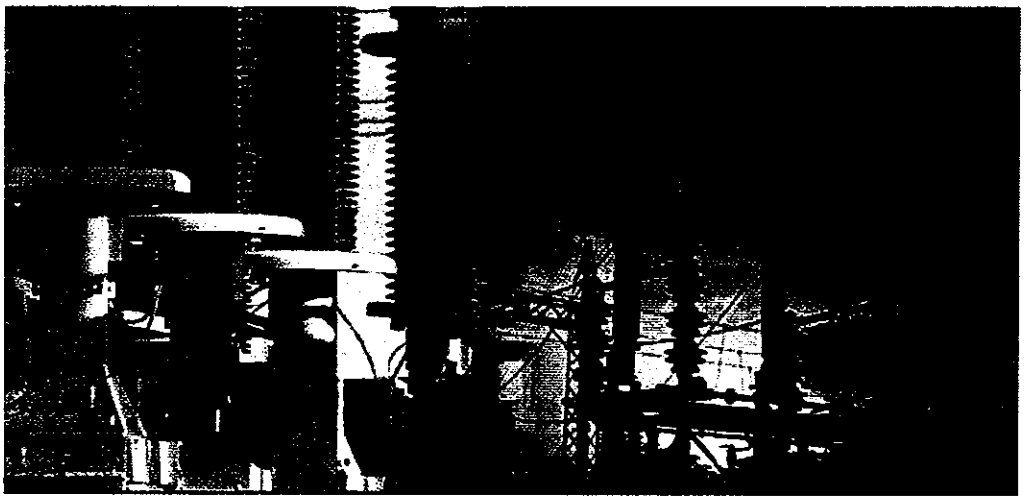
ECO

PN-ACQ-198

Energy Conservation and Commercialization Project

A Program of USAID, Ministry of Power & ICICI



DSM Cell Establishment and Assessment

Jaipur

Activity 11 Milestone B

USAID Contract Number: LAG-I-809-98-00006-00

Implemented by: NEXANT INC

23865-809.0021

Table of Contents

Preface 1

Background 2

Executive Summary 4

Objectives 6
- **Scope of Work** 6
  - *Establishment of DSM Cell at JDISCOM* 6
  - *Cell Training* 10
  - *Cell Assessment* 17

Next Course of Action 18

Proposed Plan of Action 22

Appendices 23

B

Preface

This report is a part of the deliverable for ECO Milestone 11B and documents the work done to fulfill the requirements for the first portion of Activity 11B: "Establish a DSM Cell in at least 1 DISCO of the focus state and assess their staff needs." This milestone is the second in Activity 11: Electric Utility DSM/Energy Efficiency Capacity Building. The first milestone of the activity, establishment of selection criteria and identification of the focus state has been completed. The identified focus state was Rajasthan, and the Jaipur DISCOM volunteered to establish the first DSM cell in the state. Details of that establishment process and of the assessment of the cell's staff needs form the text of this milestone report.

The ECO project is being implemented by Bechtel National Inc. (Nexant Inc) under a USAID contract. LAG-I-00-98-0000. This contract has been issued by the USAID Mission in New Delhi as a part of the IQC (Indefinite Quantity Contract) currently in place through USAID's Global Bureau. The project contract was signed on February 29, 2000 and continues through December 2003.

The main participants for this activity were:

- Mr VM Thakor, Nexant ECO Project Staff;
- Dr. Claire Fulenwider, Private Consultant on Energy and Electric utilities; and
- Saha Sprague Limited, ECO Project subcontractor.

Implemented by: NEXANT INC

New Delhi
1D-II, Parkwood Estate, Rao Tula Ram Marg, New Delhi 110 022
Tel: 91-11-618 8816, 618 1376
Fax: 91-11-619 0022
Email: Nexant@vsnl.com

Mumbai
408, Dalamal Tower, Nariman Point, Mumbai 400 021
Tel: 91-22-288 4554, 282 5869
Fax: 91-22-288 4555
Email: Nexantm@vsnl.net

Background

The Government of India ('GOI') and the US Agency for International Development ('USAID') signed a joint project agreement on January 28, 2000, refers to the implementation of the Energy Conversation and Commercialization Project ('ECO'). The ECO is a 4-year program that targets the reduction of greenhouse gas ('GHG') emissions per unit of electricity generated and consumed in India.

ECO aims to promote widespread commercialization of energy efficiency technologies and services in India, thereby contributing to the reduction in growth of GHG emissions. However, assistance will be provided for developing a market oriented policy environment for commercialization of energy conservation and enhancing the capabilities of the private and financial sectors for deploying market-based mechanisms for energy efficiency investments. The ECO project supports USAID's Climate Change Strategy and will contribute to USAID/India's Strategy Objective for increased environmental protection in energy, industries and cities.

ECO will facilitate the commercialization of energy services and technologies through a two-pronged strategy:

- Energy Efficiency Market Development and Financing (Markets Component); and
- Energy Efficiency Policy and Institutional Reforms (Policy Component).

The Markets Component will undertake the following major activities:

- Technical and project structuring services for sponsors;
- Development of financial incentives for credit enhancement/risk mitigation;
- Support to energy efficiency services industry;
- Efficient technology promotion;
- Market conditioning and promotion; and
- Non-sugar co-generation market development.

The policy component will cover policy, regulatory and institutional reform issues at the central and state levels including the following major activities:

- Energy efficiency policy and institutional support;
- Energy efficiency standards for labeling for consumer appliances;
- Energy efficiency improvement in Government facilities and private buildings;
- Energy efficiency through regulatory reform and restructuring;
- Electric Utility DSM/energy efficiency capacity building;
- Development of State energy efficiency financing schemes; and
- DSM/energy efficiency within privatized distribution utilities.

Technical assistance ('TA') and training will be provided to various government agencies to assist them in creating a market-oriented policy environment conducive to investment in efficiency. TA and training will be provided to the private and financial sectors to design and implement energy conservation projects. The Ministry of Power (and the subsequent Bureau of Energy Efficiency) will be the partner agency for the ECO project. State-level activities under the Policy Component will be coordinated with the State Regulatory Commission and State Electricity Boards (including its functionally unbundled entities) of the focus-state.

"Electric Utility DSM/Energy Efficiency Capacity Building" focuses on working with an unbundled SEB to develop energy efficiency and DSM capabilities within the utility. Under this activity, Rajasthan was identified as the focus state and a DSM cell was formed by the utility in the Jaipur DISCOM at the state of 2001.

