

Suggestions and Comments on the Draft Discussion Paper on “Regulatory Framework for DSM”

It is envisaged that a regulatory framework would provide the much needed impetus to the DSM initiatives in the State by elaborating upon MERC’s policies and procedures about the administration and delivery of the DSM in Maharashtra.

As a first step in the drafting of the Regulatory Framework for DSM, a draft discussion paper on the Regulatory Framework for DSM has been prepared. The Paper discusses:

- a. Possible policy objectives of MERC vis-à-vis DSM (section 3)
- b. Possible guiding principles of MERC for the DSM efforts in the State (section 4)
- c. Eligibility criteria – what kind of DSM programmes could be allowed by MERC and which DSM programmes will not be allowed by MERC (section 5)
- d. How the DSM effort should be organised under multi-year tariff regime (section 6)
- e. What could be the institutional structure for management of DSM effort in the State (section 7)
- f. How should the DSM targets and funding levels be decided and what could be the targets and funding levels? (section 8)
- g. What should be the procedure for approval of DSM plans/programmes (section 9)
- h. What should be the criteria for deciding which DSM programmes should form part of five year DSM plan (section 13)
- i. Evaluation, measurement and verification (Section 10)
- j. Monitoring and reporting (section 11)
- k. Post Programme reporting (section 12)
- l. Possible contents of a DSM Plan Document (Annex 2)
- m. Possible Contents of a DSM Programme Document (Annex 3)

Before finalising the framework, the Commission is keen to elicit from the stakeholders at large, suggestions and comments on the draft discussion paper prepared by the Commission. Suggestions and comments on the draft discussion paper may be conveyed to the Commission within three weeks at:

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Last date for receipt of Comments is 10th July 2009

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Draft
Discussion Paper
On
Regulatory Framework for DSM



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Draft Discussion Paper on Regulatory Framework for DSM

1. Introduction

The savings achieved as a result of Demand Side Management (DSM) activities in the State over the past three/four years are in the region of 15 to 20 MW. The potential, however, is there of the magnitude of thousands of megawatt¹. A regulatory framework would provide the much needed impetus to the DSM initiatives in the State by elaborating upon MERC's policies and procedures about the administration and delivery of the DSM in Maharashtra, including detailed elaboration of MERC's DSM programme eligibility and selection criteria; roles and responsibilities of various stakeholders in the DSM activity; DSM plan/programme funding arrangements; DSM plan/programme targets and budgets; process and procedures for submission, appraisal, approval, monitoring, evaluation and reporting of DSM programmes; as well as guidelines with respect to DSM plan preparation, DSM programme design, evaluation and monitoring, etc.

2. DSM Framework

Articulation of the long-term DSM goals or objectives of MERC is seen by MERC as an important and necessary first step in the development of a DSM framework. These long term DSM goals will form the basis for the development of a regulatory framework for DSM in the State of Maharashtra.

3. Long Term DSM Goals

Considering the huge demand-supply mismatch prevalent in the State of Maharashtra, MERC has been actively promoting DSM as a power shortage mitigation strategy in the State. Considering that the demand-supply mismatch is likely to continue in future, **power shortage mitigation will have to remain as one of the key DSM policy objective of MERC.**

¹ A 2004/05 Study by Jayant Sathaye of LBNL and IIEC under the USAID funding, estimated that EE/DSM can wipe out almost 90% of the power shortage in then prevalent in Maharashtra, there by indicating the EE/DSM potential to be of the Order of about 1300 MW. As per preliminary estimates, MERC expects the DSM/EE potential to be in the region of 2000-2300MW. Preliminary estimates put the DSM/EE potential in Mumbai in the region of 400-450 MW.

This apart, in line with the DSM and energy efficiency related provisions of the Electricity Act 2003 (EA-2003), the National Electricity Policy (NEP), the Tariff Policy (TP) (All three place significant emphasis on DSM, energy efficiency and conservation of energy and environment) and the recommendations of the recent report on DSM and energy efficiency of the Forum Of Regulators [which, while recommending that State Electricity Regulatory Commissions (SERCs) should direct the distribution licensees under their respective jurisdictions to undertake DSM initiatives, accords a key ‘central’ role for the SERCs in capturing the available DSM/energy efficiency potential]; it is easy to visualise the inclusion of the following as key DSM policy objectives of MERC:

- Lowering the overall cost of electricity to the consumers (greater operational and economic efficiency and economical use of resources)
- Reducing/differing the need for generation, transmission, and/or distribution capacity additions
- Creating consumer awareness about the need for energy efficiency (why) and how and where consumers can save energy
- Reducing the environmental damage by reducing the emission of green house gases
- Encouraging the emergence and development of energy service companies (ESCOs)

4. DSM Guiding Principles

It is proposed that the pursuance of the key DSM policy goals identified in the previous section will be guided by the following principles. Thus, all DSM activities and initiatives in the State, including DSM plans and programmes, their preparation and design, implementation, monitoring and evaluation, will all be guided by following principles:

- Considering the critical power shortage situation in the State, emphasis will be placed on quick acting resource acquisition type DSM programmes. However, within these, DSM programmes that give lasting savings – new buildings, new appliances (life of 10-25 years, instead of CFL types that have short life) will be preferred.
- With nine percent plus economy wide growth rates, the “stock” of energy consuming appliances, equipments and devices is also rising rapidly in the Indian economy. For example, the buildings “stock” is rising at the rate of about 11% (doubling of existing stock in next 6-7 years) with energy consumption in buildings rising at 16% per year compounded for past 4/5 years. Similarly, sale of refrigerators, air-conditioners and other energy consuming appliance are exhibiting over 20% growth rates (doubling of existing stock in 3-4 years) in some regions of the country. It therefore makes immense sense to ensure that the new stock coming on stream is inherently energy effi-

cient. Therefore, DSM programmes that promote energy efficiency in the new stock coming on stream in the State, and especially such new stock as is supposed to remain in the system for a long period of time; such as new buildings, new manufacturing facilities, etc. will be preferred.

- Considering the absence of well functioning energy efficiency “Market” in the Indian as well as State context, encouragement will be given to DSM program designs that provide sustainable benefits (market transformation). *Inter alia*, encouragement will be given to DSM programme designs or programmes that :
 - enhance target consumer interest and inclination in adopting energy efficiency, i.e., not only removes perceived barriers but goes beyond and motivates consumers to adopt energy efficiency
 - enhance the interest and the willingness of the intermediaries such as the banks to lend for energy efficiency , and
 - enhance emergence or development of sustainable energy delivery entities
- Efficiency, effectiveness, equity are the implicit in key provisions of the EA-2003. To maintain the same value orientation in the DSM activities, it will be ensured that all DSM related activities and initiatives in the State will be guided by efficiency, effectiveness and equity considerations. Thus it will be ensured that:
 - The DSM programmes taken up for implementation are cost effective, i.e. pass the TRC test (efficiency),
 - As far as possible, the DSM programmes taken up for implementation do not put undue burden on non-participants, i.e. pass the RIM test (equity)
 - As far as possible, DSM programmes are implemented for all segments or consumer categories (equity)
 - Well defined framework for DSM exists and that clarity of purpose, process, procedures and roles exists (effectiveness)
 - Transparency exists in all DSM processes, including DSM plan/programme design, approval, appraisal, evaluation and monitoring (effectiveness)
 - To an extent possible, “extensive stakeholder consultation” will be an integral part of all DSM related work in the State (effectiveness, equity)
- As far as possible, design development and implementation of DSM programmes that supplement National level efforts will be encouraged. Some of the examples of such programmes could be: DSM programmes to promote/incentivise purchase of five star appliances, DSM programmes to compliment national level initiatives to promote CFLs (Bachat Lamp Yojana) or promote energy efficiency in agriculture and municipi-

pal water pumping, DSM programmes to supplement the incentives provided for Chiller replacement under IDBI/ICICI Bank projects, etc.

- While distribution licensees will primarily be responsible to develop & implement DSM programmes; the Commission may direct distribution licensees to undertake DSM programmes which may be socially highly desirable but may not effectively pass the conventional cost effectiveness criteria. The Commission will make resources available for design, development and implementation of such programmes. Example of such programmes in the Indian context would be the programme to promote energy efficient electronic ballasts as a replacement for magnetic ballasts in fluorescent lamps. This measure has great potential to reduce evening lighting load emanating from domestic consumers and hence a programme to promote the use of electronic ballasts would be highly desirable, however, because of the low warranty period of one year (at the maximum) for the electronic ballasts, the programme does not become cost effective (TRC test), and is also not beneficial for domestic sector consumers (participant cost test). Another example would be the replacement of existing T-12 and T-8 fluorescent lamps with energy efficient T-5 lamps.
- As far as possible, the DSM programme portfolio (aggregation of all DSM programmes) of distribution licensees will be in line with “Needs” of their consumers, i.e. preference will be on “market driven” approach to DSM portfolio selection rather than on “technology driven” approach, although “technology driven” approach is not some thing that will be completely ruled out. For example, with the steep rise of tariff for some consumer segments in the city of Mumbai, many of the consumer groups such as Retail Owners’ Association, Restaurant and Hotel Owners’ Association, Multiplex Owners’ Association, Association representing charitable Hospitals, Association representing small shop and commercial establishment owners’, etc. had approached the Commission for a relief in tariff. Such consumer segments, that have the felt need to do something to reduce the electricity costs should form ready target segments for DSM efforts of the distribution licensees, as the DSM efforts directed at such segments that have a “felt need” tend to be more effective.
- Wherever opportunities exists for a collaborative working among distribution licensees, the same will be encouraged
- DSM programme development and design work will be done in collaboration with the existing players (vendors, distributors, dealers, manufacturers, importers, etc.) in the target industry/segments as existing players have a better and in-depth knowledge about barriers, as well as better experience and knowledge about the existing market conditions and hence have better knowledge and feel about what has been tried (to

overcome barriers), what has worked, what has not worked, what has better chances of working, etc..

5. DSM Programmes Eligibility Criteria

The DSM programmes essentially consist of two components: energy efficiency (EE) and load management (LM) - see Figure below. A third type of program that could be considered is fuel substitution (FS) where another source of energy is used in lieu of electricity.² FS would lead to reduction in electricity demand at the same time it would also lead to increased use of another energy source (for example, natural gas).

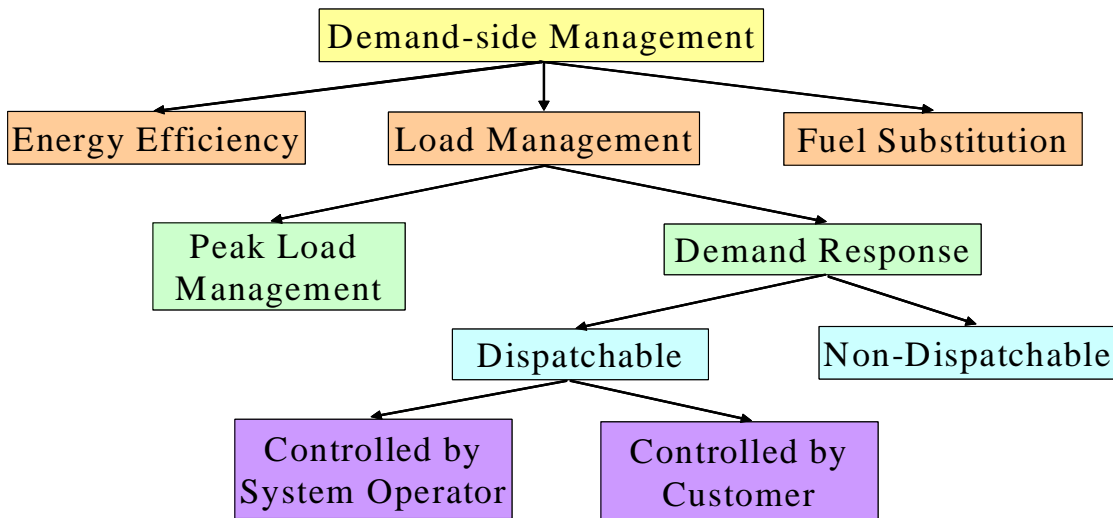


Figure: Classification of DSM resources

EE is designed to reduce electricity consumption during all hours of the year, attempting to permanently reduce the demand for energy in intervals ranging from seasons to years and concentrates on end-use energy solutions.³ LM is designed to change on-site demand for energy in intervals from minutes to hours and associated timing of electric demand/energy use (i.e. lowering during peak periods) by transmitting changes in prices,

² One example of such a program is using LPG for water heating instead of electricity. Other sources of energy such as solar would also be part of such a program. However, this program affects other sectors in addition to the electricity sector. Hence, cost-effectiveness analysis will be relatively more complex.

