



A Market for Energy Efficiency in India

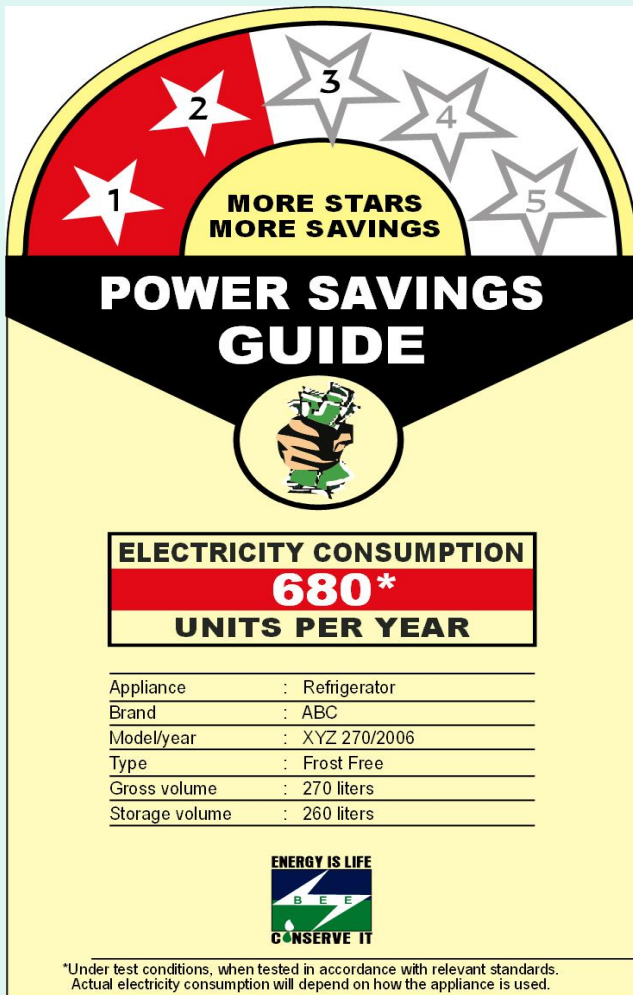
Presentation by

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June, 2010

Energy Conservation and Efficiency- Potential and Action Plan



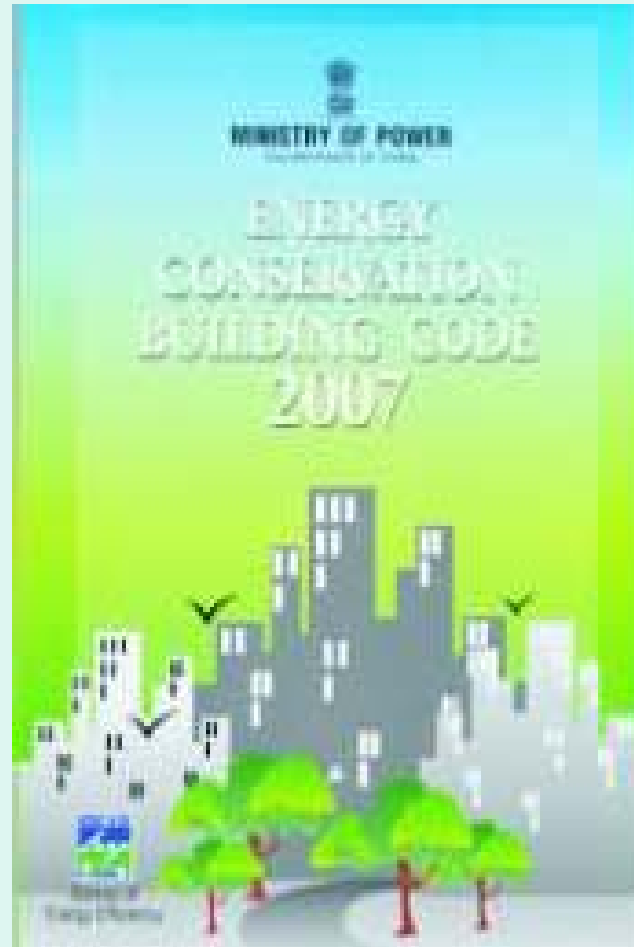
POWER SAVINGS GUIDE

ELECTRICITY CONSUMPTION
680*
UNITS PER YEAR

Appliance	: Refrigerator
Brand	: ABC
Model/year	: XYZ 270/2006
Type	: Frost Free
Gross volume	: 270 liters
Storage volume	: 260 liters

