APPENDIX E – Default Demand Side Management Plant

Demand-Side Management Plan

submitted to

Energy Regulatory Commission

Republic of the Philippines

By

(NAME OF UTILITY)

(Address of Utility)

Date

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Executive Summary

INTRODUCTION

In December 1996, The Energy Regulatory Board (ERB) approved the Framework for Demand-Side Management (DSM) in the Philippines, in compliance with Section III of the Department Circular Nos. 95-08-007 and 95-10-011 as amended per ERB Case No. 96-25. Under the framework, each distribution utility was required to submit a DSM Plan within one year from the effective date. This DSM Plan by _____ (name of utility) is in compliance with the requirements of the DSM Framework.

UTILITY OVERVIEW

- *General information – date established, location, service territory, % energization*
- *Details of electricity supply – NPC and/or Independent Power Producers (IPPs), duration of supply contracts*
- *Brief details of issues facing the utility – example: power quality, reliability, pilferage, system losses, condition of network, etc.*

The _____ was established on _____, initially serving the city of _____. Its main headquarters is situated in _____.

Today, _____ is serving one city and ____ municipalities, including ___ island municipalities. About ___% of the bulk sales is in _____. Apart from the main power station in _____, there are ____ other substations, some of which are very small with demand less than ___ kW. Only about ___% of the service area of _____ is energized. All electricity required are purchased from the _____ (NPC and/or IPP).

The major operational issues at _____ include the deficiency of power supply from _____ (NPC and/or IPP) to some of the smaller substations and improving power quality and reliability. The improvement of the distribution network to meet the increasing demands of the customers is one of the priorities. A plan is in place for the modernization of special line equipment to improve power quality and reliability.

DSM OBJECTIVES

- *Outline of the utility's objectives in undertaking DSM (a summary of Section 3.2)*

The system load profile for _____, show a system maximum demand of ___ MW. The system peak occurs around ____ (am/pm).

_____ (Place) has a relatively high load factor, around ___ %. But the overall system load factor is low when the other substations are included because of the dominance of residential customers. Increasing the system load factor is considered to be the major DSM objective.

PROGRAMS SELECTED

- *A brief description of the DSM programs selected for implementation*

The following programs have been selected for implementation on a pilot scale over the next two years:

- **High Efficiency Compact Fluorescent Lighting Program:** Replacement of incandescent lamps operating for at least three (3) hours per day with high efficiency ELI-compliant compact fluorescent lamps in the residential and commercial sectors.

- **High Efficiency Linear Fluorescent Lighting Program:** Promotion of high efficiency linear fluorescent lighting used in conjunction with high-frequency, low-loss electronic ballasts in the residential, commercial and industrial sectors.

- **Power Factor Correction Program:** Encourage the improvement of power factor by offering to install capacitor banks at the customer's premises and allowing the customer to pay in installments from the savings.

- **Consumer Efficiency Awareness Program:** Increase awareness /knowledge on energy conservation/efficiency through distribution of brochures on energy saving tips on domestic appliances including lighting, refrigeration, air-conditioning and cooking.

COST EFFECTIVENESS

- *A summary of the benefits of each DSM program from Section 4.10 (Cost Effectiveness Test Results)*

PROPOSAL FOR COST RECOVERY

- *A summary of the cost recovery proposal from Section 5.2*

IMPLEMENTATION

- *A summary of the Implementation Plan from Section 6*

The following programs have been scheduled to be implemented in _____.

(list programs)

The programs will be subject to an annual evaluation at the end of the year and based on the outcomes, a decision to cease, modify or continue the programs will be made.

In addition to programs from ____ that continue, the following programs and activities are scheduled to be implemented in _____.

(list programs)

- *Major Program Review*

The major program review would include all programs and the outcomes will be included in the revised plan for _____ onwards.

MONITORING AND EVALUATION

All programs will be monitored throughout and evaluated upon completion. As required by the DSM Framework, the programs will also be subjected to an annual evaluation.

1. UTILITY SITUATION / BACKGROUND

- *General information – date established, location, service territory, % energization*

- *Number of staff in the utility, location of Head Office and sub-offices (if applicable)*

_____ was established on _____, initially serving _____. Its main headquarters is situated in _____.

Today, _____ is servicing _____ municipalities, including island municipalities. About ____ % of the bulk sales is in ____ (place). Apart from the main power station in _____ there are ____ other substations, some of which are very small with demand less than ____ kW. Only about ___% of the service area of _____ (utility) is energized.

Total number of employees is _____ as of _____. The head office is located in _____ and it has _____ sub-offices.

1.1. Overview of Operational Issues

- *Details of electricity supply – NPC and/or Independent Power Producers, duration of supply contracts*

- *Brief details of issues facing the utility – example: power quality, reliability, pilferage, system losses, condition of network*

All electricity required are purchased from the _____ (NPC and/or IPP). The current Power Contract with _____ (NPC and/or IPP) is a ___ -year renewable contract. There is a provision in the Contract to amend the Contract Demand (kW) and Contract Energy (kWh) in any calendar year.

The major operational issues at _____ include the deficiency of power supply from _____(NPC and/or IPP) to some of the smaller substations and improving power quality and reliability. The improvement of the distribution network to meet the increasing demands of the customers is one of the priorities. A plan is in place for the modernization of special line equipment to improve power quality and reliability.

1.2. Customer Mix

A summary of customer numbers per customer class for _____ (year) is shown in the Table below:

TABLE ___ NUMBER OF CUSTOMERS BY CUSTOMER CLASS (____)*(YEAR)*

Customer Class	Number of Customers
Residential	
Commercial	
Industrial	
Public Buildings	
Other	

1.3. Trends

- *Details of growth in customer numbers in each of the customer classes (i.e. Residential, commercial, etc.) over the past few years (3 to 4 years based on data availability) and expected growth over the next 5 to 10 years.*

- *Average electricity consumption (kWh/month/customer) in the various customer categories. The historical data is available in the NEA Chronicle for each REC in Section VIII (customer numbers) and IX (energy consumption).*

- *Summarize the results in a Table (as shown below)*

The residential sector has seen a ___ % growth in customer numbers- averaging around ___% over the last five (5) years- and is projected to increase by ___ % to ____ % over the planning horizon (to ____ (year)). The commercial sector experienced a ____ growth (___% to __%) from year ___ to ____ and is projected to increase at an average of ___% per annum over the next ten years. The number of industrial customers is _____ (____ in year ____) and is not expected to grow at any significant rate. Public buildings and streetlighting are the other main customer categories and, based on historical data, the growth in these segments is expected to average ___% to ___%.

The average electricity consumption per customer in the various categories since year ____ and the projection for the year ____ is shown in the Table below.

