ELECTRICITY BREAKDOWN MANAGEMENT IN MALAYSIA: A CASE STUDY ON TENAGA NASIONAL BERHAD

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ABSTRACT

Managing electricity utility company has become a critical issue as all utility company all around the world faces many of the same challenges. On 1st September 1990, Prime Minister Dato' Seri Dr. Mahathir bin Mohamad officially proclaimed TNB as the heir and successor to NEB. Public-listed TNB is the largest electricity utility company in Malaysia with more than RM65 billion in assets and a customer base of about 6.8 million throughout Peninsular Malaysia and Sabah. This case study will see if TNB has improved their services, especially in electricity breakdown management. It will look deep in service quality, electricity breakdown management and communication performance. This case study indicates 50.9% of the respondents agree TNB provided most ot their electricity needs and 59.3% disagree that other utility company in other country possess higher service quality than TNB. 61.5% of the respondents believe TNB need to improve their power quality in the power system.

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DECLARATION

I declare that this case study entitled "Electricity Breakdown Management in Malaysia: A Case Study on Tenaga Nasional Berhad" is the result of my own research except as cited in the references. The case study has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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Date : **31st of March 2009**

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LIST OF ABBREVIATIONS

TITLE

TNB	-	Tenaga Nasional Berhad
CEB	-	Central Electricity Board
NEB	-	National Electricity Board of the States of Malaya
EGAT	-	Electricity Generating Authority of Thailand
SP	-	Singapore Power Limited
PRHEP	-	Perak River Hydro Electric Power
KED	-	Kinta Electrical Distribution Co. Ltd.
NEP	-	New Economic Policy
IPP	-	Independent Power Producers
LPC	-	Large Power Consumers
SREP	-	Small Renewable Energy Programme
GLC	-	Government Linked Company
MOSTI	-	Ministry of Science, Technology and Innovation
SPSS	-	Statistical Package for Social Science Program
SERVQUAL	-	Service Quality
PIS	-	Positive Ideal Solution
NIS	-	Distance from the Negative Ideal Solution
CRM	-	Customer Relationships Management
MW	-	Mega Watt
SAIDI	-	System Average Interruption Duration Index

SAIFI	-	System Average Interruption Frequency Index
CAIDI	-	Customer Average Interruption Duration Index
IPP	-	Independent Power Producers

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Current research on service quality has shown that customers think in terms of adequate and desired expectation and develop a "zone of tolerance" when evaluating service quality. This is the extent to which customers recognize and are willing to accept a variation in the service. So, the objective of the service provider would be to remain as close to the desired level and as far as possible (on the positive side with cost consideration) from the adequate level. In a way, we can say that this objective emulates the philosophy of any multi-criteria decision making method, where we need to minimize the distance from the positive ideal solution (PIS) and maximize the distance from the negative ideal solution (NIS).

In the services marketing literature, this approach of optimizing the distance between the desired and the adequate service levels has not been discussed. Moreover, services marketing literature talks about arranging the zone of tolerance levels by

attributes according to their levels of importance (Zeithaml and Bitner, 2003), but does not attempt to find out an overall value of the service. Further, the performance of a service organization on all the attributes and dimensions of service quality may not always move in the same direction. To improve on the responsiveness to electricity breakdown management, Tenaga Nasional Berhad (TNB) designed various ways and methods to solve and eliminate any barriers with the customers, but may not be in a position to sit with each customer and explain to the customers all the management barriers in detail.

Traditional SERVQUAL-based gap model approach cannot handle such a compromising situation, where improvement in one attribute may be at the cost of deterioration in the other. The company has at least to become the best performer in providing quality service to its customers. The objective of the study is to assess and compare the effectiveness of measuring the effectiveness of electricity breakdown management handled by TNB by using gaps approaches, viz., modified Gap Model (Parasuraman *et al.*, 1985, 1991). In this study, we also attempt to develop a framework for measuring electricity breakdown management service quality using these methods. Research on measurement of service quality has been considered important by both practitioners and academicians over more than a decade. Gap model based on the SERVQUAL instrument is a well-known and widely-used measurement approach.

The empirical evidence for this paper is provided by data on the service quality for Tenaga Nasional Berhad (TNB). The service quality evaluations obtained from these three unit namely TNB's management staff, TNB's technical staff and TNB's

customers are compared and tested for their effectiveness, thereby placing the gap model amongst a set of appropriate methods in measuring this tangible construct.

It has been held TNB is valuable which project an image of quality and reliability. However, there is evidence that this relationship may not hold which have not been found to be reliable indicators of service quality or customer behavior relating to perceive quality. Customer must satisfy or they will go somewhere else. However, since TNB is the one and only electricity utility company in Malaysia, the customer has no choice but to trust TNB as their source of needs.