ENERGY IS LIFE
CONSERVE IT

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





Portfolio Development for Energy Efficiency



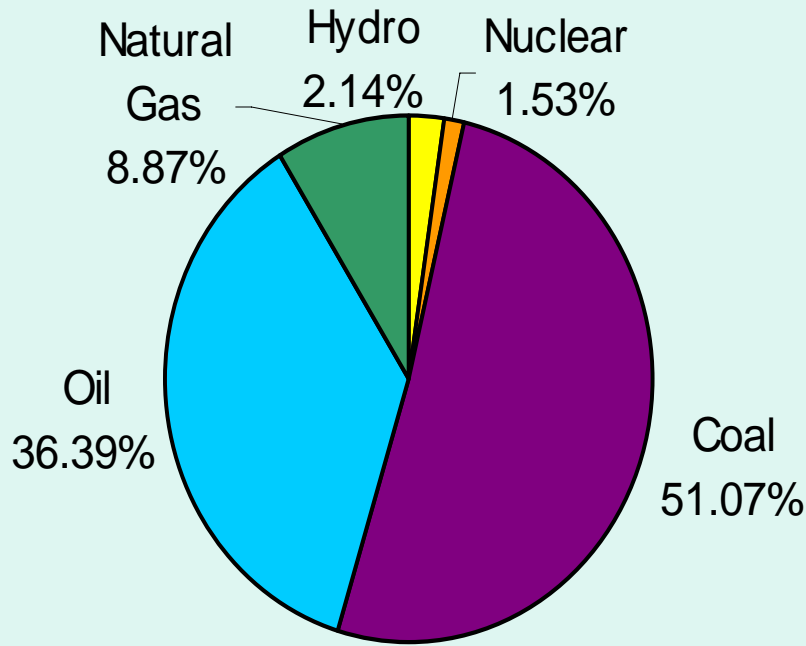
- Enactment of enabling legislation (Energy Conservation Act, 2001)
- Institutional arrangements at central and state level for regulatory oversight (BEE and SDAs)
- Putting in place a multi- sectoral policy for energy efficiency – Integrated Energy Policy (IEP), 2006
- Energy Efficiency Action Plan – Medium Term- with aspirational goals
- National Mission for Enhanced Energy Efficiency for greater thrust on energy efficiency
- Public sector corporate entity Energy Efficiency Services Ltd (EESL) for implementation leadership being set up
- Independent monitoring and verification of energy savings- being undertaken by National Productivity Council (NPC)



Indian Energy Sector

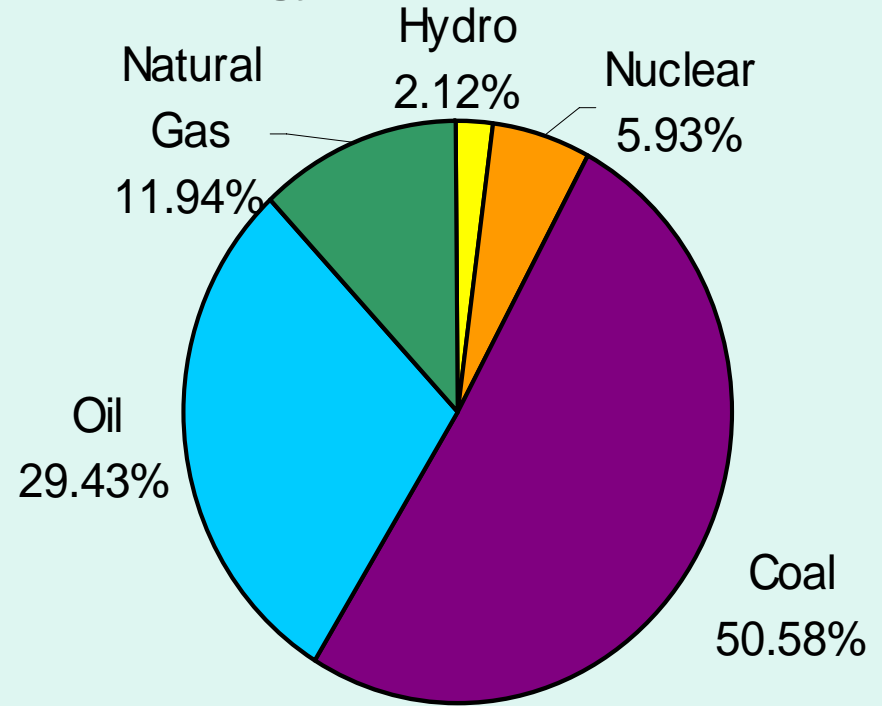


Total Primary Commercial Energy Demand (2003-04)



327 Mtoe

Total Primary Commercial Energy Demand (2031-32)



1858 Mtoe

Energy requirement to increase at a CAGR of 6.4% (2004-2032) and coal to remain the mainstay

Source: Planning Commission, 2006



The Energy Scenario (Selected Energy Indicators)

Region/Country	GDP Per Capita-PPP (US \$ 2000)	TPES Per Capita (kgoe)	TPES/GDP (kgoe/\$-2000 PPP)	Electricity Consumption Per Capita (kWh)	kWh/\$-2000 PPP
China	4838	1090	0.23	1379	0.29
Australia	28295	5630	0.20	10640	0.38
Brazil	7359	1094	0.15	1934	0.26
Denmark	29082	3852	0.13	6599	0.23
Germany	25271	4210	0.17	6898	0.27
India*	2732	439	0.16	553	0.20
Indonesia	3175	753	0.24	440	0.14
Netherlands	27124	4983	0.18	6748	0.25
Saudi Arabia	12494	5805	0.46	6481	0.52
Sweden	27869	5751	0.21	15397	0.55
United Kingdom	26944	3906	0.14	6231	0.23
United States	35487	7835	0.22	13066	0.37
Japan	26636	4052	0.15	7816	0.29
World	7868	1688	0.21	2429	0.31



Energy Efficiency Potential and Outcome



Energy Conservation potential assessed as at present (IEP) (15% by DSM and 25% overall)

20000MW

Verified Energy Savings :

-During X Plan period

877 * MW

-During 2007-08 and 2008-09

2127 MW

-Target for 2009-10

2600 MW

-Target for XI Plan period (5% reduction of energy consumption)

