CHAPTER 10 - INFRASTRUCTURE AND UTILITIES

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Chapter 10

Infrastructure and Utilities

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10 INFRASTRUCTURE AND UTILITIES

I. INTRODUCTION

10.01 Development of the infrastructure and utilities network covering transportation, communications, water supply and sewerage during the Seventh Plan period, was focused on capacity expansion through a more integrated and coordinated planning approach to ensure the availability of facilities to meet demand. As infrastructure projects require a long lead time, this supply-driven approach was adopted with active participation of the private sector. The financial crisis, which began in July 1997, affected the implementation of some major infrastructure projects, particularly those by the private sector. As a result, the Government provided financial assistance for the completion of these projects to ensure that the efficiency, productivity and competitiveness of other sectors in the economy were not affected. In addition, the implementation of critical and strategic Government-funded projects was accelerated to serve as catalysts for reviving and stimulating the economy.

10.02 For the Eighth Plan period, emphasis will be given to increasing the capacity and accessibility in less developed areas while in urban areas, the focus will be to enhance efficiency and improve public transport services. The provision of utilities such as communications, water and sewerage will be given priority to increase coverage and improve the quality of life. Participation by the private sector will continue to be encouraged with the Government assuming an increasingly important role in the supervision and setting of performance standards of infrastructure facilities and services to support the growth and competitiveness of other sectors.

II. PROGRESS, 1996-2000

10.03 The higher than expected demand for infrastructure and utilities at the beginning of the Seventh Plan period necessitated the adoption of fast track

implementation processes, application of new and adapted technologies, reduction of processing time as well as the accelerated privatization of projects. The financial crisis interrupted the pace of project implementation initially. However, the prompt recovery measures undertaken by Government enabled the implementation of critical and strategic infrastructure projects which, in turn, helped to revive and stimulate the economy.

Roads

10.04 During the Seventh Plan period, road development was guided by the need to expand capacity and upgrade existing roads. Total road network increased from 61,380 kilometres in 1995 to 65,880 kilometres in 2000. The road subsector accounted for nearly 59.8 per cent of the total allocation for the infrastructure sector with total expenditure of RM12.3 billion. In addition, the private sector also expended a total of RM7.9 billion for the development of privatized highways compared with RM15.2 billion during the Sixth Plan period. The slowdown in private investment in the road subsector, mainly due to the financial crisis, was mitigated by increased Government expenditure on road construction and improvement projects during the last two years of the Seventh Plan period.

10.05 In line with efforts to improve inter-urban linkages and provide better transport facilities, several new road construction projects were completed, as shown in *Table 10-1*. The completion of the Kuala Perlis-Changloon Highway provided a direct access from the North-South Expressway to Kuala Perlis, which has a ferry link to Langkawi Island. The completion of the Seremban-Port Dickson Highway provided a faster access to the tourist spots in Port Dickson. Concurrent to efforts to expand and provide new linkages, emphasis was also placed on improving road safety as well as ensuring pleasant and stress-free travel. In this respect, 153 accident-prone spots were improved and upgraded while eight rest and service areas were constructed along the federal roads.

10.06 Various roads were constructed or upgraded to alleviate traffic congestion on roads that lead to ports and growth centres as well as to support the industrial growth of the country. Among these roads were the upgrading of Road B15, South Klang Valley Expressway (SKVE) Section 1A and the access roads to the Port of Tanjung Pelepas and Kulim Hi-Tech Industrial Park. The completion of the upgrading of Road B15 and the SKVE Section 1A provided a vital link to Putrajaya and Cyberjaya. The completion of the access road to Kulim Hi-Tech Industrial Park provided the impetus for the growth of the park.

TABLE 10-1

MAJOR ROAD PROJECTS IMPLEMENTED, 1995-2005

Project	*Length (km)*	*Completion (Year)*
Completed Projects		
i. Government-Funded Projects		
Access Road to Kulim Hi-Tech Industrial Park	9	1996
Kota Tinggi Bypass	10	1997
Eastern Access to KLIA	17	1998
Berungis-Kota Belud Highway	38	1998
Middle Ring Road II (Phase I)	35	1998
Access Road to Belaga, Sarawak	126	1999
Kuala Perlis-Changloon Highway	36	2000
Access Road to Port of Tanjung Pelepas, Johore	8	2000
Sungai Dinding Bridge	10	2000
Upgrading of B15	10	2000
South Klang Valley Expressway Section 1A	11	2000
Access Road to Toxic Waste Plant in Bukit Nenas, Negeri Sembilan	17	2000
ii. Privatized Projects		
Butterworth-Kulim Highway	17	1996
Seremban-Port Dickson Highway	22	1997
North-South Expressway Central Link	48	1997
Shah Alam Expressway	35	1998
Second Link to Singapore	45	1998
Kuala Lumpur-Karak Highway	60	1998
Cheras-Kajang Highway	12	1998
Damansara-Puchong Highway	40	1998
Upgrading Sungai Besi Road	16	1999
Under Construction		
i. Government-Funded Projects		
Upgrading Beaufort-Sindumin Road	65	2001
Beaufort-Mempakul Road	64	2001
Lipat Kajang (Melaka) Interchange to North-South Expressway	2	2001
Sungai Rejang Bridge	7	2001
Brinchang-Lojing Road	22	2001
East-Coast Highway	169	2003
ii. Privatized Projects		
New North Klang Straits Bypass	18	2001
Western Kuala Lumpur Traffic Dispersal Scheme	26	2001
New Pantai Highway	20	2003
Kajang-Seremban Highway	48	2004
Butterworth Outer Ring Road	19	2004
Ipoh-Lumut Highway	70	2004
Kajang Traffic Dispersal Highway	37	2004

10.07 To stimulate economic growth while maintaining Government expenditure within prudential limits, the Government initiated the deferred payment scheme to implement road projects. Under this scheme, the private sector finances the project and payment is made at an agreed period after completion of works. Most of these projects involved the upgrading of existing roads which were delayed as a result of the economic crisis. A total of 20 projects was awarded under this scheme.

10.08 Under the rural roads programme, a total of 3,214 kilometres of new roads was constructed, thereby improving accessibility and enabling greater participation of the rural people in socio-economic development. This programme included the Kanibongan-Nangoh Road in Sabah and Triso-Melebu-Pusa Coastal Road in Sarawak. The quality of rural roads also improved with an increase of paved roads from 45,590 kilometres in 1995 to 48,600 kilometres in 2000.

10.09 The development of new roads resulted in the improvement of the various road development indicators, as shown in *Table 10-2*. Road Density, which measures road length over the total area, increased from 0.19 in 1995 to 0.20 in 2000, indicating a wider road coverage and greater accessibility. The Road Development Index which measures the level of road development taking into account both area and population size of the country, also improved marginally from 0.74 in 1995 to 0.75 in 2000.

TABLE 10-2

ROAD DEVELOPMENT INDICATORS, 1995-2005

Indicator	*Level of Development*		
	1995	*2000*	*2005*
Road Density[1]	0.19	0.20	0.21
Road Development Index[2]	0.74	0.75	0.76
Road Service Level[3]	2.96	2.98	3.02

Notes:

[1] Road Density measures road length over the total area.

[2] Road Development Index measures the level of road development taking into account both area and population size of the country.

[3] Road Service Level measures total road length per 1,000 population.

Urban Transport

10.10 Significant progress was achieved during the Seventh Plan period in the creation of a more integrated, efficient and reliable urban transport system, especially in Kuala Lumpur and the Klang Valley where traffic congestion reached critical levels. The other major urban centres such as Georgetown, Ipoh, Johor Bahru, Kuching and Seremban instituted various measures to improve traffic flow as well as public transport services and facilities.

10.11 In the Klang Valley, the nation's first Light Rail Transit System I (LRT STAR) began its commercial operations in December 1996, followed by the LRT System II (LRT PUTRA) in September 1998. By June 1999, the LRT System in the Klang Valley encompassed a total route length of 56 kilometres. Passenger ridership for the LRT STAR increased from an initial average of 46,853 passengers per day (ppd) in 1997 to an average of 77,803 ppd by the end of 2000. The LRT PUTRA also experienced a high growth rate with the number of passengers increasing from an average of 12,532 ppd in 1998 to 121,950 ppd by the end of 2000.

10.12 Other urban rail projects in the Klang Valley which achieved significant construction progress despite the initial financing setbacks included the KL Monorail and the Express Rail Link (ERL) to KL International Airport (KLIA) from Kuala Lumpur Sentral (KL Sentral). The KL Monorail, a privatized intra-city light rail network, stretching 8.6 kilometres, completed about 50 per cent of construction and system works. The construction of the ERL was 60 per cent complete by December 2000.

