

# *Chapter 8*

## *Infrastructure and Utilities*



# 8

## INFRASTRUCTURE AND UTILITIES

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### I. INTRODUCTION

8.01 During the review period, infrastructure and utility projects continued to contribute to economic growth through linkages and spillover benefits. Additional new projects, which supported tourism and trade, were also implemented. In addition, measures were taken to improve the efficiency of the delivery system of transportation and utility services. These efforts increased the capacity and improved the efficiency of infrastructure and utilities, which facilitated business activities and enhanced quality of life.

8.02 For the remaining Plan period, focus will be given towards improving service delivery and increasing capacity to further enhance the competitiveness and resilience of the economy. Measures will be taken to integrate transport services to ensure the seamless operation of a multimodal system. Priority will be given towards enhancing quality and reliability in the supply of water and electricity to meet the increasing demands from both domestic consumers and industries. New environmentally sustainable technologies will be studied and adopted to improve quality of life.

### II. PROGRESS, 2001-2003

8.03 During the review period, the value added of infrastructure and utilities grew by 4.6 per cent per annum, lower than the Plan target of 8.6 per cent. However, the implementation of infrastructure and utility projects contributed to the growth of the economy and constituted 12.6 per cent of Gross Domestic Product in 2003. The expansion in capacity of roads, rail, ports and airports was achieved with active participation of the private sector. The design and build method was used to shorten processing time while financing of projects was

facilitated by development financial institutions through privatisation and the deferred payment scheme. To enhance the reliability of supply of utilities, distribution networks were upgraded and expanded.

## **Roads**

8.04 During the review period, the implementation of road and bridge projects was accelerated with expenditure of RM10.3 billion, representing 73.6 per cent of the total allocation for this subsector under the Plan period. In addition, the private sector invested about RM1.3 billion under the privatisation programme to construct toll highways. Consequently, the national road network increased by 2,140 km to 75,160 km.

8.05 The completion of several roads and bridges such as the Titi Karangan - Kupang section of the Second East-West Link Road and the Pos Blau - Kampung Kuala Betis section of the Simpang Pulai - Gua Musang - Kuala Berang Road enhanced the development of new areas. Accessibility to the new airports at Tawau and Bintulu was improved with the upgrading of the access roads. In addition, two privatised road projects were completed, namely, the New North Klang Straits Bypass and the Western Kuala Lumpur Traffic Dispersal Scheme (SPRINT Highway) Package A & B. The New North Klang Straits Bypass provided an alternative access road to the North Port, Port Klang, while the completion of the SPRINT Highway Package A & B provided a better linkage between Damansara and the western part of Kuala Lumpur. The list of major road projects implemented during the review period is as shown in *Table 8-1*.

8.06 In line with efforts to improve safety and driving comfort, several road-upgrading projects were completed during the review period. Among the major roads upgraded were the Brinchang - Lojing Road, the Beaufort - Sindumin Road and the Betong - Kayu Malam Road. The upgrading of Brinchang - Lojing Road improved driving conditions within the Cameron Highlands area. The upgrading of Beaufort - Sindumin Road in Sabah and the Betong - Kayu Malam Road in Sarawak provided better road connections between the major towns in the two states. Under the road safety programme, 85 kilometres of motorcycle lanes were constructed to reduce the accident rate among this class of vehicles. Safety campaigns and nation-wide enforcement of traffic rules during long holidays also contributed to the reduction in the number of accidents. The fatality rate declined from 5.7 deaths per 10,000 registered vehicles in 2000 to 4.9 deaths in 2002, as shown in *Table 8-2*.

TABLE 8-1

**MAJOR ROAD PROJECTS IMPLEMENTED,  
2001-2005**

<i>Project</i>	<i>Length (km)</i>	<i>Completion (Year)</i>
<b>Completed Projects</b>		
<b>i. Government-Funded Projects</b>		
Upgrading of Brinchang - Lojing Road	22	2001
Upgrading of Beaufort - Sindumin Road	65	2001
Upgrading of Beluran - Spur Road	31	2001
Upgrading of Kuala Kangsar - Grik Road (Phase 3)	21	2002
Access Road to Proton City Industrial Park (Phase 1 & 2)	9	2002
Middle Ring Road II (Phase II)	6	2002
Rehabilitation of Sandakan - Tawau Road	29	2002
Upgrading of Keningau - Nabawan Road (Phase I)	45	2002
Upgrading of Merotai - Kalabakan Road (Phase I)	20	2002
Sayong Bridge, Kuala Kangsar	0.4	2002
Tanjung Manis - Rejang - Belawai Road	18	2003
<b>ii. Privatised Projects</b>		
New North Klang Straits Bypass	18	2001
Western Kuala Lumpur Traffic Dispersal Scheme (SPRINT) (Package A & B)	20	2001
<b>Under Construction</b>		
<b>i. Government-Funded Projects</b>		
Upgrading of Pitas - Kanibongan Road	28	2004
Kunak - Semporna Road	42	2004
Triso - Melebu - Pusa Road	51	2004
East Coast Expressway	169	2004
Upgrading of Merotai - Kalabakan Road (Phase 2)	59	2004
Upgrading of Muar - Melaka - Alor Gajah - Simpang Ampat Road	70	2004
Upgrading of Batu Pahat - Ayer Hitam - Kluang Road	47	2004
Upgrading of Kapar - Sabak Bernam and Klang - Banting Road	118	2004
Sungai Rejang Bridge	7	2004
Upgrading of Kuching - Serian Road	34	2005
Kanibongan - Nangoh Road	150	2005
Pusa - Sesang Coastal Road	46	2005
Tanjung Kidurong - Bakam Coastal Road	178	2005
Upgrading of Gemas Baru - Ayer Hitam Road	120	2005
Trans Eastern Kedah Hinterland Highway	116	2005
Sepulut - Kalabakan Road	145	2005
Sipitang - Tenom Road	54	2005
Keningau - Kimanis Road	59	2005
<b>ii. Privatised Projects</b>		
New Pantai Highway	20	2004
Kajang Ring Road	36	2004
Butterworth Outer Ring Road	14	2004
Shah Alam - Kuang Highway (Guthrie Corridor Expressway)	25	2004
Western Kuala Lumpur Traffic Dispersal Scheme (SPRINT) Package C	6	2004
Kajang - Seremban Highway	46	2005

TABLE 8-2

**ROAD ACCIDENTS AND FATALITY RATE, 2000-2002**

	<i>Number of accidents</i>					
	<i>2000</i>		<i>2001</i>		<i>2002</i>	
	<i>Accidents</i>	<i>Fatality</i>	<i>Accidents</i>	<i>Fatality</i>	<i>Accidents</i>	<i>Fatality</i>
<b>Type of Vehicle</b>						
Motorcycle	79,816	3,205	85,761	3,369	86,834	3,426
Car	268,881	1,023	300,910	1,044	320,719	1,015
Bus	9,660	49	9,275	68	9,258	46
Lorry	35,076	183	36,448	175	37,803	198
Others	47,953	1,575	50,957	1,193	53,381	1,200
<b>Total</b>	<b>441,386</b>	<b>6,035</b>	<b>483,351</b>	<b>5,849</b>	<b>507,995</b>	<b>5,885</b>
<b>Type of Road</b>						
Expressways		408		376		330
Federal Roads		2,089		1,957		1,716
State Roads		1,365		1,273		1,038
Municipal Roads		718		926		673
Other		1,455		1,317		2,128
<b>Total</b>		<b>6,035</b>		<b>5,849</b>		<b>5,885</b>
Accidents per 10,000 registered vehicles	237.40		234.62		232.68	
Death per 10,000 registered vehicles		5.72		5.17		4.89

8.07 Emphasis was also given to improve the accessibility of rural areas, particularly in Sabah and Sarawak. During the review period, RM5.9 billion was spent on the construction of roads, with a minimum of JKR-R3 standard. In addition, RM1.5 billion was spent to construct and maintain village roads, which added 14,488 km of roads that provided access to about 2.6 million population.

8.08 Road development indicators were revised to take into account lanes added to existing roads through upgrading projects. The revised road development indicators are as shown in *Table 8-3*. The Road Service Level increased from 2.98 km per thousand population in 2000 to 3.17 in 2003 reflecting improved road connectivity.

TABLE 8-3

**ROAD DEVELOPMENT INDICATORS, 2000-2005**

<i>Indicator</i>	<i>2000</i>	<i>2003</i>	<i>2005</i>
Road Density <sup>1</sup>	0.20	0.22	0.23
Road Development Index <sup>2</sup>	0.75	0.85	0.86
Road Service Level <sup>3</sup>	2.98	3.17	3.18

*Notes:*

<sup>1</sup> Measures road lane length over the total area.

<sup>2</sup> Measures the level of road development taking into account both area and population size of the country.

<sup>3</sup> Measures total road lane length per 1,000 population.

8.09 The rapid development of road works in the country provided the opportunity for local companies to gain vast experience, which enabled them to venture into international markets. The Government, through the Construction Industry Development Board Malaysia, facilitated the participation of local contractors in 26 road projects overseas. In 2002, the Professional Services Development Corporation Sdn. Bhd. (PSDC), a Government owned company was established. The PSDC provided a common platform for local professional service providers to improve their capacity and capability to meet the challenges of globalisation.