10000 MW

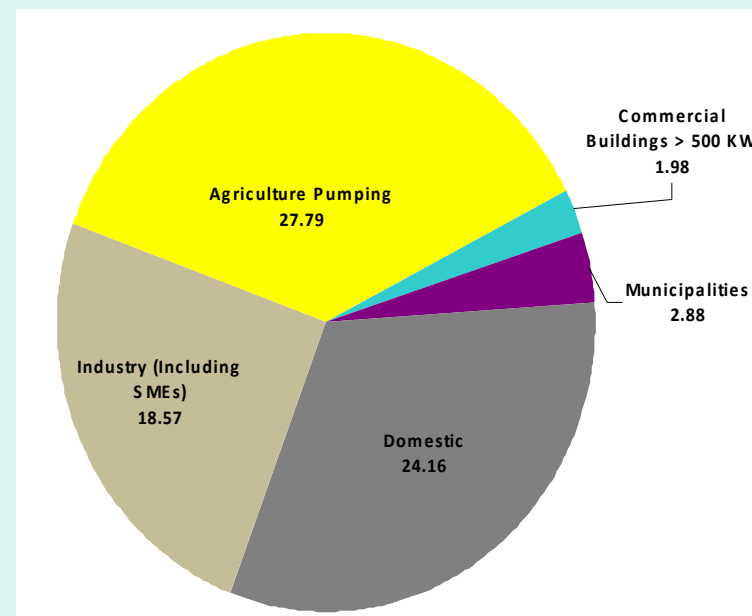
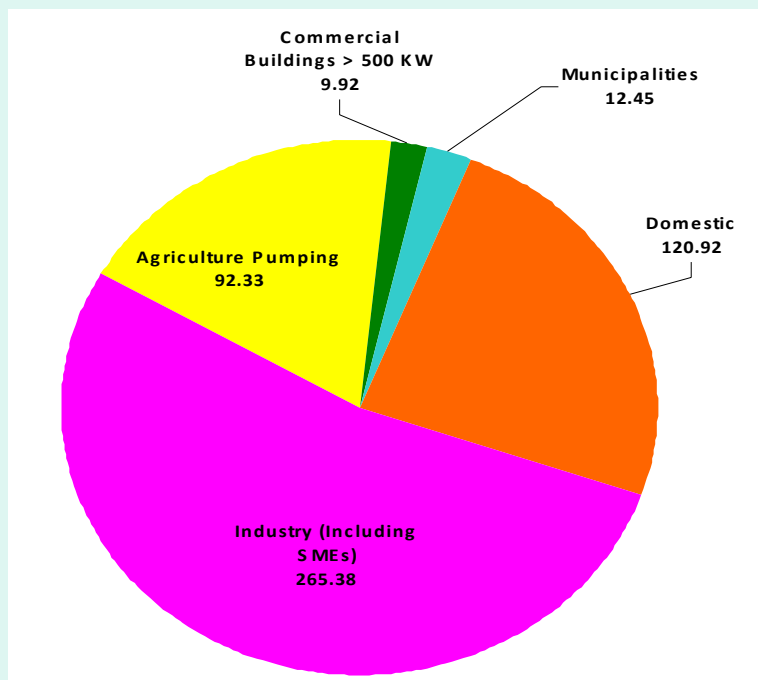
** Only as indicated by participating units in the National Energy Conservation award scheme, for the previous five years.*



Electrical Energy Consumption and Conservation Potential



S. No.	Sector	Consumption (KWh)	Saving Potential (KWh)	% Savings
1.	Agriculture Pumping	92.33	27.79	30.09
2.	Commercial Buildings/ Establishments with connected load > 500 KW	9.92	1.98	19.95
3.	Municipalities	12.45	2.88	23.13
4.	Domestic	120.92	24.16	19.98
5.	Industry (Including SMEs)	265.38	18.57	6.99
	Total	501.00	75.36	15.04



