Conservation of Energy and its Efficient Utilization: Why & How?

State Advisory Committee of MERC

Meeting: 2nd July 2007, Mumbai

Overview of Presentation

- Urgent need to capture EE/EC potential
- Where can the potential be captured?
- How can the potential be captured?

Power situation in perspective and role of conservation of energy and its efficient utilization

- **Power shortages are here to stay, at least in the near and medium term**
- **Apart from sufferings and inconvenience, shortages have huge economic cost**
- **Conservation of energy (EC) and its efficient use (EE) in consumers' premises, along with "peak shifting" measures can play a vital strategic role in mitigating power shortages**
- **EC/EE is beneficial to all stake holders, environmentally benign and is quick acting**

Power situation in perspective and role of conservation of energy and its efficient utilization

- **EC/EE potential too is very good (2000-2200 MW for State, 200-225 MW for Mumbai)**
- **Urgent need to capture the EE/EC potential**
- **The question is:**
  - **Where can this potential be captured?**
    - **Which sectors? Which end-uses? Which consumer segment? Which technology?**
  - **How can this potential be captured?**

Where does the potential exist and where can you capture it: Identifying Sectors, End –uses &Technologies : Other than Mumbai

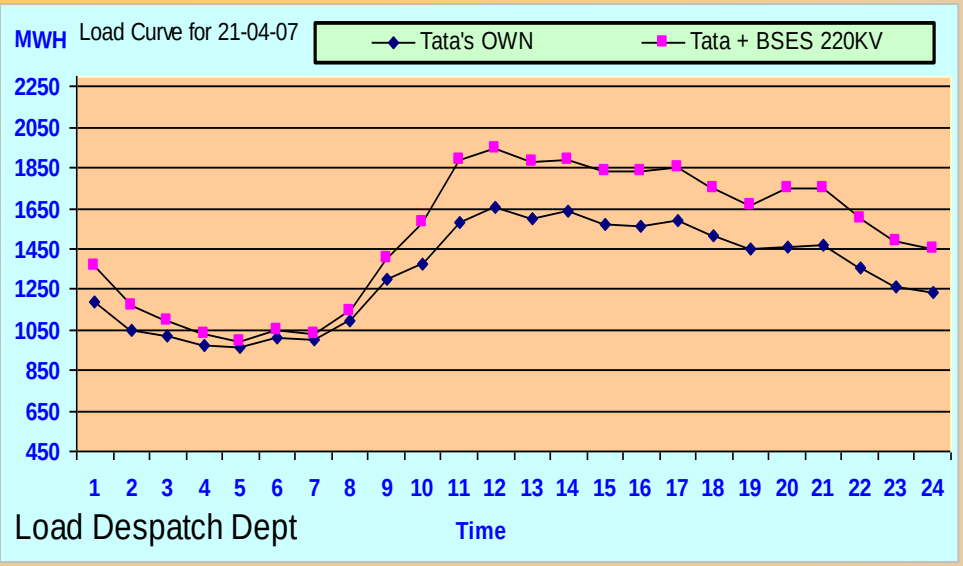
- Load Research data unavailable
- Target sectors where:
  - Cost of supply >> average revenue realization, & collection efficiencies are low
  - Possibilities of load relief are high
- In the first case: Domestic, municipal and agricultural sectors become obvious targets
- In the second case: Domestic, municipal, industrial and commercial sectors become eligible as obvious target sectors

Areas Other than Mumbai City: Target End-uses and technologies in various sectors

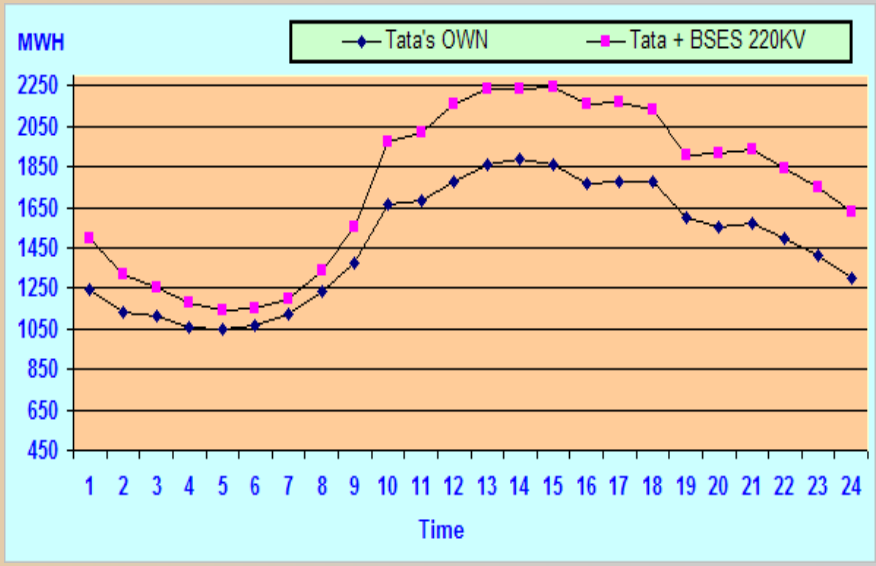
Domestic	Agriculture	Municipal
✶Heating (Gas/solar water heaters) ✶Cooling (5* appliances) ✶Lighting (CFLs, T-5 & T-8 high lumen lamps with electronic chokes) ✶Pumping (efficient pumping systems) ✶Stand-by power (switch off from mains, 4-12% savings	✶ Lift-irrigation pumping systems (efficient pumping systems) ✶Individual farmers pumping system (efficient pumping systems; irrigation methods; capacitors, HVDS/LT less distribution)	✶Water supply pumping (efficient pumping systems) ✶Street lighting (Lighting controls, efficient lamps) ✶Traffic signals (LEDs)