Electricity first made its appearance in this country at the turn of the century, and the earliest record of power generation can be traced back to a small mining town in Rawang, Selangor. Here, two enterprising individuals Loke Yew and Thamboosamy Pillai installed an electric generator in 1894 to operate their mines; they were the first to use electric pumps for mining in Malaya, and marked the great beginning of the story of electricity in Malaysia. In the same year, private supply for street lighting purpose was extended to Rawang town, and in 1895 the railway stations in Kuala Lumpur received its first electricity supply. In 1900, the Sempam Hydroelectric Power Station in Raub, built by Raub Australian Gold Mining Company became the first power station in Malaysia.

Until the mid twenties, most generating plants were small and used a variety of fuel including low grade coal, local wood, charcoal and important oil as well as water power. As the rapid increase in electricity demands continued to manifest; large scale

planning, huge sums of capital from overseas and hiring of foreign technical experts became essential.

Hence, the Central Electricity Board (CEB) was established and came into operation on 1 September 1949. The Board was to become heir to three major projects considered by the Electricity Department following its re-establishment in April 1946. The major projects were Connaught Bridge Power Station, Cameron Highlands Hydroelectric Project and development of a National Grid.

CEB became owner to 34 power stations with a generation capacity of 39.88 MW, including a steam power station in Bangsar with a capacity of 26.5 MW, a hydroelectric power station at Ulu Langat with a capacity of 2.28 MW as well as various diesel affairs with a total capacity of 11.1 MW.

CEB also became owner to both transmission and distribution systems above and below ground valued at close to thirty million dollars, as well as the impressive list of 45,495 consumers and staff of 2,466.

The age of private generators has come to an end, and all walks of life continue to enjoy fair share of electricity. For this, we sincerely thank the government for recognizing the central role of the power industry in developing the nation's economy and social growth.

On the glorious day of 31 August 1957, Almarhum Tunku Abdul Rahman declared the Independence of Malaya (now known as Malaysia); the word "Merdeka"

was proudly pronounced seven times at the Merdeka Station, and the nation rejoiced. This significant day was also the beginning of Malayanisation.

In order to materialize the success of Malayanisation, more local engineers and technocrats were needed in this demanding field to replace expatriates in the Board. Hence, in 1951, three local Shift Engineers – Abu Zarim bin Haji Omar, Tengku Daud bin Tengku Besar Burhanuddin and Tengku Yaacob Shah left for training in the British Electrical Authority, United Kingdom. From 1954 to 1957, more Malaysians were sent overseas to acquire professional qualifications relevant to the Board's needs.

In 1964, the second expatriate General Manager of CEB, J. Sharples retired, and Raja Zainal bin Raja Sulaiman became the first Malaysian appointed to the post.

Soon, the Connaught Bridge Power Station became fully operational and the first phase of the Cameron Highland Hydroelectric Project was close to completion. In Selangor, the precursor of the National Grid was slowly taking shape, and the Bangsar Power Station was connected to the Connaught Bridge Power Station, with the line subsequently extended to Malacca.

On 22 June 1965, CEB of the Federation of Malaya was renamed as the National Electricity Board of the States of Malaya (NEB). Committed to long term programme of growth and expansion backed by plans carefully crafted and laid down in the period of CEB, NEB is now firmly led by a Malaysians as the CEO.

The National Grid was one of the plans in full motion. The National Grid or Grid Nasional in Malay is the primary electricity transmission network linking the

electricity generation, transmission, distribution and consumption in Malaysia. Electricity generating plants are strategically located at Paka in Terengganu, Temengor, Kenering, Bersia and Batang Padang in Perak, Connaught Bridge, Kapar and Serdang in Selangor, Cameron Highlands in Pahang, Prai in Penang, Port Dickson in Negeri Sembilan, Pergau in Kelantan, Pasir Gudang in Johor and in Malacca.

The central area network with Connaught Bridge Power Station in Klang was the precursor of the energy grid; it also tapped into the Cameron Highlands Hydro scheme from the Sultan Yussuf Power Station, and was extended into a western network.

Later in the 1980s, the loop was finally complete; it prevailed over some of the most formidable terrain in the northern Peninsula, and Kota Bahru was successfully placed within the grid.

The National Grid is also interconnected to the transmission network of the Electricity Generating Authority of Thailand (EGAT) through a 117 MVA, 132 kV Single Circuit Line, which has since been upgraded to a HVCD line. The Grid is connected to Singapore Power Limited (SP) through a capacity of 250 MVA – 230 kV transmission lines and submarine cables. These significant connections provided us the first evidence of rudimentary ASEAN grid on the map.