Source: BEE/ NPC Study 2009

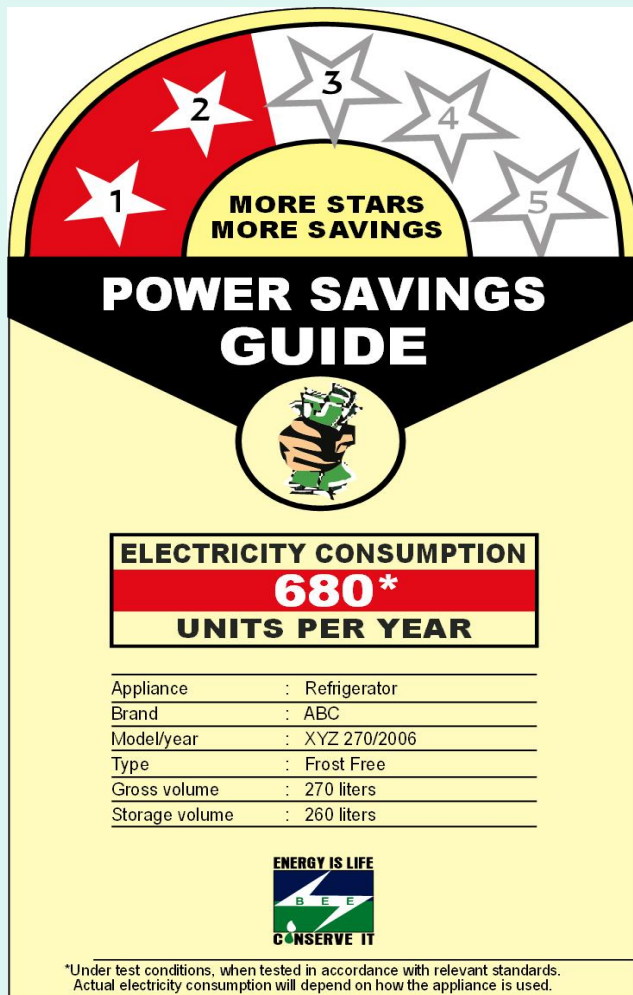


Energy Efficiency - Action Plan



- **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 equipment and appliances to lay down minimum energy performance standards.
- **Energy Conservation Building Code (ECBC)** 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 Improvement in Small and Medium Enterprises (SMEs)**: To stimulate energy efficiency measures in 25 high energy consuming small and medium enterprise clusters.

Government Leadership in Creating EE Market in India



A semi-circular label with a red and yellow background. It features five stars, with the first two filled and the last three outlined. The text 'MORE STARS MORE SAVINGS' is written across the stars. Below the stars, the text 'POWER SAVINGS GUIDE' is written in bold. A small icon of a hand holding a green leaf is in a circle below the text. A box below the icon displays 'ELECTRICITY CONSUMPTION 680* UNITS PER YEAR'. Below this box is a table with appliance details. At the bottom, there is a logo with the text 'ENERGY IS LIFE' and 'CONSERVE IT'.

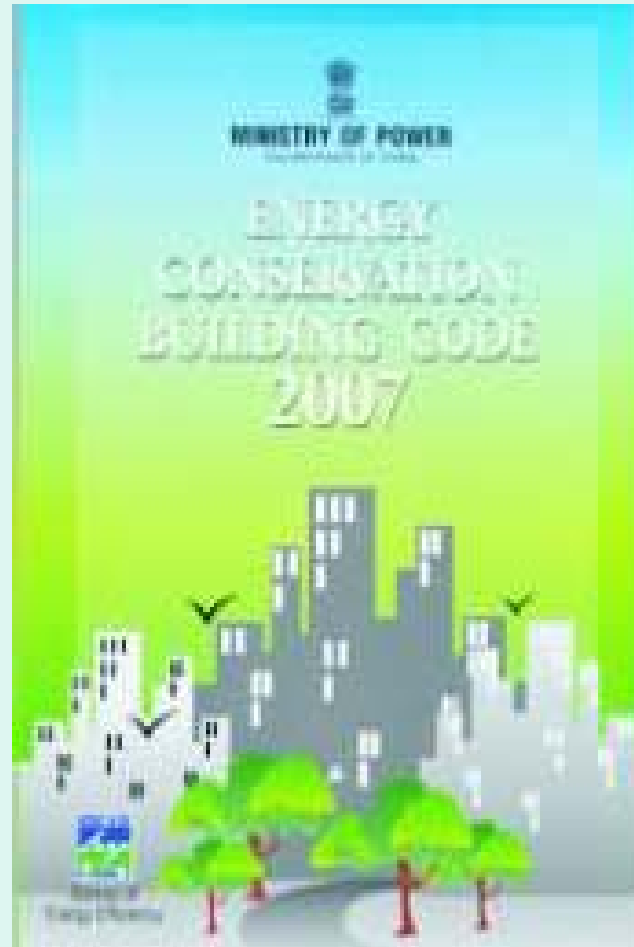
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- Preparation of bankable projects in various sectors like Government Buildings, Municipalities, Agriculture, SMEs- **About 1200 projects to be ready for implementation in one year with an estimated investment of about USD 1 billion**
- Mandating all large Government buildings to undertake energy efficiency in 3 years- **about 8000 large buildings with investment potential of USD 2 billion**
- Setting appliance standards and making them mandatory
- Setting up norms for large energy intensive industries like Thermal Power, Fertilizer, Cement, Pulp & Paper, Chlor Alkali, Steel, Textiles, Railways and Aluminum – **Investment in new technologies of USD 6 b expected**
- Massive mass media campaign to enhance awareness amongst stakeholders
- National Energy Conservation Awards for best performing industries in energy efficiency
- National Painting Competition to enhance awareness amongst young children – over 2 million children participated in last 4 years



Promoting Supply of Energy Efficiency Goods and Services



- Promotion of ESCOs – 80 ESCOs empanelled and rated through leading rating agencies of India (CRISIL/ ICRA)
- List of ESCOs being expanded to atleast double this number
- Bi-annual National Examination for certification of Energy Management Professionals – 8 exams conducted and 8000 Energy Managers and Auditors certified
- 10 equipments covered under the Standards and Labeling programme (ACs, Refrigerators, Tubelights, Distribution Transformers, Ceiling Fans, Pumps, Motors, Colour TVs, Geysers and LPG Stoves). Standards for first 4 equipments to be mandatory by January, 2010.
- Training of energy efficiency professionals in all sectors like the states, buildings, appliances, SMEs, etc.