### **Urban Transport**

8.10 Traffic in major urban centres, particularly the Kuala Lumpur conurbation, continued to grow rapidly during the review period. Efforts were intensified to create a more integrated, efficient and multimodal urban transport system. Efficient traffic management systems were instituted to improve traffic flows. Various measures were also taken to promote the use of public transport.

8.11 The urban rail system connecting Kuala Lumpur Sentral (KL Sentral) to KL International Airport (KLIA) began commercial operations in 2002. The KLIA Express provided a fast, reliable and comfortable mode of transport to KLIA. The KLIA Transit enabled access to KLIA from KL Sentral to Bandar Tasik Selatan, Putrajaya and Salak Tinggi. The 8.6 kilometre intra-city light rail network, the KL Monorail, commenced operations in August 2003. With the operation of KLIA Express, KLIA Transit and KL Monorail, the role of KL

Sentral as a major public transport hub integrating intra- and inter-city rail systems was achieved. During the review period, daily ridership on the light rail mass transit services in Kuala Lumpur, namely, Light Rail Transit System I (LRT STAR) and Light Rail Transit System II (LRT PUTRA) as well as KLIA Express and KLIA Transit increased, as shown in *Table 8-4*.

TABLE 8-4

**PASSENGER RIDERSHIP PER DAY ON LRT STAR,  
LRT PUTRA, KLIA EXPRESS AND KLIA TRANSIT, 2000-2003**

	2000	2001	2002	2003
LRT STAR	77,803	88,508	91,300	94,480
LRT PUTRA	121,950	143,777	147,802	150,494
KLIA Express and KLIA Transit	–	–	5,135	6,014
KL Monorail	–	–	–	27,000

8.12 Works on a monorail system was undertaken to provide an efficient mass transit system in Putrajaya. These works included soil investigations, alignment surveys and casting of guide beams. The Study On The Implementation Of An Integrated Transportation System In Putrajaya And Cyberjaya was conducted to formulate an integrated, multimodal system aimed at achieving a modal split of 70:30 between public transport and private vehicle usage in the core areas of Putrajaya and Cyberjaya.

8.13 Efforts were undertaken to improve traffic management and reduce traffic congestion, which included the application of an Integrated Transport Information System (ITIS) in Kuala Lumpur and the Klang Valley. Closed circuit television cameras were installed at strategic locations to monitor traffic flows, which enabled remedial actions to be taken quickly to address traffic obstructions such as accidents, stalled vehicles and road works. This information was also made available to the public through the ITIS website, which was launched in 2003.

8.14 Emphasis continued to be given to the promotion of public transport as an efficient, convenient and reliable mode of transport. Measures were also taken to enhance the use of multimodal public transport to facilitate intra- and inter-city transport services. Works on integrated transport terminals at Bandar Tasik Selatan and Gombak in the Klang Valley commenced during the review period.

## **Rail Transport**

8.15 During the review period, the focus of railway development was to improve quality, efficiency and safety to enhance the competitiveness of passenger and freight services. Among the measures taken were double tracking, rehabilitation and strengthening of the main line, refurbishment of coaches and the upgrading of bridges, halts and stations. To upgrade the freight services, efforts were geared towards improving fleet operations, control systems as well as maintenance and overhaul programmes.

8.16 For passenger services, *Keretapi Tanah Melayu Berhad* (KTMB) operated 24 inter-city services along the west coast, 12 services on the east coast and two services transversing from west to east of the Peninsular. Air-conditioned buffet and first class coaches were added to increase the comfort and service levels. Commuter traffic between Rawang - Kuala Lumpur - Seremban and Sentul - Port Klang increased from 19.3 million passengers in 2000 to 25 million in 2003. Inter-city passenger traffic decreased from 1.23 billion passenger-kilometres in 2000 to 1.20 billion in 2003 due to the temporary reduction in services caused by double tracking works from Rawang to Ipoh. Similarly, total freight traffic, mainly container cargo and cement recorded a decrease from 5.5 million tonnes in 2000 to 5.0 million in 2003.

8.17 Infrastructural works including double tracking, strengthening and electrification of tracks as well as modernisation of signalling and communications systems were implemented to further improve the railway system. The construction of the 180 kilometre Rawang - Ipoh electrified double tracking project attained 72 per cent completion during the review period. Other major infrastructure projects included the rehabilitation of 69 bridges between Gemas, Negeri Sembilan to Kuala Lipis, Pahang and seven bridges between Merapoh, Pahang to Wakaf Baru, Kelantan.

## **Ports**

8.18 During the review period, focus was given to expanding capacity, upgrading and increasing facilities of ports as well as improving other supporting maritime-related services. Emphasis was also directed towards enhancing efficiency and productivity of port operations and management as well as strengthening related ancillary services to increase the usage of local ports, especially Port Klang and Port of Tanjung Pelepas (PTP). In the shipping subsector, efforts were continued to increase the volume of cargo transported by locally registered ships.

8.19 A number of port-related projects were completed, including additional berths of 720 metre length at PTP, new basin at Kuantan Port, and additional container berths and yards at West Port, Port Klang. In Sarawak, the construction of a third Liquefied Natural Gas Jetty (LNG3) at Bintulu Port was completed in the middle of 2002 and began its operations in July 2003. In Sabah, several port-related projects were implemented including the construction of a container terminal at Sepangar Bay, the upgrading of port handling facilities and the construction of a barter trade centre and a ferry terminal at Tawau. In addition, the ferry terminal building and jetty repair works at Menumbok were completed in 2003.

8.20 Total port capacity increased from 324.9 million tonnes in 2000 to 443.4 million tonnes in 2003, as shown in *Table 8-5*. The volume of cargo handled increased by 13.2 per cent per annum, from 223.9 million tonnes to 338.8 million tonnes during the same period. This was higher than the targeted growth of 11.6 per cent per annum for the Plan period. Containerised cargo increased from 4.9 million twenty-foot equivalent units (TEUs) to 10.6 million TEUs, registering the fastest growth rate at 19.8 per cent per annum during the review period. Despite the global economic slowdown, the number of ship calls at ports increased from 81,313 in 2000 to 92,900 in 2003.

8.21 Efforts were also intensified to promote Port Klang and PTP as a hub and cargo transshipment centre, respectively. These included the establishment of business partnerships such as West Port, Port Klang with Hutchinson International Terminal and PTP with Maersk Sealand as well as the provision of rebates and other incentives. The Container Security Initiative, which required pre-screening of US-bound cargo, was implemented at Port Klang and PTP to facilitate clearance of goods to the United States. Containerised cargo handled at Port Klang increased from 3.2 million TEUs in 2000 to 5.1 million TEUs in 2003, registering a growth of 14.5 per cent per annum. Ship turnaround time at port in Westport, Port Klang reduced from 16.4 hours in 2000 to 13.6 hours in 2003. In the same period, the volume of cargo at PTP increased eight fold from 413,000 TEUs to 3.5 million TEUs. Performance at PTP also improved with average container handling rates per hour increasing from 84.4 to 90.2 containers.

8.22 Other measures to enhance the efficiency of port management and supporting services included the introduction of compulsory training on port operations and customs procedures for forwarding agents, increased automation and computerisation as well as improved interfacing capabilities of electronic data interchange.

TABLE 8-5

**PORT CAPACITY, NUMBER OF BERTHS, CRANES, SHIP CALLS AND  
VOLUME OF CARGO HANDLED AT PORTS<sup>1</sup>, 2000-2005**

	2000	2003	2005
Port Capacity (million tonnes)	324.9	443.4	481.3
Number of Berths	221	230	237
Number of Cranes <sup>2</sup>	131	210	251
Number of Ship Calls	81,313	92,900	100,950
Volume of Cargo Handled (million tonnes)	223.9	338.8	414.1
General	23.3	27.6	30.5
Liquid Bulk	87.5	126.3	158.5
Dry Bulk	28.6	33.9	37.1
Container	84.5	151.0	188.0
Containerised cargo (million TEUs)	4.9	10.6	14.2

*Notes:*

<sup>1</sup> Includes Port Klang, Penang, Pasir Gudang, Tanjung Pelepas, Kuantan, Kemaman, Bintulu, Kota Kinabalu, Lahad Datu, Sandakan, Tawau, Kuching, Miri, Rajang, Lumut, Teluk Ewa, Kuala Perlis, Kuala Kedah, Tg. Bruas, Port Dickson, Kerteh, Sungai Udang and Labuan.

<sup>2</sup> Includes gantry and multipurpose cranes.

The commencement of a sea-air cargo programme using simplified documentation for cargo utilising both sea and air modes of transport facilitated customs clearance.

8.23 Jetty facilities on islands, particularly Pulau Ketam, Pulau Langkawi, Pulau Pangkor and Pulau Tioman, were upgraded to improve cargo and passenger services. In addition, to encourage the development of yachting, recreational and other tourism activities, marina facilities at Kuala Kedah and Batu Uban, Pulau Pinang began operations in 2003. Other suitable and strategic sites for marinas were also identified for development. The Langkawi International Yacht Registry Act was enacted in October 2003 to establish Langkawi as a one-stop centre for registration of yachts to further promote yachting and related activities.