10.13 During the Plan period, a more systematic and concerted effort to address urban congestion through traffic demand management and the introduction of various measures was undertaken to encourage the greater use of public transportation. While various strategies were implemented in all major urban areas to alleviate local traffic congestion, Kuala Lumpur and the Klang Valley continued to be given priority in efforts to ensure an efficient and effective road network and public transportation service. According to a 1997 survey, travel speed on most of the major radial roads in Kuala Lumpur reduced to 10 kilometres per hour or less during the morning peak hours due to the high traffic volume.

10.14 The various measures undertaken to enhance the integration and effectiveness of the urban transport infrastructure included the upgrading and relocation of bus terminals as well as the creation of bus lanes, park-and-ride facilities, feeder bus services and promotional fares for the LRT. In addition,

major cities like Georgetown and Johor Bahru upgraded their public transport facilities and rationalized bus routes. Several urban transport studies were also completed for Georgetown, Kota Kinabalu and other urban centres, with recommendations on traffic demand management measures and long-term strategies to reduce traffic congestion.

10.15 Recognizing the need for an urban transport master plan for Kuala Lumpur, the Study on Integrated Urban Transportation Strategies for Environmental Improvement was completed in February 1999. The study recommended various policies, strategies and measures to alleviate urban congestion and enhance air quality in the Kuala Lumpur conurbation up to 2020. Several immediate measures were implemented including the restriction of on-street parking, differential parking charges, one-way streets, pedestrianization, road system improvements, bus lanes, contra-flow and restrictions on heavy vehicles entering the city centre during peak hours.

10.16 The overall construction of the KL Sentral, a major public transport terminal integrating both *Keretapi Tanah Melayu Berhad* (KTMB) inter-city and commuter services with the ERL, LRT PUTRA, Monorail, buses, taxis and pedestrian facilities, was completed in December 2000. The ERL and LRT PUTRA stations were completed in October 2000. This transport hub which also functions as a city air terminal, provides an important link to KLIA, Putrajaya and Cyberjaya.

10.17 Pedestrianization continued to be implemented in all major urban centres as part of the effort to upgrade the urban transport environment. The priority areas were linkages between public transport facilities and commercial zones. Landscaped and sheltered pedestrian bridges and walkways were built to provide a pleasant walk and encourage the use of public transport. A pedestrianization study was completed in October 1999 for the Central Planning Area (CPA) of Kuala Lumpur, bounded by Jalan Tun Razak and Jalan Mahameru. The Kuala Lumpur City Hall implemented various measures recommended by the study to further improve the pedestrian environment including the upgrading of footpaths, pedestrian bridges, signages, lighting and provision of street furniture in selected areas.

10.18 To further improve traffic flow and dispersal, traffic demand management measures and road infrastructure upgrading were undertaken in several major urban centres. These included the construction of free-flow interchanges and

ring roads, road expansion, conversion to one-way streets and reduction of on-street parking. Major road projects completed during the Plan period included the Jalan Tun Razak-Jalan Bukit Bintang underpass and the Jalan Tun Razak-Jalan Semarak interchange, Kuala Lumpur; flyovers in Panglima Bukit Gantang, Ipoh; Inner Ring Road, Johor Bahru; and Jalan Lintas, Kota Kinabalu.

10.19 The Damansara-Puchong Highway which was completed in early 1999, demonstrated the first application of advanced Intelligent Transport Systems (ITS) on an urban expressway. The ITS applications included queue detectors, high capacity data and video transmission network and surveillance equipment. To further enhance transportation efficiency, safety, comfort and environmental standards through the application of ITS, the Study of Integrated Transport Information Systems (ITIS) in the Klang Valley and Multimedia Super Corridor (MSC) was completed in October 1999.

Rail Transport

10.20 During the Seventh Plan period, the focus of the railway development programme was to enhance quality, efficiency, operational safety and service competitiveness for both passengers and freight. KTMB commuter services and inter-city passenger and freight operations were constantly upgraded through improvement of fleet operations, signalling and communications systems and revamping of maintenance and overhaul programmes. In addition, various programmes were implemented to enhance the quality of train services.

10.21 Several major projects were initiated towards the end of the Plan period to further develop rail infrastructure. The most significant of these was the inter-city electrified double track project stretching 180 kilometres from Rawang to Ipoh. Another major project implemented during the Plan period was the 32-kilometre rail link from Kempas to the Port of Tanjung Pelepas which commenced in July 1999. Other projects that were completed included the construction of a dedicated 14-kilometre rail link to the West Port of Port Klang and a rail link to the Segamat Inland Port in 1998. The three-kilometre rail link to the North Butterworth Container Terminal was completed in early 2000.

10.22 Fleet capacity of the commuter train service in the Klang Valley was expanded from 18 Electric Multiple Units (EMUs) in 1995 to 62 in 2000. In addition, new feeder stations were constructed and existing ones upgraded, including the construction of turnstiles and enclosed platform areas for the

implementation of the closed ticketing system. These measures led to improved frequency and reliability of services as well as revenue collection. Consequently, commuter ridership increased significantly from 11.1 million in 1996 to 19.0 million in 2000.

10.23 Other activities undertaken during the Plan period to enhance efficiency, safety and quality of inter-city rail services included the continued rehabilitation and strengthening of tracks and bridges on the main line, refurbishment of coaches and the upgrading of halts and stations. In addition, the Government entered into a Management Agreement with a private consortium for the management take-over of KTMB in August 1997. The consortium introduced new management tools and techniques as well as cost-saving measures to improve the efficiency, quality and viability of railway operations. It also undertook aggressive marketing of KTMB's services in a move towards greater commercialization. This contributed to increased inter-city passenger traffic from 1.25 billion passenger-kilometres in 1995 to 1.50 billion in 2000. In terms of productivity for passenger traffic, passenger-kilometres per worker increased by 20 per cent from 236,000 in 1995 to 283,000 in 2000.

10.24 Annual container traffic in terms of twenty-foot equivalent unit (TEUs) recorded an increase from 126,937 in 1995 to 223,718 in 2000. Total freight traffic which comprised mainly container cargo and cement decreased marginally from 5.25 million tonnes in 1995 to 4.98 million tonnes in 2000. The productivity of workers for freight traffic increased by 3.3 per cent from 214,000 tonne-kilometres per worker in 1995 to 221,000 tonne-kilometres per worker in 2000. Total revenue per worker improved by 68 per cent from RM110,000 in 1995 to RM185,000 in 2000.

10.25 The study on the Trans-Asian Railway link between Kunming, People's Republic of China and Singapore was completed in August 1999. The study, which was aimed at enhancing cross-border rail transportation, encompassed engineering and economic aspects, customs, immigration and quarantine facilitation as well as environmental considerations. Various options were examined for the implementation of the project.

Ports

10.26 During the Seventh Plan period, port development continued to focus on expanding capacity, upgrading and increasing equipment and facilities as well

as enhancing the efficiency of port and port-related services. In terms of new port capacities, an integrated planning approach with a view to promoting multimodalism and developing a comprehensive range of land-side facilities and services was adopted. The privatization of port activities was further accelerated to improve the operational and managerial efficiency of these services. In addition, measures were also undertaken to upgrade navigational safety and promote the expansion of domestic merchant fleet and ferry services to further increase the participation and utilization of Malaysian shipping lines in domestic and international trade as well as tourism.

10.27 In line with capacity expansion and upgrading of port and port-related facilities, several major projects were undertaken at Port Klang, Port of Tanjung Pelepas, Penang Port and Bintulu Port. In addition, related activities such as the construction of a petrochemical jetty at Kuantan Port and channel dredging at Kemaman Port, were completed. Dredging works for the basin of Kuantan Port, which commenced during the period, is expected to be completed by the end of 2001. With the completion of additional berths, other related facilities and equipment such as container yards, cargo storage and cranes, total port capacity increased by 14.6 per cent per annum from 174.1 million tonnes in 1995 to 344.1 million tonnes in 2000, as shown in *Table 10-3*.

10.28 During the Plan period, more than 90 per cent of Malaysia's international trade was conducted through seaports, which greatly supported the growth of sea-borne trade. The total tonnage of cargo handled increased by 7.7 per cent per annum from 152.3 million tonnes in 1995 to 220.8 million tonnes in 2000, mainly attributable to containerized and liquid bulk cargo, as shown in *Table 10-4*. In terms of containerized cargo, the volume increased by 16.5 per cent per annum from 37.8 million tonnes in 1995 to 81.3 million tonnes in 2000 or 2.1 million TEUs to 5.3 million TEUs, respectively. The number of passengers including tourists increased from 6.3 million passengers in 1995 to 6.7 million in 2000. The increase in both the containerized cargo and passengers is an encouraging trend, due largely to the increased investment in container trade as well as reflecting the success of various port and tourist-related promotional efforts.

