Indian Portfolio of Energy Efficiency Policies

Balawant Joshi – Director

balawant.joshi@abpsinfra.com

Outline of the Presentation

- Energy Trends in India
- NAPCC and NMEEE
- PAT Scheme
- Market Transformation Initiatives
- EEFP and FEEED

Energy Trends in India

India at a Glance – Demographic profile

- Population: 1.21 billion 2011 Provisional census, approx 400 mn without access to modern means of energy
- GDP at Factor Cost (constant prices-1999-2000) in 2008-09: US$ 660.16 bn
- Per Capita Income (constant prices) in 2008-09: US$ 505.44
- More than 30% population have less than $1/ day income
- Ranks 119 in HDI index (2010)
- Per capita electricity consumption (2009): 730 kWh
- Energy–GDP elasticity during 1953–2001 has been above unity. However for 1991–2000 it was less than unity

National Objectives for Electricity Supply

- Access to Electricity for all by 2012
- Increase in per capita consumption to 1000 units by 2012
- Min lifeline consumption of 1 kWh/household/day by 2012
- Demand to be fully met by 2012 (as against current peak shortages of around 12%)
- Financial Turnaround and Commercial Viability of the Sector

Energy Trends in India

- Energy consumption in India is low
  - Per capita energy consumption is 530 kgoe; world average is 1770
  - Per capita electricity consumption is 730kWh (2009) against world average of 2500 kWh

- Energy demand is increasing due to rising incomes, accelerated industrialization, urbanization and population growth
  - 2003-04 : 572 Mtoe
  - 2016-17 : 842-916 Mtoe
  - 2026-27 : 1406-1561 Mtoe

- Meeting the increasing demand only through increases in supply may lead to:
  - Reduced energy security due to volatility in availability and prices of imported fuels
  - Adverse environmental impacts
  - Strain on balance of payments

- Therefore, energy conservation and energy-efficiency have to be an essential part of national energy strategy

Historically India has taken several efforts.

- For promotion of EE & RE
  - In 1992, India established separate Ministry for Renewable Energy sources
  - First feed-in tariff was established in 1993-94 for renewable energy technologies
  - Energy Management Centre was established in 1980's for promotion of energy efficiency in Indian economy
  - In 2001, The Energy Conservation Act was passed by Indian Parliament
  - Bureau of Energy Efficiency was established in 1992 to take holistic view of energy efficiency
- However, these efforts were disparate and recent discussions on Climate Change issues has helped consolidate these policies

Government of India's Initiatives for Energy Efficiency

India's response to Climate Change

- Honorable Prime Minister of India unveiled National Action Plan on Climate Change (NAPCC) on June 30, 2008.
- NAPCC identifies measures that promote India's development objectives while also yielding co-benefits for addressing climate change effectively. NAPCC is comprised of eight core "national missions" running through 2017 and will help in bringing better planning, management and developmental strategies and cleaner technologies
- Increased attention towards energy efficiency at a policy level is visible with "National Mission on Enhanced Energy Efficiency (NMEEE)" as one of the missions under NAPCC

Principles of NAPCC

- Protecting the poor through an inclusive and sustainable development strategy, sensitive to climate change
- Achieving national growth and poverty alleviation objectives while ensuring ecological sustainability
- Efficient and cost-effective strategies for end-use Demand Side Management
- Extensive& accelerated deployment of technologies for adaptation& mitigation
- New and innovative market, regulatory, and voluntary mechanisms for sustainable development
- Effective implementation through unique linkages – with civil society and public-private partnerships
- International cooperation for R&D, technology transfer and global IPR regime

NAPCC seeks to promote sustainable development through enhanced demand for clean technologies by creating stringent specifications such as ECBC, norms for industries etc and creating a market for new technologies e.g. solar application , urban transportation system etc.

