APPENDIX A

Appendix A. Emission factors of SOx and the estimated sulphur content (S) of major fuels in Malaysia*.

Fuel Type	SOx Emission Factors				Sulphur Content (S)
	Industrial Sector	Transportation	Power Station	Other Sectors	[unit: wt %]
Diesel, kg/t	20.0 x S	20.0 x S	20.0 x S	20.0 x S	0.96
Motor Petrol, kg/t	20.0 x S	20.0 x S	20.0 x S	20.0 x S	0.140
Fuel Oil, kg/t	20.0 x S	20.0 x S	20.0 x S	20.0 x S	3.20
LPG, kg/t	0.0014	0.0014	0.0014	0.0014	not available
Kerosene, kg/t	20.0 x S	20.0 x S	20.0 x S	20.0 x S	0.160
Jet Fuel (ATF), kg/t	not applicable	3.2	not applicable	not applicable	not available
Aviation Gasoline (AVG), kg	not applicable	0.8	not applicable	not applicable	not available
Natural Gas, kg/10 Gcal	0.0092	0.0092	0.000092	0.0092	not available
Coal, kg/t	1.55 x S	1.55 x S	1.55 x S	1.20 x S	0.62

* Source of Information:

Analysis of Structure of Energy Consumption and Dynamics of Emission of Atmospheric Species related to the Global Environmental Change (SOx, NOx, and CO2) in Asia" by Nobuo Kato, 1996

APPENDIX B

Appendix B. Conversion Factors for Energy*.

To:	TJ	Gcal	Mtoe	MBtu	GWh
From:	*Multiply by:*				
TJ	1	238.8	2.388×10^{-5}	947.8	0.28
Gcal	4.1868×10^{-3}	1	10^{-7}	3.97	1.163×10^{-3}
Mtoe	4.1868×10^{4}	10^{7}	1	3.968×10^{7}	11,630
MBtu	1.0551×10^{-3}	0.252	2.52×10^{-8}	1	2.931×10^{-4}
GWh	3.6	860	8.6×10^{-5}	3,412	1

TOE

Tonnes Oil Equivalent

1 TOE equals:

0.93 tonnes gasoline

0.99 tonnes diesel oil

0.96 tonnes kerosene

1.04 tonnes fuel oil

0.93 tonnes LPG

1.61 tonnes coal

6.25 tonnes bagasse

2.63 tonnes fuel wood

1.35 tonnes charcoal

41.84 GJ

* *Source of Information:* http://www.bioenergy-lamnet.org/database/energy/toe.html

APPENDIX C

APPENDIX C. ANOVA and post-host test (contribution by fuel types)