10.29 The total number of ship calls at Malaysian ports increased by 5.0 per cent per annum from 70,098 in 1995 to 89,462 vessels in 2000, as shown in *Table10-4*. Main line operators (MLOs) increasingly used super post-panamax

TABLE 10-3

NUMBER OF BERTHS AND CRANES, PORT CAPACITY AND THROUGHPUT AT PORTS, 1995-2005

Port	1995				2000				2005			
	No. of Berths	*No. of Cranes*[1]	*Capacity (mil. tonnes)*	*Throughput/ Cargo Handled (mil. tonnes)*	*No. of Berths*	*No. of Cranes*[1]	*Capacity (mil. tonnes)*	*Throughput/ Cargo Handled (mil. tonnes)*	*No. of Berths*	*No. of Cranes*[1]	*Capacity (mil. tonnes)*	*Throughput/ Cargo Handled (mil. tonnes)*
Klang	40	16	40.2	40.0	45	35	110.0	65.3	49	55	151.2	123.0
Pulau Pinang	16	9	23.2	16.7	16	10	22.0	20.5	18	14	29.9	29.5
Johor[2]	14	6	15.6	16.5	20	46	83.6	29.0	29	84	203.3	88.1
Kuantan	11	2	8.7	4.2	12	5	9.0	6.0	17	8	15.0	8.6
Kemaman	4	3	7.9	2.6	7	3	14.1	2.2	7	3	14.1	3.3
Bintulu	7	-	31.9	18.6	11	6	36.5	24.9	12	6	48.7	37.7
Sabah[3]	27	-	9.5	16.3	33	-	17.2	18.1	39	2	24.6	24.3
Sarawak[4]	23	7	11.0	14.5	26	6	17.0	16.9	27	4	17.4	23.0
Others[5]	31	8	26.1	22.9	43	7	34.7	37.9	46	9	37.7	45.5
Total	**173**	**51**	**174.1**	**152.3**	**213**	**118**	**344.1**	**220.8**	**244**	**185**	**541.9**	**383.0**

Notes:

1 Includes gantry and multipurpose cranes.

2 Figures for the year 2000 and 2005 include Port of Tanjung Pelepas.

3 Kota Kinabalu, Tawau, Lahad Datu and Sandakan.

4 Kuching, Miri and Rajang.

5 Includes Teluk Ewa, Kuala Perlis, Kuala Kedah, Tanjung Bruas, Tanjung Lembung, Lumut, Port Dickson and Labuan.

vessels of more than 80,000 deadweight tonnes (DWT) to call at West Port, Port Klang and Bintulu Port as well as the new Port of Tanjung Pelepas in Johor. The increases were attributed to new shipping lines commencing direct calls and additional services by existing lines.

10.30 Kuantan Port and Teluk Ewa Jetty in Langkawi were privatized in 1998 and 1999, respectively. Besides privatization, other efforts were also undertaken to improve the efficiency of port operations, marine and land-side services, as well as ship and cargo clearance. These efforts included foreign equity participation in the management of ports; the simplification of procedures and practices for providing pilotage and tug boat services; upgrading, computerization and automation for container operations; the identification of freight forwarders to be multimodal transport operators; and the merger of Klang Container Terminal Bhd., Klang Port Management Sdn. Bhd. and Kontena National Bhd. to form a new holding company known as Northport Corporation. As a result of these efforts, Port Klang improved its rank among the container ports in the world from 21st in 1998 when it handled 1.8 million TEUs to 14th in 1999 when it handled a record of 2.6 million TEUs.

10.31 As part of the capacity expansion and development of riverine transportation, a number of port-related projects in Sabah and Sarawak were completed. These included the Tanjung Manis Port and the new deep-water port at Kampung Senari in Kuching, Sarawak as well as the expansion of the Lahad Datu Port in Sabah.

TABLE 10-4

NUMBER OF SHIP CALLS AND VOLUME OF CARGO HANDLED, 1995-2005

	1995	*2000*	*2005*	*Average Annual Growth Rate (%)*	
				7MP	*8MP*
No. of Ship Calls	**70,098**	**89,462**	**121,210**	*5.0*	*6.3*
Total Volume of Cargo Handled (million tonnes)	**152.3**	**220.8**	**383.0**	*7.7*	*11.6*
General	30.1	26.0	35.7	*-2.9*	*6.6*
Liquid Bulk	60.7	82.8	109.3	*6.4*	*5.7*
Dry Bulk	23.7	30.7	37.3	*5.3*	*3.9*
Container	37.8	81.3	200.7	*16.5*	*19.8*

10.32 Measures were also undertaken to provide adequate, efficient and properly maintained search and rescue, anti-pollution and navigational facilities and equipment to reduce the risk of pollution as well as to ensure the safety of navigation in Malaysian territorial waters. These included the purchase of additional enforcement vessels and navigational aids, the provision of quarters and training for the staff as well as the establishment of Traffic Separation Scheme which enhanced ship routing, improved traffic management and reduced oil spills in the Straits of Malacca.

10.33 Local participation in shipping activities including cargo and passenger operations expanded as reflected by the increase in the number of Malaysian vessels registered from 2,132 in 1995 to 3,200 ships in 2000, an increase of 8.5 per cent per annum. The majority of these ships were small vessels except for those ships registered under Malaysia International Shipping Corporation Berhad (MISC) and Global Maritime Ventures Berhad (GMVB). MISC's fleet increased from 62 ships in 1995 to 125 in 2000, while that of GMVB increased from three to 13 ships. Consequently, total shipping capacity increased from 3.6 million gross registered tonnage (GRT) in 1995 to 6.5 million GRT in 2000.

Airports

10.34 The thrust in airport development during the Plan period was to expand capacity and upgrade existing facilities as well as modernize and improve air traffic services and flight safety. For the Plan period, while passenger traffic was projected to grow at an average annual rate of 4.5 per cent, the actual growth rate was 3.5 per cent, from 27.3 million in 1995 to 32.9 million passengers in 2000, as shown in *Table 10-5*. However, the annual growth rate in cargo traffic for the period was higher than the projected 6.0 per cent, despite a contraction of 16.5 per cent in 1998. Total cargo handled increased from 482,030 tonnes in 1995 to 773,861 tonnes in 2000, reflecting a growth of 9.6 per cent per annum.

10.35 During the Plan period, Phase One of KLIA at Sepang was completed to cater for a capacity of 25 million passengers per annum (mppa). KLIA began commercial operations on 30 June 1998, just seven years after its conceptualization. In the first year of its operation, KLIA handled a total of 123,218 aircraft movements involving 12.7 million passengers and 350,248 tonnes of cargo. Efforts to develop KLIA as a competitive regional aviation hub were enhanced through the formation of a KLIA Hubbing Development Committee, comprising all major stakeholders and service providers in KLIA and relevant Government

TABLE 10-5

TRAFFIC HANDLED AT MALAYSIAN AIRPORTS, 1995-2005

Traffic	*1995*			*2000*				*2005*			
	Domestic	*International*	***Total***	*Domestic*	*International*	***Total***	*Average Annual Growth Rate (%)*	*Domestic*	*International*	***Total***	*Average Annual Growth Rate (%)*
Passengers ('000)	17,422	9,843	**27,265**	19,114	13,739	**32,853**	*3.5*	25,660	15,928	**41,588**	*5.2*
Cargo (tonnes)	128,702	353,328	**482,030**	114,598	659,263	**773,861**	*9.6*	238,816	890,336	**1,129,152**	*7.3*
Commercial Aircraft Movements (no.)	316,944	89,394	**406,338**	263,026	98,978	**362,004**	*-2.1*	337,435	110,983	**448,418**	*4.4*

agencies. The Committee has, among others, set service and performance standards based on world's best practices to achieve operational excellence at KLIA in terms of aircraft, passenger, baggage and cargo handling. In addition, the employees of KL International Airport Berhad (KLIAB), who gained invaluable project management skills in the construction of the airport, established a company to provide consultancy services both locally and overseas.

10.36 Other airport capacity expansion projects completed during the Plan period were the upgrading of the Langkawi Airport to cater for the latest wide-bodied B747-400 aircraft in June 1997, a new terminal building in the Labuan Airport in 1998 and a new cargo complex in the Penang International Airport in 1999. The terminal buildings in the Kuching International Airport and Sibu Airport in Sarawak as well as the Senai Airport in Johor were also upgraded. To enhance flight operations and safety as well as accommodate bigger aircraft, the Pulau Pangkor, Pulau Tioman and Mulu airstrips were upgraded, further boosting tourism to these resort areas. In addition, construction works commenced for new airports in Tawau and Limbang. Meanwhile, for the Kota Bharu Airport, works on a new terminal building, taxiway and parking apron also commenced, and is scheduled to be completed in the year 2002.

