. The CFL supplier will be chosen by the DISCOM through a due diligence process from a list of CFL suppliers empanelled by BEE. Under the scheme 40 watt, 60 Watt and 100 Watt incandescent Lamps will be replaced with 9-11Watt, 13- 15 Watt and 20 - 23 Watt CFLs respectively. BEE will monitor the electricity savings in each project area in accordance with the monitoring methodology prescribed by the Executive Board of the CDM.

In order to reduce the transaction costs associated with the approval of CDM projects, BEE has developed a Programme of Activities (PoA) ,an umbrella CDM project, and is registered with the CDM Executive Board on 29<sup>th</sup> April,2010. The individual projects, designed to be in conformance with the umbrella project, would be added to the umbrella project as and when they are prepared. The development of the PoA is a voluntary action on the part of BEE, and it would not seek any commercial or CDM revenues from the PoA. On the other hand, BEE will, on behalf of the Government of India take the responsibility of monitoring of all project areas after the DISCOMs and the CFL suppliers have entered into a tripartite agreement (TPA) with BEE.

The brief progress in Bachat Lamp Yojana sheme is as follows:

- The BLY PoA is registered with UNFCCC on 29<sup>th</sup> April, 2010.
- Appx. 208 lakh bulbs have been distributed so far.
- Bachat Lamp Yojana has been initiated in 16 states so far.
- 45 CFL Manufacturers/Traders have been empanelled by BEE for participating in the BLY Scheme. Active status of empanelled investors was reviewed. The revised list has 18 active investor agencies.
- 14 TPAs have been signed with BEE till date.

### **2. Standards and Labeling**

The Bureau of Energy Efficiency, Ministry of Power has developed a scheme for energy efficiency labeling of equipment, under clause (a-d) of section 14 of the Energy Conservation Act, 2001 by the Central Government. Central Government, under the Energy Conservation Act, 2001 has powers to:

- Direct display of labels on specified appliances or equipment (14.d)
- Enforce minimum efficiency standards by prohibiting manufacture, sale, and import of products not meeting the minimum standards (14.c)

The Standards and labelling programme for end use appliances and equipments provides for self certification by the manufacturers based on the standards issued by BEE, STAR rating, ranging from 1 to 5 in the increasing order of energy efficiency. The scheme has been developed in collaboration with all the stakeholders, and aims at providing information on energy performance so that consumers can make informed decisions while purchasing appliances. Other than the objective of informed choices to consumers, this program also leads to energy saving, and thereby the cost saving potential of the marketed household and other equipment. Along-with the fact that this would impact the energy savings in the medium and long run, it will also position domestic industry to compete in such markets where norms for energy efficiency are mandatory. The scheme was launched by the Hon'ble Minister of Power on 18<sup>th</sup> May, 2006 and is currently invoked for **12 equipments**, of which the first four (mentioned below) have been notified under the mandatory labeling regime with stakeholders' consultation effective 7<sup>th</sup> January, 2010. The scheme for other equipments/ appliances is currently under voluntary phase and depending upon the market transformation shall be made into a mandatory scheme. The equipments presently under labeling phase are:

1. Frost Free Refrigerator (Mandatory Labeling)
2. Tubular Florescent Lamps (Mandatory Labeling)
3. Room Air-conditioners (Mandatory Labeling)
4. Distribution Transformers (Mandatory Labeling)
5. Direct Cool Refrigerator
6. Induction Motors
7. Agricultural Pump Sets
8. Ceiling Fans
9. LPG Stoves
10. Electric Geysers
11. Colour TV
12. Washing Machine

Education and awareness about labels, ensuring credibility of the scheme by check and challenge testing, monitoring and evaluation of the impact of the scheme are the major aims and objectives of the scheme.

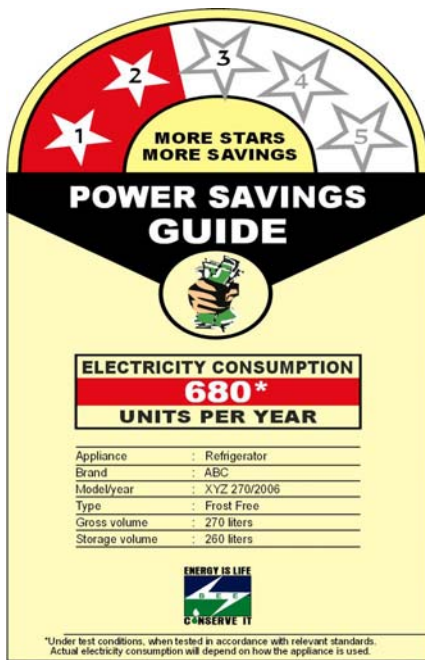
The scheme seeks to create a new market for energy efficient products by not only carrying out a sustained programme for awareness and education but also putting in place institutional structure to –

- Oversee implementation at National level with involvement of States and other stakeholders.
- Conduct market research and situation analysis for each of the new equipment to understand the key indicators concerning the market, conservation potential and impact on national energy consumption.

