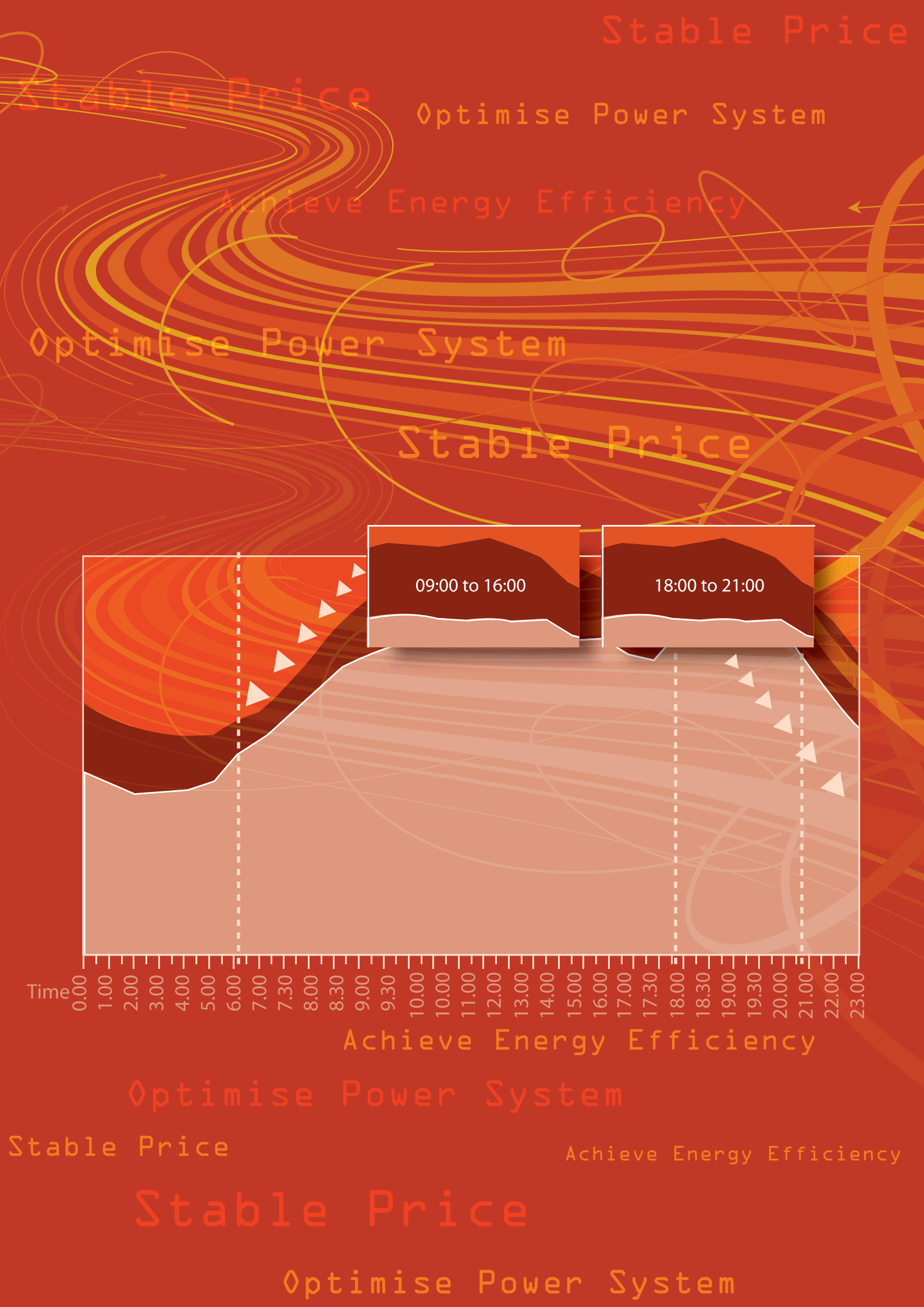
Stable Price
Optimise Power System
Achieve Energy Efficiency
Optimise Power System
Stable Price
09:00 to 16:00
18:00 to 21:00
Time
0.00
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Achieve Energy Efficiency
Optimise Power System
Stable Price
Achieve Energy Efficiency
Stable Price
Optimise Power System

How High is Demand-Side Management on the Agenda?

Sustainable power system development starts well before the setting up of the physical infrastructures. It is a shift in thinking and of evaluating alternatives. The time to focus on the supply-side has already revolved. Managing demand is equally important and it deserves our closest attention, if we are serious about our core values.

CEB, by sharing this engagement, will act in the best interests of its customers by effectively balancing the demand-supply of electricity!

DEMAND–SIDE MANAGEMENT (DSM)

Chapter 9

In working towards the least-cost expansion of the national power systems, as exemplified in this IEP, CEB has resolved that close attention be given to potential Demand-Side Management (DSM) initiatives.

