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**International Institute for Energy Conservation**

*Partners for Sustainable Energy and Environmental Solutions*

## ***Lessons from Energy Efficiency Interventions in Indian States***

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## ***Energy Infrastructure can become the Achilles' Heel in India's Development... Time for Efficiency***

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- Indian economy is catching up with global benchmarks of energy intensity/GDP
  - Energy Sector Objectives
    - Access to Electricity for all by 2012 (Around 50% of households do not have access to electricity today)
    - Cater to increase in per capita consumption to 1000 kWhr by 2012 (at present ~ 610 kWhr), with a minimum lifeline consumption 1 kWhr/household/day by 2012
    - Power demand to be fully met by 2012 (as against current peak shortages of around 12.8%)
  - Planned Capacity Addition on the Supply Side
    - 41000 MW and 59000 MW during X and XI Plan
    - 3100 MW and 6900 MW capacity addition by renewables
  - Ambitious plans to meet demand require large capacity addition (1,10,000 MW) and supply side investments (US \$235 billion)
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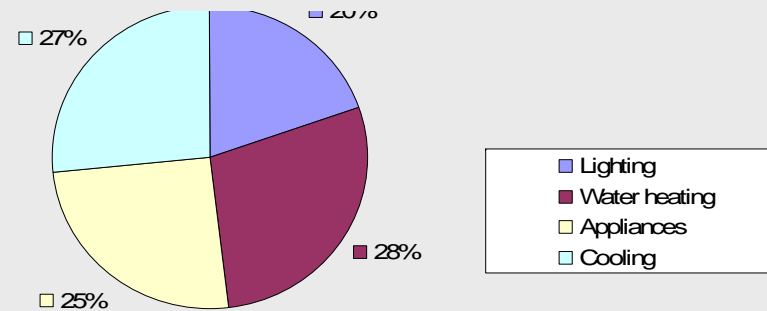
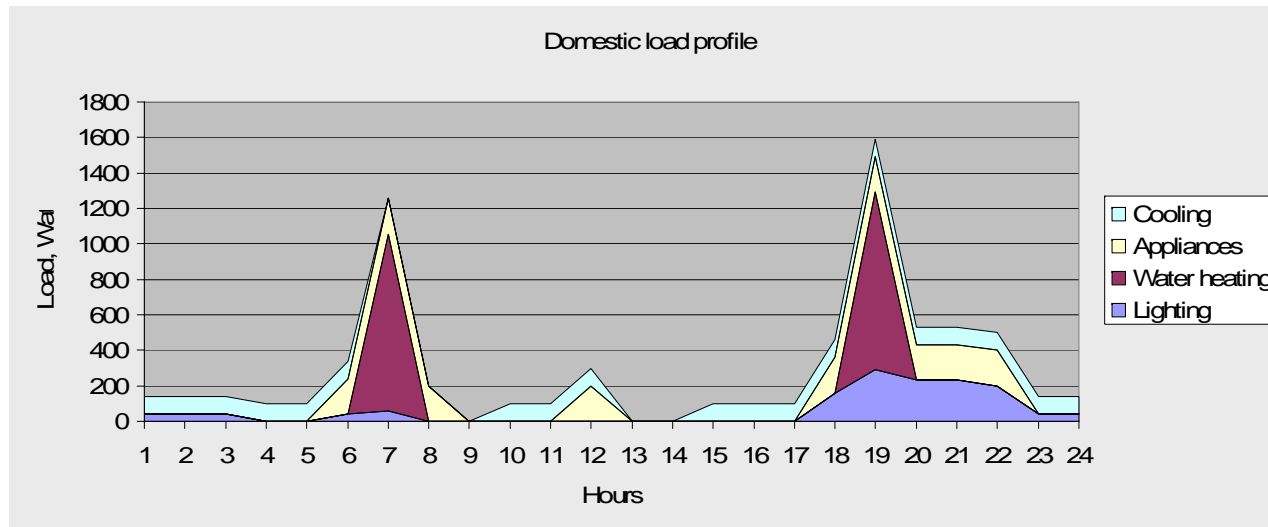
## ***State Leadership is Very Important***