³ A more accurate description of load reductions from EE would take into account the specific duration the end-use application is using electricity (e.g. lights are used only during evenings and nights and hence cannot yield any savings during the day while refrigerators are used at all hours and hence yield savings during all hours.)

load control signals or other incentives to end-users to reflect existing production and delivery costs.

LM resources can be further classified in two types - peak-load management (PLM) and demand response (DR). PLM attempts to “shift” load permanently (or during specific periods, e.g. summer season) from the peak period to off-peak period. A simple example of PLM program is the time-of-use tariff (TOU).⁴ In contrast, DR attempts to either “shift” or “forego” electricity usage only during specific events (e.g. system emergencies, high prices, etc.). In some years there may be many DR events while in others there may be no DR events. Examples of DR programs include direct load control (DLC), interruptible tariffs, critical peak pricing programs (CPP), and others.

From the perspective of the system operator, DR resources can be further categorized with respect to dispatchability. Under “dispatchable” DR programs, the system operator triggers a DR event during which customers are expected to reduce load. The actual load reduction can be controlled by either the system operator (e.g. cycling of air-conditioning units via remote-control switches) or the customer (e.g. interruptible tariffs for large commercial and industrial customers). In contrast, non-dispatchable DR programs do not have any specific DR events that are triggered by system operators and the decision to reduce load is taken solely by the customer. One example of a non-dispatchable DR program is a real-time pricing tariff where high prices during a certain period may cause a customer to reduce load.

5.1. DSM Programmes that MERC Will Support

In line with the components of the DSM described above, it is proposed that MERC will support:

- DSM programmes that promote or lead to efficient utilisation of electricity (EE) in various end-uses and processes. *Inter alia*, MERC will support DSM programmes that promote or lead to accelerated penetration or accelerated adoption of energy efficient and/or energy conserving appliances, equipment, devices, processes, practices and behaviour; and/or
- DSM programmes that promote load management (LM) in the nature of peak load management (clipping or shifting of peak load to off-peak periods) or in the nature of demand response (DR); and/or

⁴ TOU tariff consists of rate and/or price structures with different unit prices for use during different blocks of time.

- DSM programmes that promote or lead to fuel substitution - substitution of electricity with other fuels/forms of energy, including renewable energy, oil, gas or coal

In addition, considering that in India, distribution side of the electricity business is characterised by many inefficiencies, including high losses, there is a view that improving distribution system will be more beneficial to the consumers and the society at large than DSM programmes, *per se*. In the Indian context, therefore, there is a need to integrate distribution improvement with DSM. Accordingly, it is proposed that the MERC will support DSM programmes that:

- Promote or lead to efficient utilisation of electricity or load management or fuel substitution ***along with distribution improvement***. For example, a feeder based agricultural sector DSM project involving integration of initiatives to improve energy efficiency of irrigation with distribution loss reduction initiatives (e.g. LT less distribution system)

In line with the proposed key policy objectives of MERC: “Reducing/differing the need for generation, transmission, and/or distribution capacity additions”, and “Creating consumer awareness about the need for energy efficiency (why) and how and where consumers can save energy”; it is proposed that the MERC will also support DSM programmes that specifically:

- Promote or lead to deferment of new distribution capacity (new lines, net work, substation or transformer upgrades, etc.) creation by capturing the energy conservation, energy efficiency improvement, load shifting (from peak), and load clipping (from peak) potential in the consumer premises, essentially in various end-uses and processes for which consumer uses electricity.
- Promote consumer awareness and education about why, how, when and where of energy efficiency and include activities such as energy audits, awareness campaigns, training, demonstration projects, etc.

5.2. DSM Programmes that MERC Will Not Support

MERC, however, will not support projects/programmes that are in the nature of:

- Distributed generation – either renewable energy based or co-generation and/or tri-generation projects,
- Pure Co-generation or tri-generation projects,

- Pure renewable energy based generation projects (e.g setting up of wind farms)
- Energy conservation, energy efficiency improvement or load management (Peak load shifting or peak load clipping) or distributed generation based co or tri generation project that **are internal to the distribution licensees**
- DSM programmes promoting or leading to energy conservation but not resulting in energy efficiency enhancement (e.g. programmes to replace fluorescent lamps with CFLs)

6. Capturing Demand Side Resources

6.1. Existing Practice for capturing demand side resource

Hitherto, the choice of DSM programmes has been mostly ad-hoc and DSM programmes that are perceived as providing “quick-win” gains in terms of savings are being proposed or have been taken up for implementation. The important point to note here is that, presently, there are no yearly targets that are being specified and no long-term budget commitments are being accorded for DSM activities. The existing process for capturing the demand side resources is briefly described below (evaluation, measurement and verification aspects not covered):

- Distribution licensees prepare yearly DSM budget, comprising of two main components: budget for DSM programmes and budget for administration and programme development. The total DSM budget is included in the ARR for the next financial year and submitted for approval to the Commission along with the Annual Performance Review (APR) Petition (thus DSM budget for the next year is submitted along with ARR for the next year as part of APR petition which is normally submitted for Commission’s approval at least 4/5 months before the “next year” is to commence)
- The Commission examines the DSM budget and accords its approval⁵. The approval is conditional for the “DSM Programme” part of the budget, for which the approval is “in principle” with a *caveat* that the licensee shall submit to the Commission, detailed information (costs, benefits, implementation arrangements, M&V plan, etc.) as may be required by the Commission about each of the proposed DSM programmes and till such time as the Commission scrutinizes and provides its approval, the licensee shall not embark on any of the proposed or otherwise DSM programmes and that the budget as approved by the Commission at the time of the detailed scrutiny will be the

⁵ The Commission, when it accords its approval for the ARR, it is considered that, by default, approval also stands accorded for the entire DSM budget

budget that will be considered as final approved budget of the Commission for each and every programme or activity that the Commission may approve after detailed scrutiny.

- As and when the licensee designs and develops the DSM programme, the same is submitted to the Commission for final approval. The Commission examines it for cost effectiveness and consistency of design and accords its approval. Once the Commission accords its final approval, the DSM programme is taken up for implementation.
- At the end of the year, as part of the succeeding years APR petition, the approved budget for the previous year is compared with the actual DSM expenditure during that year and “truing up” is carried out and presented to the Commission for approval as well as for adjustment, if any, during finalisation of the DSM budget for the succeeding plus one year. Thus, the truing up adjustment, if any, of the year say 2007-08 is usually adjusted in the budget for the year 2009-10.

6.2. Future Approach for Capturing Demand Side Resources

The present individual DSM programme based approach for capturing the demand side resources is the result of absence of load research and basic planning data. With steps having been initiated for undertaking load research and building the necessary data base, and with distribution licensees in the State gaining experience and knowledge in the DSM area, it is envisaged that in future a move will be made towards adopting more efficient target based approach for capturing the demand side resources, wherein the focus will not be on individual programmes but portfolio of DSM programmes, referred to collectively as DSM Plan.

Under this approach, targets will be specified and DSM plan based on multi-year planning horizon will be prepared to meet the specified target. The term of the plan could be any suitable period and it could coincide with the corresponding five year multi-year Tariff term. At the beginning of the multi-year planning cycle, the Commission will accord approval to the DSM Plan. It is envisaged that the DSM Plan will contain prioritisation and implementation schedule for each DSM programme in the Plan, which will form the basis for deriving aggregated (aggregate of the entire portfolio of DSM programmes in the Plan) year wise schedules for funds requirement, and DSM plan achievements in terms of savings or shifting/reduction of peak load. The aggregated year wise funds requirement and achievements will then be the annual DSM budgets and annual targets, respectively. Here the annual budget & target setting process will essentially be in the nature of refinements and adjustments to these budget and target figures approved at the

beginning of the planning cycle to account for changes, if any, in market conditions and learning.

6.3. Transition Period

The necessary condition for changing from the present individual DSM programme based approach to future multi-year DSM plan based approach for capturing demand side resources is that sufficient load research data exists and that sufficient knowledge exists about the extent of demand side resource available in the State in terms of quantum (how much is available?), costs (what is its cost?) and timing (when is it available?). It is also necessary that data on parameters such distribution licensee long term/short term “avoided costs” exists.

Although a beginning has been made to satisfy the necessary conditions as mentioned above, it is envisaged that it would take a year or two for all the distribution licensees in the State to have the necessary data/information to be able to change over from the existing individual DSM programme based approach to future multi-year DSM plan based approach. As against this, the next five year multi-year tariff term is scheduled to start from April 2010. It will thus not be possible to change over to the DSM plan based approach along with the next multi-year tariff term starting from April 2010. It is thus envisaged that the present individual DSM programme based approach for capturing demand side resource will continue till the end of year two of the next multi-year tariff term, i.e. till the end of year 2011-12. After which, there will be a change to DSM plan based approach. By the end of year 2011-12, however, the next multi-year tariff term will have only three years left. The first DSM plan therefore will have a time horizon of three years, i.e 2012-13 to 2014-15.

7. Administrative Structure, Roles and Responsibilities

7.1. Present Structure

Presently, the three main stakeholders in the administration of DSM activities in the State are the Commission, the distribution licensees and the official consumer representatives (CRs) of the Commission, as notified under Section 94.3 of the EA-2003.

Besides providing overall policy direction, the Commission is engaged in following DSM related activities:

- Appraisal of individual DSM programmes,
- Approval for DSM individual programmes and yearly DSM budgets,
- Arranging training and capacity development of distribution licensees,
- Periodic review & monitoring of approved DSM programmes,
- Evaluation of completed DSM programmes,
- Preparation of guidelines/regulations and DSM regulatory framework, and
- Work related to memorandum of understanding between the MERC and the California Public Utilities Commission, the California Energy commission (CEC), and Lawrence Berkeley National Laboratory (NABL).

Besides being engaged in development and implementation of pilot DSM projects and programmes, presently, the distribution licensees are also engaged in general developmental activities such as load research and consumer surveys.

The CRs are contributing to the appraisal process of individual DSM project and programme proposals submitted by the distribution licensees by providing comments, and suggestions. CRs have also been involved in the evaluation of completed pilot DSM projects and programmes.

7.2. *DSM Activities for Effective Administration and Management of DSM Under Multi- Year DSM Planning Regime*

Based on more than three decades of DSM programme development, design, implementation and evaluation experience in North America and Europe, it is envisaged that, in the Indian and the State context, following major DSM related activities will need to be performed for effective administration and management of DSM activity in the State under the multi-year DSM planning regime:

- Determining overall DSM policy direction, goals and priorities
- Development and issuance of guidelines and regulations for DSM administration
 - Regulatory framework for DSM
 - DSM Plan preparation guidelines
 - DSM plan requirements' regulations
 - DSM programme design guidelines
 - DSM programme requirements' regulations
 - DSM plan and programme cost effectiveness assessment regulations

- DSM Plan and individual programme level reporting requirements' regulations/guidelines
- DSM Plan level & individual programme level monitoring requirements' regulations/guidelines
- DSM plan level and individual programme level evaluation, measurement and verification (EM&V) requirements' regulations/guidelines
- Load research & consumer survey
- Load forecasting and forecasting of load profiles
 - Aggregate system level
 - Segment Level
 - End-Use Level
 - Technology level
 - Equipment level
- Conduct of DSM and Demand Response Potential Studies
- Integrated resource planning (IRP) exercises
- Setting short- and long-term DSM targets (e.g., kWh, MW)
- DSM Plans:
 - Preparation
 - Appraisal
 - Approval
 - Plan level Monitoring
 - DSM Plan level reporting
 - Plan level Evaluation, measurement and verification
- DSM Programmes:
 - Design of Programmes
 - Preparation of DSM Programme Document
 - Appraisal
 - Approval
 - Individual programme level Monitoring
 - DSM individual programme level reporting
 - Individual programme level Evaluation, measurement and verification
- Annual work plan
 - Preparation of DSM Plan level annual work plan & its approval
 - Preparation of DSM programme level annual work plan & its approval
- DSM Budgets:

- Preparation of yearly budgets
- Scrutiny and examination of yearly budgets
- Approval of yearly budgets
- DSM programme level dispute resolution
- Development of DSM related centralised information system and data base to aid DSM planning, programme design, cost effectiveness assessment, EM&V
 - Inventory of DSM programmes, costs, achievements, lessons learned
 - DSM measure wise estimation of deemed savings, costs and timing
 - Avoided costs – generation, transmission and distribution
- Maintenance of DSM related centralised information system and data base
- Research and analysis in support of :
 - Development of data base and information system;
 - Development of guidelines/regulations
 - Conduct of potential studies
 - Development of innovate Tariff offerings to foster energy efficiency
 - Refinement, adjustment and development of DSM policy goals, priorities, targets, funding levels, etc.
- Development of DSM programmes that are socially highly desirable but otherwise do not meet the conventional cost effectiveness criteria, and approval of funding arrangement and funding for such programmes

