

CHAPTER X

Utilities

56. The continued development of Malaysia's electricity and water supply systems is important to ensure that adequate capacity is made available to meet the needs of the growing industrial and commercial sectors and to make headway in meeting the demand for domestic consumption, particularly in the rural areas. In Malaya considerable progress has already been made in establishing extensive and efficient electricity and water supply systems. Over the period of the First Malaysia Plan, the need is therefore to maintain the extension and improvement of the Malayan systems in anticipation of the growing demands for water and power. By contrast, the systems existing in the Borneo States are much less developed. Work is therefore required during the period 1966-70 to extend the network of electricity and water supply systems so as to help establish a standard which is comparable to that now existing in Malaya.

ELECTRICITY—MALAYA

57. During the last five years the demand for electricity by all classes of consumers increased by 75% from 997.8 million Kwh in 1960 to approximately 1,750 million Kwh in 1965. Over the same period two main power generating projects were undertaken and commissioned by the National Electricity Board (NEB) and one other by the Perak River Hydro-electric Company. These were the Cameron Highlands hydro-electricity scheme (106MW) and the Johore Bahru (30MW) and Malim Nawar (40MW) thermal power stations respectively. These projects resulted in an increase of the combined capacities of the NEB and Perak River Hydro-electric Company from 287 MW in 1960 to 471 MW in 1965.

FUTURE DEMAND FOR ELECTRICITY

58. Table 10-1 shows the rapid increases in demand for industrial, commercial and domestic uses which were experienced in the last ten years.

to meet existing demand, present capacity will fall far short of foreseen demand by 1970. The rate of increase of population in Sandakan at about 7% per annum is very high, while development in the area will further increase the demand for water. To meet the increased demand, work will be started on a new water supply scheme which will cost about \$40 million.

VII.—WATER SUPPLIES—SARAWAK

486. The Plan provides an allocation of \$9 million over the 1966-70 period for water supply development in Sarawak. Water supply systems in the main towns of Sarawak, including Kuching, Miri, Lawas, Semanggang and Sareki, will be extended. In addition, new water supplies will be provided to many villages and bazaars, particularly those in the coastal areas. Water supply development will also be undertaken in land development schemes.

VIII.—FINANCING THE WATER SUPPLY DEVELOPMENT PROGRAMME

487. In view of the size of the total water supply programme in the Plan and the limited resources available, it will be necessary to obtain external assistance for a number of major schemes including:

- (i) the Penang State water supply scheme,
- (ii) the Kuala Lumpur new water supply scheme,
- (iii) the Sungei Muar water supply scheme in Malacca, and
- (iv) the Sandakan water supply scheme.

488. The Plan allocations for water-supplies development are summarised in Table 10-6.

TABLE 10-6

MALAYSIA: DEVELOPMENT EXPENDITURE ON WATER SUPPLIES, 1961-70

		(\$ millions)										
		1961-65				1966-70						
		Malaya	Sabah	Sarawak	Malaysia	Malaya	Sabah	Sarawak	Malaysia			
Urban supplies	...	...	...	...	174.9	14.6	17.9	207.4	101.0	41.3	5.4	147.7
Rural supplies	...	...	...	...	...	—	—	—	49.0	1.7	3.6	54.3
TOTAL		...	174.9	14.6	17.9	207.4	150.0	43.0	9.0	202.0		

TABLE 10-1

MALAYA: ELECTRICITY CONSUMPTION BY CLASSES OF CONSUMERS, 1955-65

		(Million Kwh)							
		1955	%	1960	%	1964	%	1965	%
Tin mining		442.4	63.0	498.4	50.0	679.4	46.0	770.0	44.0
Industrial and commercial		147.5	21.0	264.0	26.5	496.0	32.8	608.0	34.8
Domestic	...	110.9	15.6	233.0	23.3	338.4	21.0	370.0	21.0
Other	...	2.7	0.4	2.0	0.2	1.2	0.2	2.0	0.2
TOTAL		703.5	100.0	997.4	100.0	1,515.0	100.0	1,750.0	100.0