Post Hoc Tests*

Multiple Comparisons

Dependent Variable: Total SOx in '000 tonnes
LSD

(I) Fuel types	(J) Fuel types	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Diesel	Motor Petrol	26.895082*	6.525381	.000	14.068872	39.721292
	Fuel Oil	-45.452906*	6.525381	.000	-58.279116	-32.626696
	LPG	29.620602*	6.525381	.000	16.794392	42.446812
	Kerosene	29.405306*	6.525381	.000	16.579096	42.231516
	ATF	29.620602*	6.525381	.000	16.794392	42.446812
	AV GAS	29.620602*	6.525381	.000	16.794392	42.446812
	Natural gas	29.620602*	6.525381	.000	16.794392	42.446812
	Coal	23.492361*	6.525381	.000	10.666151	36.318571
Motor Petrol	Diesel	-26.895082*	6.525381	.000	-39.721292	-14.068872
	Fuel Oil	-72.347988*	6.525381	.000	-85.174197	-59.521778
	LPG	2.725520	6.525381	.676	-10.100690	15.551730
	Kerosene	2.510224	6.525381	.701	-10.315986	15.336434
	ATF	2.725520	6.525381	.676	-10.100690	15.551730
	AV GAS	2.725520	6.525381	.676	-10.100690	15.551730
	Natural gas	2.725520	6.525381	.676	-10.100690	15.551730
	Coal	-3.402721	6.525381	.602	-16.228931	9.423489
Fuel Oil	Diesel	45.452906*	6.525381	.000	32.626696	58.279116
	Motor Petrol	72.347988*	6.525381	.000	59.521778	85.174197
	LPG	75.073508*	6.525381	.000	62.247298	87.899717
	Kerosene	74.858212*	6.525381	.000	62.032002	87.684421
	ATF	75.073508*	6.525381	.000	62.247298	87.899717
	AV GAS	75.073508*	6.525381	.000	62.247298	87.899717
	Natural gas	75.073508*	6.525381	.000	62.247298	87.899717
	Coal	68.945267*	6.525381	.000	56.119057	81.771476
LPG	Diesel	-29.620602*	6.525381	.000	-42.446812	-16.794392
	Motor Petrol	-2.725520	6.525381	.676	-15.551730	10.100690
	Fuel Oil	-75.073508*	6.525381	.000	-87.899717	-62.247298
	Kerosene	-.215296	6.525381	.974	-13.041506	12.610914
	ATF	.000000	6.525381	1.000	-12.826210	12.826210
	AV GAS	.000000	6.525381	1.000	-12.826210	12.826210
	Natural gas	.000000	6.525381	1.000	-12.826210	12.826210
	Coal	-6.128241	6.525381	.348	-18.954451	6.697969

* Source
: Calculated from data published by the Ministry of Energy, Telecommunications and Posts

APPENDIX C. ANOVA and post-host test (contribution by fuel types)

Multiple Comparisons

Dependent Variable: Total SOx in '000 tonnes
LSD

(I) Fuel types	(J) Fuel types	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Kerosene	Diesel	-29.405306*	6.525381	.000	-42.231516	-16.579096
	Motor Petrol	-2.510224	6.525381	.701	-15.336434	10.315986
	Fuel Oil	-74.858212*	6.525381	.000	-87.684421	-62.032002
	LPG	.215296	6.525381	.974	-12.610914	13.041506
	ATF	.215296	6.525381	.974	-12.610914	13.041506
	AV GAS	.215296	6.525381	.974	-12.610914	13.041506
	Natural gas	.215296	6.525381	.974	-12.610914	13.041506
	Coal	-5.912945	6.525381	.365	-18.739155	6.913265
ATF	Diesel	-29.620602*	6.525381	.000	-42.446812	-16.794392
	Motor Petrol	-2.725520	6.525381	.676	-15.551730	10.100690
	Fuel Oil	-75.073508*	6.525381	.000	-87.899717	-62.247298
	LPG	.000000	6.525381	1.000	-12.826210	12.826210
	Kerosene	-.215296	6.525381	.974	-13.041506	12.610914
	AV GAS	.000000	6.525381	1.000	-12.826210	12.826210
	Natural gas	.000000	6.525381	1.000	-12.826210	12.826210
	Coal	-6.128241	6.525381	.348	-18.954451	6.697969
AV GAS	Diesel	-29.620602*	6.525381	.000	-42.446812	-16.794392
	Motor Petrol	-2.725520	6.525381	.676	-15.551730	10.100690
	Fuel Oil	-75.073508*	6.525381	.000	-87.899717	-62.247298
	LPG	.000000	6.525381	1.000	-12.826210	12.826210
	Kerosene	-.215296	6.525381	.974	-13.041506	12.610914
	ATF	.000000	6.525381	1.000	-12.826210	12.826210
	Natural gas	.000000	6.525381	1.000	-12.826210	12.826210
	Coal	-6.128241	6.525381	.348	-18.954451	6.697969
Natural gas	Diesel	-29.620602*	6.525381	.000	-42.446812	-16.794392
	Motor Petrol	-2.725520	6.525381	.676	-15.551730	10.100690
	Fuel Oil	-75.073508*	6.525381	.000	-87.899717	-62.247298
	LPG	.000000	6.525381	1.000	-12.826210	12.826210
	Kerosene	-.215296	6.525381	.974	-13.041506	12.610914
	ATF	.000000	6.525381	1.000	-12.826210	12.826210
	AV GAS	.000000	6.525381	1.000	-12.826210	12.826210
	Coal	-6.128241	6.525381	.348	-18.954451	6.697969
Coal	Diesel	-23.492361*	6.525381	.000	-36.318571	-10.666151
	Motor Petrol	3.402721	6.525381	.602	-9.423489	16.228931
	Fuel Oil	-68.945267*	6.525381	.000	-81.771476	-56.119057
	LPG	6.128241	6.525381	.348	-6.697969	18.954451
	Kerosene	5.912945	6.525381	.365	-6.913265	18.739155
	ATF	6.128241	6.525381	.348	-6.697969	18.954451
	AV GAS	6.128241	6.525381	.348	-6.697969	18.954451
	Natural gas	6.128241	6.525381	.348	-6.697969	18.954451