Core Missions Under NAPCC

(1/2)

National Solar Mission

- Increased share of solar in the energy mix
- Decentralized distribution of energy
- Creation of more affordable, more convenient solar power systems and storage
- Clean technologies involved: Solar thermal power generation, solar photovoltaic generation etc.

National Mission for Enhanced Energy Efficiency

- Enhance cost effectiveness of improvements in EE in energy-intensive large facilities
- Shift to energy efficient appliances through innovative measures
- Mechanisms for financing DSM programmes& other fiscal instruments
- Clean technologies involved: efficient lighting, VFD, clean coal technology etc.

National Mission on Sustainable Habitat

- Extension of application of Energy Conservation, Building Code, incentives for re-tooling existing building stock
- Recycling of materials and urban waste management; technology development for power from waste
- Better urban planning and modal shift to public transport

National Water Mission

- Focus on conservation of water, minimizing wastage and ensuring equitable distribution
- Recycling of waste water in urban areas
- Adoption of new technologies such as low temperature desalination for coastal cities
- Optimize existing irrigation systems
- Clean water purification technology

Core Missions Under NAPCC (2/2)

National Mission for Sustaining Himalayan Ecosystem

- Sustaining and safeguarding the Himalayan glacier and mountain eco-system
- Understand whether and the extent to which the Himalayan glaciers are in recession
- Observational and monitoring network for the Himalayan environment: to assess fresh water resources and health of ecosystem

National Mission for a Green India

- Afforestation of 6 million hectares
- Coverage of degraded forest land
- Enhancement of ecosystem services including carbon sinks
- Involvement of communities in Forest protection & afforestation

National Mission for Sustainable Agriculture

- Develop new varieties of crops capable of withstanding extreme weather:
- Orient agriresearch to monitor& evaluate climate change& recommend changes
- Convergence and integration of traditional knowledge and practice systems, information technologies and biotechnology

National Mission on Strategic Knowledge for Climate Change

- Funding of high quality and focused research into climate change
- Study impact on health, demography, mitigation patterns and livelihoods
- Establish network of dedicated climate change related units in academic scientific institutions, Set up Climate change research fund
- Private sector initiatives through venture capital funds

National Mission on Enhanced Energy Efficiency

- 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 NMEEE to ensure,
  - Annual fuel savings in excess of 23 million toe
  - Cumulative avoided electricity capacity addition of 19,000 MW
  - CO_2 emission mitigation of 98 million tons per year
- NMEEE is expected to create a regulatory and policy regime to foster innovative and sustainable business models to unlock the market for energy efficiency which is estimated to be around Rs. 74,000 crores (USD 15 billion).

Action Plan Under NMEEE

Action plan under the National Mission for Enhanced Energy Efficiency seeks to implement four major initiatives.

- A market based mechanism to enhance cost effective EE improvements in energy-intensive industries and facilities, through Tradable Energy Savings Certificates. (**Perform Achieve and Trade(PAT)**)
- Accelerating the shift to energy efficient appliances through innovative measures to make the products more affordable. (**Market Transformation for Energy Efficiency**)
- Creation of mechanisms that would help finance DSM 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)

Proposed "Perform, Achieve & Trade" (PAT) Scheme

Why PAT Scheme?

- Energy consumption by industry is significantly higher as compared to its contribution to GDP.

Sector	% Energy Consumption	% Contribution to GDP
Industry	40	27
Agri, AH & Fisheries	7	19
Commercial & Services	43	54
Household & Others	10	-

Source : Energy Conservation Guide, PCRA

- If India has to reduce CO2 intensity, energy intensity of economy has to reduce. Given its characteristic, industry is low lying fruit.