10.37 Malaysia Airlines (MAS), the national carrier, increased its flight operations from 104 to 114 destinations during the Plan period. The number of international destinations increased from 66 in 1995 to 81 in 2000, while its domestic destinations were reduced from 36 to 33. Out of the 81 international destinations, 63 were operated by MAS while the remainder were by other carriers on a code-sharing basis or joint services. Flights to Beirut, Vientianne, Yangon, Pusan and Male were launched in 1996 followed by Shanghai, Cairo and Zagreb in 1997. Flights to New York were introduced in 1998, while those to Manchester and Xiamen in 1999. MAS also increased its frequencies to Australia and many long-haul destinations in Europe. To service its destinations, MAS operated 87 passenger aircraft of which 53 were narrow-bodied and 34 wide-bodied. In addition, MAS also operated five dedicated freighter aircraft and handled 590,436 tonnes of cargo or 76.3 per cent of total air cargo in 2000.

10.38 Scheduled air services were also provided by Air Asia Sdn. Bhd., Pelangi Airways Sdn. Bhd. and Transmile Air Sdn. Bhd. to complement and supplement MAS services. These airlines provided air services to selected domestic and regional destinations, particularly tourist resorts such as Tioman and Pangkor as well as Medan in Indonesia.

10.39 During the Plan Period, Malaysia Airports Berhad (MAB), continued to manage all the 36 airports and airstrips in the country. It also contributed towards the expansion of terminal buildings to handle the increased traffic volume as well as to increase retail space. Efforts were also undertaken to increase its non-aeronautical revenue and export its airport management expertise overseas. MAB was restructured as Malaysia Airports Holdings Berhad (MAHB) and was listed on the Kuala Lumpur Stock Exchange in November 1999, making it the first airport authority in Asia to be publicly listed and one of the six in the world.

Communications

10.40 The communications subsector achieved significant progress both in terms of capacity expansion as well as introduction of new services during the Plan period. The trunk backbone capacity was greatly expanded with the installation of three major fibre optic routes traversing Peninsular Malaysia as well as a second submarine fibre optic cable connecting Peninsular Malaysia to Sabah and Sarawak. In addition to the fibre optic backbone, the upgrading of network equipment which included the digitalization of switches and routers enabled innovative new services to be introduced such as video conferencing and tele-medicine.

10.41 The convergence of the telecommunications, broadcasting and computing technologies enabled the telecommunications infrastructure network to support the growth of information and communications technology (ICT) and multimedia applications. In addition to the wired infrastructure, capacity for wireless transmission was greatly boosted with the operation of Malaysia's own satellites, Malaysia East Asia Satellite (MEASAT) 1 and MEASAT 2 in 1996.

10.42 For basic telephony, the national penetration rate for fixed line telephones per 100 population increased from 16.6 in 1995 to 21.0 in 2000. The rural penetration rate doubled from 5.5 in 1995 to 11.7 in 2000, while the urban penetration rate was 24.8 and 28.6 during the same period. Fixed line telephones were complemented by cellular mobile phones which also achieved significant increase in number of subscribers from 872,000 in 1995 to 5.1 million in 2000. New services were introduced over the cellular network such as Short Messaging Services (SMS), Voice Mail and Calling Line Identification as well as Internet access with Wireless Application Protocol (WAP).

10.43 To enable the MSC to provide the best environment for new advancements in the ICT industry, a 386 route-kilometre high speed broadband fibre optic cable was installed linking Kuala Lumpur City Centre, Putrajaya and Cyberjaya to KLIA. This backbone network has a capacity of 2.5 gigabits per second (Gbps), which is upgradable to 10 Gbps for transmission of high speed, broadband multimedia applications. This network utilizes advanced switching technology such as the Asynchronous Transfer Mode and is linked internationally through both fibre optic cables and satellite connections. The MSC is thus capable of supporting services such as Virtual Local Area Network for group computing over a wide area and multimedia workstations with interactive services including e-commerce, home shopping, video library retrieval and video-on-demand.

10.44 As a measure to reduce the digital divide, efforts were undertaken to ensure equitable access to communications and hence information throughout the country. Towards this end, the Communications and Multimedia Commission completed a study on Universal Service Provision (USP) in December 2000. The main objective of the study was to identify measures to extend communications services to high-cost areas and low income groups.

Water Supply

10.45 During the Seventh Plan, various water resources projects were implemented to meet the increasing domestic and industrial water demand. Efforts were undertaken to improve the management and distribution of water resources among various river basins including inter-state water transfer. The National Water Resources Council (NWRC) was formed in June 1998 as a coordinating and integrating body for the planning and management of water resources. The NWRC was entrusted to formulate, among others, a national water policy as well as establish guidelines on catchment management to ensure long-term sustainability.

10.46 As a long-term measure, the National Water Resources Study Phase 1, for Peninsular Malaysia was carried out to determine the availability of water resources and estimate the water requirements up to the year 2050. The Study, which was completed in 2000 made recommendations for the policy and management of water resources at both the Federal and state levels, and proposed a programme of investments to meet future water demands.

10.47 During the Plan period, a total of RM2.4 billion was expended on water supply projects including the completion of four new dams and the commencement of construction of the Chereh Dam in Pahang in 2000. The four were the Kelinchi and Gemenceh dams in Negeri Sembilan, the Telok Bahang dam in Pulau Pinang and the Babagon dam in Sabah, bringing the total number of dams in operation to 69, with a total capacity of 29.9 billion cubic metres. Of these, 35 were developed for water supply, 16 for multipurpose use while the remaining were for irrigation and hydropower. Efforts were also undertaken to enhance inter-basin water transfer such as from the Kelinchi Dam in the Muar River Basin to the Terip Dam in the Linggi River Basin in Negeri Sembilan. The engineering study and design for the inter-state water transfer from Pahang to Selangor involving the construction of the Kelau Dam and a 45-kilometre tunnel was also completed in 2000.

10.48 To meet the increasing demand for water, particularly in the urban areas, new treatment plants were built and the existing plants and distribution systems were upgraded. The completed projects included the Sungai Selangor Stage I Phase II, Langkawi Submarine Pipeline Project, Labuan Water Supply Project Phase III, Kulim Water Supply Phase II, Sabah Immediate Water Supply Works and Melaka Development Corridor Water Supply projects. In addition, three fast track projects were implemented in 1998 to overcome the water shortage in the Klang Valley due to the prolonged dry spell from March to August 1998. These were the construction of the Wangsa Maju Water Treatment Plant with a production capacity of 45 million litres per day (mld) and the transfer of raw water from the Klang Gates Dam as well as from the Sungai Gombak to the plant. At the same time, work on the Sungai Selangor Stage II Phase II was accelerated for earlier completion in 2000. By the end of the Plan period, the production capacity increased from 9,480 mld in 1995 to 11,860 mld in 2000. The national water supply coverage increased to 92 per cent in 2000, as shown in *Table 10-6.*

10.49 Measures were also taken to improve the efficiency of the existing water supply systems. These included the rehabilitation and upgrading of the treatment plants and the distribution systems to reduce the rate of non-revenue water (NRW). A total of 1,680 kilometres of asbestos cement pipes was replaced with steel and polyethylene pipes. In addition, leakage control and meter replacement programmes were also implemented to further reduce the NRW. A total of RM475 million was expended on the NRW programme covering 20 districts in various states. Consequently, the national NRW rate decreased from 40 per cent in 1995 to 36 per cent in 2000, as shown in *Table 10-6.*

TABLE 10-6

URBAN AND RURAL WATER SUPPLY COVERAGE AND NON-REVENUE WATER RATE, 1995-2005

('000 persons)