*. The mean difference is significant at the .05 level.

* Source
: Calculated from data published by the Ministry of Energy, Telecommunications and Posts

APPENDIX C. ANOVA and post-host test (contribution by fuel types)

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Total SOx in '000 tonnes
LSD

(I) Fuel types	(J) Fuel types	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Diesel	Fuel Oil	-2.387500	5.663058	.675	-13.694160	8.919160
	LPG	11.168000	5.663058	.053	-.138660	22.474660
	Kerosene	10.474167	5.663058	.069	-.832493	21.780826
	Natural gas	-6.123333	5.663058	.284	-17.429993	5.183326
	Coal	8.775000	5.663058	.126	-2.531660	20.081660
Fuel Oil	Diesel	2.387500	5.663058	.675	-8.919160	13.694160
	LPG	13.555500*	5.663058	.020	2.248840	24.862160
	Kerosene	12.861667*	5.663058	.026	1.555007	24.168326
	Natural gas	-3.735833	5.663058	.512	-15.042493	7.570826
	Coal	11.162500	5.663058	.053	-.144160	22.469160
LPG	Diesel	-11.168000	5.663058	.053	-22.474660	.138660
	Fuel Oil	-13.555500*	5.663058	.020	-24.862160	-2.248840
	Kerosene	-.693833	5.663058	.903	-12.000493	10.612826
	Natural gas	-17.291333*	5.663058	.003	-28.597993	-5.984674
	Coal	-2.393000	5.663058	.674	-13.699660	8.913660

* Source - DOE Data

APPENDIX C. ANOVA and post-host test (contribution by fuel types)

Multiple Comparisons

Dependent Variable: Total SOx in '000 tonnes
LSD

(I) Fuel types	(J) Fuel types	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Kerosene	Diesel	-10.474167	5.663058	.069	-21.780826	.832493
	Fuel Oil	-12.861667*	5.663058	.026	-24.168326	-1.555007
	LPG	.693833	5.663058	.903	-10.612826	12.000493
	Natural gas	-16.597500*	5.663058	.005	-27.904160	-5.290840
	Coal	-1.699167	5.663058	.765	-13.005826	9.607493
Natural gas	Diesel	6.123333	5.663058	.284	-5.183326	17.429993
	Fuel Oil	3.735833	5.663058	.512	-7.570826	15.042493
	LPG	17.291333*	5.663058	.003	5.984674	28.597993
	Kerosene	16.597500*	5.663058	.005	5.290840	27.904160
	Coal	14.898333*	5.663058	.011	3.591674	26.204993
Coal	Diesel	-8.775000	5.663058	.126	-20.081660	2.531660
	Fuel Oil	-11.162500	5.663058	.053	-22.469160	.144160
	LPG	2.393000	5.663058	.674	-8.913660	13.699660
	Kerosene	1.699167	5.663058	.765	-9.607493	13.005826
	Natural gas	-14.898333*	5.663058	.011	-26.204993	-3.591674

*. The mean difference is significant at the .05 level.