8.24 Measures continued to be taken to promote the growth of the local shipping industry. The Cabotage Policy was reviewed in January 2001 to further encourage the use of local ships to ferry passengers and cargo between two or more destinations in the country. Rationalisation and greater investment through leasing, joint ventures, chartering business and other strategic alliances further strengthened the Malaysian shipping industry. The number of ships registered in Malaysia increased at an average of 4.5 per cent per annum from 3,126 ships or 6.8 million gross registered tonnage (GRT) in 2000 to 3,540 ships or 7.2 million GRT in

2003. Major local shipping lines including Malaysia International Shipping Corporation (MISC) and Halim Mazmin Berhad increased their capacity during the review period. MISC's fleet increased from 120 vessels in 2000 to 151 in 2003 while that of Halim Mazmin Berhad increased from six vessels to nine. Nepline Berhad, however, reduced its fleet from nine vessels to six in 2003 due to new regulation on double-hull requirement.

8.25 During the review period, about RM500 million was spent on dredging and reclamation works. In 2002, two dredging companies were given long-term contracts for fifteen years to carry out all dredging and reclamation works at ports and river mouths. These companies were required to increase their capacities by acquiring additional equipment.

8.26 Efforts were continued to improve navigational safety and to enhance enforcement and rescue operation capabilities of the Marine Department. Additional enforcement and rescue vessels were purchased to contain oil spills and pollution as well as to conduct rescue operations. Marine Police also purchased additional patrol boats to assist in surveillance to enhance safety. Ship incidents such as collision, running aground and fire increased from 16 in 2000 to 28 in 2002, mainly due to the increasing number of vessels plying in Malaysian waters. The number of oil spills decreased from 18 to 11 in the same period. Other measures included the implementation of the Vessel Traffic System and Traffic Separation Scheme in the Straits of Malacca. These systems monitored vessel movements and provided information on polluting ships and other incidents, thus increasing maritime safety and reducing threats to the marine environment.

## **Airports**

8.27 During the review period, airport capacity expanded with the commercial operation of two new airports and completion of upgrading works on existing airports. Flight safety was enhanced with the installation of navigational aids. Rationalisation as well as productivity and efficiency improvements of air services were undertaken.

8.28 Air travel was affected by the occurrence of global crisis, particularly the advent of Severe Acute Respiratory Syndrome at the beginning of 2003. Passenger traffic contracted by 8.2 per cent in the first half of 2003 but recovered to record 32.9 million passengers in 2003. Air cargo traffic increased to about 914,000 tonnes in 2003 from 773,892 tonnes in 2000.

8.29 Capacity and accessibility were enhanced with the completion of several airport projects in Sabah and Sarawak. In Sabah, the new Tawau Airport, which can handle wide-body, medium haul aircraft, commenced operations in December 2001. The new Bintulu Airport in Sarawak with the capacity to handle wide-body, medium haul aircraft, began operations in March 2003, replacing the old airport which could handle 50-seater turbo prop aircraft. Upgrading works on the Miri Airport, Sarawak to handle wide-body, medium haul aircraft were completed in June 2003. It also included a new 16,110 square metre passenger terminal building with a modern baggage handling system and three aerobridges to enhance passenger traffic flow and comfort.

8.30 Accessibility to the rural areas of Sarawak was improved with the implementation of several projects. The new Limbang Airport enabled the use of 50-seater turbo prop aircraft, more than doubling the availability of seats on the Miri - Limbang route, from the existing 19-seater turbo prop aircraft. The new Long Akah airstrip provided air access to the surrounding villages, which enabled the locals to reach Miri within an hour. Facilities at the existing airstrips of Bakelalan, Bario, Long Lellang, Long Seridan and Mulu were improved.

8.31 Focus was also given to improving air traffic management and flight safety. A new radar was installed in Miri to improve surveillance of the air space of central Sarawak. This radar complemented the existing radars in Kuching, Sarawak and Kota Kinabalu, Sabah.

8.32 Malaysia Airlines (MAS), the national carrier, was restructured in 2001 under which its aircraft fleet was sold to and leased back from *Penerbangan Malaysia Berhad*. MAS also undertook various turnaround programmes including improvements in cost control as well as increasing productivity and efficiency. To rationalise its network, services to several cities were terminated. New services were introduced to Mumbai, Bangalore, Hyderabad and Colombo. Several cities in Scandinavia were served under the MAS-KLM code-share arrangements. Frequencies to Guangzhou, Beijing, Shanghai, Ho Chi Minh City, Phnom Penh, Tokyo, Bangkok, Phuket and Denpasar were increased. As at March 2003, the MAS network spanned 109 destinations of which 77 were international. MAS operated flights to 32 domestic and 61 international destinations while code-share partners served 16 destinations.

8.33 Another scheduled airline, Air Asia, under a new management, introduced no-frills low-fare domestic flights in December 2001. Operating a fleet of seven

B737-300 aircraft, Air Asia provided point to point services to 13 destinations and carried more than one million passengers within the first year of service. The low fares, direct services and convenience of on-line booking and payment contributed to the high load factor of the airline.

## Energy

8.34 In line with the growth of economy, the peak demand for *electricity* registered a steady growth during the review period. Peak demand grew at a rate of 5.8 per cent per annum reaching 12,637 megawatts (MW) in 2003, as shown in *Table 8-6*. To meet the growth in peak demand, the *electricity generation capacity* was increased from 14,291 MW in 2000 to 18,562 MW in 2003. The bulk of the capacity expansion was in Peninsular Malaysia, from 12,645 MW in 2000 to 17,015 MW in 2003.

	<i>Generation By System<sup>1</sup></i>	<i>Accumulated Installed Capacity (MW)</i>	<i>Peak Demand<sup>2</sup> (MW)</i>	<i>Reserve Margin<sup>3</sup> (%)</i>
2000	TNB	12,645	9,712	30.2
	SESB	785	391	100.8
	SESCo	861	554	55.4
	<b>Total</b>	<b>14,291</b>	<b>10,657</b>	<b>34.1</b>
2003	TNB	17,015	11,462	48.4
	SESB	678	472	43.6
	SESCo	869	703	23.6
	<b>Total</b>	<b>18,562</b>	<b>12,637</b>	<b>46.9</b>
2005	TNB	18,465	13,172	40.2
	SESB	733	543	35.0
	SESCo	1,069	816	31.0
	<b>Total</b>	<b>20,267</b>	<b>14,531</b>	<b>39.5</b>

*Notes:*

- <sup>1</sup> Refers to utilities and the respective IPPs.
- <sup>2</sup> Refers to the maximum power demand registered by the system in a stated period of time.
- <sup>3</sup> Equals to the accumulated installed capacity minus peak demand divided by peak demand multiplied by 100.

8.35 Two new gas-based Independent Power Producers (IPPs) plants at Kuala Sanglang, Perlis and Prai, Penang with a combined installed capacity of 1,000 MW were commissioned. The conversions of IPPs plants at Lumut, Perak (640 MW) and Telok Gong, Melaka (720 MW) from open cycle to combined cycle were also completed. The utilisation of coal in power generation was further increased with the commissioning of the 1,000 MW *Tenaga Nasional Berhad* (TNB) plant in Kapar and two units of 700 MW plant in Manjung. These plants utilised clean-coal technology to meet environmental standards. Several originally planned plant-up had been deferred due to the lower than expected electricity demand in the Peninsular. Meanwhile, the implementation of the Bakun Hydroelectric Project in Sarawak was continued. The construction of the coffer dam was completed in August 2001 and works on the main dam started in October 2002.

8.36 In line with the Fuel Diversification Policy to reduce dependency on a single fuel, emphasis was given to increase the use of coal as a source of fuel. During the review period, usage of coal increased from 8.8 per cent in 2000 to 16.5 per cent in 2003, as shown in *Table 8-7*. Although natural gas remained a major contributor in the *fuel mix*, its share was reduced from 77.0 per cent in 2000 to 73.2 per cent in 2003.

TABLE 8-7

**FUEL MIX IN ELECTRICITY GENERATION, 2000 - 2005**  
(%)

		<i>Oil</i>	<i>Coal</i>	<i>Gas</i>	<i>Hydro</i>	<i>Others</i>	<i>Total (GWh)</i>
Malaysia	2000	4.2	8.8	77.0	10.0	0.0	<b>69,280</b>
	2003	2.6	16.5	73.2	7.0	0.7	<b>81,488</b>
	2005	2.4	26.8	64.3	5.9	0.6	<b>96,087</b>
TNB	2000	2.3	8.7	79.6	9.4	0.0	<b>63,634</b>
	2003	0.9	17.2	74.8	6.3	0.8	<b>74,539</b>
	2005	0.9	28.2	64.9	5.4	0.6	<b>87,800</b>
SESB	2000	47.3	–	31.4	21.3	–	<b>2,299</b>
	2003	37.6	–	44.6	17.8	–	<b>2,701</b>
	2005	33.0	–	52.4	14.6	–	<b>3,289</b>
SESCo	2000	11.2	15.1	59.4	14.3	–	<b>3,347</b>
	2003	9.4	15.4	63.6	11.6	–	<b>4,248</b>
	2005	8.0	20.6	61.6	9.8	–	<b>4,998</b>

8.37 The electricity *transmission system* was further upgraded with the completion of several major transmission projects. In Peninsular Malaysia, the transmission line from Manjung power station to Ayer Tawar, Perak was completed in August 2001. In Sabah, the 275 kilovolt (kV) transmission lines connecting Kota Kinabalu and Kudat as well as the East Coast Grid project was completed at the end of 2003 while the construction of the East - West Interconnection Grid was started. To facilitate the transmission of electricity between Malaysia and Thailand, the existing interconnection was upgraded to a 300 MW High Voltage Direct Current line.

