

Implementation of Energy Conservation Act and BEE Action Plan

NEERAJ DHINGRA
Project Engineer
Bureau of Energy Efficiency
New Delhi



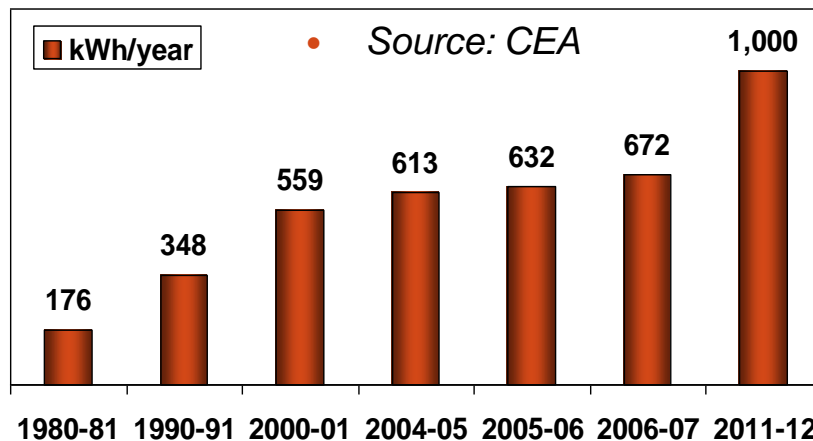
Outline of Talk

- **Energy Use in India**
- **Sectoral Energy Consumption**
- **EC Act, 2001**
- **BEE Activities**
- **Designated Consumers**
- **Energy Manager and Auditors**
- **Accreditation Procedure**
- **PAT Scheme**

Energy Use in India

- Total primary energy supply of India has increased from about 350 Mtoe in 1990 to about 580 Mtoe in 2004; an increase of about 2.2% per year
- Energy demand is increasing due to accelerated industrialization, urbanization and population growth
 - 2003-04 : 572 Mtoe
 - 2016-17 : 842-916 Mtoe
 - 2026-27 : 1406-1561 Mtoe
- With installed capacity of over 143 GW and annual generation of over 700 Bus; INDIA ranks sixth largest electricity market.
- With per capita consumption of 672 kWh against world average of 2600 kWh; INDIA ranks much lower than other developed countries

