

말레이시아 에너지 統計

編輯者 註: 本 統計資料는 第13次 WEC 칸느總會 및 IEC 會議 期間中 收集한 資料임.

GENERAL FEATURES OF THE ENERGY ECONOMY

Malaysia is located between latitudes 1° and 7° N and covers an area of 330,434 km², with a total population of 15.270 million at the end of 1984.

Malaysia's transition from an agro-based to a more diversified industrializing economy has been rapid. Gross Domestic Product (GDP) in 1984 was US\$23.75 × 10⁹, of which agriculture accounted for 20.1 percent, manufacturing 20.3 percent, mining 10.5 percent, construction 5.2 percent, commercial 28.3 percent and other services 15.6 percent.

Malaysia has an open economy, and recent global recessionary economic trends have imposed considerable constraints on its growth and development. Average GDP growth was around 6 percent per annum for the 1981 - 85 period, as compared to around eight percent per annum for the period 1976 - 1980. Future growth prospects of the country in the medium term are expected to be of the order of five percent per year. This will be characterised by the continuing effort to promote heavy industry in the manufacturing sector.

Energy consumption grew at an average of about seven percent per annum between 1978 - 1984. The two dominant energy consuming sectors are the industrial and transport sectors, and this pattern is likely to continue in the future.

Malaysia is a net energy exporting country, exporting about 787 PJ of crude oil and refined petroleum pro-

ducts in 1984. Energy imports are relatively small, and comprise mainly refined petroleum products to cater for shortfalls in the domestic refinery capacity, and coal/coke for industrial uses. Primary energy supply in 1984 was 605 PJ, an increase of 56 percent from the 1978 level, while the oil share dropped from 75 percent to 64 percent.

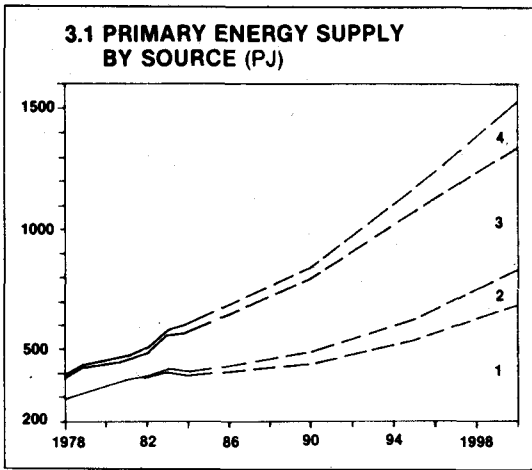
The national energy policy has emphasised a four-fuel strategy based on hydro, gas, coal and oil. The share of oil is expected to drop further in the future, with the increasing penetration of hydro, natural gas and coal, although it will still play an important role in sectors such as transportation, households and services, where substitution by other energy forms may not be economically and technologically justified.

Natural gas and its related products will be an increasingly important energy supply source, as the domestic natural gas resource base is significantly larger than that of oil. The bulk of the increase in natural gas utilisation is expected to occur in the power generation sector, heavy industries and household/residential sector. Natural gas is projected to contribute 36 percent of the total primary energy supply by the year 1990.

The use of coal in the power and certain industrial sectors is expected to rise to approximately six percent by 1990. The country has an estimated hydro potential exceeding 120 TWh per year, and hydro power is expected to contribute six percent to the primary supply mix by 1990.

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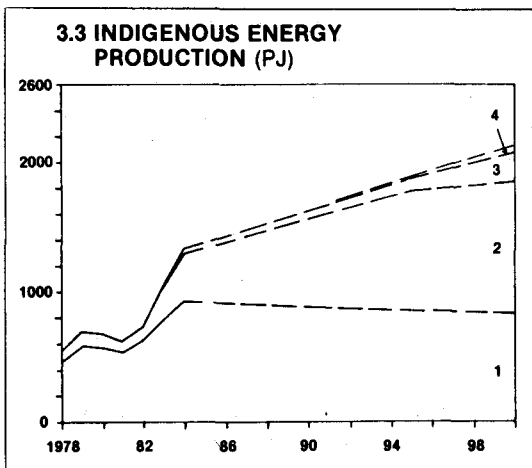
Sources of Data: National Energy Balances Malaysia 1978 - 1984, Annual Reports of National Electricity Board, Sarawak Electricity Supply Corporation, and Sabah Electricity Board, and Malaysian National Committee estimates.