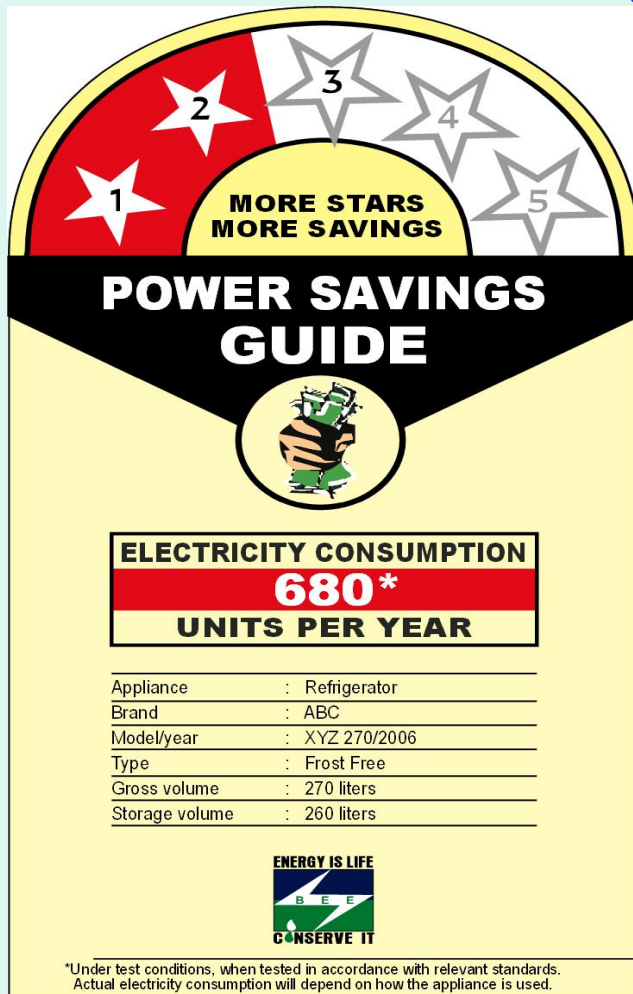


Enabling Finance for Energy Efficiency Goods and Services



- Creation of Energy Efficiency Financing Platform (EEFP) to provide non-recourse financing to ESCO projects- 2 Financial Institutions have joined and commenced financing (PTC India Ltd and SIDBI)
- Provision of Partial Risk Guarantee Fund for provide partial guarantees to ESCO projects- part of NMEEE and World Bank and GEF providing Technical Assistance for setting it up
- Setting up of Venture Capital Fund to provide last mile equity to enable financial closure of ESCO projects – part of NMEEE
- Training modules for banks and financial institutions prepared and training initiated to enhance awareness about performance contracting and appraisals thereof.
- Tax incentives for ESCOs being proposed

National Mission for Enhanced Energy Efficiency (NMEEE)



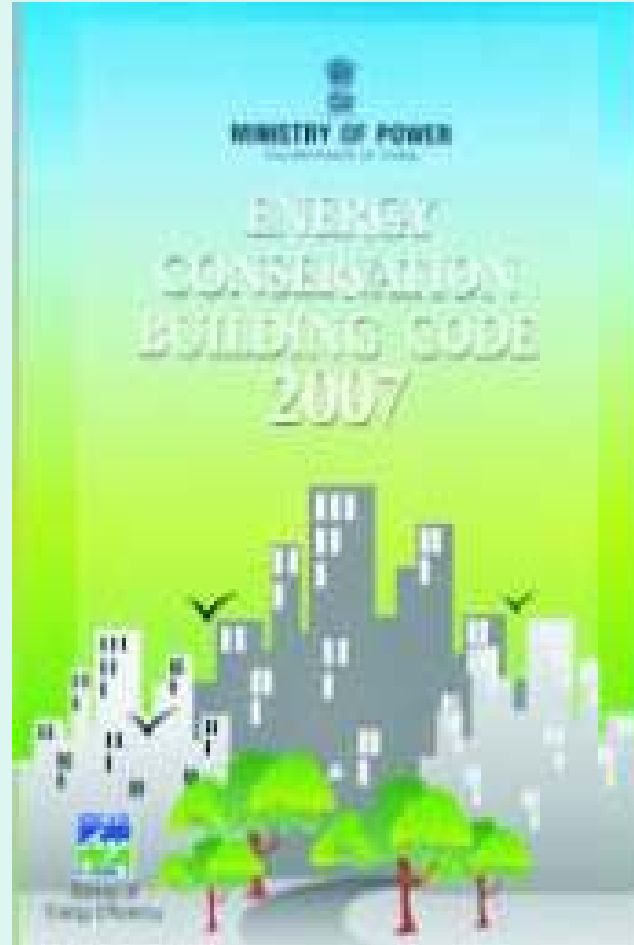
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NMEEE-4 New Initiatives



- A market based mechanism to enhance cost effectiveness of improvements in energy efficiency in energy-intensive large industries and facilities, through certification of energy savings that could be traded. (**Perform Achieve and Trade**)
- Accelerating the shift to energy efficient appliances in designated sectors through innovative measures to make the products more affordable. (**Market Transformation for Energy Efficiency**)
- Creation of mechanisms that would help finance demand side management programmes in all sectors by capturing future energy savings. (**Energy Efficiency Financing Platform (EEFP)**)
- Developing fiscal instruments to promote energy efficiency namely **Framework for Energy Efficient Economic Development (FEEED)**