Per Capita Consumption of India

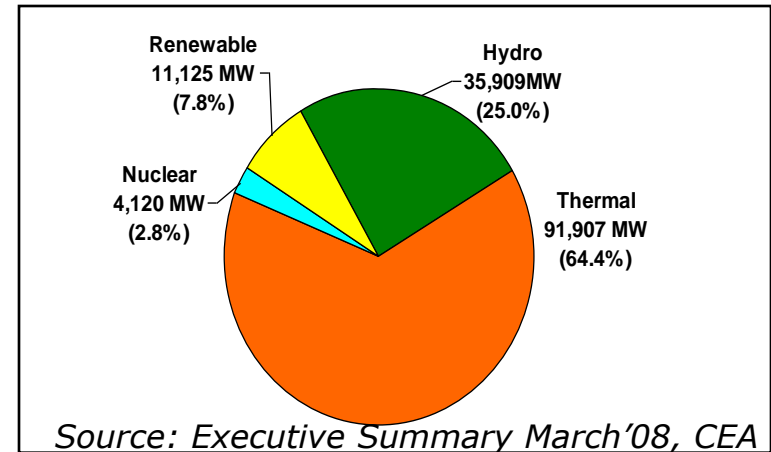


(Coal + Lignite – 76,049 MW,

Gas – 14,656 MW,

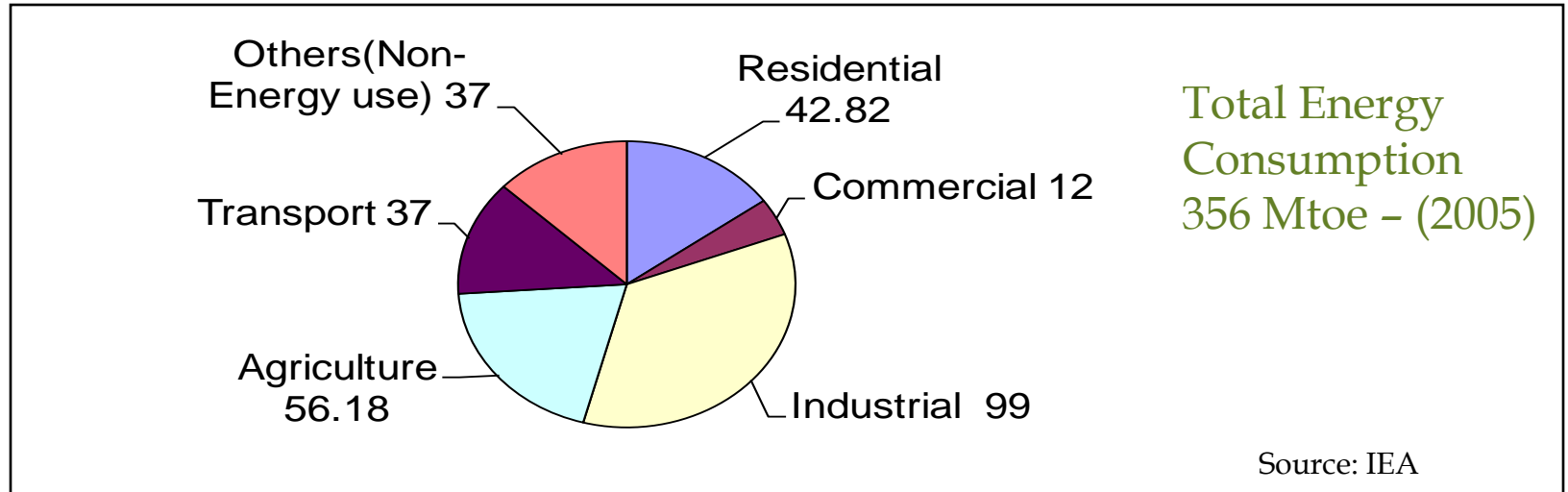
Diesel – 1,202 MW)

Generation Capacity of India Mar'08



Sectoral Energy Consumption

Sectoral Energy Consumption



Saving Potential in different Sectors

Sectoral Intervention	Potential Energy Savings
Agriculture	60 b KWh
Municipalities	3.7 b KWh
Buildings	3.52 b KWh
Industry	98 b KWh
Lighting	70 b KWh

Source: BEE

Importance of Energy Conservation

- Energy efficiency/conservation measures can reduce peak and average demand.
- One unit saved avoids 2.5 to 3 times of fresh capacity.
- Also avoids investment in fuel, mining, transportation etc.
- Keeping the above factors in view and also to provide a policy guidance, Government of India enacted the Energy Conservation Act, 2001

Energy Conservation Act 2001

- **An Act to provide for efficient use of energy and its conservation and for matters connected therewith or incidental thereto.**
- **Enacted in Oct 2001, became effective from 1st March 2002 onwards.**
- **It extends to the whole of India except the state of Jammu and Kashmir.**
- **Under the provisions of the act, the Bureau of Energy Efficiency (BEE) came into force from March 2002.**

Contents of EC Act 2001

Chapter No	Contents
1	Short title, extent and commencement
2	Establishment and incorporation of Bureau of Energy Efficiency
3	Transfer of assets, liabilities and employees of Energy Management Centre
4	Powers and functions of Bureau
5	Power of Central Government to enforce efficient use of energy and its conservation
6	Power of State Government to enforce certain provisions for efficient use of energy and its conservation
7	Grants and loans by Central Government
8	Penalty
9	Establishment of Appellate Tribunal
10	Power of Central Government to issue directions to Bureau

BUREAU OF ENERGY EFFICIENCY

- The **Bureau of Energy Efficiency (BEE)** was established on 1st March 2002, under the Energy Conservation (EC) Act, 2001.
- The Mission of **BEE** is to develop policy and strategies with a thrust on self-regulation and market principles, within the overall framework of the Energy Conservation Act (EC Act), 2001 with the primary objective of reducing energy intensity of the Indian economy.
- This will be achieved with active participation of all stakeholders, resulting in accelerated and sustained adoption of energy efficiency in all sectors.