7.3. *Future Proposed Structure for DSM Administration & Management*

Looking at the activities that would need to be performed for effective administration and management of DSM under multi-year DSM planning regime and comparing them with what is being done at present (Section 7.3), it is evident that the scale and scope of DSM work will expand far more than the present scale and scope of DSM work. Learning from the experience gained in North America and Europe, it is envisaged that the DSM administration structure in the State will have to be strengthened by creating and assigning specific role to the following two entities⁶:

- Inter-Utility Working Group (IUWG), and

⁶ The creation of two entities, their possible role and composition was first suggested by Prayas Energy Group, Pune and in particular by Mr. Girish Sant of Prayas Energy Group in their short Paper entitled “Suggestions for Inter-Utility Organizational Structure to Promote DSM Programs in Maharashtra” that was circulated during a DSM coordination meeting held at MERC in September 2008. Most of the material presented with respect to the two entities is a direct ‘draw/quote’ from this short paper of Prayas Energy Group, Pune

- DSM Consultative Committee (DSM-CC)

It is envisaged that the above two entities, together with the major existing players, i.e. MERC, the distribution licensees and the CRs, will be the key players in the administration and management of the DSM effort in the State in future. It is envisaged that the Commission/MERC will continue to provide overall policy direction and oversight to the DSM effort in the State. The distribution licensees will continue to develop, design, and implement DSM programmes/programme portfolio. The DSM –CC, it is envisaged will play an advisory role and will mainly assist the Commission in its policy direction and oversight work. The IUWG will facilitate the DSM effort in the State and it is envisaged that it will be involved in both, the developmental and the operational work. The CRs will continue to provide comments and suggestions on the DSM programmes and programme portfolios, but they will also play an expanded role of assisting the Commission (as part of DSM-CC) in policy direction and oversight work. More specifically, it is envisaged that the players in the DSM effort will have responsibilities as described below:

7.3.1. MERC

Broadly, the MERC, it is envisaged, will be responsible for the following:

- Provide policy direction to the DSM effort in the State by developing and implementing a regulatory framework for DSM, which it will review periodically for keeping it current and in line with changing needs and requirements. Such a framework will be developed under extensive stakeholder consultation process
- Provide oversight to the DSM effort in the State and will be responsible for:
 - Development of programmes that are socially highly desirable but are not cost effective under the conventional definition of cost effectiveness,
 - Appraisal and approval of five year DSM Plan
 - Prescription of cumulative DSM Plan targets
 - Approval of annual DSM budgets
 - Prescription of regulations/guidelines/rules with respect to:
 - § DSM plan preparation/DSM programme design
 - § DSM Plan level / DSM programme level appraisal and approval process and procedure
 - § DSM Plan level /DSM programme level monitoring & reporting requirements
 - § DSM Plan level /DSM programme level EM&V requirements

§ DSM resources, i.e. DSM measure deemed savings, their costs, and their timing (when will they be available during the day/season, etc.) etc.

- Conducting DSM Plan level periodic review
- Conducting DSM Plan level EM&V
- Oversee following DSM related work (may not actually be deeply involved in the actual planning & implementation of the work, but the work will be done under overall guidance of MERC)
 - Research and analysis task (see section 7.2)
 - Development of guidelines/regulation / rules
 - Conduct of DSM and demand response potential studies
 - Development of centralized information system and data base
- Work related to MOU between MERC and the CPUC, CEC and the LBNL

7.3.2. Distribution Licensees

It is envisaged that the distribution licensees, in the main, will be responsible for following work:

- Load research and consumer surveys
- IRP exercises
- Load forecasting and DSM baseline development
- Own capacity development through training
- DSM Plan preparation
- DSM Programme design
- Yearly Budget preparation & filing of the same with MERC for approval
- Annual work plan preparation & filing of the same with MERC for approval
- Implementation of MERC approved DSM plans and programmes
- Fulfilling Annual reporting requirements as may be prescribed by MERC guidelines/regulations
- Setting up DSM programme level dispute resolution mechanism and resolution of disputes, if any
- Performing DSM plan and programme level EM&V as may be prescribed by MERC guidelines / regulations
- Providing inputs to:
 - Centralised Information system / database development work

- Research and analysis work,
- DSM and demand response Potential studies
- Load forecasting model development efforts

7.3.3. Inter-Utility Working Group (IUWG)

As mentioned earlier, it is envisaged that IUWG will facilitate the DSM efforts in the State by bringing synergies in programme design, incentives and EM&V. IUWG, it is envisaged will be particularly advantageous for programmes aimed at market transformation, e.g., in provision of rebates to manufacturers.

It is proposed that the IUWG, which would essentially be an entity jointly “owned” by the distribution licensees of the State, could be in the nature of an organization with its own separate office and staff, to be headed by a Director who will be responsible for day-to-day functioning of the IUWG. The Director and other staff of IUWG could be the “deputed” staff from the distribution licensees, or they could also be direct recruits. It is envisaged that the Director of IUWG will work under the overall supervision of the Steering committee which will comprise of the representatives of the distribution licensees in the State at a suitable level of seniority. It is envisaged that IUWG Steering Committee will meet frequently, possibly once every month.

It is envisaged that IUWG, in the main, will perform following tasks:

- Research and analysis work:
 - Development of data base and centralised information system development;
 - Development of guidelines/regulations
 - Conduct of DSM and demand response potential studies
 - Development of innovate Tariff offerings to foster energy efficiency
- Coordinate common programs across distribution licensees (common procurement, common specifications for equipment/technology)
- Provide assistance to the distribution licensees in Plan preparation and programme design
- Training/capacity building within distribution licensees
- Maintain centralized information system and data base
- Conduct market research, consumer surveys in collaboration with distribution licensees
- On going DSM Plan/programme monitoring and EM&V

- Act as platform for:
 - Sharing of experience with respect to the entire DSM cycle, comprising DSM Cell establishment, DSM Cell Training, DSM Plan preparation, load research, IRP, DSM programme design, implementation, monitoring, review and evaluation.
 - Interaction and coordination with the Commission and/or MOU partners CPUC, CEC and LBNL
 - Joint Development of incentive programmes, especially for energy efficient (CFLs) and star rated products
 - Sharing of experience with respect to EC/EE vendors, consultants, contractors
 - Joint interaction with financiers and bankers
 - Joint development/running of: Awareness campaigns, awareness activities, establishment and running of EC/EE Centres, Joint Organisation of Consumer interaction sessions, Exhibitions, etc.
 - Development of Case studies, consultant/vendor directories, technology, films

7.3.4. DSM-CC

As mentioned earlier, DSM-CC is envisaged to be an advisory body that will mainly assist the MERC in overseeing promotion of DSM. It is proposed that it should comprise of senior most level representatives from each of the distribution licensees. In addition, it should also have representation from MERC appointed CRs. One expert each from DSM and/or energy efficiency, finance and ESCO area could be invited to join this Committee by MERC. The MERC Executive Director/Director could coordinate the DSM –CC. The DSM-CC could meet once every quarter, to review development of DSM and advise accordingly.

8. DSM Funding, Targets and Budgets

8.1. Funding Source

From the experience world over, it is seen that the funding for DSM activities essentially comes from the consumers of the utilities. Once the DSM targets are set, the DSM programmes to meet these targets are identified and the corresponding funds required for

implementing these programmes are determined. The required funds are collected from the consumers of the utility by either of the below mentioned methods⁷:

- A rate surcharge, such as the “system benefit charge or societal benefit charge (SBC)” or Public Goods Charge (California). These surcharges are typically mandated by legislation and are charged as percentage of utility revenue and are collected from consumers either as percentage of their bills or as per unit charge, and
- The utility’s overall rates, i.e. the DSM funds requirement/budget is included in the utility’s annual revenue requirements (ARR)

MERC has adopted the second approach. Thus MERC has allowed the distribution licensees in the State to recover all costs incurred by them in any DSM related activity, including planning, designing, implementing, monitoring and evaluating DSM programmes, by adding these costs to their annual revenue requirement (ARR) to enable their funding through tariff rates. It is envisaged that MERC will continue with the present practice of DSM funding through the ARR. However, since the DSM costs are being paid for by the consumers through tariff rates, it will be necessary to qualify that MERC will fund cost effective DSM activities and not any DSM activity, with cost effectiveness being assessed as per guidelines developed by MERC.

The funding source for the DSM activities for the distribution licensees in the State, therefore, will continue to be their respective ARR. Through the ARR, unless otherwise stated, only cost effective DSM activities (cost effectiveness assessed as per cost effectiveness assessment guidelines developed by MERC) will be funded.

8.1.1. Funding for IUWG and DSM-CC

In the section on administrative structure, it has been proposed that two new entities, namely, the IUWG and DSM-CC be created for effective administration and management of DSM in the State. Since IUWG is essentially an organisation that is to be created by the distribution licensees in the State, it is envisaged that the funding for IUWG will come from the distribution licensees. It is also envisaged that all the distribution licensees in the State will equally share the yearly budget requirement of IUWG. Thus, each licensee will claim the apportioned part of their IUWG budget liability by including the same

⁷ Utility’s power supply procurement budgets are also funding some of the DSM efforts, such as in California, where, over and above the targets set by the CPUC, the utilities are encouraged to acquire Demand Side Resources (through competitive DSM bidding or Standard Offer DSM resource acquisition programmes) out of their power procurement budgets

in their respective ARR. As far as funds requirement for DSM-CC is concerned, it is envisaged that the funds requirement will be entirely funded out of MERC's own budget.

8.2. DSM Funding Levels, DSM Targets and Yearly Budgets

DSM targets and funding levels are interrelated, as one determines the level of other. For the sake of clarity, it is clarified here that DSM targets are being considered as savings obtained as a result of DSM (yearly and cumulative over a planning horizon) in kWh and/or MW terms, while funding levels are in rupee terms and indicate the rupee amounts available for whole of the DSM efforts of the distribution licensee (yearly and cumulative over the planning horizon).

Study of the practices being followed in North American gas utilities⁸ shows that in most utilities it is the funding level that is determined first and this is followed by a target setting process. The study also indicates that the funding level itself is determined by considerations such as “*what is reasonable*” and/or “*what is available*” through the funding mechanism. The study further indicates that, once the funding levels are set, the utilities either seek to maximise DSM targets by following some form of competitive bidding for DSM programme design and/or delivery or by following the process that can loosely be characterised as “*do the best you can with the available funds*” as determined by total Resource Cost Test or Societal Cost Test, i.e. utilities seek to implement all cost effective DSM programmes within the available funds and the DSM target then becomes the aggregate of savings expected from all programmes that utilities seek to implement.

A more recent study⁹ has categorised the practices being followed by different North American jurisdictions (States in USA and Provinces in Canada) in setting the electric energy efficiency¹⁰ funding levels into seven broad approaches as mentioned below:

Setting DSM funding level based on:

- i. Cost effective DSM potential estimate
- ii. Percentage of utility revenue
- iii. Mills/kWh of utility electric sales

⁸ “DSM in North American Gas Utilities”, Report by IndEco Strategic Consulting Inc. & Navigant Consulting Limited. The Report was prepared for Enbridge Gas Distribution; April 2004.

⁹ “Demand Side Management: Determining Appropriate Spending levels and Cost-Effectiveness Testing”, A Report prepared by Summit Blue Consulting LLC and The Regulatory Assistance Project (RAP). The Report Prepared for Canadian Association of Members of Public Utility Tribunals (CAMPUT), June 30, 2006.

¹⁰ Approaches to load management and demand response funding are not included here

- iv. Levels set through Resource Planning Process
- v. Expenditure set through the restructuring process
- vi. Projected load growth
- vii. Case-by-case approach

Out of the seven approaches mentioned above, it is seen that in the case of approaches listed at “i., iv. and vi.”, some kind of DSM targets (savings in kWh and/or MW terms) are first set and the funding required for meeting these physical targets are worked out. The actual funds come from the SBS and/or public goods charge and/or rates and/or power procurement budgets. In the case of approaches listed under “ii. and iii.” above, it is the funding level that gets determined first and then what ever best that is (best DSM options) possible to be implemented within the available funds is determined, which in a sense can be looked upon as the physical target in kWh and MW terms . In the case of approach listed at “v.” above, year wise funding levels for the entire planning horizon are specified (e.g. in New York, the funding level has been set at US \$ 175 million per year from 2006-11) and then, just as in the approaches listed at “ii. And iii.” above, whatever best that is (best DSM options) possible to be implemented within the available funds is determined.