Objectives of NMEEE



- The basic tenet of the mission is to ensure a sustainable growth by an appropriate mix of 4 E's namely- **Energy, Efficiency, Equity and Environment.**
- Promote development objectives, while also yielding co-benefits for addressing climate change effects.
- By 2014-15:
 - Annual fuel savings in excess of 23 million toe
 - Cumulative avoided electricity capacity addition of 19,000 MW
 - CO₂ emission mitigation of 98 million tons per year
- Market based approach to implementation of energy efficiency – market size of USD 18 b to be unlocked



(a) Methodology for setting Specific Energy Consumption (SEC) norm for each designated consumer

- Differential targets for different Designated Consumers on a gate-to-gate basis
- For thermal power plants and fertilizer plants, the SEC targets to be harmonised with current tariff setting context – CERC and Ministry of Fertilizer to undertake this
- Detailed baselines to be measured and verified by BEE

(b) Promotion of Trading of ESCerts

- Verification by accredited verification agency or by energy auditors,
- Issuance process for Energy Savings Certificates (ESCerts) who exceed their target SEC reduction- transparent regulatory framework for their issuance, monitoring and verification, and reconciliation protocols outlined.
- Trading Process for ESCerts - can be carried out bilaterally between any two designated consumers (within or across the designated sectors), or on special platforms for their trading which are created in the power exchanges
- Compliance and reconciliation process for ESCerts- accounting and depository protocols to be evolved



(c) Fungibility of ESCerts

- MNRE may take this fungibility into consideration while formalizing the REC structure.
- A joint group of the agencies to agree to the linkage mechanism between the RECs and the ESCerts once both the mechanisms are operational
- The conversion factor must be transparent based on verifiable parameters like kgoe

(d) Amendments to EC Act, 2001

- Financial Penalty for Non-compliance u/s 26 of EC Act to be enhanced- The penalty should be greater than the cost of equivalent energy to meet the shortfall in targets
- DCs may be allowed to meet their obligation through purchase of ESCerts, by way of an enabling amendment in section 14 of the Act.

(e) PAT mechanism is a purely national scheme. SEC reduction targets under the PAT mechanism do not create any international obligations. Has no linkage to any international financial instrument for emission reductions.



Perform Achieve and Trade (PAT) (3)



Legal Mandate

- The Energy Conservation Act, 2001, provides a legal mandate for energy-efficiency regulations for industry
- Under the EC Act, units in nine sectors, with energy consumption exceeding specified thresholds, have been notified as “designated consumers”
 - Power
 - Iron & steel
 - Pulp & paper
 - Chlor-alkali
 - Railways
 - Fertilizer
 - Cement
 - Aluminum
 - Textile



Designated Consumers



- Designated Consumers are, *inter alia*, required to:
 - appoint certified energy managers,
 - undergo specific energy audits,
 - report energy consumption data, and
 - comply with prescribed energy consumption norms.
- BEE certifies energy managers (through a national exam), and accredits energy auditors
 - About 5,000 energy managers have been certified
- Energy Consumption Returns are being filed
 - Designated Consumers use about 240 Mtoe per year
 - Specific energy consumption is decreasing at about 4% p.a.
 - E-filing network being established
- Energy consumption norms are being prescribed



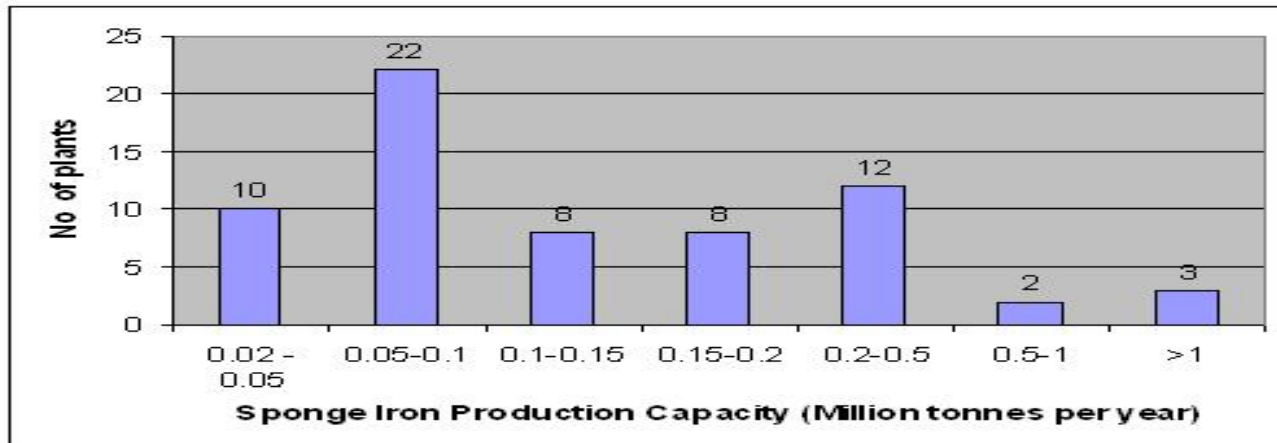
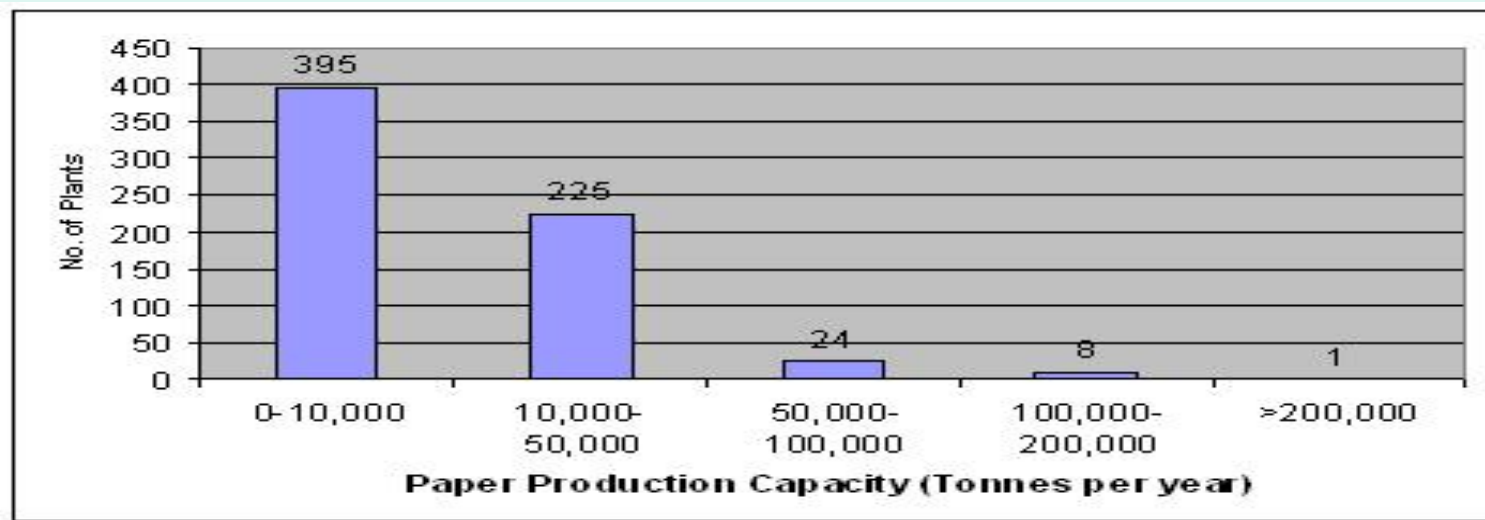
Setting energy consumption norms - Challenges



