

MALAYSIA
ENERGY BALANCE TABLES

2002										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	0.2	39.5	44.2	0.7		1.5				86.1
Net Imports	2.4	- 14.1	- 19.5							- 31.2
TPED	2.5	26.3	24.7	0.7		1.5				55.8
Electricity and Heat Generation	- 1.3	- 1.6	- 12.5	- 0.7			5.9			- 10.2
Petroleum Refineries		- 3.7								- 3.7
Others	- 0.2	- 0.7	- 6.9							- 7.8
TFED	1.1	20.0	5.1			1.5	5.9			33.6
Industry	1.1	5.1	5.0			0.1	3.1			14.3
Transport		13.4								13.4
Residential		0.7				1.4	1.2			3.3
Commercial		0.8					1.7			2.5

2010										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	0.3	41.3	58.3	0.7		1.9				102.5
Net Imports	12.3	- 9.5	- 26.6							- 23.8
TPED	12.6	31.8	31.7	0.7		1.9				78.7
Electricity and Heat Generation	- 11.1	- 0.3	- 13.8	- 0.7		- 0.2	9.0			- 17.1
Petroleum Refineries		- 3.7								- 3.7
Others		- 0.7	- 9.1							- 9.8
TFED	1.6	27.1	8.8			1.6	9.0			48.1
Industry	1.6	6.3	8.7			0.1	4.9			21.5
Transport		18.9	0.1							19.0
Residential		0.8				1.6	1.9			4.3
Commercial		1.1					2.1			3.2

2020										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	0.3	41.1	58.3	0.9		2.2				102.9
Net Imports	22.1	1.0	- 16.5							6.6
TPED	22.4	42.1	41.9	0.9		2.2				109.5
Electricity and Heat Generation	- 20.0	- 0.3	- 18.5	- 0.9		- 0.4	14.3			- 25.9
Petroleum Refineries		- 3.3								- 3.3
Others		- 0.7	- 9.1							- 9.8
TFED	2.4	37.9	14.2			1.8	14.3			70.6
Industry	2.4	7.8	13.9			0.1	8.4			32.6
Transport		27.6	0.2							27.8
Residential		1.1				1.7	3.1			5.9
Commercial		1.3	0.1				2.8			4.2

2030										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	0.4	37.4	58.3	1.0		2.5				99.6
Net Imports	33.4	17.6	- 3.9							47.0
TPED	33.7	55.0	54.4	1.0		2.5				146.7
Electricity and Heat Generation	- 30.4	- 0.2	- 25.0	- 1.0		- 0.5	21.4			- 35.6
Petroleum Refineries		- 2.6								- 2.6
Others		- 0.6	- 9.1							- 9.7
TFED	3.4	51.6	20.4			2.0	21.4			98.7
Industry	3.4	9.6	19.9			0.1	13.4			46.4
Transport		39.0	0.3							39.3
Residential		1.4	0.1			1.9	4.4			7.7
Commercial		1.6	0.1				3.6			5.3

MALAYSIA
MACRO ASSUMPTIONS

	1980	2002	2010	2020	2030	Growth Rate (% per annum)				
						80-02	02-10	10-20	20-30	02-30
GDP (2000 PPP US\$ billion)	63	231	347	550	860	6.1	5.2	4.7	4.6	4.8
Population (million)	13.9	24.5	28.5	32.8	36.1	2.6	1.9	1.4	1.0	1.4
GDP per capita (2000 PPP US\$)	4 527	9 417	12 170	16 780	23 780	3.4	3.3	3.3	3.5	3.4
GDP in Services (2000 PPP US\$ billion)	24	114	168	270	417	7.3	5.0	4.8	4.5	4.7
GDP in Industry (2000 PPP US\$ billion)	25	108	175	286	442	6.8	6.2	5.0	4.5	5.2
Urbanisation level (%)	42	63	68	74	78	1.9	1.0	0.8	0.5	0.7

