

MAHARASHTRA ELECTRICITY REGULATORY COMMISSION

ENERGY EFFICIENCY DEMONSTRATION PROJECTS

OUTLINE OF SCHEME

Background:

Maharashtra Electricity Regulatory Commission (“Commission”), vide its various directives from time to time, had asked distribution licensees in the State of Maharashtra to undertake Demand Side Management (DSM), Energy Efficiency and Energy Conservation projects to reduce electricity demand (including peak demand) as well as to reduce electricity consumption. While some licensees have initiated efforts to implement pilot level DSM projects, the experience so far, indicates the need to enhance capacity further to develop DSM and EE projects. At present most of the licensees do not have adequate capacity to develop, formulate, structure and implement DSM and EE improvement projects.

Development of Demonstration Projects:

It is proposed to facilitate development of a few *demonstration EE projects* with a view to enhancing the capacity and capabilities within the distribution licensees. These projects will be implemented in respective areas of supply of the licensees. The main purpose of developing demonstration projects is to provide a platform to the licensee to develop and structure EE project with need based support and guidance (by the Commission through its consultants) and to disseminate results to other licensees and stakeholder organisations for emulation. The principal objective of facilitating development of these EE projects is to demonstrate efficacy of the selected technology option through systematic measurements of variety of parameters before and after implementation of projects. It is envisaged to demonstrate the impact of projects both in terms of reduction in electricity demand (kW) and total electricity consumed (kWh). The demonstration projects would provide important leads on all the project cost components including costs associated with replacement of existing equipments and components. This initiative will provide an opportunity to the licensee to be part of the project development cycle.

To begin with, it is proposed to work with Brihanmumbai Electric Supply and Transport Undertaking (BEST) on the demonstration projects, considering the logistics of project development process. It is also proposed to work with other distribution licensees to develop similar other projects as appropriate. The demonstration projects will primarily be developed in the field of energy efficient lighting. The other areas (such as air conditioning – space cooling, water pumping) will also be addressed depending upon the opportunities emerging during the next few months. The purpose of this note is to outline the scheme of the first few demonstration projects to elaborate project impact evaluation process and parameters.

Project Scheme:

Proposed initial demonstration projects envisage use of efficient lighting technology in commercial buildings. At present, several commercial buildings use conventional fluorescent tube lights (FTLs) along with magnetic (aluminium or copper) ballasts. The proposed projects envisage replacing existing ballasts with electronic ones. It is proposed to identify facility owner(s) willing to undertake EE projects. The Consultants (of the Commission) propose to assist distribution licensees in formulating and structuring demonstration projects. The Consultants will explore possibility of associating Energy Service Company (ESCO) with the project. Distribution licensee would submit these projects thus developed to the Commission and seek its approval to finance a part of the cost

of the project out of Load Management Charge fund accrued with the licensee. The responsibility of implementing the project will be with the facility owner.

After exploratory discussions with a few facility owners, possibility of taking up EE demonstration projects will be ascertained. Such a possibility will depend upon the status of existing lighting and other areas (such as air conditioning and water pumping) and age of the system, types of components installed, etc. Broad electricity saving potential will be estimated based on the data supplied by the facility owners. The Consultants will interact with vendors of efficient lighting systems and / or ESCOs to understand and appreciate alternative technology options and also to estimate cost of the project and benefits (Procurement will be the responsibility of the facility owner). Facility owner(s) will prepare project report, including the plan for establishing the electricity savings and cost benefit analysis. Savings could be guaranteed by ESCO or vendors of efficient equipments / components. Monitoring and verification plan would be evolved by the ESCO in the event of its association. Alternatively, the Consultants would provide need based inputs to evolve such a plan.

Typical FTL lighting system (with single FTL) consumes approximately 54 to 56 W electricity (40 W in tube light and 14 to 16 W in ballast). A typical commercial building having about 400 FTLs consumes about 6,720 kWh per annum (22.4 kW load). The project mainly envisages replacing existing (a) conventional ballasts with electronic ones, and (b) FTLs with efficient ones such as T8 or T5. Luminaries could also be changed to increase lighting efficiency.

Electronic ballast ideally consumes approximately 2 to 3 W (depending upon the type), whereas T8 lamp would consume 36 W and T5 lamp would consume 28 W resulting into system consumption of approximately 30W to 39W. In the given example of 400 FTLs, total savings could be in the order of 3,120 kWh per year and reduction of load to the extent of 10.4 kW.

It would be essential to measure, evaluate and demonstrate impact of the first two projects so that the results could be widely disseminated, so that more consumers (commercial) are enthused to take up EE projects. The following aspects and parameters of the project would help in this regard. The following paragraphs outline measurement aspects of the demonstration projects.

Baseline- In order to estimate the potential for savings in electricity resulting from the proposed project, it will be necessary to establish electricity consumption in the existing ballasts, tubes and hence in the lighting system, present level of illumination at the site (Lumens output), etc. Electricity consumption in the existing ballast will be dependent on the type of the ballast and specifications thereof. This consumption could vary from 7 Watts (W) to 21 W as per the study arranged by Bureau of Energy Efficiency (BEE) recently. It may be possible to test a sample of ballasts to estimate present level of consumption. Possibility of having "Separate metering for lighting" will be explored, so as to facilitate monitoring.

Conditions after implementation of the project- After implementation of the EE project, parameters and conditions will be measured to judge the impact. Parameters such as new level of illumination, specifications of electronic ballasts and electricity consumption therein, fluorescent tube light specifications (preferably to be changed along with ballast), electricity consumption and demand under new set up and lumens per Watt could be established through measurements / data. Verification of these parameters could be undertaken by the facility owner with the help of vendor / ESCO. Details of the evaluation methodology will be provided along with project reports at the time of structuring projects.

Representative Steps in the Project Formulation and implementation: (Some or all the following steps could be followed. These are indicative steps only).

1. Solicitation of interest from facility owner.
2. Select interested project participants for developing demonstration projects and initiate project formulation discussions.
3. Facility owner discussions with vendors of EE technology / components (as well as possibly with ESCOs).
4. Identify Efficiency improvement areas and select optimum options (e.g. Efficient FTL and electronic ballasts)
5. Prepare project reports with plan to measure effectiveness of the technology. (Parameters and readings to be taken prior to implementation as well as after implementation). Project reports will also provide cost benefit analyses and estimated savings.
6. Additional inputs and suggestions on the project report by consultants of the Commission.
7. Prepare final project reports (By the facility owners) and provide to respective licensees. Licensee to submit for review by review committee. (An appropriate Review Committee (to be decided in due course of time) for project review and approval, to be supported under LMC fund, reviews the proposal.)
8. Approval provided and documentation completed.
9. Licensees provide finance to the approved demonstration projects (approval process being evolved).
10. Measurement of pre-implementation conditions and other related parameters to establish baseline to be completed.
11. Procurement of components and equipment completed by facility owners / project developers.
12. Implementation of Projects and measurement of performance parameters for specified period.
13. Results from projects: immediate impact (say after 3 months) and results from long term measurements are presented.
14. Dissemination of results
15. Launch of scheme to support similar projects by respective licensees as appropriate (with guidelines to be provided by the Commission).

Note:

Demonstration projects may differ in nature and structure depending upon the efficiency measure being addressed and variety of factors. Hence, the steps in formulation and implementation will vary from project to project. The Commission will play the role as facilitator and responsibility of undertaking the project will be of the licensee and facility owner / project developer. Procurement will be responsibility of the project implementing organization.

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