CHAPTER 2

A REVIEW OF RELATED LITERATURE

2.1 Overview

Privatization involves the sale of government assets to private owners, or provision of government services by private companies. It often includes the reallocation of resources, the restructuring of the existing state owned business, and the implementation of new regulations (Economic Report 93/94: 142).

Privatization of state owned assets became a major economic policy of many nations in the 1980's, and in some cases amounted to conscious attempts to roll back the frontiers of the state, and return responsibility to the market (Petelis and Clarke, 1991). Vickers and Yarrow (1988) pointed out the following reasons why most governments privatize state owned enterprises:

i. Improving efficiency
ii. Reducing the public sector borrowing requirement (PSBR)
iii. Reducing government involvement in the decision making process
iv. Easing problems of public sector pay determination
v. Widening share ownership
vi. Encouraging employee share ownership
vii. Gaining political advantage

However, Vickers and Yarrow (1988) stress that the objectives are likely to differ from government to government, and may change over time as new opportunities and constraints develop.

Viewed in economic terms, privatization may improve production efficiency if the change in ownership produces a significant change in managers' incentives to

reduce costs, as the agents operate under the 'profit motive' (McDaniel, 1998:170). Thus, private firms are more inclined to cut costs and monitor employee effectiveness as compared to public agents, who might have their own hidden agenda, such as bureaucratic or political motivations. Similarly, allocation efficiency should improve if competition can be established. Any cost savings achieved as a result of these attitudes and practices are passed on to final customers. Private firms that are more effective at lowering costs will gain a greater market size, thus incentives for cost cutting should be significant.

Thus in the final analysis, governments gain by improving efficiency and cutting costs, customers gain by getting better services at a cheaper price, and the private firms gain by obtaining business profits.

2.2 Services in the Power Industry

The power industry can be divided into three separate services: generation, transmission and distribution.

i. **Generation** - Generation is defined as the production of electricity, which is done by utilizing fossil fuels (for example, gas, coal, and nuclear fuel), renewable sources of energy (for example, hydraulic energy and solar energy), or combustion turbines. The power produced by these plants is sold to distribution and wholesales companies (such as TNB).

ii. **Transmission** – This refers to the evacuation of electricity over long distance, high voltage power lines from the generation source to a local distribution site (wholesale purchasers) where consumers are available. This transmission facility is usually provided by a national utility (as in Malaysia), or privately owned by wholesalers.

iii. **Distribution** - Distribution is defined as the delivery of electricity from transmission to business and residential customers. In other words, it refers to delivering the power from the wholesale purchaser to the retail consumer. High voltage current is stepped down for this purpose. In Peninsular Malaysia, the distribution network is divided into six regions: North, South, East, Kuala Lumpur, Selangor and Perak.

2.3 Deregulation of the Power Market

Deregulation of the power market is the process of dividing or unbundling electric services into three individual components: generation, transmission and distribution. In a regulated environment, the utility company is mainly under the control of local authorities providing all three services.

Since the generation, transmission and distribution are interdependent, most governments minimize the costs of interactions among the sectors by deregulating the generation and supply sectors, and regulating the transmission and distribution sectors to avoid network duplication.

The advantages of unbundling the power market in the above mentioned structure are:

i. easier coordination among the activities compared to deregulation of individual activities.

ii. less coordination and monitoring cost.

The IPP became popular in the advanced and developing countries for the following reasons:

i. To relieve the investment burden of the government, with regard to the aspect of the development of power generation sector to meet the ever increasing electricity demand;

ii. To improve efficiency by introducing the profit motive and competition in the power sector; and,

iii. To transfer power generation technology at a rapid pace.

In the past, state owned utilities had access to substantial levels of government funding in the form of subsidiaries and cheap lines of credit. MacDonald (1999) states that in developing countries, concessional loans from multilateral and bilateral agencies or grants from international development organizations often supplemented these funds. However, over the last decade the level of funding for new generation capacity available from these sources has dramatically declined and power generation is no longer a high priority matter for government and multilateral agencies with limited capacity resources.

MacDonald (1999) further states that IPPs are viewed as mechanisms which enable governments to lessen the need to be directly involved in the financing of energy generating projects. This frees governments to use public sector resources elsewhere, such as in education and public health.