- “Sectors” (e.g. steel, cement, paper) are everywhere characterized by great diversity in terms of:
 - Scale
 - Technology pathways
 - Technology vintages
 - Project boundaries
 - Type and quality of inputs/resource endowment
 - Product diversity



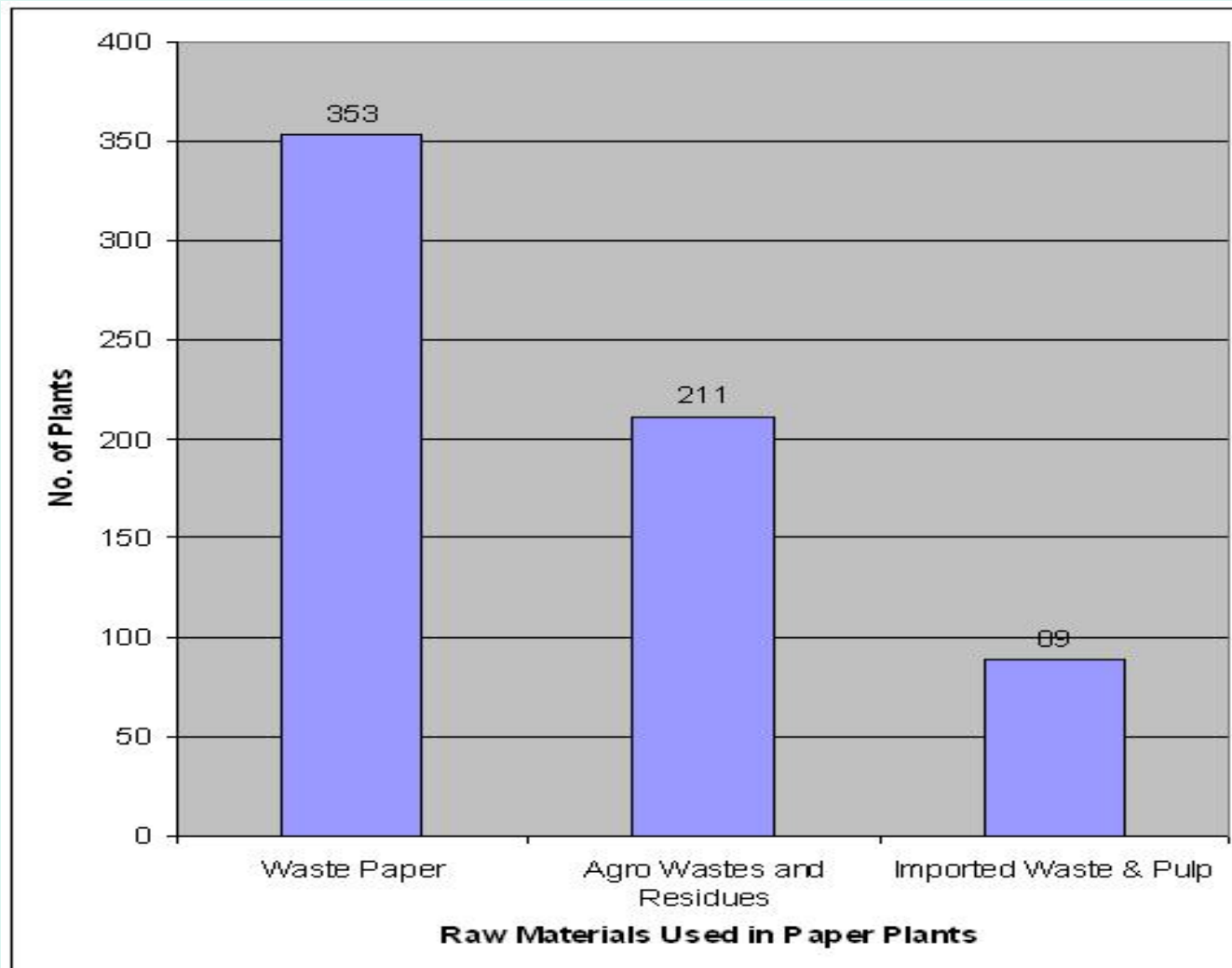
Diversity within Sectors in India - Capacity



