

NEW ZEALAND
ENERGY BALANCE TABLES

2002										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	2.7	1.4	5.4	1.9		3.7				15.1
Net Imports	- 1.7	5.3								3.6
TPED	1.2	6.6	5.4	1.9		3.7				18.8
Electricity and Heat Generation	- 0.3		- 2.0	- 1.9		- 2.6	3.0			- 3.7
Petroleum Refineries		- 0.6								- 0.6
Others			- 0.1							- 0.1
TFED	0.9	6.1	3.0			1.0	3.0			14.0
Industry	0.8	0.5	2.5			0.8	1.3			6.0
Transport		5.4								5.4
Residential			0.2			0.2	1.0			1.5
Commercial	0.1	0.1	0.3				0.6			1.1

2010										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	3.0	1.3	2.0	2.3		5.0				13.5
Net Imports	- 0.6	6.4								5.8
TPED	2.4	7.7	2.0	2.3		5.0				19.3
Electricity and Heat Generation	- 1.4		- 0.6	- 2.3		- 3.6	3.6			- 4.3
Petroleum Refineries		- 0.6								- 0.7
Others			- 0.1			- 0.1				- 0.1
TFED	0.9	7.1	1.3			1.3	3.6			14.2
Industry	0.8	0.6	0.7			1.1	1.7			5.0
Transport		6.3								6.3
Residential		0.1	0.2			0.2	1.2			1.7
Commercial	0.1	0.1	0.3				0.7			1.2

2020										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	3.3	1.1	2.4	2.5		8.0				17.4
Net Imports	- 0.9	7.9								7.0
TPED	2.4	9.0	2.4	2.5		8.0				24.4
Electricity and Heat Generation	- 1.4		- 0.9	- 2.5		- 6.5	4.5			- 6.8
Petroleum Refineries		- 0.6								- 0.6
Others			- 0.1			- 0.1				- 0.1
TFED	1.0	8.4	1.5			1.5	4.4			16.8
Industry	0.9	0.7	0.8			1.2	2.2			5.9
Transport		7.5								7.6
Residential		0.1	0.3			0.2	1.4			2.0
Commercial	0.1	0.1	0.4				0.8			1.4

2030										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	3.6	1.0	3.3	2.4		11.8				22.2
Net Imports	- 0.9	9.3								8.4
TPED	2.7	10.3	3.3	2.4		11.8				30.6
Electricity and Heat Generation	- 1.6		- 1.5	- 2.4		- 10.2	5.3			- 10.5
Petroleum Refineries		- 0.6								- 0.6
Others						- 0.1				- 0.1
TFED	1.0	9.7	1.7			1.6	5.3			19.3
Industry	1.0	0.8	1.0			1.3	2.6			6.6
Transport		8.8								8.8
Residential		0.1	0.3			0.3	1.8			2.4
Commercial	0.1	0.1	0.5				0.9			1.5

NEW ZEALAND
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)	47	83	105	134	166	2.6	2.9	2.4	2.2	2.5
Population (million)	3.15	3.95	4.43	5.03	5.44	1.0	1.4	1.3	0.8	1.2
GDP per capita (2000 PPP US\$)	15 045	21 133	23 721	26 606	30 465	1.6	1.5	1.2	1.4	1.3
GDP in Services (2000 PPP US\$ billion)	31	59	75	102	133	3.0	3.1	3.1	2.6	2.9
GDP in Industry (2000 PPP US\$ billion)	13	19	25	33	41	1.9	3.4	2.7	2.3	2.7
Urbanisation level (%)	83	86	86	88	89	0.1	0.1	0.1	0.2	0.1

