

Demand Side Management

a) Concept of DSM : Demand-side management (DSM) refers to cooperative activities between the utility and its customers (sometimes with the assistance of third parties such as energy services companies and various trade allies) to implement options for increasing the efficiency of energy utilization, with resulting benefits to the customer, utility and society as a whole.

According to Ministry of Power:-

“Demand-side management is used to describe the actions of a utility, beyond the customer's meter, with the objective of altering the end-use of electricity - whether it be to increase demand, decrease it, shift it between high and low peak periods, or manage it when there are intermittent load demands - in the overall interests of reducing utility costs”

b) Benefits

DSM programs are beneficial to the consumers, utility (Electricity Distribution Company) and society.

From consumer point of view, DSM programs encourage the installation and use of end-use technologies that will use less energy, thereby reducing the customers' overall electricity bill. Energy efficient technologies also have higher efficiency operating characteristics; they tend to last longer, thus reducing the operation and maintenance cost. This is especially true for programs that encourage the use of high efficiency heating, cooling, and ventilation equipment (HVAC), energy efficient lighting, and process technologies, such as fans and motors.

Utilities can benefit from these reductions or shifts in customer energy use. For some utilities, DSM programs can help them reduce their peak power purchases, thereby lowering their overall cost of operations. In the short term, DSM programs can reduce energy costs for utilities, and in the long term, DSM programs can help limit the need for utilities to build new power plants, distribution, and transmission lines. In short, a DSM programs can be much cheaper to implement than building a new generating plant.

Society benefits from DSM are with respect to combat climate change. Reduced or shifted energy usage result into less air pollution, less carbon emissions, and a way to lower the potential environmental threats associated with global warming. Moreover, a good structured DSM program can actually track the program impacts and measure the amount of carbon reduced or saved based on program activities.

c) DSM in context with Indian Power Sector

Electricity is one of the essential components to ensure sustained economic growth for any country. India has the fifth largest power generation capacity in the world. Our total installed capacity is 340GW as on 31st March, 2018 with peak demand of 164 GW in 2017. Owing to the rapid industrialization and modernization across the country, it is anticipated that demand for power would double by 2035 from the current level.

Thus in order to meet the continual increasing demands in sustainable way, we have to focus more on Demand Side Management and Energy conservation measures rather than Capacity addition as capacity addition has many implications like :-

1. Intensive investment is required for new constructing new power plants
2. Lack of well-integrated infrastructure (T&D) to support supply augmentation and hence Network augmentation expenditure has to be incurred
3. Long Gestation period of the new power plant projects
4. Insufficient fuel supply/Stagnating domestic fuel production leading to higher import dependence
5. Environmental concern related to CO2 emissions

d) Tata Power DDL DSM Initiatives

Brief description of the major projects has been given below:-

1. **DERC approved Rebate based AC Replacement Program:** It is observed in load research report that the share of the domestic category in the total sanctioned load stands at 55%. 80% of these AC units are either non star or less than 3 stars. Night time system peak load is majorly attributed by domestic AC load. TPDDL has developed a unique energy efficiency program "Replacement of non-star rated AC with BEE 5 Star rated / Inverter Technology AC". The rebate finalized against each capacity of AC has been derived under DSM cost effectiveness framework. The savings to be accrued under the scheme has been monetized and passed on to the consumers in the form of rebate thus resulting into tariff neutral impact. One of the salient feature of the scheme is the disposal of old ACs in an environment friendly manner which will prevent the re-entry of inefficient ACs in gray market thus serves the basis purpose of demand side management. Inclusion of Inverter Technology AC with higher rebate under the scheme so that consumers adopt new energy efficient technology and maximize the benefit out of it. Around 17500 non star ACs were replaced under this program with objectives of:
 - i. Peak Load and contingency management
 - ii. Flatten load curve
 - iii. Rise in domestic consumer's electricity bill during summer

Low penetration of BEE star rated ACs among domestic consumers

- 2. Discount Based scheme for energy efficient appliances:** Tata Power DDL came up with the first utility based discounted LED Lighting and BEE 5 star Ceiling Fans program direct with branded LED OEMs like Crompton Greaves Customer Electricals Ltd (CGCEL). Under this scheme, the complete range of LED lighting products with 11 varieties (e.g. LED bulbs, Tube Lights, Panels and Down Lighters etc.) and ceiling fans with 5 varieties were offered to the TPDDL customers at attractive discounted prices through distribution counters at district customer care centers of Tata Power-DDL. There was huge price advantage over market price in the range of 20 to 40% due to direct distribution from OEM. Around 1 lakh energy efficient appliances were distributed with Primary objectives of:

- Increase the penetration of LED Lighting Products and 5 star ceiling fan among TPDDL customers
- Offer range of energy efficient light and fan products as per customer requirement for higher utilization
- Reduction in customers' electricity bills through energy efficiency
- Provide competitive pricing and warranty to TPDDL customers
- Increase awareness about Energy Efficient Technologies and Lights

Effective Load management

- 3. Energy Efficient LED Lighting Program:** Under DELP and Ujala program of Govt. of India, energy efficient LED lights (7W, 9 W LED Bulb and 20 W LED Tube light) and BEE 5 star rated Ceiling Fans are being offered at discounted rates through distribution counters of Tata Power-DDL. The lighting products were distributed among customers through Tata Power-DDL distribution counters by Abha members engaged by Tata Power-DDL. Tata Power-DDL is the only DISCOM who directly facilitating the distribution of LED lighting products on behalf of implementing agency EESL. More than 19.3 lakh LED lights were distributed under these program.

4. Tata Power DDL ESCO services to Customers

TATA POWER-DDL, being the only utility empanelled as BEE Grade-I Energy Service Company (ESCO), providing value added Energy Efficiency services along with partnered solution providers. It provides an end to end solution starting from investment grade energy audit to energy efficiency project implementation with monitoring & verification. Services are offered at two financing options: - consumer investment for capital with

performance guarantee from ESCO or ESCO financing the project CAPEX with sharing of savings between consumer and ESCO. It has successfully awarded Energy Audit order of 55.59 MW sanctioned load cumulative YTD and ESCO Project Implementation Order for 8.58 MW sanctioned load cumulative YTD. Rashtrapati Bhavan, India is one of major Govt. Establishment where Tata Power-DDL has successfully conducted Energy Audit.

Cumulative Impact

Major savings / benefits achieved through successful implementation of the Energy Efficiency initiatives under DSM program by Tata Power-DDL are given below:-

S No	DSM Program till date	Scale (Nos)	Annual Energy Savings (MU)	Load Reduction (MW)	Annual CO2 reduction (MT)
1	LED Lights	1,930,000	59.2	15.2	19,714
2	Whole range LED Light with Crompton	100,000	3.01	2.8	1003
3	BEE 5 star Ceiling Fan with Crompton	60,000	5.4	1	1,798
4	Non Star AC replacement Scheme	17,123	10.5	15.3	3,496
5	Rooftop Solar through Net Metering of 12.96 MW	236	6.62		2204
	Total		84.72	34.3	28,215