TABLE ___ AVERAGE KWH/MONTH/CUSTOMER

Customer Class	1995	1996	1997	1998*
Residential				
Commercial				
Industrial				
Public Buildings				
Other				

** forecast consumption based on projected growth*

2. LOAD FORECAST

The load forecast is based on historical data and proposed developments in the service territory

2.1. Energy Sales and Demand

- *Provide details of historical and forecast energy sales for each customer class. This information could be given in the form of a Table or Graph or both.*

Details of historical and forecast energy sales in each of the customer sectors and the maximum demand are given in the appendices (Section 8.1). Forecast total energy sales and maximum demand are shown in graphs in the following pages.

2.2. Overview of Alternate Forecasts

- This document proposes a set of pilot DSM programs to precede full-scale implementation, which is consistent with the DSM Framework. Future loads that differ from the load forecast will have no effect on the pilot stage of the DSM programs. The main effect of future loads being different from those forecast is in the total magnitude of energy and demand savings available. Provided that a DSM program can achieve a high level of participation to cover its fixed costs, variation of future loads from those forecast is not likely to be a significant problem. Alternative forecasts have therefore not been considered in this document.

3. OBJECTIVES

3.1. Corporate Objectives

- *Briefly describe the Utility's broad objectives in operational and management issues. This could include improving power quality and reliability, minimizing pilferage, reducing system losses, improving distribution network, upgrading substations, high collection efficiency, improving customer service, etc.*

_____'s (utility) main objective is to provide reliable electric service to all its customers within its franchise area at a reasonable cost.

The improvement of the distribution network to meet the increasing demands of the customers, including the modernization of the special line equipment to improve power quality and reliability is considered to be a major objective.

Addressing the current shortfall in power supply from _____ (NPC and/or IPP) to some of the smaller substations is another management objective.

3.2. DSM Objectives

3.2.1. LOAD-SHAPE RELATED OBJECTIVES

- *Include a typical system load profile and based on the profile provide brief details of the load and the system peak period.*

The system load profile for _____, ____ (year), shown in the preceding pages, show a system maximum demand of ___ MW and a base load of around ___ MW. The system peak occurs around _____ (time, am/pm).

_____ (Utility) has a _____ load factor (around ___%). But the over-all system load factor is _____ when the other substations are included because of the dominance of residential customers.

There are a range of load shape objectives available to the DSM planner. These include:

- peak clipping – the reduction of utility load primarily during periods of peak demand.

- valley-filling – the improvement of system load factor by building load in off-peak periods.

- load shifting – the reduction of utility loads during periods of peak demand, while at the same time building loads in off-peak periods. Load shifting typically does not substantially alter total electricity sales.

- conservation – the reduction of utility loads, more or less equally, during all or most hours of the day.

- load building – the increase in utility loads, more or less equally, during all or most hours of the day.

- provision of a more flexible utility load shape – programs that set up utility options to alter customer energy consumption on an as-needed basis, as in interruptible / curtailable arrangements.

    - *Outline the utility's load shape related DSM objectives.*

The load shape objective or objectives suitable for a particular electric cooperative depend to a large extent on the cooperative's current load shape. The DSM load shape objectives most applicable to ____ (utility) in the short- to medium-term are _____ and _____.

3.2.2. NON-LOAD-SHAPE RELATED OBJECTIVES

- *Outline the main non-load shape related DSM objectives – example: improving customer service, improving utility image in the community, environmental considerations, etc.*

The non-load shape related objective is to improve quality and reliability of service.

4. RECOMMENDED DSM OPTIONS, PROGRAMS & PLAN

4.1. Options/Technologies

- *Outline main objective of DSM and how it could be achieved (options, target customer segments, applicable technologies).*

The main focus of DSM will be the improvement of the system _____. This could be achieved by:

- encourage customer, especially industrial, during the off-peak period;
- investigating the feasibility of introducing a time-of-use (TOU) for larger users; and
- encouraging customers to use energy efficient technologies especially during the system peak period (example: CFLs for residential customers, high efficiency fluorescent lamps for streetlighting)

4.2. Customer Groups Targeted

- *List of the customer groups targeted in the selected DSM programs in achieving the utility's DSM objectives.*

It is considered that the ____ and ____ customer segments should have an input in achieving the utility's/cooperative's DSM objectives. It is likely that the sector would have the biggest impact.

4.3. Proposed Programs

4.3.1. OVERVIEW

- *List the programs that have been selected*

The following programs have been selected and included in the Plan:

1. High Efficiency CFL Lighting Program
2. High Efficiency Linear Fluorescent Lighting Program
3. Power Factor Correction Program
4. Consumer Efficiency Awareness Program

- *Insert a Summary of load shape objectives*

Overview of Load-Shape Objectives

TABLE __ LOAD SHAPE OBJECTIVES

Program	Load Shape Objective/s	Comments
High Efficiency Compact Fluorescent Lighting Program	Peak Clipping, Conservation, Flexible	The residential lighting end-use load shape is highly co-incident with the utility system peak, so improving the efficiency of this particular end-use tends to reduce the system peak.
High Efficiency Linear Fluorescent Lighting Program	Peak Clipping, Conservation, Flexible	Most commercial and residential end-uses are highly co-incident with the daytime and evening peak, so improving the efficiency of this particular end-use tends to reduce system peak.
Power Factor Correction Program	Peak Clipping (kVA)	This program reduces apparent power (kVA) therefore reducing transformer capacity requirements and hence network capital costs for the same real power (kW) and therefore level of energy service.
Consumer Efficiency Awareness Program	Conservation	Most residential end-uses are highly coincident with the peak, but many of these are difficult to improve other than by general education and information.

Overview of End-Use Technologies

- *Insert a Summary Table of End-Use, Base and DSM Technologies*

A summary of end-use technologies promoted by the programs are given below.

TABLE __ SUMMARY OF END-USE TECHNOLOGIES

Program	End-Use	"Base Technology"	"DSM" Technology
High Efficiency Compact Fluorescent Lighting Program	Lighting	Incandescent Lamp	High Efficiency (ELI-compliant) Compact Fluorescent Lamp
High Efficiency Linear Fluorescent Lighting Program	Lighting	T-12 Fluorescent Lighting w/ electromagnetic ballast	High Efficiency Fluorescent Lighting w/ high-frequency low-loss electronic ballast
Power Factor Correction Program	All	Low Power Factor, High Inductive Loads	Capacitor Banks to Improve Power Factor, High Power Factor Loads
Consumer Efficiency Awareness Program	All	Lack of Knowledge on Energy Conservation/ Efficiency	Increased Knowledge on Energy Conservation/ Efficiency

Overview of Customer Segments

- *Insert summary of customer segments targeted*

Given below is a summary of the customer segments targeted by the programs.

TABLE __ CUSTOMER SEGMENTS TARGETED BY THE PROGRAMS

Program	Residential	Commercial	Industrial	Other
High Efficiency Compact Fluorescent Lighting Program	√	√		
High Efficiency Linear Fluorescent Lighting Program	√	√	√	
Power Factor Correction Program		√	√	
Consumer Efficiency Awareness Program	√			

Each proposed program is described below, with details on:

- the customer segment targeted;
- the end-use targeted and the alternative technology to be promoted;
- the key barriers that have prevented ____ (utility) electricity consumers adopting this technology to date;
- objective of the program;
- a description of the program and how it is designed to overcome the barriers identified; and
- the cost categories associated with the program (the detailed presentation of program costs is in Section 4.9).