Apart from relieving the financial burden of the government, deregulation of the power industry, especially in the generation sector, serves to promote competition, and improve efficiency in order to reduce the electricity price. Before privatization/deregulation there was no incentive to improve efficiency because:

i. The generation activity was under a government owned utility company. Therefore, the power plants are integrated, even when new power plants are constructed to meet the electricity demand. There is no competition among

the power plants, thus there is no need to lower operating costs to capture market share.

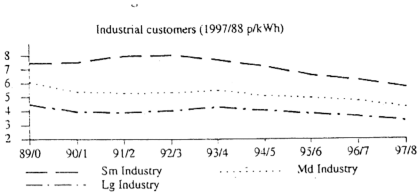
ii. The government subsidizes for any increase in operating costs.

However, under deregulation of the generation sector, the power plants are owned by private firms who compete to increase market share by offering cheaper electricity prices and reliable services. To achieve low electricity price, the private generators reduce their capacity costs by improving their plant efficiency.

Another advantage of deregulation is that it eliminates the need for nonessential items such as the purchase of raw material from a supplier specified by the government, and the maintenance of a redundant labour force. For example, according to Vickers and Yarrow (1988), the British government successfully used its influence over the terms of the Central Electricity Generating Board's (CEGB) purchase contracts with British coal to shield the domestic coal industry from international competition. This forced the CEGB to purchase its principal input at rates that were typically well in excess of international market levels, and limited the extent to which it could make use of imported coal. Hence, due to this policy, the generating cost had been inflated above opportunity cost levels, and this high generating cost was passed forward to the end users.

McDaniel (1998) states that deregulation in the United Kingdom had lowered electricity prices by 22 – 29 per cent for both the 1MW and 100kW markets. Figure 2.1 shows price trends for three groups of industrial customers in the United Kingdom from 1989 to 1997.

Figure 2.1 : Electricity Prices in United Kingdom



Source: Digest of UK Energy Statistics.

2.4 The Structure of Independent Power Producers

Private firms are given licenses or concessions by the Government to build, operate and sell electricity to the utility company. The relationship between these (the IPPs) and the utility company is regulated by Power Purchase Agreements (PPAs), which state the tariff rates and the quantities of power that IPPs have to generate for the utility company.

According to MacDonald (1999), the first IPP project to be agreed upon usually involves unbidden proposals from developers. The project is then implemented following direct negotiations between the developer and the Government. At this point, the Government does not have much knowledge of the whole process, and neither does it have much bargaining power because it is in a position to accept any likely bid that is offered in order to meet the demand for electricity. However, subsequently, the government is at liberty to implement a competitive bidding process in order to solicit new projects.

IPPs can be categorized into two types, depending on the contractual agreement with the utility company. These are:

i. Base load plants – This type of power plants supply electricity at a fixed amount throughout a particular period to the grid, as stipulated in the PPA. A typical base load power plant is actually a combined cycle plant, nuclear plant, coal fired thermal plant or a hydro plant.

ii. Peaking plants – These supply power to the grid only when there is an additional power demand to the base load, which happens only for short periods during the day. This type of power plant is the open cycle plant.

2.5 The Transition Period During the Deregulation of Power Market

This refers to the period between the time when the government implements deregulation and the time when the process is fully in force.

In the past, the electric utility industry was structured on the idea that consumers of electricity could best be served by regulated electricity monopolies. These independent monopolies, monitored by regulation, were able to provide reliable and efficient services to all consumers who desired them.

This technique improved the efficiency of the power plants by reducing their operation costs, which were in turn due to the existing economy of scale. Moreover, permanent predictable consumers allowed the utilities to develop their power generation capacity on a larger scale, which meant that the consumer paid less for the services rendered. The existing industry structure also prevented needless and costly duplication of facilities in the power generation industry, as generation, transmission and distribution were all in the hands of one body/institution.

In exchange for exclusive rights to serve certain regions, utilities acknowledged the right to serve anyone in their regions who was willing to abide by the government regulated terms of service. This regulation responsibility meant that utilities had to plan for the present and future energy needs of their region and build facilities or buy power contracts to meet these needs. The utilities' consumers shared the costs for the construction and procurement, but only if the expenses were judged to be prudent and practical by regulators.

Utilities historically made business determinations based on reliable assumptions about the number of consumers that they would be serving in the future. It must be noted that in the deregulated industry, there can be no assumptions about the market size that the utility companies will be serving, because it is not possible to predict who the consumers will be purchasing their power from.