- Conduct research to arrive at parameters to be tested, test procedure to be adopted, collection of sales literature and efficiency levels and assess availability of NABL accredited laboratories for testing to assist the technical committee in arriving at informed decisions.
- Conduct engineering and economic analysis to arrive at optimum energy performance standards and this would be the basis of discussions at the technical committee meetings.
- Conduct series of meeting with stakeholders and recommendations for, type of label, label rating plan, design of label, minimum energy performance standards arrived in technical committee.
- Improve credibility of the schemes by carrying out sample verification tests, physical verification of the labels, collection of samples for verification and challenge testing, conducting base line efficiency and further collection of data to verify the impact of the scheme at the National level.
- Conduct check and verification testing throughout the country.
- Support would be required for R & D activities for optimising manufacture of energy efficient products at small and medium scale manufacturers and providing assistance for testing of products.
- Evaluate the impact of consumption of energy by use of these products and educate and made consumers aware about the need and relevance of rated products.
- Respond to the queries and complaints regarding claims.
- Training of distributors and retailers for this exercise.

**The process of certification of Star ratings:** BEE has been working on this aspect of performance rating, which has resulted in the Standard & Labeling program for various equipment and appliances. Through the process of formation of technical committees of individual equipments, BEE has observed that some of the equipments are highly energy efficient with respect to equipments of similar nature and this has resulted in binding the program based on comparative labeling. BEE through this Technical Committee recommends to the Steering Committee for issuing standards for a particular product and with the approval of the Central Government a scheme is announced for voluntary labeling. The entire process is a very concentrated process. BEE has developed standards from the viewpoint of Indian market and has been working closely with the industry, individual manufacturers, and large stakeholders. Based on propose of the standards, consultations are drawn and it's only after that, the standards are put up for recommendation to the Central Government. The Bureau is involved in developing standards for standby power and these labels shall endorse the amount of the energy being consumed by appliances while operating in the standby mode. The process for these standards is being developed with the stakeholders such as manufacturers, components manufacturers, test laboratories, opinion makers such as VOICE, other NGO's etc.

**Pictorial Labels:** 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 provide consumers necessary data on energy efficiency necessary to make informed choices. A sample refrigerator label is as under:



**Promotion of Consumer Awareness for S&L program:** BEE felt that there is also an urgent need to promote awareness about the meaning and significance of the BEE label to all stakeholders including consumers. The consumers have to be educated on the cost benefits of buying higher energy efficiency equipment through multimedia awareness campaign. Multimedia campaign has been launched by BEE in print and audio visual media to create awareness about energy efficiency and create market for these appliances. To create awareness about the BEE star rating label a half day workshop on **National Educational / Awareness Program on Standards and Labeling** has been arranged for the sales executives. The objective of the workshop is to educate the sales executives about the BEE star rating label and to communicate to the customers/purchasers by providing necessary information to select energy efficient products. The scope of these workshops has been expanded to cover all household appliances currently under voluntary / mandatory phase under the BEE S&L programme. More than 50 awareness programs have been conducted for consumers and sales representatives.

**Check Testing:** BEE Star labeling process is on self proclamation basis. In order to make credibility of these labels check testing for various equipments and appliances is under progress at NABL accredited laboratories to check, if their performance matches with what is printed on the label. The results are being compiled to understand the deviations from Standard as proclaimed by the manufacturers.

### ***Label Verification Process***

The Bureau will verify the label contents, and the manner of display of label for each equipment/model on a regular basis. One such label verifications study was completed during the year 2008-09 and the results have demonstrated strict compliance to the programme. The next such study is presently under progress.

**Independent Agency for Monitoring and Evaluation (IAME)** M/s. RITES was engaged as an IAME and with due approval of the governing council.

**Impact of S&L:** Impact analysis of Standards and Labeling program has been initiated by BEE. The impact on energy savings for 2007-08 was around 260 MW and which has been increased to 599.44 MW during the year 2008-09. The savings during the year 2008-09 was contributed only from efficient products in TFLs, refrigerator and AC segments. The savings during the year 2009-10 is 2179 MW. The huge savings is due to the fact of market transformation in greener products.

### **3. Energy Conservation Building Codes**

The Energy Conservation Building Code (ECBC) was launched by the Govt. of India on 27th May 2007. The ECBC sets minimum energy standards for new commercial buildings having a connected load of 100kW or contract demand of 120 KVA in terms of the amended EC-Act, 2001.

The ECBC defines norms of energy performance and takes into consideration the climatic regions of the country where the building is located. Energy Conservation Building Code (ECBC) addresses the five climatic zones of the country (hot & dry, warm & humid, composite, temperate and cold). The major components of the building which are being addressed through the code are Envelope (walls, roofs, windows), Lighting systems, HVAC System, Water heating and pumping system, Electrical distribution system.

A scheme for implementation of Energy Conservation Building Code (ECBC) and improving energy efficiency in existing buildings was approved by the government at a total cost of Rs.13.99 crores during the 11<sup>th</sup> Plan period.

Under section 14 (p) of the Energy Conservation Act,2001, Central Government has powers to prescribe ECBC for commercial buildings having a connected load of 100 KW or building complex for efficient use of energy and its conservation. The state governments have the flexibility to modify ECBC to suit local or regional needs. The Central Government is also empowered to include such commercial buildings in the list of designated consumers under section 14(e). The state governments are empowered, under section 15(a) to amend the ECBC to suit regional / local climatic conditions and notify ECBC in the states.