BEE - Scope of Activities

- BEE is responsible for spearheading the improvement of energy efficiency in the economy through various regulatory and promotional instruments
 - Plan, manage and implement provisions the EC Act
 - Appliance standards and Labeling
 - Industrial energy benchmarks
 - Energy Conservation Building Codes
 - Monitor energy use in high energy-consumption units
 - Certify and accredit energy auditors and energy managers
 - Provide a policy framework and direction to national energy conservation activities
 - Disseminate information and knowledge, and facilitate pilot and demonstration projects
 - Take necessary measures to create awareness and disseminate information for efficient use of energy and its conservation.
 - Establish EE delivery systems through Public-Private Partnerships

Designated Consumers (DCs)

Among 15 Energy Intensive Industries,

9 industries have been notified as Energy Intensive Industries,

as specified in the Schedule to the Energy Conservation Act, 2001 having annual energy consumption as indicated against each industry as **Designated Consumers (DCs) for the purposes of the EC Act**

List of Energy Intensive Industries and other establishments specified as designated consumers

- 1. Aluminium;
- 2. Fertilizers;
- 3. Iron and Steel;
- 4. Cement;
- 5. Pulp and paper;
- 6. Chlor Akali;
- 7. Railways
- 8. Textile;
- 9. Chemicals;

Thermal Power Stations- 30,000 metric tonne of oil equivalent (MTOE) per year and above

Fertilizer- 30,000 metric tonne of oil equivalent (MTOE) per year and above

Cement- 30,000 metric tonne of oil equivalent (MTOE) per year and above

Iron & Steel- 30,000 metric tonne of oil equivalent (MTOE) per year and above

Chlor-Alkali- 12,000metric tonne of oil equivalent (MTOE) per year and above

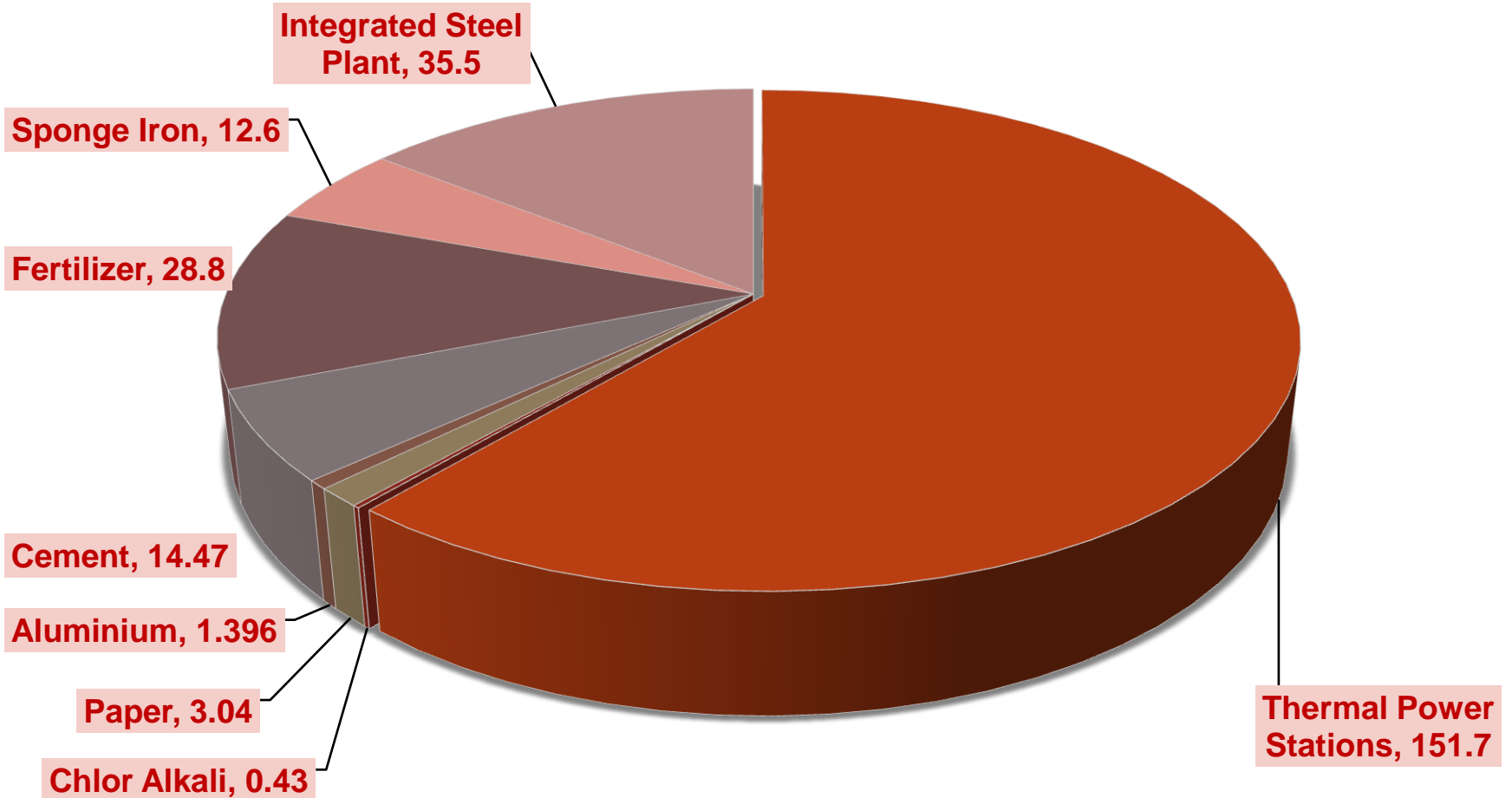
Aluminium- 7,500 metric tonne of oil equivalent (MTOE) per year and above