The study also indicates that, whatever the approach, it is generally seen that the present energy efficiency funding level for a number of major utilities and jurisdictions vary between 2 % to slightly above 3.3 % of their respective revenues. The study also indicates that even after spending as much as 3.3 % of the annual revenues on yearly DSM activities, many of the jurisdictions in North America could not fully exploit all the cost effective DSM potential that was available in the respective jurisdictions. Acknowledging that there are several considerations that go into the DSM target and funding level determination process¹¹, the study recommends that a minimum expenditure of 1.5% of annual revenue may be appropriate with a ramping up to a level near 3%, and that higher percentages may be warranted if there is expected to be rapid growth in electric demand or an increasing gap between demand and supply.

¹¹ For example, as mentioned in the study: resolving conflict between wanting to exploit all cost effective energy efficiency potential and concern about the resulting immediate effect on rates. Or the consideration that when the funding level is set administratively as in approach “v.”, energy efficiency is disconnected from other resources that are serving consumers and programme becomes like a government programme, in which managers get a budget and do their best to manage within it, without necessarily considering fundamental questions about the size and purpose of the programme

As can be seen from the foregoing discussion, there is no one method for arriving at DSM targets and funding levels and that different jurisdictions in North America have been following different approaches.

8.3. DSM Funding level, DSM target and budget in the context of MERC

Looking at the North American experience, one of the following three approaches can be followed for fixing DSM targets and funding levels in Maharashtra:

- Set DSM targets in kWh and or kW terms and then make the necessary resources available through the ARR, irrespective of the level of resources required. This would be some what similar to what is being followed in California, where kWh/kW targets are specified (about 90% of the all available cost effective potential is targeted) and then resources are made available to meet the targets specified.
- Set the funding level and then identify most optimal portfolio of cost effective DSM programmes that can be accommodated within the available funding and the DSM target then becomes the aggregate of savings expected from all programmes in the “optimal” portfolio. Here the most optimal portfolio could be identified by maximising aggregate savings (aggregate of all cost effective DSM programmes in the portfolio) or maximising aggregate NPV (TRC test NPV) or maximising aggregate demand savings, etc. subject to over all funding level as the constraint.
- Set DSM targets in kWh/kW terms, but also set a cap on the funding level that will be made available for meeting the target. Since there will be a cap on the funding level available for DSM, this approach will ensure that the consumers are not unnecessarily burdened due to DSM.

Given that the approved annual revenue requirement of the distribution licensees in the State has been going up at the rate of 16% compounded per annum for the past 3 years, it may not be feasible at this stage to adopt first of the above mentioned approach for setting DSM targets and funding levels as DSM without resource cap (as the first approach proposes) may put unacceptable (unacceptable to the consumers) burden on the consumers. Clearly, in the context of Maharashtra, unlike in California, there will need to be some sort of cap applied on the funding level available for funding DSM programmes, as otherwise, running and implementing DSM activities may put undue burden on the consumers, who are already seeing about 16% per year rise in their average tariffs. Considering this and also considering the DSM infrastructure and capacity constraints (non-functioning energy efficiency market, lack of trained utility personnel, lack of qualified DSM consultants, contractors and ESCOs, etc.) that exists in the Indian and Maharashtra

context; it is proposed that MERC need only consider the second and the third of the above mentioned approaches for deciding about DSM targets and funding levels.

The second and the third approach mentioned above will yield similar 'outcome' (DSM programmes that get included in the 'optimal' portfolio) if it is sought to maximise the savings and the funding level set under option two and the budget cap level set under option three are similar. However, if it is sought to maximise the NPV (TRC test NPV as NPV as determined under TRC test is the actual benefit for the licensee and its consumers), the 'outcome' with the two approaches will be different as, under the second of the above approaches, the maximisation sought will have funding level as the sole constraint, while under the third of the above approaches, the maximisation sought will have, apart from funding level, the DSM target specified (savings in kWh or kW) as another constraint, i.e. minimum of the target specified to be achieved. The second of the above mentioned approaches proposes fixing of the funding level first. This is likely to be a major shortcoming as the focus under this approach is likely to be more on funding level available and on spending the funds available, rather than on achieving the savings in terms of kWh or kW. Since ultimate goal of DSM is to achieve measurable reduction in demand in cost effective manner (and without reducing the level of service to the consumer), MERC should adopt the third of the above mentioned approaches, i.e. set the DSM target in terms of savings in kWh and/or kW, but also put a cap on the funding that will be available for DSM.

To set DSM targets in kWh or kW terms, inputs from some sort of resource planning exercise or inputs from DSM and demand resource (DR) potential studies are required. In the context of Maharashtra, the DSM or DR potential determination studies are yet to be designed, and there are limitations on data available for carrying out basic resource planning exercise. It is, however, envisaged that, over the next 2/3 years, the licensees in the State will have the necessary DSM/DR potential data as they would have conducted the required studies and exercises.

Since no potential studies have been conducted as yet, it is not possible to specify any specific number as target for yearly/cumulative savings at this juncture. However, it is envisaged that the Commission, in consultation with the DSM-CC and other stakeholders, will specify DSM targets for the Plan period (proposed to be five year) and will also specify the cap on the funds that will be available. Considering the recommendations as regards to funding levels as mentioned in the previous section, and present level of

DSM preparedness in the State (which varies between the distribution licensees in the State – some are far ahead, while some are yet to begin), it is proposed that annual funding level for DSM be capped at 1.5% of the annual revenue of the respective distribution licensee. The approved revenue requirement of the State distribution licensees for the year 2008-09 is about Rs. 34,000 crore, it can thus be seen that the total funding available for DSM would be sufficient and that funding (of DSM) to the up to a level of 1.5 % of the revenue will not unnecessarily burden the consumers.

It is thus envisaged that the distribution licensees in the State will be given a five year DSM target (Cumulative savings to be achieved, the sum of yearly targets could be more than the cumulative saving target for the Plan period – see Annex 1 for explanation). The licensees will prepare five year (proposed DSM planning horizon) DSM plan (aggregation of individual DSM programmes) to meet this given cumulative target with funds availability capped at 1.5 % of the anticipated/estimated five year distribution licensee revenues. It is also envisaged that all such cost effective DSM programmes that meet the specified target within the available funding will be included in the five year DSM plan. It is envisaged that the funding level cap of 1.5 % at the maximum of the anticipated/estimated five year distribution licensee revenues, will not be applicable on year to year basis but rather will be applicable for the entire five year plan period. Thus it will be possible for the distribution licensee to spend more or less than the “cap limit” in some years of the five year plan period, provided the total funding level for the Plan period of five years is within the “cap limit”.

As mentioned earlier, it is envisaged that the DSM Plan will contain prioritisation and implementation schedule for each DSM programme in the Plan, which will form the basis for deriving aggregated (aggregate of the entire portfolio of DSM programmes in the Plan) year wise schedule for funds requirement, and aggregated year wise schedule of DSM plan achievements in terms of savings or shifting/reduction of peak load. The aggregated year wise funds requirement and achievements will then be the annual DSM budgets and annual DSM targets, respectively. These annual DSM budgets and targets, determined and approved at the beginning of the planning cycle will be revisited during the Annual Performance Review essentially to see if any refinements and adjustments are required to these budget and target figures (approved at the beginning of the planning cycle) on account of changes, if any, in market conditions and learning.

8.3.1. Funding for DSM Activities Other Than DSM Plan implementation

It is envisaged that the funding level so determined will be the funding that is available for implementing approved DSM Plan comprising of individual DSM programmes. The distribution licenses, however, will require additional funding for carrying out other DSM activities such as load research, consumer surveys, DSM Cell expenses, DSM plan and programme development activities, research and analysis, funding of IUWG, conduct of potential studies, training & development, etc. It is envisaged that the funding required for meeting such costs will be over and above the funding that is available for implementation of the DSM plan and programmes contained therein. A report¹² by Energy Centre of Wisconsin mentions that the total administrative costs (*of DSM*) can be expected to range between 10% and 15% of the total portfolio costs depending on the existing capabilities of the administering entity and the level of evaluation activity. It is therefore proposed that the funding for DSM activities other than DSM plan/programme implementation, be capped at the level of 15% of the funding level for DSM plan/programme implementation (which has been proposed to be capped at 1.5% of the distribution licensee revenues).

8.3.2. Budget for Load Research & Consumer Surveys Not to Be Included in DSM Budget

Since load research and consumer survey are important activities and since load research/consumer survey outcomes are an important input to DSM design, monitoring and evaluation work, it is indeed necessary that distribution licensees carry on with these activities on a continuous basis. Also, since the Commission has directed¹³ that load research be undertaken as an integral part of the operation of the distribution licensees, it is proposed that load research and consumer survey activities be treated as distribution licensee routine activities and not as DSM activities and hence be altogether excluded from DSM budget/funding allocations. Thus, it is envisaged that funding for DSM activities other than DSM plan/programme/project implementation (capped at 15% of the funding level for DSM plan/programme implementation) will not include funding for load research and DSM related consumer survey work, and that load research and consumer survey work will not be funded out of DSM budget but will be funded through the ARR as any normal activity of the distribution licensee.

¹² "Indiana DSM Investigation Report: Report on Current Programs and Future Directions"; Prepared by Energy Centre, Wisconsin for Indiana Utility Regulatory Commission for their case IURC Cause No. 42693; April 2007.

¹³ MYT Tariff Orders of distribution licensees in the State, issued in April/May 2007

It is envisaged that the distribution licensees in the State will also include funding requirement for DSM activities other than DSM plan/programme implementation (capped at 15% of the funding level for DSM plan/programme implementation) in the five year (proposed DSM planning horizon) DSM plan, with funding requirement for each year of the five year plan shown separately. It is envisaged that the cap of 15% of the funding level for DSM plan/programme implementation will not be applicable on year to year basis but rather will be applicable for the entire five year plan period. Thus it will be possible for the distribution licensee to spend more than the “cap” level in some years of the five year plan period, provided the total funding level for the Plan period of five years on DSM activities other than DSM plan/programme/project implementation is not more than the applicable “cap”. These annual funding levels as indicated in the Plan will be appraised and approved at the beginning of the planning cycle and they then will become the annual budgets for DSM activities other than DSM Plan/programme implementation, and will be revisited during the Annual Performance Review, essentially to see if any refinements and adjustments are required to these budget figures (approved at the beginning of the planning cycle) on account of changes, if any, in market conditions and/or changes if any in administration and management of the DSM within the distribution licensee.

8.3.3. Allocation of Funds for Consumer awareness, Equity and Sustainable Benefits

As stated in the policy objective and guiding principle sections, MERC accords significant importance to creating consumer awareness about the need for energy efficiency (why) and how and where consumers can save energy. MERC also accords substantial importance to DSM programme designs that provide sustainable benefits (market transformation) and is keen to ensure that all DSM related activities and initiatives in the State are guided by equity considerations, besides efficiency and effectiveness considerations. To give effect to the Commission’s concerns regarding consumer awareness, equity and sustainable benefits, it is proposed that certain portion of the total funding available for implementation of DSM Plan/programme is set aside for DSM programmes that help in enhancing equity considerations as well as consumer awareness and market transformation type DSM programmes. In particular, given the varying degree of DSM preparedness among State distribution licensees, it is proposed that between 10% (at the minimum) and 20% (at the maximum) of the total funding for DSM Plan/Programme implementation be reserved for following types of DSM programmes:

- Market transformation (see definitions section) DSM Programmes
- DSM Programmes that:

- Promote consumer awareness and education about why, how, when and where of energy efficiency and include activities such as:
 - § Energy audits,
 - § Awareness campaigns,
 - § EE and LM demonstration projects,
 - § Training programmes, seminars, workshops, round tables, conferences, business exchange meets (buyer-seller meets)
 - § Establishment of permanent display/demonstration centres cum model “green”/ ultra energy efficient buildings (buildings that go beyond ECBC – Energy conservation Building Codes)
- DSM Programmes for “hard to reach” (see glossary section) consumers
- DSM Programmes for consumers below poverty line/consumers consuming less than 100 units per month (generally considered as low income consumers)

8.3.4. Funding of DSM Programme Implementation out of the Power Procurement Budget

In addition to the implementation of DSM programmes taken with separate budget that will be earmarked for DSM Plan implementation, the distribution licensees in the State can take up additional implementation of DSM programmes with funds available under the power procurement budget. Section 23.2.d of the MERC’s Tariff Regulations states that the long term power procurement plan of the distribution licensees shall comprise measures proposed to be implemented as regards energy conservation and energy efficiency. Although the Commission, since the first MYT Tariff Orders of April/May 2007, has been penalising the distribution licensees in the State for not meeting the requirements as stated under Section 23.2.d of the tariff regulations (penalty is being levied at the rate of 2% of the total cost of the “costly power” purchased by the distribution licensees); hitherto, no distribution licensee has considered demand side resources (energy efficiency or energy conservation) in their power procurement plans

To facilitate DSM potential exploitation over and above what is possible under the DSM budget and to avoid imposition of penalty by the Commission for not complying with Section 23.2.d of MERC’s Tariff Regulations, the distribution licensees in the State can make use of the power procurement budget for acquiring DSM resources under “standard offer” or “competitive bidding process” (see glossary section). It is therefore proposed that the distribution licensees be asked to gear themselves up for procuring DSM resource via the DSM acquisition route (standard offer or competitive bidding) to the extent of Rs.

