

2. CONVENTIONAL ELECTRICITY BILLING METHOD (CEBM) VERSUS ENERGY DISPENSING SYSTEM (EDS)

A billing system is simply a mode by which due is collected for the service rendered. In the context of electricity supply services, the billing system refers to the process in which the dues are collected from the customers for the services rendered in the form of bringing electricity to their home for consumption.

2.1 Conventional Electricity Billing Method (CEBM)

The Billing System can be as crude as installing electricity or water meter at customer's home and having a meter reader to take the reading once a month or once in two months. The customer will in turn produce the bill at the collection center to make payment . This method of billing is known as the Conventional Electricity Billing Method (CEBM). Although the system seems crude but its contribution to the utility company is no less significant than any other initiatives. Among a few salient points on the importance of billing system include ensuring timely and appropriate amount of cashflow to the company and providing the interfacing between the company and the customers.

Billing system is a mean by which the Company recoups its investment. As such, the collection cycle becomes very critical in meeting the cashflow targets. However, there are a number of factors that are associated with the inefficiency of CEBM, namely:

- *Labor - intensive*

Meter readers need to be employed to ensure adequate coverage of customer's premises. This method is uneconomical in low density

population. As the country's labor market becomes very tight, we can see the rising cost in meter reading.

- *Delay in payment/defaulters*

There are many reasons why TNB is not receiving payment in time. These include customers not paying in time or not receiving their bills in time or not receiving their bills at all, collection agents (banks, post office, etc.) are not prompt in sending their collection dues, etc.

- *High degree of electricity thefts*

CEBM does not provide the effective mean by which these unhealthy activities can be checked. Normally, spot checks are conducted at premises suspected of stealing electricity. Electricity thefts have become so sophisticated these days and it is increasingly more difficult to apprehend the culprits.

- *Unnecessary repetition of activities*

The reporting has to be prepared every month on the status of the customer's consumption. From there on, a detailed analysis will be carry out to determine reasons for certain behavior of consumption. Programmers, clerks, cashiers as well as meter readers are collectively responsible to ensure all the necessary data is being captured. On most occasions, jobs are repeated among various categories of employees. The disconnection and connection services responsible for terminating supply of the defaulters, similarly, carry out routine job of disconnecting and connecting customer's supply.

The billing system provides the interfacing between the utility company and the customers. We observed series of cosmetic changes being put to display by the utility company in recent years. Cosy and comfortable counters with shorter queues, air conditioned cubicles, friendly meter readers, read-yourself meter, longer payment period are some of the measures being undertaken by many utilities. Although these initiatives bear results but a more focus or long term solution has to be formulated to rid of all the problems associated with the traditional method of billing.

2.2 Energy Dispensing System (EDS)

The coin-operated meter used in England a few decades ago is considered by some as the advent of electricity prepaid system. In order to operate the meter, coins need to be inserted into the meter box. The duration of the consumption will be based on the amount of coin being inserted into the meter and will automatically be disconnected once the time has ran out.