As in other sectors, the rationale underlying DSM in power systems is the exact opposite of traditional supply-side philosophy. In the electricity business, a supply-side approach focuses on the construction of new generation capacity in response to increasing demand. DSM is based on the demand-side approach, that is, what can be done on the demand-side, not only to promote efficient use of energy, but also to lower and/or displace loads imposed on the power system.

As highlighted in the previous IEP, CEB had embraced the DSM concept as far back as in 2003. From mere theory, the concept was translated into real initiatives. Today, DSM has gained useful momentum and is an integral element in the planning of the CEB's power systems.

Within the DSM framework, CEB had actively emphasized measures to manage electricity demand in households and businesses. Over the recent years, CEB, in collaboration with the MEPU, initiated and implemented a number of projects in accordance with its DSM objectives; as is elaborated briefly in the next section. Sections 9.2 and 9.3 below give some important information on the scope of the CEB's DSM strategy and on its future DSM initiatives, respectively.

9.1 RECENT DSM INITIATIVES IMPLEMENTED

In its commitment to pursue its DSM strategy, CEB has implemented successfully the following initiatives.

9.1.1 Efficient Lighting (One Million CFLs Distribution Campaign)

CEB successfully accomplished the distribution of a total of one million Compact Fluorescent Lamps (CFLs) in Mauritius and Rodrigues. The CFL project was launched on 1st August 2008 and lasted until April 2009. The targets set were indeed largely met, as pointed out in the Table 9.1 below.

TABLE 9.1: Targets and Outcomes of the CFLs Distribution Campaign

Objectives Set	Target	Achieved
Annual decrease in electricity consumption during evening peak hours	15 to 16 GWh	12.3 GWh
Daily reduction in electricity demand during peak hours	15 MW	14.36 MW
Annual reduction of carbon emissions (7-year lifetime of the CFLs)	37.5 kTon	As per target

9.1.2 *Daylight Saving Time (DST)**

Under a directive from the Government, CEB engaged actively in the Daylight Saving Time (DST) project. The project was launched on the 26th of October 2008 and ended on the 29th of March 2009. The post-evaluation of the project confirmed the expected benefits. The published results are reproduced in the Table 9.2 hereunder.

TABLE 9.2: Targets and Outcomes of the DST Project

Objectives Set	Target	Achieved
To decrease electricity consumption during peak hours	3 to 4 GWh	4 GWh
A reduction in electricity demand	15 MW	18 MW
To improve the system load factor	Not quantified	Improved by 1%

Despite these benefits, Government resolved not to renew the project, because of strong objections from the public.

9.1.3 Sensitization Campaign

The CEB's on-going sensitization campaign, which started in 2005, has produced positive results. Over the past years, a noticeable improvement in specific

* *See glossary*

consumption, especially in residential consumption, has been noted. Based on information collected, it appears that customers are becoming more and more efficient in their electricity consumption.

As part of its sensitization campaign, among other actions, CEB distributed, free of charge, a very useful Energy Saving Booklet to about 300,000 households in Mauritius and Rodrigues in 2006, and also carried out communication exercises through the different media.

9.2 THE ENERGY EFFICIENCY MANAGEMENT OFFICE (EEMO)

Following the setting up of the EEMO, the CEB revised the scope of its DSM strategy, especially with regard to energy efficiency. This is a necessary step so as to prevent potential duplication of activities which, otherwise, may negatively impact on the overall effectiveness of national energy efficiency initiatives. CEB, however, will maintain its active participation in the EEMO's activities.

As a key stakeholder, in accordance with its DSM strategy, CEB will continue to provide technical and development supports in the national project entitled 'Removal of Barriers to Energy Efficiency and Energy Conservation in Buildings and Industry', being led by the EEMO. CEB is strongly convinced that initiatives falling under this project can contribute positively to the efforts to manage the ever-growing electricity demand.

9.3 PROPOSED 2013-2022 DSM INITIATIVES

As part of its commitment to ensure the least-cost development of the power system, CEB will keep on emphasizing the importance of DSM related activities. Over the next 10-years, to the extent it is feasible and viable; CEB will work toward the implementation of the following actions, which are closely in line with the Energy Strategy Action Plan (ESAP) 2011-2025 of the MEPU, so as to effectively respond to its customers' demand.

Renew the Sale of Energy Saving Lamps

Depending on the findings of the Households Electricity Utilisation Survey, conducted in May-July 2012, the second campaign of the sale of CFLs, under similar conditions governing the first one, will be planned. In parallel with the proposed CFLs campaign, CEB intends to launch a project for the replacement of Conventional Fluorescent Tubes (T8) by Linear Fluorescent Lamps (T5).