There are 3 deliverables under Milestone B:

- Establish a DSM Cell in at least 1 DISCO of the focus state and assess their staff needs;
- Conduct at least 2 workshops on Cell Organizational and Management; and
- Conduct 2 regional training programs on the role of energy efficiency.

Executive Summary

Rajasthan was selected as the focus state for DSM cell development in the fall of 2000. By January 2001, the DSM cell at the Jaipur DISCOM was established. An assessment of the DSM cell activity was conducted during this period.

Staff members assigned in early January were two executive engineers and an assistant engineer. At the same time, space was allocated and the senior Ex. Eng. Mr. C.P. Agarwal was made In-charge of the Cell with due authority to complete assignment of staff to the cell by selecting two Junior Engineers and two stenographers, who are also conversant with computer operation.

A week's training followed by assessment was completed with the 3 senior members of the cell by Nexant staff Mr. V.M. Thakor, and the US consultant, Dr. Claire Fulenwider. Subsequently, DSM work and workflow, the nature of analysis that needed to occur, work sequencing, skill sets required for various work tasks and personnel issues were reviewed. The cell members with assistance from the Nexant staff, developed preliminary work plans, staff assignments and assessments of time requirements for various DSM tasks. These are explained and delineated in more detail in following sections of this report.

Assessment of the DSM cell, its organization, resources and challenges, also occurred within that week. Staff members initially assigned appears to be well trained and qualified for the tasks required for success. Top management support is solid and objectives for the cell have been made clear. Chairman and managing Director ('CMD') Mr. Umesh Kumar IAS, has been responsive and timely to all requests from Nexant/USAID with regard to the DSM cell. As conveyed, DSM Cell presently is an independent unit and reports directly to CMD. It will be critical, on a going forward basis, that cell's status and responsiveness of top officials continue to occur and the DSM cell is understood by the entire DISCOM organization as a vital new endeavor that is expected to have real longevity. CMD's leadership will be vital to assure the communications and intra-organizational support for the cell on an as-needed basis.

All 3 engineers assigned to the Cell attended the two-day workshop held in Jaipur on January 23-24, when the cell inauguration was implemented in the presence of senior officials from the State Govt., RERC and the three DISCOMs. In the workshop, course content on DSM Cell organization and management was presented. For additional detail, refer to a separate report on these workshops on DSM Cell Organization and Management.

A viable DSM cell needs to provide for several primary component of work, market assessment, program design and development, program implementation and evaluation and monitoring. The market assessment work component involves load shape development and analysis and the establishment of a DSM baseline load forecast. It also includes DSM measure identification, cost-benefit analysis of these measures and development of a DSM plan for achieving low cost energy and demand savings over a specified time period. Program design and development requires market knowledge, vendor knowledge and the ability to develop and structure the various processes needed to administer successful customer programs. This includes functions such as metering and billing processes, application procedures, customer financing, tracking and monitoring of savings and costs. Program implementation involves actual execution of the program and assuring that it reaches its targeted audience and achieves the highest participation rate at the lowest cost. Customer and vendor contact and communications require paperwork processing, data collection and overall quality control. Monitoring and evaluation component measures, access whether or not the planned activities and programs achieved their objectives in terms of energy and demand savings, loss reduction, environmental impacts, and customer participation and cost level. From these data, on-going annual processes can be established for selection of desired programs to meet DSM objectives, evaluation of their results and cost-benefits, and forecasting of expected system loads and low cost supply requirements.

The critical remaining work is the completion of the staffing of the DSM cell and securing the necessary computer and software resources and special measuring instruments and support equipments. In addition, CMD needs to clarify the reporting relationship of the DSM cell directly to him-self and make regular direct communications with the cell, a matter of routine.

A recent report on information technology success in India found that "other managerial inputs such as management commitment, proper processes and procedures, appropriate policy framework and developing the right attitude in staff, is essential for the new IT system to be effective in producing the desired results." (Manohar, V.M., "Use of Information Technology to Increase Revenues in Distribution Systems," COPU Conference on Energy Theft and Metering Technologies, 29-30 June, 2000, New Delhi, p. 7). This is equally true for demand side management and the establishment of new cells in local state distribution companies. Effective change in management is required, if concept such as demand-side management is to succeed within very traditional utilities in the country.

Objectives

The overall function of this Activity is to enhance the capacity of the utility to stimulate energy efficiency throughout India by implementing Demand Side Management ('DSM').

The specific objectives of Milestone B are 4-fold:

- To establish a DSM cell in at least 1 DISCO in the focus state (Rajasthan);
- To assess the staff needs of this DSM cell;
- To conduct at least 2 workshops on DSM Cell Organization and Management; and
- To conduct 2 regional training programs on the role of Energy Efficiency.

This report summarizes the work completed to fulfill the first two of the abovementioned objectives.

Scope of Work

The work undertaken to fulfill the portions of this activity is discussed in three sections:

- The establishment of the DSM cell at Jaipur DISCOM;
- The training of the senior cell staff, and
- The assessment of the cell. This latter section discusses the adequacy of cell staffing, resources and general support and lays out subsequent actions and work requirements to help assure the success of the cell.

Establishment of DSM Cell at JDISCOM

During the fall of 2000, extensive work was completed in determining criteria for the selection of a focus state for DSM cell development and work. The work has been summarized in an earlier report, Milestone 11A. Rajasthan was selected as the focus state resulting in the establishment of the Jaipur DISCOM, the site of the first formally established DSM cell in the ECO project.

Initial Steps

Rajasthan having been selected as a focus state, it was informally conveyed to the CMD of JDISCOM, Mr. Umesh Kumar and Chief Engineer Mr. Bishnoy, in the meeting held on November 6, 2000 by the energy team constituted for the selection of the Focus State. The same was also conveyed to Secretary (Energy) of the State Govt. Mr. C.S. Rajan, IAS and CMD of JDISCOM in a joint meeting. The Secretary (Energy) issued a letter of interest, long-term commitment and support for conducting DSM activities in the State in favour of USAID (Appendices A). Director, USAID responded to the said letter vide his letter dated November 28th, 2000 to the Secretary (Energy). Rajasthan having been selected as a focus state and DSM activities being established at JDISCOM was conveyed to the Secretary (Energy) vide letter dated -------- by Secretary (Power) Govt. of India (Appendices C).