Energy Scenario in Industrial Sector

The energy intensity i.e. energy consumed per unit of GDP for industrial sector has declined by about 1.5% per annum during 2004-05 to 2008-09 although the ratio of energy intensity in industry to agriculture & service sector hovers around 4.0 – 4.4

Particulars	2004-05	2005-06	2006-07	2007-08	2008-09
Industry GDP (in Rs. Crore)	468,451	506,519	560,775	602,032	617,882
Commercial energy consumption in Industry (in mtoe)	152.8	164.7	174.3	181.4	186.3
Energy Intensity of industry sector (mtoe per Billion Rs. GDP)	0.0326	0.0325	0.03102	0.03019	0.03015
Ratio energy intensity: industry vs. agriculture and service sector	4	4.3	4.2	4.3	4.4

Note: GDP at factor cost at constant (1999-2000) prices (in Rs. Crore)

Source: Green rating Project, 2009, Centre for Science and Environment, New Delhi

Why Scheme for Industrial Energy Efficiency?

- Energy tariffs to industry in India are very high due to cross-subsidies
- Competition drives industrial energy efficiency, but ……
  - Industry is risk averse to take up early adoption of new technologies
  - In developing countries, where new-plant addition rates are high,
    - Capacity expansion is more profitable than EE investment
    - Financially depreciated plants – which are older and less efficient – can compete with newer plants which have to be more efficient
  - It is necessary to have 'Compliance' scheme to incentivise industry to undertake energy efficiency measures

Overview of PAT Mechanism

Market Based Mechanism

Reward over - achiever

Penalize under - performer

- Administrator
  - Set target and compliance period
- Designated Consumers
  - 8 sectors Thermal Power Plant, Steel, Cement, Fertilizer, Pulp & Paper, Textile, Aluminium, Chlor-alkali
- Auditing Agencies
  - Independent
  - Monitor, verify and certify
- Market Place
  - Transaction of energy efficiency instrument

Set Targets

- Setting targets on the basis of current specific energy consumption
- Set compliance period
- May take into account Location, Vintage, Technology, raw materials, product mix etc.

Monitoring & verification of targets by Designated Energy Auditors (DENA)

- Check if designated consumer has achieved targets
- Underachievement: Obligations to buy ESCerts or pay penalty
- Overachievement: Issuance of ESCerts for banking for later use or trade

Trading of ESCerts

- Participation by Designated consumers on platform provided by Power Exchanges
- Symmetrical flow of information