459. With the above information as a benchmark, projections have been made of the future demand for electricity. During the period 1955-1965 demand for electricity was dominated by tin mining. Power demands for this purpose are likely to increase further for the next three years and level off thereafter. Industrial users consume only 16.2% of the total power supplied at present. However, industrial expansion is expected to contribute substantially to the growth of power demand in the future. Some of the major potential industrial loads are expected to be concentrated in the Kuala Lumpur/Port Swettenham area, where a chemical complex and a number of other industrial and water supply projects are anticipated. Similarly, in the Butterworth area, which will become one of the centres for heavy industry, a number of industrial projects are in the course of construction. A sugar refinery has been completed and an iron and steel mill will be built. It is also likely that electricity will be needed for a flour mill, a jute mill, a paper and pulp plant and another steelworks. As a result it is estimated that demand by industrial consumers will increase to about 860 million units in 1970 and 2,410 million units in 1980. At the same time demands for commercial and domestic purposes will increase to 1,985 million units in 1970 and 4,680 million units in 1980. As shown in Table 10-2, total demand for power is expected to increase to 3,250 million units in 1970 and 7,500 million units in 1980.

TABLE 10-2

MALAYA: PROJECTED ELECTRICITY CONSUMPTION BY CLASSES OF CONSUMERS, 1970 AND 1980

		(Million Kwh)			
		1970	%	1980	%
Industrial	...	860	26.5	2,410	32.0
Commercial	...	1,265	39.0	2,900	38.6
Domestic	...	720	22.0	1,780	26.4
Tin mining	...	400	12.5	400	3.0
Other	...	5	—	10	—
TOTAL		3,250	100.0	7,500	100.0

460. The major source of power in Malaya is the NEB. The two other large suppliers of electricity are the Perak River Hydro-electric Company and the City Council, George Town, Penang. Neither of these will construct any additional generating capacity during the 1966-70 period. By 1967 the Perak River Hydro-electric Company will start receiving bulk supply from the NEB to meet foreseen increases in demand. The City Council's existing capacities are more than capable of meeting present demand and it is envisaged that any further increase in demand will be met with power obtained from the NEB. The Plan provides \$545 million for the power development of the NEB. This represents an increase of 55% over the amount spent during the Second Five-Year Plan.

GENERATION

461. The generation projects included in the Plan are indicated in Table 10-3.

TABLE 10-3

MALAYA: GENERATION PROJECTS, 1966-70 (\$ millions)

Batang Padang hydro-electric scheme (153MW)	...	...	...	...	121
Prai thermal power station (60MW)	...	...	...	...	45
Port Dickson thermal power station (120MW)	...	...	...	...	108
Bentong hydro-electric scheme (14MW)	...	...	...	...	20
Raub hydro-electric scheme (20MW)	...	...	...	...	20
Johore Bahru thermal station 1st extension (30MW)	...	...	...	...	14
Johore Bahru thermal station 2nd extension (30MW)	...	...	...	...	14
Upper Perak River hydro-electric scheme	...	...	...	...	25
Other generation projects	...	...	...	...	9
TOTAL					\$375

462. It is anticipated that by the end of the Plan period the combined installed capacities of the NEB, Perak River Hydro-electric Company and Penang City Council will increase to about 915 MW. This will be almost double their present capacities. The energy generated is likely to increase from about 1,925 million units in 1965 to about 3,575 million units in 1970. *Per capita* consumption is expected to rise from 220 units to 345 units over the period.