In order to ensure administration of ECBC implementation in a uniform and consistent manner all over the country, the BEE has set up a ECBC Programme Committee (EPC) by pooling in the expertise of all stake holders, including State Designated Agencies, Industry etc. This committee facilitates the development of ECBC compliant building design, credible implementation of a few demonstration projects in the public sector, making arrangements for evaluation of the progress and outcomes by creating appropriate institutional mechanism. ECBC has been revised incorporating the comments received from stakeholders and organizations like

CPWD, MES etc.

### **Present Status**

With a view to build adequate technical capacity and develop building procedures and tools to effectively implement ECBC - a panel of 45 ECBC expert architects have been empanelled. Through these empanelled architects assistance is being provided to various Central/State Governments and public sector organizations in developing ECBC compliant buildings.

As part of capacity building exercise, BEE is conducting training workshops covering all aspects of the code to sensitize the various government departments/ professionals on the requirements of the code. 50 training programmes/ workshops involving about 5000 professionals have been conducted till date with the objective of to sensitize architects/ developer/ design professional/ students/ consultants on the code requirements and promote energy efficient buildings.

ECBC User Guide has been prepared under the USAID ECO-III Project that aims to guide and assist the building designers, architects and all others involved in the building construction industry to implement ECBC in real situations and comply with the requirements of ECBC. This will be an additional support, complementing the support provided by BEE empanelled expert architects for designing Code compliant buildings.

The ECONirman conformance Check Tool has been developed with the objective of helping architects and design professionals to assess the conformance of their designs with the code requirements. This tool would help in assessing both the [mandatory](#) and [prescriptive](#) requirements under the ECBC.

To familiarize users with the interface of ECONirman through the step by step process of using the conformance assessment, a ECONirman User Guide has also been parallelly developed.

A standard ECBC training package has been developed covering the various aspects of the code, which would enhance ECBC awareness together with providing administrative and technical guidance towards its conformance. These modules have been so developed that professionals undertaking the training programme would be required to undergo an ECBC Proficiency test to assess their understanding of the Code.

In addition, Tip sheets on building envelopes, lighting, HVAC and Building Simulation have been developed under the USAID ECO III programme.

The capacity building of architects and engineers has also been taken up by developing curricula with Architectural/ Engineering colleges through training the next generation of Architects and Engineers to enable them to design energy efficient and sustainable buildings.

Quality reference material in the form of Building Technology Atlas Series containing up-to- date reference work on energy efficiency buildings and technical

information and practical case studies covering Lighting, Heating, Appliances and Drive Power has been distributed to 30 Engineering colleges and 13 Non Profit organizations.

BEE has also provided assistance to the Architecture Department/ PWD, Government of Haryana through the empanelled expert architects for developing energy efficient building plans for their Mini Secretariat at Nuh (Administrative Block and court complex), SDO Civil Complex (Admin Block), Community/Primary Health Centre, Industrial Training Institute (ITI). These proto-type building plans would be used for replication across the state.

### **Energy Efficiency in Existing Buildings**

There is a huge potential of energy savings in existing buildings. Energy Audit studies conducted in several office buildings, hotels and hospitals indicate energy saving potential of 23% to 46% in end uses such as lighting, cooling, ventilation, refrigeration etc. The potential is largely untapped, partly due to lack of effective delivery mechanisms for energy efficiency. Performance Contracting through Energy Service Companies is an innovative delivery mechanism for overcoming the barriers faced by energy users. The overall energy efficiency investment market size under ESCO system of performance contract in India has been estimated by the ADB Study project team at Rs 140 bn (Rs. 14000 crores) and has the potential to save about 54 billion units of electricity annually.

A scheme for implementing energy efficiency in existing central government buildings through the ESCO mode was initiated which included several prestigious government buildings.

In order to promote energy efficiency in existing buildings, a scheme to promote Energy Efficiency in Government Buildings has been developed by BEE. The approved scheme provides for funding of Investment Grade Energy Audits (IGEA) being arranged by the Central Government Agencies/ State Designated Agencies.

In order to promote implementation of energy efficiency measures through Performance Contracting route BEE undertook a process of shortlisting of ESCOs through an open invitation and evaluation process. These shortlisted ESCOs were accredited by SEBI accredited agencies. The accreditation exercise was based on approved methodology which involved an assessment of Business Risk (Track record and Market position), Organizational setup and financial capability of the organizations. 89 ESCOs have been accredited till date with BEE. This exercise is expected to aid ESCOs to be able to successfully bid for energy services projects and to arrange financing for the execution of such projects.

Hon'ble President of India launched an initiative "ROSHINI" which aims at converting the President's Estate into a model township which would be eco- friendly, green and plastic free. BEE has been entrusted the task of taking up energy efficiency measures for the entire President's Estate excluding the Rashtrapati



Bhawan. Under an MoU between PTC and BEE the implementation of energy efficiency measures under the ESCO route has been taken up within the following 6 facilities:

1. President Estate
2. AIIMS
3. Safdarjung Hospital
4. Ram Manohar Lohia Hospital
5. ESIC, Rohini
6. ESIC, Jhilmil

BEE has also entered into an MoU with Employees State Insurance Corporation (ESIC) for enhancing the energy efficiency of ESIC owned /operated / hospitals / commercial buildings / residential colonies all over the country.

In order to create a market pull for Energy Efficiency activities in the commercial buildings, the Bureau of Energy Efficiency has developed a Star Rating Programme for Office buildings and BPO buildings which is based **on actual performance of the building**, in terms of specific energy usage (in kWh/sq m/year). This Programme rates buildings on a 1-5 star scale, with 5-Star labelled buildings being the most energy efficient. Till date 136 buildings have been found eligible for the award of label.