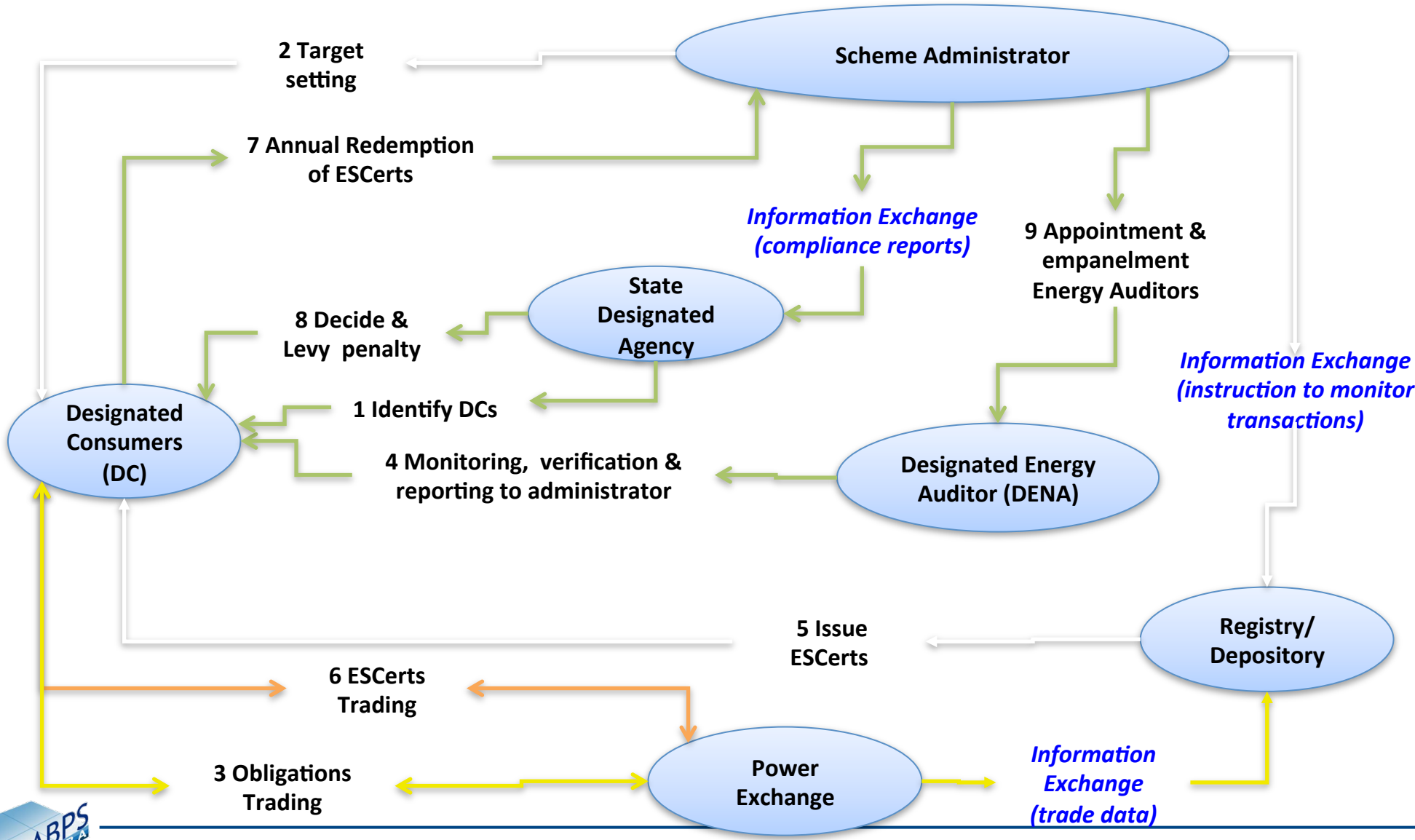
PAT Scheme

- On 12th March 2007, Government of India notified minimum energy consumption for following nine industrial sectors and notified the industries qualifying these criteria as "designated consumers".