The DSM Cell establishment, its role, structure, infrastructure requirements, etc., were discussed in detail with CMD, who readily agreed for staffing with three Ex.Engs. One Asst. Eng., two Jr.Engs, two clerks and a steno to start with. This strength would be reviewed at a latter date for additional requirement. Accordingly, CMD selected two Ex. Eng. and one Asst. Eng. and placed them in the DSM Cell in early January 2001. Mr. C. P. Agarwal, Senior Ex. Eng. was made In-charge of the Cell. Space was also allotted to the Cell in the corporate office, which would be suitably increased once the reshuffling and shifting amongst three DISCOMs take place. CMD conveyed that DSM Cell will be an independent unit and would report to him. A list consisting of important measuring instruments and supporting equipments as well as essential infrastructure requirement was also submitted to CMD, who assured to look into and make necessary arrangements. The policy statement on Power Sector Reforms in Rajasthan of 1999 provide for Demand Side Management with the objective to

improve efficiency in supply and end-use. For details refer to the report on selection of Focus State under Milestone 11A.

DSM Objectives

CMD Mr. Umesh Kumar clearly stated the objectives for DSM within the state of Rajasthan and for the Jaipur DISCOM in particular. Those objectives were specified as:

- Achieving strategic conservation (energy savings) so that the unmet demand of end-users can be better served;
- Reducing transmission and distribution losses; and
- Improve revenue by increasing sale by meeting unmet demand.

The focus of DSM for the Jaipur DISCOM should be customer oriented.

A comprehensible statement of objectives is one of the most critical requirements for success of any demand-side management activity. Each objective drives different DSM measure selection and program design. Clear objectives contribute to acceptance and support for the DSM cell within the organization. This project is fortunate that the CMD at Jaipur's DISCOM provides this leadership.

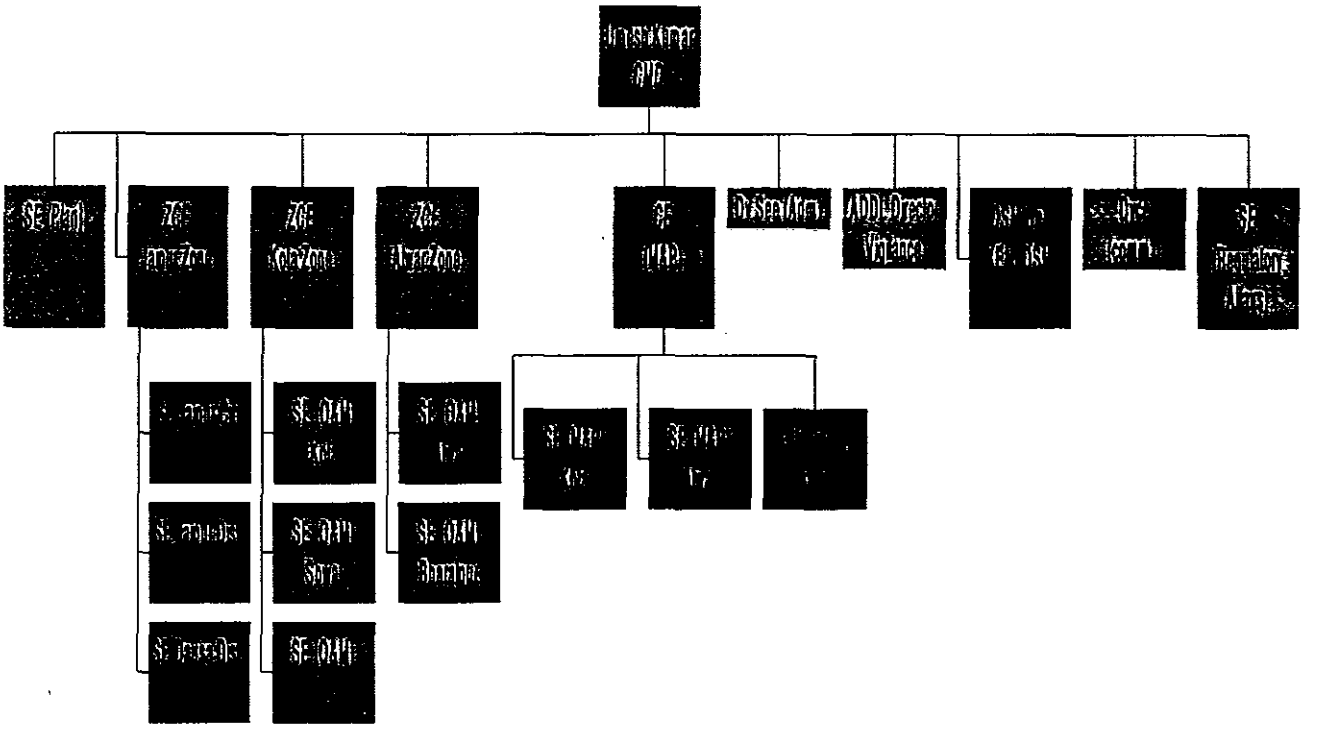
Cell Members

- Mr. C.P. Agarwal is B.E. (Elect.) and is an Ex. Eng., having 28 years of experience with Rajasthan State Electricity Board ('RSEB'). He was selected by CMD JDISCOM and placed in DSM Cell as its Head in early January 2001. With his long experience and knowledge of T&D, he would be able to guide and oversee all the functions of DSM Cell.
- Mr. Ramji Lal Kejriwal is B.E. (Elect.) and is an Ex. Eng. having 22 years of experience with RSEB. He was selected by CMD and placed in DSM Cell along with Mr.Agarwal. His long experience in metering and measurements in distribution system, would be very useful in integrating this work with that of DSM Cell.
- Mr. Ajeet Saxena is B.Tech (Elect. Power) as well as MBA in marketing and is an Asst. Eng. having 17 years of experience with RSEB. With the field experience of T& D system and excellent public relations, he will be very useful in marketing of DSM activities.

Following three additional officials were placed in DSM Cell in the beginning of February 2001.

- Mr. Madan Lal Jhalani is B.E. (Elect.) and is an Ex. Eng. having 35 years of experience with RSEB. He has worked in Distribution and O&M of HT and LT systems of rural and urban areas. He has also been associated with Energy Consumption and Project Cell (EC&P Cell). His vast experience in T&D as well as EC&P cell would be useful in DSM project preparation and implementation.
- Mr. Navin Arora is B.E. (Elect.) and is an Asst. Eng. with 22 years of experience with RSEB. He has worked in O&M of Jaipur city Distribution Network Design as well as Procurement of Electrical Equipments/Materials used in power system network. He has PC with Internet connection at home and is a computer literate. His knowledge and experience in the area of O&M of Jaipur city distribution network design, and computer operation would be very useful for DSM activities.
- Mr. Pankaj Parekh is B.E. (Elect.) and is a Jr. Eng. with 7 years of experience with RSEB. He is a Post Graduate Diploma holderin Marketing and Sales Management from Bharti Vidya Bhavan, Mumbai. He is also doing M.E. (part time) from MREC, Jaipur. He has worked in Transmission and O&M wings as well as Substation Procurement Circle (Material Management Wing). His experience on transmission as well as O&M will be useful in the field operation of DSM activities.