8.38 The *distribution network* was expanded to meet the increased demand from the consumers and to enhance quality of the system. The bulk of the expansion was in Peninsular Malaysia, which increased from 182,000 circuit-kilometres (cct-km) in 2000 to 200,000 cct-km in 2003. In addition, TNB's distribution network was further strengthened with the completion of 71 main intake substations and 62 main distribution stations. By the end of the review period, the distribution networks totaled 5,500 cct-km in Sabah and 8,800 cct-km in Sarawak.

8.39 The *productivity and performance* of the electricity supply services was improved, as shown in *Table 8-8*. During the review period, the three utilities, namely TNB, Sabah Electricity Sdn. Bhd. (SESB) and Sarawak Electricity Supply Corporation (SESCo) recorded improved performance in terms of units sold per employee and a continuous reduction in the number of interruption incidences. The System Average Interruption Duration Index also improved with the efforts of the utilities in enhancing work practices, utilisation of information and communications technology as well as ensuring better coordination of system operation and maintenance.

TABLE 8-8

**PERFORMANCE INDICATORS OF THE ELECTRICITY SUPPLY SYSTEMS<sup>1</sup>, 2001 AND 2002**

<i>Indicator</i>	2001			2002		
	<i>TNB</i>	<i>SESB</i>	<i>SESCo</i>	<i>TNB</i>	<i>SESB</i>	<i>SESCo</i>
System Losses <sup>2</sup> (%)	12.2	17.8	13.7	12.9	18.4	14.5
Unit Sold per Employee <sup>3</sup> (GWh)	2.49	0.99	1.51	2.55	1.04	1.60
Interruption Incidences (number)	47,296	10,426	6,004	31,333	9,457	4,167
SAIDI (minute/customer/year)	281.0	2,279.8	731.3	149.0	1,779.1	610.6

*Notes:*

<sup>1</sup> Comprises utilities only.

<sup>2</sup> Refers to losses in generation, transmission and distribution stages as well as own-use.

<sup>3</sup> Refers to the total unit of electricity sold divided by the total number of employees.

8.40 The supply of electricity to rural areas was improved. A total of 805 *rural electrification* projects benefiting 45,747 housing units, mainly in Sabah and Sarawak was implemented. As a result, rural electricity coverage for Sabah increased from 67.1 per cent in 2000 to 69.8 per cent in 2003, while that of Sarawak from 66.9 per cent to 77.3 per cent, as shown in *Table 8-9*.

TABLE 8-9

**RURAL ELECTRIFICATION COVERAGE<sup>1</sup> BY REGION, 2000-2005**  
(%)

<i>Region</i>	2000 <sup>2</sup>	2003	2005
Peninsular Malaysia	97.5	98.0	98.6
Sabah	67.1	69.8	72.8
Sarawak	66.9	77.3	80.8
<b>Malaysia</b>	<b>89.5</b>	<b>91.5</b>	<b>92.8</b>

*Notes:*

<sup>1</sup> Refers to rural housing units served as a percentage of total rural housing units.

<sup>2</sup> Refers to Census 2000 data excluding housing units served with private individual generators.

8.41 During the review period, efforts were taken to promote the utilisation of *renewable energy* (RE) as a fifth fuel. The Small Renewable Energy Programme (SREP) was launched in 2001 to encourage and intensify the utilisation of RE. By end of May 2003, a total of 48 projects was approved with a grid connected capacity of 267.3 MW. Of these, 28 were biomass projects, 16 mini-hydro and four landfill gas. Apart from the SREP projects, the non-grid connected facilities of palm oil mills produced for their own consumption about 1,065 gigawatt-hour (GWh) or 1.3 per cent of the total electricity generated in 2003. To encourage the utilisation of RE, the 2001 Budget provided fiscal incentives for companies which utilised biomass as a source of energy and these incentives were extended for another three years until December 2005.

8.42 In Peninsular Malaysia, the power sector continued to be the main consumer of natural gas, accounting for about 70 per cent of total *gas utilisation* in 2003. The consumption of gas by the power sector grew at 5.0 per cent per annum from 1,179 million standard cubic feet per day (mmscfd) in 2000 to 1,332 mmscfd in 2003 with the commissioning of new gas-based power plants. The consumption

of gas by the non-power sector also increased from 338 mmscfd in 2000 to 572 mmscfd in 2003. As part of the efforts to promote the usage of natural gas by the small and medium industrial, commercial and residential consumers, the Natural Gas Reticulation System network was expanded by 28 per cent per annum from 462 kilometres in 2000 to 912 kilometres in 2003. To support the growth of the petrochemical industry, Centralised Utility Facilities were developed to supply utilities such as electricity, steam, demineralised water, oxygen and nitrogen to the integrated petrochemical complexes in Kertih, Terengganu and Gebeng, Pahang.

8.43 During the review period, 23 *natural gas for vehicles* (NGV) outlets were built in Johor Bahru, the Klang Valley and Prai, bringing the total to 44 by the end of 2003. As part of the efforts to increase the utilisation of NGV, *Petroliam Nasional Berhad* also provided price concession on conversion kits for taxis. As a result, about 7,500 vehicles, mostly taxis, were converted to run on dual fuel.

8.44 In line with the commitment to moderate the trend of increasing energy consumption, efforts were undertaken to encourage *efficient utilisation of energy*, particularly in the industrial and commercial sectors. Under the Malaysian Industrial Energy Efficiency Improvement Programme (MIEEIP), a total of 43 energy audits was conducted in eight manufacturing subsectors, namely, wood, pulp and paper, iron and steel, cement, rubber, glass, ceramics and food. The findings indicated potential energy savings of 5.6 per cent in electricity and 26.7 per cent in fuel with the implementation of energy efficiency (EE) measures by the audited companies. The energy audits also facilitated the establishment of an on-line Energy-use Benchmarking System at the National Productivity Corporation. The system enabled companies to effectively implement EE measures and improve their productivity.

8.45 In the commercial sector, efforts were focused to promote EE in buildings. A new Code of Practice in EE and RE for Non-residential Buildings was formulated as part of the Malaysian Standard MS 1525:2001. The new office building of the Ministry of Energy, Communications and Multimedia in Putrajaya, was designed with energy saving features in the architecture as well as the mechanical and electrical systems to demonstrate the technical and economic feasibilities of the Code. The new office building was also targeted to achieve an annual energy consumption of 100 kilowatt-hour (kWh) per sq. metre.

8.46 An energy audit programme was also launched to develop the energy service industry. Energy service companies were appointed to conduct energy audits involving 12 government buildings to establish a benchmark database on energy consumption as well as EE measures for reference by architects and engineers in designing new and retrofitting buildings. These energy audits recorded a range of energy consumption from 77.9 to 246.8 kWh per sq. metre per year and indicated a potential energy savings of 20 to 30 per cent annually with the implementation of recommended EE measures. In 2003, one of the audited government buildings was selected for implementation to demonstrate the practicality of the recommended measures.

8.47 The implementation of the EE initiatives increased the awareness of energy savings, particularly in the industrial sector. However, the implementation of the EE measures by industries was limited due to lack of financing and expertise. To encourage adoption of EE measures, the 2001 Budget provided fiscal incentives, which were subsequently extended to December 2005. In addition, the 2003 Budget reduced the write-off period from three years to one year for the accelerated capital allowance on EE-related equipment.

## **Water Supply**

8.48 The water supply subsector focused on the construction of new infrastructure as well as the upgrading and rehabilitation of existing systems with the main objectives of meeting the water needs of the domestic and industrial sectors and improving the efficiency of water supply distribution. During the review period, measures were taken to reduce water loss and wastage of water. Efforts were also taken to expand supply of potable water to rural areas.

8.49 The supply of water increased with the construction of water treatment plants (WTPs) and modernisation of water supply systems. The Teluk Bahang/Batu Feringhi Water Supply Project in Pulau Pinang as well as Kuala Jelai Phase II WTP and Sungai Terip Phase III WTP in Negeri Sembilan were completed during the review period. The completion of Rasa Stage 1 WTP in 2002 and Sungai Selangor Dam as well as Bukit Badong Stage 1 WTP in 2003, which formed part of the Sungai Selangor Phase III Project (SSP3), increased potential water storage capacity by 235 million m<sup>3</sup> and water treatment capacity by 525 million litres per day (Mld) in Selangor. The completion of source work projects increased the total national production capacity from 11,917 Mld in 2000 to

13,603 Mld in 2003. This ensured that water supply could meet demand which grew from 9,655 Mld to 11,317 Mld in the same period, as shown in *Table 8-10*. In addition, the national water supply coverage increased to 93 per cent in 2003, as shown in *Table 8-11*.