10 crore per year, from their respective power purchase budgets, starting from first year of the next MYT cycle, i.e starting from year 2010-11, and linearly rising to a level of Rs. 20 crore per year in the final year of the next MYT cycle, i.e. Rs. 20 crore for the year 2014-15.

9. DSM Plan, DSM Programme and DSM Annual Work Plan

As proposed in Section 6.2, a move will be made towards adopting more efficient target based approach for capturing the demand side resources, wherein focus will not be on individual programmes but portfolio of DSM programmes, referred to collectively as DSM Plan. Under this approach, every distribution licensee in the State will prepare DSM plan based on five-year planning horizon. The term of the plan will coincide with the corresponding five year multi-year Tariff term. At the beginning of the five year cycle, the Commission will accord approval to the DSM Plan.

9.1. DSM Plan Document

It is envisaged that every distribution licensee in the State will prepare a five year DSM plan and submit it for the approval of the Commission. Annex 2 provides description of general elements that the DSM Plan document will be required to contain.

9.2. DSM Plan Approval Process

Process as described below is proposed for according Commission approval for the DSM Plan:

- The term of the plan will coincide with the corresponding five year multi-year Tariff term
- The Commission will set the five year DSM Plan targets and convey the targets to the respective distribution licensee at least 18 months before the commencement of the next five year Plan period
- The DSM Plan will be submitted to the Commission at least nine months before the commencement of the next five year multi-year Tariff term. Thus, for example, if the next five year multi-year Tariff term is to commence say from April 2012, the DSM plan will have to be submitted to the Commission by end June 2011.
- The distribution licensee will have to submit the Plan in both, hard copy version (Six copies) and soft copy version.

- Between four and six weeks of the submission of the DSM plan for Commission's approval, Commission will hold Technical Validation Session (TVS) for the Submitted Plan in presence of DSM-CC Members.
- Within one week of the TVS, the Commission will send the "minutes" of the TVS to the distribution licensee. Thereafter the licensee, after resolution of all the issues contained in the "minutes" of the TVS, will resubmit the revised DSM Plan to the Commission within three weeks.
- A public hearing process will be followed for the approval of the revised DSM plan submitted by the licensee as per the Commission's standard procedures with regard to Public Hearing
- After the public hearing, the Commission will accord approval to the DSM plan through a written Order of the Commission.

9.3. *DSM Programme Document*

After approval of the DSM plan after public hearing, the distribution licensee will prepare, for all DSM programmes included in the approved DSM plan, a "DSM Programme Document" (PD). The PD will be required to include the general elements as per the details provided in ANNEX 3. This PD will guide implementation, monitoring, review etc. of all the approved individual DSM programmes contained in the Plan.

9.4. *DSM Annual Work Plan*

Once the DSM plan is approved, the licensee will work out the first year work plan and include it in the APR petition of the licensee. The first year budget should be reflected in the Annual Work Plan. The budget reflected in the Annual Work Plan will be carried over to the ARR for the next year, which as per practice, is submitted along with the APR petition. The DSM Annual Work Plan will have information about the following for the year concerned:

- The achievements to be accomplished in the year (in terms of savings, participation rates of consumers, trade ally participation, etc), both individual programme wise and programme portfolio wise (i.e., at Plan level)
- Activities and outputs to be accomplished (individual programme as well as portfolio wise/Plan level), including time line for the same
- Schedule of resources required (budget, manpower, infrastructure, organisation)
- Elaboration of responsibilities of various stakeholders in the DSM programme implementation and the distribution licensee DSM effort

- Adjustments and refinements if any in approved programmes and budgets, if any, with proper description of the nature of refinements and adjustments sought, along with justification for the same.

For subsequent years too, the distribution licensees in the State will prepare yearly Annual DSM Work Plan Document and include it in the APR petition for the corresponding year.

9.5. Posting of DSM Plan, programme and Annual Work Plan Documents on The Website of the Distribution Licensee

Once the DSM Plan Document, the individual DSM Programme Document as well as the Annual work Plan Document are approved, the distribution licensees will post these documents on their respective websites for wider dissemination of the DSM work being planned, the expected contribution from demand side resources as well as achievements in comparison to the planned/expected results.

10. Evaluation, Measurement & Verification (EM&V)

Under the funding model proposed, DSM will be entirely funded by the consumers of electricity in the State. It would therefore be necessary to ensure that the DSM plans and programmes fully achieve the purpose for which they are being/have been planned and implemented. EM&V of the DSM plans and programmes will thus form an extremely important element of the administration and management of DSM by the Commission.

Apart from measurement and verification of the impacts in terms of amount of energy (kWh) saved and/or demand (MW/kW) reduced at the DSM plan and individual DSM programmes levels, evaluation of actual cost effectiveness at the Plan and individual programme level as well as the assessment of the programme assumptions made at the planning stage will also form an important part of the EM&V process. In addition, evaluation of the efficacy and workability of the various processes employed during programme implementation, design and planning stage will also be covered under the EM&V process. How effective, efficient and equitable were the programme delivery mechanisms employed, programme implementation arrangements, programme administration and management systems, and programme communication processes at interface with stakeholders, will all form part of the evaluation process. Assessing effectiveness and efficiency of programme marketing among target consumers, consumer response to the pro-

programme offer, how is the market changing as a result of the programme, will also form an integral part of the EM&V exercise.

In addition to the impact and process evaluation at the programme and plan levels, evaluation of the DSM plan will also be carried out to assess its contribution to the overall policy objectives of the Commission (section 3) and the Commission guiding principles (section 4).

To give effect to the EM&V concerns of the Commission, it will be mandatory to include, EM&V plan as an integral part of every DSM plan and every DSM programme proposal that will be sent to the Commission for approval. It is envisaged that the Commission will engage the services of third party contractors to carry out DSM plan level EM&V. While the Commission is not expected to carry out individual programme level evaluation, it is envisaged that at least the individual programme level verification will be carried out by the Commission/DSM-CC. It is also envisaged that the individual programme level EM&V will be carried by the IUWG, for which it will be necessary that the contractor/consultant engaged in programme level EM&V does not have any association with the contractor/consultant who has helped the individual distribution licensee and/or IUWG in either the design or implementation of the DSM programme being subjected to EM&V.

EM&V requirements, including elaboration on what is to be included in the DSM Plan and Programme documents, as well as the roles and responsibilities of the Commission, IUWG, DSM-CC and distribution licensees in the EM&V process will be in line with the EM&V requirements as spelt out in the Commission's EM&V Regulations.

11. Monitoring & Reporting

Programme monitoring is a process of regularly measuring the progress in effectively completing programme activities and to an extent in achieving the goal and purpose of the programme. Monitoring at the programme level is essential to verify if programme activities have been effectively completed (including quantity, quality and timeliness) and also to assess whether and how well these activities are achieving the stated outputs and the corresponding goals of the programme. Ongoing programme monitoring provides important feedback on programme status to allow for early adjustment to the programme and/or the annual work plan to ensure success. Monitoring also generates information

and provides feed back on variety of programme elements such as: are we getting the expected participation rates, are we getting the expected savings, are we getting the participating consumer characteristics as per expectation, are we getting the anticipated trade ally response/participation, etc. It also generates data that in turn help in activities such as EM&V, regulatory reporting requirements, DSM programme design, energy/demand forecasts, etc.

It is envisaged that monitoring plan will form part of every programme document (PD). While the Monitoring Plan to be included in the PD will be as per the Monitoring & Reporting Guidelines of the Commission, it is expected to have, at the minimum, elaboration about what will be monitored, how frequently will it be monitored, what will be reported, to whom, when and in what format. It is envisaged that the suitable performance indicators as well as the corresponding means of verification for these performance indicators will be identified with respect to major programme activities, assumptions, outputs, goals and outcomes and system to track and monitor these performance indicators on a regular basis and report the same to the programme management as also the Commission will form part of this monitoring and reporting plan.

It is envisaged that the distribution licensees Apart from submitting quarterly reports on the status of each programme in the DSM Plan, will submit along with DSM Annual Work Plan (to be submitted as part of APR petition) yearly report on the status of implementation of programme portfolio as per the format and reporting guidelines contained in the Commission's Monitoring & Reporting Guidelines.

12. End of DSM Programme Completion Reports

At the completion of the programme, the distribution licensees will prepare a detailed programme completion report and submit it to the Commission within one month of the completion of the programme. Such a completion report, apart from providing information on the actual amount expended on the programme, shall also cover, programme accomplishments in terms of achievement of results, outcomes and outputs; constraints/difficulties faced, if any; conclusions, recommendations, and lessons learned; regulatory support needed, if any; and future steps envisaged. A similar completion report will also be prepared by the distribution licensees at the completion of the DSM Plan period.

13. Selection Criteria: Methodology for Selection of DSM Programmes to be Included in the DSM Plan

Under the proposed multi-year DSM Planning approach, the DSM planners will usually have a large number of eligible and cost effective individual DSM programme options to choose from to meet their DSM targets/goals. The challenge before the planners will be to identify and select a portfolio of DSM programmes that gives maximum benefits within the available five year Plan budget (proposed to have a cap of 1.5% of revenue).

If net present value (as in TRC test) of a DSM programme is used as a sole parameter to be used in the selection process, a DSM programme portfolio that gives maximum aggregate NPV (aggregate of all programmes in a portfolio) within the overall five year Plan budget, subject to the achievement of the specified DSM targets will be the preferred portfolio. A simple optimization technique such as the linear integer programming will be able to identify individual eligible and cost effective DSM programmes to be included in a portfolio (to arrive at the preferred portfolio of DSM programmes¹⁴). However, apart from cost effectiveness, it will also be necessary to examine the DSM programmes for their contribution to the key policy objectives of MERC and their congruence with the guiding principles enumerated in sections 3& 4. Hence, apart from NPV, following additional parameters will also have to be used in the selection process to arrive at the preferred portfolio.

- Peak load reduction (peak clipping) and/or peak load shifting potential –the Commission generally will prefer DSM programmes providing savings during peak period over DSM programmes providing savings during non-peak hours. Also, of the DSM programmes providing savings during peak periods, the Commission will prefer DSM programmes providing highest peak load reduction or peak load shifting, everything else remaining same.
- Energy efficient new stock - the Commission will generally prefer DSM programmes promoting energy efficient new stock, especially programmes that promote energy efficient new stock with longer life.
- Length of time period over which electricity savings are available –the Commission will generally prefer DSM programmes giving savings over a longer period of time.

¹⁴ With Objective Function: Maximise aggregate NPV, subject to budget and target constraints.

- Green house gas (carbon di-oxide) reduction potential –the Commission will generally prefer DSM programmes giving higher savings of electricity over life of the programme.

The consideration of the abovementioned additional parameters in the selection process will make the optimization exercise more involved. While it would be possible to mathematically arrive at an optimal portfolio¹⁵, it will not be possible to avoid the introduction of ‘subjectivity’ even in the selection process that is based on mathematical formulation. From the transparency perspective, it would be necessary that the selection process to identify optimal DSM Programme portfolio is simple even for the average consumer of the distribution licensees. It is therefore proposed that the Commission, for the present, use the NPV as a sole parameter to arrive at a portfolio that in the aggregate maximizes the portfolio NPV within the available budget cap, subject to the achievement of the specified DSM targets and then use the stakeholder consultation forums such as the TVS (where advisory body DSM-CC would be present) and the public hearings to discuss the portfolio thus emerging from the perspective of the other additional parameters. At the same time, it is also proposed that the Commission take a final view on the development and use of a suitable multi-criteria/objective optimization model to arrive at an optimal DSM program portfolio, after wider stakeholder consultation.