ENERGY PROJECTIONS

	Mtoe					Growth rate (% per annum)				
	1980	2002	2010	2020	2030	80-02	02-10	10-20	20-30	02-30
Production	18.2	86.1	102.5	102.9	99.6	7.3	2.2	0.05	-0.3	0.5
Coal		0.2	0.3	0.3	0.4		7.4	1.0	1.0	2.8
Oil	14.5 (79%)	39.5 (46%)	41.3 (40%)	41.1 (40%)	37.4 (38%)	4.7	0.6	-0.04	-0.9	-0.2
Gas	2.0 (11%)	44.2 (51%)	58.3 (57%)	58.3 (57%)	58.3 (59%)	15.1	3.5			1.0
Hydro		0.7 (1%)	0.7 (1%)	0.9 (1%)	1.0 (1%)	8.6	-1.3	3.7	0.7	1.2
NRE	1.6 (9%)	1.5 (2%)	1.9 (2%)	2.2 (2%)	2.5 (3%)	-0.3	2.9	1.6	1.2	1.8
Nuclear										
Net Imports	- 5.5	- 31.2	- 23.8	6.6	47.0	8.2	- 3.3		21.8	
Coal		2.4	12.3	22.1	33.4	20.3	22.7	6.0	4.2	9.9
Oil	- 5.6	- 14.1	- 9.5	1.0	17.6	4.3	- 4.8		33.6	
Gas		- 19.5	- 26.6	- 16.5	- 3.9		4.0	- 4.7	- 13.4	- 5.6
Electricity										
Total Primary Energy Demand	12.2	55.8	78.7	109.5	146.7	7.2	4.4	3.4	3.0	3.5
Coal	0.04	2.5 (5%)	12.6 (16%)	22.4 (20%)	33.7 (23%)	20.6	22.3	5.9	4.2	9.7
Oil	8.4 (69%)	26.3 (47%)	31.8 (40%)	42.1 (38%)	55.0 (38%)	5.3	2.4	2.8	2.7	2.7
Gas	2.0 (17%)	24.7 (44%)	31.7 (40%)	41.9 (38%)	54.4 (37%)	12.1	3.1	2.8	2.7	2.9
Hydro	0.1 (1%)	0.7 (1%)	0.7 (1%)	0.9 (1%)	1.0 (1%)	8.6	-1.3	3.7	0.7	1.2
NRE	1.6 (13%)	1.5 (3%)	1.9 (2%)	2.2 (2%)	2.5 (2%)	-0.3	2.9	1.6	1.2	1.8
Nuclear										
Input for Electricity and Heat Generation	- 2.5	- 16.2	- 26.1	- 40.2	- 57.1	8.9	6.1	4.4	3.6	4.6
Coal		- 1.3 (8%)	- 11.1 (43%)	- 20.0 (50%)	- 30.4 (53%)		31.0	6.1	4.2	12.0
Oil	- 2.4 (94%)	- 1.6 (10%)	- 0.3 (1%)	- 0.3 (1%)	- 0.2 (0%)	- 1.6	- 20.4	0.9	- 1.8	- 6.6
Gas		- 12.5 (77%)	- 13.8 (53%)	- 18.5 (46%)	- 25.0 (44%)		1.2	3.0	3.0	2.5
Hydro	- 0.1 (5%)	- 0.7 (5%)	- 0.7 (3%)	- 0.9 (2%)	- 1.0 (2%)	8.6	- 1.3	3.7	0.7	1.2
NRE			- 0.2 (1%)	- 0.4 (1%)	- 0.5 (1%)			4.8	2.1	
Nuclear										
Other Transformation	- 0.5	- 11.5	- 13.5	- 13.0	- 12.3	14.9	2.0	- 0.4	- 0.6	0.2
Coal		- 0.2 (1%)								
Oil	- 0.5 (100%)	- 4.5 (39%)	- 4.5 (33%)	- 4.0 (30%)	- 3.2 (26%)	10.1		- 1.2	- 2.1	- 1.2
Gas		- 6.9 (60%)	- 9.1 (67%)	- 9.1 (70%)	- 9.1 (74%)		3.5			1.0
NRE										
Electricity										
Heat										