Jaipur DISCOM Organization

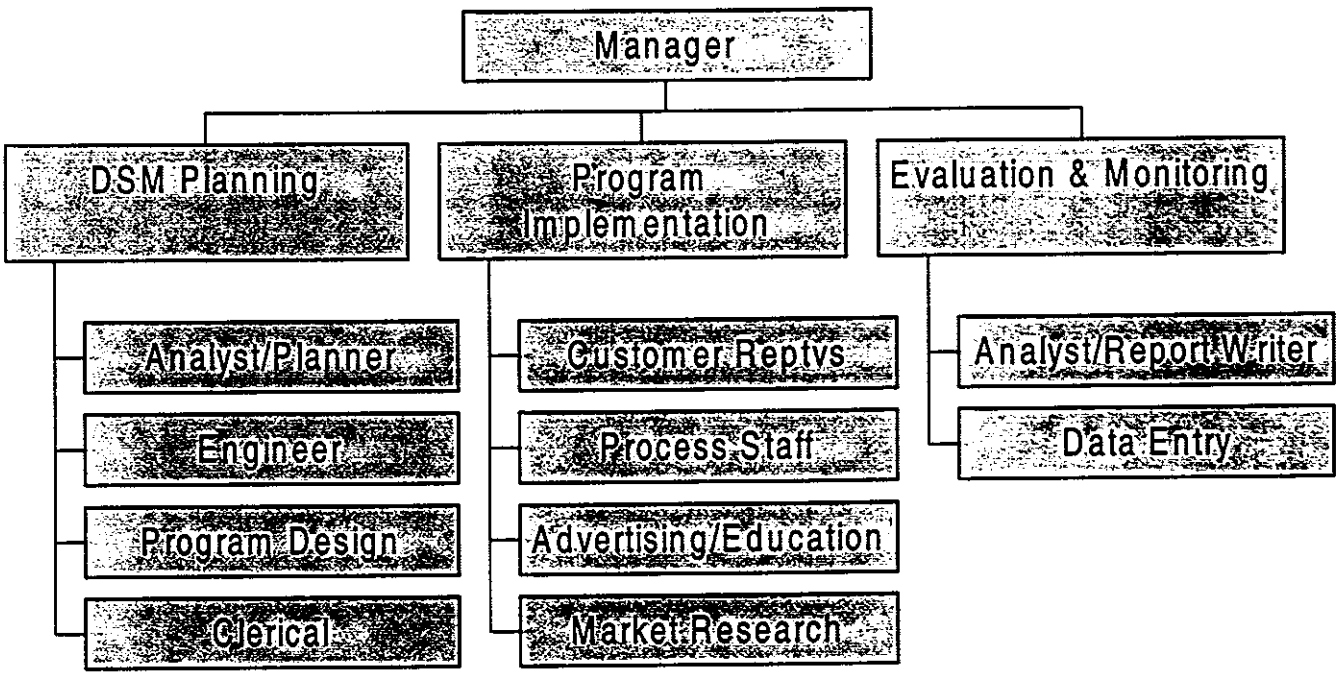


Organizational Structure

- The chart above depicts the placement of the DSM cell within the Jaipur DISCOM organization. The two distinct marked features of the DSM function on this chart is the cell itself, (indicated on the right side of the chart) reports directly to the CMD. The second is where Ex. E. Kejriwal reports, (indicated in the center of the organization chart), presently to a Chief Engineer ('M&P') as he is assigned a special task of installing meters on all 11 KV/EHV feeders of JDISCOM. This work is likely to last for approximately 6 months. The provision of meters would enable the energy input as well as out going from 11 KV feeders of JDISCOM, which would be used in T&D loss evaluation and monitoring. It was conveyed, that this arrangement is for short period, hence does not anticipate any problem about the availability of Mr. Kejriwal for DSM work. However, this needs to be clarified. The important issue of DSM Cell is the rank, which is obviously not comparable to that of CE and SE reporting to CMD and needs to be clarified and incorporated in the organization chart with due pronouncement by CMD. During discussions, CMD clarified that for the present, this arrangement would continue and would be reviewed at a suitable time for heading the Cell at the level of S.E.

A typical DSM cell is structured along the following lines. With increase in number of personnel , we would anticipate that the cell structure would approximate the model below.

DSM Cell Function & Staffing



The present staff reflects initial selections only. We would anticipate that as the utility's understanding of DSM work grows and the initial staff achieves success at bringing value to the utility and fulfilling DSM objectives, additional and/or different staff would be assigned to the unit.

(Do we require this since this is mentioned in the proposed plan of action at the end)

❑ Cell Training

Meetings were held on January 9th, 10th, 11th and 12th with Mr. Agarwal and Mr. Saxena. Mr. Kejriwal also attended the meeting on January 12. All meetings were held in Jaipur, at either Jaipur DISCOM office or Taj Jai Mahal Hotel.

The following issues were covered:

- ❑ Resource needs and availability: space, communication facility (Telephone/Fax/E-mail), computers, software, furniture and measuring instruments and equipments;
- ❑ Structural issues such as reporting and intra-company relationship;
- ❑ Delineation of the DSM work, the DSM process and its major components, critical tasks and skills required to do the work well. See Attachment 2a, 11B;
- ❑ Personnel resource requirements, the skills needed to do the job well and personnel availability. See Attachment 2b, 11B;
- ❑ The nature of the work by type and which individual in the cell might perform best. See Attachment 2c, 11B; and
- ❑ Development of a preliminary work plan indicating tasks, milestones, time frame for work and who would be assigned responsibility for that work. See Attachment 2d, 11B.

Resource Needs and Availability

Resource needs and availability as discussed with CMD are as follows:

Communication

Separate telephone connection	:	Agreed
Through PBX (1 + 2)	:	1 existing & agreed for remaining for other officials
Fax	:	Agreed

Computer

Personal Computer (PC) 2 Nos with one printer	:	Not possible under present policy Requested for providing under AID
Internet connection	:	agreed. Will be obtained once PC's are made available
Space	:	120 Sq. feet already provided. Additional will be made available in due course
Office furniture for all DSM staff	:	Agreed

Measuring instruments and equipments

TOD meter	:	Available
Energy Meter Calibrator	:	Available
Tong Tester	:	Available

Fluke Power Meter	:	Agreed to procure
P.F. Meter	:	Agreed to procure
Lux Meter	:	Agreed to procure
Loggers		If not possible under AID, agreed to procure

Vehicle

Transportation	:	Available from pool of vehicles

Mr. Agarwal has already taken initiatives for the procurement of instruments and separate telephone connection besides provision of fax, which is on priority. Once the computers are made available, Internet connection will be obtained shortly. Additional space will be provided as soon as some portion is vacated by other offices under reshuffling, as clarified by CMD. CMD was quite positive for providing facilities as agreed.