* Source - DOE Data

APPENDIX D

APPENDIX D. ANOVA and post-host test (sectoral contribution)

Post Hoc Tests*:

Multiple Comparisons

Dependent Variable: Total SOx in '000 tonnes
LSD

(I) Economic sectoral	(J) Economic sectoral	Mean Difference (I-J)	Std. Error	Sig.
Industrial	Transport	8.563379	6.266931	.173
	Power Station	-5.370157	6.266931	.392
	Residential/Commercial	13.153706*	6.266931	.036
	Agriculture	13.022753*	6.266931	.038
	TOTAL	-24.715658*	6.266931	.000
Transport	Industrial	-8.563379	6.266931	.173
	Power Station	-13.933537*	6.266931	.027
	Residential/Commercial	4.590326	6.266931	.464
	Agriculture	4.459374	6.266931	.477
	TOTAL	-33.279037*	6.266931	.000
Power Station	Industrial	5.370157	6.266931	.392
	Transport	13.933537*	6.266931	.027
	Residential/Commercial	18.523863*	6.266931	.003
	Agriculture	18.392910*	6.266931	.004
	TOTAL	-19.345500*	6.266931	.002
Residential/Commercial	Industrial	-13.153706*	6.266931	.036
	Transport	-4.590326	6.266931	.464
	Power Station	-18.523863*	6.266931	.003
	Agriculture	-.130953	6.266931	.983
	TOTAL	-37.869363*	6.266931	.000
Agriculture	Industrial	-13.022753*	6.266931	.038
	Transport	-4.459374	6.266931	.477
	Power Station	-18.392910*	6.266931	.004
	Residential/Commercial	.130953	6.266931	.983
	TOTAL	-37.738411*	6.266931	.000
TOTAL	Industrial	24.715658*	6.266931	.000
	Transport	33.279037*	6.266931	.000
	Power Station	19.345500*	6.266931	.002
	Residential/Commercial	37.869363*	6.266931	.000
	Agriculture	37.738411*	6.266931	.000

* Source
: Calculated from data published by the Ministry of Energy, Telecommunications and Posts

APPENDIX D. ANOVA and post-host test (sectoral contribution)

Multiple Comparisons

Dependent Variable: Total SOx in '000 tonnes
LSD

(I) Economic sectoral	(J) Economic sectoral	95% Confidence Interval	
		Lower Bound	Upper Bound
Industrial	Transport	-3.754575	20.881334
	Power Station	-17.688112	6.947797
	Residential/Commercial	.835751	25.471660
	Agriculture	.704798	25.340708
	TOTAL	-37.033612	-12.397703
Transport	Industrial	-20.881334	3.754575
	Power Station	-26.251491	-1.615582
	Residential/Commercial	-7.727628	16.908281
	Agriculture	-7.858581	16.777328
	TOTAL	-45.596992	-20.961083
Power Station	Industrial	-6.947797	17.688112
	Transport	1.615582	26.251491
	Residential/Commercial	6.205908	30.841818
	Agriculture	6.074956	30.710865
	TOTAL	-31.663455	-7.027546
Residential/Commercial	Industrial	-25.471660	-.835751
	Transport	-16.908281	7.727628
	Power Station	-30.841818	-6.205908
	Agriculture	-12.448907	12.187002
	TOTAL	-50.187318	-25.551409
Agriculture	Industrial	-25.340708	-.704798
	Transport	-16.777328	7.858581
	Power Station	-30.710865	-6.074956
	Residential/Commercial	-12.187002	12.448907
	TOTAL	-50.056365	-25.420456
TOTAL	Industrial	12.397703	37.033612
	Transport	20.961083	45.596992
	Power Station	7.027546	31.663455
	Residential/Commercial	25.551409	50.187318
	Agriculture	25.420456	50.056365

*. The mean difference is significant at the .05 level.