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- In India, power is a “concurrent” subject, and therefore, central government policies can be ineffective without state participation
  - States have substantial influence in the management of the distribution system, where many smaller renewable and efficiency technologies are inter-connected
  - Implementation is impacted by changes in personnel in different state departments, utilities, and regulatory agencies
  - States have tried out different mechanisms for EE, e.g.,
    - Karnataka: Market-based Utility DSM
    - Gujrat, West Bengal, Andhra Pradesh: ESCOs for Public Buildings EE
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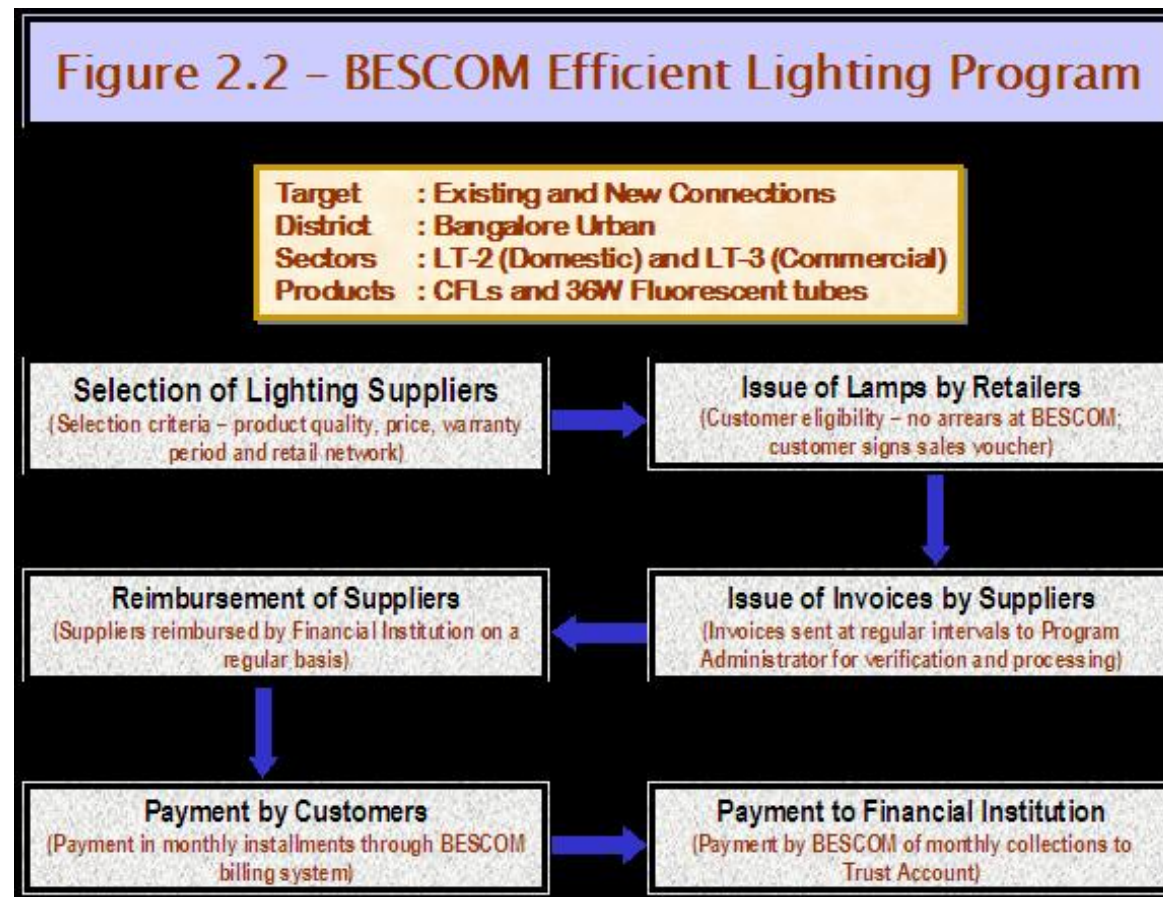