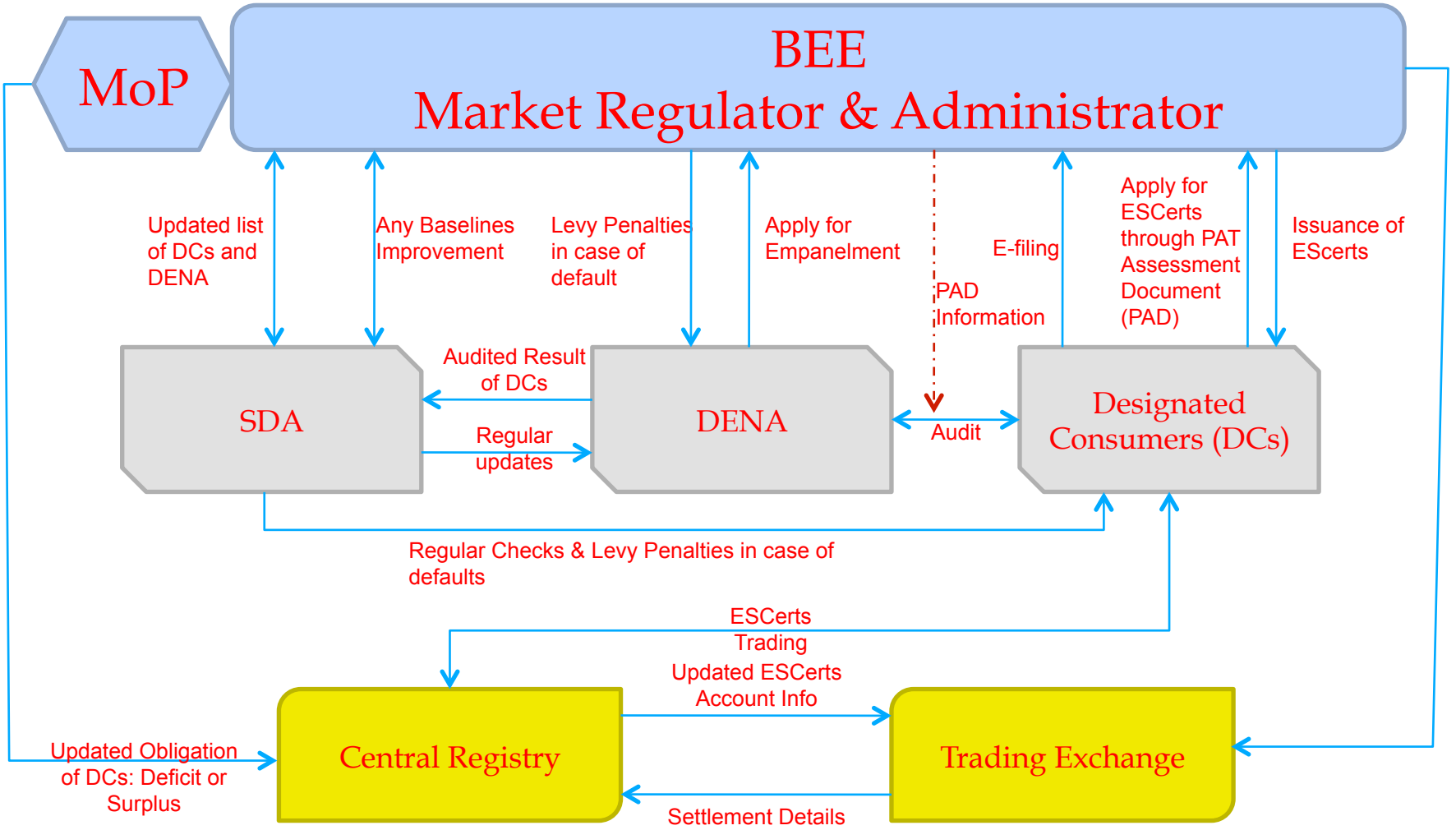
Sector	Minimum Energy Consumption (MTOE)
Power	30000
Fertilizer	30000
Chor - Alkali	12000
Iron & Steel	30000
Cement	30000
Textiles	3000
Pulp & Paper	30000
Aluminium	7500

Consumers satisfying the above criteria were identified and notified as Designated Consumers.

Process Flow for PAT Scheme



Proposed Institutional Design



Roles of institutions

Sr No	Institution	Role	Responsibility
1	Ministry of Power	Issue necessary notifications in consultation with BEE	
2	Bureau of Energy Efficiency (BEE)	Market Regulator and Administrator	Reduce conflict of Interest; Accredit DENA
3	Energy Efficiency Services Limited	Process Manager, appoint accredited 3rd party energy auditors	Maintain centralized data administration; strong quality assurance
4	Designated Consumer	Undertake energy efficiency measures;	Maintain compliance with set energy efficiency benchmark
5	Trading Platforms	Maintain data of traded prices, traded volumes and trends.	Create efficient and transparent market for trading
6	State Designated Agencies	Monitor Designated Consumers in the State and levy penalty	
7	Designated Energy Auditors	Verification of specific energy consumption	Audit industry energy savings