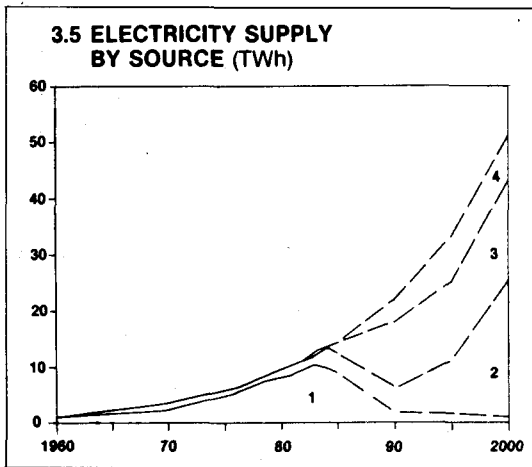
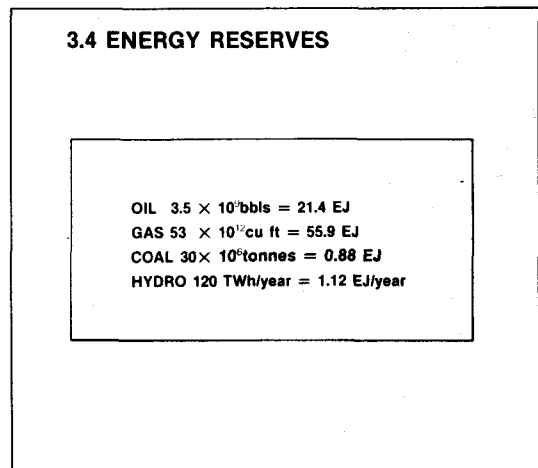
1 OIL 2 COAL 3 GAS 4 HYDRO



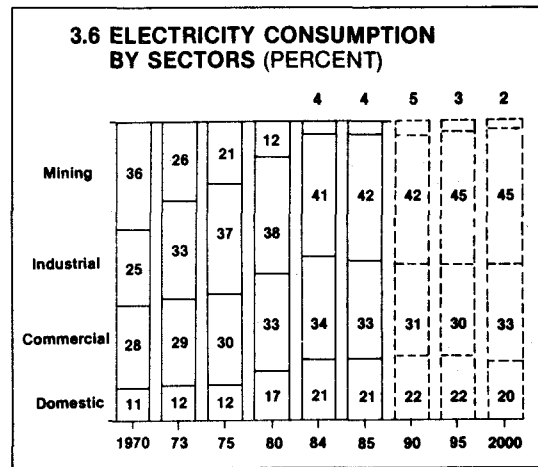
1 PRIMARY ENERGY 2 GNP 3 ELECTRICITY



1 OIL 2 GAS 3 HYDRO 4 COAL



1 OIL 2 HYDRO 3 GAS 4 COAL



4.1 GENERAL ENERGY DATA	1970	1973	1979	1980	1981	1982	1983	1984
Population 10 ⁶	na	na	13	14	14	15	15	15
GDP 10 ⁹ US \$ (1978)	na	na	19	20	22	23	24	26
GDP 10 ⁹ M \$ (1978)	na	na	41	45	48	50	54	58
GDP/Capita US \$ (1978)	na	na	1 412	1 472	1 536	1 574	1 721	1 710
GDP/Capita M \$ (1978)	na	na	3 122	3 252	3 395	3 478	3 804	3 779
Primary Energy Supply								
Total PJ	na	na	441	457	474	503	575	605
Total Mtoe	na	na	11	11	11	12	14	14
Per Capita GJ	na	na	33	33	34	35	39	40
Per GDP MJ/US \$ (1978)	na	na	24	23	22	22	22	23
Per GDP MJ/ M \$ (1973)	na	na	11	10	10	10	10	10
Electricity Supply								
Total GWh	na	na	8 757	9 307	10 088	11 188	12 191	13 093
Per Capita kWh	na	na	659	677	717	771	819	857
Per GDP Wh/US \$ (1978)	na	na	467	460	467	490	476	501
Per GDP Wh/ M \$ (1978)	na	na	211	208	211	222	215	227