Railways-As notified.

Textile-3,000 metric tonne of oil equivalent (MTOE) per year and above

Pulp & Paper-30,000 metric tonne of oil equivalent (MTOE) per year and above

Energy Consumption Share (Mtoe)



Total Energy Consumption in Mtoe

18 May 09

Designated Consumers - Compliance

- 1 File Energy Consumption returns to Designated Agencies and BEE.
- 2 Designate or Appoint Energy Manager for their industry
- 3 Energy Audits on a regular / periodic basis by accredited energy auditor
- 4 Capture of information related to energy consumption across various processes
- 5 Adoption of best practices in different industries.
- 6 Specific energy consumption norms and standards for the industrial sectors
- 7 Continuous improvement in the specific energy consumption of industries thereby reducing the bandwidth (gap between the best performers and the low performers among the specific energy consumption)
- 8 There are 98 DC in Iron and Steel Sector

Awareness of Energy Conservation among Children

- Participation by 4th, 5th and 6th standard school children in painting competition.
- Participation by 6th, 7th and 8th standard school children in Essay competition.
- Participation by 9th, 10th, 11th and 12th standard school children in Debate competition.

Are you ready to be India's Energy Efficiency Star!

Inviting participation in School, State and National Level Painting Competition on Energy Conservation-2010

The Ministry of Power, Government of India invites children to paint a world of their imagination and discover the magic of a clean, green and energy efficient future. A future which they will inherit. In this process, the children will not only learn a few good things but will also teach us a few things!

Themes for School Level Painting Competition

Themes

More stars, more savings
Today's energy wastage is tomorrow's energy shortage
Energy saved is future saved

Prizes

Level	First	Second	Third	Consolation
State/ UT Level	Rs. 10,000/-	Rs. 8,000/-	Rs. 5,000/-	Rs. 1,000/- each (10 nos)
National Level	Rs. 1,00,000/-	Rs. 50,000/- each (4 nos)	Rs. 25,000/- each (8 nos)	Rs. 10,000/- each (10 nos) BEE Prizes of Rs. 10,000/- each (10 nos)

For 4th, 5th & 6th Standard Students



SCHOOL LEVEL PAINTING COMPETITION

- School Principals to organize painting competition of 2 hours duration for 4th, 5th and 6th Standard students on any day upto 5th Oct., 2010. Children can use any size of paper, but preferably A4 size and select any one of the above mentioned themes for painting (Schools located in National Capital Region will have the choice to participate in the Delhi State Level Painting Competition).
- School Principals will select 2 best paintings and send them along with the information on number of students participated at School Level Competition to the Nodal Officer for the State/ UT whose address is given below so as to reach him by 12th Oct., 2010 postively.
- The back of the two selected paintings should carry the following information :
 - Name of the Student • Father's/Mother's Name • Tel/ Mobile No. of Parents • Standard • Roll No. • E-mail ID of Student (if any) • School Name & Postal Address • School Located in Urban or Rural Area • School Tel./ Mobile No. • State/ UT • Sign of School Principal
- All participants will be issued certificate of participation.
- State Nodal Officer's address for Delhi & NCR
Sh. Om Prakash, Sr. Manager (PR)
Power Finance Corporation Limited,
"SURLANDEHI", 1, Sarakhumbal Lane, Connaught Place, New Delhi - 110001.
Tel: (C) 011-23456726, (M) 09868649144, Fax: 011-23456781, 23456726
E-mail: omprakash@pfclindia.com, omprakashpf@gmail.com
For address of Nodal Officers for other States / UT's and for the names of the students selected for participation in the State Level Competition please log on to www.bee-india.nic.in and www.energymanagertraining.com

SAVE ENERGY FOR BENEFIT OF SELF & NATION

STATE LEVEL PAINTING COMPETITION

- Up to a maximum of 50 best paintings will be selected by a Committee of Experts/ Jury and selected students will be called at a designated place in State / UT for a two hours on-the-spot Painting Competition to be held on 14th November, 2010.
- Each participating student will be paid Rs. 1000/- in cash and a participation certificate. Sleeper class rail-fare / state roadways bus fare for participating student and two guardians will also be reimbursed on the day of competition.
- Prizes will be given away on the same day.