463. Table 10-4 sets out all sources of power by mode of generation for 1965 and 1970.

TABLE 10-4

MALAYA: INSTALLED POWER CAPACITY BY MODE OF GENERATION, 1965 AND 1970

(Megawatts)					1965	1970	% increase
					(actual)	(target)	
Hydro	...	...	...	...	138.8	326.8	136
Thermal	...	...	...	...	298.0	548.0	84
Diesel	...	...	...	...	34.2	40.2	19.4
Total generating capacity					471.0	915.0	94

HYDRO-ELECTRIC POWER

464. The main hydro-electric schemes now in operation are the Cameron Highlands (106MW), Ulu Langat (2.3MW), Chenderoh (27MW), Sempang (1.2MW) and Rahman (2.3MW). Total hydro generating capacity will increase by about 136% during the Plan period. This increase will be mainly attributable to the Batang Padang scheme, which will be commissioned in 1968. The Batang Padang scheme will have a capacity of approximately 154 MW and will supply some 530 million Kwh per annum. This output will be one and a half times greater than that of the present Cameron Highlands hydro-electric scheme. This energy will be delivered into the combined systems of the NEB and the Perak River Hydro-electric Company. Two other hydro schemes will also be undertaken during the Plan period. These are the Raub and Bentong hydro-electric schemes, with a generating capacity of 20 MW and 14 MW respectively. Construction is due to start in 1966 at Bentong and 1968 at Raub. The two power plants are expected to be commissioned by 1968 and 1970 respectively. The construction of these two schemes will link the western towns of Pahang with the Central Network, thereby enabling the Board to shut down its existing diesel station at Bentong.

THERMAL POWER

465. The principal thermal plants now in operation are Connaught Bridge (80MW) and Malacca (30MW) in the Central Network, Malim Nawar (94MW) and Batu Gajah (24MW) in the areas supplied by the Perak Hydro-electric Company, George Town, Penang (40MW) and Johore Bahru (30MW). Thermal generation contributes about 61% of total electricity supply in Malaya.

466. Two thermal power stations will be constructed and commissioned during the Plan period, one at Port Dickson (120MW) and another at Prai (60MW). In addition, an extension of the Johore Bahru power station to accommodate two further sets of 30MW each and an extension of the Malacca power station to accommodate another 10 MW set will be carried out. Thus 250 MW of additional thermal generating capacity will be made available under the First Malaysia Plan.

DIESEL POWER

467. Medium and small diesel generating stations will continue to provide the necessary power in small towns and districts where the demand for electricity is too small to justify other methods of supply. The maximum demand on the majority of the Board's diesel power stations is doubling every seven years but the loads on stations in East Coast towns such as Kota Bahru, Kuala Trengganu and Dungun are increasing far more rapidly. Diesel plants will be transferred from certain West Coast power stations to the East Coast in 1966-68, thereby providing sufficient generating capacity to meet demand well into the next decade.

TRANSMISSION AND DISTRIBUTION

468. A sum of \$137 million has been allocated for transmission and distribution facilities associated with all these generation projects. One of the major features in the development of the Board's transmission and distribution network will be the integration of the Central Network with the Northern Zone areas by 1967 to form one national grid extending from Alor Star in the north to Kluang in the south. The first phase of the interconnection will be the linking of the Perak River Hydro-electric Company's network with the Board's Northern Network in Province Wellesley and with the Penang City Council's power station on Penang Island. The second phase will be the interconnection of the Board's Northern Network with the Central Network at Kuala Woh, where the main station of the Batang Padang hydro-electric scheme will be located, and linked with the existing Cameron Highlands-Connaught Bridge transmission circuits. Finally, the extension of the Board's 132KV and 66KV transmission systems northwards to Alor Star and southwards to Kluang respectively will be effected. These improvements will establish an efficient and flexible Western Network system which will be capable of supplying power economically during both dry and wet periods. However, a gap will remain between Kluang and Johore Bahru, where prospects of load development at present do not

justify the interconnection of the Board's Western Network with the new Johore Bahru power station.