  - *The sections 4.3.2, 4.3.3,……is for the description of the selected programs. Details of standard programs for all customer segments are given in Attachment 1. If the details of the programs given in Attachment 1 are the same as the selected programs, then these could be inserted in the relevant sections.*

  - *If the programs are different then a program description have to be prepared using the same format.*

4.3.2. High Efficiency Compact Fluorescent Lighting Program

Customer Segment Targeted

This program will be offered to residential and commercial customers.

End-Use and Technology

This program targets the lighting end-use, which is a significant contributor to the _____ (utility) system peak during the evening. Compact fluorescent lamps (CFLs) are able to provide the same light output as an incandescent lamp with less energy input.

Key Barrier/s

In the medium term, the energy savings from using a CFL in place of an incandescent lamp are greater than the higher cost of the CFL. However, not all residential and commercial customers who could use CFLs in place of incandescent lamps do so. Perhaps the main barrier to the use of CFLs is their high cost compared with the cost of a standard incandescent lamp. Other barriers may include:

- lack of customer awareness of the energy- and money-saving potential of CFLs;
- mistrust in the energy-saving and extended life information on the lamp packaging; and
- not "getting around to" purchasing a lamp.

Program Objective

This program is designed to encourage residential and commercial customers to install CFLs to replace existing incandescent lamps. The program aims to overcome the major barrier- the high up-front cost of CFLs- by providing customers with the lamps which they then pay-off in installments on their electricity bills. In addition, the program advertising will help overcome any lack of customer awareness; the utility endorsement of the technology will help overcome customer mistrust of the manufacturers' claims about energy savings and lamp life; and the existence of the program should make more people "get around to" installing CFLs. In line with this program, the Efficient Lighting Initiative (ELI) hopes to assist utilities in the distribution of highly-efficient ELI-qualified CFLs or "ELI-compliant" CFLs (or CFLs that meet ELI specifications) in the Philippine market.

ELI will work in a number of ways to increase consumer awareness in the Philippines of the benefits for energy-efficient lighting to create immediate and

direct impacts through increased market penetration of efficient lighting. ELI will also foster a market transformation through education and financial transaction support that will have longer-term and indirect effects.

The program will concentrate on residential and small business consumers in the short term to accelerate the market share of efficient lighting, while also working to build awareness among students as well as professional associations to transform the market over time to greater and greater levels of efficiency.

The heart of the ELI program in the Philippines is a consumer awareness strategy. A radio and print media campaign balanced with a schools-focused educational effort will build general awareness in the market about the economic benefits of efficient lighting technology, as well as establish recognition for the ELI logo which all products meeting the ELI performance standard will receive.

The labeling program includes ELI support for strengthening local product testing capacity and labeling enforcement regimes to ensure that the ELI investment in establishing the logo identity will be sustained in the market as a source of reliable consumer information at the completion of the project. This strategy is intended to contain the market infection of low-cost inferior CFLs to drive down prices while protecting the market against mislabeled or non-performing products. ELI will complement this public awareness campaign in the retail network by training equipment vendors and providing educational sales tools, including point-of-sale marketing activities.

Program Description

A CFL uses approximately one-quarter the energy of a standard incandescent lamp, while providing equivalent lighting output. In addition, the life expectancy of a CFL is about six times as that of a standard incandescent lamp. However, in order for the residential and commercial customer to fully obtain the benefits of efficient lighting, "ELI-compliant" CFL models should be the preferred products to be used for the this program.

"ELI-compliant" CFLs are more efficient that the typical CFLs commonly found in the market.

This program has been modeled on the basis that _____ (utility) purchases the CFLs in bulk directly from the manufacturers and then offers the lamps to the residential and commercial customers, and allows the customer to pay for the lamps in fixed monthly installments, with their electricity bill, over a period of ___ months.

The main features of the program are as follows:

- Lamp manufacturers will be requested to provide details of their range of CFLs- technical specifications, price and warranty periods.

- _____ (Utility) will prepare a list of CFLs that they wish to promote-based on power factor, suitability under supply conditions, cost and warranty provided. The warranty period offered by the manufacturers would need to be at least the duration of the repayment period.

- _____ (Utility) will purchase the selected brands directly from the manufacturers. The selling price would include a mark-up on the wholesale purchase price to cover program administration costs, finance costs, etc.

- _____ (Utility) sub-offices will be the retail outlets for the CFLs.

- Program details will be publicized in the media and the program will be formally launched. Co-financing of advertising by the lamp manufacturers will be considered.

- Residential and commercial customers will purchase the CFLs and sign an agreement to pay in installments. Customers will be required to show a copy of their electricity bill at the time of purchase for verification and inclusion of account details in the agreement. There will be a limit of three (3) lamps per customer to minimize the risk that CFLs are installed in "low-use" locations and to reduce "siphoning" of the lamps to parties outside the _____ (utility) area.

- The regional offices will send the details of sales and copies of the customer agreements to _____ (utility) head office for processing.

- _____ (utility) will send a letter of confirmation to the customer of the purchase and the date of inclusion of the first installment in the customer's electricity bill.

- The program will initially run for a period of three (3) months and then evaluated. The program will run for another three (3) months following nay revisions to the original approach.

Cost Categories

The costs associated with this program include:

- set-up costs - financing costs, computer programming modifications to the customer billing system, staff training;
- advertising - posters, media advertising; and
- administration - procurement, processing payments, monitoring, evaluation.

4.3.3. High Efficiency Linear Fluorescent Lighting Program

Customer Segment Targeted

This program is primarily for residential and commercial customers, although it is also applicable to industrial customers.

End-Use Technology

This program targets the lighting end-use, which is a significant contributor to the ____ (utility) system peak during the evening. High efficiency T-8 linear fluorescent lamps (36W and 18W) are able to provide the same light output as the more common T-12 linear fluorescent lamps (40W and 20W) with less energy input. The other technologies include high-frequency, low-loss electronic ballasts, 32W/36W tri-phosphor lamps with reflectors.

Key Barrier/s

From discussions with retailers, the main barrier to the promotion of high efficiency fluorescent lighting appears to be the lack of knowledge and perceptions of the public. The high efficiency and the standard lamps of the same brand are available of the same price but in spite of this, there is a high percentage of sales of the standard lamps.

The most common customer perceptions are that:

- the larger diameter T-12 tubes (20W and 40W) produces more light than the thinner tubes; and
- the thinner tubes may not fit the existing fixture.

Ballast losses can be halved by using the "high-frequency, low-loss" electronic type instead of the more common electromagnetic type. However, lack of good quality electronic ballast and awareness are considered to be the main barrier. Other barriers may include;

- 18W and 32W/36W T-8 fluorescent lamps to replace 20W and 40W lamps, in existing buildings;

- high frequency, low-loss electronic ballast (with 3 to 5W current draw) to replace standard electromagnetic ballast (10W to 12W), in existing buildings; and

- for new buildings and refurbishment: electronic ballasts and 32W/36W T-8 lamps together with reflectors to significantly reduce the number of lighting fixtures.