State	1995							2000							2005						
	Urban	*%*	*Rural*	*%*	***Total***	*%*	*NRW*	*Urban*	*%*	*Rural*	*%*	***Total***	*%*	*NRW*	*Urban*	*%*	*Rural*	*%*	***Total***	*%*	*NRW*
Johor	1,130	*99*	1,207	*96*	**2,337**	*97*	*36*	1,278	*99*	1,394	*98*	**2,672**	*98*	*26*	1,446	*99*	1,593	*99*	**3,039**	*99*	*23*
Kedah	324	*100*	942	*89*	**1,266**	*94*	*48*	374	*100*	1,269	*97*	**1,643**	*98*	*48*	440	*100*	1,600	*98*	**2,040**	*99*	*44*
Kelantan	383	*85*	432	*45*	**815**	*65*	*40*	488	*95*	481	*46*	**970**	*70*	*36*	569	*98*	777	*65*	**1,346**	*81*	*35*
Melaka	213	*99*	332	*97*	**545**	*98*	*35*	228	*100*	358	*99*	**586**	*99*	*30*	242	*100*	380	*99*	**622**	*99*	*24*
Negeri Sembilan	469	*98*	312	*95*	**782**	*96*	*42*	519	*100*	346	*99*	**865**	*99*	*38*	567	*100*	378	*100*	**945**	*100*	*32*
Pahang	224	*98*	956	*86*	**1,180**	*92*	*48*	251	*98*	1,049	*89*	**1,300**	*93*	*42*	330	*99*	1,140	*92*	**1,471**	*95*	*38*
Perak	1,216	*98*	727	*84*	**1,943**	*91*	*37*	1,117	*100*	876	*100*	**1,993**	*100*	*36*	1,193	*100*	863	*100*	**2,056**	*100*	*32*
Perlis	55	*99*	137	*89*	**191**	*94*	*38*	62	*100*	154	*90*	**216**	*95*	*36*	70	*100*	188	*92*	**258**	*96*	*31*
Pulau Pinang	581	*98*	587	*98*	**1,168**	*98*	*20*	602	*100*	687	*100*	**1,289**	*100*	*19*	663	*100*	776	*100*	**1,439**	*100*	*18*
Sabah[1]	807	*87*	462	*42*	**1,269**	*64*	*58*	930	*88*	553	*45*	**1,483**	*66*	*52*	1,070	*93*	660	*60*	**1,730**	*77*	*45*
Sarawak[2]	613	*93*	533	*80*	**1,146**	*86*	*36*	692	*100*	644	*88*	**1,336**	*94*	*34*	783	*100*	844	*89*	**1,627**	*95*	*28*
Selangor[3]	3,216	*100*	1,411	*92*	**4,627**	*96*	*40*	3,608	*100*	1,348	*97*	**4,956**	*99*	*36*	5,190	*100*	1,422	*100*	**6,612**	*100*	*29*
Terengganu	438	*90*	292	*77*	**730**	*83*	*38*	470	*98*	400	*89*	**870**	*94*	*35*	509	*100*	434	*92*	**944**	*96*	*30*
Malaysia	**9,669**	***96***	**8,330**	***82***	**17,999**	***89***	***40***	**10,619**	***98***	**9,559**	***87***	**20,179**	***92***	***36***	**13,072**	**99**	**11,055**	**91**	**24,129**	***95***	**31**

Notes:

[1] Including Federal Territory of Labuan.

[2] Including partially treated water in rural areas.

[3] Including Federal Territories of Kuala Lumpur and Putrajaya.

10.50 During the Seventh Plan period, several water supply projects were privatized which included the construction of the Sungai Selangor Phase II project on a Build-Operate-Transfer (BOT) basis. The Sungai Selangor Phase III project, which involved the construction of Sungai Selangor Dam and two treatment plants with a capacity of 1,050 mld, was privatized in 2000. In addition, two state water supply authorities were corporatized, namely the Terengganu Water Supply Department and the Penang Water Authority. Consequently, water regulatory bodies were formed in the respective states. At the same time, the process of corporatization of the Melaka Water Board commenced.

10.51 The development of groundwater as an alternative source was enhanced during the Plan period. In this respect, 87 shallow wells, eight hard rock wells, seven alluvial wells and 15 monitoring wells were constructed in Selangor. In Kedah, five hard rock wells were constructed in Padang Terap with an average yield of 43,600 litres per hour and three hard rock wells in Sungai Petani with an average yield from the two wells at 43,600 litres per hour and one at 4,540 litres per hour.

10.52 In Sarawak, a project was carried out to identify potential sources of groundwater for domestic, agricultural and industrial use. This project subsequently enabled the successful supply of water to numerous villages, longhouses and schools that were isolated and without proper water supply system. These were located in Bintulu, Limbang and Miri in the northern zone, Kuching, Samarahan and Sri Aman in the western zone and Kapit, Sarikei and Sibu in the central zone. In the water-stressed state of Sabah, hydrogeological studies and construction of groundwater wells were carried out in the western coastal areas of Semporna-Lahad Datu.

Sewerage

10.53 During the Seventh Plan period, the privatization of sewerage services was extended to cover a total of 84 local authorities. Public sewerage treatment plants operated by the concessionaire increased from 3,200 in 1995 to more than 6,000 in 2000. Consequently, the sewerage pipeline network that needed maintenance increased from 3,500 kilometres to more than 8,500 kilometres. By the end of the Plan period, the coverage of the population served by public sewerage systems and septic tanks increased from 7.5 million to over 12.6 million people.

10.54 In order to improve and expand services within local authority areas, new sewerage capital works were undertaken. Priority was accorded to cities and towns where sewage pollution was a potential threat to public health and the tourism industry. Several sewerage work projects in Kuala Lumpur, Langkawi, Port Dickson, Seremban, Labuan and Ipoh were completed during the Plan period with a total capital expenditure of RM282.5 million. Many of the public sewerage systems handed over by the local authorities were refurbished to meet the design intent of the systems. A total of RM182.0 million was expended during the Plan period to refurbish 1,162 treatment plants.

10.55 During the Plan period, monitoring of sewerage contractors was done by the Sewerage Services Department through the issuance of licences. A total of 333 local sewerage contractors was registered with the Department and the standard of work and services were monitored through inspections during construction.

III. PROSPECTS, 2001-2005

10.56 The supporting role of infrastructure and utilities to facilitate the growth of other sectors, particularly in the distribution of goods and services is vital to ensure the attainment of the Eighth Plan's objective of growth with resilience. Efforts will continue to be undertaken to upgrade existing facilities and increase capacities, particularly in the less developed areas as well as to improve productivity and efficiency in urban areas. Greater accessibility, adequacy and quality of the supply of infrastructure and utilities will contribute to a better quality of life. The development thrust of the sector during the Eighth Plan period will thus be guided by the following strategies:

- *emphasizing long-term integrated planning and coordinated implementation of projects to ensure a more orderly, systematic and comprehensive development of infrastructure and utilities;*
- *providing a comprehensive range of infrastructure facilities and amenities to facilitate economic growth and open new corridors for development;*
- *promoting multimodalism to enhance the seamless integration of all modes of transport;*
- *encouraging the use of public transport as well as intelligent transport systems, particularly in urban areas to reduce congestion;*

- ❑ *increasing efficiency, productivity and reliability of service through continuous review and stricter enforcement of performance standards and technical specifications as well as the use of new and adapted technologies; and*
- ❑ *ensuring the availability of reliable infrastructure facilities and services at reasonable costs.*

Roads

10.57 Road development programme will be continued with emphasis on quality and safety. New roads construction will focus on opening up corridors for development as well as improving accessibility to rural areas. Construction of roads through privatization and deferred payment method will be continued on a selective basis, thereby sustaining road project implementation.

10.58 For the Eighth Plan period, a total of RM5.1 billion will be allocated for the development of new roads and RM8.9 billion for the improvement and upgrading of existing roads. The larger allocation for upgrading of existing roads is in line with the efforts to improve safety, driving comfort and reduce travel time, including the provision of motorcycle lanes in identified dangerous stretches. Major projects that will be implemented during the Eighth Plan period are as shown in *Table 10-7*.

10.59 Emphasis will be placed on roads leading to and within the less developed areas, in order to provide better access and improve road system to these areas. In this regard, new rural roads will be built to high geometric standards that will facilitate the movement of larger commercial and heavy vehicles to serve industries in these areas, thereby accelerating rural and regional development. Some of the major projects to be undertaken include the construction of Titi Karangan-Grik section of the Second East-West Highway, Sepulut to Kalabakan Road in Sabah and the highway from Kuching to the new Federal Administrative Centre in Rambungan in Sarawak. In addition to the Pan Borneo Highway linking Miri and Limbang and the Simpang Pulai-Lojing-Kuala Berang Road, the construction of the East Coast Expressway will be expedited through Government funding.

10.60 Various new projects are expected to be completed through privatization including the Senai-Desaru Highway, Kajang-Seremban Highway and the Western Kuala Lumpur Traffic Dispersal Scheme (SPRINT Highway). The completion of these highways will add about 100 kilometres of privatized highways to the total road network.

