Chapter 3

ASSESSMENT OF ELECTRICITY SUPPLY INDUSTRY IN MALAYSIA

3.1 External Environment Analysis

External environment plays a significant role in the growth and profitability of utilities, independent power producers (IPPs) and firms. This chapter will discuss about the significant changes taking place in the electricity supply industry and how TNB, IPPs and firms should analyse and understand their external environment. Their success or failure in this changing industry will be determined by their reactions to the changes in their environment.

The objective of external environment analysis is to identify opportunities and threats. Opportunities will help a firm to achieve strategic competitiveness while threats may hinder a firm's effort to achieve strategic competitiveness. There are four components of the external environment analysis:

Scanning Identifies early signals of environmental changes and trends.

Monitoring Detecting meaning through ongoing observations of environmental changes and trends.

Forecasting Developing projections of anticipated outcomes based on monitored changes and trends.

Assessing Determines the timing and importance of environmental changes and trends for firm's strategies and their management.

Elements in an environment that influence the electricity supply industry, IPPs and firms are grouped as below:

1. Global Segment
2. Economic Segment
3. Political/Legal Segment
4. Technology Segment
5. Environment Segment

The industry, IPPS and firms are unable to control these elements directly. The challenge is to understand each segment and its implication, so appropriate strategies can be formulated and implemented.

3.2 Segments in External Environment Analysis

3.2.1 Global Segment

The global segment includes new global markets and existing ones that are changing, important international political events, and critical cultural and institutional characteristics of relevant global markets. Firms must also attempt to identify critical new global markets and/or those are changing. It is clear that many global markets are fast becoming borderless and integrated.

Privatization and regulatory reform of electric utilities has taken off globally since passage of the Public Utilities Regulatory Policies Act in 1978 by the United States Congress and privatization of Britain's Central Electricity Generating Board (CEGB) in 1989. In the early 1980s, the world's national electric utilities were in general vertically integrated, centralized and publicly owned. Since the late 1980s, many countries have seen a transition of their electric power industries from public ownership to private and private/public ownership whilst deregulation is perceived as a means of encouraging efficiency through competition.

3.2.2 Economic Segment

The economic environment refers to the nature and direction of the economy in which a firm competes or may compete. Clearly, the health of a nation's economy affects the performance of individual firms and industries. If TNB plans to invest heavily in neighbouring countries, then TNB shall scan, monitor, forecast and assess the health of the country's economies because of the interconnectedness of the global financial community.

3.2.2.1 Infrastructure and Risk Costs

With the development of a number of infrastructure projects in the industrial and commercial sectors, the country's demand for electricity will inevitably increase. Power consumption reached a high of 9,712 MW in May 2000, and the rate is now levelling off at 9,300 MW per month. TNB reported demand growth exceeding 15% for the first nine months of its current financial year and revised its growth estimates for 2001-2002 from 7-8% to 12% per annum.

There are number of commercial risks such as power station construction, fuel prices, demand and operation efficiency in the electricity supply industry. With a vertically integrated industry, all risks are passed on to consumers. Customers benefit from good performance, but have to bear the costs resulting from poor performance or from building stations. Ideally, a vertically integrated utility should provide electricity at the lowest possible cost. However, history has shown that consumers have not been well served by this structure, particularly on account of the fact that management was not held accountable for the quality of their decisions.

The first and easiest step in sharing the risks between the industry and consumers is to open the generation market to competition. With competition, the generation companies assume the risks associated with construction and

operation and the risks can be shared with the utility and consumers. Generators sell electricity into a wholesale market, from which suppliers purchase electricity to sell to customers. Ideally, customers are able to choose from whom they will purchase electricity and suppliers can sell to any customer.

3.2.2.2. Economic Co-operation among ASEAN Countries

In addition to economic co-operation among ASEAN countries, there is a growing wave of support for an ASEAN electricity grid. Though the Asian financial crisis in 1997 has undoubtedly halted the momentum, it is still economically realistic to have power support agreement between any two neighbouring countries' electrical network. For example, Malaysia is interconnected with the electricity grids of both Thailand and Singapore. TNB is interconnected with the Electricity Generating Authority of Thailand (EGAT) via an HVDC link. The present interconnection between TNB and the Public Utility Board of Singapore is also to be upgraded from 132kV to 275kV. Upon completion of the Bakun project, Malaysia would have the ability to transport or wheel the power from one region to another or from one country to another.[10]

3.2.2.3 Fuel for Electricity Generation

Prices of gas oil (diesel) and fuel oil - the main refined oil products used to fire power stations have more than doubled in less than a year. And much of the liquefied natural gas (LNG) and pipeline gas used in Asian generation is linked in some ways to fuel oil or crude prices. A sharp rise in crude price this year has pushed up the cost of Malaysia's generating feedstock. The higher operating costs will be passed on to consumers through a rise in electricity price as TNB has requested the government to increase the tariff on 13 August 2000.