#### **4 Agricultural (Ag DSM) Scheme**

In order to accelerate DSM measures in agriculture sector, Government of India approved a scheme on Ag DSM to be implemented by Bureau of Energy Efficiency (BEE), Ministry of Power. The objective of the scheme is to create appropriate framework for market based interventions in agricultural pumping sector by facilitating conducive policy environment to promote Public Private Partnership (PPP) to implement projects.

In this scheme, BEE is providing resources to create a shelf of bankable DPRs in the agricultural sector to mainstream the scheme. The scheme has been envisaged in two phases:

**Phase 1:** Identification and selection of most preferred states, sub-divisions and feeders based on a framework for initial engagement of the study, engagement of consultants for carrying out the study at the areas (feeders) predetermined as mentioned above and preparation of detailed project reports (DPRs).

**Phase 2:** Implementation of the pilot project by distributing the BEE Star Rated pumpsets free of cost to the farmers through PPP mode based on the business models emanating from the study conducted in phase-1.

The brief status of the project is as below:

Five states (Maharashtra, Gujarat, Rajasthan, Haryana, Punjab) have been initially selected for implementation of Agriculture DSM projects in the phase-I of the assignment.

1. The first pilot Ag-DSM project was launched by Shri Sushilkumar Shinde, Hon'ble Union Minister of Power in the Mangalwedha Sub-division of Solapur District in Maharashtra in February, 2009. This pilot Ag DSM project covers 3530 agricultural pumps connected on five feeders (Bramhapuri, Nandeshwar, Borale, Bhoose and Kharatwadi) in Mangalwedha and Pandharpur sub-divisions of Maharashtra.
2. The detailed project report (DPR) has been prepared and an energy service company (CRI Pumps Pvt Ltd) has been engaged for implementation of the findings of the DPR. As of January, 2010, CRI Pumps has signed more than 500 agreements with the farmers and installed about 70 energy efficient star rated pump sets in the pilot feeders.
3. In the state of Gujarat, two Ag DSM pilot projects are being initiated with PGVCL in Jamnagar, Bhavnagar and Surendernagar districts and the other one with MGVCL in Anand district. The Ag DSM pilot project with PGVCL covers 1932 agricultural pumps connected on 6 feeders in Bhavnagar, Jamnagar and Surendernagar districts of Gujarat. The Ag DSM pilot project with MGVCL covers 530 agricultural pumps connected on 6 feeders in Anand district of Gujarat.
4. In November, 2010 the MGVCL has approved in principal to implement the Ag DSM pilot project in Discom Mode and BEE is assisting MGVCL for engagement of implementing agency.
5. The Ag DSM pilot project in the state of Punjab covers 2081 agricultural pumps connected on 6 Agricultural feeders in Muktsar and Tarn Taran districts of Punjab. In October, 2010 the Punjab state power corporation limited issued the in principal approval to implement the Ag DSM pilot project and BEE is assisting MGVCL for engagement of implementing agency.
6. The Ag DSM pilot project in the state of Haryana covers 1994 agricultural pumps connected on 15 Agricultural feeders in Kaithal & Kurukshetra districts out of which 13 feeders are in Kaithal and 2 feeders are in Kurukshetra.
7. The Ag DSM pilot project in the state of Rajasthan covers 1949 agricultural pumps connected on 13 feeders in the Chomu sub-divisions of Jaipur district.
8. Extensive stakeholder consultations are under progress for implementation of pilot projects in the states of Haryana and Rajasthan.
9. Five Discoms in the following states have been identified for initiating the Ag DSM pilot projects in the next phase:
  - Madhya Pradesh
  - Andhra Pradesh
  - Karnataka
10. In the state of Madhya Pradesh, two Ag DSM pilot projects are being initiated with East and West Discoms of M.P. 'Energ Engineering' and 'See-Tech Solutions' have been appointed by BEE for the preparation of DPRs with these Discoms.

Energy audit study of the pump sets in the identified pilot feeders is under progress.

11. In the states of Andhra Pradesh, two Ag DSM pilot projects are being initiated with East and Central Discoms of A.P.

## **5. BEE's Program for Enhancing Energy Efficiency in SME Sector**

Large number of Small and Medium Enterprises (SMEs) like foundries, brass, textiles, refractories, brick, ceramics, glass, utensils, rice mills, and dairy units etc, are said to have large potential for energy savings. Many of these units are in clusters located in various states of the countries.

BEE has initiate diagnostic studies in 25 clusters to prepare cluster specific energy efficiency manuals covering Specific energy consumption norms, energy efficient process and technologies, best practices, case studies, etc. These studies would provide information on technology status, best operating practices, gaps in skills and knowledge, energy conservation opportunities, energy saving potential, etc for each of the subsector in SMEs. The studies/projects will also be aimed to provide a direction for designing sub-sector specific energy conservation programs in the SME sectors. BEE will also undertake capacity building of local service providers and entrepreneurs/ managers of SMEs. The local service providers will be trained in order to be able to provide the local services in the setting of energy efficiency projects in the clusters.