13.1. Selection Criteria for Programmes to be included in the Plan out of the Reserved Budget of 10-20%

It has been proposed that between 10% (at the minimum) and 20% (at the maximum) of the total funding for DSM Plan/Programme implementation be reserved for funding DSM programmes that enhance equity considerations as well as consumer awareness and market transformation type DSM programmes. As proposed in section 8.3.3, typically, programmes of the type mentioned below will be supported under this budget:

- Market transformation (see definitions section) DSM Programmes
- DSM Programmes that:
 - Promote consumer awareness and education about why, how, when and where of energy efficiency and include activities such as:

¹⁵ Weights will have to be provided to each parameter, depending on its relative importance. Further, suitable indicators will have to be identified to use as proxy for assessing some of the parameters (e.g. energy efficient new stock). Also, some kind of marking system will have to be evolved to assign marks with respect to the parameters being considered in the selection process to each eligible and cost effective DSM programmes being considered for inclusion in the portfolio. The assignment of weights, assigning of marks and choice of proxy indicator will bring in subjectivity in the selection process.

- § Energy audits,
 - § Awareness campaigns,
 - § EE and LM demonstration projects,
 - § Training programmes, seminars, workshops, round tables, conferences, business exchange meets (buyer-seller meets)
 - § Establishment of permanent display/demonstration centres cum model “green”/ ultra energy efficient buildings (buildings that go beyond ECBC – Energy conservation Building Codes)
- DSM Programmes for “hard to reach” (see definitions section) consumers
 - DSM Programmes for consumers below poverty line/consumers consuming less than 100 units per month (generally considered as low income consumers)

DSM programmes of the type described above may not provide immediate results in terms of quantifiable and tangible benefits to the consumers or the licensees, but they do contribute in bringing about economy wide energy efficiency in the long run and in sustainable manner. The DSM programmes, proposed to be funded under this budget, therefore, will not be subjected to the cost effectiveness assessment as described in Commission’s cost effectiveness assessment guidelines. The selection of these programmes, instead, will be guided by/based upon factors such as:

- Programme’s contribution to the Commission’s policy objectives
- Programme’s congruence with the Commission’s guiding principles
- Programme’s ability to overcome barriers and bring about sustainable positive changes in consumer’s value orientation or attitude or knowledge towards energy efficiency and towards adoption of energy efficient practices/ devices/ equipment,
- Quality and viability of programme design, including clarity of objectives, appropriateness of the over all strategy to meet the objectives; soundness of the logical linkage between the outcomes, objectives, strategy, outputs, activities and inputs; reasonableness of the budgets and inputs;

14. Glossary of Terms

Approach to DSM: Market Driven Approach – Here the focus is consumer needs. Market-driven approach begins with understanding various consumer segments and their needs as well as opportunities for those consumers to use energy more efficiently. The first step is to assess consumer needs. This information can be obtained from either primary or secondary research. If information is not known about consumer needs relative to

energy use and costs, then programme opportunities can be listed for consumers which contribute significantly to peak demand and for end-uses which contribute significantly to the consumer's energy costs. Next, programme types which address those needs or end-uses are considered. Research is conducted next to understand something of what consumer interest may be in the programmes, barriers in the marketplace, delivery channels for the products or services involved and technical issues. Next, evaluation of programme concepts is done from an economic standpoint as well as from a qualitative standpoint. The design phase includes the delivery approach, development of needed partnerships, a promotion plan, an administration plan, and a data collection and post-implementation evaluation plan.

Approach to DSM: Technology Driven Approach - In this process, the utility, end use and technology data is prepared for analysis. The first step in DSM analysis is a technical screening, which means that the technology costs and demand and energy savings are compared with the cost of building capacity/purchasing power or generating electricity, respectively. After technologies or rates are chosen, programmes are designed. An optimum programme design is sought which maximizes the “net benefits” (benefits minus costs) of the program. Costs and savings are interdependent, since higher costs may increase participation and, therefore, savings, but also reduce the “net” benefits per participant.

Avoided Costs: Avoided costs refers to the incremental costs avoided by the distribution licensee when it purchases power because of implementation of DSM programmes, or other wise defers or avoids distribution related costs from existing/new distribution system upgrade investments

Barrier: Any characteristic of the market that prevents the adoption of cost beneficial (to the consumer) energy efficient devices / equipment/appliances/practices by the consumers at large

Baseline Data: The initial base level consumption and/or demand for electricity for comparing the net result of DSM programmes changes versus what would have happened in the absence of the program or activity.

Cogeneration: Combined production of heat and electricity - a process in which a facility uses its waste energy to produce heat or electricity.

Conservation: Reduction of a consumer's energy use achieved by relying on changes to the consumer's behaviour which may result in a lower level of end use service.

Conservation Measures: Activities and/or behaviours aimed at reducing energy consumption.

Conservation Programs: Programs which are intended to influence customer behaviour as a means to reduce energy use.

Cost Effectiveness: An indicator of the relative performance or economic attractiveness of any investment in DSM programme or when compared to the costs of energy produced and delivered in the absence of such an investment. Defined as per the Commission's Cost effectiveness Assessment Guidelines

Consumer: Any person or entity that pays an electric bill to a distribution licensee/franchisee and that is the ultimate consumer of goods and services including energy efficiency products, services, or practices.

Cumulative Savings: Cumulative savings represent the savings in that year from all previous DSM programmes (and reflecting any persistence decay that has occurred since the DSM measures were installed) plus the first-year savings of the DSM programme /measures installed in that program year.

Demand-Side Resource: A saving in consumption (kWh) and/or demand (kW/KVA) available as a result of implementation of DSM programme. It has to be expressed in three important dimensions: Quantum - how much is available (kWh and/or kW); Time - When is it available (at what time of day, on what days, in what season); Cost – at what cost

Distributed Generation: Small-scale electric generating technologies installed at or near the end-user's location. May also be referred to as "distributed energy resources" or "distributed resources."

Distribution Licensee: A licensee authorized (by the Commission, under EA-2003) to operate and maintain a distribution system for supplying electricity to the consumers in his area of supply

Demand Response (DR): DR is a type of DSM initiative where emphasis is on reducing peak demand for short periods of time for a few times during the year. DR is useful for reducing near-term peak demand deficit. DR, by reducing the peak demand, obviates the need for temporary or emergency load shedding through opening of EHV circuits. It is used for getting demand relief over small duration (15 min – 6 hours). Under DR, consumers are paid incentives to shift load, forego load or use on site generation to provide short term load relief for the system. The payment to consumer is because DR involves a reduction in consumer value, comfort, or output. Examples of DR programs include direct load control (DLC), interruptible tariffs, critical peak pricing programs (CPP), and others.

Dispatchable & Non-dispatchable DR: From the perspective of the system operator, DR resources can be further categorized with respect to dispatchability. Under “dispatchable” DR programs, the system operator triggers a DR event during which customers are expected to reduce load. The actual load reduction can be controlled by either the system operator (e.g. cycling of air-conditioning units via remote-control switches) or the customer (e.g. interruptible tariffs for large commercial and industrial customers. In contrast, non-dispatchable DR programs do not have any specific DR events that are triggered by system operators and the decision to reduce load is taken solely by the customer. One example of a non-dispatchable DR program is a real-time pricing tariff where high prices during a certain period may cause a customer to reduce load.

Demand Side Management (DSM): DSM as a set of initiatives undertaken by the Utility on the consumer side of the ‘meter’ to bring about a desired change in consumer demand and/or demand profile, while maintaining or even enhancing the service provided to the consumer in terms of quality, reliability and cost of service. The emphasis is on ‘Utility initiatives’ or ‘Utility organized’ efforts and that too on the ‘consumer side of the meter’. Thus, while staggering of weekly holidays or single phasing are no doubt Utility organized efforts to modify the demand pattern, they cannot be termed as DSM, as they do not operate on the consumer side of the meter. Such measures are demand management initiatives of the Utility, distinct from DSM initiatives. Similarly, purchase of an energy efficient five star labelled appliance by a consumer on his own initiative, and not

on account of any Utility scheme or Utility organized effort cannot be termed as DSM activity.

DSM measure: A specific action taken to conserve energy, use it efficiently, shift peak load, clip peak load, substitute electricity with other fuel forms, or to defer investments in distribution upgrades. Thus, replacing existing combination of T-12 fluorescent lamps and magnetic ballasts with T-5 fluorescent lamps with electronic ballasts is a “lighting efficiency DSM measure” that would result in peak load clipping and using electricity efficiently in lighting application. Similarly, motivating consumers to buy high efficiency (Five Star Rated) air-conditioners in place of 1 or 2 Star air-conditioners is a “space cooling efficiency DSM measure” that would result in using electricity efficiently and possibly deferring investment in distribution upgrades.

DSM programme: A “DSM measure” offered to a large number of distribution licensee consumers belonging to a particular sector, segment, geographic area or tariff category OR many different “DSM measures” (usually addressing same end-use such as lighting or space cooling, etc.) offered to a large number of distribution licensee consumers belonging to a particular segment. Thus, replacement of T-12 with T-5, when promoted among domestic sector consumers of a distribution licensee would typically be a “lighting efficiency DSM programme”. Similarly, promotion of compact fluorescent lamps (CFLs) along with promotion of replacement of T-12 with T-5 would also be a typical “lighting efficiency DSM programme”.

DSM portfolio: It is the aggregate of all the “DSM programmes” that a distribution licensee is proposing to implement or is implementing.

DSM optimization: It means the process of selection and evaluation of DSM options that can achieve the highest level of effectiveness;

DSM Resource acquisition: It is a mechanism to reduce energy consumption and peak load, and improve utility system efficiency, through implementation of DSM programs by customers, ESCOs, NGOs, equipment manufacturers/suppliers, or other private sector organizations, with payments made to them by the utility for the resulting energy and load reductions:

- **Competitive Bidding Process for DSM Resource Acquisition:** Under this approach, the utility issues a Request for Proposal (RFP) for resource acquisition

from any organization interested in implementing DSM projects that may provide peak load reduction and other benefits to the utility. The bidders define the project and specify the facilities, technologies, end uses, implementing strategies and mechanisms, measurement and verification protocols, and proposed payments from the utility for the verified savings. The utility selects the most attractive projects from the pool of projects proposed and negotiated a contract for the resource acquisition. Payment terms are included in the contract and most payments are made after verification of the results. In this approach, the various winning bidders may get different amounts of payments per kWh or kW saved.

- **Standard Offer Methodology for DSM Resource Acquisition;** In the Standard Offer process, the utility determines what it may be willing to pay for energy and demand savings and publishes a standardized schedule of payments per kWh and/or kW saved in various seasons and time periods. The utility also provides standardized monitoring and verification (M&V) protocols. Any implementing organization may then propose and implement projects and demonstrate the savings using the M&V protocols. Payments are made for verified savings using the published standard offer. In this approach all implementers get the same amount per kWh or kW.

End Use: 1) The purpose for which energy is used (e.g. heating, cooling, lighting).
2) A class of energy use that a DSM programme is concentrating efforts upon. Typically categorized by equipment purpose, equipment energy use intensity, and/or building type.

Energy Efficiency: Activities or programmes that stimulate customers to reduce customer energy use by making investments in more efficient equipment or control that reduce energy use while maintaining a comparable level of service as perceived by the customer.

Energy Efficiency Measure: An energy using appliance, equipment, control system, or practice whose installation or implementation results in reduced energy use (purchased from the distribution utility) while maintaining a comparable or higher level of energy service as perceived by the consumer. In all cases energy efficiency measures decrease the amount of energy used to provide a specific service or to accomplish a specific amount of work

Energy Efficiency Programmes: Programmes that reduce consumer energy use by promoting energy efficiency investments or the adoption of conservation practices or changes in operation which maintain or increase the level of energy services provided to the customer.

Energy Service Companies (ESCOs): Energy Services Companies (ESCOs) are companies that provide energy efficiency or load reduction services to customers that own or operate facilities such as factories and buildings. The range of services ESCOs can provide include: feasibility analyses, structuring of a paid-from-savings program, obtaining or arranging financing, engineering design, construction management, purchase and installation of equipment, project management, project guarantees, monitoring of project performance, maintenance of efficiency measures, training, administrative services, etc. An ESCO project is performance-based when its compensation is tied to the amount of energy actually saved. For this reason, ESCOs are fundamentally different from consulting engineers specializing in efficiency improvements, who are typically paid a fee for their advice rather than being paid for the results their recommendations may yield. The consulting engineer takes no risk while the ESCOs compensation is entirely at risk—unless they produce results. An ESCO project is comprehensive when it seeks to achieve energy savings from the widest possible array of cost-effective measures in a given facility. ESCOs are also distinguished from equipment suppliers which only provide single-measure installations (such as lighting contractors). These do not offer performance guarantees and ignore the potential for savings unrelated to the equipment in which they specialize. Some equipment suppliers have established their own ESCOs.