The program will look at using trade allies such as lighting suppliers and installers to promote these technologies to their customers.

Program Description

Fluorescent lighting has a very high penetration in the industrial, commercial and residential sectors. The most common type of fluorescent lighting are the 48-inch 40W and the 24-inch 20W T-12 tubes. The 40W T-12 lamp can be readily replaced with an energy-efficient 32W or 36W T-8 lamp with the same lighting output (lumens), without any modifications. Similarly, the 20W T-12 lamp can be replaced with an 16W or 18w T-8 lamp.

Preliminary inquiries with lighting retailers revealed the following:

- all types of lamps (20W, 18W, 40W, 36W and 32W) are commonly available;

- the 20W and 40W lamps are manufactured in the Philippines and the efficient lamps are imported;

- in each brand, the 20W and 18W lamps are sold for roughly the same price and so are 40W and 32W/36W lamps;

- lack of customer knowledge was considered to be the main reason why the energy efficient lamps have not captured a larger share of the market; and

- the most common customer perceptions are- the larger diameter T-12 tubes (20W and 40W) produces more light than the thinner energy-efficient T-8 tubes; and the thinner tubes may not fit the existing fixture.

A ballast is a device required to start and regulate the electricity that is used by the linear fluorescent lamp. The standard electromagnetic ballast is the most commonly available type of ballast and have losses around 10W to 12W. There are newer types of magnetic and electromagnetic ballasts where the losses are around 5W.

There is a new type of fluorescent lamp called the energy-efficient T-8 linear fluorescent lamps and are available in 18W and 36W. These lamps produce around 15% to 20% more light (lumens) than the equivalent T-12 lamps. Such lamps are manufactured by most of the leading lighting manufacturers. In addition, electronic ballasts that are now available have losses of only 2W to 3W. These ballasts also "under-drive" the tubes resulting in even greater energy savings.

Projects overseas have shown that the use of reflectors together with T-8 linear fluorescent lamps and high-frequency, low-loss electronic ballasts have reduced the number of lighting fixtures by over 50% compared to standard lamps and ballasts without reflectors.

This program will be implemented by _____ (utility) in association with the lighting retailers and installers. The primary focus will be the promotion of these technologies through brochures, advertising and training of sales staff.

The costs associated with this program include the following:

- brochures - design and printing of brochures, posters, etc.;
- promotion - media advertising; and
- administration - coordination with retailers, monitoring and evaluation.

4.3.4. Power Factor Correction Program

Customer Segment Targeted

This program is focused on _____'s (utility) large industrial customers although this may also be applicable to commercial customers.

End-Use Technology

Power factor is improved through the installation of capacitor banks at customer's load sides.

Key Barrier/s

Although _____ (utility) is initially intending to meet the up-front costs that would be repaid by a customer by a shared savings arrangement, there is still likely to be customer doubt if savings can be realized.

Program Objective

Customers are sometimes billed by their electric utility for having large inductive loads at their facilities. Inductive loads result from the storage of energy in

magnetic fields, which occurs in coils of wire, such as in motor windings. To decrease high electricity bills resulting from this large inductive load, capacitors may be installed at the facility to increase the power factor.

As customers are billed for how much reactive power they use, and since reactive power supplies no benefit to the manufacturer, it is desirable to reduce or eliminate the reactive component of power that the manufacturer uses.

The aim of this program is to encourage customers to improve their power factor by offering to install capacitor banks at the customer's premises and allowing the customer to pay in installments from the savings.

Program Description

The current bulk supply contact with NPC includes a Power Factor (PF) adjustment clause. The supply is based on a power factor of 0.90 and a penalty is imposed if the power factor is below 0.90 and a discount is offered if the power factor is above 0.90 up to a ceiling of 0.95 PF.

In this program, _____ (utility) will meet the capital costs of the capacitor banks. The costs will be recovered by _____ (utility) on a monthly basis equivalent to 50% of the customer's actual monthly bill savings due to power factor improvement.

The cost associated with this program include the following:

- project financing;
- labor - installation; and
- administration - coordination and monitoring.

4.3.5. Consumer Efficiency Awareness Program

Customer Segment Targeted

This program is targeted to residential customers, although also applicable to other customer classes.

End-Use Technology

There are a number of types of household equipment and appliances where changes in customer behavior or improvements in maintenance practices can save energy. These opportunities cannot be captured by simple substitution of one technology with another, as in the case with the proposed CFL program described in the preceding section.

Key Barrier/s

Perhaps the main barrier to residential customers not performing energy-saving maintenance or implementing energy-saving behavior is lack of knowledge. For example, few residential customers know that keeping their refrigerator coils clean will save energy, or that air conditioner filters need to be kept clean to prevent inefficient operation. Also, savings tend to be trivial compared to the effort required.

Program Objective

This program aims to educate customers on the average running costs of a range of domestic appliances and equipment and to provide energy saving tips so that they may reduce consumption. This will be undertaken through the publication of a brochure and follow-up reminder slips to be distributed with monthly electricity bills.

Program Description

A wide range of domestic appliances are likely to be operating during the system peak period. These include refrigerators, electric cookers, lighting, cooling appliances (fans and air conditioners), washing machines and dryers. Past surveys elsewhere indicate a general lack of appreciation by residential consumers of the energy costs of operating various appliances. Such lack of knowledge often results in numerous complaints about high electricity bills. In addition, there has not bee any significant effort to date by _____ (utility) to educate consumers on energy saving measures that could be undertaken by them to reduce electricity costs.

This program proposes to design and publish a "user-friendly" brochure with information on the running costs of commonly used appliances, along with suggestions on how to save energy for each type of equipment. The brochure would also include contact telephone numbers for those seeking advice on electrical appliances and energy conservation.

The distribution of the brochures would be carried out primarily by meter readers. Other sources could be via trade allies and ____'s (utility) regional offices where customers come to pay their bills.

In addition, it is proposed to include energy saving tips with the monthly bills. The tips will focus on one end-use from the brochure each month.

Cost Categories

The cost categories associated with this program include:

- brochures - design and printing;

- distribution;
- design and incorporation of energy tips in monthly electricity bills; and
- administration - answering customer queries.

4.4. Avoidable Costs and Externalities

There are several broad areas where society as a whole can avoid costs by implementing DSM initiatives. These include:

- the cost of generating marginal units of energy – avoidable energy cost;
- the cost of providing marginal generating plant capacity – avoidable demand cost;
- the cost of providing marginal transmission and distribution network capacity; and
- external costs associated with the supply of energy to consumers.

Energy and Demand Avoidable Costs

The analysis in this submission uses the _____ (NPC or IPP) contract charges to _____ (utility) as a substitute for the true total resource or societal avoidable costs of energy and generation capacity. The true values would be the energy and generation costs that would be avoided by _____ (NPC or IPP) due to marginal reductions in energy and demand at the _____ (utility) bulk supply points. These numbers were not available to _____ (utility) at the time of this submission.