However, in the deregulated system, it is basically the consumer who will pay the costs (stranded costs) of regulation induced procurements, made to meet the power demands of future consumers who may no longer use that power. (Stranded costs is defined as costs that is incurred by a utility preparing for anticipated power needs that might not come about under competition.)

Hence, the duration of the transition period plays a significant role in the deregulation process because it affects the method by which 'stranded costs' will be paid and by whom. A longer transition period means that ratepayers will pay the uneconomic costs fixed in regulated prices, while a shorter transition period means that IPPs and taxpayers will pay them (in the absence of mandated recovery of stranded costs). Zink (1997) pointed out that if 'stranded cost' is not recovered, average electricity prices under competition could be reduced by 6 per cent.

In a fully competitive market, some IPPs will not recover their full investment in power generating capacity if their selling price is higher than the market prices.

Therefore, the taxpayers are affected because IPPs will pay lower taxes on reduced capital gains and dividend payoffs. In addition the affected utilities will pay less in income taxes if stranded costs reduce their taxable income. In view of this, the perception of who pays the uneconomic costs now covered in regulated prices will rest on both the pace at which competition becomes a reality, and the magnitude to which regulators and legislators mandate to recover the stranded costs.

2.6 Competition in the Power Market

There are at least three elements in the structure of the electric power industry that define the nature of competition and the institutions that support it:

i. Who maintains control of the network – Independent System Operators or Transmission Owning Utilities?

ii. What are the types of transactions allowed – pool purchases only (where all wholesale transactions are through the power pool) or bilateral trades only (where wholesale power purchases are consummated through a two-party contractual agreement, without the market clearing function of the power pool)?

iii. What are the levels of competition – wholesale only or retail as well?

Each of the three elements above is discussed below in order to facilitate understanding of the competitive electricity market. However, item (ii) will be discussed in greater detail as this is the area of emphasis.

2.6.1 Control of the Network

Market power exists when a producer or consumer is able to influence prices. The ability to influence prices results from:

i. A small number of producers or consumers with a significantly high share of the market (on either the production or demand side).

ii. The control of access to a product's distribution channels, such as control of the transmission system so that some producers of electricity can get their product to market while access is denied to others.

The main question that arises in the distribution channel is whether Transmission Owning Utilities should be allowed to maintain control over the access to electricity markets in their geographically defined territories through control of the transmission system, or, whether they should turn the control of the network over to an Independent System Operator in order to ensure fair competition and unbiased access to markets (Bacon, 1995).

Both options have their own advantages and disadvantages, and they are not mutually exclusive, and it is possible that the industry may evolve through a system in which utilities maintain control of the transmission network for a while, then control is assumed by an Independent system operator.

If utilities maintain control of their own networks, then they must "wheel" power into or through their systems in order to provide third party access to the transmission system for other generation companies to have access to competitive markets. 'Wheeling' refers to a process when a particular utility transmits electricity across its lines on behalf of another generating utility. For instance, in a 'wheeling' model, Transmission Owning Utilities will maintain control of the network and allow access to third party generators for a fee. On the

other hand, in a 'power pool' model, a third party such as an Independent System Operator assumes control of the network and charges a levy for the transmission of power to consumer.

2.6.2 Types of Transactions

According to Bacon (1995), there are three principal dimensions to power sales agreements:

a) The selling prices for power.
b) The amount of power.
c) Incentive to improve performance, and disincentives to ensure that performance does not fall below a basic standard.

Bacon (1995) pointed out that the stronger a purchase agreement's guarantee of a market for the IPP's output, the more attractive the IPP becomes for its sponsors and financiers. However, this type of purchase agreement does not create competition pressure for the private generators to improve efficiency of their plants. In view of this, the PPAs must take into account two conflicting issues: attracting private finance and improving sector efficiency.

The purchase agreements of energy are based on a two-part pricing structure that separates payment for capacity (investment cost) from payment for energy (generating/running cost). The former is usually related to the capacity declared available, rather than to the actual capacity run. It is likely to be set so that, at a given level of operation, the discounted revenue from capacity payments will cover capital costs over the life of the project. The latter refers to the operating expenses of the power plant, which includes fuel costs and operating and maintenance (O&M) costs.