8.50 Water demand management and conservation strategies continued to be adopted to improve the efficiency and reliability of water supply systems. Water supply operators, related government agencies and non-governmental organisations also promoted public awareness on water conservation. State water supply authorities reduced non-revenue water (NRW) through replacing old asbestos cement pipes and faulty water meters, improved the capacity for leak detection and repairs, and prevented illegal connections. The NRW level was reduced from 40.0 per cent in 2000 to 37.0 per cent in 2003, as shown in *Table 8-12*.

TABLE 8-10  
**PRODUCTION CAPACITY AND QUANTITY OF WATER SUPPLIED, 2000-2005**  
(mld)

State	2000		2003		2005	
	Production Capacity	Quantity of Water Supplied	Production Capacity	Quantity of Water Supplied	Production Capacity	Quantity of Water Supplied
Johor	1,285	1,158	1,929	1,334	2,380	1,482
Kedah	988	804	1,004	935	1,239	1,038
Kelantan	214	212	238	236	264	262
Melaka	386	324	386	360	476	400
Negeri Sembilan	528	490	528	520	652	605
Pahang	762	500	905	696	1,117	773
Perak	969	812	1,158	961	1,429	1,067
Perlis	91	84	91	94	113	104
Pulau Pinang	1,050	741	1,166	847	1,439	941
Sabah	718	706	718	783	887	870
Sarawak	918	602	935	700	1,154	778
Selangor <sup>1</sup>	3,437	2,858	3,962	3,425	4,487	3,527
Terengganu	511	334	523	388	645	431
Labuan	60	30	60	38	75	42
<b>Malaysia</b>	<b>11,917</b>	<b>9,655</b>	<b>13,603</b>	<b>11,317</b>	<b>16,357</b>	<b>12,320</b>

Note: <sup>1</sup> Includes Wilayah Persekutuan Kuala Lumpur and Wilayah Persekutuan Putrajaya.

TABLE 8-11

**URBAN AND RURAL WATER SUPPLY COVERAGE, 2000-2005**  
(% of population)

State	2000			2003			2005		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Johor	100.0	98.0	<b>99.0</b>	100.0	98.5	<b>99.3</b>	100.0	99.0	<b>99.5</b>
Kedah	100.0	97.0	<b>98.0</b>	100.0	98.0	<b>99.0</b>	100.0	99.0	<b>99.5</b>
Kelantan	63.0	48.0	<b>53.0</b>	70.0	55.0	<b>62.5</b>	72.0	58.0	<b>65.0</b>
Melaka	100.0	99.0	<b>99.0</b>	100.0	99.0	<b>99.5</b>	100.0	99.5	<b>99.8</b>
Negeri Sembilan	100.0	99.0	<b>99.0</b>	100.0	99.0	<b>99.5</b>	100.0	92.0	<b>99.8</b>
Pahang	98.0	89.0	<b>93.0</b>	98.0	89.0	<b>93.5</b>	99.0	92.0	<b>95.5</b>
Perak	100.0	99.0	<b>99.0</b>	100.0	99.0	<b>99.5</b>	100.0	99.5	<b>99.8</b>
Perlis	100.0	97.0	<b>98.0</b>	100.0	98.0	<b>99.0</b>	100.0	99.0	<b>99.5</b>
Pulau Pinang	100.0	99.0	<b>99.0</b>	100.0	99.0	<b>99.5</b>	100.0	99.5	<b>99.8</b>
Sabah	89.0	60.0	<b>74.0</b>	89.0	60.0	<b>74.5</b>	90.0	64.0	<b>77.0</b>
Sarawak	100.0	92.0	<b>96.0</b>	100.0	92.0	<b>96.0</b>	100.0	92.0	<b>96.0</b>
Selangor <sup>1</sup>	100.0	98.0	<b>99.0</b>	100.0	99.0	<b>99.5</b>	100.0	99.5	<b>99.8</b>
Terengganu	84.0	78.0	<b>81.0</b>	86.0	80.0	<b>83.0</b>	90.0	83.0	<b>86.5</b>
Labuan	100.0	100.0	<b>100.0</b>	100.0	100.0	<b>100.0</b>	100.0	100.0	<b>100.0</b>
<b>Malaysia</b>	<b>97.0</b>	<b>85.0</b>	<b>92.0</b>	<b>97.0</b>	<b>86.0</b>	<b>93.0</b>	<b>97.5</b>	<b>87.0</b>	<b>94.0</b>

Note: <sup>1</sup> Includes Wilayah Persekutuan Kuala Lumpur and Wilayah Persekutuan Putrajaya.

8.51 A pilot project was undertaken in Labuan to further reduce NRW through the application of Geographical Information System (GIS). The GIS mapped out the water supply system infrastructure such as the routes of the pipe networks and locations of valves, reservoirs and WTPs. The Supervisory Control And Data Acquisition and telemetry systems were also applied in leak detection and automatic valve closure consequent to pipe burst. NRW in Labuan was reduced from 32.0 per cent in 2000 to 30.0 per cent in 2003, as shown in *Table 8-12*.

8.52 Preliminary works for the Inter-State Raw Water Transfer Project From Pahang To Selangor (ISRWT) project were undertaken. The Detailed Environmental Impact Assessment for the ISRWT project was approved by the Department of Environment in 2001. A socio-economic survey on the settlers at Felda Lembah Kelau and *Rancangan Tanah Pemuda Kelau* was also undertaken in 2002. In addition, two studies were completed in 2003, namely, the Additional Survey Of Flora And Fauna In The Lakum Forest Reserve (Additional Survey) including a survey of riverine fishery at Sungai Kelau and Sungai Semantan, Pahang and

TABLE 8-12

**NON-REVENUE WATER, 2000-2005**

<i>State</i>	<i>2000</i>		<i>2003</i>		<i>2005</i>	
	<i>%</i>	<i>Mld</i>	<i>%</i>	<i>Mld</i>	<i>%</i>	<i>Mld</i>
Johor	32	371	32	427	23	341
Kedah	46	370	43	402	42	436
Kelantan	44	93	43	101	38	100
Melaka	31	100	28	101	24	96
Negeri Sembilan	45	221	44	229	43	260
Pahang	38	190	38	264	37	286
Perak	38	309	34	327	32	341
Perlis	44	37	40	38	35	36
Pulau Pinang	23	170	20	169	18	169
Sabah	72	508	62	485	58	505
Sarawak	30	181	30	210	28	218
Selangor <sup>1</sup>	42	1,200	39	1,336	36	1,270
Terengganu	39	130	31	120	30	129
Labuan	32	10	30	11	28	12
<b>Malaysia</b>	<b>40</b>	<b>3,890</b>	<b>37</b>	<b>4,221</b>	<b>34</b>	<b>4,199</b>

*Note:* <sup>1</sup> Includes Wilayah Persekutuan Kuala Lumpur and Wilayah Persekutuan Putrajaya.

Environmental Impact Assessment (EIA) Study for the proposed conversion of 600 acres of Kelau Forest Reserve at Sungai Bilut for the resettlement of the Sungai Temir Orang Asli, Pahang. The Additional Survey provided inputs to the preparation of the Environmental Management Plan for the construction of ISRWT project while the EIA Study covered the environmental and social issues related to the resettlement of Orang Asli Sungai Temir to Sungai Bilut.

8.53 Efforts were made to reduce the wasteful use of treated water. In this regard, property developers were required to install 6-litre toilet flushing systems in buildings. Studies on the practicalities, economics and health aspects of rainwater harvesting and utilisation were also conducted.

8.54 To meet the increasing demand for water in rural areas, a total of 293 projects was implemented under the Alternative System Of The Rural Water Supply Programme (BALB) nation-wide, mostly in Sabah and Sarawak. A total of RM12 million was spent for the implementation of BALB that included the construction of 141 gravity flow, 140 tube well and 12 rainwater harvesting

projects. BALB benefited about 43,000 people in Sabah and 10,000 people in Sarawak.

8.55 Groundwater sources continued to be given emphasis as an alternative to supplement surface water. The major groundwater supply system completed was the Chicha WTP in Kelantan, with a capacity of 60 Mld, which sourced its water from 38 wells. The capacity of the existing Kg. Puteh groundwater supply system was increased to 45 Mld from 30 Mld with the construction of a production well in 2003. The Study On The Sustainable Groundwater Resources And Environmental Management For The Langat Basin was completed in 2002. The Study estimated the volume of annual groundwater recharge in Langat Basin at 139 million m<sup>3</sup> and the sustainable groundwater yield at 45 Mld. The development of groundwater quality monitoring networks for Sabah and Sarawak were also completed. Under the National Groundwater Resources Study, a total of 22 exploratory wells was constructed in Johor, Kedah, Negeri Sembilan, Sabah, Sarawak and Selangor.

8.56 The corporatisation of state water supply authorities and privatisation of water supply continued during the review period. The corporatisation of Selangor Waterworks was completed in 2002 with the establishment of *Perbadanan Urus Air Selangor* (PUAS). PUAS was given the responsibility for water supply management and distribution, billing and revenue collection as well as the implementation of future capital works including the reduction of NRW in Selangor and the Federal Territories of Kuala Lumpur and Putrajaya.