As project developers, ESCOs are responsible for a wide range of functions. They identify, design and finance the project. (The ESCO arranges financing for the project, but does not usually finance it out of its own pocket. Most ESCO projects are financed entirely with debt, which goes onto the balance sheet of the customer, not the ESCO. Project financing using ESCO, or third party equity contributions, is actually quite rare.) ESCOs install and maintain all or most of the equipment involved. They measure and monitor the project's energy savings. Also, and very important, they assume the risk that the project will save the amount of energy guaranteed.

Evaluation, Measurement and Verification (EM&V): Activities which evaluate, monitor, measure and verify performance or other aspects of DSM / energy efficiency programs or their market environment.

Fuel Substitution: Programmes which are intended to substitute energy using equipment of one energy source with a competing energy source (e.g. switch from electric water heaters to gas heaters).

Funding Cycle: Period of time for which funding of DSM/ energy efficiency programs have been approved by the Commission.

Hard to Reach Consumers: Those consumers who do not have easy access to DSM programme information or generally do not participate in DSM programmes due to a language, business size, geographic, or because of staying in/using rented/leased premises.

Life: An estimate of the median number of years that the DSM measures installed under the programme are still in place and operable.

Load Management: Programmes that reduce or shift peak demand away from periods of high cost electricity to non-peak or lower cost time periods, with a neutral effect on or negligible increase in electric use.

Load Research: An activity embracing the measurement and study of the characteristics of electric loads to provide a thorough & reliable knowledge of trends, and general behaviour of the load characteristics of the customers serviced by the electrical industry. Simply put, load Research allows utilities to study the ways their customers use electricity, either in total or by individual end uses. Load research is about “drilling down” to find out what causes hourly variations in load. It helps in answering questions such as: How do customers differ in their energy use? Which customer segments contribute most to peak demand? What end-uses *drive* each customer’s load shape? How do Cities and Towns and utility districts differ in their power demand? Which DSM programs will have the highest load impact? Which DSM programs will help alleviate network or generation constraints? Where should we focus our DSM efforts?

Lost Opportunities: DSM/Energy efficiency measures that offer long-lived, cost-effective savings that are fleeting in nature. A lost opportunity occurs when a consumer does not install/employ an energy efficient equipment/appliance/device/practice that is cost-effective at the time, but whose installation is unlikely to be cost-effective if the consumer attempts to install the same measure later.

Market Transformation: Long lasting and sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency equipment / device / appliance / practice or measures to the point where further publicly-funded intervention is no longer appropriate in that specific market.

New Construction: Residential and non-residential buildings that have been newly built or have added major additions

Programme Design: The method or approach for making, doing, or accomplishing an objective by means of a programme.

Programme Development: The process by which ideas for new or revised DSM/energy efficiency programmes are converted into a design to achieve a specific objective.

Programme Management: The responsibility and ability to oversee and guide the performance of a programme to achieve its objective.

RIM Test: This test measures the difference between the change in total revenues earned by the distribution licensee and the change in the total costs incurred by the distribution licensee as a result of the DSM programme. If the change in revenue earned is larger or smaller than the change in costs incurred, then rate/tariff levels will change because of the DSM programme. Thus, this test in effect assesses the DSM programme from the “tariff level” perspective. This test also provides a measure of the impact of the DSM programme on the consumers who do not participate in the DSM programme and hence is some times also termed as a non-participant test. When a cost-effectiveness of a DSM programme is proved from the participant perspective (through PCT test), the participants in the DSM programme stand to gain from the programme in the form of reduced bills, even though the RIM test may show that because of the DSM programme, the tariff level has to go up for all the consumers of the licensee. With the tariff increasing, the non-participants stand to loose in terms of higher bills due to higher tariffs that they now have to pay because of the DSM programme. This test helps address questions such as: What is the impact of the DSM programme on the licensee’s revenues and costs? Would the DSM program necessitate an increase/decrease in tariffs to bring about matching of costs and revenues?

Savings : Reduced electricity use (or savings) produced by DSM measure/programme which maintain the same level of end use service or conservation actions which usually reduce energy use by reducing the quantity or quality of the baseline energy services demanded.

Supply-Side Options: Means options designed to supply power. It includes renewable energy such as biomass, solar, wind, geothermal or hydro, and also means by product materials that, but for their use as a source of energy, would be considered waste

Trigeneration: Combined production of heat, electricity and cooling - a process in which a facility uses waste energy to produce heat, electricity and cooling

Total Resource Cost Test (TRC)

The TRC test measures the net resource benefits from the perspective of the distribution licensee and all its consumers taken together, by combining the net benefits of the programme to participants and non-participants. The benefits are the avoided costs of the supply-side resources avoided or deferred. The TRC costs encompass the cost of the measures/equipment installed and the costs incurred by the programme implementer (See Commission's Cost Effectiveness Assessment Guidelines)

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ANNEX 1

Cumulative DSM Plan Target and the Actual Yearly Accomplishments:

Normally it would be expected that the cumulative DSM Plan target would be the sum total of the yearly targets. However, this would be true only if the life of DSM measures being promoted through the DSM programme is longer than the Plan period. If the life is less, the actual yearly targets will need to be of higher value to ensure that Plan level cumulative targets are met. An example will help clarify this aspect.

Suppose that the Commission specifies following year wise and cumulative DSM target for the Plan period:

Year	Year 1	Year 2	Year 3	Year 4	Year 5
Yearly DSM Target in MW	5	15	20	25	35
Cumulative DSM Target in MW	5	20	40	65	100

Suppose that we identify 5 DSM programmes to meet the yearly and cumulative targets in the following manner:

	Year 1	Year 2	Year 3	Year 4	Year 5
Yearly Target in MW	5	15	20	25	35
Cumulative Target in MW	5	20	40	65	100
Programme A Contribution	5	5	-	-	-
Programme B Contribution	-	15	15	15	-
Programme C Contribution	-	-	25	25	25
Programme D Contribution	-	-	-	25	25
Programme E Contribution	-	-	-	-	50
Actual Yearly Contribution Required to meet cumulative targets	5	15	25	25	50
Cumulative savings if along with yearly targets, cumulative savings target was not required to be met	5	20	35	60	80

It is seen that Programme A contributes 5 MW of savings over a two year period (life of programme is 2 years) and that Programme B contributes 15MW savings over a three year period (life of programme B). From the above table it is clear that, to meet cumulative saving targets, the actual savings to be captured in year 3 will have to be 25 MW instead of yearly target of 20MW (20 MW for meeting the yearly target + 5 MW lost due to programme A's life getting over) and actual savings required to be captured in year 5 will have to be 50 MW instead of yearly target of 35 MW (35 MW for meeting the yearly target + 15 MW lost due to programme B's life getting over). On the other hand, if the requirement was to meet the yearly targets and not the cumulative targets, then, with the present combination of programmes, the cumulative savings at the end of Plan period would have been only about 80 MW. Thus DSM targets need to be specified in cumulative terms and the actual savings to be captured will then have to be worked out, depending upon the programmes identified to be included in the portfolio.

ANNEX 2

DSM Plan Document to be submitted by the distribution licensees for the approval of the Commission will be required to include the following general elements:

1. **Executive summary:** Provide here an overview of the Plan, including the DSM target for the Plan period as set by the Commission; the total funding envisaged for the Plan period with a break up of funds for programmes and funds for administration and management of DSM effort by the licensee, including funds for DSM Cell; listing and brief description of the DSM programmes proposed to be implemented for meeting the DSM targets set by the Commission; Plan level and individual DSM programme level cost effectiveness, including impact on consumer tariffs; qualitative and/or quantitative contribution of the Plan towards Commission's key policy objectives; year wise break up of achievement of targets and funds requirement; major assumptions and risks
2. **Introduction:** Discuss here the achievements during the past five year plan, including what targets were set, to what extent were they/are they achieved/ likely to be achieved and the reasons and explanations if the targets set have not been achieved; to what extent and how effectively the funds earmarked have been used; what were the major constraints faced in the implementation of various programmes; what lessons have been learned
3. **Characteristics of Distribution Licensee System:** Present here time series (past 2 to 5 years) information about:
 - a. Power situation in general, including demand met, load shedding, if any
 - b. the consumer base of the licensee – total number of consumers, consumers by rate category
 - c. Total consumption and break-up of the same by consumer and rate category
 - d. Source wise energy purchase and the average rate of purchase of power
 - e. Load duration curve, peak load by season, typical average daily, seasonal and weekly load curves
 - f. Forecast of demand, energy requirement, sales and revenue requirement over the next five years (Plan period), including elaboration of methodology used, data used, statement of underlying assumptions used and basis for the assumptions, sensitivity analysis carried out and changes in assumptions and other conditions assumed for carrying out sensitivity analysis

4. **DSM Plan targets and the resource availability estimates:** Discuss here the DSM targets set by the Commission and the resources likely to be available for meeting the targets through the ARR over the five year Plan term (3.f. as the basis)
5. **Identification of sectors, segments and end-uses for the achievement of set targets:** Discuss here what sectors (domestic, commercial, industrial, agriculture, municipal), segments (consumer category, such as – offices, hospitals, hotels, malls, banks, consumers consuming >500 units per month, industrial cluster -MIDC industrial estate, geographical area, street lighting, grampanchayat water supply systems, specific feeders, etc.) and end-uses (lighting, pumping, heating, space cooling, air-conditioning, etc.) you intend to target for the achievement of the targets set and justification for choosing these sectors, segments and end-uses (*why the identified sector/segment/end-use and why not some other sector/ segment/end-use. Here, it is better to start by discussing the “felt need” status of the consumers in various segments vis-à-vis energy efficiency, load management & fuel substitution, i.e., does any consumer segment has or do any consumer segments have expressed or latent “felt need” about reducing their bills through DSM. If yes, these segments become readily identified target segments. Having a “Felt need” for DSM is a powerful justifier*)
6. **Identification of DSM measures/technology options to achieve DSM targets:** Discuss here the process (including justification) that has been used for identification of DSM measures and technologies (within the identified sectors, segments and end-uses) that you intend to target for achievement of the set targets. Also discuss here the DSM measures and technologies that were considered but were finally rejected and reasons for their rejection, including screening criteria used, if any, assumptions used, if any, basis for the assumptions, etc.
7. **Identification of DSM Programme options to achieve DSM targets:** Discuss here the process used for bundling the identified DSM measures and technologies into DSM programme concepts and then translating programme concepts into DSM programmes. Also discuss here the DSM programme concepts and programme options that were considered but were finally rejected and reasons for their rejection, including screening criteria and assumptions used as well as the basis for the screening criteria and assumptions used.
8. **Identification of DSM Programme options for possible inclusion in the DSM Plan:** Starting with a set of DSM programme options identified under the previous step, discuss here the process and the detailed methodology used (along with justification for using that methodology) for identification of DSM programme options for possible inclusion in the DSM Plan, including selection criteria used, assumptions

used for savings estimates and their justification, cost effectiveness analysis (to be performed as per the cost effectiveness assessment guidelines of the Commission) results, including impacts on consumer tariffs, and impacts in terms of savings. Also describe here the sensitivity analysis carried out and changes in assumptions and other conditions assumed for carrying out sensitivity analysis

9. **Identification of DSM Programmes to be included in the DSM Plan:** Discuss here in details the process and the methodology used (along with justification), for identification of a final set of DSM programme (portfolio of DSM programmes) to be included in the DSM Plan. The starting point for this exercise would be the set of DSM programme options identified during the previous step, i.e. DSM programme options for possible inclusion in the DSM Plan. The outcome here would be identification of a portfolio of DSM programmes, which when implemented will be expected to lead to the achievement of the set DSM target within the available budgetary resources. Also present here an overview of how the chosen programmes contribute to the (and how congruent they are with) Commission’s policy objectives and guiding principles.
10. **Individual Programme Description:** For each of the DSM programme included in the final identified portfolio of DSM programmes, provide following minimum information:
 - a. Programme description:
 - i. Description of DSM measure/technology the programme is intending to promote
 1. Background information on the consumer segment, end-use and the status of various technologies being used in the sector/segment; status of efficient technologies/devices that can be used the particular sector/end-use/segment, including their relative market shares, key market barriers faced in their marketing/commercialization, estimate of their saving potential (technical/economic/commercial); analysis of main opportunities/threats, strengths/weaknesses and issues facing efficient technologies and Description of the technology/DSM measure that will be promoted through DSM programme
 - ii. Consumer segments the programme is targeting and the justification for the same
 - iii. Barriers the programme is addressing
 - iv. Strategy the programme proposes to use, including “the offer” programme intends to make/the marketing mix the programmes intends to use, including justification for the same