Additional Resources Required: (Quick, initial list.)

- Computer training will benefit the cell members, especially in the areas of load shape development, load research and modeling.
- Computer resources are needed, to start with 2 PCs and one printer. Ultimately, may require more PCs depending upon the progress of work.

Software that develops load shapes and assists in DSM Baseline development, such as EPRI's IRP Manager, US DOE's 2.1 Energy simulation model, US DOE's PEAR (Program for Energy Analysis of Residences), EPRI's COMMEND (commercial) or REEPS (residential) or INFORM (industrial) and DS Manager would be good modeling software and useful in program development.

ACTION ITEM 2: The resource list for computer hardware including printer (soft ware not included), Internet connection and appliances and equipments has been submitted to CMD and USAID. The entire above requirement has been discussed with CMD for action and fulfillment.

Structural Issues

Reporting issues are important for the success of the DSM cell. Presently, the Cell located in the corporate office, will ensure its access to the top management. Initial feedback indicates Mr. Agarwal reporting directly to CMD. This is both attractive and desirable but needs to be made very explicit. As indicated by CMD, Cell as a separate unit directly reporting to him has been made to known all concerned. The management structure, as understood, is under going a transformation and it would be necessary to be placed appropriately in the revised structure. It is desirable that a notice of the work and significance of the DSM cell to the utility is made known to all concerned. Mr. Agarwal will be responsible to meet and communicate regularly with the CMD. These should occur at least monthly, more frequently if needed. Communications between face-to-face meetings should occur more frequently and more easily, via phone, email or written notes.

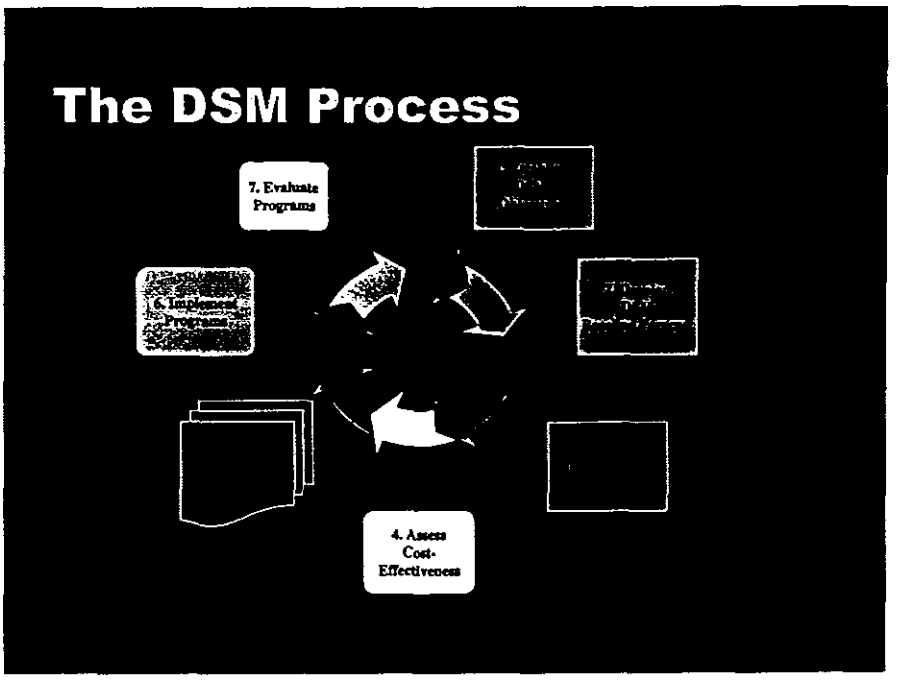
Intra-company relationships are equally important to the success of the new cell. If information is not provided for the cell to complete its work, success obviously will not occur. Currently, Mr. Agarwal's status within the organization is not as high as that of the other reportees to the CMD. Other cells reporting to CMD are either headed by S.E. or C.E. CMD, will need either to promote Mr. Agarwal to

a higher level more comparable with his other direct reportees, or make an explicit announcement to the organization that he expects full, total and timely responsiveness to requests by the DSM cell of other areas of the organization.

ACTION ITEM 3: CMD needs to make a public announcement of the importance of the cell and expected levels of cooperation from the organization to help ensure its success. To assure that this communication occurs Nexant (Mr. V.M. Thakor) will do necessary follow-up with CMD.

DSM Work & the DSM Process

The basic components of DSM work and the elements in the DSM process were reviewed with the senior staff. The DSM process can be illustrated by the following:

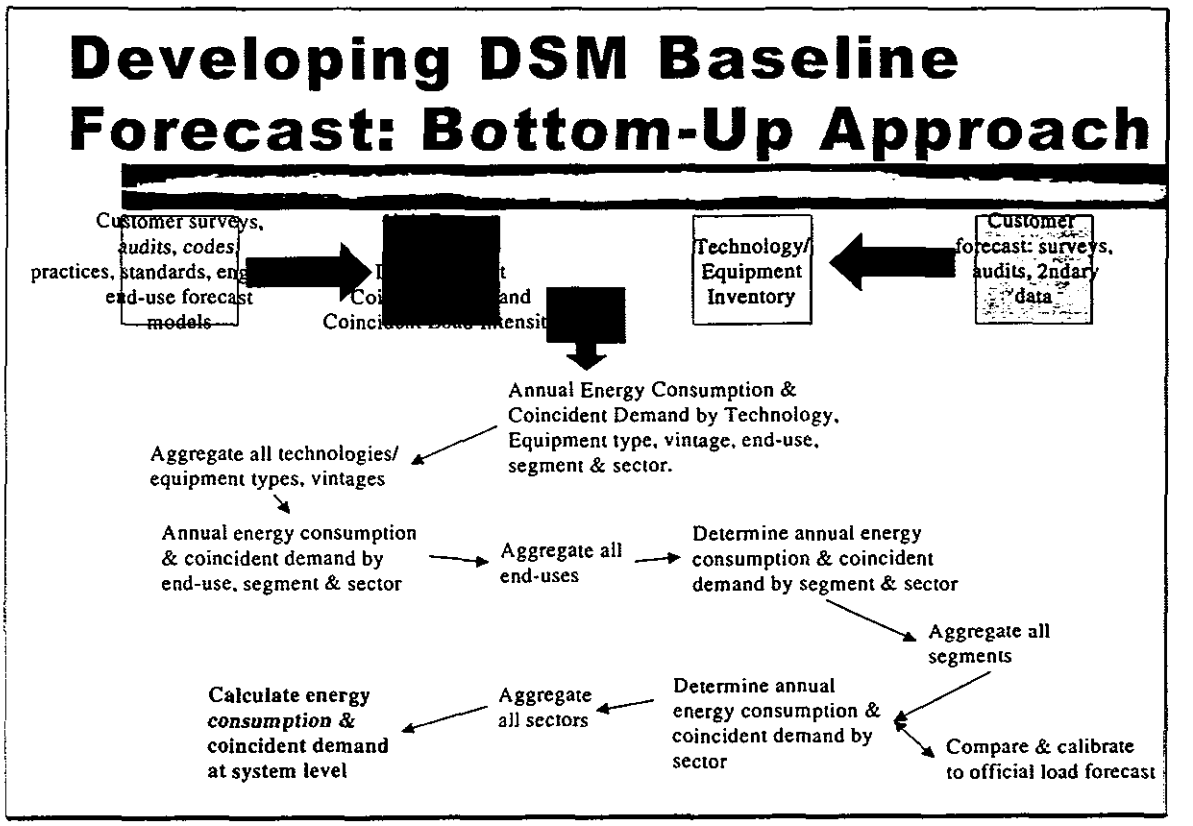


DSM objectives have been clarified by CMD and communicated to the DSM cell senior staff. The principal objective for the DSM cell is to achieve energy savings to enable unmet demand of consumers accommodated effectively. Secondarily, the DSM cell should make an effort to reduce transmission and distribution losses in the Jaipur DISCOM system. Peak demand reduction is less critical than energy savings, although it is anticipated that energy savings will assist in reducing system peak also.

DSM Baseline Forecast Work

The initial task for the DSM cell is to develop a DSM baseline forecast. The DSM baseline forecast is used to identify the DSM potential among the customer base and on the distribution system. The DSM baseline is derived from the utility's official load forecast which historically does not contain the level of detail required to estimate the impact that DSM measures can have on forecasted energy load and peak system demand. Consequently, a different framework developed around DSM measures and/or end-use technology would generally be developed to accommodate various calculations to derive DSM impacts.

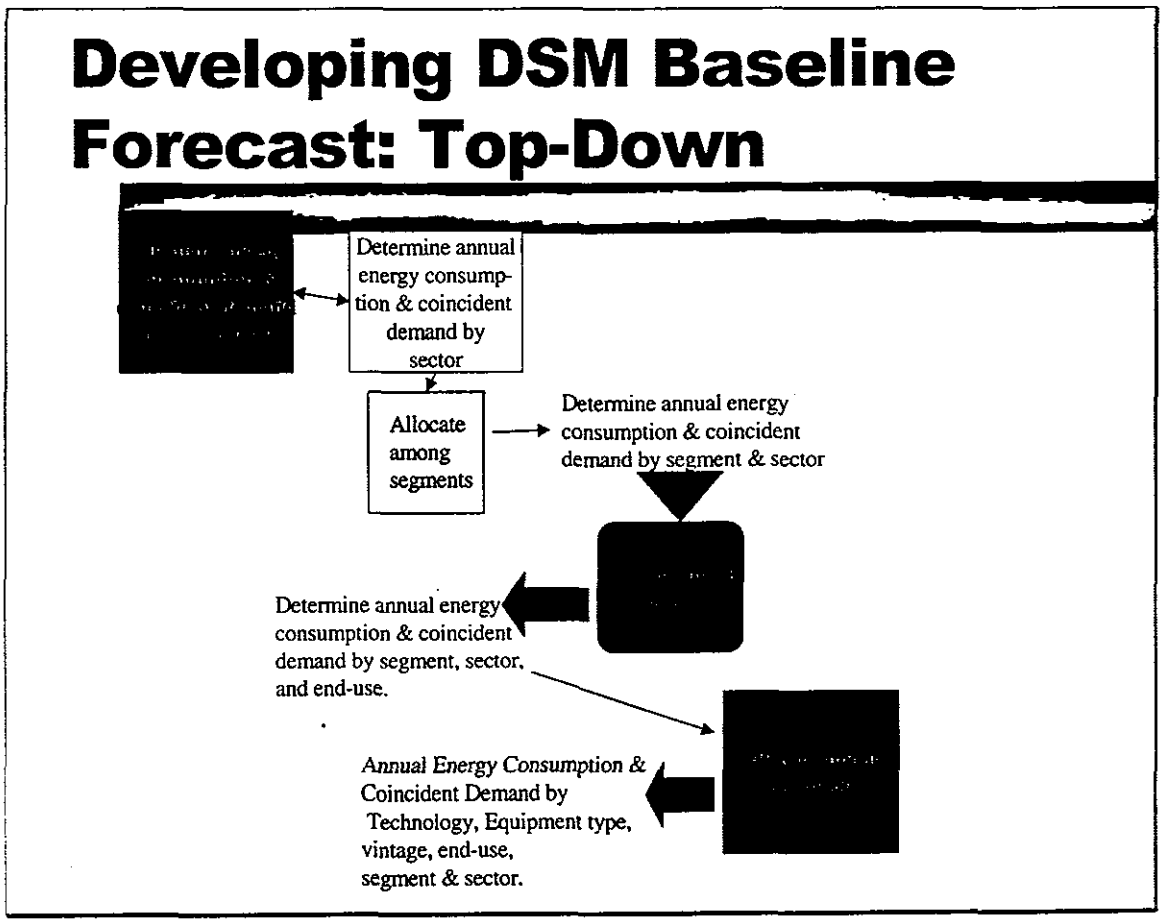
The level of detail in the baseline forecast is usually a function of the data available. System level data is used initially, with progressively more detailed data accumulated as available at the sector or tariff class level, segments within sectors, end-uses for the segment, and then technology. Estimates of impacts of specific equipment or measures for equipment are then manually calculated and compared to the technology or end-use level data in the baseline forecast.