NATIONAL LEVEL PAINTING COMPETITION

- 1st, 2nd and 3rd prize winners of the each State/UT will be invited to Delhi to participate in "National Level Competition" to be held on 12th December, 2010.
- Boarding & Lodging, to & fro sleeper rail-fare/ state roadways bus fare by the shortest route for each participant and two guardians will be reimbursed. In addition each participating student will be paid a sum of Rs. 1000/- as incidentals and given a participation certificate.
- National Level winners will be awarded cash prizes by the Chief Guest on the "National Energy Conservation Day function" to be held in Delhi on 14th December, 2010.

NOTE :

- The 1st, 2nd & 3rd prize winners of State/UT Level Painting Competition of last two years are not eligible to participate in this year competition.
- The consolation prize winners of State Level are eligible to participate but they would only be considered for prizes, if they win 1st/2nd/3rd Prize at the State/UT Level.
- Names of schools who have recorded 100% participation in the 4th, 5th and 6th standard (as applicable) will be included in the Painting Competition booklet prepared by BEE.
- Three awards would also be presented in the following categories for the State/ UT's education department who have ensured highest School & Student participation and percentage improvement over the previous year.
 - Best State Education Department (other than North-Eastern States)
 - Best North-East State Education Department
 - Best Union Territory Education Department
- The decision of the Jury/Expert Committee at all levels of the painting competition will be final.
- Two paintings selected at School Level and paintings at State/UT Level and National Level would be the sole property of BEE, which will have the right to use for any purpose it considers appropriate.
- Please visit BEE website for further details

Director (Energy Conservation)
MINISTRY OF POWER
Government of India
Room No. 223, Shram Shakti Bhawan, Rafi Marg,
New Delhi - 110 001, Tel. : 011-23716020

ENERGY IS LIFE
BUREAU OF ENERGY EFFICIENCY (BEE)
(Ministry of Power, Government of India)
4th Floor, Sewa Bhawan, R.K. Puram, New Delhi - 110 066
Tel. : 011-26179699 (5-Lines), Fax No. 011-26178326-52

Impact of Competitions

- **Spreads awareness about conservation of energy among children**
- **Includes involvement of parents and teachers.**
- **Enhances imagination and creativity among children.**

Certified Energy Managers and Energy Auditors

As per the Energy Conservation Act 2001, it is mandatory for all the **designated energy consumers** to get energy audit conducted by an **Accredited Energy Auditor** [under clause 14(h) and 14(i)] and to designate or appoint an **Energy Manager** [under clause 14(l)].

The Bureau has successfully conducted Ten National Certification Examinations since 2004.

After 9th Exam

- 7766 persons have been qualified as energy managers out of which 5390 have been qualified as energy Auditors
- Over 3,000 energy audits have been carried out by the certified agencies over the past 3 years

Responsibilities and Duties of Energy Auditor

- Carry out a detailed energy audit
- Quantify energy consumption and establish base line energy information
- Perform efficiency evaluation of energy & utility systems
- Compare energy norms with existing energy consumption levels
- Identify and prioritization of energy saving measures
- Analyse technical and financial feasibility of energy saving measures
- Recommend energy efficient technologies and alternate energy sources
- Report writing, presentation and follow up for implementation

Responsibilities and Duties of Energy Manager

- Establish an energy conservation cell & prepare an annual activity plan
- Develop and manage training programme for energy efficiency at operating levels
- Develop integrated system of energy efficiency and environmental improvement
- Initiate activities to improve monitoring and process control to reduce energy costs
- Co-ordinate implementation of energy audit/efficiency improvement projects through external agencies
- Establish / participate in information exchange with other energy managers of the same sector through association
- Provide information to BEE and Designated Agency of the respective States as demanded in the Act

Qualification of Accreditation

Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010, was notified on 31st March, 2010 in the Gazette of India

Qualifications for accredited energy auditor.- An energy auditor shall be qualified to become an accredited energy auditor if, he/she-

