A SMALL SMART GRID PILOT PROJECT UNDERTAKEN
BY
MANGALORE ELECTICITY SUPPLY COMPANY (MESCOM) IN CONSULTATION WITH CENTER FOR STUDY OF SCIENCE, TECHNOLOGY AND POLICY (CSTEP)

MESCOM is a leading electricity distribution utility in Karnataka. The utility is responsible for distribution of electricity in the following districts viz., Mangalore, Dakshina kannada, Udupi, Shimoga, and Chickmagalur. It covers an area of 26,222 Sq Kms and a population of 58 lakhs. The registered customer base covers 16 lakhs.

The utility has had a very low AT&C loss of 12.95 % in 2009 and the AT&C loss in some of the towns is well below 10%. It has undertaken a number of measures to improve the quality of supply and to reduce the number of interruptions to the consumers.

Following are some of the measures undertaken:

1. Installation of auto reclosers and sectionalisers on feeders to minimize the no. of interruptions,
2. Installation of transformers with 3 star ratings
3. Transformer metering and to conduct rigorous energy auditing
4. RLMS scheme to improve reliability and regulation of supply to rural areas
5. Spot billing of consumer installations etc.

In its efforts to implement progressive schemes for better management of the distribution system the utility thought of undertaking a small Pilot project to prove and learn the Smart Grid technology and functionalities in collaboration with Centre for Study of Science Technology and Policy(CSTEP) in Bangalore (a non-profit organization) and has successfully implemented the scheme in Mangalore City to monitor and control the loads of a small group of consumers connected to two Distribution transformers and also switching-on and switching-off of street lights in two street light circuits.

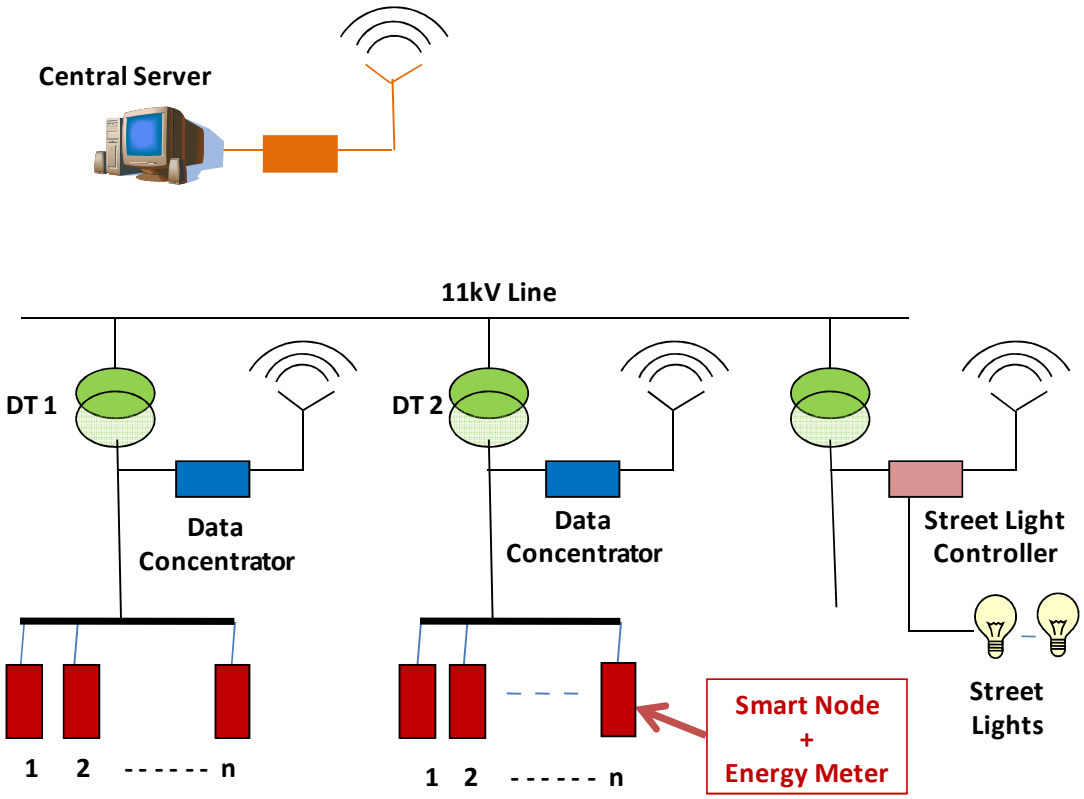
The main features of the Pilot are:

1. Establishing communication link between the consumer meters, data forwarder at the DT and the server at the control centre for data acquisition and control.
2. Read all the metered parameters like voltage, current, energy, pf, demand etc. every 15 minutes.
3. Make provision for load curtailment of the consumers
4. The load control facility enables the utility to fix a provision of minimum power to individual consumers during the curtailment(shortage) period which will be intimated to the consumers in advance. If the consumer exceeds the fixed load, the contactor provided within the smart node disconnects the supply to the consumer. It reconnects the supply to the installation after a preset duration and checks if the load is less than the specified curtailed limit. If the load is within the limits set, the supply will continue otherwise it will again disconnect the installation. This process is repeated three times to give the consumer to act and if

the consumer fails to reduce the load still, the consumer supply will be cut off for the duration of curtailment.

