

NEW ZEALAND  
ENERGY BALANCE TABLES

<b>2002</b>										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
<b>TPED</b>	<b>1.2</b>	<b>6.6</b>	<b>5.4</b>	<b>1.9</b>		<b>3.7</b>				<b>18.8</b>
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
<b>TFED</b>	<b>0.9</b>	<b>6.1</b>	<b>3.0</b>			<b>1.0</b>	<b>3.0</b>			<b>14.0</b>
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

  

<b>2010</b>										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
<b>TPED</b>	<b>2.4</b>	<b>7.7</b>	<b>2.0</b>	<b>2.3</b>		<b>5.0</b>				<b>19.3</b>
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
<b>TFED</b>	<b>0.9</b>	<b>7.1</b>	<b>1.3</b>			<b>1.3</b>	<b>3.6</b>			<b>14.2</b>
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

  

<b>2020</b>										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
<b>TPED</b>	<b>2.4</b>	<b>9.0</b>	<b>2.4</b>	<b>2.5</b>		<b>8.0</b>				<b>24.4</b>
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
<b>TFED</b>	<b>1.0</b>	<b>8.4</b>	<b>1.5</b>			<b>1.5</b>	<b>4.4</b>			<b>16.8</b>
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

  

<b>2030</b>										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
<b>TPED</b>	<b>2.7</b>	<b>10.3</b>	<b>3.3</b>	<b>2.4</b>		<b>11.8</b>				<b>30.6</b>
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
<b>TFED</b>	<b>1.0</b>	<b>9.7</b>	<b>1.7</b>			<b>1.6</b>	<b>5.3</b>			<b>19.3</b>
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
<b>GDP</b> (2000 PPP US\$ billion)	47	83	105	134	166	2.6	2.9	2.4	2.2	2.5
<b>Population</b> (million)	3.15	3.95	4.43	5.03	5.44	1.0	1.4	1.3	0.8	1.2
<b>GDP per capita</b> (2000 PPP US\$)	15 045	21 133	23 721	26 606	30 465	1.6	1.5	1.2	1.4	1.3
<b>GDP in Services</b> (2000 PPP US\$ billion)	31	59	75	102	133	3.0	3.1	3.1	2.6	2.9
<b>GDP in Industry</b> (2000 PPP US\$ billion)	13	19	25	33	41	1.9	3.4	2.7	2.3	2.7
<b>Urbanisation level</b> (%)	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
<b>Production</b>	<b>5.5</b>	<b>15.1</b>	<b>13.5</b>	<b>17.4</b>	<b>22.2</b>	<b>4.7</b>	<b>- 1.4</b>	<b>2.6</b>	<b>2.5</b>	<b>1.4</b>
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										
<b>Net Imports</b>	<b>4.2</b>	<b>3.6</b>	<b>5.8</b>	<b>7.0</b>	<b>8.4</b>	<b>- 0.7</b>	<b>6.2</b>	<b>1.9</b>	<b>1.8</b>	<b>3.0</b>
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										
<b>Total Primary Energy Demand</b>	<b>9.2</b>	<b>18.8</b>	<b>19.3</b>	<b>24.4</b>	<b>30.6</b>	<b>3.3</b>	<b>0.4</b>	<b>2.4</b>	<b>2.3</b>	<b>1.8</b>
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										
<b>Input for Electricity and Heat Generation</b>	<b>- 3.2</b>	<b>- 6.7</b>	<b>- 8.0</b>	<b>- 11.3</b>	<b>- 15.8</b>	<b>3.4</b>	<b>2.1</b>	<b>3.6</b>	<b>3.4</b>	<b>3.1</b>
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										
<b>Other Transformation</b>	<b>- 0.5</b>	<b>- 0.8</b>	<b>- 0.8</b>	<b>- 0.8</b>	<b>- 0.7</b>	<b>2.3</b>	<b>0.3</b>	<b>- 0.3</b>	<b>- 0.3</b>	<b>- 0.1</b>
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
<b>Total Final Energy Demand</b>	<b>6.5</b>	<b>14.0</b>	<b>14.2</b>	<b>16.8</b>	<b>19.3</b>	<b>3.6</b>	<b>0.2</b>	<b>1.7</b>	<b>1.4</b>	<b>1.2</b>
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										
<b>Industry</b>	<b>2.7</b>	<b>6.0</b>	<b>5.0</b>	<b>5.9</b>	<b>6.6</b>	<b>3.7</b>	<b>-2.3</b>	<b>1.7</b>	<b>1.2</b>	<b>0.4</b>
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										
<b>Transport</b>	<b>2.1</b>	<b>5.4</b>	<b>6.3</b>	<b>7.6</b>	<b>8.8</b>	<b>4.5</b>	<b>1.9</b>	<b>1.8</b>	<b>1.5</b>	<b>1.7</b>
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				
<b>Residential</b>	<b>1.0</b>	<b>1.5</b>	<b>1.7</b>	<b>2.0</b>	<b>2.4</b>	<b>1.7</b>	<b>1.8</b>	<b>1.7</b>	<b>1.8</b>	<b>1.8</b>
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										
<b>Commercial</b>	<b>0.7</b>	<b>1.1</b>	<b>1.2</b>	<b>1.4</b>	<b>1.5</b>	<b>2.0</b>	<b>1.2</b>	<b>1.2</b>	<b>1.1</b>	<b>1.2</b>
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
<b>Total Electricity Generation (TWh)</b>	<b>23</b>	<b>36</b>	<b>43</b>	<b>53</b>	<b>63</b>	<b>2.2</b>	<b>2.3</b>	<b>2.1</b>	<b>1.7</b>	<b>2.0</b>
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										
<b>Total Installed Generation Capacity (GW)</b>	<b>6</b>	<b>8</b>	<b>11</b>	<b>15</b>	<b>16</b>	<b>1.5</b>	<b>3.4</b>	<b>2.9</b>	<b>0.7</b>	<b>2.2</b>
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 & CO<sub>2</sub> EMISSIONS**

	1980	2002	2010	2020	2030	Growth Rates (% per annum)				
						80-02	02-10	10-20	20-30	02-30
<b>Energy Intensity (toe per US\$ million GDP)</b>	<b>195</b>	<b>225</b>	<b>184</b>	<b>182</b>	<b>184</b>	<b>0.7</b>	<b>-2.5</b>	<b>-0.1</b>	<b>0.1</b>	<b>-0.7</b>
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
<b>Energy Intensity (kgoe per capita)</b>	<b>2 929</b>	<b>4 751</b>	<b>4 358</b>	<b>4 848</b>	<b>5 616</b>	<b>2.2</b>	<b>-1.1</b>	<b>1.1</b>	<b>1.5</b>	<b>0.6</b>
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
<b>CO<sub>2</sub> Emissions (million tonnes)</b>	<b>15.7</b>	<b>36.6</b>	<b>36.9</b>	<b>42.1</b>	<b>49.2</b>	<b>3.9</b>	<b>0.1</b>	<b>1.3</b>	<b>1.6</b>	<b>1.1</b>
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
<b>CO<sub>2</sub> Emissions Intensity</b>										
CO <sub>2</sub> 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 <sub>2</sub> 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
<b>Total (2000 US\$ billion)</b>	<b>4.55 - 5.35</b>	<b>11.02 - 12.99</b>	<b>14.87 - 17.88</b>
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