- is a certified energy manager and has passed the examination in "Energy Performance Assessment for Equipment and Utility Systems" conducted by the Bureau
- has an experience of five years in energy audit out of which at least three years' shall be in any of the Energy Intensive Industries; and
- has been granted a certificate of accreditation by the Bureau

Application for grant of certificate of accreditation

A qualified person, possessing qualifications may apply for Accreditation and the application shall be made in Annexure-I (which is Form I of the Notified Regulation) and be accompanied by-

- five detailed energy audit reports in any of the Energy Intensive Industries undertaken by the energy auditor in an individual capacity or as a leader or associate or active team member of the energy audit team;
- feed back on energy audit received from Energy Intensive Industries;
- fee of rupees one thousand payable by demand draft drawn in favour of the Bureau of Energy Efficiency, New Delhi

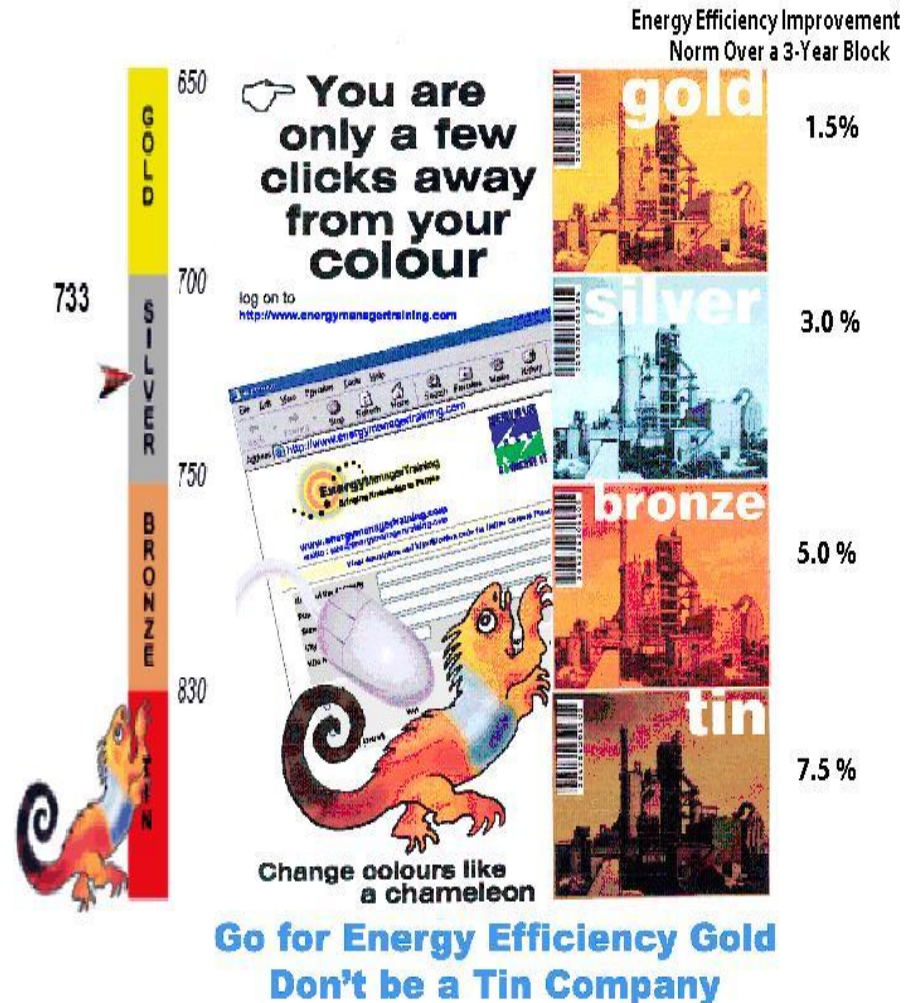
Evaluation Criteria

- evaluation of five detailed energy audit reports submitted alongwith the application;
- the number of and the kind of Energy Intensive Industries in which detailed energy audits have been made;
- association of applicant with number of and kind of experts including full time energy auditors or part time energy auditors or consultants with expertise in thermal, electrical utilities and processes and nature of such association;
- possession of at least four up-to-date basic instruments namely, clip-on-type, power measuring instruments, flue gas analyser, temperature and lux measuring instruments which are duly calibrated by a laboratory accredited by the National Accreditation Board for Testing and Calibration Laboratories and expertise in using such instruments for conduct of energy audit;
- manner of work followed in energy audit;
- training experience;
- quality of field studies including observations, probing skills, collection and generation of data, depth of technical knowledge and analytical abilities;
- quality of recommendations for improving energy efficiency or for conserving energy;
- capacity to undertake cost benefit analysis of recommended measures for improving energy efficiency or for conserving energy and preparation of action plan for implementation of recommendations for reduction of energy consumption; and
- quality of energy audit reports.