Bacon (1995) states that the price of power is usually tied to an initial cost estimate and a series of cost indexation factors. An initial heat rate and initial fuel rate, together with O&M costs, are assessed for the plant by applying the appropriate indexes, for example, the consumer price index for O&M costs and the average fuel price index of the sector for fuel costs. These determine the power price. Often, the price is set to just cover such costs, and as long as the indexes track the actual costs exactly, there will be no change in the net revenue per unit of power supplied. The capacity price is collected because the plant was declared available, not because it actually ran, and since it earns no net revenue per unit of power, there is no gain from being dispatched. The power price in then designed, as in certain power pools, so that the IPP is indifferent as to whether or not it (the power) is dispatched.

2.6.2.1 Must-run or take-or-pay contracts

These are the least risky forms of contract for IPPs. The IPPs are guaranteed the sale of a specified amount of power and energy for the life of the contract, hence the IPPs are assured of the market so that they cannot lose without compensation, but they cannot increase their market share. Under this must-run contract, there is no issue of economic dispatch for the plant even when other plants have lower costs. The subsequent entry of additional IPPs, each with a long-term contract, can compound this problem. The purchaser (utility company) must pay for any contracted output that it does not take from the IPP. In other words, the purchaser (such as TNB) has to pay the IPPs (for example, YTL Power Generation) a fixed amount of power output as stipulated in the contract, even though the power is not required by TNB on a particular day.

According to Bacon (1995), this arrangement has three separate effects on the performance of the sector.

i. There is no competitive pressure for the IPPs to lower costs, so that efficient operation depends solely on the profit motive. For costs that are indexed, the incentive to improve performance centres on "beating the index" to benefit from the difference.

ii. Dispatch can occur out of merit order, leading to the loss of a system's productive efficiency.

iii. Lack of competition for market share between the IPPs and other generators means that, even if operated efficiently, the IPPs pose no threat to other generators because they have no spare capacity to capture their market share.

2.6.2.2 Economic dispatch

Bacon (1995) states that the capacity price is again related to availability, and the power price is paid only for the power dispatched according to costs. To cover the investment cost, the IPPs declare their available capacity, but the power sale for the IPPs are not guaranteed under the economic dispatch. Under this form of contract, the plants are dispatched according to their economic ranking and power prices are linked to a cost index. However, it requires establishing an entity to determine dispatch on a cost-related basis. Bacon (1995) pointed out that the cost saving is not passed on the consumers or reflected in the prices that influence dispatch decisions. This is because the dispatch is based on the contractual energy costs, which relate to the initial settlement level and the values of the indexes since the start of the contract.

According to Bacon (1995), bonuses and penalties should be used for capacity availability to create competition between plants. If the IPP tries to increase its market share by bidding a higher availability, other generators may lose market share and respond by trying to reduce their capacity costs so as to improve their

availability. However dispatch on economic costs provides no competitive incentives for the supply of energy. Because generators cannot bid market prices, but instead offer cost-related prices determined at the outset of contracts, there is no way for IPPs or for other generators to increase market share through price competition. Contracts that guarantee a " minimum take" below normal capacity availability combine aspects of the must-run contract with those of an economic dispatch contract.

2.6.2.3 Generator Trading

Generator trading is viewed as the most effective way to promote competition and improve efficiency in the power generation sector. According to Bacon (1995), the contract prices for energy are predetermined for all generators, but the generators bid availability for the next period (typically the next day). Generator trading, as it is practiced in the United Kingdom, is such that the system operator forecasts demand for the following day, and accepts bids that satisfy the projected demand at the lowest cost. The utility companies determine least-cost dispatch on the basis of the contract prices and announce the schedule. Furthermore, to meet the contractual commitments to the power purchase IPPs, some trade energy among themselves, buying from lower-cost generators who are not fully committed to dispatch energy to the power purchasers.

The trade for energy emerges when an actual cost to generate power is less then the contract prices. The power purchaser is informed of such trade, and adjusts the dispatch schedule while paying in accord with the original schedule. However, the saving due to lower generating cost is not passed down to the consumers, because generator prices are tied to the cost index. The system can lead to competitive pressure for generator to improve efficiency once costs start to diverge from the index. But it is complicated to operate because the utility companies have to determine the dispatch in advance and maintain records of

transactions between companies and generators. Moreover, the utility companies need to have sophisticated systems to maintain transaction records in order to ensure the proper function of generation trading.

2.6.3 Wholesale and Retail Competition

Another factor that effects competitive electricity prices is the extent of competition, whether retail competition emerges nationally or competition is constrained to the wholesale level only.