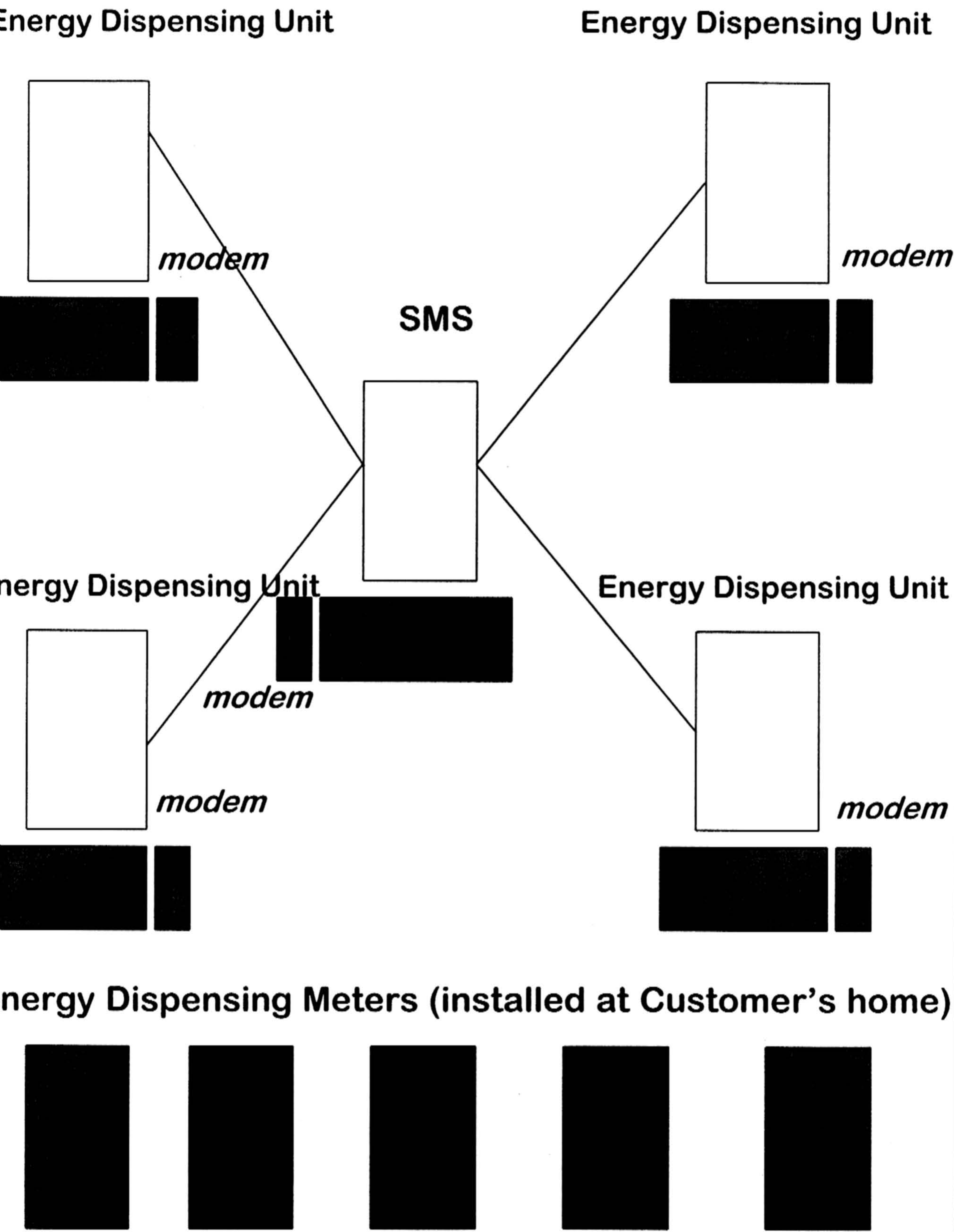
This principle forms the basis of electricity prepaid system or popularly known as Energy Dispensing System (EDS). There are two reasons why the word Energy Dispensing System is used instead of prepaid system. Firstly, it is for marketing purposes. The customers tend to resent anything to do with prepayment that is pay first and get the service later. Subsequently, it is the feature of the system itself. Electricity is no more billed but rather being bought as a commodity in the same way as other grocery items in the shopping list. So appropriately, it is a mean of dispensing electricity or energy to the customer.

2.2.1 Technical Features

Figure 2.1 shows a typical layout of an Energy Dispensing System. The principle components of the system include.

- System Master Station (SMS) comprises of a Personal Computer with adequate memory and preloaded EDS's software. SMS acts as the 'brain' of the system responsible for managing the database and verifying data accuracy at every dispensing centers connected to it. It also behaves as the central processor which collect and collate all data, analyze, and churn out reports according to the stipulated formats.
- Energy Dispensing Center (EDC) comprises of a Personal Computer hook-up via telephone or computer line to the SMS. EDC acts as a premise for issuing out magnetic cards or tokens to the customer, payment receipt, and at the same time updating the customer's consumption status. This data will eventually be transmitted back to SMS for safe keeping. EDCs are normally located at the premises convenient to the customers and made available until late hours if not 24 hours.
- Magnetic Card comprises of a plastic or paper card with magnetic strip attached to it. The data programmed at the EDC will be transported to the Energy Dispensing Meter (EDM) using this card in order to trigger the operating mechanism inside EDM. The token functioned similarly as the magnetic card except that the data is transmitted in the form of punching numbers on the EDM instead of inserting the magnetic card. In other words, there will be two types of EDM, one using magnetic card and the other one (the key-pad type) uses token.