Areas Other than Mumbai City: Target End-uses and technologies in various sectors

Commercial	Industrial
✶**Cooling (efficient A/C systems, building management controls, VSDs, thermal storage, VAR systems, AHU belts, CT fans, pumps)** ✶ **Lighting (CFLs, T-5, T-8 high lumen, controls, electronic ballasts, lighting design)** ✶**Pumping (efficient pumping systems)** ✶**Waste Heat Recovery/Co-generation**	✶**Electrical System** ✶**Motors & motor systems** ✶**Utilities- compressed air, refrigeration, cooling water** ✶**Services – air-conditioning, lighting** ✶ **waste heat recovery Co-generation**



Saturday, 21/4/2007



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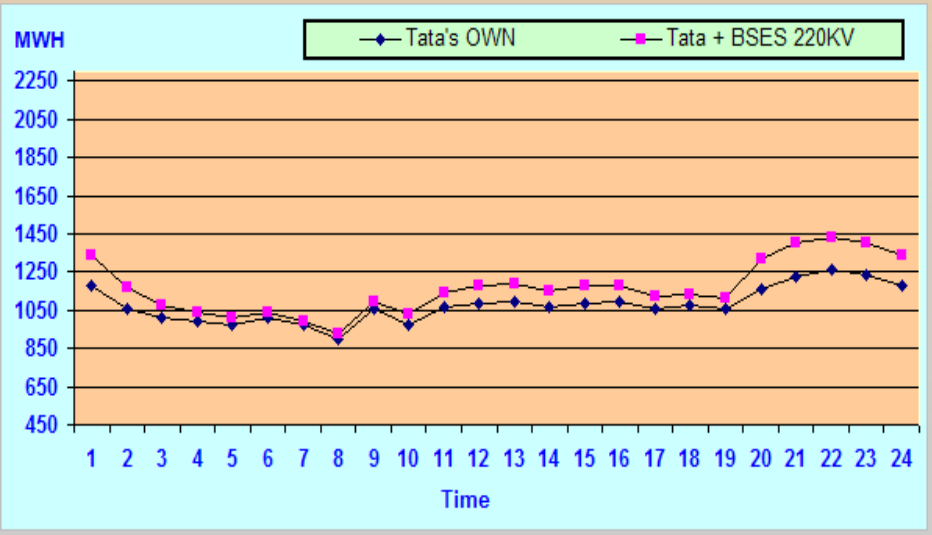

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Identifying sector to Target

Load Curves: Courtesy Tata Power Company

Identifying End –uses &Technologies : Mumbai City

- Commercial Sector Analysis
  - Lighting - 10-15%
  - Air Conditioning - 50-70 %
  - Others (including pumping) -15-40 %
- Technological Options Available for Commercial Sector
  - CFL / LED/ T-5 Tube light with Electronic Choke/T-8 high lumen with electronic chokes/ lighting controls / lamp luminaries
  - Efficient A / C Systems
  - Efficient pumping systems

How can this potential be captured?

- Potential can be captured, if:
  - Millions (and not just few hundreds) of heterogeneous consumers adopt EE/EC or are interested in adopting EE/EC
  - Financiers and bankers are interested in financing EE/EC
  - Well functioning EE/EC delivery companies exists
  - Energy efficient products, processes, equipments are easily available in the market
- Presently such conditions do not exist
- All the stakeholders – consumers as well as supply chain entities (bankers, energy delivery companies, equipment vendors, etc.) face several barriers
- Consequently, majority of EE/EC potential has remained unrealised

How can this potential be captured?