* Source
: Calculated from data published by the Ministry of Energy, Telecommunications and Posts

APPENDIX D. ANOVA and post-host test (sectoral contribution)

Post Hoc Tests*:

Multiple Comparisons

Dependent Variable: Total SOx in '000 tonnes
LSD

(I) Economic sectoral	(J) Economic sectoral	Mean Difference (I-J)	Std. Error	Sig.
Industrial	Transport	-1.331138	7.545832	.860
	Power Station	-3.696310	5.773256	.524
	Residential/Commercial	15.930345*	5.773256	.007
Transport	Industrial	1.331138	7.545832	.860
	Power Station	-2.365172	7.545832	.755
	Residential/Commercial	17.261483*	7.545832	.024
Power Station	Industrial	3.696310	5.773256	.524
	Transport	2.365172	7.545832	.755
	Residential/Commercial	19.626655*	5.773256	.001
Residential/Commercial	Industrial	-15.930345*	5.773256	.007
	Transport	-17.261483*	7.545832	.024
	Power Station	-19.626655*	5.773256	.001

* Source - DOE Data

APPENDIX D. ANOVA and post-host test (sectoral contribution)

Multiple Comparisons

Dependent Variable: Total SOx in '000 tonnes
LSD

(I) Economic sectoral	(J) Economic sectoral	95% Confidence Interval	
		Lower Bound	Upper Bound
Industrial	Transport	-16.311509	13.649233
	Power Station	-15.157673	7.765053
	Residential/Commercial	4.468982	27.391708
Transport	Industrial	-13.649233	16.311509
	Power Station	-17.345544	12.615199
	Residential/Commercial	2.281111	32.241854
Power Station	Industrial	-7.765053	15.157673
	Transport	-12.615199	17.345544
	Residential/Commercial	8.165292	31.088018
Residential/Commercial	Industrial	-27.391708	-4.468982
	Transport	-32.241854	-2.281111
	Power Station	-31.088018	-8.165292

*. The mean difference is significant at the .05 level.

* Source - DOE Data

APPENDIX E

Table 1 - Commercial Energy Supply, ktoe

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Crude Oil	5,901	7,579	8,783	16,159	18,255	17,916	17,132	17,643	21,673	23,590
Total Petroleum Products	2,323	2,131	3,651	610	2,099	2,113	1,763	418	1,922	2,173
Natural Gas	697	1,487	4,991	10,974	12,339	14,108	14,549	15,893	20,194	20,032
Coal and Coke	53	362	1,326	1,612	1,677	1,622	1,731	1,940	2,486	2,970
Hydropower	383	1,019	915	1,540	1,243	790	1,113	1,668	1,560	1,687
Total Primary Supply	9,357	12,578	19,666	30,895	35,613	36,549	36,289	37,562	47,887	50,452
Average Annual Growth Rate (%)				9.4	15.3	2.6	(0.7)	3.5	27.5	5.4
Share (%)										
Crude Oil and Petroleum Products	87.8	77.2	63.2	54.3	57.2	54.8	52.1	48.1	49.2	51.1
Natural Gas	7.4	11.8	25.4	35.5	34.6	38.6	40.1	42.3	42.4	39.7
Coal and Coke	0.6	2.9	6.7	5.2	4.7	4.4	4.8	5.2	5.2	5.9
Hydropower	4.1	8.1	4.7	5.0	3.5	2.2	3.0	4.4	3.2	3.3