## **Sewerage**

8.57 The sewerage subsector focused on improving services through the construction of new infrastructure as well as the upgrading and rehabilitation of existing systems. The studies on engineering services and detailed designs of the 13 National Sewerage Projects were divided into Phase 1 and Phase 2 and completed in 2001 and 2002, respectively. The tendering process for the construction of Phase 1 was completed in 2003.

8.58 Capital and refurbishment works were carried out to improve the quality of effluent discharged into surface water bodies, thereby improving the environment. Land reclamation works for Jelutong sewerage treatment plant (STP) and the construction of the sludge drying bed at Bayan Baru, Pulau Pinang were completed in 2002. The construction of Bayan Baru STP commenced in 2003. To improve

the conditions of beaches, the Port Dickson Pumping Station, a part of the overall sewerage improvement works in Port Dickson, was completed in 2002. The construction of STPs and sewerage networks at Padang Matsirat and Pantai Tengah to improve the sanitation conditions in Langkawi were undertaken in 2002.

8.59 The catchment study for Pulau Tioman, which covered both sewerage and sludge management strategies, was completed in 2002. Based on topography, natural drainage systems as well as existing and future land use patterns, the study identified seven catchment areas for the construction of sewerage infrastructure. As an interim measure to improve the sanitation condition on Pulau Tioman, communal septic tanks serving four to five households were installed in Kg. Tekek and Kg. Salang catchments.

### **III. PROSPECTS, 2004-2005**

8.60 Infrastructure and utilities development will continue to be implemented with the objective of enhancing the competitiveness of the economy. In this regard, measures to increase efficiency of the multimodal transport chain will be given emphasis. The use of public transport will be further encouraged to reduce traffic congestion, especially in urban centres. Efforts will also be undertaken to minimise damage to the environment by encouraging the use of cleaner fuels, renewable energy as well as good construction practices in the implementation of infrastructure projects.

#### **Roads**

8.61 During the remaining Plan period, implementation of road and bridge projects will be undertaken with emphasis on improving accessibility to less developed, recreational and potential economic growth areas. Road construction through privatisation will be promoted in line with efforts to expand required infrastructure by utilising private sector expertise and funding. In addition, efforts will also be continued to improve road safety.

8.62 Allocation on road development will be increased from RM14.0 billion to RM18.6 billion. The additional fund will be utilised to expedite completion of major road projects. These projects include the Simpang Pulai - Gua Musang - Kuala Berang Road, Bentong - Kuala Lipis Road, Trans Eastern Kedah Hinterland

Highway, Kuching - Serian Road, Nangoh - Kanibongan Road, Sepulut - Kalabakan Road and Sipitang - Tenom Road. The Trans Eastern Kedah Hinterland Highway will open up the eastern corridor of Kedah for development, while the completion of Simpang Pulai - Gua Musang - Kuala Berang Road and the upgrading of Bentong - Kuala Lipis Road will enable better access to the hinterland of Pahang, Kelantan and Terengganu. The new road connecting Nangoh and Kanibongan in Sabah will provide a new linkage between Kudat and Sandakan as well as provide access to the large plantations along the road corridor. The completion of Sepulut - Kalabakan Road and Sipitang - Tenom Road will provide improved linkage to the hinterland of Sabah. The list of major road projects that are scheduled to be completed within the Plan period is as shown in *Table 8-1*.

8.63 Implementation of various privatised road projects, which were affected by the financial crisis in 1997, will be reviewed. The list of privatised road projects that are expected to be completed is as shown in *Table 8-1*. The New Pantai Highway when completed will reduce traffic congestion between Kuala Lumpur and Subang Jaya while the completion of Shah Alam - Kuang Highway will open up a new corridor for development.

8.64 Efforts will be continued to improve accessibility to less developed areas in order to support the development of the rural areas. Roads will be built to further improve mobility of the rural population as well as facilitating the transport of their produce to the markets.

8.65 Various studies will be undertaken to provide the direction for future road development. A Study To Review The Highway Network Development Plan will be conducted in 2004 to update the original plan, which was completed in 1983. The Study will identify potential road projects to be implemented up to the year 2020. In addition, the ITS Master Plan Study will be completed to provide the framework for future implementation of intelligent transport systems (ITS) nationwide, which aims to promote efficient transportation of goods and passengers. A common architecture will be formulated to enable inter-operability among ITS systems that will be implemented in various urban centres.

8.66 The Government will continue to promote road safety programmes in order to reduce accident rates to less than 4 deaths per 10,000 registered vehicles by the year 2010. Studies will be undertaken to identify further measures to reduce accidents, especially those involving motorcyclists. Efforts will be made to improve the skills of driving instructors, particularly on safety aspects to enable them to impart this knowledge to learner drivers.

8.67 Measures will continue to be undertaken to encourage local contractors and professional service providers to participate in projects abroad. CIDB will continue to provide assistance to enable local construction firms venture overseas. In view of the liberalisation of the services sector, the PSDC will undertake a study to map out the strategy for the export of professional services. The PSDC will also provide linkages for these service providers to enable them to compete in international markets.

## **Urban Transport**

8.68 During the remaining Plan period, priority will be given to ensure accessibility and seamless transfer between the various modes of public transport, particularly in the Klang Valley. Traffic management will focus on uninterrupted right of way for mainline journey and efficient traffic dispersal to ease traffic congestion. In other urban centres such as Putrajaya, Pulau Pinang and Johor Bahru, rail-based transportation networks will be introduced.

8.69 Multimodal public transportation will be enhanced with the operation of integrated transport terminals. KL Sentral will continue to be the hub of public transportation in central Kuala Lumpur. Construction of the integrated terminals at Bandar Tasik Selatan and Gombak at the fringes of Kuala Lumpur will commence. The Sentul Integrated Station will be built with private sector participation.

8.70 To enhance public transportation in Putrajaya, the Putrajaya Monorail Line 1 is scheduled to be completed by the end of the Plan period. The 13.2 kilometre east-west alignment will link Precinct 7 in the west to Precinct 14 in the east. When completed, there will be 18 stations of which seven will be underground, one at grade and 10 elevated. In addition to car parks, these stations will be served by feeder buses and taxis.

8.71 The restructuring of the public transportation system in urban centres will be continued to improve the quality of public transport. The first phase of the current restructuring exercise will involve the takeover of the two major bus companies operating in the Klang Valley. The Government will lease the assets to a single operating company that will reroute buses with emphasis on feeder services to commuter and LRT stations, thereby providing a seamless multimodal and efficient public transport service in the Klang Valley. A Public Transport Authority will be established by the end of the Plan period, which will, among others regulate the restructured public transport system in the Klang Valley. The functions of this authority will be expanded to plan, coordinate and implement

public transport programmes in other major cities as well as ferry and other riverine transportation.

8.72 Studies will be undertaken to address the problem of traffic congestion in the Klang Valley. These studies will include re-routing, accessibility and frequency of public transport as well as convenience to the users. The Study On The Integrated Plan For The Development Of Public Transportation System And Land Use Development In The Klang Valley will be completed in 2004. This study will provide the strategy for the future development of the public transportation system in the Klang Valley until the year 2020.

8.73 The ITIS project will be fully implemented in Kuala Lumpur in 2005. The Klang Valley Advanced Traffic Management System with its control centre at Technology Park Malaysia will become the Transport Management Centre of the ITIS. With the operation of ITIS, road users will be able to obtain real time information on traffic situations and plan their journey to avoid traffic congestions.

## **Rail Transport**

8.74 The rail subsector will continue to focus on increasing the competitiveness of rail services. Passenger services will be increased and improved to enhance rail transport as an efficient people-mover system. Modernisation of equipment will include the purchase of new coaches and locomotives. Skills upgrading will be provided to enhance the capability and productivity of KTMB personnel.

8.75 The Rawang - Ipoh Double Tracking Project, which will increase capacity and enhance services between Kuala Lumpur and Ipoh, will be completed in 2005. Passenger train travel time will be reduced from three and a half hours to two. In addition, works in double tracking the railway line from Ipoh to Padang Besar and Seremban to Johor Bahru will be undertaken. The KTM Commuter service will be extended from Rawang to Tanjung Malim. With the completion of double tracking of the seven kilometre stretch from Sentul to Batu Caves by the end of the Plan period, the commuter service will be extended to Batu Caves. In addition, KTMB will purchase 10 coaches and 40 locomotives to increase its services.

8.76 KTMB will take measures to enhance its operations and maintenance standards to remain competitive in carrying freight. Focus will be given to high yield cargo, vessel concept operation, heavier haul for conventional bulk, long distance cargo and e-freight. This will enable KTMB to become a major regional intermodal transporter with land, sea and air connectivity.

8.77 A new Central Workshop and Training Centre will be established at Batu Gajah, Perak to replace the existing Depot and Training Centre at Sentul, Kuala Lumpur. The Central Workshop will be equipped with modern equipment to provide quality maintenance for locomotives and coaches. The training centre will provide training to KTMB staff to upgrade and enhance their skills and knowledge to improve productivity.