Figure 2.1 Typical Layout Of An EDS



- Energy Dispensing Meter (EDM) comprises of an electricity meter installed at customer's premise. This meter is equipped with all the necessary features to facilitate state-of-the-art operation including among others five levels security measure, protection against lightning surge and tampering, display of unit consumption of electricity in KWH & RM, indicators to show low level and rate of consumption.
- Checker Unit is used to verify whether the credit obtained at the dispensing unit is valid or not. It is normally located at the dispensing outlets.
- Management Software is located at the SMS and serves to operate the system.
- Modem is a device used for communication between SMS and EDU.

The EDS developed by AEG has undergone years of perfection and incorporated the latest state-of-the-art technology and these include :

- Multi-tariff capable to operate on a sliding-scale tariff
- stringent security protection system to ensure foolproof system
- choice of keypad or magnetic card type
- warning device either in the form of blinking light or audible sound
- emergency credit facility allowing for further use of electricity under emergency.

Research & Development team of AEG has continuously concentrate their effort in enhancing the system. Future improvements include :

- Peak/off Peak tariff
- Three-phase meters
- Remote metering

The EDS operates as a system. As such, each component is dependent on each other and has to be operated and maintained as a single unit. Once the system is adopted for use, it will stay to exist for years to come. The future development of the billing method will then be complementary to EDS instead of revolutionizing it.

2.2.2 Operation Model

Table 2.1 shows the scope of responsibility involved in implementation the EDS. The distribution of work between parties responsible for EDS depends on the operation model to be adopted by TNB. Based on the current situation and trend, two most likely approaches that may be adopted by TNB are as follows:

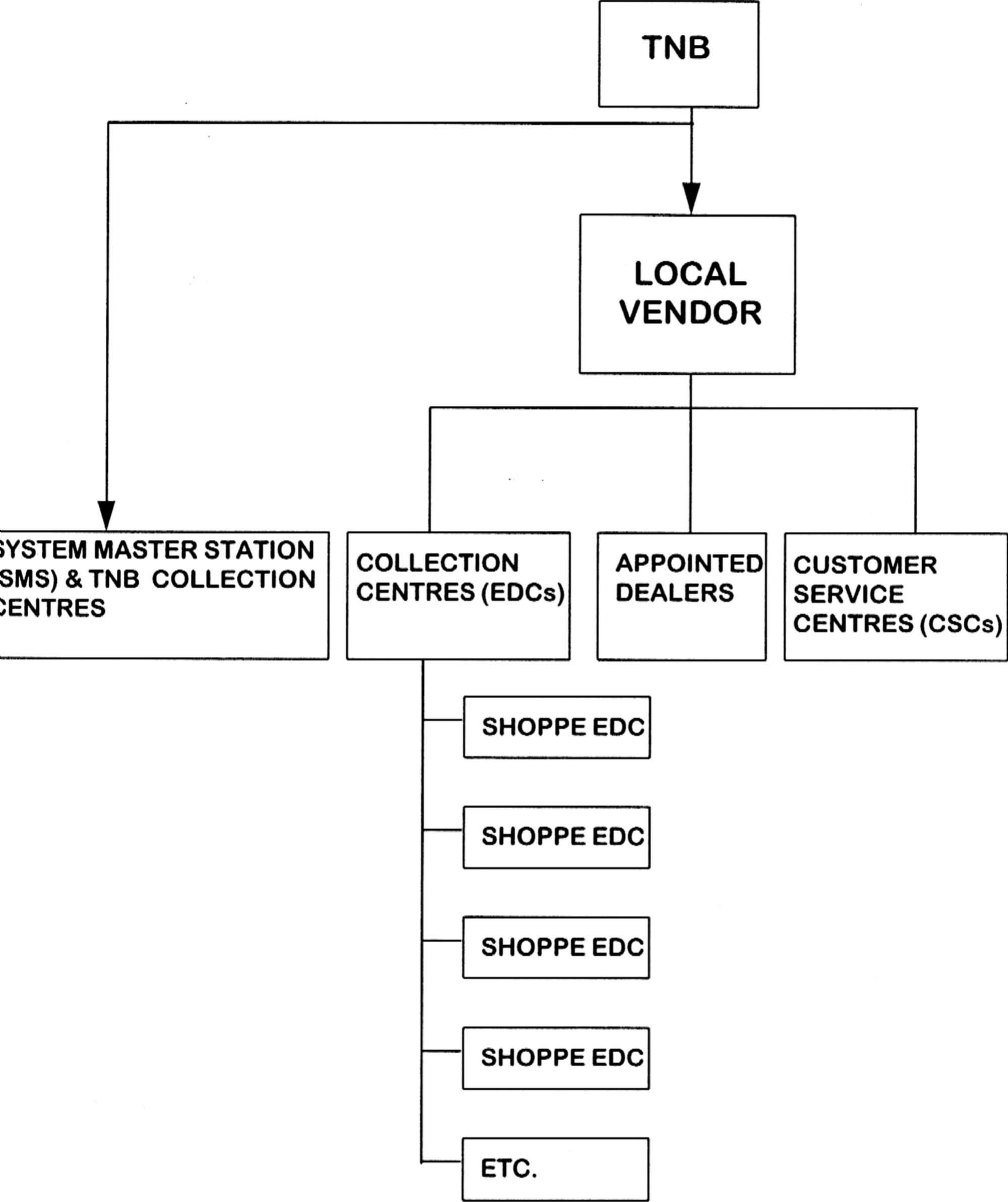
Scenario 1	TNB to buy from local vendors all the necessary components of EDS and undertake the implementation alone.
Scenario 2	TNB to request maximum participation from local vendors and will only be involved in the operation and marketing of the system.