RURAL ELECTRIFICATION

469. The government recognises that electricity contributes towards improved living standards in rural areas and is anxious to extend this facility to the rural population as fast as possible. Rural electrification not only provides an amenity to the rural population but also serves to stimulate the processing of agricultural products, the growth of sawmills and other small-scale industries and the use of irrigation pumps and other agricultural equipment. The Plan makes a provision of \$15 million for rural electrification.

FUTURE POWER DEVELOPMENT

470. A long-term power development programme is necessary to ensure that generation and transmission facilities are adequate to meet the growth in demand. Studies indicate that by 1980 maximum demand throughout Malaya will exceed 1,100 MW, compared with the present demand of about 335MW. These studies also suggest that by 1980 Malaya's hydro-electric potential will be fully utilized. After that date further expansion of demand will probably have to be met by other means, mainly by the development of new thermal power stations. The Board has already undertaken a survey of suitable sites for long-term thermal station development. Two locations have already been earmarked for the siting of future thermal stations, one at Lumut and the other at Port Dickson.

471. One major incentive for the industrialisation of the economy is the availability of plentiful and cheap electric power. With this end in view, the industrial tariff, covering large manufacturing users, will be reduced, as recently announced by the government.

IMPLEMENTATION OF DEVELOPMENT PROGRAMMES

472. The NEB has the necessary technical capacity to carry out these programmes as scheduled. The Malaysianisation of the Board's staff will be completed by the end of 1967. Extensive training programmes are being pursued to create the necessary local staff competence to perform all technical and managerial operations.

II.—ELECTRICITY—SABAH

473. The Sabah Electricity Board operates diesel generating sets in the various load centres in Sabah and is responsible for the development of

electricity in the State. Annual consumption is expected to increase from 53 million units in 1965 to 78.9 million units in 1970. The diesel generating capacity of the SEB will be raised from 18.7 MW at present to 44.8 MW in 1970. However, this expansion will not be sufficient to meet foreseen needs in the Jesselton area, where the demand for power is likely to reach a level at which diesel generation is uneconomic. Thus it will be necessary to install other hydro-electric or thermal generating capacity by 1970. The cost of the diesel generation programme, together with associated transmission and distribution facilities, will be \$15.0 million. Of this amount \$1.5 million will be provided by the government to encourage minor rural electrification projects. An additional \$9 million has been earmarked as a preliminary and tentative allocation for the construction of either a hydro-electric or thermal generating station to serve Jesselton.

1.—ELECTRICITY—SARAWAK

14. The development of electricity in Sarawak is the responsibility of the Sarawak Electricity Supply Corporation (SESCO). A sum of \$24.3 million has been provided for the expansion of SESCO's diesel generation, distribution and transmission facilities to meet the growth in demand, which is estimated at 14.5% per annum. Future demand, at least over the Plan period, will be dominated by domestic and commercial users. Industrial demand for power is not likely to be a substantial proportion of total demand, at least not until the coal fields at Silantek begin to be exploited.

15. Of the total allocation of \$24.3 million, a sum of \$1.2 million will be provided by the government for the promotion of rural electrification. Rural electricity is particularly important in Sarawak as an inducement to shifting cultivators to settle in the new land development schemes.

1.—FINANCING THE ELECTRICITY DEVELOPMENT PROGRAMME

16. The power development programme for the whole of Malaysia over the next five years will cost \$584.3 million. This is a vast capital programme and its financing will present considerable difficulties. A loan for the completion of two of the major projects in the Plan, amounting to \$156 million, has already been secured from the World Bank. This loan will cover the foreign exchange costs of the Batang Padang hydro-electric scheme, the Prai thermal power station and associated transmission lines. In addition, it is hoped to obtain external assistance for other major generating projects and also for transmission and distribution development.