### **Activities**

The activities identified under this program are-

- Current energy use and technology analysis
  - o Situation analysis of SME clusters to understand the ground situation such as technology, energy consumption, etc in the cluster
  - o Energy use and technology audit to understand the energy productivity
- Capacity building
  - o Introductory workshop to share the outcome of above activity
  - o Information dissemination workshops in the clusters
  - o Preparation of case studies on best practices in the cluster
  - o Preparation of cluster manual
- Implementation of energy efficient measures
  - o Preparation of 15 bankable DPRs per cluster on the identified technologies (total 375 DPRs under the program)
  - o Capacity building of local services providers (LSPs) to implement EE projects
- Facilitation of innovating financing schemes
  - o Facilitation of financing EE projects
  - o Capacity Building of banks to evaluate EE projects
  - o Conducting local services providers (LSPs) Workshop

## **Synergy with other agencies**

- Ministry of Micro, Small and Medium Enterprises (MoMSME) has agreed in principal to capitalize on the DPRs prepared under the BEE's SME program.
- Small Industries Development Bank of India (SIDBI) will also act on similar lines and will provide subsidized finance for implementation of energy efficiency technologies as identified in the DPRs. A MoU in this regard has already been signed.
- World Bank (WB) is implementing energy efficiency improvement program in 5 identified clusters with BEE under the GEF funded Programmatic Framework Project on Energy Efficiency in India. The activities will lead to larger penetration of energy efficient technologies and skill enhancement of various stakeholders in the clusters.
- UNIDO has also started a program with BEE to improve the energy efficiency of SMEs in identified 12 clusters by helping units to install energy efficient and renewable energy technologies.

## **Progress**

The progress of BEE's SME program is mentioned below-

- Situation analysis in 35 SME clusters is already over and based on this, 25 clusters have been identified for implementation of this program.
- A MoU has been signed with SIDBI for collaboration in the areas of financing of EE projects
- Executing agencies selection completed to perform the energy use and technology gap assessment study in selected 25 clusters.
- Energy use and technology gap assessment study is completed in 20 clusters whereas the work is in progress in remaining 5 clusters.
- A joint national conference on Financing Mechanism for Energy Efficiency Improvement in SMEs was organized on 18-19 November 2009 at New Delhi
- Cluster specific manual on energy efficiency prepared for 18 clusters. These manuals have been circulated among the industries and local industries associations during the cluster level dissemination workshops.
- 30 nos cluster level information dissemination and awareness workshops were conducted in various SME Clusters to disseminate the energy conservation opportunities in various sectors in SMEs.
- More than 160 Detailed project reports on energy efficient technologies identified during energy use and technology gap assessment study has been prepared. These DPRs has been reviewed by financial institutions (SIDBI).
- Training of trainers in India for promotion of energy efficiency through the Small Group Activities (SGA) and Total Energy Management (TEM).
- SGA/TEM implementation in 9 units in 3 SMEs clusters to promote the energy efficiency interventions though in-house group activities.
- Capacity building of various stakeholders on small group activities in Japan has been conducted with collaboration of ECCJ, Japan.

## **6. 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 of the states have notified SDAs in the last 3 years. 32 States have designated their agencies so far. 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 have been developed for 31 states and the implementation is in progress in almost all the states. The scheme with an estimated cost of around Rs. 49.47 crores had been approved by the Ministry of Power under the XI<sup>th</sup> five year plan out of which Rs. 49.41 crores is already disbursed to the SDAs for implementing various Energy Conservation measures. The SFC for Rs. 20.82 crores has been put up to MoP for approval to take up further energy conservation activities under phase-II scheme of SDAs.

## **7. Contribution to State Energy Conservation Fund (SECF) Scheme**

SECF is a statutory requirement under section 16 of the Energy Conservation Act 2001 and is one of the key elements of the ECAP. The scheme is for support of Rs. 70 crores as contribution by BEE to SECF to invest in Energy Efficiency projects. 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. The Ministry of Power has approved the scheme "Contribution to SECF by the Bureau of Energy Efficiency" for which Rs. 70.00 crores was sanctioned and to be disbursed during the last three Financial Years of the XI Five Year Plan i.e. 2009-10, 2010-11 & 2011-12. The funds were disbursed to those States who have constituted their State Energy Conservation Fund and finalized the rules and regulations to operationalize the same. Till date funds have been disbursed by BEE to 16 States under the above scheme.

## **8. National Energy Conservation Awards, 2010**

Ministry of Power had instituted National Energy Conservation Awards to motivate industrial units to conserve and use energy efficiency. This award scheme has been extended to building sector and zonal railway. Indian industrial units, office buildings, hotels, zonal railways, state designated agencies, aviation, BEE star labeled appliances, thermal power station and municipalities, who are leading the way in becoming more energy efficient, are awarded by Ministry of Power in a function organized on the occasion of National Energy Conservation Day, the 14th December 2010 at New Delhi. These annual awards recognize innovation and achievements in energy conservation by the Industry; buildings, railways, state designated agencies and municipalities and raise awareness that energy conservation plays a big part in India's response to reducing global warming through energy savings. Ninety (90) units in the industries, office buildings, hotels, zonal railways, state designated agencies, Star labelled appliances; Thermal Power Stations, municipalities and manufacturers of BEE star labeled appliances have been selected from 592 nominations received for the National Energy Conservation Awards 2010. This year, 1 Top Rank Award, 32 First Prizes, 30 Second Prizes and 27 Certificates of Merit have been awarded.