Replacement of T8 by T5

T5 lamps (Linear Fluorescent Lamps) consume around 40% less energy than T8 lamps of similar dimension. Although the cost of a T5 tube is higher, when compared to a T8 type, the high initial cost will be fully compensated by the long life of the T5 and the benefits derived from its energy efficiency properties. Currently, a pilot study has been undertaken on one of the CEB's premises. After the feasibility study, if the findings are positive, a project to replace all T8 tubes by T5 on the premises will be carried out. At a later date, the project will be reformulated so as to encourage all CEB's customers to replace their T8 tubes by T5 Linear Fluorescent Lamps.

Promoting the Use of Light Emitting Diodes (LEDs) Technology

As an alternative to the above proposed sale of CFLs, CEB will study the possibility of promoting the use of LED technology. LED technology is a real source of energy saving. LED light bulbs are much more energy-efficient than conventional incandescent lights and even CFLs. They contain no mercury and have a lifespan of about 15 years. As the price of LED bulbs becomes more competitive, CEB, with the participation of other stakeholders, may launch a LED campaign at a national level.

Encourage the Replacement of Old Inefficient Refrigerators

According to a latest survey, 92% of households in Mauritius have at least one refrigerator of an average capacity of 200-300 litres. The refrigerators originated from different countries and their energy consumptions vary a lot. Most of the refrigerators of the 1990s consume far more energy than the new frost-free generation.

As a consequence of the varying power consumption, the refrigerators have different coefficient of performance (COP). Hence, for same output, different quantities of input (electricity) are required.

To encourage people to replace their less energy-efficient refrigerators - those older than ten years - an appropriate incentivised scheme will be planned. However, for the scheme to be effective, the followings are necessary:

- The full support of the EEMO and the MID Fund; and
- Enforcement of the necessary regulations in relation to the Energy Efficiency Act.

Use of Smart Power Strips

From information collected in a previous survey, an equivalent of 1.4 MW of electrical appliances was estimated to be left on stand-by mode. This unnecessary energy loss can be avoided by encouraging customers to use a Smart Power Strip. In collaboration with the EEMO, CEB will plan to launch the Smart Power Strip project on a pilot basis.

The Smart Power Strip is an intelligent power strip made of several power inlets with one control inlet. Once an appliance, say a TV, connected to the control inlet is switched off at the TV level, all other equipment, say a DVD player, satellite channel receivers, Hi-fi and so on, are switched off automatically, and power is cut off to all of them completely, thus avoiding stand-by mode power consumption or idle current.

Smart Metering

CEB has started installing smart meters on the premises of some of its important consumers, in replacement of conventional meters. This is a first step towards smart metering, which eventually will contribute to building the ultimate Smart-Grid.

For the medium term, the CEB envisages replacing all its electro-mechanical energy meters by electronic meters or, to the extent that it is viable, by smart meters. Smart meters, among other advantages, offer the possibility of monitoring electric loading on consumers' premises. With this option, CEB may explore the possibility of engaging in load management, if need be, as part of its demand-side management strategy. More information on metering is given in Chapter 10, Section 10.3.

*Time-Of-Use (TOU) Tariff**

Exploring the potential of TOU tariff in the local power system has been a recurrent debate. It is known that TOU tariff is a powerful tool to manage electricity demand and can contribute to optimising the utilisation of power generation assets. However, like most alluring business applications, the TOU tariff also has some critical implications for both the consumers and the utility.

In our context, after systematic analysis, it has been found that TOU tariff will not be an effective means to manage electricity demand, unless a comprehensive restructuring of the current electricity tariffs is pervasively accepted and made. The importance of a fully-fledged tariff restructuring and features of a modern tariff model are discussed in Chapter 10.

In general, TOU tariffs will be dependent on customers' expected gains, which normally should be equal to a certain amount of revenue that the utility is willing to forgo. That monetary amount should at least be equal to the efficiency gains made through optimal dispatching of generation facilities under a revenue-neutral scenario.

At the CEB, efficiency gains can be generated by flattening the daily demand curves. The results of the flattening of those curves shall enable the CEB to minimise the operation of high running cost engines.

Impact of TOU on the Evening Peak Demand

The system's evening peak is generally caused by the demand of the Residential Sector. From a recent customer survey, it was estimated that there is a potential of reducing the evening load by shifting it to the off-peak (night period), using a TOU tariff, as depicted in the typical demand curve shown in Figure 9.1 on the next page.

Impact of TOU on the Daytime Peak Period

The morning peak in the system is generally caused by the activities of the Industrial and Commercial Sectors. Figure 9.1 also shows the shift in load that can be targeted through an effective TOU tariff scheme.