If there is only wholesale competition, the end consumer continues to purchase electricity from a regulated distribution company, which is the local electric company with a franchise monopoly service territory and no competitors. The consumer who decides how much electricity to buy may choose a higher or lower quality of service in terms of reliability, or stricter technical specifications of the power received, but may not choose the supplier. The local electric company may acquire electricity generation services or other services from competing suppliers, but decisions on the retail price for supply of electricity to the customer is fixed by the local companies themselves (Bacon 1995).

With retail competition, end consumers may choose the providers of generation and other packaged (such as lighting and heating) services from competitive markets or aggregators or they may remain with the local electric company and purchase bundled services there just as they always have. The basic difference between wholesale competition and retail competition is one has the right to choose the supplier of generation services and other services associated with electricity production.

2.7 International Development of the Power Sector

Electric utility industries have already been restructured in a number of other countries including Sweden, Norway, Argentine, Chile, New Zealand and United Kingdom. The competitive electricity market in the United Kingdom consist of three large generating companies, plus a number of small independent power producers that produce electricity, and 12 privately owned regional electricity companies that distribute the power to consumers. The transmission facilities are owned by National Grid, which operates a large power pool and runs a spot market. The spot markets operate in the following manner: Each afternoon, the generators submit bids to supply a given amount of power at a given price for each 30 minutes of the next day. The bids are then used to dispatch the power. The marginal cost for the entire system for a given 30 minutes is basically the bid price of the last unit dispatched (McDaniel 1998).

The 'spot price' is the sum of the marginal cost and a reliability component, based on estimates of the probability of outage and consumers' losses if an outage occurs. If the bid is accepted, the bidder receives the 'spot price'. The experience to date suggests that the splitting of generation and transmission does not adversely affect reliability. In fact, in the United Kingdom, IPPs are constructing new power plants without long-term contracts. Additionally, at least in the United Kingdom, cost per unit energy (£/kWh) has fallen.

On the other hand, although the cost of electricity generation has decreased in the United Kingdom, the cost reduction has largely been retained by the generation companies in the form of higher profits rather than passed through to consumers in the form of lower tariffs. That is, the evidence to date recommends that competition in the United Kingdom has had only a limited effect on retail electricity prices. It is assumed that competitive prices will equal the incremental cost of producing the power, plus a small reliability component. This assumption rests on the belief that the number of competing utilities will be sufficient to push

down the marginal cost. In the United Kingdom, market participation of only three large utilities and a small number of IPPs has not fostered an adequate level of competition. The competition price to consumers is much greater than the incremental cost of producing the electricity. This is an indication that market power exists. However, it is not proven that allowing competition would always bring an adequate number of players into the market to eliminate the market power of producers and allow consumers to gain from lower electricity costs.

2.8 The Power Generation Sector in Malaysia

Before the deregulation of power generation, TNB was the sole power producer in Peninsular Malaysia. In 1993, the Government deregulated the power generation sector to overcome the shortage of installed capacity due to the increase in electricity demand created by rapid economic growth and the emergence of industries. The Government also hoped that this step would serve to promote competitiveness and efficiency in the generating sector. The five IPPs currently in operation are:[2]

i. PD Power – peaking power station with an installed capacity of 440 MW. The plant began its operation on January 1995.
ii. Powertek – peaking power station with an installed capacity of 440 MW. The plant began its operation on January 1995.
iii. Genting Sanyen Power – base load power station with an installed capacity of 720 MW. The plant began its operation on April 1996.
iv. YTL Power – base load power stations with an installed capacity of 1212 MW. The plants began their operation on March 1996.
v. Segari Energy Venture (SEV) – based load power station with an installed capacity of 1303 MW. The plant began its operation on June 1997.

[2] Source from prospectus

In addition to the above-mentioned IPPs currently under operation, the Malaysian government issued four new IPP licenses:

i. Bakun Hydropower plant – generating capacity of 2,400 MW.
ii. Automan Power Sdn. Bhd. – generating capacity of 1,000 MW.
iii. Teknologi Tenaga Perlis Sdn. Bhd. – generating capacity of 650 MW.
iv. Mansfield Development Sdn. Bhd. – generating capacity of 120 MW.

2.9 The Regulation Framework

The activities of the electricity supply industry in Malaysia are governed by the Electricity Supply Act 1990. Under this act, The Director General of Electricity Supply is responsible for the issuing of licenses to generate, transmit and distribute electricity in Malaysia.