The adoption of Scenario 1 results in very little changes to the current set up of the billing system. The local vendors would only be supplying their system to TNB and providing the necessary technical backup. Scenario 2 requires a drastic revamp to the current billing system. The operation model of TNB’s billing system need to be changed to suit the model shown in Figure 2.2. Based on the model, TNB and the local vendors have to embark on a 3-prong strategy in order to ensure the system is successfully distributed and implemented. The first approach is what is termed as Dealership Program. For every states, regions are created which in turn will be compartmentalized into districts. Depending on the number of customers in each district, dealers will be appointed responsible for sales, installation, and after sales service. Normally,

Table 2.1 Scope Of Responsibility

	DETAILED ACTIVITIES
SUPPLY	<ul style="list-style-type: none"> • Distribution of EDS
INSTALLATION	<ul style="list-style-type: none"> • Install meters at consumers' homes.
COMMISSIONING	<ul style="list-style-type: none"> • Check the meter after installation (seal and commissioning by TNB) • Install the computer hardware and software and commission.
OPERATION	<ul style="list-style-type: none"> • Maintain the SMS. • Manage the Electricity Dispensing Centers (EDCs) • Collection of revenue. • Preparation of statistics and reports.
MARKETING	<ul style="list-style-type: none"> • Measures to educate, convince and retain the customers.
MAINTENANCE	<ul style="list-style-type: none"> • After sales service (technical service).
CUSTOMER SERVICE	<ul style="list-style-type: none"> • Attend to customers' complaints and problems.
RESEARCH & DEVELOPMENT	<ul style="list-style-type: none"> • Ensure EDS's performance being enhanced continuously.

Figure 2.2 Operation Model Of EDS



an electrical-based company or electrical appliances retailer is appointed as the dealer in this program. The dealers will enjoy some privileges from this program including free training and dealership commission. The number of dealers in each district will be increased as the number of customers increases.