Plants within the Grid form a power bloc governed by technological alliances and careful arrangements to further the common good for all. The National Load

Despatch Centre made active communications possible in order to identify the needs of the community we serve.

By the 80s, the Board was supplying the whole Peninsular with electricity, strategically replacing the Perak River Hydro Electric Power company (PRHEP) and its subsidiary Kinta Electrical Distribution Co. Ltd (KED) in 1982, Penang Municipality in 1976, and areas supplied by Huttenbach Ltd in 1964, which included Alor Setar, Sungai Petani, Kulim, Lunas, Padang Serai, Telok Anson, Langkap, Tampin and Kuala Pilah. Its transmission lines now stretched over 6,300 kilometres, a great achievement from its previous 1,560 kilometres just a decade ago.

By 1984, installed capacity had more than doubled to 1,379.2 MW exceeding peak demand by a healthy margin. Its consumer base now numbered 1,965,162 with revenue of approximately RM2.2 billion and fixed assets close to RM5.5 billion, as well as 24,882 staff.

The Board was producing handsome profits through leadership of the highest caliber, and for the first time in history, a significant reduction in tariffs was offered. The Board even received accolade from the World Bank, recognizing it as a well-run and financially sound entity with an appropriate pricing policy, investment planning and with adequate autonomy.

However, the Board's loans became heavier as more funds were needed to fuel its expansion plans. Loans from foreign sources and the government soon stood at approximately RM1 Billion each with internal borrowings added to another 1 billion.

Concurrently, staff wage had also risen significantly. Plus, the new power of International Capital and the emerging trend of Globalization made the challenge even more demanding.

Subsequently, Prime Minister Dato' Seri Dr. Mahathir Mohamad announced the government's decision on a policy of privatization. He stressed the danger of the government becoming a burden to the people it serve. Thus, privatization is set in motion.

The new policy of privatization had four main objectives – to relieve the administrative and financial burden of the government, improve the effectiveness and quality of the public services, encourage the spread of private entrepreneurship in the public sector and last but not least, contribute to the attainment of the goals set for the New Economic Policy (NEP). The NEP is the new social-economic restructuring affirmative action program aimed to strengthen political unity and stability through equal distribution of the nation's wealth.

On 4 May 1988, the government announced its final decision to privatize. This triggered anxiety and fear among all staff. Their concerns include the fear that public good would be sacrificed due to greed, the passing of foreign ownership through share purchases in the open market, and that NEB was profitable and therefore not suitable for privatization as only sick and ailing were the common perception suitable for privatization.

Keeping the nation's interest in mind, the government relentlessly pursued its ultimate objective and two pieces of legislation were passed to replace the existing Electricity Act, and to provide for the establishment of a new corporation – Tenaga Nasional Berhad, purposefully replacing the NEB (Successor Company Act). Datuk Hj. Ibak bin Abu Hussein became the last Deputy Chairman and General Manager of the NEB and the first Managing Director of TNB.

On 1 September 1990, Prime Minister Dato' Seri Dr. Mahathir bin Mohamad officially proclaimed TNB as the heir and successor to NEB. TNB became a private company wholly-owned by the government; on the same day, Tan Sri Dato' Haji (Dr) Ani bin Arope was appointed Chairman.

Public-listed TNB is the largest electricity utility company in Malaysia with more than RM65 billion in assets and a customer base of about 6.8 million throughout Peninsular Malaysia and Sabah (TNB, www.tnb.com.my). Globally and regionally, TNB enjoys a reputation of outstanding performance. TNB is the only Malaysian energy company to rank among the top 50 energy companies in Asia in 2006 (Platt's survey, 2007).

TNB controls Malaysia's largest generation capacity of about 11,000 megawatts (MW). TNB also manages and operates a complete transmission network, spanning the whole of Peninsular Malaysia forming a loop known as the National Grid, linking the electricity power producers, made up of TNB power stations and Independent Power Producers (IPP), to the TNB Distribution networks and some Large Power Customers (LPC).

TNB's business is complemented by a complete Distribution System, Customer Service Centre, Call Management Centre and Administration throughout Peninsular Malaysia and Sabah. Their integrity, customer-focus driven, business excellence and caring makes them committed to developing energy for the national and regional power sectors.

TNB is also involved in several diversified businesses linked to the power industry. Some of the diversified business include undertake the manufacturing of transformers, high voltage switchgears and cables; the provision of professional consultancy services, architectural, civil and electrical engineering works and services, repair and maintenance services and fuel; as well as research and development and project management services.

There are few reasons why the service is important nowadays. Firstly, where the customer as already seen is getting more and more critical of the service they receive. Many customers are not only wanting, but also expecting better services. Second, there are many service industries with narrow previous market e.g. electricity utility companies are now competing in geographically wider markets. When this is combined with the deregulation, it is easy to see another reason for the focus on services: competition.