Market Transformation Initiatives

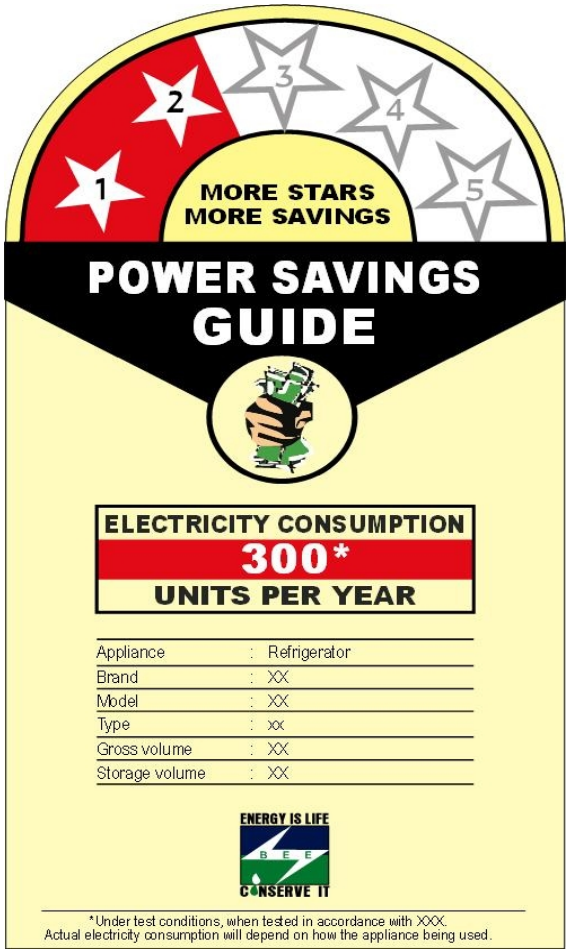
Key Interventions

- Provide energy use information
  - Labeling of appliances
  - Energy use information by units within industrial sectors
- Mandate standards
  - Building Codes
  - Sectoral energy consumption norms in industry
- Reduce perceived risk
  - *Market Transformation & Demand side management*
  - *Performance guarantee contracting, through ESCOs*
- Incentives
  - *Differential Taxation*
  - *Preference in Government Procurement*

Standards and Labeling of Appliances

- Evolve minimum energy performance standards (MEPS) for notified equipment and appliances
- Introduce Energy labeling to enable consumers to make informed choice
- The National Energy Labeling Programme was launched by on 18th May, 2006.
  - Frost free refrigerators, fluorescent tube lights, air conditioners, distribution transformers, induction motors, pump sets, ceiling fans, LPG, electric geysers, Color TVs have been included in mandatory labeling.
- Mandatory labeling has been launched for four appliances: tubular fluorescent lamps, frost free refrigerators, air conditioners and distribution transformers

Sample Labels



Refrigerator

Tubular Fluorescent Lamp

Outreach and Recognition

- Industrial units recognized for energy-efficiency activities through high-profile Awards program
  - participating units of the 2010 Awards have collectively invested Rs. 5457 crores in energy conservation measures.
  - achieved a monetary saving of Rs. 2138 crores every year.
  - resulted in an annual saving of 2422 Million kWh of electrical energy.
  - equivalent to the energy generated from a 357 MW thermal power station at a plant load factor of 0.775
- National energy-conservation painting competition draws participation from over children
  - 2010 competition saw a record **participation** from 47155 schools and 15.63 lakh students from across the country

Energy Conservation Building Code

- ECBC covers:
  - Building Envelope (Walls, Roofs, Windows)
  - Lighting (Indoor and Outdoor)
  - Heating Ventilation and Air Conditioning (HVAC) System
  - Solar Hot Water Heating
  - Electrical Systems
- ECBC released in May 2007; mandatory after capacity building and implementation experience
- Applicable to new commercial buildings with electrical connected load of 100 kW or more
  - a few states leading the way in making ECBC mandatory – Orissa, Haryana, Rajasthan and Delhi
- Impact of ECBC - Reduced Energy Use for buildings
  - National Benchmark ~ 180 kWh/m^2/year
  - ECBC Compliant building ~ 110 kWh/m^2/year

Energy Efficiency Financing Platform & Framework for Energy Efficient Economic Development

