Implementing Strategies for Energy Efficiency

City – Surat, Gujarat

Year of Execution – 2001

The Surat Municipal Corporation (SMC) initiated a strategy towards energy management and conservation in the city. it established an Energy Efficiency Cell in November 2001. The financial and environmental impact that the strategy had, offers interesting insights for other cities.

Situation before the initiative

In the year 2000, Surat Municipal Corporation was faced with a difficult situation; it was facing rising electricity bills and was unable to cope with the costs. However, street lighting is one of the basic services apart from, water supply, drainage which any urban local body is required to provide regardless of costs.

Continuous increases in the energy bill made SMC realize that they need to understand and analyze the major causes and try to improve the situation. It realized the need for the provision of uniform illumination with increased energy efficiency. As part of this innovation, the government decided to facilitate future energy development in a scientific and systematic manner. It is in this background that the SMC established an "Energy Efficiency Cell" in November 2001 with two dedicated experienced electrical engineers for solely conducting regular energy efficiency related activities.

Implementation strategies

In order to achieve the basic objectives of the SMC, the corporation decided:

- To identify and implement energy conservation projects
- To find out sources for procuring power at lowest possible price
- To conduct in-house and external energy audit
- To carry out feasibility studies for power generation from conventional and non-conventional energy sources
- To make representation in the Gujarat Electricity Regulatory Commission (GERC) for availing electrical energy at economical rates

The following interventions are part of the strategy of overall process of revival of Surat city:

Energy Conservation in transmission Grid for Potable Water

The SMC water supply systems consists of four water treatment plants, nine water distribution stations and four pumping stations. Most of the water distribution stations are interconnected and a water transmission grid has been made for achieving reliability in availability of water. Detailed studies have been made of interconnections between Water Distribution Stations (WDS) and Water Treatment Plants (WTP) in the context of specific energy consumption i.e. Kwh/ML required for transmitting the water and accordingly the most economical route for transmitting water has been derived. By changing the transmission route for Umarwada WDS underground tank from Varachha Water Works to Sarthana Water Works, SMC has saved Rs. 16.8 million per annum (4.163 million KWH/annum).

Similarly, SMC has saved Rs. 8.5 million per annum (2.08 million KWH/annum) by modifying the transmission route for filling underground tanks of Athwa and Khatodara WDS.

Street Lighting System

The SMC has converted 19570 flourescent streetlight luminaries, having conventional FL lamp and copper wound ballasts consuming 50W luminaries into an energy efficient luminaries. This was done by replacing with hi-lumen fluorescent lamp and electronic ballast with total power consumption of 28 W/luminary keeping the same light output. The implementation was done in January 2003. This has resulted in saving of Rs. 5 million per annum (1.54 million kWh/annum).

After successful implementation, SMC has made a policy stating that any new fluorescent luminaries in street light system should be installed with electronic ballast and high lumen fluorescent lamp only. This has resulted in saving of Rs. 3.5 million per annum (1.1 million kWh/annum) till date.

Energy Auditing

Emergy suditing of 34 services with contract demand of more than 75 kWh was doen through an auditor approved by Government of Gujarat. The results are as below:

Revision of electricity tariff

SMC was successful in revising its tariff for 18 HT (high tension) services meant for water supply and sewage disposal system. This has resulted in saving of Rs. 13 million per annum. It has also recived special consideration in the demand charges for the HT Services of water supply and sewage disposal system which further resulted in savings of Rs. 1.5 million per annum.

Results and Impact

- The strategic step of establishing a dedicated Energy Efficiency Cell has contributed to environment protection by reduction in carbon dioxide emission to the tune of 21,830 tons.
- Since the inception of the cell, SMC has saved more than Rs. 600 million per annum and 1.24 crore KWH per annum.
- Energy auditing has resulted in:

  Total energy saving possibilities (implemented): Rs. 8 million per annum

  Total energy saving realized: Rs. 7.71 million per annum

  Total actual investment done: Rs. 13.0 million

Sustainability

Energy consumption and bill data of all high tension and low tension services from January 2001 have been prepared and is being continuously monitored. The rise is electricity expenditure is relatively more gradual indicating that the efficiency cell is making inroads into the operational activities of the ULB.

Further, database of specific energy consumption e.g. kWh/ML of potable water distributed is prepared and it is also being monitored. Measurement of efficiency of most important machineraies, pump, motor, transformer, air conditioners are periodically checked through in-house/external energy auditing.

Accordingly, improvement of efficiency of machinery/equipments is palnned and executed. In the context of Energy Conservation Act, 2001, although it is not compulsory for SMC, it is going to create the post of “Energy Manager” at the middle level management. SMC also

plans to appoint additional junior level staff for improving the work efficiency of the cell.

The strategic and administrative steps towards conservation of energy by SMC are not only environmentally sustainable, but as the financial results show, are also financially viable.

Lessons Learnt

- It is possible to look at alternatives such as energy efficiency as means of reducing the financial deficit.
- There is a need for such energy cells within urban local bodies in all cities.
- Awareness about energy conservation has increased among the different departments and employees of the SMC.

Replicability

The lessons from this initiative clearly indicate that the formation of dedicated energy cell within the ULBs is very necessary and similar initiatives may be replicated.

Source: Mega Cities…Poised for Change, Leading Practices Catalogue - 2007, Urban Management Centre (UMC)