The biggest challenge for TNB in the service industry is to deliver satisfactory outcomes to its customers. If the customers dissatisfied with the quality of a service, they will turn to the alternatives that they have at that moments. Although it is clearly that the biggest electricity utility company in Malaysia is unlikely to receive any

competitor soon, it does not mean that the customer will be loyal to them forever, especially when the alternatives came. Therefore TNB needs to develop a better understanding of their customer needs. TNB has to continue to exaggerate and modernize to improve the quality of service. TNB has been established before independence and has been in upgraded its facilities from time to time. The core service provided by TNB is electricity utility. Apart from the above, there are several other services provided by TNB such as manufacturing of transformers, high voltage switchgears and cables; the provision of professional consultancy services, architectural, civil and electrical engineering works and services, repair and maintenance services and fuel; as well as research development and project management services.

In the past few decades, most of the electricity utility company was focused on renewable and sustainable energy, keep the levels of competition as high as possible and to keep the price as low as possible while keeping the customer satisfaction as high as possible. They also have to create a good mapping to explain their key functional stages, resources and resources ownership.

1.2 Problem Statement

The monthly average of power interruption in Peninsular Malaysia is reduced from 6,040 to 6,575 cases in 2004 (Energy Commission, 2005). However, the average is still high. TNB has developed a few programs to enhance the power distribution reliability in Peninsular Malaysia. The programs include transmission enhancement through Voltage system (MSVR) and High-Voltage System (MSVT), prevention maintenance work by monitoring the electric feeder filer and continuous scheduling maintenance and manual operation revision and asset maintenance to enhance the quality of work.

There are two types of power interruption; scheduled power interruption and unscheduled power interruption. Scheduled power interruption usually planned by TNB staff for maintenance purposes. Unscheduled power interruption is usually happen because of unforeseen circumstances.

Most of the unscheduled power interruption in Peninsular Malaysia happens because of natural disaster, power overload, loose connection and others. Table 1 below shows the cause of the unscheduled power interruption in Peninsular Malaysia from 2003 to 2005.

Table 1.1: Causes of Unscheduled Power Interruption in Peninsular Malaysia from Year 2003 to 2005

CAUSE	NO. OF INTERRUPTION		
	2003	2004	2005
Natural Disaster	8,575 (32.9%)	18,192 (34.6%)	21,418 (30.1%)
Overload	4,429 (17.0%)	4,706 (9.0%)	9,644 (13.6%)
Damaged on Equipment	617 (2.4%)	716 (1.4%)	1,918 (2.7%)
Damaged by Third Party	3,199 (12.3%)	4,536 (8.6%)	5,380 (7.6%)
Loose Connection	2,009 (7.7%)	10,226 (19.5%)	14,581 (20.5%)
Work Quality	1,739 (6.7%)	2,386 (4.5%)	2,786 (3.9%)
Others	5,507 (21.1%)	11,752 (22.4%)	15,374 (21.6%)
Total	26,075	52,514	71,101

Source: Report On the Performance of the Electricity Supply Services in Malaysia Year 2006 Edition

Based on Table 1.1, natural disaster considered as the main factor for unscheduled power interruption in Peninsular Malaysia. The cause, followed by power overload, loose connection and other problems represents 85.8% of total interruption in 2005. This is a big number, considering that TNB tries to become a respectable company by delivering quality services in Peninsular Malaysia.

Based on the factor itself, there are improvement can be made, especially on overload, loose connection and other factors. TNB has considered all the factors above

as a threat to their business in a long term. While the globalization is now rising and recession is likely to be anywhere nears this or next year, financial risk is consider a major problem.

Managing electricity utility company has become a critical issue as all utility company all around the world faces many of the same challenges. Service quality improvement must reach certain level of customer expectation. To improve to quality of TNB services, they must understand how their customers judge their service is performed.

There are many complaints directly and indirectly to some branches by the unsatisfied customers. There are differences between products offered and service provided by other electricity utility company but TNB may provide better service than the other.

The Energy Commission was established under the Energy Commission Act 2001 to regulate the electricity supply and piped gas supply industries in Peninsular Malaysia and Sabah. While in Sarawak, the state Chief Electrical Inspectorate is the regulator of the electricity supply industry under the Electricity Ordinance of Sarawak.

The Small Renewable Energy Programme (SREP) which was launched in the year 2001 to encourage private sector to undertake small power generation project using renewable resources has not been progressing well due to a number of factors such as uncertainty in long term fuel supply and challenges in securing loans for financing the projects. In order to promote and increase the use of renewable energy in Malaysia, better incentives and more conducive environment need to be established.