The "avoidable costs" used in this DSM analysis represent the value of those costs that would be avoided by _____ (utility) due to energy and demand savings from the equipment and behavior changes promoted by the proposed DSM programs. Energy and demand savings achieved at the end-use level by _____ (utility) consumers/cooperative members reduce the payments that _____ (utility) makes to _____ (NPC or IPP) under its energy supply contract, provided that those savings do not take _____ (utility) total purchases below the take-or-pay "contract demand" threshold for energy and/or demand. The current _____ (utility) contract with. _____ (NPC or IPP) is structured to:

- avoid paying for unused supply via a margin for demand and energy being below what is projected; and to
- avoid penalty maximum demand payments via a margin for maximum demand going above what is projected; as well as

- provide some flexibility by allowing two alterations to the "contracted demand" level in each calendar year.

The analysis in this document assumes that DSM impacts will not take _____ (utility) below the take-or-pay contracted threshold. In other words, it is assumed that adjustments to the contract demand could always be made in time to avoid this so the end-use savings would always provide bulk supply savings to (insert name of supplier- NPC and/or IPP) bill.

Given below are the supply contract charges used as avoidable costs in the analysis.

- *Insert relevant energy and demand figures*

Type	Avoidable Cost	Units
Energy		PHP/kWh
Demand		PHP/kWh

Network Avoidable Costs

The analysis does not assign any avoidable cost values to the sub-transmission and distribution network. This would require very detailed, time-consuming and costly work treating each small local area separately and is not appropriate for first-time pilot DSM programs as proposed here. Moreover, experience elsewhere[1] suggests that the avoidable costs available in the local network are usually small compared with the avoidable costs of energy and generation capacity.

Avoidable Environmental Externality Costs

This analysis does not use avoidable externality costs. A collaborative process is underway to determine a set of avoidable externality costs for DSM planning in the Philippines, but it has not yet produced a set of numbers for use. The addition of avoidable externality cost data to the analysis would only make the proposed DSM programs more cost-effective under the societal test than they are as presented below. Future cost-effectiveness analyses will incorporate these values once they are available.

4.5. Technology Cost Effectiveness

For a proposed DSM program to be cost-effective against the societal test, as required by the Philippines DSM Framework, the DSM technology itself must be cost-effective at the unit technology level. That is, the costs saved or "avoided" in the electricity system

[1] Northern Rivers, New south Wales, Australia, 1995. Beaudesert, South-East Queensland, Australia, 1994

and in the environment by the DSM technology must be greater than the cost of the DSM technology.

If environmental externality costs are not included, this comparison represents the application if the total resource cost test at the level of individual pieces of equipment or individual market segment units (such as residential households or units of commercial floor are) less program costs. If the DSM technology cannot pass this simple cost comparison test, it will never pass as full DSM program when program costs are also included.

- *In sections 4.5.1, 4.5.2,….include the results of the calculations or the methodology adopted for determining the cost-effectiveness of the technologies.*

4.5.1. High Efficiency Compact Fluorescent Lighting Program

The summary in the following pages shows the step-by-step calculation approach to the technology-level cost-effectiveness analysis. For both energy and demand, the process involves subtracting the DSM technology data from the base technology data; allowing for marginal system losses and multiplying by the avoidable costs (from the power purchased contracts). This provided the benefits, which can then be compared with the incremental technology costs to determine the over-all cost-effectiveness.

Item	**Incandescent Bulb**	**"ELI-Compliant" CFL**
Wattage	60	13
Lumens per watt	10	46
Rated life, in hours	1,000 hrs	6,000 hrs
Price, in PHP	PHP 18.00	PHP 300.00
Voltage variation tolerance	N/A	+/- 10%
Thermal protection	no	yes
Warranty	none	12 months
CO2 emissions (after 6,000 hours)	214 kg	46 kg
Energy & Equipment Cost[2] (after 6,000 hours)	**PHP 1,746.00**	**PHP 654.90**
Savings		PHP 1,091.1

Recommended Lamp Replacement (Equivalent Luminous Flux)

Incandescent / GLS	**ELI Specification-Compliant Compact Fluorescent Lamp**
100 W	20 – 25 W
75 W	15 – 18 W

[2] assume 4 hours daily usage and PHP 4.55 per kWh electricity cost

60 W	*12 – 15 W*
50 W	*10 – 12 W*
40 W	8 – 10 W
25 W	5 – 7 W

Note: Ratings in bold italics are preferred for utility DSM Programs

4.5.2. High Efficiency Linear Fluorescent Lighting Program

Local research showed that 40W T-12 lamps and the more energy-efficient 32W/36W T-8 lamps are available from the same manufacturer are available at roughly the same price. Consider two alternative lamp replacement schemes:

- Wait until individual 40W T-12 tubes reach the end of their service life and replace them with energy-efficient 32W/36W T-8 tubes; or

- Discard existing, functioning 40W T-12 tubes and replace with the energy efficient 32W/36W T-8 tubes.

In the first case, there is no incremental technology cost, as the two alternatives cost the same. In fact, the manufacturers claim that the service life of an energy - efficient 36W tube is 20,000 hours, compared with 7,500 hours for the 40W tubes. This means that the long-term capital cost of the 36W lamps is lower than the 40W lamps.

Linear fluorescent Lighting Systems used for commercial, institutional and industrial buildings should use electronic ballasts that meet the following efficiency criteria for ELI-compliant linear fluorescent technologies:

Lamp Power (High Frequency	**Max. Circuit Power Draw**
16 W	less than or equal to 21 W
32 W	less than or equal to 38 W
18 W	less than or equal to 24 W
36 W	less than or equal to 41 W

Fluorescent lamps shall have a color rendering index (CRI) of 70.

Electronic Ballasts that are to be used for this program should meet the following requirements:

Frequency	greater than 20 kHz
Power Factor	greater than or equal to 0.90
Total Harmonic Distortion	less than or equal to 32 %
Voltage Variation	Must operate within specified parameters at a range of nominal voltages up to 15% higher or lower than rated operating voltage without reduction in rated life
Warranty	Minimum 3-year replacement warranty

	including a labor allowance for electronic ballasts that fail early due to manufacturer defect. Manufacturer shall apply a label with basic warranty terms and a local telephone number to each ballast, written in at least one applicable local language.

Recommended Lamp Replacement

T – 12 **Linear Fluorescent Lamp**	**T – 8** **Linear Fluorescent Lamp**
40 W (4 ft) 20 W (2 ft)	*32 W (4 ft) or 36 W (4 ft)* 17 W (2 ft) or 18 W (2 ft)

Note: Ratings in bold italics are preferred for utility DSM Programs

With lower long-term capital costs as well as energy savings, it may be feasible to replace operating 40W lamps and electromagnetic ballasts with 36W lamps and electronic ballasts immediately. That is, before waiting for the 40W lamps currently in service to fail.