The functions and duties of the Director General, Deputy Director Generals, Directors and Assistant Directors of Electricity Supply under the Act are as follows:

i. To issue licenses as stated under section 9 of the Act;

ii. To exercise regulatory functions with regard to the provision of electricity;

iii. To promote competition in the generation and supply of electricity so as to ensure the optimum supply of electricity at reasonable rates;

iv. To promote the interest of consumers;

v. To ensure that licensees are able to finance the activities authorized under their licenses;

vi. To promote and encourage the generation of energy to support the economic development of the country.

Section 29 of the act provides for the licensee to enter into a special arrangement with the buyer of electricity. However, since it is the duty of the Director General of Electricity to safeguard the interest of the consumer under section 4 of the Act, the power purchase agreement has to be approved before implementation.

2.10 The objectives of Privatization in Malaysia

The Malaysian Government in 1983 implemented its privatization policy to achieve the following objectives:

i. To relieve the financial and administrative burden on the government.
ii. To improve efficiency and productivity.
iii. To facilitate economic growth.
iv. To reduce the size and presence of the public sector economy.
v. To help meet the targets of National Economic Policy.

The public enterprises and sectors which were included in the privatization projects were electricity, postal services, telecommunications, port services and infrastructure construction.

2.11 Methods of Privatization in Malaysia

There are basically nine methods of privatization employed by the Malaysian government. These are described briefly below.

2.11.1 Management Contracts

According to this method, the operation of a government facility is contracted out to private companies, with the actual ownership of the firm's assets and liabilities remaining with the government. Facilities where the management is frequently contracted out include airports, wastewater plants, arenas and convention centers. In management contracts or leasing methods, the government has less control over the operations of private company, since the contract allows the government to only specify the terms and conditions under which the private companies must operate.

2.11.2 Sale of Equity

Under the sale of equity, the management responsibility, assets and personnel of government enterprises are transferred to the private sector. This method can be implemented either partially or completely.

2.11.3 Selling of Assets

Selling the assets of state owned enterprises involves selling off the company and thereby clearing its outstanding debts. This approach is only used when there is clearly no hope that the firm can be saved by internal restructuring.

2.11.4 Management Buy-out

Under this method, the top management in a government firm buys over the enterprise. This method is also known as leverage buyout.

2.11.5 Corporatization

In this form of privatization, the government organizations are reorganized along modern business lines. Typically they are required to pay taxes, raise capital on the capital market (without government backing, either implicit or explicit), and

operate according to commercial principles. Government corporations now focus on maximizing profits and achieving a favorable return on investments. They are freed from government procurement, personnel and budget systems.

2.11.6 Build – Operate – Transfer (BOT).

Under the Build-Operate-Transfer (BOT) arrangements, the private companies design, finance, build and operate the facility over the life of the contract. At the end of this period the ownership reverts to the government.

2.11.7 Build – Own – Operate (BOO)

Under the Build-Own-Operate (BOO) arrangement, the private firm retains permanent ownership and operates the facility on contract.

2.11.8 Build- Transfer (BT)

Under this method of privatization, the private sector constructs the facility and transfers it back to the government upon the completion of the project.

2.11.9 Lease of Assets

Under this method the right to use the assets is transferred to private companies for a specified period and payment.

Table 2.1 shows a list of privatization projects by sector and mode from 1996 to 1998.

Table 2.1 – NUMBER OF PRIVATIZED PROJECTS BY SECTOR AND MODE, 1996 – 1998

Sector	Mode of Privatization									Total Projects	(%)	Saving in Capital Expenditure (RM mil)
	SOE	BOT	SOA	BOO	COR	BT	MBO	LOA	MC			
Agriculture & Forestry	1	0	0	0	2	0	0	0	0	3	4.5	0
Mining & Quarrying	0	0	0	0	0	0	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
Construction/ Infrastructure	0	13	13	0	0	4	0	0	0	30	44.1	18,827.7
Electricity, Gas & Water	0	0	0	7	0	0	0	0	0	7	10.3	28,131.0
Transport, Storage Communication	1	2	0	0	0	0	0	1	0	4	5.9	5,449.0
Wholesale & Retail Trade, Hotel & Restaurants	1	0	1	0	0	0	0	0	0	2	2.9	0
Finance, Real Estate & Business Services	6	0	0	0	1	0	0	0	0	7	10.3	616.6
Government Services	0	0	2	0	1	1	0	1	8	13	19.1	106.1
Other Services	0	0	0	0	2	0	0	0	0	2	2.9	0
Total	9	15	16	7	6	5	0	2	8	68	100	53,130.4