## **Ports**

8.78 During the remaining Plan period, capacity, efficiency and productivity of port-related services will continue to be improved. The promotion of Port Klang as a mega hub and distripark as well as PTP as a cargo transshipment centre will be intensified. In addition, efforts will continue to be undertaken to ensure the integrated development of all service providers in the logistics and transportation chain. This will enhance the usage of other local ports, marinas and related facilities as well as to further promote the development of the local shipping industry.

8.79 In an effort to increase capacity, improve competitiveness and enhance utilisation of national ports, emphasis will be given to the completion of on-going projects. These projects include additional berths at West Port, Port Klang and PTP, Second Inner Harbour Development at Bintulu Port, redevelopment of Swettenham Jetty at Penang Port, and additional infrastructure works at Kuantan Port. The major port expansion programmes under implementation will increase the capacity from 443.4 million tonnes in 2003 to 481.3 million tonnes in 2005. Demand for port and related facilities during the same period is expected to grow at an annual rate of 13.2 per cent per annum, from 338.8 million tonnes to 414.1 million tonnes, as shown in *Table 8-5*. In terms of containerised cargo, it is expected to increase from 10.6 million TEUs to 14.2 million TEUs.

8.80 The complete implementation of electronic documentation and paperless port operations will enhance the performance of Port Klang, PTP and other local ports. Closer cooperation will be fostered between port operators, port authorities and Government agencies. The formation of a single port authority will be expedited to regulate and monitor the performance of all port operators. Port operators are encouraged to undertake more innovative and creative strategies to improve their operations. Procedures and practices relating to traffic handling and clearance will be further simplified and automated. In line with the recommendations of the Inter-Agency Study On Integrated Logistics And Supply

Chain Management, a comprehensive master plan will be formulated to promote total supply chain management in exports and imports as well as in domestic freight transport. This will further enhance Malaysia's competitiveness and stimulate economic growth.

8.81 Inland water transport for both passengers and freight will continue to be promoted as an alternative mode to land transport, particularly in Sarawak and Sabah. Efforts will be undertaken to improve and upgrade passenger and cargo facilities, including the construction and upgrading of passenger terminals. The formulation of regulations and performance standards for ferry and other riverine transport services will be included in the functions of the proposed Public Transport Authority to ensure systematic and orderly development of the whole public transportation subsector.

8.82 For the remaining Plan period, local participation in sea-related transport services, which include passenger and cargo as well as dredging services is expected to increase. The shipping industry is expected to consolidate and focus on LNG and petroleum businesses. To further strengthen the shipping industry, better fleet programming and asset reliability will be pursued. In addition, shipyard activities such as maintenance, repair and overhaul of ships will be promoted. Strategic measures will be taken including long-term charter and global alliances to gain economies of scale, lower operating costs and increase opportunities. In addition, the Government will convert the Shipping Fund into a revolving fund and facilitate greater usage and distribution of the Fund to potential Malaysian shipping companies.

8.83 MISC will acquire additional vessels, including 27 petroleum tankers and will have a total fleet of 165 vessels by 2005. The activities of local shipping companies will be diversified to cover both domestic and international shipping, particularly in the high-growth route of Asia-Pacific. With the increased investments by local shipping companies, the number of vessels registered in Malaysia is expected to increase from 3,622 ships in 2003 to 3,800 in 2005.

8.84 For the remaining Plan period, dredging and reclamation works at ports and river mouths will be carried out by local dredging companies, thus saving the outflow of foreign exchange. As part of the capacity expansion programmes, the two long-term dredging contractors will acquire, own and operate additional equipment such as dredgers, barges and tug-boats. With the increased capacity, these companies will also be able to compete in international tenders for dredging and reclamation works.

8.85 Emphasis will also be given to enhance the safety of maritime navigation and reduce marine pollution. In this regard, a Malaysian Maritime Enforcement Agency will be established to assist in surveillance and intelligence works in Malaysian waters. The Marine Department will continue to enhance the enforcement role and upgrade its training programmes. In addition to the privatised Malaysian Maritime Academy, a Maritime Training Centre will be constructed at Pulau Indah, Port Klang. Other measures include the implementation of the Automatic Identification System to monitor vessel movements in the Straits of Melaka as well as exchange information between ships and maritime authorities. This is in line with the conventions recommended by the International Maritime Organisation.

## **Airports**

8.86 The airport subsector will focus on measures to increase the usage of existing facilities, expand capacities in specific areas as well as improve the efficiency of services. KLIA will continue its promotional efforts in its bid to become a regional aviation hub. Efficiency and productivity of air services will also be improved.

8.87 Efforts to attract more international airlines to KLIA as well as encourage existing airlines to increase frequencies will be continued. Other measures will include strategic alliances with tourism-related industries and marketing campaigns overseas. Services in the airport such as ground handling, baggage handling and retail shopping will be continuously monitored and improved.

8.88 Facilities at other airports will be upgraded to cater to passenger comfort and convenience. Kuching International Airport, which handles about 2.5 million passengers annually will be upgraded to cater for wide-body, long haul aircraft operations. Its terminal building will be extended and renovated to provide more holding lounges, shopping arcades and other facilities. Upgrading works on Alor Setar Airport will be completed by the end of the Plan period. Facilities at Kota Kinabalu and Labuan airports will also be upgraded. The runway at Pulau Pangkor Airport will be extended to enable turbo prop aircraft and executive jets to operate there. The airport at Batu Berendam, Melaka will be upgraded to mainly facilitate medical tourism while Senai Airport, Johor will be developed into an air cargo centre.

8.89 A new airport will be built in Pulau Tioman to support its development as a duty free island resort. The airport situated at Kampung Paya will be able to handle narrow-body jet aircraft and will replace the existing airport in Kampong Tekek which can only handle up to 50-seater turbo prop aircraft. To ensure obstacle-free flight operations, the runway will be built on the sea while landside facilities will be on the island. Pulau Redang, another island resort, will also have an airstrip by 2004, which will improve access to the island.

8.90 During the remaining Plan period, MAS will continue to focus on strengthening its operations. Measures to be taken include productivity improvements by shortening aircraft turnaround time, improving ticketing systems, refurbishing cabins for better seat configurations, better scheduling of flights as well as increasing frequencies and destinations to high-yield sectors. Air Asia will expand its network by adding new routes, both domestic and regional as well as increasing frequencies. In addition to KLIA, the airline will operate from Johor Bahru and Kota Kinabalu.

8.91 The Government will continue to adopt a liberal policy on Air Services Agreements, including open sky agreements, to assist the airlines to expand their networks. The Government will negotiate with relevant authorities to enable the airlines to operate additional frequencies and destinations on a reciprocal basis. In this regard, additional Air Services Agreements will enhance connectivity and capacity of airlines, thereby improving convenience to passengers and facilitate tourism.

## **Energy**

8.92 In line with the positive outlook of the national economy, peak demand for *electricity* is expected to grow at a higher rate of 7.2 per cent per annum from 12,637 MW in 2003 to 14,531 MW in 2005, as shown in *Table 8-6*. By the end of the Plan period, the accumulated installed capacity is expected to increase to 20,267 MW. The reserve margin is expected to decline to 39.5 per cent, which is more than adequate to meet the demand of the country. In the longer term to enable a more effective utilisation of resources, the reserve margin will be reduced gradually to 20 percent. In this regard, the focus will be on phased implementation of current committed power generation projects as well as imposing a freeze on approvals for future IPPs. In addition, the concept of demand risk sharing will be introduced in new power purchasing agreements to facilitate the sharing of the costs of maintaining the reserve margin.

8.93 The 2,100 MW Manjung coal plant will be fully commissioned during this period with the completion of its final plant unit. With the operation of the TNB plant in Manjung, the share of coal in the *fuel mix* will increase from 16.5 per cent in 2003 to 26.8 per cent in 2005, as shown in *Table 8-7*. The contribution of gas in the fuel mix will be reduced to 64.3 per cent, while those of oil and hydro are expected to remain below 10.0 per cent. The gas supply situation will be further improved by the end of the Plan period with the commencement of production from the new offshore fields.

8.94 Utilisation of *RE* as the fifth fuel will be continued to supplement the supply from conventional fuel sources. In this regard, to enhance the implementation of the SREP, studies will be conducted on the availability and competitive uses of biomass, particularly oil palm residues as well as the cost structure of producing electricity from the various sources of RE. In addition, the biomass-based industrial boilers for the production of steam as well as co-generation system for production of electricity and heat energy, mainly for in-house consumption, will be encouraged. In this regard, oil palm millers will be encouraged to adopt measures to enhance the efficiency of their non-grid connected facilities.

8.95 To meet the overall demand of consumers and improve the quality of the electricity supply system, several *transmission and distribution* projects will be constructed. Transmission network in Peninsular Malaysia is expected to total 17,000 cct-km, in Sabah 2,400 cct-km and in Sarawak 900 cct-km. Another 8,000 cct-km of distribution circuit will be constructed while 62 main intake substations and 123 main distribution stations will be installed in Peninsular Malaysia to further strengthen and improve the coverage of the networks. By the end of the Plan period, the distribution network in the Peninsula will reach 208,000 cct-km, in Sabah about 5,800 cct-km while in Sarawak it is expected to be 9,800 cct-km.