4.5.3. Power Factor Correction Program

Technology cost-effectiveness analysis will be conducted on a site-by-site basis. Power factor correction equipment will only be installed in customer's facilities where it avoids greater transformer costs in the _____ (utility) network.

A typical schedule ____ (rate schedule for commercial customers) customer has a power factor of about ____ and a kW demand of _____. If the first phase of _____ (utility) rate restructuring will be implemented, these customers will be penalized by about _____ PHP per month for low power factor. To avoid the penalty, power factor must be improved to ____ (PF). This will require a correction a correction of about _____ kVAr, consisting about _____ PHP. Payback period is expected to be around _____ years.

4.5.4. Consumer Efficiency Awareness Program

The residential Customer Awareness and Behavior Program is not well suited to a straight-forward cost-effectiveness analysis. There are no "technology costs" as such. The costs are in the promotion and monitoring of the program itself. However, some guidelines for cost-effectiveness can be established and monitoring results compared with these guidelines.

For the program to be cost-effective, the present value of the costs of promoting and monitoring the program must be less than the present value to the _____ system of the energy saved and the peak demand reduced by the program. Customer awareness and behavior change programs require on-going advertising

and information to achieve consistent results. This is why an on-going program of practical energy saving tips mailed out with the monthly bills has been proposed.

Therefore, a steady stream of program costs will be incurred each year in an effort to achieve a steady stream of energy and demand savings. This means that a reasonable quick comparison can be made between costs and benefits without the need for present value calculations.

4.6. Market Size and Participation Projections

4.6.1. High Efficiency Compact Fluorescent Lighting Program

The appropriate use of CFLs for incandescent bulbs may be limited because of its technical nature and its impending cost. Technically, an 18W ELI-compliant CFL may replace an ordinary 50- to 70-W bulb without a significant change in the quality of light output. To be economically sound (that is, the payback period is most 2 years), an 18W CFL replacing a 60W incandescent bulb should be used for at least three (3) hours per day.

This lighting program is aimed at customer's lamps which are technically and economically feasible for a retrofit. This eligible market is defined as: 50W to 75W incandescent bulbs used for three (3) hours daily. The eligible market among the residential sector was determined through a customer survey in the _____ (utility) franchise area. The survey shows that ___% of residential customers have an average of __ (number) lamps eligible for retrofit.

4.6.2. High Efficiency Fluorescent Lighting Program

This program is an information program. As the cost-effectiveness analysis above shows, the technology is very cost-effective: each 40W T-12 lamp replaced with a 36W T-8 lamp is worth net P 85 to society in present value terms. The program costs are estimated below at P 85,000, so it would take about 1,000 lamps for the costs to be justified.

4.6.3. Power Factor Improvement Program

The pilot phase of this program will target ___ (number) customers. The full market potential will be assessed during the period.

4.6.4. Consumer Awareness And Behavior Program

The market size is all residential customers. Calculation on the number of participants required to cover the estimated program costs.

4.7. Energy and Demand Effects

- *For sections 4.7.1, 4.7.2,….insert the projected annual energy and demand savings for the programs.*

4.7.1. High Efficiency Compact Fluorescent Lighting Program

Table ___ shows the projected annual energy and demand savings for this program under the following assumptions:

- the program acceptance numbers as indicated above; and
- the end-use energy and demand savings and the utility losses are as described in Table ___.

TABLE __ PROJECTED ENERGY AND DEMAND SAVINGS

Year	End-Use Energy Saving kWh	Peak-Coincident Demand Saving kW
	Pilot	Pilot

4.7.2. High Efficiency Linear Fluorescent Lighting Program

Aggregate energy and demand effect estimates have not been made for this program. _____ (number) lamps changed from 40W to 36W would cover the estimated costs of the program from society's perspective. Each lamp-and-ballast set changed will save 14W times 20,000 hours or 280 kWh over its life in a typical office. This estimate does not include the additional savings from the network loss reduction.

4.7.3. Power Factor Improvement Program

This program is designed to reduce apparent power (measured kVA), therefore reducing transformer capacity requirements and hence network capital costs for the same real power (kW) and therefore the same level of energy service. However, improved power factor can cut down losses reducing peak demand. This program will not save any energy, nor will it directly reduce demand measured in kW.

4.7.4. Consumer Efficiency Awareness Program

The pilot program, followed by surveys and analysis of consumers' electricity consumption before and after the program is required to make reasonable estimates of the energy and demand effects of a program such as this. However, we can work backwards from the program costs to calculate how much energy would need to be saved to justify the program costs from the societal test perspective.

Table ___ in the section on expected costs indicates that the residential customer awareness and behavior program is estimated to cost PHP _____ in each year. The program would need to save energy, demand and reduce environmental costs that at least total this amount to pass the societal test. The avoidable cost of energy of _____ (utility) is _____ PHP per kWh. Therefore, not counting any benefits from peak demand reductions nor any reductions in environmental costs, if the program saved 436,000 kWh in that year, the benefits to society would equal the costs to society. Now, 436 MWh is less than 1% of the projected _____(utility name) residential energy consumption in _____ (year). This is considered to be an achievable level of energy savings to make. It is therefore proposed that the program be implemented in ____ (year) as a pilot and follow-up research done on customer responses.

4.8. Externalities

This submission does not place monetary values on reduced external costs, for the reasons discussed under Avoidable Environmental Externality Costs.. Nevertheless, the Table below briefly summarizes the externality effects of the proposed programs. Programs that reduce total energy consumption will also reduce those marginal external costs associated with each unit of energy generated.

TABLE ___ EXTERNALITY EFFECTS OF PROPOSED PROGRAMS

Program	Utility Peak Demand	Utility & NPC Total Energy	Environmental Costs

4.9. Expected Costs

The costs outlined in this section are the estimated costs associated with the implementation of the ____ (number) programs over a ___-year period. However, it does not include costs associated with programs that are implemented in ____ (year), which after initial evaluation, is continued in ____ (year). These costs will be incorporated in the Revised Plan that will be submitted at the end of ____ (year).

4.9.1. PROGRAM COSTS

The estimates of program costs for each of the programs is given in Table ___.

TABLE ___ ESTIMATED PROGRAM COSTS

Program/ Cost Type	No.	Units	@Unit Cost PHP	Direct Cost PHP	Total PHP
Program Name:					
Sub-Total					
Program Name					
Sub-Total					
Total Program Cost					

4.9.2. OTHER COSTS

Aside from the costs directly associated with programs, there are a number of other costs associated with DSM activities which are given in the Table below.

OTHER (NON-PROGRAM-SPECIFIC) COSTS

Program/ Cost Type	No.	Units	@Unit Cost PHP	Direct Cost PHP	Total PHP
Program Name:					
Sub-Total					
Program Name					

Program/ Cost Type	No.	Units	@Unit Cost PHP	Direct Cost PHP	Total PHP
Sub-Total					
Total Program Cost					

4.10. Cost-Effectiveness Test Results

The five cost-effectiveness tests defined in the *Standard Practice Manual: Economic analysis of Demand-Side Management Programs*, California Public Utilities Commission and California Energy Commission, December, 1987 are used here.