- **What needs to be done?**
  - **Facilitate availability of good quality/EE appliances (EC – ACT: Standards & Labeling)**
  - **Consumers and financiers: Make value "offers" that remove barriers and motivates them to adopt EC/EE or to fund EC/EE**
  - **Energy delivery companies: Create demand for services and strengthen supply response**
- **The above can be done as a direct specific activity or indirectly through PROJECTS/ PROGRAMMES Framework**
- **Experience shows that working through Projects/Programmes framework helps in achieving results faster**

Projects/programmes framework to capture EE/EC potential

- When we talk about projects/programmes, it is evident that:
  - Some one will need to conceive, plan, design fund, and implement the projects/programmes: ESCOs?, NGOs?, State (BEE/SEDAs)? Utilities?
- UTILITIES ARE WELL SUITED TO UNDERTAKE SUCH ACTIVITIES
- From mid 1970s utilities in North America, Australia and even some Asian countries have been involved in EE/EC activities
- Today, utility such as Pacific Gas & Light directly employees > 400 personnel for EE/EC work (gas & power sector combined)
- When utilities work with their consumers to affect the quantum and timing of consumers' electricity demand, through appropriate EC/EE and peak shifting projects/programmes, such projects/programmes by utilities are generally termed as DSM projects/programmes of utilities

Promotion of EE/EC by MERC

- Recognising the importance of EE/EC and considering the prevalent shortage situation in the State, MERC, under Section 23 of EA has directed the State distribution companies to undertake EE/EC through appropriately formulated DSM Programmes/projects

Promotion of EE by MERC: Key Initiatives

- Consumer oriented initiatives:
  - Time of Day (TOD) Tariff
  - Power factor incentive/penalty
  - Base tariff (higher for hoardings, commercial sector, high consumers)
  - Load Management incentive and penalties
- Utility oriented initiatives
  - 2007 MYT Tariff orders
    - Mandating DSM and load research as an integral part of operations
    - Allowing recovery of DSM related costs
    - Mandating integration of DSM in all future power procurement plans
    - 2% of costly power purchase to be reduced through EE/EC or DSM

Nature of EE/EC Projects/programmes

- Nature of such projects/programmes could be:
  - Technology Projects/Programmes (CFLs, T-5, VSDs,….)
  - End-use Projects/Programmes (pumping, HVAC,…)
  - Devices Projects/Programmes (5* ACs, Refrigerators, DTs,..)
  - Industry Projects/Programmes (textiles, steel, cement, …..)
  - Geographical area based Projects/Programmes (clusters, industrial estates..)
  - Consumer categories wise Projects/Programmes (domestic>300 units/pm, commercial large single owner buildings, govt. hospitals,…..)

EE/EC Programme/Project: Steps

- Identify sector to target
- Identify end-use to target
- Identify EE/EC measure/technology to promote
- Identify consumer segment to target
- Design Project/programme: Offers to motivate consumers, offers to motivate other supply chain (financiers, EE delivery companies, equipment vendors, etc.) entities, define delivery approach, identify partnerships needed, promotion plan, administration plan, data collection and post-implementation evaluation plan
- Raise/mobilize project/programme finances
- Implement project
- Evaluate project

Capturing EE/EC Potential

- For utilities to be able to capture the potential, they will need completely new:
  - Orientation, value system and operating practices, and
  - Set of competencies

Capturing EE/EC Potential: New Orientation/Value System

- Consumer orientation
  - From commodity producers to service providers (meeting consumer need)
  - Extension approach – from monopoly seller selling in "sellers" market to reaching out to consumers to market EE/EC
  - Since consumer cannot be forced to adopt EE/EC, you will need to be:
    - Patient
    - Dogged, persistent, relentless day after day, year after year

Capturing EE/EC Potential: New Set of Competencies

- Utilities will need to understand and have knowledge of: (indicative list)
  - EE/EC Project management skills, including EE/EC project development, appraisal
  - EE/EC project/program financing options, financing mechanisms, securitization
  - Performance contracting
  - ESCO operations
  - Marketing, marketing strategy development, market research
  - Contracting/procurement
  - Load research techniques
  - Statistical methods, survey techniques
  - Measurement and verification methodologies
  - Cost-benefit analysis – societal, utility, individual view points, multiple EE/EC project screening and selection

Capturing EE/EC Potential: Institutionalize DSM & Load Research

- Utilities will need to institutionalize DSM and Load Research and internalize within existing structure:
  - Dedicated staff
  - Dedicated infrastructure, resources and budgets

Putting in Perspective

- EE/EC can provide all round benefits, including power shortage mitigation
- EE/EC potential is significant
- MERC is thus keen on capturing this potential and has incentivised consumers and utilities
- Need to formulate appropriate EE/EC Programmes/projects to capture this potential
- Utilities can best do this, but need to re-orient, need to institutionalize DSM and develop competencies


ThankYou