Table 2 – Net Import and Export of Energy, ktoe

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Net Export of Crude Oil	7,585	15,036	21,902	18,518	16,859	16,022	16,626	16,274	10,036	9,128
Net Export of LNG	-	5,658	8,686	10,790	15,251	16,396	16,429	15,445	16,633	16,636
Net Export of Natural Gas *	-	-	-	1,474	1,474	1,340	1,444	1,177	1,198	1,163
Net Export of Electricity	(7)	(5)	5	2	1	(1)	(1)	0	neg	neg
Net Import of Petroleum products	2,495	2,113	2,618	150	778	2,491	2,164	1,196	(1,914)	(2,019)
Net Import of Coal and Coke	23	362	1,396	1,538	1,923	1,437	1,522	1,313	1,924	2,631

note : () means negative value * Singapore
neg means negligible

Table 3 - Conversion in Refineries, ktoe

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Input :										
Local crude oil	1,867	5,277	7,736	15,991	15,879	16,382	15,942	14,595	15,421	13,299
Imported crude oil & others	4,034	2,302	2,244	969	3,501	1,535	1,190	3,048	6,252	10,290
Total Input	5,901	7,579	9,980	16,960	19,380	17,917	17,132	17,643	21,673	23,589
Output :										
Motor petrol	933	1,187	1,406	2,320	3,134	2,491	2,545	3,056	3,893	4,623
Diesel oil	1,748	2,387	3,496	6,011	6,174	6,744	5,926	6,712	8,059	8,462
Fuel oil	2,257	1,952	3,241	2,212	3,696	2,716	3,233	2,603	2,532	2,269
Kerosene	232	712	512	360	292	265	285	210	239	283
ATF	214	201	376	1,587	1,899	2,000	1,985	2,140	2,660	2,954
LPG	83	138	256	431	371	371	449	617	838	875
Non-energy	136	567	585	3,403	2,554	1,783	2,117	2,159	2,492	3,020
Refinery gas	90	209	158	384	331	203	192	230	241	331
Total Output	5,693	7,353	10,030	16,708	18,451	16,573	16,733	17,727	20,954	22,817

Table 4 - Conversion in Gas Plants, ktoe

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Input:										
Natural Gas	-	6,778	9,797	17,088	20,822	24,945	23,138	24,116	26,093	25,703
Output:										
LNG	-	5,658	8,761	11,244	15,251	16,396	16,688	16,417	17,231	16,636
LPG (butane, propane & ethane)	-	-	-	1,900	1,212	1,258	1,526	1,472	2,237	2,044
MDS		-	-	421	344	389	-	-	451	1,407

Table 5 - Conversion in Power Stations (exclude co-generation & private licensed plants), ktoe

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Input:										
Fuel oil	2,059	2,174	2,873	2,073	2,354	2,482	2,130	950	592	730
Diesel oil	287	345	116	265	284	185	275	172	191	278
Natural Gas	33	539	1,361	6,414	7,489	7,531	8,886	10,162	11,580	11,922
Hydropower	383	1,019	915	1,540	1,243	790	1,113	1,668	1,612	1,687
Coal	-	-	813	957	950	882	964	1,332	1,495	1,994
Total input	2,762	4,077	6,078	11,249	12,320	11,870	13,368	14,284	15,470	16,611
Average Annual Growth Rate (%)				13.6	9.5	(3.7)	12.6	6.9	8.3	7.4
Input (%):	84.9	61.8	49.2	20.8	21.4	22.5	18.0	7.9	5.0	
Fuel and Diesel Oil										6.1
Natural Gas	1.2	13.2	22.4	57.0	60.8	63.4	66.5	71.1	74.9	71.8
Hydropower*	13.9	25.0	15.1	13.7	10.1	6.7	8.3	11.7	10.4	10.1
Coal	0.0	0.0	13.4	8.5	7.7	7.4	7.2	9.3	9.7	12.0
Output:										
Total electricity generated	864	1,285	1,979	3,909	4,421	4,977	5,013	5,609	5,263	5,594