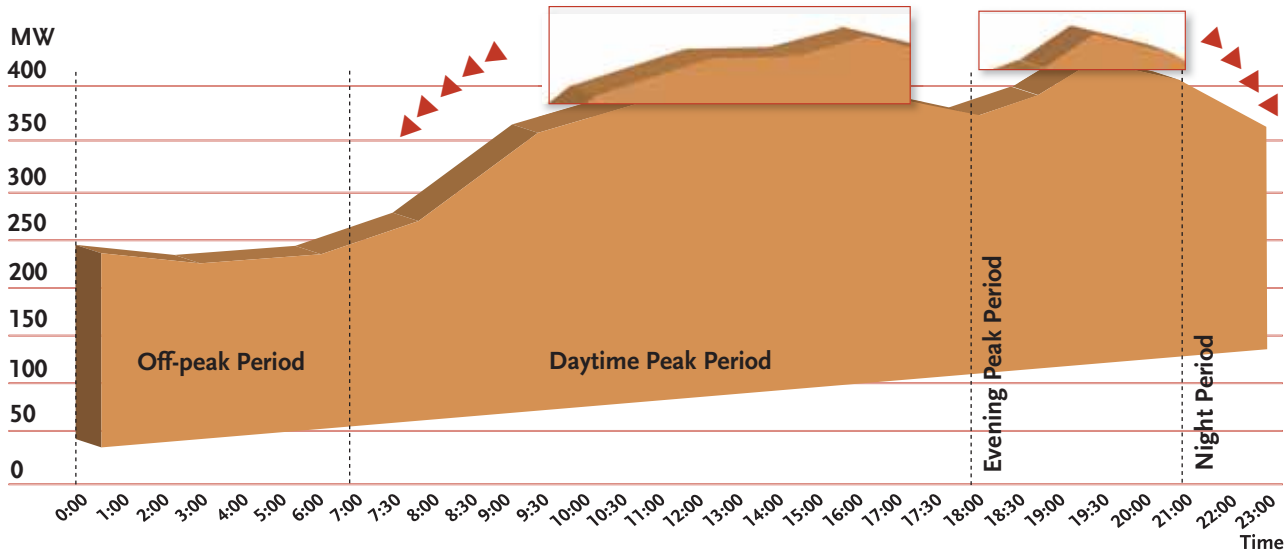
Limitation of the Inclining-Block Tariff Structure

By its very specific nature, the present residential inclining-block tariff, applicable to households in Mauritius and Rodrigues, does not allow offering a single equivalent TOU tariff, which would be suitable to all CEB's residential customers under a revenue-neutral scenario.

Figure 9.2, on page 106, shows the current distribution of the number of accounts by average selling price in the residential category. It can be observed that for every block of consumption, customers pay an average selling price which is different from another block of consumption.

* *See glossary*

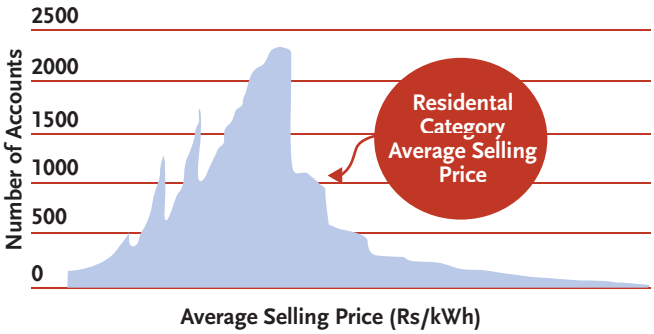
FIGURE 9.1: Shifting of the Daytime Peaks to Off-peak Period and Evening Peak Period to Night Period



In fact, viewed at a micro level, for every quantity of electricity consumed a consumer experiences a different average selling price. This snag is even more acute in the low usage bracket. The distribution in Figure 9.2 also shows that a large number of the residential customers pay an average selling price below the mean selling price of the category.

Taking the above into account, if no customer is to be penalized while opting for TOU tariff, the CEB will have to customize a set of TOU rates for each bracket of consumption. However, this is contrary to normal practice and is not reasonable.

Figure 9.2: Number of Customers by Average Selling Price (Rs/kWh)



Other DSM-related Initiatives

A lack of information and insufficient knowledge usually prevent optional DSM practices. To enhance the CEB's DSM programme, the aforementioned communication campaign (Section 9.1.3) will be intensified and will cover such actions as:

(a) Promoting the use of sensors to control lighting;
(b) Encouraging the use of more energy-efficient lamps for public lighting; and
(c) Identifying and motivating customers, who are consuming high reactive power. This will include how, and why, to use Power Factor Correctors in electrical installations.

The communication campaign will also comprise CEB's participation in events on energy-related activities organised by government, schools, colleges, hotels, industries and other stakeholders.