Large variation in scale of production capacities

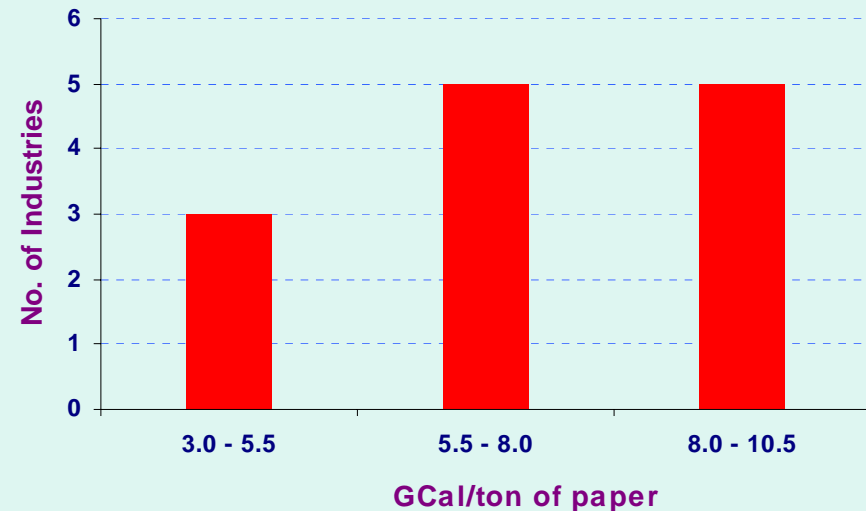
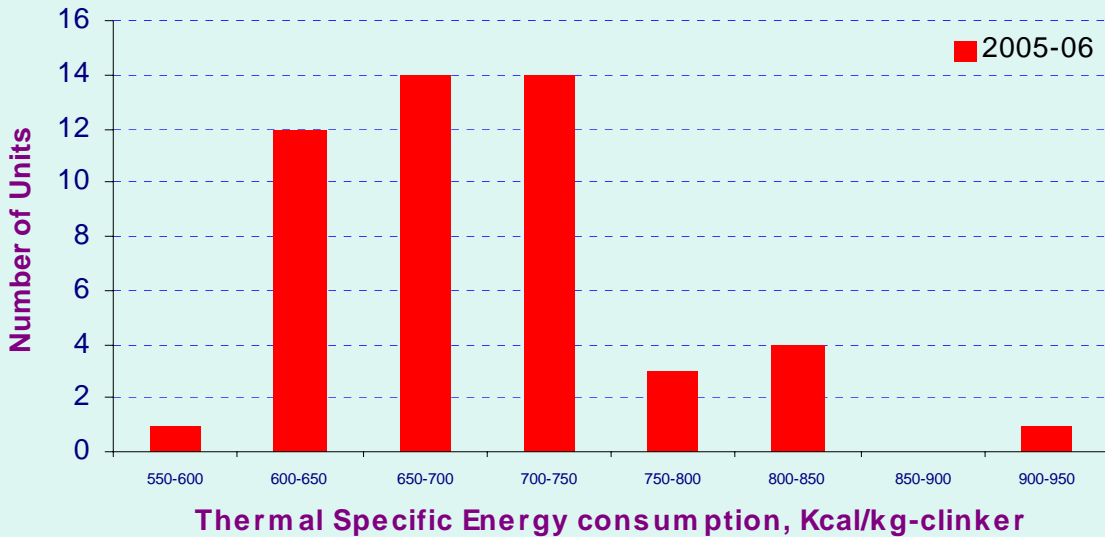


Diversity within Sectors in India - Raw Material Used





Diversity within Sectors in India - Specific Energy Consumption



- Large bandwidth in specific energy consumption in all sectors
- In almost every sector, the most energy-efficient unit is also amongst the most efficient units in the world



Creation of Energy Efficiency Services Ltd (EESL)



- (a) Joint Venture between 4 Public Sector Companies under MOP-
Main implementation arm of the National Mission for Enhanced
Energy Efficiency – **initial equity of USD 45 million.**
- (b) Lead in implementing energy efficiency projects as a ‘Super
ESCO’
- (c) Provide partial risk guarantee fund/ venture capital fund to
ESCOs
- (d) Leverage multilateral and bi-lateral financing
- (e) Enter into partnerships, JVs with other implementing partners
like ESCOs, industry, etc. to promote energy efficiency.
- (f) Provide consultancy services to private and public sector in the
areas of energy efficiency, CDM, etc.
- (g) Take up revenue generating activities of BEE like implementing
Standards and Labeling Programme, National Examination, etc.

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