

## **1. INTRODUCTION**

What is Energy Dispensing System ? What is it's relevance to the Electricity Billing System? What is the difference between these two systems? Is there any additional benefits in adopting Energy Dispensing System? Why are they so important to a utility company? Which is relatively better to adopt at the present time? Or should there be any changes to the billing method at all? These are some of the pertinent questions that arise time and again when we start talking about electricity billing system.

Therefore, it is the purpose of this report to highlight the advantages and disadvantages of Energy Dispensing System (EDS) in contrast to the Conventional Electricity Billing System (CEBS). Subsequently, the writer will make an attempt to elucidate various aspects of EDS and will try to do so from various angles namely from Tenaga Nasional Berhad (TNB), customer and local vendor's perspective. However, it is seemingly more appropriate to look into the electricity business first in order to understand how the industry evolves and its future trend.

### **1.1 Electricity in our Everyday Life**

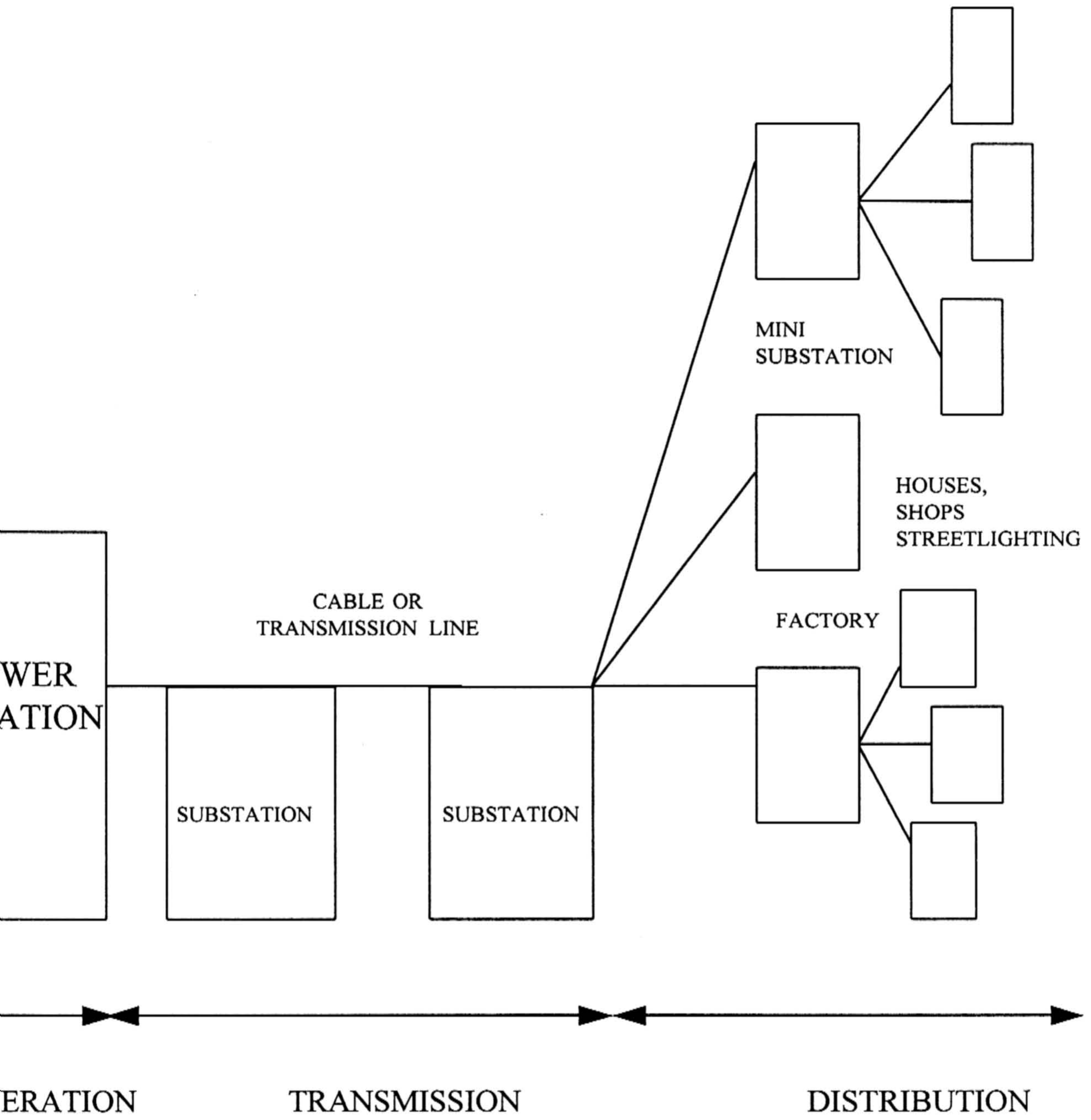
Electricity has become so important to our everyday life as a primary source of energy in powering our daily activities. We use electricity to light our homes and offices, we boil water using electric kettle, we iron our clothes using electric iron, wash using electric washing machine, etc. In fact, we rely so much on electricity as a 'clean' and efficient form of energy and this dependency gets stronger each day as the country becomes more develop. The process of transmitting electricity to our homes involves generating electricity, transporting it via the transmission lines and substations, and finally