[10] "Malaysia Energy Market Report," (April 1999), Asian Power, pp26-28

TNB has diversified its fuel base in line with the Government's four-fuel policy of gas, hydro, coal and oil. The displacement of oil by gas, coal and hydro has reduced dependence on imported fuel oil and encourage the utilisation of indigenous energy resources.[11]

3.2.3 Political/Legal Segment

The political/legal segment is the arena in which firms compete for attention and resources. This segment represents how firms try to influence government and how government entities influence them. Deregulation in the electric power industry will force many firms to restructure their competitive practices.

3.2.3.1 Existing Industry Structure

The Malaysian government had reviewed and identified four main activities in the supply of electricity. They are Generation, Transmission, Distribution and Supply. Historically, these four functions were either run on national or regional lines by a fully integrated monopoly. Planning and control have been centralized to ensure optimum allocation of resources. Utilities are characterized as large scale, capital intensive investments with long payback periods. Therefore, they require some assurance on return and having a monopoly best provides that assurance. The government had traditionally owned and controlled the industry to prevent the private sector from exploiting the monopoly position at the same time to allow government to direct national industrial policy. In addition, the technology skills required for all these four activities are complementary.

The separation of these functions into distinct business activities is often referred to as "unbundling" and is a key feature in the development of the new industry. The Government identified transmission and distribution as monopoly activities,

[11] International Private Power Quarterly Report (2001), " Malaysia's Private Power Status," Second Quarter, pp89.

in which there would be no benefits from the introduction of competitive duplicated transmission and distribution networks.

3.2.3.2 Privatization of Power Generation in Malaysia

In order to guarantee a 30% reserve margin and thus keep up the momentum of industrialisation, the Malaysian government has privatised its electric power industry and authorised the Director General of the Electricity Department to regulate and issue licenses for the construction and operation of generation plants.

The Government had issued licences to five IPP on the peninsular namely YTL Power Generation, SIKAP Energy Ventures, Genting Sanyen Power, Powertek and Port Dickson Power. These five IPPS have come on line in stages from 1994 with a combined total generating capacity of 4,070MW. Because of the drop in TNB stock in 1994, Malaysia's Energy Minister has asked the government to guarantee TNB a 70% share of the country's electric generation market. Although TNB retains a legal monopoly, the company is required to purchase at least 30% of the total generating requirement from IPPs.[12]

3.2.4 Technology Segment

The technological segment includes the institutions and activities involved with creating new knowledge and translating that knowledge into new outputs, products, processes and materials. Technological changes affect many parts of societies. The firms that are early adapters of new technology often achieve higher market shares and earn higher returns. Another technology with important implications for business is the information superhighway.

[12] Malaysia Energy Market Report," (April 1999), Asian Power, pp26-28

The emergence of a global economy coupled with the opening up of electricity markets has led to forces of change converging on power delivery systems world-wide. Deregulation in the power industry has bought utilities to face up with increased competition and is expected to prevail and further intensified. New technologies provide a mean for the industry to cope with the constraints of limited financial and manpower resources. Technology also holds the key towards bringing about the transition from a regulated, cost-based electricity environment to a more competitive market-based environment.

3.2.4.1 Renewable Sources of Energy

The uncertainties about fossil fuel supplies and increasing environmental concerns have renewed attention to the development of New and Renewable Sources of Energy (NRSE). In Malaysia, solar photovoltaic technology is used to supply electricity to small isolated communities in Sabah and Sarawak. One third of the Government's total allocation of $120 million under the Seventh Malaysia Plan will be used for the provision of solar powered installations for rural and remote communications.

3.2.4.2 Improves Customer Services

At the customer level, the days of home to home meter reading will soon be a part of our childhood memories. In North America and Australia, utilities communicate with their customers interactively through the electronic media. Customers can now pay their bills via the Internet and determine at any moment in time the amount of electricity consumed and the amount owed to the utility.

The application of technological advances has also provided the utilities the opportunity to increase their database. Historically, utilities have segmented their customers into three major groups: industrial, commercial and residential. This segmentation has served the industry well in the past. However, in the highly

competitive, customer-focused environment, customer understanding is becoming the basis for competitive advantage. To understand the needs of the customers would rely on enhancing the marketing database and thus the application of modern technology. The future of the energy marketing battlefields will be reminiscent of the telecommunications wars. The winners will be those that are best equipped and prepared.