4.2 PRIMARY ENERGY SUPPLY (PJ)	1970	1973	1979	1980	1981	1982	1983	1984
Indigenous Production								
Natural Gas	na	na	106	94	79	100	240	364
Crude Oil	na	na	591	573	536	630	797	931
Hydro Power	na	na	12	16	19	16	19	38
Non commercial								
Total Production	na	na	709	683	634	746	1 056	1 333
(Mtoe)	na	na	17	16	15	18	25	32
Imports (+)								
Crude Oil	na	na	189	169	152	108	116	112
Refined Petroleum Products	na	na	79	110	132	168	166	144
Coal	na	na	1	2	4	4	10	11
Total imports	na	na	269	281	288	280	292	287
(Mtoe)	na	na	6	7	7	7	7	6
Exports (-)								
Natural Gas	na	na	-	-	-	-	-	-
LNG	na	na	-	-	-	-	101	200
Crude Oil	na	na	521	486	439	518	616	714
Refined Petroleum Products	na	na	8	6	5	12	41	70
Total Exports	na	na	529	492	444	530	758	984
(Mtoe)	na	na	13	12	11	13	18	23
Marine Bunkers (-)	na	na	- 3	- 2	- 1	- 2	- 2	- 2
Change in Stocks (±)	na	na	+ 3	- 19	+ 11	+ 1	+ 18	- 3
Statistical Differences	na	na	- 8	+ 5	- 14	+ 9	- 32	- 6
Total Primary Energy Supply	na	na	441	456	474	504	574	605
(Mtoe)	na	na	11	11	11	12	14	14

4.3 TRANSFORMATION SECTOR (PJ)	1970	1973	1979	1980	1981	1982	1983	1984
Conversion Losses	na	na	79	99	97	93	116	124
Energy Sector Own Use	na	na	113	102	87	107	137	153
Statistical Differences (±)	na	na	+ 7	- 2	- 1	- 3	- 5	- 9
Total Use in Transformation	na	na	199	189	183	197	248	268
(Mtoe)			5	5	4	5	6	6

4.4 FINAL ENERGY DEMAND (PJ)	1970	1973	1979	1980	1981	1982	1983	1984
(Mtoe)	na	na	242	267	291	307	326	337
	na	na	6	6	7	7	8	8

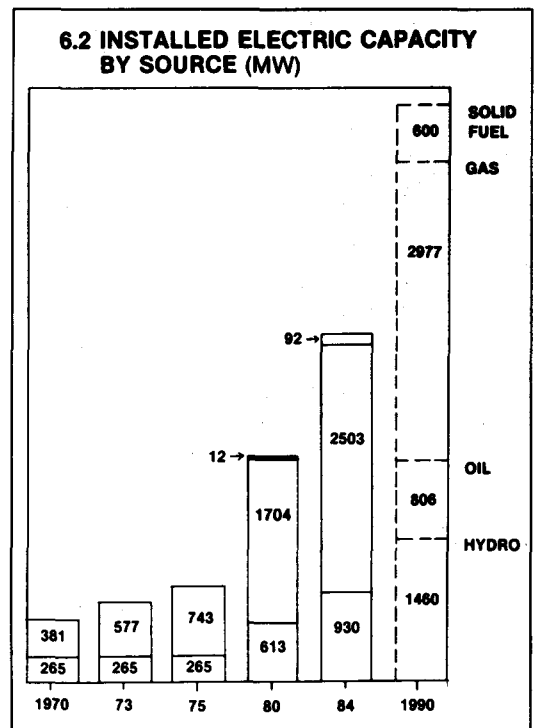
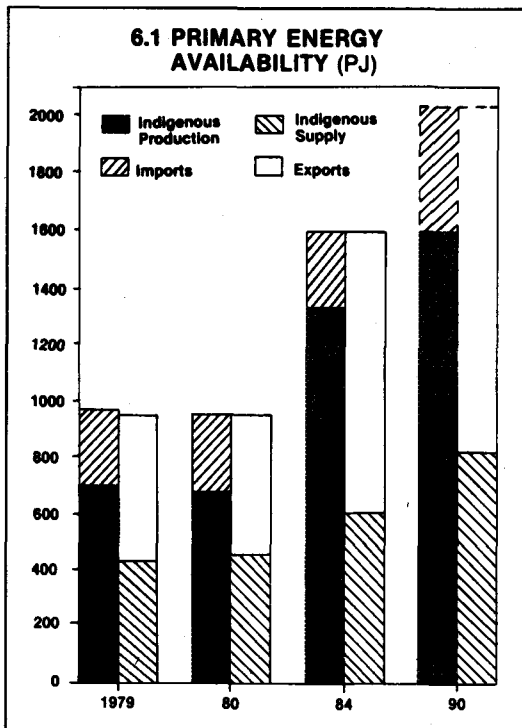
5.1 FINAL ENERGY DEMAND BY SOURCE AND SECTOR (PJ)	1970	1973	1979	1980	1981	1982	1983	1984
Solid Fuels								
Industrial	na	na	1	2	4	4	10	11
Total Solid Fuels (Mtoe)	na	na	1	2	4	4	10	11
Natural Gas								
Residential & Commercial	na	na	1	2	2	2	2	2
Industrial	na	na	—	—	—	—	—	4
Total Natural Gas (Mtoe)			1	2	2	2	2	6
Refined Petroleum Products								
Residential & Commercial	na	na	18	18	19	19	20	21
Industrial	na	na	93	101	115	116	110	107
Transport	na	na	89	101	106	116	132	137
Non-energy use	na	na	11	12	12	14	13	13
Total Refined Petroleum Products (Mtoe)			211	232	252	265	275	278
			5	6	6	6	7	7
Electricity								
Residential & Commercial	na	na	14	16	17	19	21	23
Industrial	na	na	15	15	16	17	18	19
Total Electricity (Mtoe)			29	31	33	36	39	42
			1	1	1	1	1	1
Others			—	—	—	—	—	—
Total Final Energy Demand (Mtoe)	na	na	242	267	291	307	326	337
			6	6	7	7	8	8

5.2 ELECTRICITY SUPPLY BY SOURCE (GWh)	1970	1973	1979	1980	1981	1982	1983	1984
Oil	na	na	7 652	7 922	8 344	9 689	10 125	10 063
Gas	na	na	—	25	33	33	268	135
Hydro Power	na	na	1 004	1 274	1 625	1 401	1 736	2 826
Other	na	na	—	—	—	—	—	—
Net Imports	na	na	101	86	86	65	62	69
Total	na	na	8 757	9 307	10 088	11 188	12 191	13 093
of which								
Public Supply	na	na	8 476	9 020	9 772	10 882	11 871	12 749
Autogeneration	na	na	281	287	316	306	320	344

5.3 SECTOR OIL SUBSTITUTION INDICATORS (OAR, OUR)	1970	1973	1979	1980	1981	1982	1983	1984
Oil Application Ratio (OAR)								
Residential, Commercial & 1)	na	na	0.10	0.09	0.09	0.09	0.08	0.09
Industrial	na	na	0.31	0.30	0.33	0.31	0.28	0.28
Transport	na	na	0.29	0.31	0.30	0.31	0.33	0.35
Electricity Generation	na	na	0.30	0.30	0.29	0.29	0.30	0.29
Oil Use Ratio (OUR)								
Residential, Commercial & 1)	na	na	0.65	0.63	0.62	0.62	0.59	0.57
Industrial	na	na	0.85	0.85	0.85	0.85	0.79	0.76
Transport	na	na	1.00	1.00	1.00	1.00	1.00	1.00
Electricity Generation	na	na	0.87	0.85	0.83	0.84	0.85	0.73

$$\text{OAR} = \frac{\text{Oil Consumption in Sector}}{\text{Total Oil Consumption in Country}} \quad \text{OUR} = \frac{\text{Oil Consumption in Sector}}{\text{Total Energy Consumption in Sector}}$$

1) Non-energy use



6.3 EXPLANATIONS AND DEFINITIONS

SYMBOLS AND ABBREVIATIONS EMPLOYED:

- e = estimated data
- na = not available data
- = magnitude zero
- r = revised data in respect of previous issue

In rounding data, each figure has been rounded off to the nearest final digit. The sum of the parts may not therefore equal the total.