MALAYSIA

	Mtoe					Growth rate (% per annum)				
	1980	2002	2010	2020	2030	80-02	02-10	10-20	20-30	02-30
Total Final Energy Demand	7.1	33.6	48.1	70.6	98.7	7.3	4.6	3.9	3.4	3.9
Coal	0.04	1.1	1.6	2.4	3.4	16.1	4.7	4.3	3.7	4.2
		(3%)	(3%)	(3%)	(3%)					
Oil	5.4	20.0	27.1	37.9	51.6	6.2	3.9	3.4	3.1	3.4
	(75%)	(60%)	(56%)	(54%)	(52%)					
Gas		5.1	8.8	14.2	20.4		7.1	4.9	3.6	5.1
		(15%)	(18%)	(20%)	(21%)					
NRE	1.0	1.5	1.6	1.8	2.0	2.0	1.1	1.0	1.0	1.0
	(14%)	(4%)	(3%)	(3%)	(2%)					
Electricity	0.7	5.9	9.0	14.3	21.4	9.9	5.3	4.8	4.1	4.7
	(10%)	(18%)	(19%)	(20%)	(22%)					
Heat										
Industry	2.9	14.3	21.5	32.6	46.4	7.5	5.2	4.2	3.6	4.3
Coal	0.04	1.1	1.6	2.4	3.4	16.1	4.7	4.3	3.7	4.2
		(8%)	(7%)	(7%)	(7%)					
Oil	2.5	5.1	6.3	7.8	9.6	3.3	2.7	2.2	2.1	2.3
	(84%)	(35%)	(29%)	(24%)	(21%)					
Gas		5.0	8.7	13.9	19.9		7.0	4.9	3.6	5.0
		(35%)	(40%)	(43%)	(43%)					
NRE		0.1	0.1	0.1	0.1	3.9	3.2	2.6	2.4	2.7
		(0%)	(0%)	(0%)	(0%)					
Electricity	0.4	3.1	4.9	8.4	13.4	9.9	6.2	5.5	4.7	5.4
	(13%)	(21%)	(23%)	(26%)	(29%)					
Heat										
Transport	2.5	13.4	19.0	27.8	39.3	8.0	4.4	3.9	3.5	3.9
Coal										
Oil	2.5	13.4	18.9	27.6	39.0	8.0	4.4	3.9	3.5	3.9
	(100%)	(100%)	(99%)	(99%)	(99%)					
Gas		0.03	0.10	0.20	0.30		18.2	7.5	4.2	9.2
		(0%)	(1%)	(1%)	(1%)					
NRE										
Electricity										
Residential	1.4	3.3	4.3	5.9	7.7	4.0	3.5	3.1	2.7	3.1
Coal										
Oil	0.4	0.7	0.8	1.1	1.4	2.2	2.4	2.4	2.7	2.5
	(31%)	(21%)	(20%)	(18%)	(18%)					
Gas	0.03		0.01	0.03	0.05	-8.9	13.5	9.4	7.2	9.7
	(2%)		(0%)	(0%)	(1%)					
NRE	0.9	1.4	1.6	1.7	1.9	1.9	1.0	0.9	0.9	0.9
	(67%)	(43%)	(36%)	(29%)	(24%)					
Electricity		1.2	1.9	3.1	4.4		6.5	4.9	3.5	4.9
		(35%)	(44%)	(52%)	(57%)					
Heat										
Commercial	0.4	2.5	3.2	4.2	5.3	9.2	3.0	2.8	2.4	2.7
Coal										
Oil		0.8	1.1	1.3	1.6		3.3	2.5	1.6	2.4
		(32%)	(33%)	(32%)	(29%)					
Gas		0.01	0.03	0.08	0.15		14.7	9.9	6.7	10.1
		(0%)	(1%)	(2%)	(3%)					
NRE										
Electricity	0.4	1.7	2.1	2.8	3.6	7.3	2.8	2.8	2.6	2.7
	(100%)	(67%)	(66%)	(66%)	(68%)					
Heat										

ENERGY SECURITY

	1980	2002	2010	2020	2030
Diversity of Primary Energy Demand (Rated between 1 and 100)	50	63	74	76	77
Net Energy Import Ratio (%)	-44	-57	-30	6	32
Net Oil Import Dependency (%)	-67	-54	-30	2	32