ENERGY PROJECTIONS

	Mtoe					Growth rate (% per annum)				
	1980	2002	2010	2020	2030	80-02	02-10	10-20	20-30	02-30
Production	5.5	15.1	13.5	17.4	22.2	4.7	- 1.4	2.6	2.5	1.4
Coal	1.1 (21%)	2.7 (18%)	3.0 (22%)	3.3 (19%)	3.6 (16%)	4.0	1.1	1.0	0.9	1.0
Oil	0.4	1.4 (9%)	1.3 (9%)	1.1 (7%)	1.0 (5%)	6.1	- 1.0	- 1.0	- 1.0	- 1.0
Gas	0.8 (14%)	5.4 (36%)	2.0 (15%)	2.4 (14%)	3.3 (15%)	9.1	- 11.9	2.0	3.2	- 1.8
Hydro	1.6 (30%)	1.9 (12%)	2.3 (17%)	2.5 (14%)	2.4 (11%)	0.6	2.6	0.8	- 0.2	1.0
NRE	1.6 (28%)	3.7 (24%)	5.0 (37%)	8.0 (46%)	11.8 (53%)	4.0	3.8	4.9	3.9	4.3
Nuclear										
Net Imports	4.2	3.6	5.8	7.0	8.4	- 0.7	6.2	1.9	1.8	3.0
Coal	- 0.1	- 1.7	- 0.6	- 0.9	- 0.9	17.4	- 12.1	3.5	0.9	- 2.1
Oil	4.3	5.3	6.4	7.9	9.3	1.0	2.5	2.0	1.7	2.0
Gas										
Electricity										
Total Primary Energy Demand	9.2	18.8	19.3	24.4	30.6	3.3	0.4	2.4	2.3	1.8
Coal	1.0 (11%)	1.2 (6%)	2.4 (12%)	2.4 (10%)	2.7 (9%)	0.7	8.9	0.3	0.9	2.9
Oil	4.2 (46%)	6.6 (35%)	7.7 (40%)	9.0 (37%)	10.3 (34%)	2.0	2.0	1.6	1.4	1.6
Gas	0.8 (9%)	5.4 (29%)	2.0 (10%)	2.4 (10%)	3.3 (11%)	9.2	- 11.9	2.0	3.2	- 1.8
Hydro	1.6 (18%)	1.9 (10%)	2.3 (12%)	2.5 (10%)	2.4 (8%)	0.6	2.6	0.8	- 0.2	1.0
NRE	1.6 (17%)	3.7 (20%)	5.0 (26%)	8.0 (33%)	11.8 (39%)	4.0	3.8	4.9	3.9	4.3
Nuclear										
Input for Electricity and Heat Generation	- 3.2	- 6.7	- 8.0	- 11.3	- 15.8	3.4	2.1	3.6	3.4	3.1
Coal	- 0.2 (5%)	- 0.3 (5%)	- 1.4 (18%)	- 1.4 (13%)	- 1.6 (10%)	3.4	20.5	0.1	1.1	5.9
Oil										
Gas	- 0.3 (10%)	- 2.0 (29%)	- 0.6 (8%)	- 0.9 (8%)	- 1.5 (10%)	8.4	- 13.3	3.1	6.2	- 0.9
Hydro	- 1.6 (50%)	- 1.9 (28%)	- 2.3 (29%)	- 2.5 (22%)	- 2.4 (15%)	0.6	2.6	0.8	- 0.2	1.0
NRE	- 1.1 (34%)	- 2.6 (38%)	- 3.6 (45%)	- 6.5 (58%)	- 10.2 (65%)	4.0	4.3	6.1	4.6	5.0
Nuclear										
Other Transformation	- 0.5	- 0.8	- 0.8	- 0.8	- 0.7	2.3	0.3	- 0.3	- 0.3	- 0.1
Coal										
Oil	- 0.4 (76%)	- 0.6 (79%)	- 0.6 (81%)	- 0.6 (81%)	- 0.6 (82%)	2.5	0.5	- 0.2	- 0.2	
Gas	- 0.1 (25%)	- 0.1 (11%)	- 0.1 (9%)	- 0.1 (8%)	- 0.1 (8%)	- 1.5	- 1.3	- 1.5	- 1.3	- 1.4
NRE		- 0.1 (7%)	- 0.1 (7%)	- 0.1 (7%)	- 0.1 (7%)		0.2	0.2		0.1
Electricity		- 0.02 (3%)	- 0.02 (3%)	- 0.02 (3%)	- 0.02 (2%)	10.8	0.6	- 0.5	- 0.5	- 0.2
Heat										