CONVERSION FACTORS

When hydro, nuclear or geothermal electricity is accounted for as primary energy in PJ or Mtoe a convention of 1 TWh of electricity = 2.6 TWh of primary energy has been used (table 4.2, diagram 3.1 and 3.3) and the conversion losses are included in table 4.3. Thus 1 TWh electricity = 2.6 TWh = 9.36 PJ of primary energy.

In table 5.1 is electricity final demand given in PJ (1 TWh = 3.6 PJ).

In table 5.2 electricity supply amounts in GWh.

S.I. MULTIPLIERS AND EQUIVALENTS

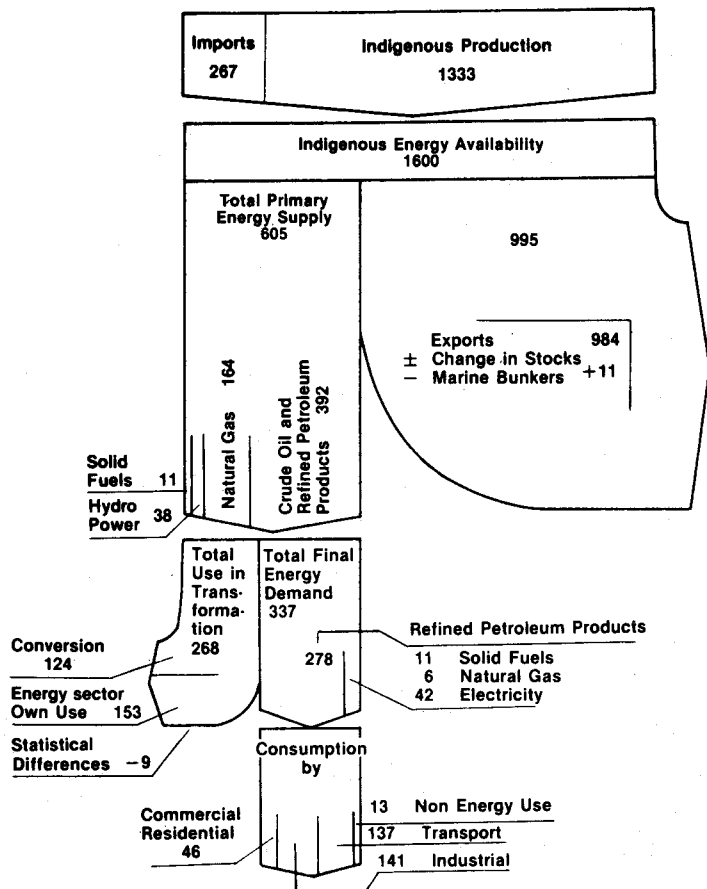
The use of double prefixes should be avoided, e.g., GW not kW.

(k) = kilo = 10^3	J	= 1 Joule	= 0.239 cal = 1 Ws
(M) = mega = 10^6	1 kWh final demand	= 3.6 MJ or 860 kcal	
(G) = giga = 10^9	1 Ton	= 1 000 kg	
(T) = tera = 10^{12}	1 kg	= 2.2046 lb.	
(P) = peta = 10^{15}	1 Btu	= 0.252 kcal = 1.055 kJ	
(E) = exa = 10^{18}	1 Therm	= 10^5 Btu	25 200 kcal = 105 506 kJ
	1 Toe	= 42 GJ	
	1 Tce	= 29.3 GJ	

CURRENCY CONVERSION

Local currency is converted to 1978 US\$ by using the 1978 US Dollar exchange rate (1 US\$ = 2.21 MR)

DIAGRAM OF ENERGY FLOW 1984 (PJ)



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