# Domestic Lighting Efficiency Improvement for Peak Reduction in Karnataka





## **BESCOM Efficient Lighting Program (BELP) Design**





## ***Key M&V Results from BELP***

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- Impact evaluation: Energy demand and cost-effectiveness
  - Process evaluation: Participation, customer satisfaction, procedures and marketing strategies
  - Market evaluation
    - Market penetration in customer segment
    - Secondary impacts – other suppliers (pricing etc) Sales over the previous year – same period increased by at least 70% year-on-year; total sales under BELP ~ 431,000 compared to 250,000 previous year
  - Utility branding was an important driver
  - Price, warranty and reduction in bills were the key parameters for customer
  - Customers preferred cash down (versus lease) payments
  - Posters and road-shows were effective marketing tools
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## ***Lessons Learned from BELP Success***

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- Program tenure: a minimum of 12 months need to be offered to get full advantage
- Price refinement: suppliers should be allowed to refine the prices downwards midway in the program, which will benefit consumers
- Installation payments to suppliers: against the bank guarantee, BESCO could pay the suppliers, without waiting for the central accounting to receive the intimation/validation from the sub-divisions
- Permanent stalls: suppliers should be allowed to maintain permanent stalls at the sub-divisions of their choice



## ***Public Buildings Program in Three Indian States***

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- Selected 6 public buildings
    - Willingness of top management to try out something new (ESCO route)
    - Mixed load – lighting / HVAC / pumping / lifts
    - > 500 KVa of connected load
    - Replication potential to other similar buildings
    - Suggestions from SNAs
  - Bid documents created
    - Bidding process (three-envelop)
      - Post-submission qualification (turnover, past projects)
      - Technical short-listing (project team, implementation plan, EE measures, O&M services, schedule)
      - Financial short-listing (cost-break-down, guaranteed savings, payment terms)
    - Short-listing and evaluation criteria
    - Legal documentation
    - Agreement formats
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## ***EE Potential in Selected Public Buildings***

	Gujarat		Andhra Pradesh		West Bengal	
<b>Name of the building</b>	<b>GUVNL, Vadodara</b>	<b>High Court, Ahmedabad</b>	<b>Secretariat Building, Hyderabad</b>	<b>BRKR Bhawan, Hyderabad</b>	<b>Vidyut Bhawan, Kolkata</b>	<b>Secretariat Building, Kolkata</b>
<b>Connected load, kW</b>	<b>980</b>	<b>1173</b>	<b>3132</b>	<b>765</b>	<b>615</b>	<b>550</b>
<b>Present consumption, MU/yr</b>	<b>1.89</b>	<b>2.01</b>	<b>6.96</b>	<b>1.00</b>	<b>1.69</b>	<b>1.26</b>
<b>Maximum demand reduction, kVA</b>	<b>136-759</b>	<b>250</b>	<b>262</b>	<b>60</b>	<b>15-60</b>	<b>15-45</b>
<b>Energy Saving, MU/yr</b>	<b>0.25</b>	<b>0.84</b>	<b>0.655</b>	<b>0.31</b>	<b>0.245</b>	<b>0.226</b>
<b>Investment required, Rs. Lacs</b>	<b>35</b>	<b>64</b>	<b>71.5</b>	<b>25.1</b>	<b>101.0</b>	<b>104.9</b>
<b>Savings, Rs. Lacs/yr</b>	<b>44</b>	<b>44</b>	<b>45.1</b>	<b>18.65</b>	<b>28.8</b>	<b>31.44</b>
<b>Simple payback, yr</b>	<b>0.83</b>	<b>1.5</b>	<b>1.6</b>	<b>1.34</b>	<b>3.5</b>	<b>3.34</b>



## ***Lessons Learned from Public Buildings Program: ESCO Approaches Are Not a Panacea***

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- Where are the ESCOs?
  - Very few tenders from ESCOs
  - Perceived initial willingness given the fact that energy audit expenses are borne by WB... till reality hits!
- EE procurement is still at a nascent stage at state level – Public Works Department engineers and bureaucracy not ready for competitive bidding for energy savings
- Facilities not ready to share the low-hanging fruit
  - Good for internalizing and achieving efficiency goals
  - Not favorable to conventional notions of performance contracting
  - PWD/R&B departments not gearing up to procure and implement EE lighting, capacitor banks and tie-in HVAC and pumps



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## ***For More Information...***

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