Urban Transport

TABLE 10-7

MAJOR ROAD PROJECTS, 2001-2005

Project	*Length (km)*	*Completion (Year)*
Batang Rajang Bridge	1.5	2002
New Coastal Road Triso-Melebu-Pusa	51	2002
Urban Ring Road in Putrajaya	14	2002
Upgrading Road from Anak Bukit to Kepala Batas	5	2002
Kuala Kangsar-Grik Road	100	2003
Upgrading Bentong-Kuala Lipis Road	109	2003
Road From Kuching to New Federal Administrative Centre in Rambungan	26	2003
New Road From Kunak to Semporna	60	2003
Upgrading Federal Route 50 from Batu Pahat to Kluang	60	2003
Upgrading Route 98 from Temerloh to Jerantut	60	2003
East Coast Highway	169	2003
New Road From Kanibongan to Nangoh	160	2004
Upgrading Old Klang Road	4	2004
Upgrading Federal Road 65 from Lee Rubber to UIA	12	2004
Upgrading Federal Route 51 from Seremban to Kuala Pilah	35	2004
New Tenom-Beaufort Road	120	2005
Changloon-Padang Besar Highway	39	2005

10.61 During the Eighth Plan period, the urban transport strategy will continue to focus on the development of an integrated, efficient and reliable urban transport environment in the Klang Valley as well as in other major urban centres. In this regard, strategies and measures will be required to alleviate traffic congestion as most urban centres continue to experience high population growth and socio-economic development. Emphasis will be on the need to have a more efficient, safe and comfortable public transport system to enable a modal shift from private car usage.

10.62 The rapid increase in car ownership and commercial development in major cities will continue to impose greater demand on road capacity. Greater and more sustained efforts are therefore required to enhance public transport services, improve traffic demand management and upgrade the road network to

enable quicker vehicular flow and dispersal to the ring roads. In this regard, local authorities need to upgrade their expertise in urban transportation planning and management. Measures such as adequate land use planning, provision of public transport facilities and strict enforcement with regard to indiscriminate parking and construction activities will be required to alleviate severe cases of traffic congestion.

10.63 The increasing number of motor vehicles in all major urban centres will require the implementation of public transport priority measures, car parking control, local area traffic improvement schemes, restrictions on heavy vehicles, greater pedestrianization and the application of ITS. Measures will be taken to enhance effective car parking control through limiting the duration of parking hours, reducing parking requirements for new projects and imposing higher parking charges in specific areas. Local area traffic improvement schemes include one-way circulation, contra-flows during peak hours and traffic calming measures.

10.64 ITS applications will continue to be an imperative tool in the strategy to alleviate traffic congestion and improve the urban transport system as well as reduce pollution. Some of the more effective ITS applications include vehicle information system, transport information kiosks, variable message signages and ultimately an integrated demand management system (IDMS). This will incorporate an urban traffic control system with linkages to vehicle tracking, data collection, safety, public transportation and parking guidance. In this regard, a Government appointed private consortium will undertake a plan to implement ITIS in the Klang Valley.

10.65 While LRT STAR, LRT PUTRA and KTM Commuter managed to secure a combined daily ridership of about 250,000 commuters on peak days, it is still lower than the forecasted figures, thus requiring more promotional efforts by the companies. The Government will also consider various options to ensure the financial viability of the projects and the provision of better services to the public. In addition, higher productivity and cost-saving measures will be pursued to enhance the financial sustainability of the urban transit systems. The intra-city monorail system, however, is viewed as more commercially viable by the concession company based on lower construction, systems, operating and maintenance costs. The lower costs are attributed to the deployment of Malaysia's first locally manufactured monorail vehicles. The monorail system is expected to provide a critical public transport link from KL Sentral to the central business district and several LRT stations. To further expand the urban rail network, the Government will implement the locally manufactured monorail system which is

similar to the KL Monorail, as the core transport mode in Putrajaya and Cyberjaya. The first phase of the project is scheduled for completion in 2003. Both Putrajaya and Cyberjaya will feature an integrated internal transport system which will interface with the ERL to Kuala Lumpur and KLIA and inter-city buses.

10.66 Further development will continue to focus on greater rationalization and optimization of the public transport sector especially in the Klang Valley. Emphasis will be on the promotion of multimodalism through the use of a common ticketing system, integrated route and facility networks, improved locations for bus and taxi stands, transit malls, efficient feeder buses and more car parks on the urban fringes close to LRT and bus stations. Buses will continue to be a major mode of transport in cities and will be further improved to provide an efficient, safe and comfortable service. For the Klang Valley, the Government will examine the reorganization and restructuring of the total urban transport operations with the objective of creating an efficient and financially sustainable system.

10.67 The opening of KL Sentral in early 2001 heralds a significant milestone for public transportation in the Klang Valley. As the main public transport hub linking Kuala Lumpur to KLIA, Putrajaya and Cyberjaya through the ERL, KL Sentral's pivotal role will be continuously monitored and enhanced. It is also expected to increase the ridership levels of the LRT PUTRA, KTMB inter-city and commuter train services and the monorail, as these different modes will converge at the KL Sentral. To ensure efficient operation of KL Sentral, its management will be privatized.

10.68 Pedestrianization projects in the major urban centres will continue to be encouraged to induce the public to walk short distances rather than use their cars. Landscaped and sheltered pedestrian walkways will continue to be implemented. Further improvement in lighting and provision of street furniture will also be undertaken to attract more commuters to public transportation.

10.69 Several major urban roads will be constructed during the Eighth Plan period. These include the road link from Kampung Pandan Roundabout to Sultan Ismail Road in Kuala Lumpur; Butterworth Outer Ring Road, Penang; Muar Bypass Road, Johor and several roads in Kota Kinabalu and Kuching. In addition, several other roads will be upgraded including Jalan Klang Lama, Kuala Lumpur; Kuantan Bypass Road, Pahang and the Karamunsing Interchange, Kota Kinabalu.

Rail Transport

10.70 During the Eighth Plan period, emphasis will continue to be given to enhance the efficiency and quality of rail services. In this regard, efforts will be undertaken to increase operational safety, reliability and greater professionalism of the railway workforce in order to realize the inherent competitiveness of rail transportation.

10.71 The selective doubling, strengthening and electrification of tracks, modernization of signalling and communication systems and investment in higher quality rolling stock augurs well for the future role of rail transportation. The current share of overall freight transportation by rail of less than 5 per cent offers vast potential for market expansion. Towards this end, the rail industry will embark on more effective marketing of its services.

10.72 With the completion of the rail link project to the West Port of Port Klang, North Butterworth Container Terminal and the scheduled completion of the rail connection from Kempas to Port of Tanjung Pelepas, Johor in 2002, efforts will be undertaken to promote the competitive cost advantage of freight transportation by rail. This will also contribute significantly to the development of these ports. Various supporting measures, including the upgrading of operations and maintenance standards, enhancing productivity levels and the optimal utilization of existing resources, will be undertaken to enhance rail transportation.

10.73 The implementation of the Rawang-Ipoh electrified double track project is scheduled for completion in 2004. This will serve as a crucial link in the Southern Thailand to Malaysia land-bridge project by providing efficient freight services on the Padang Besar-Ipoh-Rawang-KL-Port Klang route. In line with the need to increase track capacity, efficiency and quality of both passenger and freight services, the Government will consider the extension of the current Rawang-Ipoh electrified double track project to Padang Besar in the north and from Seremban to Johor Bahru in the south. Inter-city passenger services will be improved with the increased track capacity and the extension of commuter operations between Rawang and Tanjung Malim. In addition, the implementation of the Sentul-Batu Caves electrified double track project will extend commuter train services in the Klang Valley by another seven kilometres.

10.74 As part of its long-term strategy to promote freight multimodalism, KTMB will continue to gear itself towards general cargo containers as well as increase productivity and performance standards of its yard and terminal facilities. In addition, more container depots and terminal facilities will be built jointly with

the private sector to further increase freight business. In order to have an efficient, market-oriented and sustainable railway operation, a major restructuring of KTMB will be undertaken.

Ports

10.75 Port development will continue to focus on improving capacity, upgrading equipment and facilities as well as enhancing the efficiency and productivity of port and port-related services. In terms of capacity, an integrated approach to develop a comprehensive range of inland related support facilities and services will be adopted. Accessibility to ports, especially road and rail links will be upgraded. Simultaneously, multimodal transport operations that offer door-to-door services will be in place. In addition, various measures will be undertaken to further promote the expansion of Malaysian shipping lines including ferry services, preserve marine environment and upgrade navigational safety.

10.76 A single port authority will be established which, *inter alia*, will perform regulatory functions to ensure that port operators meet with the performance standards stipulated as well as comply with the terms and conditions of the licences issued. In addition, the authority will facilitate an orderly and integrated development of ports and port-related services based on their respective strengths, uniqueness and specialization, especially in terms of hinterland coverage, expertise and facilities to handle certain types of traffic as well as to take into consideration environmental aspects.