The second approach involves ensuring the magnetic cards or tokens within reach by the customers. Elektrokad will take step to identify possible locations for the dispensing units. Normally, a dispensing center can handle 3000 customers and must be located within the radius of 3km from the furthest customers. The dispensing units will be made available at customer's convenience stores including grocery shops, stationaries, petrol kiosks, etc. and open till late hours if not 24 hours. Elektrokad will provide the shopkeepers with all the necessary set of equipment and will attend to all their phone bills used for the system. In addition, the shopkeeper will earn some commission on the services rendered based on the amount of revenue collected.

The third approach is more of a customer service effort. In order to ensure customers are well look after the customer service centers need to be establish at least one for every district. Their function is to attend to problem associated to the use of EDS and to educate the customers on the system. The service will be provided based on commission on the number of customers attended by the service center. This effort is quite critical at the early stage of the implementation in order to gain customer's confidence and positive publicity. Scenario 2 fits in well with the current TNB's strategy of contracting out non-core businesses in order to trim down their staff. The success of the second approach lies on the proper coordination between TNB and local vendors in undertaking the implementation work. Table 2.2 shows the appropriate division of responsibility between the two parties under the Scenario 2.

Table 2.2 Division Of Responsibility

TNB	LOCAL VENDOR
OWNER	
	SUPPLY
PROJECT MANAGEMENT	PROJECT MANAGEMENT
MARKETING	MARKETING
	TRAINING
	INSTALLATION (DEALER)
SEAL AND COMMISSIONING	
	AFTER SALES SERVICE (DEALER)
OPERATION OF SMS & EDC (TNB OFFICES)	OPERATION OF EDCs (SHOPPE)
	OPERATION OF CUSTOMER SERVICE CENTRES
STATISTIC AND REPORTING	
	RESEARCH AND DEVELOPMENT

2.3 Future Outlook on The Billing System

The technology has advanced so rapidly today. New inventions are created to help improve the quality of human life. The utility sector is not excluded from the tide of reengineering and innovation. The customer service has become so sophisticated as the level of education and standard of living increases. Now it is not only the question of which is cheaper but rather which services or products provide for greater value for money. In other words, customers are willing to pay for the quality they required.

Billing method, to some extent, affect the performance of a utility company in terms of cashflow management and image to the customers. Methods after methods are being invented and perfected to ensure effective and efficient billing operations. From a simple electricity meter and manual reading, the system has evolved to a slightly more sophisticated computerized billing method employing hand-held computer operated by the meter reader. However, there is no indication of any revolutionary approach in the billing system. The utility companies are still laden with bad debts, defaulters, electricity thefts, etc. There seems no solution to all these problems until the advent of EDS. The EDS is a revolutionary approach to the billing method. In other words, it revamps the entire process of obtaining dues from customers. It changes the previous concept of billing electricity to 'buying' electricity as commodity.

The experience by utilities in South Africa can be a good guide for the implementation of EDS in Malaysia. Initially, the utilities over there make use of EDS to get rid of defaulters but eventually other utilities elsewhere in the world starts to follow. The customers, in fact, enjoy having EDS because it is very convenient and appears to be 'hi-tech' in nature. That was a decade ago and today almost 4 million customers are using EDS in South Africa and increasing at 10-12% annually. The evolution has gone very smoothly from a

crude and cumbersome system to an efficient and convenient system. The initiatives undertaken by the utilities and vendors over there has made South Africa as the pioneer or center of excellence for EDS. This fact is confirmed with the increasing use of EDS in other countries including South American countries, Europe, China, India, etc. using South Africa technology.

The world trend indicates that the prepaid system or EDS is here to stay. The changes in future would only be complementary in nature. For example, if the system now can be considered as semi-automatic since a portion of the process is contributed by manual handling of the customers, later the EDS may be improved to include more automation. The energy dispensing meter at home may be programmed to accept credit cards or smart cards and the consumption be deducted monthly together with other expenditure from the credit cards. Or the energy dispensing meter may be equipped with remote metering facilities to ensure consumption be monitored from a centralized control center. An aggregate consumption of water, electricity and gas can be deducted from the same meter. Another possible scenario is the integrated dispensing system for water, phone, electricity and gas using similar meter and centralized customer information center. These are some of the possible scenarios and there may be more drastic changes to the once billing system. But one thing for sure, the billing system will not be the same anymore with the advent of the EDS.