The Award Scheme has motivated the participating units to undertake serious efforts in saving energy. The 592 participating units of 2010 Awards have collectively invested Rs. 5457 crores in energy conservation measures and achieved a monetary savings of Rs. 2138 crores every year, implying a very short payback period of 31 months only; once again proving the fact that energy conservation is a least cost option. The participating units have also saved 2422 million kWh of electrical energy, which is equivalent to the energy generated from a 357 MW thermal power station at a PLF of 0.775%. In other words, these participating units have avoided the installation of power generating capacity equivalent to 357 MW thermal power station in 2009-10, which would otherwise have been required to meet the power demand of these units. In the last 12 years of Award scheme of the period 1999-2010, the participating industrial units have collectively saved Rs 13399 crores per year and the investment made on energy efficiency projects was recovered back in 20 months. In energy terms, 14535 MW of electrical power, 27 lakh kilolitre of oil, 91 lakhs metric tonnes of coal and 22 billion cubic metre of gas was saved, through the energy conservation measures of the participating units.

## **9. Painting Competition on Energy Conservation, 2010**

Ministry of Power has undertaken National Campaign on Energy Conservation 2010. Under this campaign, a painting competition on energy conservation 2008 at School, State level and National level are conducted. 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 Competition. First two winners from each State and UTs are invited to participate at the national level competition. This year 47155 Schools and 15.63 lakhs students of 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> standards of the 35 States and Union Territories Participated in the School Level Painting Competition, which was quite encouraging. This competition is aimed at motivating the children towards energy conservation and offers them a chance to

explore their creativity. The expressive paintings of the children reflected their interest in the energy conservation activities and their concern about climate change.

## **10. National Certification Examination for Energy Managers and Energy Auditors**

The Government of India has specified the passing of the National level certification examination as the qualification for a Certified Energy Manager and Certified Energy Auditor, to be appointed or designated by the designated consumers under the Energy Conservation Act.

BEE has taken up the challenge of creating a cadre of professionally qualified energy managers and auditors with expertise in energy management, project management, financing and implementation of energy efficiency projects, and policy analysis. BEE has conducted the National Certification Examination, nation-wide, for Energy Managers and Energy Auditors regularly since May 2004 onwards. The certification examination has been rated Very Good to Excellent by the candidates. In keeping with the developments in the area of energy efficiency and conservation, the coverage and syllabus has also been revised in the latest edition of the guide books prepared in 2010.

The country has now 8013 Certified Energy Managers, out of which 5726 are also qualified as Certified Energy Auditors, from the previous 10 examinations conducted during 2004-2010.

The capacity building of energy managers and energy auditors through National Certification Examination route will have a long-term impact on the Indian economy by making it less energy intensive.

## **11. National Mission for Enhanced Energy Efficiency (NMEEE)**

The Cabinet approved the financial outlay of Rs.235.35 crores and a budgetary provision for Rs.125 crores has been made for the current year. So far Rs.58.38 crores (Rs. 50.88 crores for PAT + Rs.7.5 crores as corpus) have been released to BEE. The rest Rs.66.62 crores has been budgeted for creation of Partial Risk Guarantee Fund and Venture Capital Fund for the current financial year. The following are the status of various activities under NMEEE for 2010-11:

- (a) As per the baseline data collected for last 5 years (2005-06 to 2009-10), 563 designated consumers have been identified in 8 industrial sectors.
- (b) Data compilation has been completed and verification of the reported data is under progress by National Productivity Council (NPC) for establishing the baseline specific energy consumption.
- (c) Methodology for target setting has been developed for all sectors except railways with the help of Indian Institute of Science, Bengluru and CSTEP, Bengluru. The first draft target setting for cement and aluminum sectors are

completed on the basis of the developed methodology. The first draft targets for all 8 sectors are expected by January 2011.

- (d) Expert committees have been indentified in 7 sectors (Thermal Power plant, Iron & Steel, Aluminum, Pulp & Paper, Cement, Fertilizer & Chlor-alkali) for discussion and approval of methodologies of each step of target setting.
- (e) Pre-bid conference of empanelment of consultants (40 organizations) to carry out baseline energy audit in designated consumers was held at New Delhi on 7<sup>th</sup> Dec 2010. Final RfP for the same was issued. The audits will kick-off from January/February 2011. The work has been assigned to Energy efficiency Services Ltd. (EESL).
- (f) Rs.12.56 crores have been disbursed to EESL as 30% advance of the estimated value of the audit.
- (g) 3-level consultation workshops (national level/state level/industry level) have been scheduled during January – March 2011.
- (h) PAT consultation document has been prepared and discussed at BEE. It is under final review of Ministry of Power before being made public.
- (i) Draft reports of the study on “Institutional Mechanism for Issuance of e-Scerts and trading mechanism” from PXIL has been received and being reviewed.
- (j) Draft implementation document for Partial Risk Guarantee Fund (PRGF) and Venture Capital Fund (VCF) has been obtained and are under review. BEE is targeting to operationalise the funds by March 2011.

## **12. International Co-operation Programmes**

1. Indo German (IGEN)
2. Indo Japan high level Energy dialogue
3. USAID-Energy Conservation and Commercialization (ECO) project
4. Indo – France Bilateral Co-operation/ADEME
5. French Agency for development (AFD)
6. Indo –EU Joint study on energy efficiency
7. BEE/rural DSM TA (ADB)

### **(1) IGEN Phase I – completed: “Oct 2003- Sep 2009**

#### **Objective**

1. Technical Assistance on Energy Efficiency Components – financial support of EURO 6.1 million
2. Technical Assistance on Power Plant Optimization.