- *Insert results for each program*

4.10.1. High Efficiency Compact Fluorescent Lighting Program

The calculation of benefits from the CFL program is dependent on the assumption about its peak demand impacts.

If the end-use demand impacts are assumed to contribute 100% to the reduction of peak demand, then the cost-effectiveness to the total resource of the CFL program would have benefits to the society over ___ (number) times its costs and it would have a strong positive (downward) impact on tariffs.

If, at the other extreme, the end-use demand impacts are assumed not to contribute at all to the reduction of peak demand, then the cost-effectiveness to the total resource of the CFL program would have benefits to society of under ___ (number) times its costs, and it would have a negative (upward) impact on tariffs.

In between, where the end-use demand impacts are assumed to contribute 50% to the reduction of peak demand, then the cost-effectiveness to the total resource of the CFL program would have benefits to society of just under ____ (number) times its costs and it would have a relatively neutral impact on tariffs.

Or:

The CFL program has benefits to society of around _____ (number) times its costs.

TABLE __ SUMMARY OF CFL PROGRAM COST-EFFECTIVENESS

Benefits & Costs	Participant	Utility	Rate Impact Measure	Total Resource Cost
PV Reduced Supply Costs				
PV Customer bill Savings				
PV Equipment Costs				
PV Program Costs				
Net present Value				
Benefit/Cost Ratio				

4.10.2. High Efficiency Linear Fluorescent Lighting Program

As described above under market participation estimates, this program requires just _____ 40W T-12 and electromagnetic ballast sets changed to energy efficient 36W T-8 and high-frequency, low-loss electronic ballast sets to be cost-effective.

4.10.3. Power Factor Correction Program

The cost-effectiveness of this program is not shown here pending the results of the pilot test where necessary data will be extracted.

4.10.4. Consumer Efficiency Awareness Program

The market participation results represented above show that annual energy savings of ____ (in kWh or MWh), or less than ___ % average of all residential customers would be sufficient for this program to just pass the total resource cost and societal tests. The rate impact test would be negative, but the average customer would save a net PHP ____ on their annual bill for achieving their share of the less than ___ % savings. If the savings were larger than this, the program would pass the total resource cost and societal tests at a higher ratio and participating customers would save more on their annual bills.

4.11. Effect on Bills and Rates

- *Insert results*

4.11.1. High Efficiency Compact Fluorescent Lighting Program

Implementation of the CFL program for five years, with the energy and demand savings described, at the current level of NPC charges to ____ (utility), including all program costs, and using a ___ % would save the cooperative PHP _____, but would incur program costs and reduced revenue totaling P _____, resulting in a net loss to the cooperative of PHP _____. Since _____'s (utility) labor costs are included in the rate base the net loss is reduced to PHP _____. The annual variable tariff adjustment for cost recovery is given in the table below.

TABLE __ REVENUE AND TARIFF EFFECTS

Year	Projected Reduced Supply Cost PHP	Projected Customer Bill Savings PHP	Projected Program Costs PHP	Annual Rate Impact PHP	Projected Consumption With Program MWh	Recovered Revenue PHP/kWh

4.11.2. High Efficiency Linear Fluorescent Lighting Program

The revenue and tariff effects of this program will be assessed during ____ (year) and submitted to the ERC at the end of ____ (year).

4.11.3. Power Factor Correction Program

The revenue and tariff effects of this program will be assessed during ____ (year) and submitted to ERB at the end of ____ (year).

4.11.4. Consumer Efficiency Awareness Program

The residential tariff increase that would be required to make ____ (utility) financially whole from the effect of this program would be:

- the tariff rate minus the avoidable cost PHP ____ - PHP ____;
- multiplied by the energy savings; and

- divided by the projected residential energy sales (PHP ____ MWh) less the savings achieved.

If this program were to save just enough energy to cover the program costs - _____ MWh – then:

- the "average" customer would save PHP _____ on their bill; but
- tariff would need to increase by _____ PHP per kWh;
- which equates to an increase of PHP _____ on the average bill; and
- so that customers would on average save a net PHP ____ on their bill.

This is a worst-case calculation, because it assumes that _____ (utility) makes no peak demand savings on its _____ (NPC and/or IPP) bill from this program. Because the residential patterns of electricity use are highly co-incident with the _____ (utility) peak, in reality it is likely that each unit of energy saved by customers due to this program would also provide at least some reduction in peak demand. This would reduce the magnitude of the tariff impact.

4.12. Sensitivity Analysis Results

The programs proposed will be implemented at a pilot level in ____ (year). So detailed sensitivity calculations were not considered appropriate for this submission. Nevertheless, the following observations on the sensitivity of the results to several variables can be made.

4.12.1. Avoidable Costs

As discussed in the section on avoidable costs, the avoidable cost analysis is based on _____ (NPC and/or IPP) charges to _____ (utility). Strictly speaking, these charges do not accurately represent the costs in the generation system. The changes currently provide _____ (utility) with a strong incentive to reduce their peak load, rather than _____ (NPC and/or IPP) generation peak. The programs proposed here, particularly the residential compact fluorescent lighting program and to some extent the residential awareness and behavior program, respond to these current price signals.

If the price signal was to change such that the incentive to reduce _____ (utility) evening peak was reduced or removed completely, the cost-effectiveness of the programs would change significantly. Because the peak demand costs avoided by the program would become smaller, the cost-effectiveness of the program would then become more dependent on the value of the energy saved to be cost-effective against the societal test, the total resource cost test, the utility

test and the rate impact measure test. Unless the residential tariff changed, the cost-effectiveness against the participant test would not change.

4.12.2. Discount Rates

Adjustment of the discount rates in the program analysis spreadsheet show that the results are not particularly sensitive to changes in the discount rates. The spreadsheet is available for examination by ERC upon request.

4.12.3. Participation Rates

On the key cost-effectiveness test – the societal test – the programs are not particularly sensitive to changes in participation levels. This is because the fixed program costs are small relative to the aggregate cost of the DSM equipment, so the results scale quite readily over large ranges in participation level.

5. FINANCIAL PLAN

5.1. Proposal for DSM Financial Incentives

- *Details of programs that include financial incentives*

This document proposes financial incentives for the residential high efficiency compact fluorescent lighting program in the form of a loan. Customers will sign for lamps from _____ (utility name or retailers) and pay them off on their electricity bill from the energy savings delivered by the lamps.

Incentives from the commercial room air conditioner pilot program are provided in to the ___ (number) selected participants in the form of free servicing. In return, the participants provide access to useful pilot program before and after monitoring results.

5.2. Proposal for Cost and Revenue Recovery

_____ (Utility) proposes to recover program costs and net revenue losses through small adjustments to the tariff of the customer group to whom the programs are offered. The advantages of this approach are that:

- customers who participate in the program experience significant bill savings offset by an insignificant increase due to the tariff increase; and
- customers who don't participate in the program experience insignificant increases in their bills; and
- if this bothers them, they are free to participate in the program and achieve the savings.