3.2.4.3 Threats in Technological Segment

The West contributed most of the technological advancements. In fact, giant companies in the industry such as ABB, Alstom, Siemens and GE have extensive research and development programs. In contrast, many Asian countries are basically the end user of the technology. Consequently, many of the utilities in this region are still dependent on these giant companies in expanding their electricity energy production. Though technology transfer is the ultimate aim, the process seldom evolved into reality due to lack of resources and commitment by the utilities themselves.

3.2.5 Environmental Segment

Perspectives on the nature and role of electricity energy production and use, and the formulation and implementation of electric sector policies have, in the past, been dominated by technological and economic considerations. However, for the last few decades the interrelationships between electric energy and environment quality have received increased attention.[13]

The awareness of environmental consequences of electricity production and the growing public and political sensitivity on environmental issues have made it imperative to integrate environmental concerns into the power planning process. The integration of environmental factors in the electric energy planning process

[13] Extract from "Power & Environment Issues," (2000), Magazine of Electricity International, April, pp20.

involves consideration of not only the physical impacts of electricity production and its use, but also the socio-economic and political impacts, and its implications.

3.2.5.1 Pollution and Loss of Ecosystem

Coal-fired thermal power plants have been identified as the main "culprit" in producing acid rain and greenhouse gases, which are generally acknowledged to be a major factor in producing climate change. Besides the acute local effects of pollution, emissions of sulfur and nitrogen oxides can also have more far-reaching environmental effects.[14]

Although burning of fossil fuels have detrimental environmental impact; they are by no means the only areas of concern. Some of the largest current campaigns by "green" activists and other concerned non-governmental organizations involve new hydroelectric schemes. The bitter controversy and legal debate surrounding the Bakun project in Sarawak is typical of the problems surrounding large hydro projects. Many environmental activists object to the construction of the reservoir, which will flood an area of virgin rain forest to the size of Singapore. This 'giant lake' will destroy rich forestlands together with rare plants and animal life, with the consequence total loss of a unique ecosystem.

The Malaysian government, as a signatory to the Rio Declaration and the Kyoto Treaty, requires power-generating companies to reduce CO_2 emissions to the 1990 level by 2000. Malaysian power operators now have to manage their emissions within the prescribed levels laid down by the Department of Environment (DOE), and Environmental Impact Assessment (EIA) are undertaken before the construction of all new power stations and transmission systems.

[14] Akhtar, A and Taha, F. (1996), "Environmental Dimensions of Electric Sector Planning," 11th Conference on Electric Power Supply Industry, Section 20.6, pp247-256.

3.2.5.2 Electromagnetic Forces and Health

In the area of transmission, there is also a perception that there are serious health effects associated with the electromagnetic forces from High Voltage lines (EMF). Despite the almost total lack of supporting scientific evidence, the public perception remains that there must be something in the theory and that Electricity Supply Authority has a vested interest and is not to be trusted. Articles appearing in women's magazines and in some medical journals accept the correlation of EMF with juvenile leukemia and other type of cancers without hesitation and consequently add to the perception.[15]

3.2.5.3 Threats in Environment Segment

There is a need to achieve a balance between economic growth and preservation of environment. It is advisable to undertake a cost-benefit study analyzing the costs imposed due to environmental degradation and the cost incurred to remove or lessen the impact of pollution. However, such study is often costly and time consuming. Furthermore, the study will need to take into account the long lead times and operational life span of power generation facilities. There is a likelihood that what is environmentally acceptable today may not be acceptable in future due to changing values, regulations and policies.

[15] Extract from "Testing Times for HV Transmission Lines," (2000), Journal of Asian Electricity, September, pp16-18.

3.3 Opportunities

3.3.1 Competitive Power Market

In lieu of globalisation and era of free trade, there are then tremendous opportunities for the players in the generating market. A distribution authority able to gain power at better or more competitive rates is in a dominant position as an electrical provider. Consequently, a customer can be quite selective when choosing its energy provider to obtain an economical price and a guaranteed level of service. A customer can enter into a contract for a level of service and at an energy price best suited to its individual needs. This contract could be directly with a generator if its need is sufficient great, with a distributor or with a private broker (also known as power marketer). In the electric industry, the catalysts for change are the power marketers. IPM (independent power marketers) own neither generation or transmission, are not affiliated with any entity owning generation or transmission, and are not affiliated with any entity with a franchised service territory. They make their money by buying and selling power. IPM can do this more efficiently than traditional utilities by physically unbundling the power and separating its functional from its physical aspects.[16]

3.3.2 Export Opportunities

With the restructuring process, TNB and Electricity Generating authority of Thailand (EGAT) have agreed to a 70 miles, 300kV HVDC interconnection between the two countries. The power transfer capacity will upgrade from 300 MW to 600 MW in future.