8.96 The implementation of the *rural electrification* programme will be continued with the implementation of 850 projects. For Peninsular Malaysia, the contribution of the Electricity Supply Industry Trust Account towards this programme will be increased. By the end of the Plan period, rural electricity coverage in Sabah and Sarawak will reach 72.8 per cent and 80.8 per cent, respectively.

8.97 To promote *gas utilisation* by the small and medium industrial, commercial and residential customers, the Natural Gas Reticulation System network will be expanded by about 50 per cent to 1,350 kilometres in 2005. With the expanded network, the natural gas consumption is expected to increase by 62 per cent to

119 mmscfd. To further promote NGV utilisation, another 20 NGV outlets will be built and the number of vehicles running on dual fuel is expected to increase by an additional 2,000 units when PROTON starts producing factory-fitted NGV vehicles.

8.98 During the remaining Plan period, efforts will be continued to promote *productive energy utilisation* through improvements in plant, equipment and processes as well as end-use. Under the MIEEIP, energy audits will be conducted to promote energy-use benchmarking, particularly among the small- and medium-scale enterprises. The coverage of the energy audits will be expanded to include the plastics, chemicals and textiles industries. To increase awareness and encourage the use of EE equipment, energy rating and labelling will be developed. In this regard, an EE testing facility will be established in Standards and Industrial Research Institute of Malaysia (SIRIM) Berhad. Recognising that funding is a constraint in the implementation of EE programmes, particularly in the industrial sector, a study will be undertaken to identify the modalities of finance.

8.99 At the regional level, Malaysia will continue to support the ASEAN initiative in energy supply security through the participation in the ASEAN Power Grid and Trans ASEAN Gas Pipeline projects. In this regard, the ASEAN Interconnection Master Plan will provide the framework for the development and implementation of 14 electricity supply interconnection projects in the ASEAN region up to the year 2020. To facilitate the implementation of the Trans ASEAN Gas Pipeline project, the establishment of the ASEAN Gas Centre in Malaysia will serve as the strategic technical and information resource and capacity building centre.

## **Water Supply**

8.100 The sustainability of water supply will be ensured through increasing the efficiency of existing water supply systems, construction of source works and conservation of water resources. In this regard, the Federal Government will assume a more active role in planning, managing and coordinating programmes on water resources in the country. Effective monitoring and regulatory mechanisms will be used to ensure the quality of water supply meets established standards. Programmes on rehabilitation and upgrading of existing WTPs and NRW reduction will continue to be implemented. The billing and collection systems will be strengthened to increase revenue.

8.101 The construction of Pahang to Selangor ISRWT project will commence in 2004. It will be implemented in three packages, namely the construction of a water transfer tunnel, dam and pumping station. SSP3 will be fully operational with the completion of Rasa Stage II WTP in 2004 and Bukit Badong Stage II WTP in 2005. This will increase the water supply capacity of SSP3 by 525 Mld to its full capacity of 1,050 Mld. The multi-purpose Beris Dam in Kedah which has a storage capacity of 115 million m<sup>3</sup> and supply capacity of 650 Mld will be completed in 2004. It will enhance the supply of water in the northern states of Kedah, Perlis and Pulau Pinang. The Chereh Dam with a storage capacity of 250 million m<sup>3</sup>, which forms part of the Greater Kuantan Water Supply Scheme Phase 2 will be completed by 2005. The Jus Dam will be completed in 2004 and increase the water availability in Melaka by 275 Mld. In addition, the Tanjung Malim Water Supply Scheme with a capacity of 128 Mld will be completed in 2005 and cater for the water needs of Behrang, Slim River and Tanjung Malim.

8.102 The development of water resources will be undertaken on a sustainable basis with emphasis given to Integrated Water Resources Management (IWRM). The IWRM integrates all water resources and incorporates considerations for land use, environment, social and economic development in water resources management. In addition, campaigns on raising IWRM awareness will be conducted at all levels to gain active support and enhance the transfer of knowledge on global experiences and best practices. Water conservation needs, capacity building as well as research and development (R&D) will also be incorporated into the IWRM programmes. The National Water Resources Study Phase 2 for Sarawak, based on IWRM concept, will commence during the remaining Plan period.

8.103 Alternative sources of water will continue to be developed to increase the national water supply. During the remaining Plan period, the National Groundwater Resources Study covering Johor, Kedah, Negeri Sembilan, Sabah, Sarawak and Selangor will be continued. For sustainable development of groundwater resources in the Langat Basin, monitoring of groundwater level and quality as well as land subsidence will be undertaken.

8.104 Emphasis will be given to reliable water supply in hinterlands and islands to improve public health and promote the tourism industry. The construction of the submarine pipelines to Pulau Perhentian in Terengganu and Pulau Brait in Sarawak will provide potable water to these islands. A wellhead protection programme will be set up in Pulau Tioman to protect the groundwater quality to ensure sustainable groundwater supply. Alternative rural water supply programme

will be expanded with emphasis on affordable, small-scale and community-led solutions for water management. This will include rainwater harvesting, groundwater development and low-water sanitation technologies.

8.105 A Management Information System will be set up to integrate the databases of all water supply authorities. This will provide easy access to information to improve the planning, monitoring, operation and maintenance of water supply systems.

8.106 The Melaka Water Board will be corporatised while Negeri Sembilan Water Supply Department will be privatised during the remaining Plan period. The corporatisation and privatisation of these state water supply authorities will include all aspects of water supply such as the construction of source works and distribution systems, operation and maintenance, as well as billing and collection of charges.

## **Sewerage**

8.107 The implementation of the sewerage capital development programme will continue in the remaining Plan period. The construction works for Phase 1 of the National Sewerage Project will commence whilst the tendering process for Phase 2 will be initiated. Phase 1 which covers the central zone consists of five projects, namely: Bonus STP, Pantai STP and network, Bandar Tun Razak STP, Puchong STP and Southern Klang Valley Central Sludge Treatment Facility (CSTF). These projects will provide an additional sewerage treatment capacity of 979,000 population equivalent (PE) when completed in 2005.

8.108 Construction of Bayan Baru STP with a capacity of 200,000 PE will be completed in 2004 while the design of Jelutong STP and CSTF is scheduled to be completed in 2004. The Jelutong STP with a design capacity of 1.2 million PE will be constructed in two phases and Phase 1 will cater for 800,000 PE. The Jelutong CSTF will provide sludge treatment facility for Penang island. The completion of sewerage facilities at Bayan Baru and Jelutong will improve the quality of rivers and beaches in Penang island.

8.109 Sewerage improvement works in Port Dickson as well as Padang Matsirat and Pantai Tengah in Langkawi will be completed during the remaining Plan period. These works will provide sewerage capacity of 30,000 PE in Port Dickson

and 32,000 PE in Langkawi. The detailed designs will be prepared for the sewerage network systems and sewerage treatment works as well as sludge handling, treatment and disposal facilities for Pulau Tioman.

8.110 Studies will be carried out to identify areas that need to be provided with centralised sewerage systems. R&D in sewerage will be promoted including sludge re-use and disposal. The Sanitation Commission will be established to formulate economic and safety regulations to safeguard public interest and to promote the development of sewerage and solid waste management.

#### IV. ALLOCATION

8.111 The Eighth Plan allocation for infrastructure and utilities development amounting to RM29.4 billion will be increased to RM39.7 billion, as shown in *Table 8-13*. This allocation accounts for 24.8 per cent of the total development budget for the Eighth Plan. The transport sector will receive the bulk of this allocation, amounting to RM30.9 billion.

<i>Sector</i>	<i>8MP Allocation</i>		<i>Estimated Expenditure, 2001-2003</i>	<i>Balance, 2004-2005</i>
	<i>Original</i>	<i>Revised</i>		
<b>Transport</b>	<b>21,222.1</b>	<b>30,941.8</b>	<b>18,228.7</b>	<b>12,713.1</b>
Roads <sup>1</sup>	14,002.6	18,614.4	10,316.9	8,297.5
Urban Transport	705.6	930.8	459.3	471.5
Rail	4,081.0	6,301.4	5,124.3	1,177.1
Ports	1,500.0	3,040.6	1,122.3	1,918.3
Airports	932.9	2,054.6	1,205.9	848.7
<b>Utilities</b>	<b>8,151.5</b>	<b>8,764.8</b>	<b>4,544.6</b>	<b>4,220.2</b>
Water Supply	3,966.3	4,810.0	2,231.5	2,578.5
Sewerage	1,583.6	1,666.0	678.8	987.2
Energy	2,601.6	2,288.8	1,634.3	654.5
<b>Total</b>	<b>29,373.6</b>	<b>39,706.6</b>	<b>22,773.3</b>	<b>16,933.3</b>

*Note:* <sup>1</sup> Excludes localised roads in regional development areas, some local authorities and agricultural roads.

## **V. CONCLUSION**

8.112 Capacity expansion of infrastructure and utilities during the review period provided a catalyst to stimulate domestic demand through its linkages and spillover benefits. The increased capacity enhanced the mobility of goods and people, thereby facilitating business and improving the quality of life. To ensure that investments in the expanded infrastructure and utilities are utilised optimally, focus will be given towards improving the delivery of services and satisfying customer needs. Thus, the infrastructure and utilities network constructed will continue to enhance the efficiency, productivity and competitiveness of the economy.