_____ (Utility) proposes a provisional automatic tariff adjustment of _____ PHP per kWh to recover net losses over the life of the projected program effects with a present value of PHP_____ when discounted at __ %. This could be reviewed when the program goes into full implementation.

It is proposed that pilot results be used to:

- adjust cost recovery for the pilot; and
- set the initial cost recovery rate for use in the full implementation (if it goes forward).

_____ (Utility) proposes that the revenue effects of the programs on tariff be dealt with in the next submission prior to the implementation of the full programs, when the data and lessons from the _____ (year) pilot stage of program implementation are in hand.

It is suggested that the adjustment of the cost recovery rate be made no more frequently than every six months and no less frequently than every year. More frequent adjustments would be an inefficient use of _____ (utility) and ERC resources. Less frequent adjustments could cause actual and recovered costs to diverge.

6. IMPLEMENTATION PLAN

6.1. Program Implementation Process

Considering the requirement of the _____ (number) programs that have initially been identified in the light of the available resources within _____ (utility), it is proposed to undertake _____ (number) DSM programs in the first year (_____) and the remaining ___ (number) in the second year (_____).

6.1.1. PROGRAMS FOR _____(year)

- *List programs selected for ____(year)*

The following programs have been scheduled to be implemented in ____ (year).

- PROGRAM 1
- PROGRAM 2
- PROGRAM 3

The programs will be subject to an evaluation at the end of the year and based on the outcomes, a decision to cease, modify or continue the programs will be made.

6.1.2. PROGRAMS FOR _____ (year)

- *List the selected programs for _____ (year)*

The following programs and activities are scheduled to be implemented in _____ (year).

- PROGRAM 4
- Major Program Review

The major program review would include all programs and the outcomes will be included in the revised plan for 2000 onwards.

6.1.3. PROGRAMS FOR _____ (year) to _____ (year)

The programs to be undertaken during this period would be dependent on the load shape and the _____ (utility) objectives achieved during ____ (year) and ____ (year). They are likely to include the continuation of all or some of the initial programs. In addition, the following programs will be analyzed in-depth for possible implementation:

- *List future programs*

6.1.4. Timeline Chart of Activities and Milestones

A timeline covering tasks and milestones for each of the programs to be implemented in_____ (year) and _____ (year) are detailed in the following sheets.

7. MEASURING DSM PROGRAM RESULTS

7.1. Monitoring

- *Insert monitoring procedures for each of the programs. The monitoring procedures for the programs given in Attachment 1 are outlined in Attachment 2.*

The following monitoring procedures will be adopted for each of the programs:

7.1.1. High Efficiency Compact Fluorescent Lighting Program

The procedure to be adopted for this program involves the setting up of a database of relevant information from each of the participating customers. The database would include the following information:

- Customer name, address and electricity account number
- Date and number of CFLs purchased
- Date of first and last payments
- Customer estimate of hours of usage per day per CFL
- Calculation of energy and demand savings
- Details of CFLs returned and reasons

In addition, the database would assist in tracking customers who have purchased the maximum number of three (3) lamps.

7.1.2. High Efficiency Linear Fluorescent Lighting Program

This is an information program and impacts of this program could be assessed through trade allies (lighting retailers) and require their cooperation. The following aspects will be monitored:

- Sales information on high efficiency and standard fluorescent lighting, before and after program promotion
- Availability of and demand for low loss ballast s and tri-phosphor lamps and reflectors
- Customer interviews to determine satisfaction with any measures implemented
- Change in customer's awareness of energy efficient technologies as a result of the information

7.1.3. Power Factor Correction Program

The program impacts will be assessed by monitoring the following:

- details of participating customers;
- estimated monthly and annual savings; and
- actual savings achieved.

7.1.4. Consumer Efficiency Awareness Program

This is an information program and although its impacts are difficult to measure, some program monitoring can be done in the form of interviews. Customer interviews would try to establish the following:

- whether the customers remembered receiving brochure;
- was the brochure easy to understand;
- usefulness of the monthly energy saving tips;
- customer satisfaction with any measures implemented; and
- change in customer's awareness of energy efficient technologies as a result of the information.

7.2. Evaluation

All proposed programs will be evaluated upon completion. As required by the DSM Framework the programs will be subject to an annual evaluation.

8. APPENDICES

8.1. Forecast

TABLE __ HISTORICAL & FORECAST ELECTRICITY SALES AND DEMAND

Year	Residential	Commercial	Industrial	Other	Total Sales (MWh)	Max. Demand (MW)

TABLE __ HISTORICAL & FORECAST ELECTRICITY SALES AND DEMAND GROWTH RATES

Year	Residential	Commercial	Industrial	Other	Total Sales (MWh)	Max. Demand (MW)

TABLE __ HISTORICAL AND FORECAST CUSTOMER NUMBERS

Year	Residential	Commercial	Industrial	Other	Total

Year	Residential	Commercial	Industrial	Other	Total

TABLE __ HISTORICAL AND FORECAST CUSTOMER GROWTH RATES

Year	Residential	Commercial	Industrial	Other	Total

8.2. DSM Options

8.2.1. Data And Assumptions Used In Option Analysis

The main data used in the option analysis was the _____ (utility) load shape, the _____ (NPC and/or IPP) charges and the historical sales, demand and customer numbers.

8.2.2. Options Rejected

Apart from the programs included in the Plan, no other options were seriously considered.

Or:

All options considered are included in the plan.

8.2.3. Model Used In The Analysis

The analysis was conducted using a spreadsheet. The spreadsheet used the standard cost-effectiveness tests as defined in the Standard Practice Manuel: Economic Analysis of Demand-Side Management Programs, California Public Utilities Commission and California Energy Commission, December 1987. The spreadsheet is available for examination by ERC upon request.

8.2.4. Optimization By The Cost-Effectiveness Test perspectives

The High Efficiency Compact Fluorescent Lighting Program has been designed to produce the best cost-effectiveness result under the main test specified by the DSM Framework- the societal test. This also produces optimum results under the total resource cost test. The program is designed to provide excellent leverage of _____ (utility) funds by the use of loan mechanism, so that it produces optimum results under the utility test. It does not pass the rate impact measure test. No DSM program that saves energy in a utility or cooperative that is not selling at a loss will pass the rate impact measure test. However, the impact on residential tariffs is extremely small. The program provides a high benefit/cost ratio under the participant test- otherwise consumers would not participate.

The full cost-effectiveness assessment of the other programs will be conducted in _____ (year) and submitted to ERC for approval of program implementation.

8.3. Project Implementation Plan

Please prepare a Gantt chart of all DSM activities using the model below:

TABLE __ PROJECT IMPLEMENTATION PLAN – ____ (YEAR)

Program / Task	**Jan-02**	**Feb-02**	**Mar-02**	**Apr-01**	***Mo.-Yr.***