distributing it through the distribution system before reaching the customer's home. Figure 1.1 shows a typical model of an electricity supply network. Basically, it is made up of three components, namely Generation, Transmission and Distribution System.

Generation involves producing electricity from other sources of energy such as thermal energy and kinetic energy. For example, when oil or fuel is burned, it will generate heat and this heat, in turn, will be used to heat the water. Once the steam is produced, it will be used to turn the turbine and electricity generated is captured by the generator. As electricity cannot be stored, it has to be transported spontaneously via the transmission system. Transmission system comprises of transmission lines or cables, and substations. The substations will ensure safe and reliable flow of electricity while transmission lines or cables act as the transporting medium. Transmission system operates at high voltages normally exceeding 66000 volts. Electricity supplied to the domestic customers is at much lower voltages ranging from 240 to 415 volts. As such, intermediate or distribution substations will have to be provided to bring down the electricity voltages from the transmission system to a safe level for consumption. The distribution system is a duplication of the transmission system. The only difference is that the former operates at lower voltages compared to the latter.

Electricity consumption is synonymous with modern society. As the country progresses further, the demand for energy increases accordingly. Despite the existence of various other alternative sources of energy, electricity remains as the most convenience and widely accepted form of energy. The trend is set to stay for years to come. The only changes in future, if any, will be in the primary source of energy but the final product is still electricity.