10.77 Various port projects, which commenced in the Seventh Plan, are expected to be completed by the end of the Eighth Plan period. These include the construction of additional container berths and storage facilities at West Port, Port Klang; reclamation of 25 hectares of land for expansion of North Butterworth Container Terminal; a dedicated container terminal and petrochemical jetty at Kuantan Port; an additional 360 metre berth at Port of Tanjung Pelepas; the third LNG Jetty at Bintulu Port and the construction of an additional port at Ranca-Ranca, Labuan. To enhance port capacity, supporting ancillary services such as distriparks, bunkering, banking, insurance, customs brokerage and shipping agencies will be further improved. An integrated landscaping and land utilization programme for ports and port-related activities will be developed to further increase capacity and utilization of related services. With regard to the promotion of tourism, cruise ship operations and the development of a host of marinas and other recreational activities surrounding port areas will be upgraded.

10.78 As part of capacity expansion and development of riverine transportation,

a number of port-related projects in Sarawak and Sabah will be implemented. These include the dredging of the Kuala Baram and Sarawak river mouths to deepen the channel access to Miri and Kuching ports and the construction of a container terminal and oil jetty at Sapangar Bay in Sabah. Inland water transport as an alternative mode will be upgraded to cater for the increased demand from locals and tourists in the states of Sarawak and Sabah. Towards this end, projects will be undertaken to improve and upgrade passenger and cargo facilities such as the construction of passenger terminals and dredging for navigation. In addition, the construction of ferries with low-wash-type technology will be encouraged to minimize the impact of river bank erosion.

10.79 During the Plan period, more efforts will be undertaken to increase the usage of local ports. Besides Port Klang, Port of Tanjung Pelepas will also be developed as a hub and cargo transhipment centre. In this regard, the relaxation of the Cabotage Policy will be extended to Port of Tanjung Pelepas. Government agencies and terminal operators will concentrate on promotional activities to attract more exporters, importers and other members of the shipping community to use local ports. More cooperation with other international ports will be enhanced through joint ventures, sister port arrangements and forging of strategic alliances with foreign port operators and shipping companies. Other initiatives will include offering main line operators user-friendly services, competitive port tariffs, rebates, preference vessels and dedicated berth schemes.

10.80 Further efforts will be made to improve the efficiency and productivity of ports and ancillary services through continuous multi-skill training programmes, modernization, increased automation and computerization to upgrade management processes and procedures. To achieve computerized port status, the majority of Malaysian ports will take steps to invest in computerization and link with the electronic data interchange (EDI) system as well as computer integrated networks, thus facilitating ports to manage the entire logistics chain. E-commerce in the port business will also be undertaken. Modern port equipment such as super post-panamax cranes, rubber tyre-gantry cranes and other off and foreshore facilities embodying state-of-the-art technology and computerized application standards with major international ports will also be provided.

10.81 By the end of the Plan period, total port capacity is expected to increase at the rate of 9.5 per cent per annum from 344.1 million tonnes in 2000 to 541.9 million tonnes in 2005, as shown in *Table 10-3*. At the same time, the volume of cargo handled is estimated to increase from 220.8 million tonnes in 2000 to

383.0 million tonnes in 2005. In line with the rapid growth in world containerized cargo at 8.0 per cent per annum, containerized cargo is expected to continue with double digit growth at 19.8 per cent per annum. The number of ship calls is expected to increase by 6.3 per cent per annum from 89,462 vessels in 2000 to about 121,210 vessels in 2005, as shown in *Table 10-4*.

10.82 In the shipping subsector, greater emphasis will be given to further expand the local shipping companies including ferry services carrying cargo and passengers. Greater investment through leasing, joint venture, chartering and purchase of additional vessels will be made by the private sector. To enhance productivity and efficiency in shipping operations, the Government will encourage shipping operators to modernize their operations and form strategic alliances. In addition, local shipping companies, particularly those involved in the operations of off-shore logistics support services will be encouraged to utilize the Shipping Fund to expand their capacity.

10.83 During the Plan period, MISC will continue to be the main ship owner and operator and is expected to acquire two additional ships, thus increasing the total fleet to 127 ships and raising its capacity from 3.3 million GRT to 3.4 million GRT. Other shipping companies such as the GMVB, Nepline Bhd. and Halim Mazmin Bhd. are expected to increase their investments, especially roll-on roll-off vessels and oil tankers with tonnage ranging between 2,526 to 104,449 GRT. In terms of ferry services, Star Cruise will increase its fleet from three ferries to four in 2005. With the increased investment made by all the local shipping companies, the total number of vessels registered in Malaysia is expected to increase from 3,200 ships or 6.5 million GRT in 2000 to 3,800 ships or 8.8 million GRT in 2005.

10.84 To enable the Marine Department to assume a more effective role in ensuring the safety of navigation and Malaysian waters are free from pollution, efforts will continue to be made to improve both preventive and enforcement activities. These include the purchase of additional enforcement vessels and navigational aids, the promotion of the usage of Marine Electronic Highway as well as the introduction of Automatic Identification and Differential Global Positioning systems to identify and provide safe advice to vessels plying in the Straits of Malacca. In addition, training programmes will be conducted to meet the requirements of the International Convention on Standards of Training, Certification and Watch Keeping for Seafarers.

Airports

10.85 Airport development will continue to focus on efficiency, productivity and flight safety as well as increasing the capacity to cater for the rising demand for air transport. During the Plan period, passenger and cargo traffic is expected to grow at an average annual rate of 5.2 per cent and 7.3 per cent, respectively. Passenger traffic is expected to increase to 41.6 mppa in 2005, while air cargo is expected to increase to 1,129,150 tonnes, as shown in *Table 10-5*.

10.86 Efforts will continue to be taken to improve efficiency and performance standards of services in KLIA to make KLIA the regional aviation hub. In addition, the airport operator and the national air carrier will jointly promote KLIA and attract more foreign airlines to operate flights into and from KLIA, for both passenger and cargo services. Strategic alliances will be formed by both the airport operator and air carrier with other operators and airlines, to increase cooperation and connectivity.

10.87 The other airports will also be improved to provide efficient services and increase accessibility, particularly in the rural areas of Sabah and Sarawak. These airports will also act as feeder airports to complement the development of KLIA as an aviation hub. Construction of the new airports at Tawau, Bintulu, and Limbang will be completed during the Plan period. The airports at Alor Setar and Miri will also be upgraded to increase their capacity.

10.88 The Government will continue to negotiate Air Services Agreements to increase the number of airlines and flight frequencies into the country as well as additional landing rights for Malaysian carriers. In this regard, a liberal approach including the Open Sky Policy will be adopted in the granting of traffic rights to increase connectivity *albeit* with sufficient safeguards to ensure market access and competitiveness of the national carrier and other local operators.

10.89 The privatization of air traffic control services will be completed at the beginning of the Plan period. As a result, all aviation-related services will be managed by the private sector. A new regulatory body, the Civil Aviation Authority of Malaysia (CAAM) will be established to set performance standards and oversee airport operations and aviation services. In addition, the CAAM will certify aircraft and aircraft components manufactured in Malaysia. The CAAM will also ensure that all airport and aviation service providers maintain a balance between commercial interest and development needs of the industry.

10.90 Efforts will be taken by MAHB to improve productivity and efficiency at all airports. In addition, MAHB will seek to increase the contribution of non-aeronautical revenue including the development of the land bank of KLIA. In this regard, a hotel, theme park, golf course and an air museum are planned to promote KLIA as a tourist destination. Motor sports will be actively promoted to utilize the facilities at the Formula One Racing Circuit at KLIA. In addition, the construction of the National Exhibition and Convention Centre as part of the redevelopment of the Sultan Abdul Aziz Shah Airport in Subang will be completed during the Plan period.

Communications

10.91 The thrust of the communications subsector will be to increase capacity to provide greater accessibility to communications and multimedia services, particularly in the rural areas and at reasonable cost. Improvements in Voice over Internet Protocol (VoIP) technology will further reduce the cost of telephony services. The use of Asymmetric Digital Subscriber Line (ADSL) will enable high speed internet access through the existing copper lines in the local loop. In addition, rapid advances in mobile communications technologies such as the General Packet Radio Service and Third Generation (3G) mobile phones using Code Division Multiple Access (CDMA) technologies will enable the provision of new services including high speed Internet access and audio-video streaming. New transmission technologies such as Power Line Communication (PLC) Technology which transmits data over electricity lines will provide an alternative to the telephone line, thus reducing local access infrastructure cost while increasing connectivity.