- v. Programme implementation arrangements, including major stakeholders and their roles, including justification for the same
 - vi. Describe how the programme is congruent with the Commission’s policy objectives and guiding principles and how it contributes to these
- b. Estimate of yearly and cumulative savings due to the programme with all the assumptions used in measure level and programme level savings estimate, penetration rate assumptions and the basis and justification for the assumptions used
 - c. Yearly Programme funding requirements. Reflect here total programme cost, and then provide year-wise source wise (how much from distribution licensee, how much from participant, how much from other stakeholders, etc.)
 - d. Cost effectiveness calculation details, including programme costs and benefits, impact on consumer tariffs with explicit showing of all the input values, assumptions used regarding input values and basis and justification for the same. Also present results of sensitivity analysis carried out
11. **Yearly and cumulative achievements:** Present here yearly contribution that will come forth from various DSM programmes in the final identified portfolio (to ensure that the Plan cumulative targets are met).
12. **Details about programme portfolio chosen out of 10 to 20 % of budget reserved for education/awareness, sustainability and equity:** Describe here the programme the distribution licensee intends to implement with the 10 to 20 % of the reserved budget. Provide justification for including these programmes and not any other programme, including any selection criteria used, if any and basis for the “selection criteria” used. Also discuss all the assumptions made together with the basis for assumptions. Also describe in what way will they contribute to the Commission’s policy objectives and guiding principles:
- a. For each programme under this category, provide details as per the format presented in “10” & “11” above (minus the cost effectiveness analysis, which is not required for programmes chosen under this category)
13. **Administration and management of DSM by the distribution licensee:** Discuss here the organisational requirements of the distribution licensee for the administration and management of the DSM effort over the five year Plan period, in terms of:
- a. Strengthening of the DSM Cell proposed to be undertaken during the five year Plan period the justification for the same
 - b. DSM plan and programme preparation/development activities proposed to be undertaken during the Plan period and the justification for the same

- c. Research and analysis proposed to be undertaken during the five year Plan period and the justification for the same
 - d. Funding requirements for meeting the licensee's share of the IUWG expenses over the five year Plan term and the justification and basis for the same
 - e. Conduct of potential studies proposed to be undertaken during the five year Plan period and the justification for the same
 - f. Undertaking of any other specific activities for effective and efficient administration and management of DSM effort during the five year Plan period and the justification for the same
 - g. Funding requirement (total as well as year wise for every year of the five year Plan period) for performing activities and tasks proposed to be carried out with respect to administration and management of DSM effort (as described in a to f above) along with justification and basis for the same
14. **Funds Requirement and Financing:** Present here the total as also year wise (for each of the five years of the Plan period) funds requirement for the total Plan. Here, also show the break-up of the total funds requirement (year wise) in to funds required for programme implementation and funds required for administration and management of DSM effort. Also present here how the financing for the funds requirement will come, including the amount that will be expected to be reflected in the ARR of each year of the Plan period.
15. **DSM Plan EM&V:** Describe here the EM&V Plan for the DSM Plan. The EM&V Plan to be included here will be guided by the EM&V regulations of the Commission
16. **DSM Plan monitoring and reporting:** Describe here the monitoring and reporting Plan (frequency, minimum content, format, producers, receivers, indicators and means of verification chosen). The monitoring and reporting Plan to be included here will be guided by the Monitoring and Reporting Guidelines of the Commission
17. **Implementation Plan:** Present here the schedule of implementation of different elements of the plan, i.e the DSM programmes to be implemented as well as schedule of implementation of activities concerning the administration and management of DSM effort. As far as individual DSM programmes are concerned, there will be no need to provide detailed activity by activity schedule of implementation, but such schedule may be provided for major "works" or "tasks" contained in each DSM programme.

ANNEX 3

DSM Programme Document

The PD will guide the implementation of the DSM programme and will be the reference document for the licensee as well as the Commission and other stakeholders. As described in Section 10, Annex 2, it will have information on the consumer segments (Shopping malls, Clubs, 5-star hotels, etc.) where identified DSM measures are to be promoted. It will also have 'offers' to motivate target segment consumers to adopt identified DSM measures; 'offers' to motivate other entities in the supply chain, i.e., financiers, energy delivery companies, equipment vendors, contractors, etc. to participate in the programme. Besides, it will have definition of delivery approach and identification of partnerships needed. It will also have promotion, administration, data collection and post-implementation evaluation plans. It will also have definition of programme management/implementation organization, institutional relationships, detailed programme implementation plan with time lines and implementation responsibilities, etc. In particular, DSM Programme Document (PD) will be required to include the following general elements:

1. Programme description:

- a. Description of DSM measure & technology the programme is intending to promote, including:
 - i. Listing of brands and manufacturers/vendors that will be eligible for inclusion in the DSM program (e.g. CFL bulbs having power factor of more than 0.85, which can handle voltage levels within 160-300V range, which of make X, Y, Z etc.)
 - ii. Description of prices at which participating brands will be available, along with description of quality assurance and replacement/guarantee policy
- b. Consumer segments the programme is targeting, e.g. domestic consumers in socio-economic categorization B and C in western Maharashtra towns having population between 1 and 3 lakh OR consumers having centralized air conditioning systems of size 50 tons or above, etc.
 - i. Description of eligibility criteria to be used for identification of potential consumers within the identified target segment (e.g. consumers

who have good track record of payment or consumers who are staying in own residences – not in rented premises)

- c. Other stakeholders in the supply chain (financiers, ESCOs, equipment vendors, consultants, energy auditors, trade associations, groups of persons, NGOs, academic institutions, government organisations) involved in the implementation process, including description of their roles and responsibilities and manner of participation
- d. Barriers the programme is addressing
- e. Strategy the programme proposes to use, including “the offer” programme intends to make/the marketing mix the programmes intends to use for motivating consumers and other stakeholders in the supply chain; delivery approach and process, including description of partnerships envisaged, also:
 - i. Description of payment and collection system – who will make payment and how much (consumer? Licensee? ESCO?); How the payment will be made, when the payment will be made? Who will collect the payment? How the payment will be collected (up-front, instalment, from savings, shared savings, ESCROW account, through bills, etc)? When the payment will be collected?
 - ii. Description of incentive, if any, to be offered – what incentive, how much incentive, to whom incentive (consumer, intermediary or vendor), description of mechanism to pass on the incentive, when to pass on the incentive, etc.
 - iii. Description of how the target segments/consumers will be informed of the DSM program, e.g. description of how will the target consumers be informed of the launch of the DSM program. Description of how the target consumers will be informed about the program elements and how to participate in the program
 - iv. Description of how the target consumers will be motivated to participate in the DSM program, i.e. description of program promotion strategy – e.g., awareness campaign? Door-to-door canvassing?
 - v. Description of delivery mechanism, i.e. description of how the efficient device/technology/brand will be made available to the target segment – through vendors and retail? Through direct marketing (e.g. Amway model)? Through door-to-door selling?
- f. Description of Programme management and implementation arrangements, including description of institutional relationships

- i. The section will also have description of how the program will be organized and managed, i.e. programme implementation organization, including description of who all will be involved in program implementation, along with their roles and responsibilities: e.g. if the program will be implemented internally by distribution licensee or will be out sourced. If outsourced, the section will contain draft documents for EOI, TOR, tender evaluation methodology, etc. ; who will be the main “driver” or “owner” of the program and who will be the supporters of the program, what will be the roles and responsibilities of the “owner” and other supporting individuals/ organizations /institutions.
- ii. The section will also have description of the institutional mechanism, if any, for (Committee/Advisory Group, etc) program guidance, review and supervision.
- iii. Description of what will be expected of the distribution licensee in terms of:
 1. Coordination between field and HQ; between field and accounts/billing, if any
 2. Performance of activities of routine nature (as a result of launching of DSM programs) as well as program specific which may be of “one-off” nature
 3. Establishment of new systems and/or structure (e.g. new billing system for collection of cost of efficient device through bills, OR system to track/research load on various feeders)
 4. Employment of new practices/processes
 5. Description on internal processes/steps to be followed within distribution licensee for arriving at various decisions, along with description of who is responsible for piloting the internal process for getting decisions and that persons/sections role and responsibility: Discussion notes required, detailing out decision points for the consideration of the licensee management (The note will describe alternative options for each of the decision points and present pros & cons matrix that will help the Management of the licensee in arriving at a considered decision)

2. EM&V, monitoring & reporting: The section will describe EM&V and monitoring and reporting plans

- a. Description of base line calculation and description of monitoring and verification methodology
- b. Description of DSM program monitoring, review and impact (in terms of program participation, in terms of increases in penetration level of efficient devices and technologies, and in terms of load reduction/energy savings) analysis system/mechanism – who will monitor, what will be monitored, how will be monitored, who will verify, how frequently will be monitored, who will prepare monitoring/progress reports, etc.

3. Detailed Implementation Plan

- a. This section will describe if the program will have any phases (e.g. demonstration/pilot etc.).
 - b. The section will also have description of main activities, and indication about their sequencing and interdependence. For each main activity, the section will also provide description of who will, in the main, be responsible for the activity and when will the activity be performed.
4. Estimate of yearly and cumulative savings due to the programme with all the assumptions used in savings estimation process, including base line considered
 5. Yearly programme funding requirements. This section will have description of financing arrangement, including share of distribution licensee, vendors, consumers, retailers, State government, Central government, etc
 6. Cost effectiveness calculation details, including programme costs and benefits, impact on consumer tariffs, with explicit description of all the input values considered and all the assumptions used in cost effectiveness calculations and for input values
 7. Discussion about the extent of congruence of the DSM programme with the MERC key policy objectives and guiding principles, especially with “additional” parameters listed in Section 13
 8. **Dispute Resolution Mechanism:** Appropriate mechanism to be suggested for resolution of disputes arising during programme implementation stage. Statement of how the programme implementer will resolve concerns and issues (participation, equity and other issues that may crop up) that the distribution licensee may have as regards the manner in which the programme is being implemented
 9. **Training/Seminars/Workshops proposals will be on following lines:**
 - Theme of training/seminar/workshop with justification for the same
 - Structure (in class + field trip; in class + group exercises; theory, case studies, group exercises; et al)) + Coverage with justification
 - Number of courses/events/seminars/workshops

- No of days per event
- Possible dates/location
- Audience/participants
- Marketing/publicity for the event
- Possible resource persons and partners
- Preparatory work
- Possible funding sources (Contribution from Participants?)
- Future spin-off possibilities

10. Consumer awareness / information programme proposal will have, at the minimum, following information:

At the very broad level, the proposal should be able to provide understanding about:

- Purpose of awareness: What is it that we want to achieve along with description of where we are at the moment and where do we want to reach
- Why do we want to achieve what we want to achieve or how will awareness help in reaching where we want to reach – i.e., justification
- How do we want to achieve what we want to achieve – strategy, plan, outputs, activities, inputs, assumptions, risks

The proposal:

- Narrative: Background and where does “awareness” figure in the overall effort to promote energy efficiency/load management or fuel substitution. What is need for an awareness campaign? Why we need to create awareness? How is awareness creation justified?
- Broad level Objectives of the awareness campaign/awareness creation effort
- Who are the target audience & why (justification)
- Specific Objectives of the awareness creation effort along with justification:
 - Cognitive change (awareness, knowledge, attention, exposure)
 - Affect (change in attitude – interest, desire, prefer, conviction, interest, evaluation, attitude, intent)
 - Behaviour change (To get to act-adopt EE – action, adoption, purchase, trial-adoption)
- Message design: (attention, interest, desire, action: appeal -persuasiveness, comprehensibility, generation, desirability, exclusiveness, believability) & justification

- § Content – what to say?
- § Structure – How to say it logically?
- § Format – How to say it symbolically?
- § Source – Who should say?
- § Audience situation/stage
- § What to appeal, rational positioning, emotional positioning
- Communication Channels (Reach, frequency, impact) & justification
 - § Personal
 - § Non-personal – media, events
- Communication Budget & justification
- Communication mix & Justification