5. Facility for street light control is also incorporated to control two street light circuits from the control centre for switching-ON, switching-OFF remotely at predetermined/determined timings and to switch-OFF alternate lights during light traffic hours after mid-night.
6. The data gathered from the consumers will be stored in the server for the purpose of analysis in a suitable format.

The schematic diagram of the system is given below:



Schematic Diagram of the Smart Grid Pilot Project

Details of electricity distribution system covered under the project area.
Number of Distribution transformers: 2
Number of single phase connections: 79
Number of three-phase connections: 6
Number of street light circuits: 2
Number of street light lamps: ~75

The scheme is live and running for the past few weeks successfully in the field. The utility is thinking in terms of taking up the project on a bigger scale to assess it utility for

the organization in extending quality and continuity of supply to the consumers and improve the performance of the organization in turn. The impact of such a scheme can be assessed only when it is scaled in size to cover a sizable number of consumers of different categories having a measurable demand.

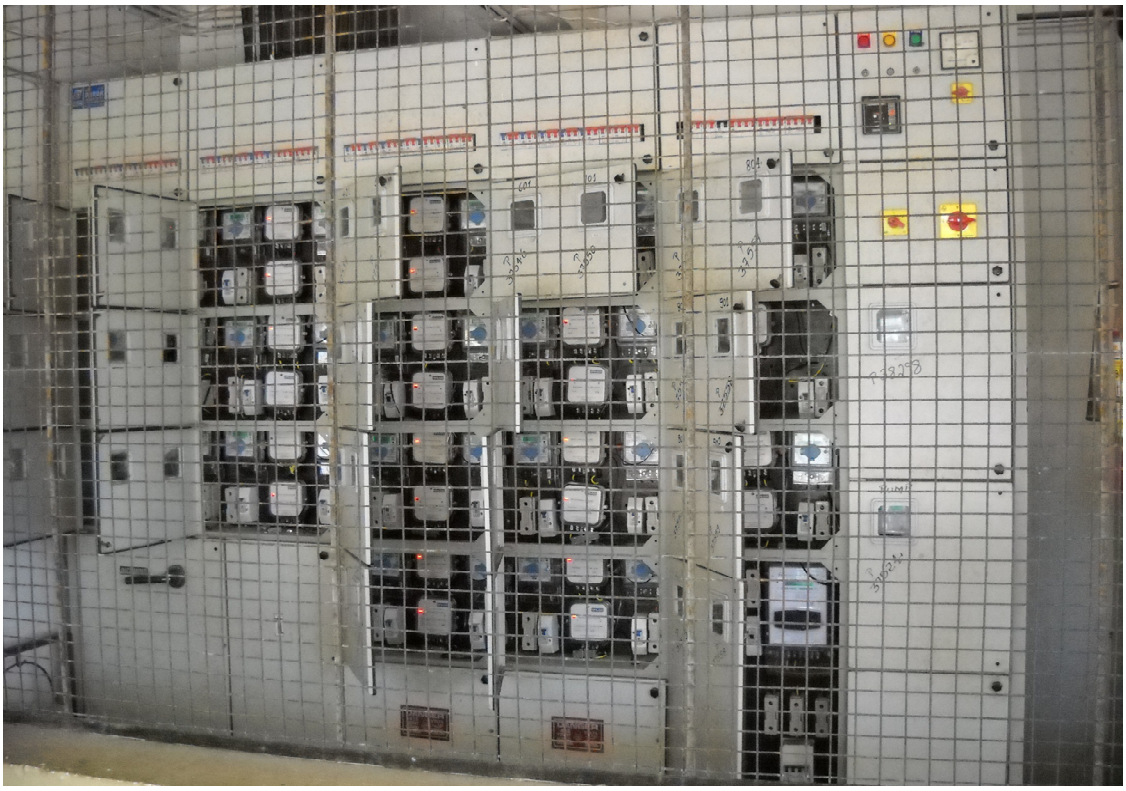
It may not be out of place to say here that certain difficulties were faced in the course of implementation of this project.
The main problem was with regard to the meters: Even though the meter was supposed to confirm to the BIS specification there was no provision for reading the instantaneous values read by the meter and the firmware had to be modified by the manufacturer. Similarly in the case of three phase meters selection of only the required parameters posed a problem in the initial stages which was overcome later.

A local startup firm-Onleo Global systems has supplied the hardware and software required for the project.

Standard software packages like Meter data management and analysis software, DSM and DR would be considered while implementing the project on a larger scale for making a full scale Smart Grid Project.

Site of the Pilot Project at Mangalore:

Energy meters for all the flats at Kadri Heights Apartment.
Total 37 Meters (34 are 1-phase and 3 are 3-phase meters) :



Smart Nodes connected adjacent to existing Energy Meters in Kadri Heights: