

VIET NAM
ENERGY BALANCE TABLES

2002										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	8.9	17.4	2.3	1.6		23.2				53.4
Net Imports	- 3.4	- 7.6								- 11.0
TPED	5.5	9.8	2.3	1.6		23.2				42.4
Electricity and Heat Generation	- 1.5	- 1.7	- 1.6	- 1.6			2.7			- 3.7
Petroleum Refineries										
Others		0.3	- 0.7			- 0.7				- 1.1
TFED	4.0	8.4				22.5	2.6			37.5
Industry	3.0	2.3					1.1			6.5
Transport		4.7								4.8
Residential	0.8	0.4				22.5	1.3			24.9
Commercial	0.3	0.9					0.2			1.3

2010										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	18.1	18.0	6.8	2.8		23.2				69.0
Net Imports	- 6.8	- 3.1								- 9.9
TPED	11.3	15.0	6.8	2.8		23.2				59.1
Electricity and Heat Generation	- 4.5		- 4.3	- 2.8			5.7			- 6.0
Petroleum Refineries		- 0.4	- 0.1							- 0.5
Others		0.4	- 1.0			- 0.7				- 1.3
TFED	6.8	15.0	1.4			22.5	5.7			51.3
Industry	5.2	4.5	1.4				2.4			13.4
Transport		8.2								8.2
Residential	1.1	0.8				22.5	2.9			27.3
Commercial	0.5	1.5					0.4			2.4

2020										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	26.7	23.6	10.8	4.7	3.6	25.3				94.7
Net Imports	- 7.6	5.1					0.6			- 1.9
TPED	19.1	28.7	10.8	4.7	3.6	25.3	0.6			92.8
Electricity and Heat Generation	- 7.9		- 6.6	- 4.7	- 3.6	- 2.1	11.3			- 13.6
Petroleum Refineries		- 1.3	- 0.4							- 1.7
Others		0.4	- 1.0			- 0.7				- 1.2
TFED	11.2	27.8	2.9			22.5	11.9			76.2
Industry	8.8	8.5	2.7				4.8			24.8
Transport		15.2								15.3
Residential	1.6	1.5	0.1			22.5	6.2			31.8
Commercial	0.9	2.6					0.9			4.3

2030										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	41.7	20.0	16.7	6.0	10.8	25.8				121.1
Net Imports	- 6.6	26.6					0.6			20.6
TPED	35.1	46.6	16.7	6.0	10.8	25.8	0.6			141.7
Electricity and Heat Generation	- 18.5		- 10.6	- 6.0	- 10.8	- 2.6	20.6			- 28.0
Petroleum Refineries		- 2.6	- 0.7							- 3.3
Others		0.4	- 0.9			- 0.7				- 1.2
TFED	16.6	44.4	4.4			22.5	21.1			109.1
Industry	13.3	12.4	4.1				8.5			38.2
Transport		25.6					0.1			25.7
Residential	2.1	2.4	0.3			22.5	11.0			38.3
Commercial	1.2	4.0	0.1				1.6			6.9

VIET NAM

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)	68	201	353	653	1 111	5.0	7.3	6.3	5.5	6.3
Population (million)	53.7	80.5	88.6	99.0	108.7	1.9	1.2	1.1	0.9	1.1
GDP per capita (2000 PPP US\$)	1 271	2 500	3 987	6 597	10 215	3.1	6.0	5.2	4.5	5.2
GDP in Services (2000 PPP US\$ billion)		70	120	232	424		7.1	6.8	6.2	6.7
GDP in Industry (2000 PPP US\$ billion)		70	141	277	471		9.2	7.0	5.5	7.1
Urbanisation level (%)	19	25	29	35	43	1.2	1.9	2.0	1.9	1.9

ENERGY PROJECTIONS

	Mtoe					Growth rate (% per annum)				
	1980	2002	2010	2020	2030	80-02	02-10	10-20	20-30	02-30
Production	18.4	53.4	69.0	94.7	121.1	5.0	3.3	3.2	2.5	3.0
Coal	2.9 (16%)	8.9 (17%)	18.1 (26%)	26.7 (28%)	41.7 (34%)	5.2	9.3	3.9	4.6	5.7
Oil		17.4 (33%)	18.0 (26%)	23.6 (25%)	20.0 (17%)		0.4	2.7	- 1.6	0.5
Gas		2.3 (4%)	6.8 (10%)	10.8 (11%)	16.7 (14%)		14.5	4.7	4.5	7.3
Hydro		1.6 (3%)	2.8 (4%)	4.7 (5%)	6.0 (5%)	12.1	7.5	5.4	2.5	4.9
NRE	15.3 (83%)	23.2 (43%)	23.2 (34%)	25.3 (27%)	25.8 (21%)	1.9	0.03	0.8	0.2	0.4
Nuclear				3.6 (4%)	10.8 (9%)				11.6	
Net Imports	1.5	- 11.0	- 9.9	- 1.9	20.6		- 1.3	- 15.1		
Coal	- 0.4	- 3.4	- 6.8	- 7.6	- 6.6	10.9	9.0	1.1	- 1.4	2.4
Oil	1.8	- 7.6	- 3.1	5.1	26.6		- 10.8		17.9	
Gas										
Electricity				0.6	0.6				0.3	
Total Primary Energy Demand	19.6	42.4	59.1	92.8	141.7	3.6	4.2	4.6	4.3	4.4
Coal	2.3 (12%)	5.5 (13%)	11.3 (19%)	19.1 (21%)	35.1 (25%)	4.1	9.5	5.4	6.3	6.9
Oil	1.8 (9%)	9.8 (23%)	15.0 (25%)	28.7 (31%)	46.6 (33%)	7.9	5.4	6.7	5.0	5.7
Gas		2.3 (5%)	6.8 (12%)	10.8 (12%)	16.7 (12%)		14.5	4.7	4.5	7.3
Hydro	0.1 (1%)	1.6 (4%)	2.8 (5%)	4.7 (5%)	6.0 (4%)	12.1	7.5	5.4	2.5	4.9
NRE	15.3 (78%)	23.2 (55%)	23.2 (39%)	25.3 (27%)	25.8 (18%)	1.9	0.03	0.8	0.2	0.4
Nuclear				3.6 (4%)	10.8 (8%)				11.6	
Input for Electricity and Heat Generation	- 1.1	- 6.4	- 11.7	- 24.9	- 48.6	8.4	7.9	7.8	6.9	7.5
Coal	- 0.8 (71%)	- 1.5 (23%)	- 4.5 (39%)	- 7.9 (32%)	- 18.5 (38%)	3.1	15.1	5.7	8.9	9.5
Oil	- 0.2 (17%)	- 1.7 (27%)				10.6				- 16.0
Gas		- 1.6 (25%)	- 4.3 (37%)	- 6.6 (27%)	- 10.6 (22%)		13.3	4.3	4.8	7.0
Hydro	- 0.1 (12%)	- 1.6 (25%)	- 2.8 (24%)	- 4.7 (19%)	- 6.0 (12%)	12.1	7.5	5.4	2.5	4.9
NRE				- 2.1 (8%)	- 2.6 (5%)			46.0	2.4	
Nuclear				- 3.6 (14%)	- 10.8 (22%)				11.6	
Other Transformation		- 1.1	- 1.8	- 3.0	- 4.6		6.3	4.9	4.4	5.1
Coal										
Oil		0.3 (22%)	0.01 (1%)	- 0.9 (31%)	- 2.2 (48%)		- 37.3		9.1	
Gas		- 0.7 (59%)	- 1.1 (61%)	- 1.3 (45%)	- 1.7 (37%)		6.9	1.7	2.3	3.4
NRE		- 0.7 (63%)	- 0.7 (39%)	- 0.7 (24%)	- 0.7 (16%)					
Electricity										
Heat										

VIET NAM

	Mtoe					Growth rate (% per annum)				
	1980	2002	2010	2020	2030	80-02	02-10	10-20	20-30	02-30
Total Final Energy Demand	17.8	37.5	51.3	76.2	109.1	3.4	4.0	4.0	3.7	3.9
Coal	1.3 (7%)	4.0 (11%)	6.8 (13%)	11.2 (15%)	16.6 (15%)	5.1	6.8	5.2	4.0	5.2
Oil	1.5 (9%)	8.4 (22%)	15.0 (29%)	27.8 (36%)	44.4 (41%)	8.0	7.6	6.4	4.8	6.1
Gas			1.4 (3%)	2.9 (4%)	4.4 (4%)			7.7	4.5	
NRE	14.7 (83%)	22.5 (60%)	22.5 (44%)	22.5 (30%)	22.5 (21%)	1.9				
Electricity	0.2 (1%)	2.6 (7%)	5.7 (11%)	11.9 (16%)	21.1 (19%)	11.6	10.3	7.7	5.9	7.8
Heat										
Industry	1.6	6.5	13.4	24.8	38.2	6.4	9.6	6.3	4.4	6.6
Coal	0.9 (57%)	3.0 (46%)	5.2 (39%)	8.8 (35%)	13.3 (35%)	5.4	7.2	5.4	4.2	5.5
Oil	0.6 (34%)	2.3 (36%)	4.5 (34%)	8.5 (34%)	12.4 (32%)	6.7	8.6	6.5	3.8	6.1
Gas			1.4 (10%)	2.7 (11%)	4.1 (11%)			7.2	4.1	21.1
NRE										
Electricity	0.1 (9%)	1.1 (18%)	2.4 (18%)	4.8 (19%)	8.5 (22%)	9.7	9.6	7.4	5.8	7.4
Heat										
Transport	0.6	4.8	8.2	15.3	25.7	9.5	7.1	6.4	5.3	6.2
Coal	0.1 (10%)									
Oil	0.6 (90%)	4.7 (99%)	8.2 (100%)	15.2 (100%)	25.6 (100%)	10.0	7.1	6.4	5.3	6.2
Gas										
NRE										
Electricity		0.03 (1%)	0.03 (0%)	0.04 (0%)	0.05 (0%)		3.4	2.6	2.1	2.6
Residential	15.3	24.9	27.3	31.8	38.3	2.2	1.1	1.5	1.9	1.5
Coal	0.3 (2%)	0.8 (3%)	1.1 (4%)	1.6 (5%)	2.1 (5%)	3.7	4.5	3.7	3.1	3.7
Oil	0.2 (1%)	0.4 (2%)	0.8 (3%)	1.5 (5%)	2.4 (6%)	4.6	7.8	6.1	4.8	6.1
Gas			0.01 (0%)	0.11 (0%)	0.27 (1%)			25.3	9.8	
NRE	14.7 (96%)	22.5 (90%)	22.5 (82%)	22.5 (71%)	22.5 (59%)	1.9				
Electricity	0.1 (1%)	1.3 (5%)	2.9 (11%)	6.2 (19%)	11.0 (29%)	13.3	11.0	7.9	6.0	8.1
Heat										
Commercial	0.2	1.3	2.4	4.3	6.9	8.5	7.6	6.2	4.8	6.1
Coal		0.3 (22%)	0.5 (21%)	0.9 (20%)	1.2 (18%)		7.1	5.4	3.7	5.3
Oil	0.2 (99%)	0.9 (65%)	1.5 (62%)	2.6 (60%)	4.0 (58%)	6.4	7.0	5.7	4.6	5.7
Gas				0.0 (1%)	0.1 (2%)				9.7	
NRE										
Electricity	0.003	0.2 (13%)	0.4 (16%)	0.9 (20%)	1.6 (22%)	20.3	10.6	8.1	6.2	8.1
Heat										

ENERGY SECURITY

	1980	2002	2010	2020	2030
Diversity of Primary Energy Demand (Rated between 1 and 100)	36	64	80	89	92
Net Energy Import Ratio (%)	8	-26	-17	-2	15
Net Oil Import Dependency (%)	100	-77	-20	18	57

VIET NAM
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)	4	36	76	148	266	11.1	9.9	6.9	6.0	7.4
Coal	1 (40%)	5 (14%)	20 (26%)	36 (24%)	85 (32%)	5.8	19.0	6.1	9.1	10.7
Oil	1 (18%)	4 (12%)				9.1	-100			-14.4
Gas		8 (23%)	23 (31%)	37 (25%)	62 (23%)		13.8	4.7	5.2	7.4
Hydro	1 (42%)	18 (51%)	32 (43%)	55 (37%)	70 (26%)	12.1	7.5	5.4	2.5	4.9
NRE			1 (1%)	6 (4%)	7 (3%)			27.7	0.8	
Nuclear				14 (9%)	42 (16%)				11.6	
Total Installed Generation Capacity (GW)	1	9	23	44	63	10.2	12.5	6.9	3.7	7.3
Thermal	1 (77%)	5 (53%)	14 (60%)	23 (53%)	38 (60%)	8.3	14.3	5.6	4.9	7.8
Coal		1 (14%)	6 (25%)	11 (26%)	22 (34%)		20.9	7.0	6.8	10.7
Oil		1.35 (15%)	1.05 (5%)	0.48 (1%)	0.48 (1%)		-3.1	-7.6		-3.7
Gas		2 (23%)	7 (30%)	12 (27%)	16 (25%)		16.2	5.6	3.0	7.6
Hydro		4 (19%)	9 (39%)	16 (37%)	17 (26%)	14.7	9.9	6.3	0.3	5.1
NRE	0.04 (4%)		0.22 (1%)	2.25 (5%)	2.50 (4%)	-99.8		25.9	1.1	
Nuclear				2 (5%)	6 (10%)				11.6	

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)	287	211	167	142	128	-1.4	-2.8	-1.6	-1.1	-1.8
Industry (toe per US\$ million GDP in Industry)		92	95	90	81	0.0	0.4	-0.6	-1.0	-0.5
Commercial (toe per US\$ million GDP in Services)		19	20	19	16	0.0	0.5	-0.5	-1.3	-0.5
Energy Intensity (kgoe per capita)	365	526	667	937	1 303	1.7	3.0	3.5	3.4	3.3
Industry	31	80	152	251	351	4.5	8.3	5.2	3.4	5.4
Transport	12	59	93	154	236	7.5	5.8	5.2	4.3	5.1
Residential	285	310	308	321	352	0.4	-0.1	0.4	0.9	0.5
Commercial	4	16	27	44	64	6.5	6.3	5.0	3.9	5.0
CO₂ Emissions (million tonnes)	13.4	56.4	101.5	177.2	301.0	6.8	7.6	5.7	5.4	6.2
Electricity Generation	3.5	14.7	27.7	46.0	96.5	6.7	8.3	5.2	7.7	7.0
Transformation other than Electricity Generation		1.1	2.5	4.2	6.6		11.4	5.3	4.8	6.8
Industry	5.4	18.6	33.9	60.0	89.2	5.8	7.8	5.9	4.1	5.8
Transport	2.0	14.1	24.3	45.3	76.3	9.4	7.1	6.4	5.3	6.2
Residential	1.8	4.3	6.7	10.5	15.3	4.0	5.7	4.6	3.9	4.7
Commercial	0.7	3.7	6.4	11.2	17.1	8.1	7.0	5.6	4.4	5.6
CO₂ Emissions Intensity										
CO ₂ emissions per GDP (tonnes per US\$ million)	195.6	280.3	287.4	271.3	271.0	1.6	0.3	-0.6		-0.1
CO ₂ emissions per capita (tonnes per capita)	0.2	0.7	1.1	1.8	2.8	4.8	6.3	4.6	4.5	5.0

ENERGY INVESTMENT REQUIREMENTS

(Cumulative from 2003 -)	2010	2020	2030
Total (2000 US\$ billion)	28.2 - 35.0	80.0 - 100.5	136.1 - 172.2
Coal Production & Transportation	1.1 - 1.5	2.3 - 3.0	4.2 - 5.6
Oil & Gas Production & Processing	3.2 - 4.8	10.0 - 15.3	13.4 - 20.4
Oil & Gas International Trade			0.04 - 0.10
Oil & Gas Domestic Pipeline	0.9 - 1.3	1.7 - 2.4	2.8 - 4.1
Electricity Generation & Transmission	23.0 - 27.5	66.1 - 79.8	115.6 - 142.1