NEW ZEALAND

	Mtoe					Growth rate (% per annum)				
	1980	2002	2010	2020	2030	80-02	02-10	10-20	20-30	02-30
Total Final Energy Demand	6.5	14.0	14.2	16.8	19.3	3.6	0.2	1.7	1.4	1.2
Coal	0.8 (12%)	0.9 (6%)	0.9 (7%)	1.0 (6%)	1.0 (5%)	0.5	0.7	0.5	0.5	0.6
Oil	3.2 (49%)	6.1 (44%)	7.1 (50%)	8.4 (50%)	9.7 (50%)	3.0	1.9	1.7	1.5	1.7
Gas	0.4 (6%)	3.0 (21%)	1.3 (9%)	1.5 (9%)	1.7 (9%)	10.0	-10.1	1.6	1.3	-2.0
NRE	0.5 (7%)	1.0 (7%)	1.3 (9%)	1.5 (9%)	1.6 (8%)	3.8	2.8	1.1	0.6	1.4
Electricity	1.7 (26%)	3.0 (21%)	3.6 (25%)	4.4 (26%)	5.3 (27%)	2.6	2.5	2.1	1.7	2.1
Heat										
Industry	2.7	6.0	5.0	5.9	6.6	3.7	-2.3	1.7	1.2	0.4
Coal	0.5 (20%)	0.8 (13%)	0.8 (17%)	0.9 (15%)	1.0 (15%)	1.6	1.1	0.8	0.6	0.8
Oil	0.8 (31%)	0.5 (9%)	0.6 (12%)	0.7 (12%)	0.8 (12%)	-2.0	1.7	1.5	1.1	1.5
Gas	0.3 (10%)	2.5 (42%)	0.7 (15%)	0.8 (14%)	1.0 (14%)	10.8	-14.4	1.4	1.2	-3.5
NRE	0.3 (13%)	0.8 (14%)	1.1 (22%)	1.2 (21%)	1.3 (20%)	4.2	3.3	1.2	0.6	1.6
Electricity	0.7 (26%)	1.3 (22%)	1.7 (35%)	2.2 (38%)	2.6 (39%)	2.9	3.5	2.5	1.7	2.5
Heat										
Transport	2.1	5.4	6.3	7.6	8.8	4.5	1.9	1.8	1.5	1.7
Coal										
Oil	2.1 (100%)	5.4 (100%)	6.3 (100%)	7.5 (100%)	8.8 (100%)	4.5	1.9	1.8	1.5	1.7
Gas			0.01 (0%)	0.01 (0%)	0.01 (0%)		2.8			0.8
NRE										
Electricity		0.01 (0%)	0.01 (0%)	0.01 (0%)	0.01 (0%)	2.3				
Residential	1.0	1.5	1.7	2.0	2.4	1.7	1.8	1.7	1.8	1.8
Coal	0.1 (13%)	0.01				-10.1	-11.3			
Oil	0.03	0.05	0.1 (4%)	0.1 (4%)	0.1 (4%)	3.1	3.0	1.6	1.4	1.9
Gas		0.2 (12%)	0.2 (13%)	0.3 (13%)	0.3 (12%)	6.4	2.9	1.7	1.4	1.9
NRE	0.1 (12%)	0.2 (15%)	0.2 (14%)	0.2 (12%)	0.3 (11%)	2.8	0.9	0.5	0.5	0.6
Electricity	0.7 (68%)	1.0 (69%)	1.2 (70%)	1.4 (71%)	1.8 (74%)	1.8	1.8	1.9	2.1	2.0
Heat										
Commercial	0.7	1.1	1.2	1.4	1.5	2.0	1.2	1.2	1.1	1.2
Coal	0.1 (16%)	0.1 (10%)	0.1 (8%)	0.1 (7%)	0.1 (5%)	-0.2	-1.3	-1.3	-1.1	-1.2
Oil	0.3 (36%)	0.1 (7%)	0.1 (6%)	0.1 (6%)	0.1 (5%)	-5.5	0.2	0.3	0.5	0.3
Gas	0.1 (7%)	0.3 (26%)	0.3 (27%)	0.4 (29%)	0.5 (30%)	7.9	1.9	1.9	1.6	1.8
NRE										
Electricity	0.3 (40%)	0.6 (57%)	0.7 (58%)	0.8 (59%)	0.9 (59%)	3.6	1.4	1.4	1.2	1.3
Heat										

ENERGY SECURITY

	1980	2002	2010	2020	2030
Diversity of Primary Energy Demand (Rated between 1 and 100)	74	82	78	75	74
Net Energy Import Ratio (%)	43	19	30	29	27
Net Oil Import Dependency (%)	100	80	84	87	90

NEW ZEALAND
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)	23	36	43	53	63	2.2	2.3	2.1	1.7	2.0
Coal	0.4 (2%)	1 (4%)	6 (15%)	7 (12%)	7 (12%)	5.6	20.8	0.3	1.1	6.1
Oil										
Gas	2 (8%)	10 (26%)	3 (7%)	5 (9%)	9 (14%)	8.1	-12.7	3.7	6.8	-0.2
Hydro	19 (84%)	22 (59%)	26 (61%)	29 (54%)	28 (45%)	0.6	2.6	0.8	-0.2	1.0
NRE	2 (7%)	4 (11%)	7 (17%)	13 (25%)	19 (30%)	4.2	8.6	6.1	3.5	5.9
Nuclear										
Total Installed Generation Capacity (GW)	6	8	11	15	16	1.5	3.4	2.9	0.7	2.2
Thermal	2 (30%)	3 (30%)	4 (32%)	5 (34%)	5 (32%)	1.4	4.5	3.2	0.3	2.5
Coal		0.3 (4%)	1.1 (10%)	1.1 (7%)	1.1 (7%)		16.0			4.3
Oil										
Gas		2 (26%)	2 (22%)	4 (26%)	4 (25%)		1.6	4.4	0.3	2.1
Hydro	4 (66%)	5 (62%)	6 (51%)	7 (46%)	7 (44%)	1.2	0.9	1.9	0.2	1.0
NRE	0.2 (4%)	1 (8%)	2 (15%)	3 (20%)	4 (24%)	4.6	12.4	6.1	2.2	6.4
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)	195	225	184	182	184	0.7	-2.5	-0.1	0.1	-0.7
Industry (toe per US\$ million GDP in Industry)	211	310	198	180	161	1.8	-5.5	-1.0	-1.1	-2.3
Commercial (toe per US\$ million GDP in Services)	23	18	16	13	11	-1.0	-1.9	-1.8	-1.5	-1.7
Energy Intensity (kgoe per capita)	2 929	4 751	4 358	4 848	5 616	2.2	-1.1	1.1	1.5	0.6
Industry	851	1 516	1 125	1 169	1 215	2.7	-3.7	0.4	0.4	-0.8
Transport	662	1 378	1 430	1 502	1 616	3.4	0.5	0.5	0.7	0.6
Residential	322	372	382	397	440	0.7	0.3	0.4	1.0	0.6
Commercial	226	275	270	269	279	0.9	-0.2	-0.0	0.3	0.0
CO₂ Emissions (million tonnes)	15.7	36.6	36.9	42.1	49.2	3.9	0.1	1.3	1.6	1.1
Electricity Generation	1.4	5.9	7.1	7.6	10.0	6.6	2.4	0.8	2.7	1.9
Transformation other than Electricity Generation	0.8	2.2	2.1	2.1	2.1	5.0	-0.4			-0.1
Industry	5.4	10.6	6.8	7.7	8.4	3.1	-5.3	1.1	0.9	-0.8
Transport	6.0	16.1	18.8	22.4	26.1	4.6	1.9	1.8	1.5	1.7
Residential	0.7	0.6	0.7	0.8	0.9	-0.9	2.1	1.5	1.4	1.6
Commercial	1.4	1.3	1.4	1.5	1.6	-0.2	0.6	0.8	0.8	0.8
CO₂ Emissions Intensity										
CO ₂ emissions per GDP (tonnes per US\$ million)	331.6	438.9	351.0	314.9	296.6	1.3	-2.8	-1.1	-0.6	-1.4
CO ₂ emissions per capita (tonnes per capita)	5.0	9.3	8.3	8.4	9.0	2.9	-1.3	0.1	0.8	-0.1

ENERGY INVESTMENT REQUIREMENTS

(Cumulative from 2003 -)	2010	2020	2030
Total (2000 US\$ billion)	4.55 - 5.35	11.02 - 12.99	14.87 - 17.88
Coal Production & Transportation	0.08 - 0.08	0.18 - 0.19	0.28 - 0.31
Oil & Gas Production & Processing	0.22 - 0.28	0.58 - 0.79	1.16 - 1.62
Oil & Gas International Trade			
Oil & Gas Domestic Pipeline	0.03 - 0.04	0.08 - 0.11	0.16 - 0.22
Electricity Generation & Transmission	4.23 - 4.95	10.19 - 11.88	13.27 - 15.71