Source : Mid Term Review of Seventh Malaysian Plan (pg. 145)

Notes:
SOE = Sale of Equity SOA = Sale of Asset COR = Corporatization MBO = Management-Buy-Out MC = Management Contract
BOT = Build-Operate-Transfer BOO = Build-Operate-Own BT = Build-Transfer LOA = Lease of Asset

2.12 Tenaga Nasional Berhad

The Malaysian government privatized its electric utility company Lembaga Letrik Nasional (LLN) by establishing a new company, Tenaga Nasional Berhad (TNB) on 1st September 1990, with a license to operate as power producer for a period of 21 years. With the transfer of ownership, TNB became responsible for the generation, transmission, distribution and sale of electricity in Peninsular Malaysia. Hence, after privatization, TNBerhad is still a single fully vertically integrated electric utility company. This means that, despite privatization, there is still no competition in the power sector.

Due to the shortage of electricity supply in the early 1990s' as a result of strong economic growth and the emergence of a substantial number of industries, the Government deregulated the electricity generation by issuing licenses to five private investors to generate electricity to Tenaga Nasional Berhad. With the entry of the five IPPs into the generation sector, TNB lost its position as the sole power generator in Peninsular Malaysia.

TNB established two power generation subsidiaries to develop its power generation sector and compete with the IPPs. These subsidiaries are:

i. TNB Generation Sdn. Bhd. – established on 1st September 1997 to manage and operate TNB's 12 major power stations. TNB Generation Sdn. Bhd. currently has a total installed capacity of 8,128.9MW, which makes it the largest power generator in Malaysia. The company functions as an IPP, which sells its electricity to TNB. The total electricity sale for the financial year 1998 was 31,959.59 GWh.[4]

[4] Tenaga Nasional Berhad 1998 Annual Report

Table 2.2 : The installed capacity of TNB Generation

PLANT TYPE	CAPACITY OF INSTALLATION
Combined Cycle	2,000 MW
Conventional Thermal (Oil/Gas)	1,714 MW
Conventional Thermal (Coal)	600 MW
Gas Turbine	1,994 MW
Hydro	1,818.9 MW
Total	**8,128.9 MW**

Source TNB Annual report 1998

ii. TNB Janamanjung Sdn. Bhd. – established in August 1996 to develop the 2100MW coal-fired power plant in Perak. The development cost for the power station is RM 7 billion, and the first phase of 700MW is due to be commercially operational by the year 2003. The consortium awarded for the engineering, procurement and construction for this project consists of the Kentz Group based in Ireland, and ABB Alstom Power and Peremba Construction, both of which are based in Malaysia.[5]

Listed below are the generation plants under which TNB has invested to increase its generation capacity to meet the electricity demand.

[5] Asian Power – September 1999

Table 2.3 : Tenaga Nasional Berhad generation plant-up programmes 1998-2000

Station/Project	Type	Capacity	Completion Date
Paka CC Conversion	Combined Cycle	1x95 MW	April 1998
Pergua – Unit 1	Hydro	1x150 MW	August 1999
Pergua – Unit 2	Hydro	1x150 MW	August 1999
Pergua – Unit 3	Hydro	1x150 MW	August 1999
Pergua – Unit 4	Hydro	1x150 MW	August 1999
Melaka CC Conversion	Combined Cycle	1x110 MW	January 1998
Sungai Piah Hilir I	Hydro	1x27.5 MW	December 1998
Sungai Piah Hilir I	Hydro	1x27.5 MW	December 1998
Kapar – Phase Unit 1	Steam Turbine	1x500 MW	December 1998
Kapar – Phase Unit 2	Steam Turbine	1x500 MW	April 1999
Chenderoh Rehabilitation	Hydro	3x10 MW	July 2000

Source Tenaga Annual Report 1998

To further liberalize the electricity market in Malaysia, TNB plans to establish transmission and distribution subsidiaries and an independent grid system operator (IGSO) to serve as a power market pool operator. The restructuring will make IGSO the power dispatch planner as well as generation and transmission capacity planner. All generators connected to the grid will have to bid for power dispatch through the pool. The retail arm of the distributing company will be responsible for the payment of electricity brought through the pool.[6]

[6] Asian Power – Sepetember 1999 (p. 6)