Table 6 - Final Energy Use by Sectors, ktoe

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Industrial	2,870	3,726	5,885	8,060	9,443	10,106	10,121	10,277	11,406	11,852
Transport	2,398	3,477	5,387	7,827	8,951	10,201	9,793	11,393	12,071	13,137
Residential and Commercial	826	1,123	1,646	2,837	3,557	3,073	3,314	3,653	3,868	4,048
Non-energy (Petroleum & Gas)	291	386	299	1,994	1,744	2,298	2,023	1,799	2,250	2,378
Agriculture	-	-	-	446	472	490	307	106	104	98
Industrial including Agriculture & Non-energy	3,161	4,112	6,184	11,500	11,659	12,894	12,451	12,182	13,760	14,328
Total	6,385	8,712	13,217	22,164	24,167	26,168	25,558	27,228	29,699	31,515
Average Annual Growth Rate (%)		6.4	8.7	14.9	9.0	8.3	(2.3)	6.5	9.0	6.1
Industrial GDP (*)	35,678	44,660	65,458	98,587	101,031	116,593	90,100	94,986	109,805	104,856
Industrial Energy Intensity (toe/RM million at 1987 prices)	89	92	94	117	115	110	138	128	124	136

Note(*): Defined as total GDP for Agriculture, Forestry and Fishing, Mining and Quarrying, Manufacturing and Construction.

Table 7 - Final Use of Commercial Energy by Type of Fuels, ktoe

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Petroleum products	5,550	6,756	9,896	16,142*	17,189	18,578	17,488	18,782	19,582	20,323
Electricity	747	1,079	1,715	3,375	3,777	4,384	4,577	4,815	5,263	5,594
Natural Gas	35	515	1,093	1,935	2,474	2,465	2,726	3,023	3,863	4,621
Gas for Non-Energy	-	*218*	*609*	*1,064*	*870*	*1,391*	*1,282*	*1,118*	*1,512*	1,684
Gas for Heating	*35*	*297*	*484*	*871*	*1,604*	*1,074*	*1,444*	*1,905*	*2,351*	2,955
Coal and Coke	53	362	513	712	727	740	767	608	991	977
Total	6,385	8,712	13,217	22,164	24,167	26,168	25,558	27,228	29,699	31,515
Total (excl. Non-Energy)	6,385	8,494	12,608	19,888	23,297	24,777	24,276	26,110	28,235	29,137
Average Annual Growth Rate (%)		5.9	8.2	9.7	17.1	6.4	(2.0)	7.6	8.1	6.1

Note: * Petroleum Products for 1995 include 1,212 ktoe of butane and propane from GPP (16,142 ktoe vs 14,930 ktoe previously). This amount is deducted from natural gas non-energy use as reported earlier (1,064 ktoe vs 2,276 ktoe previously).

Table 8 - Final Demand for Petroleum Products, ktoe

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Diesel	2,368	2,773	4,421	5,810	6,735	7,314	6,252	6,506	7627	6,827
Motor petrol	1,317	2,088	2,901	4,548	5,205	5,586	5,854	6,793	6,387	8,116
Fuel oil	846	554	883	1,506	1,756	1,978	1,678	1,792	1,875	1,497
LPG	121	229	548	2,215	1,215	1,245	1,301	1,523	1,362	1,392
Kerosene	351	310	203	177	197	169	165	162	131	99
ATF & AVGAS	250	386	628	1,160	1,335	1,439	1,619	1,424	1,574	1,762
Non-energy & Others *	269	416	312	728	746	847	619	582	625	626
Total	5,522	6,756	9,896	16,144	17,189	18,578	17,488	18,782	19,582	20,323

Note : * Including Refinery Gas

Table 9 - Demand for Motor Petrol by Sectors, ktoe

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Transport	1,296	2,057	2,889	4,477	5,161	5,574	5,849	6,778	6,378	6,820
Industrial	21	31	12	68	41	9	2	8	5	5
Agriculture	-	-	-	3	3	3	3	7	4	2
Total	1,317	2,088	2,901	4,548	5,205	5,586	5,854	6,793	6,387	6,827