#### **Achievements:**

- Commencement of benchmarking of energy consumption of the identified designated consumers. Evaluation of energy input of 300 designated consumers undertaken
- Prepared guidebooks for National Certificate examination. 7566 qualified energy professionals certified.
- Examination feedback assessment system through website.
- Energy saving impact through Standards & labeling – saving of 1425 mu or avoided capacity of 260 MW in 2007-08
- Five year Energy conservation Action plan for 29 designated Agencies.



- Support for National Action plan for climate change to develop market based mechanism for energy efficiency through certification of energy saving certificates
- Mapping of 83 Thermal plants of 17 state generating utilities.
- Draft Energy Audit manual for power plants
- Capacity building programmes of power station professionals
- NPTI faculty trained on best practices of thermal power stations.

## **IGEN Phase II“Oct 2009 – Sep 2013”**

### **Objectives**

- To work jointly to promote energy efficiency, energy conservation and power plant optimization in co-operation with BEE, CEA and SDAs.

### **Technical Assistance of Euro 9 million on**

- A) Energy Efficiency Component
- B) Power plant Optimization component

#### Objectives:

- Energy Efficiency component including CDM
- To support PAT scheme under NMEEE- through appointment of 7 industrial experts
- To support preparation of panel of independent, impartial and trustworthy Designated Energy Auditors to safeguard confidentiality of PAT scheme
- To support preparation of E=Specific Energy Consumption (SEC) norms for PAT under NMEEE
- To Support establishment of systems and processes for Monitoring , Verification of SEC of designated consumers in the baseline year and in target year
- Establishment of institutional arrangements for ensuring Energy Saving Certificates.
- To support implementation of workshops under 3 L programme
- To support research work in framing rules under sections 56 and sec 58 of EC Act 2001
- To support deemed savings methodology for approval by UNFCCC for Air conditioners and home refrigerators.
- To support self sustaining business model for PoA.
- To support technology research and development for promotion of low grade heat recovery technology.
- Development of Road map for post 2012 to leverage carbon finance mechanism
- To support up gradation of the institutional capacity of SDAs
- to support preparation of assessment reports in each sector under jurisdiction of 35 SDAs and UTs and preparation f Action Plan and their implementation for realization of saving potentials.

### **IGEN ACHIEVMENTS**

- Signing of Tri-Gen MoU between Trauma Center AIIMS, BEE, MoP and German technical Cooperation.
- ECO Implementation Agreement between CEA, BEE and GTZ.

- Establishment of permanent office in 2<sup>nd</sup> phase.

## **(2) INDO - JAPAN**

### **Areas of Co-operation**

- 1) Capacity building of the *Stated Designated Agencies*
- 2) Capacity building of the various stakeholders in SMEs including SIDBI, MOMSME & local industry association.
- 3) Measures for promoting energy efficiency in SMEs through implementation of Total Energy Management and Small group Activities
- 4) Setting up of Regional Energy Efficiency Centers (REECs)
- 5) Promotion of ESCOs

## **(3) USAID- Energy Conservation and Commercialization (ECO) Project**

### **Objective:**

- to enhance commercial viability and performance of Indian energy sector
- To promote utilization of clean and energy efficient technology in the sector
- Energy Efficiency Action Plan
- Implementation of ECBC
- Energy Efficiency in Existing buildings and municipalities
- Technical assistance to utility sponsored energy efficiency initiative
- Education Curriculum and professional training

## **(4) Indo – France –ADEME**

### **Objective:**

Exchange information on Policies, programmes and technologies relating to Energy Efficiency and demand side management.

### **Activities**

- Development of energy efficiency indicators and specific instruments for energy management, such as energy efficiency certificates and labeling
- Technical and institutional assistance to one or more SDAs (Punjab and Haryana) for implementing energy efficiency programmes, focusing on building sector.
- Support for Public awareness
- Support for development of a framework to promote energy efficiency research and development.
- Support in enhancing energy efficiency in transport sector
- Organizing technical visits in France and working seminars in India
- Placement of senior long term expert to bring technical assistance to the BEE. Deputation of *Mr. Robert Angioletti* has been extended for next two years starting Sep 2010.

## **(5) French Agency for Development (AFD)**

### **Objective:**

ODA assistance to support programme on energy, Clean development and climate change with respect to energy efficiency.

**Activities:**

- Realize a demonstration projects including energy efficiency renovations in industries and commercialization sectors, using Indian and French know how, financial instruments and energy saving guarantees involving Public Private Partnerships,
- Launch DSMs to reduce shortages of electricity supply by improving energy efficiency
- Capacity building and knowhow for stakeholders and professionals

**(6) Indo-EU Joint study**

- Assessment of available of Technology and technology know how
- Harmonize methodologies with the tools used in Eco-design directives
- Harmonizing test procedures for the equipments and appliances
- Exchange documentation and the envisaged study on eco-design.
- Assess the difference between standards, testing procedures and the laboratory accrediting procedures.

**(7) BEE/Rural DSM TA (ADB)**

- 3 phase technical assistance to support clean power generation technology transfer.
- Advancement of Technical Assistance (TA) has been taken up with ADB through DEA.