17. The Plan allocations for power development programmes are summarised in Table 10-5.

TABLE 10-5
MALAYSIA: DEVELOPMENT EXPENDITURE ON
ELECTRICITY, 1961-70

		(\$ millions)								
		1961-65				1966-70				
		Malaya	Sabah	Sarawak	Malaysia	Malaya	Sabah	Sarawak	Malaysia	
Generation	}	337.5	13.6	16.0	367.1	376.0	}	13.5	23.1	566.6
Transmission						16.0				
Distribution						121.0				
Administration and miscellaneous						17.0				
Rural electrification		15.0	0.3	0.4	15.7	15.0	1.5	1.2	17.7	
TOTAL		352.5	13.9	16.4	382.8	545.0	15.0	24.3	584.3	

V.—WATER SUPPLIES—MALAYA

478. A sum of about \$175 million was expended under the Malayan Second Five-Year Development Plan to improve and extend existing water supplies and develop new ones. The number of water supply systems rose from 140 in 1960 to over 170 by the end of 1965. Average daily output increased by 54% from 84 million gallons per day in 1960 to 130 million gallons in 1965. As a result, the number of people served by treated water supplies rose by about a million from 2.7 million in 1960 to 3.7 million in 1965.

479. The First Malaysia Plan provides for capital expenditure of \$150 million, out of which \$101 million will be spent on major capital works in the urban areas and surrounding rural areas and the remainder exclusively on rural supplies. The proposed capital expenditure will make available an additional 80 million gallons per day, which will ultimately benefit an additional 1.15 million people.

480. The major projects over the next five years will be undertaken to augment water supplies for the major towns of Kuala Lumpur, Malacca, Penang, Kota Bahru and Alor Star, where demand for water is expected to rise substantially as a result of rapid industrial development and urbanization. The water supply scheme for Penang, estimated to cost \$50 million will be capable of providing 25 million gallons per day initially and an additional 25 million gallons per day after further development. This expansion will provide enough water for the whole of Penang Island and Province Wellesley up to 1984, when the State's population is expected to be about one million. It will also meet the growing demand resulting from industrial development. In Malacca the proposed Sungei Muar scheme costing \$18 million will have a capacity of 12 million gallons per day.

he scheme will supplement existing supplies of 9.4 million gallons per day, which are capable of serving only 200,000 people. The present plants are already working to maximum capacity and will not be able to cope with further increases in demand.

81. The rapid increase in population in Kuala Lumpur and the new town of Petaling Jaya has necessitated the construction of a new source of water supply, together with related distribution facilities. The new scheme will cost \$50 million and is expected to provide an output of 60 million gallons per day after 1968 to augment existing supplies of about 40 million gallons. The new scheme should be able to meet the water requirements of the nation's capital and surrounding areas up to 1990.

RURAL WATER SUPPLIES

82. The number of rural water supply schemes increased from 111 in 1960 to 159 in 1965 under the Second Five-Year Plan. Continued efforts will be made in the next five years to extend further rural water supplies. A sum of \$49 million has been allocated for this purpose.

WATER CHARGES

83. At present water charges do not cover the capital and operating costs of water supply schemes. In many cases the supply of water has been heavily subsidised by the government. In view of the growth in the level of private incomes, heavy subsidisation of water supply development is no longer necessary. In the future, water supplies, like other utility services, will be expected to be self-supporting as is the case in many countries, including even the developing countries. Consideration is therefore being given to increase water charges.

VI.—WATER SUPPLIES—SABAH

484. The demand for water in major towns such as Jesselton, Kota Belud, Tawau and Lahad Datu is fast exceeding present supply capacities. For example, in Jesselton the demand for water by all users reached a level of 1.5 million gallons per day at the end of 1964, while supply capacity was two million gallons. However, by 1970 the population in Jesselton is likely to reach 50,000 and a supply of three to four million gallons per day will be necessary to cope with peak demand. The Plan provides \$2.8 million for expanding capacities in a number of towns, including those mentioned above.

485. Existing sources of supply in Sandakan are capable of yielding about one million gallons per day in dry weather. Present average daily consumption is about 0.6 million gallons. Although there are enough water resources