The model above outlines a bottom-up approach that may be available to access adequate data. The forecast starts with customer surveys, audits, and general sector data, usually with pre-existing models and secondary data, and a technology equipment inventory. From that unit energy consumption, energy use intensity, unit coincident demand and coincident load intensity are determined. Annual energy consumption and coincident demand are calculated by technology and equipment type and vintage. Further, all technology and equipment types are aggregated and annual energy consumption and coincident demand are calculated by end-use and segment and sector. End uses are then aggregated and energy and coincident demand calculated by segment and sector. Segments are aggregated and calculations are done for the sector. Furthermore, the sectors are aggregated and the calculations made at the system level. Calibration and comparison has to be made to the system load factor at the segment and sector level.

If the method is too data intensive and time-consuming, a reversed top-down approach should be used. In this process, it initiates with the utility's official load forecast at the sector level and does not have a forecast at the segment or end-use level. Annual energy consumption and coincident demand are determined by sector. These data are allocated among segments within each sector. Billing records assist in this step. Energy and coincident demand are then estimated by segment within sector. These data are then allocated among end-uses for the sector using engineering simulations, load research, audit records or modeling data, and annual energy consumption and coincident demand are estimated by end-use. The final step is allocating down to the technology and equipment type level and

estimating energy consumption annually and coincident demand. At this step, load research data, audits, regional or national secondary data and engineering simulations are used. The following diagram illustrates this approach.



The latter approach is probably more feasible for the Jaipur DISCOM DSM cell for its usage. By this method, metered data can be used to calculate system load. Billing data can be used to disaggregate that into sector load shapes. Engineering analysis and secondary data is applied to calculate end-use load shapes within each sector. Technology data can be implemented thereafter. A DSM database with technology data can be developed and added to, as more data are available.

Here, we follow a straightforward hierarchy of data:

System data
Sector data
Segment data
End-use data
Technology data

With the bottom-up approach, data is developed starting at the technology level and ending with system loads. In the top-down approach data starts at the macro level and becomes increasingly specific until it reaches the technology or equipment level data. The top-down approach is less data intensive and more straightforward and is the recommended approach for initial efforts.

ACTION ITEM 4: Sub contractor M/s. Saha Sprague and Nexant (Mr. Thakor) will provide more detailed follow-up training to the DSM cell to assist them in developing the DSM baseline forecast. This would include establishing the DSM database with technology and equipment data.

DSM Measure Identification

After the DSM baseline forecast is developed, the objectives for the DSM cell – energy savings and T&D loss reduction – need to guide the selection of DSM measures to be focused. All known measures, which would contribute to the objectives, are listed, and two screenings are performed.

The first, and possibly most important screening is the **Qualitative Screening.** In this step, the following yes/no questions are asked of each measure:

Qualitative Screening Questions

- **Technological Maturity.** Is the measure commercially available and supported by a market infrastructure? That is, is it readily available for purchase and installation in this area?
- **Utility Match.** Is the measure suitable for the climate, building types, and equipment that are typical in the utility service territory?
- **Best in Class.** Is this the best measure to achieve desired results? or is another measure available that is as efficient, functional and cost-effective?
- **Quantifiability.** Can the energy savings and impacts from this measure be readily quantified? Can an economic or financial evaluation of the measure be made?
- **Customer Acceptance.** Does the measure meet customers' service expectations? Will they accept and use it?
- **Environmental or Health Issues.** Does the measure present any environmental or health concerns? Or does it improve environmental or health conditions?

The qualitative screening is essential, straightforward and relatively fast. A task force of knowledgeable utility employees could be set up to brainstorm measures that relate to the DSM objectives. This screening is simply providing a common sense evaluation of what measures are worth the time to analyze in more detail. It should be a highly public process, and generally marked by a consensus on the evaluation. Yes/No answers can be scored 1 and 0 respectively, and a requirement of 5 or 6 set as a threshold for passing. It is often advantageous to circulate the list of measures to be screened prior to screening and to solicit additional ideas and measures from others in the utility.

Quantitative Screening

Once DSM measures appropriate to the customers in the utility's service area have been selected, quantitative analysis of the value of the measure needs to be made. Information on measure characteristics needs to be gathered. Such data as operating history, usage patterns, annual energy consumption impacts, peak demand impacts, load shape impacts, useful life, incremental cost (purchase, installation, operation), environmental effects, etc. need to be compiled. The impacts of measure installation and use must be quantified with regard to energy savings and coincident demand reductions. Critical information is needed on energy savings (e.g., reduction in wattage x hours of operation) and on peak demand reductions (e.g., reduction in wattage x end-use coincidence factor). Simple engineering calculations can be performed or computerized engineering simulation models can be used to estimate load shape, energy savings and peak demand impacts of various measures.

Statistical methods can be used to estimate the impacts of tariff options such as Time Of Day rates. Secondary data is also available for some DSM measures. Where available, a common sense comparability test can be made to determine whether these data are similar to what one would expect with operation locally and then the data can be applied.

Assessing Cost-Effectiveness

Total and incremental costs of measures are also required to complete various cost-benefit analysis. These data are available in sources such as EPRI's TAG (Technical Assessment Guide). Cost data are likely to be modified to reflect conditions in the utility's service territory, but generally will provide a guideline on cost-effectiveness.

Assessing cost-effectiveness involves assessing the potential of DSM measures. This involves observations at several layers of cost-effective potential.

- Technical potential. Is the measure more efficient than the ones being used presently?
- Economic potential. Does the measure have a reasonable life cycle payback if installed or is it so costly that it's installation doesn't pass a common sense test?
- Achievable potential. What is a realistic or real-world potential? What penetration level could one achieve with the measure in terms of customer acceptance?
- Program impact. Given the structure a specific utility-designed program, what will be the impact of the measure?

Once measure impacts have been determined on a per measure basis, combined or aggregated DSM impacts are estimated. These are the achievable or realistic potential or target and provide the set of measures, which will be looked at to choose the ones that make sense in combination for particular programs.

Developing Program Concepts

Good program design involves tailoring a program to the characteristics of a specific utility. Key to a good program is combining and offering a set of DSM measures to a targeted segment of the utility's customer base. This is undertaken to achieve economies of scale in delivery of the measures and because the combination will make sense for this set of customers. To analyze the cost-effectiveness of particular program, participation rates need to be estimated, program delivery costs calculated and energy impacts estimated. More training on program design should be commenced frequently later in the ECO project.

ACTION ITEM 5: Provide program design training to DSM cell staff at the time when they have selected DSM measures they want to offer to their customers.

Monitoring and Evaluation

Process and energy impact evaluations should be conducted following pilot program implementation.

ACTION ITEM 6: At the time of the training on DSM program design or just after that, training should be provided on DSM program evaluation.

❑ Cell Assessment

Issues

Top Management Commitment

CMD Mr. Umesh Kumar appears highly committed and motivated to develop a successful DSM competency within the organization. His responsiveness and availability both have been highly commendable. It will be critical going forward, that CMD provides regular face-to-face access to Mr Agarwal, and responds directly and promptly to questions requiring clarification, organizational support and resources.

Staff Qualifications and Adequacy

The initial staff consisting of Mr. Agarwal, Mr. Saxena and Mr. Kejriwal, are well-qualified and experienced individuals, bringing a high level of commitment and credibility to the cell. The selection of Mr. Saxena, combines a marketing competency with engineering, adds particular strength to the cell for the extensive customer knowledge and analysis to implement DSM effectively. Subsequently, placed officials, Mr. Madan Lal Jhalani, Mr. Navin Arora and Mr. Pankaj Parekh are also well-qualified and experienced officials, contributing benefits to the Cell.

Structure

Structurally metering handleld by Mr. Kejriwal is not part of the DSM cell. Coordination between Mr. Agarwal, Mr. Kejriwal and Mr. Madan Lal Jhalani, who are peers, will be more complex. Hence, requires either SE level official to head the Cell or elevate Mr. Agarwal to that level. Until such time suitable instruction need to be issued about Mr. Agarwal heading the Cell.

Reporting and Rank

Mr. Agarwal's reporting relationship to CMD requires further clarification. It appears that the DSM cell through Mr. Agarwal will report directly to CMD, however, others who report directly to CMD are C.E. or S.E. Mr. Agarwal being an executive engineer, not as high ranked as an SE, could pose potential communication problems as Mr. Agarwal's requests for information and data may be weighed less heavily than requests from other SE's reporting to CMD, and could slow the timeliness and receipt of needed responses.

Facilities

The space allocated to the DSM cell was not immediately available, however, was available on January 15th and the cell was occupied between January 15th and 19th. This space is about 120 square feet and not adequate for a group of 5-8 individuals. It is critical that adequate space be made available immediately if the group is to start interacting and functioning.

Resources

Hardware and software are required. No computers (PCs) are available and these are essential. A minimum of 2 PCs with one printer is needed for the DSM cell to function effectively. One PC should be dedicated to the maintenance of a DSM measure database whereas another for DSM baseline development and maintenance of load shapes of the utility, for each sector or tariff class, and then of segments within each sector. Based on the worked undertaken and its performance, a separate PC for market research, program design, development and implementation as well as program monitoring can be considered. Software is also needed to facilitate load research and load shape development, to accommodate cost-benefit analysis of DSM measures and programs and for monitoring and evaluation. USAID is being approached with a request to assist with the procurement of PCs with printer for the cell.

Next Course of Action

A work plan for the next year's work needs to be developed in consultation with all the Cell members. Mr. Manoj Saha and Mr. V.M Thakor will work through the said plan with DSM cell, allowing flexibility, Cells input, tasks and assignments and time frame. The first draft of such work plan is presented below.

Key Tasks		Responsible	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
State Objectives		CMD												
Administrative														
	Staff supervision	Agarwal												
	Oversight & mangmt	Agarwal												
	Complete cell set-up	Agarwal												
	Hire remaining staff	Agarwal												
	Occupy space & furniture	Agarwal												
	Get phones & Fax set-up	Agarwal												
	Procure PCs	Agarwal												
	Get email hooked up	Agarwal												
	Identify software	Agarwal												
	Develop 1 year work plan	All: Agarwal to lead												
	Set up Computer Systems	Arora												

Key Tasks		Responsible	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Market Assessment														
	Develop Utility LoadShape	Kejriwal Arora												
	By System	Kejriwal												
	By Circle	Arora												
	Develop DSM Baseline	Jhalani Arora Parekh												
	By Sector	Jhalani												
	By Segment	Arora												
	By End-Use	Parekh												
	Develop Data Base	Arora Parekh												
	Identify DSM Measures	Agarwal Saxena Parekh												
	Qualitative screening	Saxena												
	Detailed screening	Parekh												
	Develop long-term DSM Plan	Agarwal Jhalani Kejariwal Saxena												

Key Tasks		Responsible	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Program Planning & Design														
	Pilots:	Agarwal												
Education Program	Identify/Design	Jhalani												
	Develop concept	Jhalani												
	Develop details	Jhalani												
	Get approval	Agarwal												
	Plan implementation	Jhalani												
	Plan evaluation	Arora												
Load Research Program	Identify/Design	Agarwal												
	Develop concepts	Saxena												
	Develop details	Saxena Arora Parekh												
	Get approval	Agarwal												
	Plan implementation	Saxena Parekh												
	Plan evaluation	Arora												
Pilot Program	Identify/Design	Agarwal												
	Develop concepts	Kejariwal												
	Develop details	Kejariwal Parekh												
	Get approval	Agarwal												
	Plan implementation	Kejariwal												
	Plan evaluation	Parekh												

Key Tasks		Responsible	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Implementation														
	Education	Jhalani Arora												
	Load Research Program	Saxena Parekh												
	Pilot Program	Kejariwal Parekh												
Evaluation														
	Pilots	Kejariwal												
	Education	Arora												

Proposed Plan of Action

Initially, a review & developing first year work plan with DSM Cell staff by Mr. V.M. Thakor and M/s. Saha Sprague is required. Once the initial work plan is approved and accepted as fairly realistic and achievable, CMD Jaipur DISCOM should review and approve the same. Mr. Agarwal and Mr. Jhalani/Kejriwal should also participate such review meeting with CMD. Upon the approval of work plan from CMD, Mr. Thakor and M/s. Saha Sprague would develop a strategy for implementation and monitoring and provide assistance of staff implementing this process.

Consequent to the above the following items also need to be accommodated:

ACTION ITEM 1

Assessment of the Cell's work and appropriateness of its staff should be made at least quarterly and weekly contacts should occur in the interim.

ACTION ITEM 2

The resource list has been submitted to CMD for action and fulfillment, a copy of the same is forwarded to USAID. For its timely provision follow-up action is required.

ACTION ITEM 3

The CMD of Jaipur DISCOM needs to make a public announcement of the importance of the cell and expected levels of cooperation from the organization to help ensure its success.

ACTION ITEM 4

To provide detailed follow-up training to DSM Cells staff in developing DSM baseline forecast including establishing DSM database with technology and equipment data.

ACTION ITEM 5

To provide program design training to DSM cell staff, at the time when they have selected DSM measures which they want to offer to their customers.

ACTION ITEM 6

While providing training on DSM program design or thereafter, training on DSM program evaluation should be provided