Figure 1.1 Typical Electricity Supply Network Model

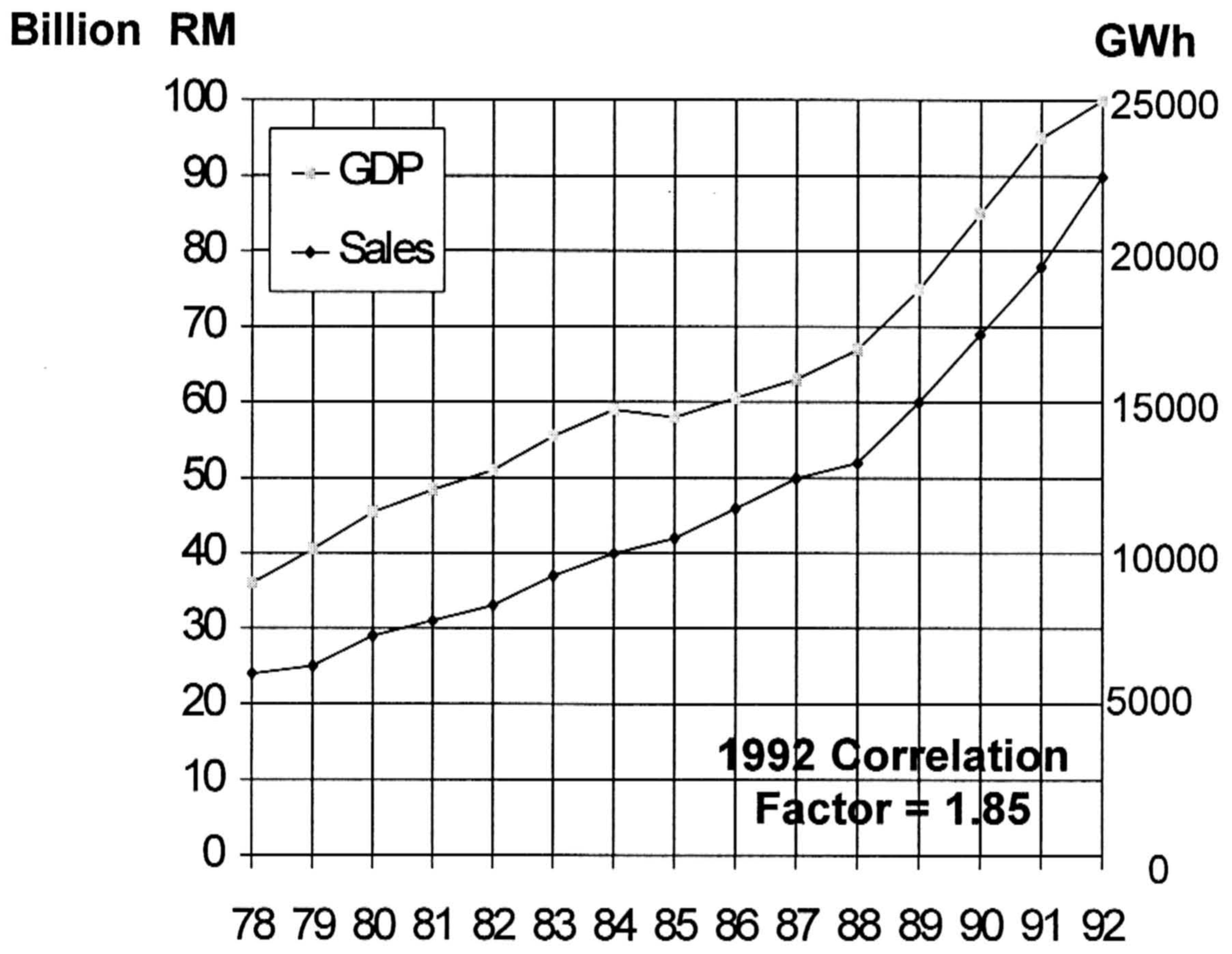


## **1.2 Electricity Supply Industry**

The electricity consumption has undergone a steady growth throughout the years. For the year 1995, total electricity consumption was 29,000 Gwh and it is expected to grow 15% annually and will surpass 40,000 Gwh by the end of the century. The current maximum demand on the National Grid is at 6,381 MW and it is expected to exceed 10,000 MW by the year 2000. The country's strong economic growth was reflected by a 15% increase in Kwh sales of electricity and a 20% rise in revenue of Tenaga Nasional Berhad (TNB - the sole electricity utility company in West Malaysia) for the year ending 1995. The yardstick is very important owing to the fact that TNB contributes 99% of the sales of electricity in Malaysia. The other two utilities are in East Malaysia, namely Sabah Electricity Board (SEB) and Sarawak Electricity Supply Company (SESCO) and they contribute the remainder of sales of electricity to the country.

The growth in the consumption of electricity is highly correlated with the GDP. Figure 1.2 shows the correlation between Electricity Sales to Gross Domestic Product for the year 1978 to 1992. From the graph, it is observed that the increase of electricity sales correlates positively and closely with the increase in GDP and the consumption has increased steadily throughout the years in the range of 12 - 15% annually. Higher demand for electricity calls for more generating capacity that is planting up of power stations, follows by expanding the transmission capacity that is more transmission lines, cables, and substations, and finally the need to expand the distribution system. When the system expands, the control gets complicated and as such more automation has to be introduced. Therefore, it is not surprising that the capital expenditure of TNB is estimated close to RM 3 billion annually to cater for the infrastructure development. Customers become more sophisticated as the society grows more affluent. Customer service has increasingly becoming more and more important

# Figure 1.2 Correlation of Electricity Sales to GDP



to the utility company in the wake of competition introduced in the once monopolized industry.

In the beginning of 1994, the wave of change has swept the utility industry throughout the world. The process of deregulation and decentralization in the industry has caused a lot of concern from various quarters. The government of Malaysia has also participated in the privatisation exercise for some obvious reasons. These included :

- Inadequate response by utilities to changes in the industry structure
- Slow development of the institutional framework in terms of expertise and delineation of roles and responsibilities
- Strong pressure from private sector developers to participate in the power sector
- Higher than forecast load growth

The first attempt by the government to introduce competition in the industry is by issuing licenses to Independent Power Producers (IPPs). These private power stations are allow to generate electricity and sell to TNB through the National Grid. Naturally, it is expected that the next competition in the utility industry is in the transmission and distribution sectors.

As far as technical performance is concerned, TNB has to undertake a drastic move if they are going to compete in future. New strategies need to be devised and executed. Restructuring and reengineering should be undertaken in a more rapid pace. New tools and products have got to be introduced to benefit the customers. Energy Dispensing System may not be able to solve all TNB's current problems but it will help to complement to some degree the initiatives toward efficient and effective customer services.

### **1.3 The Role and Functions of Electricity Billing System.**

Electricity Billing System is considered as the interfacing between the utility and its customers. This is the platform in which the customer gets to pay for the services rendered by TNB. As such, the role and functions of Electricity Billing System are central to any utility and can be summarized as follows :

- Provide mechanism in which revenue can be collected by the company for the services rendered to its customers.
- Establish ways of monitoring and checking the electricity consumption of the customers.
- Act as platform to improve public relations between the utility and the customers.
- Mean of obtaining statistics and reports on customer's consumption behavior and pattern.

Electricity Billing System made up quite a significant part of the customer service initiatives of a utility. Ability to enhance its effectiveness can help the utility not only to improve its cashflow but also its image in the eyes of the customers.