**Multilateral Programmes- ongoing**

- BEE/Asia Pacific Partnership- Building and Appliance Task force (BATF)
- Global Environment Facility (GEF)
- International Energy Agency
- International Partnership for energy efficiency Co-operation (IPEEC)
- Major Economies Forum on Energy and climate change.

**BEE/Asia Pacific Partnership- Building and Appliance task Force(BATF)**

- The task force aims for energy efficiency in appliances and buildings.

**Areas of co-operation**

- 1) Market transformation – support for Standards and Labeling program. The funds under APP are \$500,000.
- 2) Information exchange and notes on best practices

Performance analysis of the ongoing initiatives by the APP partner countries by mapping tool.

## **Australian-Indian Buildings Tune Ups**

- Best practices adopted by Indian ESCOs and Australian ESCOs to decrease use of energy use in existing buildings.
- High Performance buildings and developments (HPBAD)
- High performance database (BATF-06-26)
- High performance commercial buildings(BATF-07-42)
- Green-spaces TM-IT/ITES special economic zone (BATF-07-49)

## **Global Environment Facility (GEF)**

### **Objective:**

GEF to play catalytic role in assisting BEE for energy efficiency.

### **Areas of Co-operation**

- Financial Assistance of \$35.15 million
- Energy Efficiency improvements in commercial building- UNDP
- Chiller energy Efficiency Project – WB
- Financing Energy Efficiency in SMEs-WB
- Promoting Energy Efficiency and renewable energy in selected clusters in India-UNIDO
- Improving Energy Efficiency in Indian Railways System-UNDP
- Knowledge management and sharing – WB
- 

## **International Energy Agency**

- **Task XV : Network driven DSM**  
Status: completed
- **Task XVI: Competitive Energy Services**  
Status: completed
- **Task XVIII: DSM and climate change**  
Status: completed
- **Task XIX: Micro Demand Response and Energy Saving.**
- **Task XX: Branding Energy Efficiency**

## **International Partnership for Energy Efficiency Cooperation – IPEEC**

### **Objective**

- To facilitate broad actions that yield high efficiency gains, exchange of information on best practices, and facilitate other means to improve energy efficiency.
- Incorporate the sustainable buildings network proposed under the energy efficiency in residential, commercial and industrial buildings.
- IPEEC to finalize a work plan along with ToR
- Invite countries to join new partnership

## **Major Economies Forum on Energy and Climate change**

### **Objective :**

To lay diplomatic foundation for a successful outcome at the UN climate change negotiations to be held in Denmark

- 1<sup>st</sup> Preparatory meeting of major economies between representatives of 17 major economies with Denmark and UN.
- 2<sup>nd</sup> Preparatory meeting held on 26<sup>th</sup> May 2009 in Paris

### **Proposed Bi-Lateral**

- Indo – Swiss cooperation with BEE on new buildings
- Indo –Australia rating of buildings, exchange programmes with officers in India
- Indo-Norway Joint development of CDM projects by MoEF
- Indo-Sweden
- Indo - Canada

### **Verified Savings for 2009-10:**

1. The Standards and Labeling (S&L) Programme have resulted in electricity saving of 4350.92 Million units, equivalent to avoided capacity generation of 2179.31 MW.
2. The National Energy Conservation Award Programme has resulted in electricity saving of 2450.6 Million units, equivalent to avoided capacity generation of 358.6 MW. Apart from this these programmes were able to reduce 1.366 Million MTOE of thermal energy.
3. The Energy Conservation Building Codes (ECBC) Programme has resulted in electricity saving of 21.06 Million units, equivalent to avoided capacity generation of 3.082 MW.
4. Energy Conservation initiatives by various States have shown the electricity saving of 1874.25 Million units, equivalent to avoided capacity generation of 304.6 MW.

### **Potential Savings:**

- (a) The ECBC programme has stimulated construction of commercial buildings with a potential saving of about 316 MW on completion.
- (b) Bachat Lamp Yojana (BLY) PoA had been submitted to the CDM Executive Board in the end of December, 2009 with a positive validation report from the DOE TUV-SUD. The BLY – PoA has been registered at UNFCCC-EB on 29<sup>th</sup> April, 2010. 20 CPA projects have been implemented and have successfully distributed 128 lac CFLs under BLY-PoA. Another 50 CPAs are expected in the year 2011-12. The programme coverage will be increased to all the states in the year 2010-12. The scheme targets to replace 400 million incandescent bulbs leading to a possible reduction of 6000 MW and a reduction of about 24 million tonnes of CO<sub>2</sub> emissions.

(c) The Agriculture and Municipal DSM programme as well as the SME programme were taken up this year. DPRs in 5 States, namely Maharashtra, Gujarat, Rajasthan, Punjab and Haryana, have been prepared and 2 DPRs are in process of preparation in Madhya Pradesh under Ag DSM programme. 375 DPRs on energy efficient technologies selected under BEE-SME programme, will be prepared in 25 SME clusters in next 2 years period. IGEAs have been carried out in 112 ULB under MuDSM programme. The reports for all the 112 ULB are under review and submission process. Work orders for the 4<sup>th</sup> Phase of MuDSM are being released. In the year 2010-11, IGAs with identified savings equivalent to about 1000 MW of avoided thermal capacity will be prepared.