MALAYSIA
ELECTRICITY GENERATION

	1980	2002	2010	2020	2030	Growth rate (% per annum)				
						80-02	02-10	10-20	20-30	02-30
Total Electricity Generation (TWh)	10	77	116	185	274	9.7	5.2	4.8	4.0	4.6
Coal		4 (6%)	42 (36%)	83 (45%)	136 (50%)		32.3	7.0	5.1	13.0
Oil	9 (85%)	7 (9%)	1 (1%)	1 (1%)	1	-1.0	-19.8	1.5	-1.2	-6.0
Gas	0.1 (1%)	58 (74%)	65 (56%)	89 (48%)	123 (45%)		1.5	3.3	3.3	2.8
Hydro	1 (14%)	8 (11%)	8 (7%)	11 (6%)	12 (4%)	8.6	-1.3	3.7	0.7	1.2
NRE			0.76 (1%)	1.29 (1%)	1.69 (1%)			5.5	2.7	
Nuclear										
Total Installed Generation Capacity (GW)	2	16	28	34	50	9.1	7.3	2.0	4.0	4.2
Thermal	2 (74%)	14 (86%)	25 (92%)	31 (92%)	47 (94%)	9.9	8.1	2.1	4.2	4.5
Coal		2 (11%)	11 (40%)	15 (44%)	23 (45%)		26.3	2.9	4.3	9.7
Oil		1.1 (7%)	0.5 (2%)	0.5 (1%)	0.5 (1%)		-9.2			-2.7
Gas		11 (69%)	14 (50%)	16 (47%)	24 (48%)		3.1	1.4	4.2	2.9
Hydro	1 (26%)	2 (13%)	2 (8%)	2 (7%)	2 (5%)	5.9	0.1	0.7	0.6	0.5
NRE		0.01	0.2 (1%)	0.3 (1%)	0.4 (1%)		42.2	4.1	1.5	12.8
Nuclear										

ENERGY INTENSITY & CO₂ EMISSIONS

	1980	2002	2010	2020	2030	Growth Rates (% per annum)				
						80-02	02-10	10-20	20-30	02-30
Energy Intensity (toe per US\$ million GDP)	193	242	227	199	171	1.0	-0.8	-1.3	-1.5	-1.2
Industry (toe per US\$ million GDP in Industry)	115	132	123	114	105	0.6	-0.9	-0.7	-0.8	-0.8
Commercial (toe per US\$ million GDP in Services)	15	22	19	16	13	1.8	-1.9	-1.9	-2.0	-1.9
Energy Intensity (kgoe per capita)	875	2 275	2 760	3 341	4 057	4.4	2.4	1.9	2.0	2.1
Industry	210	584	755	996	1 283	4.8	3.3	2.8	2.6	2.9
Transport	177	548	666	849	1 087	5.3	2.5	2.5	2.5	2.5
Residential	101	135	152	180	213	1.3	1.5	1.7	1.7	1.7
Commercial	26	103	112	128	148	6.4	1.1	1.4	1.4	1.3
CO₂ Emissions (million tonnes)	24.1	132.3	205.9	299.9	414.0	8.0	5.7	3.8	3.3	4.2
Electricity Generation	7.6	39.2	76.0	121.9	176.8	7.8	8.6	4.8	3.8	5.5
Transformation other than Electricity Generation	0.2	17.5	22.7	22.7	22.6	23.1	3.3			0.9
Industry	7.8	31.1	45.0	65.0	88.1	6.5	4.7	3.7	3.1	3.8
Transport	7.2	39.8	56.3	82.7	117.0	8.1	4.4	3.9	3.5	3.9
Residential	1.3	2.2	2.6	3.3	4.4	2.3	2.1	2.4	2.9	2.5
Commercial		2.5	3.3	4.3	5.1		3.5	2.7	1.7	2.6
CO₂ Emissions Intensity										
CO ₂ emissions per GDP (tonnes per US\$ million)	384.2	572.8	593.5	545.3	481.6	1.8	0.4	-0.8	-1.2	-0.6
CO ₂ emissions per capita (tonnes per capita)	1.7	5.4	7.2	9.2	11.5	5.3	3.7	2.4	2.3	2.7

ENERGY INVESTMENT REQUIREMENTS

(Cumulative from 2003 -)	2010	2020	2030
Total (2000 US\$ billion)	37.0 - 44.4	66.0 - 82.2	107.4 - 135.1
Coal Production & Transportation	0.02 - 0.02	0.02 - 0.03	0.03 - 0.04
Oil & Gas Production & Processing	8.1 - 11.9	17.3 - 25.1	28.4 - 40.8
Oil & Gas International Trade	11.5 - 12.0	15.4 - 16.3	17.5 - 19.0
Oil & Gas Domestic Pipeline	0.54 - 0.77	1.33 - 1.91	2.32 - 3.31
Electricity Generation & Transmission	16.82 - 19.71	31.93 - 38.87	59.15 - 71.96