Energy Efficiency Financing Platform…..(1/2)

- Ensuring availability of finance at reasonable rates for energy efficiency project implementation – Expansion of EEFP to include other FIs and public and private sector banks;
- Create demand for energy efficiency products, goods and services- awareness, public policy, facilitation/ stimulation by preparation of bankable projects and markets
- Promotion of ESCOs – accreditation by CRISIL/ ICRA
- Credible monitoring and verification protocols to capture energy savings
- Capacity building of banks and FIs

EEFP – Current Status…. ….(2/2)

- Energy Efficiency Services Ltd. (EESL) has been created as a corporate entity to provide market leadership
- 100 ESCOs have been rated
- Stimulate necessary funding for ESCOs based on delivery mechanism
- MoU with M/S PTC India, M/S SIDBI & HSBC bank signed by BEE
  - PTC India has started financing several building energy efficiency projects
  - SIDBI has taken up projects for 25 SME clusters
- Investment Grade Energy Audits
  - Completed for large public buildings in different states of the country
  - Will be taken up for implementation through ESCO route

Framework for Energy Efficient Economic Development…..(1/3)

- Providing comfort to lenders by provision of
  - Risk guarantee for performance contract Partial Risk Guarantee Fund (PRGF)
  - Venture Capital Fund for Energy Efficiency (VCFEE)
  - Initial seed capital from Government budget-can be expanded by contributions from other agencies as well.
  - Fund can be managed by the financial intermediaries
- Incentives to Central Public Sector Undertakings (CPSUs) to take up energy efficiency
  - Policy guidance to CPSUs to take up energy efficiency project-special parameter (to be called Energy Efficiency Performance Index (EEPI) on the line of KPI) may be added to the MoU guidelines from 2010-11
  - Promoting Energy Efficient Public Procurement

Framework for Energy Efficient Economic Development…..(2/3)

- Support and Assistance to Electricity Regulatory Commissions for stimulating Utility driven Demand Side Management (DSM)
  - Develop a mechanism to incentivise utilities for DSM including Time of Day tariffs, load management directives, etc.
  - Develop guidelines for evaluating DSM options and integrating DSM options with supply side options.
  - DSM plan, design, preparation, period, load research, consumer surveys, cost-benefit assessment, technology assessments, etc.
  - Evolve suitable monitoring and verification protocols for DSM programmes.

- Tax/ Duty Exemptions for Promotion of Energy Efficiency
  - Graded excise duty for STAR labelled equipments in favour of higher efficiencies
  - Income and Corporate tax incentives for ESCOs/ Venture Capital funds, etc. in energy efficiency
  - Providing infrastructure status to ESCO business

FEEED – Current Status…..(3/3)

- Guidelines for procurement of energy efficient appliances and services by public authorities under consideration of Government
- To enhance energy efficiency measures at utility level, BEE is working with the DSM Working Group of the Forum of Regulators (FOR) to overcome regulatory barriers and enable utilities to undertake DSM. Draft report has been prepared and is to be discussed by FOR
- Partial Risk Guarentee Fund (PRGF) and Venture Capital Fund (VCF)
  - Rs.66.62 crores allocated for both the funds in 2010-11
  - Implementation document is under preparation
  - These funds are expected to operationalize by March 2011
- Proposal on "Energy efficiency in Public Procurement" approved in principle by CoS
  - Guidelines to be issued by Ministry of Finance are under preparation
- Detailed proposal on "Tax/Duty concessions for energy efficiency" will be submitted to Department of revenue

ABPS Infrastructure Advisory

Practical Solutions to Real Life Problems

ABPS Infrastructure Advisory
A-309, Kohinoor City
Kirol Road, off LBS Marg
Kurla (West), Mumbai 400 070
Ph: +91 22 6124 0400/ 6124 0444
Fax:+91 22 6124 0499
Email: contact@abpsinfra.com