Table 10 - Demand for LPG and Kerosene by Sectors, ktoe

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
LPG										
Residential and Commercial	101	190	471	758	919	929	950	1,166	943	948
Industrial	20	39	77	245	164	217	225	255	304	347
Agriculture	-	-	-	-	-	22	-	-	-	-
Non-Energy	-	-	-	1,212	132	77	126	102	115	97
Total	121	229	548	2,215	1,215	1,245	1,301	1,523	1,362	1,392
KEROSENE										
Residential and Commercial	328	282	197	166	184	153	145	140	109	75
Industrial	23	28	6	11	12	15	20	22	22	24
Agriculture	-	-	-	-	1	1	-	-	-	-
Total	351	310	203	177	197	169	165	162	131	99

Table 11 - Selected Energy and Economic Indicators (1980 – 2001)

	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
GDP at 1987 prices (RM million)	62,317	80,010	111,061	120,609	130,012	140,864	153,881	166,625	183,292	197,120	182,331	192,795	209,365	210,188
Population ('000 people)	13,764	15,681	17,756	18,547	19,043	19,564	20,112	20,689	21,169	21,666	22,180	22,985	23,275	24,013
Primary Energy Supply (ktoe)	9,364	13,583	19,661	20,611	23,059	26,294	28,247	30,893	35,612	36,550	36,288	37,245	47,887	50,452
Final Energy Demand (ktoe)	6,385	8,712	13,217	14,560	16,185	17,468	19,287	22,164	24,167	26,168	25,558	27,228	29,699	31,515
Electricity Demand (ktoe)	747	1,079	1,715	1,925	2,218	2,450	2,932	3,375	3,777	4,384	4,577	4,815	5,263	5,594
Electricity Demand (GWh)	8,682	12,540	19,932	22,373	25,778	28,474	34,076	39,225	43,897	50,955	53,187	55,912	60,299	63,043
Average Annual Growth Rate (%)														
GDP at 1987 Prices		5.1	6.8	8.6	7.8	8.3	9.2	8.3	10.0	7.5	(7.5)	6.1	8.3	0.4
Primary Energy Supply		7.7	7.7	4.8	11.9	14.0	7.4	9.4	15.3	2.6	(0.7)	2.6	28.6	5.4
Final Energy Demand		6.4	8.7	10.2	11.2	7.9	10.4	14.9	9.0	8.3	(2.3)	6.5	9.0	6.1
Electricity Demand		7.6	9.7	12.2	15.2	10.5	19.7	15.1	11.9	16.0	4.4	5.1	7.8	4.5
Per Capita														
GDP at 1987 Prices (RM)	4,528	5,102	6,255	6,503	6,827	7,200	7,651	8,054	8,659	9,098	8,221	8,388	8,995	9,043
Primary Energy Supply (toe)	0.680	0.866	1.107	1.111	1.211	1.344	1.404	1.493	1.682	1.765	1.636	1.620	2.179	2.100
Final Energy Demand (toe)	0.464	0.556	0.744	0.785	0.850	0.893	0.959	1.071	1.142	1.208	1.152	1.184	1.276	1.312
Electricity Demand (kWh)	631	800	1,123	1,123	1,206	1,354	1,455	1,896	2,074	2,352	2,398	2,433	2,591	2,625
Energy Intensity														
Primary Energy Supply (toe/GDP at 1987 prices (RM Million)	150	170	177	171	177	187	184	185	194	185	199	193	242	240
Final Energy Demand (toe/GDP at 1987 prices (RM Million)	102	109	119	121	124	124	125	133	132	133	140	141	142	150
Electricity Demand (toe/GDP at 1987 prices (RM Million)	12	13	15	16	17	17	19	20	21	22	25	25	25	27
Electricity Demand (GWh/GDP at 1987 prices (RM Million)	0.139	0.157	0.179	0.185	0.198	0.202	0.221	0.235	0.239	0.258	0.292	0.290	0.288	0.299

Note: () means negative values