Perform, Achieve and Trade (PAT) Mechanism

Market-based mechanism to enhance energy-efficiency in industry

- This creates a differentiated potential for energy savings
- Trading of savings allows maximum cost-effective savings as plants with “low-cost savings” exceed their “mandated” savings for trade



NATIONAL MISSION ON ENHANCED ENERGY EFFICIENCY (NMEEE)

- The National Action Plan on Climate Change was released by Honorable Prime Minister of India in June 2008
- The Action Plan Outlines **8 Missions** including National Mission on Enhanced Energy Efficiency (**NMEEE**)

NMEEE.... 4 new initiatives

- The market based mechanism to enhance cost effectiveness of improvements in EE in energy intensive industries through certification of energy saving which can be traded.
(Perform, Achieve & Trade)
- Accelerating the shift to energy efficient appliances in designated sectors through innovative measures to make the product more affordable
- Creation of a mechanism that would help finance DSM programs in all sectors by capturing future energy saving
- Developing fiscal instruments to promote energy efficiency

Industry Sector	Annual Energy Consumption Norm to be DC (mtoe)	No. of Identified DCs
Aluminum	7500	11
Cement	30000	92
Chlor-Alkali	12000	23
Fertilizer	30000	22
Pulp & Paper	30000	70
Power	30000	154
Iron & Steel	30000	110
Textiles	3000	197

Estimated Consumption in DCs

Sector	MTOE
Power (Thermal)	160.3
Integrated Steel	26.98
Cement	14.47
Fertilizer	11.95
Sponge Iron	9.1
Textile	3.5
Aluminium	2.42
Paper	1.38
Chlor-Alkali	0.43
TOTAL	230.53