This transmission link is part of TNB's plan to become a regional electricity supplier. The Malaysia government is also considering developing a subsea link

[16] Extract from Peta Miller (2001), "Competitive Energy Market in Asean & its Management Style," Journal of Asian Electricity, July, pp35-36.

between peninsular Malaysia and other Asean countries under 8th nation Asean group.

3.4 Threats

The problems that the government is currently experiencing with the private power programs are largely the result of weak regulatory frameworks, inadequate procedures for soliciting bids, and lack of transparency with the process of tariff negotiation.

3.4.1 Non Competitive Electricity Tariff

Electricity tariff is one of the major issues in the electricity supply industry. The tariff is regulated by the Electricity Supply Act 1990 and the licence currently issues to TNB restricts TNB from imposing charges exceeding or below those as fixed on 1st September 1990.

3.4.2 High Selling Price of Electricity from IPPs

TNB as the established supplier enjoys certain economies such as flexible credit facilities, cheaper financing and start up costs and a relatively lower operating and maintenance costs. In order to attract IPPs into a highly capital intensive industry as requested by government, the selling price of electricity generated by IPPs are expected to be higher than TNB's own generation costs.

3.4.3 IPP Contract Awarded Thorough Political Connection

There is a tendency for the government to implement the private power projects by issuing license or awarded the contract to the developer's with excellent political connections. Although this type of "Award" reduces the time needed to negotiate complex risk-allocation arrangements, experience shows that the tariff

and risk allocation arrangements for " favour-son" projects have been heavily weighted in favour of the developer. This type of contract awarding procedure is the creation of opportunities for businessmen and government officials to abuse the process of awarding contracts and negotiating tariffs.

A few project promoters, posing as "International Private Power Developers, " have made a bad situation worse by relying solely on political connections to secure government concessions for developing projects. These project promoters have been interested largely in earning lucrative project success fees but not making a long-term investment in the country's power sector.[17]

3.4.4 Lack of Comprehensive and Well Defined Regulatory Frameworks

Malaysia's regulatory frameworks are better developed compare to other countries in Asia, but they remain not fully tested and most likely need to be revised significantly over the next few years. Inadequate regulatory frameworks are symptomatic of a broader malaise afflicting the country's private power programs especially about the allocation of sovereign risks and the provision of government guarantees of utility payment obligations. These two conditions will, in most cases, need to be met if a power project is to be financed on a non-recourse basis. In the same time, the transparency of fair procedures for awarding projects and negotiating power purchase as agreements is questionable. This might have discouraged many credible developers and bankers from pursuing private power deals in the country.[18]

[17] Extract from Dick Medd (2000), "Asean Power Market, Need Clear Direction," Magazine of Electricity International, April, pp16-17.
[18] Extract from "Reaching Target of Deregulation & Resolving Conflicts," (2000), Journal of Asian Power, July, pp27-29.

3.4.5 Projects Financing

With the desire of increasing competition, electricity regulators throughout Asia are now exploring options such as pool systems direct retail sales, reduction or elimination of take-or-pay power purchase agreements and the unbundling of electrical services. These options are perceived by the policy makers in the region as a means of reducing the cost of electricity.

Independent power developers are generally "squeezed" into tight corners with these new developments. However, they have largely resigned themselves to these developments; provided that the regulators can ensure them the existence of a level playing field through the adoption of a transparent and economically rational regulatory framework.

The diminishing of a fixed revenue stream and replacement with a variable source of income introduces a set of new risks. Thus, equity investors may need to bear a much higher degree of risks as compared to the current market. Large scale projects are currently financed with non-recourse debt that set forth the basis of long term fixed capacity payments as stated in the relevant power purchase agreements. If lenders are forced to accept exposure to market risk and a variable revenue stream, developers may be forced to contribute higher amounts of equity or defer receipt of dividends in order to mitigate the risks to lender. Developers need to carefully access such considerations as part of the risk profile before deciding whether to participate in Asia's new electricity frontier[19]

[19] Extract from "Asia Pacific Electric Power survey, Infrastructure Finance Ratings," (1999), Std & Poor.