10.92 The Communications and Multimedia Commission will oversee the implementation of the USP plan including setting targets and time-table for the roll-out of communications infrastructure, the standard of service and its delivery. The rural penetration rate is thus expected to increase to 17.5 telephones per 100 population in 2005 and the national penetration rate to 27.0. This will involve the installation of 423,800 new lines and 88,760 public telephones in the rural areas. A total of RM2.1 billion is expected to be invested to achieve the USP target, with the majority of funding by the private sector through contributions to the USP Fund. Cellular phone penetration is forecasted to be 38 per 100 population in 2005, spurred by its convenience, competitive pricing and computing capability.

10.93 The communications and multimedia industry will provide world-class services at competitive rates to meet the challenges of global competition. The Communications and Multimedia Act, 1998 will facilitate the introduction of new services using new technologies through a more liberal licensing regime that is technology-neutral and service-neutral. In this regard, most e-commerce activities such as web hosting, internet content, electronic transaction and private network services are exempt from licensing by the Commission. The Act also provides increasing self-regulation by the industry to enable operators to respond quickly to competitive pressures and focus on productivity and efficiency. The Government will develop key performance indicators to monitor performance and set broad guidelines such as fair competition to protect and promote consumer interest as well as ensure social objectives are met. The private sector will have to be innovative and creative to provide new and differentiated services, especially in niche markets where customization and specialization will command a premium.

Water Supply

10.94 The thrust of the subsector will focus on the need to efficiently manage the national water resources so that the nation will have an adequate supply of safe water. For this purpose, the proposed National Water Policy and the new National Water Resources Master Plan, which covers the planning horizon up to year 2050, will provide the strategies and guiding principles for the future development and conservation of national water resources. These principles will be based on, among others, integrated development, equitable regional allocation of water resources, environmental integrity, uniform water regulation and practices, economic value of water and uniform water tariff structure. In this respect, the proposed Water and Sanitation Commission will enforce compliance to meet environmental and water quality objectives through the regulatory mechanism. In addition, the Government will incorporate watershed planning as a decision-making tool involving land-use policies to reflect the economic value of water catchments, forest reserves and other protected areas, as well as to gazette water catchment areas, dam sites and riparian areas to preserve water supply for future use. Adequate funding and resources will be provided to carry out these programmes effectively. These will be coordinated by the National Water Resources Council through greater cooperation and coordination via federal-state Government and industry players' dialogues and partnerships.

10.95 Besides ensuring an efficient and reliable water supply system, priority will be given to minimize wastage and losses. During the Plan period, an effective and comprehensive demand management and conservation strategy will be

introduced. The NRW is thus expected to be reduced from 36 per cent in 2000 to 31 per cent in 2005. The public awareness campaign on the importance of conserving water will be intensified. Building by-laws will be amended to ensure that new houses and industrial premises are fitted with water conservation devices. Efforts will also be undertaken to improve the monitoring and surveillance of dams. These measures will include close monitoring of dam characteristics such as hydrological yield, storage volume, critical level and mode of release of water for better balancing of supply and demand, particularly during the dry season. In addition, the construction of more storage bunds will be carried out.

10.96 Demand for water for domestic and industrial use is expected to increase by 5.4 per cent per annum during the Plan period. The national water supply coverage is expected to increase to 95 per cent, with almost 100 per cent coverage of urban areas and 91 per cent of rural areas in 2005. Besides meeting the increasing demand in urban areas, the Government will continue to provide good quality drinking water to small rural communities. In this regard, the development of infrastructure facilities will continue to be undertaken to tap groundwater and treat water from rivers and streams to supplement piped water. Supply of water will be further improved in states that have low water coverage in rural areas. In addition, the utilization of downstream surface water for industrial and non-critical purposes will be implemented.

10.97 The implementation of water supply projects will be further accelerated, such as the construction of the Chereh Dam and the Greater Kuantan Water Supply and the Tanjung Malim Water Supply Scheme. The construction of two major source works, the Sungai Selangor Phase III project (SSP3) and the Pahang-Selangor Raw Water Transfer scheme, will commence during the Plan period to cater for the increase in water demand in the Klang Valley. Besides the Sungai Selangor Dam, the SSP3 includes Stage 1 of the Bukit Badong Water Treatment Plant with a capacity of 400 mld which is expected to be completed by 2002 and Stage 2 with a capacity of 400 mld by 2004. The Pahang-Selangor Raw Water Transfer project is designed to transfer a maximum capacity of 2,400 mld of raw water by means of pipelines and a tunnel from Pahang to Selangor as well as the Federal Territory of Kuala Lumpur and subsequently to Negeri Sembilan.

10.98 During the Plan period, the states of Melaka, Negeri Sembilan, Pahang, Perak and Sabah are expected to complete the privatization or corporatization of water supply authorities. Privatization of water supply authorities will be conducted in an integrated manner to include treatment works, distribution of water, billing and customer services. State water regulatory bodies will be set

up with sufficient powers for the enforcement of economic and safety regulations to ensure that the private companies adhere to the conditions in the privatization agreement. In enhancing the effectiveness of the state's regulatory mechanism, the Water and Sanitation Commission will be set up to advise state governments on matters relating to social obligations to be performed by the concessionaire as well as on legal aspects.

10.99 The use of ICT will be expanded with the establishment of a standardized national information system with a network of databases at the Federal and state levels. Apart from data on water availability and actual usage, the system will also include projections of demand for water. In addition, to enhance the management and operation of water distribution, the application of Geographical Information System (GIS), Supervisory Control & Data Acquisition System (SCADA), telemetry systems as well as customer information and billing systems will be expanded. These systems will, among others, alleviate the problem of NRW through the early detection of problem areas.

Sewerage

10.100 During the Eighth Plan period, the Government will embark on an extensive sewerage capital development programme with the implementation of 13 sewerage work projects. These include the upgrading of 10 sewerage treatment plants and sewer networks and the provision of three new central sludge facilities to ensure the delivery of better service. The completion of these projects will provide sewerage services to an additional 1.8 million population.

10.101 The implementation of the refurbishment works programme on about 2,500 treatment plants will produce better quality effluent and improve the environment. The implementation of this programme is in line with the recommendations of the sewerage study where the existing concessionaire will undertake the operation and maintenance works for the sewerage services including billing and collection of charges. The Government, on the other hand, will be responsible for the capital expenditure required to expand, upgrade and rehabilitate the sewerage system. This option will, among others, ensure that the sewerage services will continue to be provided to the public at affordable rates and ensure safe wastewater disposal.

10.102 The taking over of new sewerage plants from the developers will increase the coverage of the population served by the concessionaire to about 14.4 million people by the year 2005. The implementation of the sewerage catchment plan

will further reduce the number of localized treatment plants and optimize resources in the operation and maintenance of sewerage systems. However, individual sewerage systems will be implemented in locations such as hilly and isolated areas where connections to the centralized system are costly or have an adverse impact on the environment.

IV. ALLOCATION

10.103 The Government will continue to provide a substantial allocation for infrastructure and utilities development. As shown in *Table 10-8*, a total of RM27 billion will be allocated by the Government, with RM14.0 billion for

TABLE 10-8

DEVELOPMENT ALLOCATION FOR INFRASTRUCTURE AND UTILITIES, 2001-2005
(RM million)

Sector	*7MP*		*8MP*
	Allocation	*Expenditure*	*Allocation*
Transport	**20,913.1**	**20,484.2**	**21,222.1**
Roads[1]	12,429.9	12,269.5	14,002.6
Urban Transport	404.2	404.0	705.6
Rail	5,450.3	5,450.3	4,081.0
Ports	1,157.4	1,089.2	1,500.0
Airports	1,471.3	1,271.2	932.9
Utilities	**3,445.3**	**3,048.0**	**5,549.9**
Water Supply	2,776.8	2,382.7	3,966.3
Sewerage	668.5	665.3	1,583.6
Communications	**51.0**	**39.6**	**228.0**
Communications & Posts	10.2	4.1	146.7
Meteorological Services	40.8	35.5	81.3
Total	**24,409.4**	**23,571.8**	**27,000.0**

Note: [1] Excludes localized roads in regional development areas, some local authorities and agricultural roads.

roads, RM4.1 billion for rail and RM4.0 billion for water supply. Investments by the private sector amounting to RM3.5 billion on roads will complement the Government's allocation for this subsector. This substantial investment in infrastructure and utilities projects will further improve the transport network as well as the availability and reliability of public utilities.

V. CONCLUSION

10.104 The Eighth Plan will focus on increasing efficiency, productivity, quality and reliability of infrastructure facilities and services to enhance linkages and improve transportation to support the nation's competitiveness. The increasing urban congestion requires a modal shift towards mass public transport and greater application of ITS for better traffic management, transport efficiency, safety and comfort as well as reduce pollution. Greater use of ICT will also improve supply and demand management of water as well as support multimedia applications. Environmental considerations will be integrated into infrastructure project planning for greater safety and provision of a better quality of life.