**About 55% of DCs
Contribute 96% of Total
Consumption**


**About 45% of DCs
contribute rest 4%
of Total
Consumption**

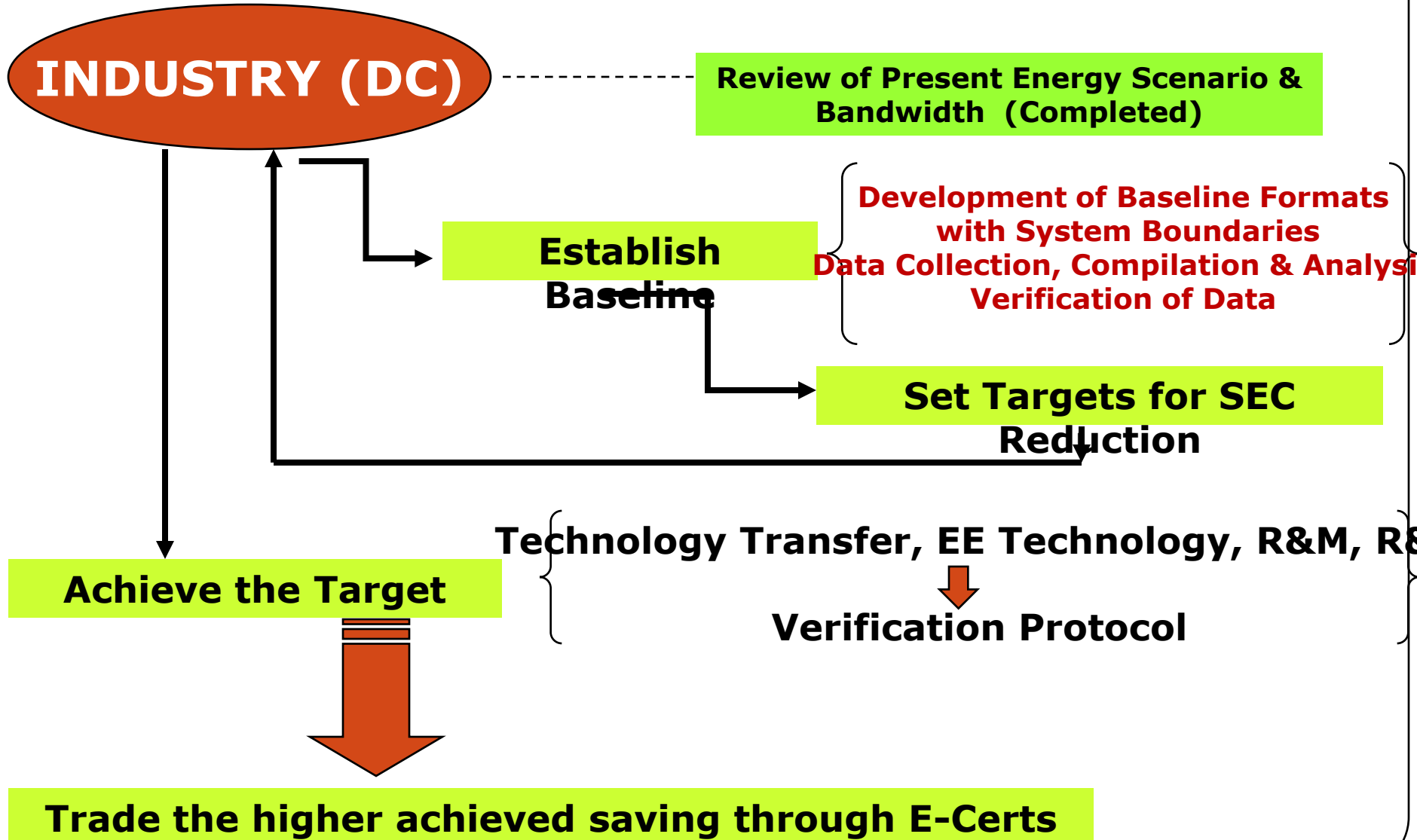
Large Energy Usage Bandwidth

The energy usage pattern varies widely in industries of a particular sector due to various **diversities** like

- Scale of Production (Installed Capacities)
- Use of Raw Material
- Process Technology
- Vintage of Technology
- O & M Practices
- Type of Product Output etc.

Factors of Diversity	Most Affected Sectors
a) Raw Material Input	Pulp & Paper, Fertilizer, Power Plant, Textile
a) Quality of Raw Material / Fuel	All sectors
a) Process & Technology	Aluminium, Iron & steel, Chlor-Alkali, Paper
a) Final Product output	Textile, Iron & Steel, Aluminium
a) Vintage	All Sectors
a) Capacity Utilization	All sectors

THE PAT SCHEME Approach



PAT - Approach

- Specification of specific energy consumption (SEC) norm for each designated consumer in the baseline year and in the target year-
Statutory requirement for designated consumers under EC Act (section 14 (g) read with section 56(2)(g))
- Verification of the SEC of each designated consumer in the baseline year and in the target year by an accredited verification agency
- Issuance of Energy Savings Certificates (ESCCerts) to those designated consumers who exceed their target SEC reduction
- Trading of ESCerts with designated consumers who are unable to meet their target SEC reduction
- Checking of compliance, and reconciliation of ESCerts

PAT – Institutional Framework

- Creation of demand for the commodity e.g. compliance requirement for energy savings ESCerts over a pre-specified period (**Regulatory Framework**)
 - MOP, in consultation with BEE to set individual targets
 - Penalty for non-achievement under EC Act to be increased (section 26 – Maximum of Rs. 10,000 and Rs. 1,000 for every additional day of default)
 - Fiscal incentives for ESCerts- IT Exemption, pass-through in tariff
 - BEE/ EESL to take up capacity building
- Ensuring supply of the commodity (ESCert) (**Issuance of ESCerts**)
 - EESL to be the nodal agency for issuance
 - Synergise the activity with BEEnet- Standard forms, electronic submission, etc.
 - Proper authentication of claim by EM of DC
 - Independent authentication by certified agencies like CEAs

PAT – Institutional Framework (2)

- **MNV for ESCerts (Resp.- BEE and EESL)**

- Energy use and production verification protocol for each DC
- Verification agencies which could be accredited energy auditors under the EC Act to assume liability for verification alongwith other credible certification agencies
- Utilisation of services of certified agencies, CEAs by DCs

- **Trading of ESCerts (Resp. EESL)**

- Maintain compliance with set energy efficiency benchmark by the DCs
- Create efficient and transparent market for trading by the exchanges by taking measures to safeguard market integrity and enhance transparency in operations and also maintain data of traded prices, traded volumes and trends.
- The Transfer Agents/ Depositories must hold the ESCerts under each industry in electronic form and provide client services in relation to ESCerts.

THANK YOU

Question & Answers

- For any Query contact ndhingra@beenet.in