

NORTH AMERICA
ENERGY BALANCE TABLES

2002										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	583.9	493.2	610.4	52.9	225.8	91.4				2 057.6
Net Imports	- 10.3	610.5	14.3				- 6.1			608.4
TPED	575.0	1 100.2	612.6	52.9	225.8	91.4	- 6.1			2 651.8
Electricity and Heat Generation	- 542.4	- 27.8	- 154.7	- 52.9	- 225.8	- 32.9	360.4	6.3		- 669.7
Petroleum Refineries		- 237.0	- 21.5			- 1.2	- 4.8	- 0.9		- 265.4
Others	- 0.1	- 1.5	- 59.2			- 5.5	- 5.5			- 71.9
TFED	32.6	843.3	377.4			51.7	344.0	5.4		1 654.3
Industry	29.1	135.7	165.8			37.8	106.2	5.4		480.0
Transport		651.9	0.4			1.8	0.4			654.6
Residential	1.3	33.3	128.1			10.9	121.3			294.9
Commercial	2.2	22.4	83.0			1.2	116.0			224.9

2010										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	653.4	634.4	634.8	56.3	231.5	117.7				2 328.0
Net Imports	- 36.8	597.8	54.5				0.4			616.0
TPED	616.6	1 232.3	689.3	56.3	231.5	117.7	0.4			2 944.0
Electricity and Heat Generation	- 580.3	- 27.6	- 180.6	- 56.3	- 231.5	- 51.2	413.4	6.7		- 707.4
Petroleum Refineries		- 247.7	- 21.9			- 1.3	- 4.9	- 0.9		- 276.5
Others	- 0.1	- 2.2	- 68.8			- 7.9	- 6.6			- 85.6
TFED	36.2	954.8	418.1			57.3	402.3	5.8		1 874.6
Industry	32.8	149.6	177.0			42.0	118.8	5.8		526.0
Transport		749.5	0.6			2.6	0.4			753.1
Residential	1.2	32.7	139.7			11.5	135.8			320.9
Commercial	2.2	23.0	100.9			1.2	147.3			274.6

2020										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	669.8	681.4	684.2	58.2	253.1	153.6				2 500.3
Net Imports	10.6	694.2	100.6				- 0.1			805.3
TPED	680.4	1 375.5	784.8	58.2	253.1	153.6	- 0.1			3 305.5
Electricity and Heat Generation	- 641.2	- 28.1	- 225.9	- 58.2	- 253.1	- 75.1	491.0	6.8		- 783.8
Petroleum Refineries		- 252.8	- 21.5			- 1.2	- 4.8	- 0.9		- 281.1
Others	- 0.1	- 2.4	- 70.8			- 11.7	- 6.6			- 91.6
TFED	39.1	1 091.9	466.6			65.6	479.5	6.0		2 148.6
Industry	35.8	162.3	196.6			48.0	135.7	6.0		584.3
Transport		873.7	1.0			3.9	0.4			879.0
Residential	1.1	32.1	148.8			12.4	158.6			353.1
Commercial	2.2	23.7	120.3			1.2	184.8			332.2

2030										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	786.2	666.1	669.0	56.5	253.0	198.1				2 628.8
Net Imports	46.0	853.9	136.5				- 0.3			1 036.1
TPED	832.2	1 519.9	805.5	56.5	253.0	198.1	- 0.3			3 664.9
Electricity and Heat Generation	- 791.6	- 27.4	- 204.4	- 56.5	- 253.0	- 104.9	558.5	7.0		- 872.3
Petroleum Refineries		- 267.3	- 21.8			- 1.3	- 4.9	- 0.9		- 296.1
Others	- 0.1	- 2.3	- 66.2			- 16.5	- 6.4			- 91.5
TFED	40.5	1 222.9	513.1			75.5	546.9	6.1		2 405.0
Industry	37.3	173.2	216.3			55.0	151.1	6.1		639.0
Transport		993.7	1.6			5.5	0.4			1 001.1
Residential	1.0	31.7	154.5			13.8	180.8			381.7
Commercial	2.2	24.4	140.7			1.2	214.6			383.1

NORTH AMERICA

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)	5 680	11 035	14 303	19 238	24 647	3.1	3.3	3.0	2.5	2.9
Population (million)	252	320	343	372	399	1.1	0.9	0.8	0.7	0.8
GDP per capita (2000 PPP US\$)	22 499	34 494	41 643	51 659	61 850	2.0	2.4	2.2	1.8	2.1
GDP in Services (2000 PPP US\$ billion)	4 337	8 527	11 292	15 447	20 002	3.1	3.6	3.2	2.6	3.1
GDP in Industry (2000 PPP US\$ billion)	1 335	2 531	3 141	4 009	4 901	2.9	2.7	2.5	2.0	2.4
Urbanisation level (%)	74	78	81	84	89	0.2	0.4	0.4	0.5	0.5

ENERGY PROJECTIONS

	Mtoe					Growth rate (% per annum)				
	1980	2002	2010	2020	2030	80-02	02-10	10-20	20-30	02-30
Production	1 760.7	2 057.6	2 328.0	2 500.3	2 628.8	0.7	1.6	0.7	0.5	0.9
Coal	468.4 (27%)	583.9 (28%)	653.4 (28%)	669.8 (27%)	786.2 (30%)	1.0	1.4	0.2	1.6	1.1
Oil	582.0 (33%)	493.2 (24%)	634.4 (27%)	681.4 (27%)	666.1 (25%)	-0.7	3.2	0.7	-0.2	1.1
Gas	518.2 (29%)	610.4 (30%)	634.8 (27%)	684.2 (27%)	669.0 (25%)	0.7	0.5	0.8	-0.2	0.3
Hydro	45.6 (3%)	52.9 (3%)	56.3 (2%)	58.2 (2%)	56.5 (2%)	0.7	0.8	0.3	-0.3	0.2
NRE	66.7 (4%)	91.4 (4%)	117.7 (5%)	153.6 (6%)	198.1 (8%)	1.4	3.2	2.7	2.6	2.8
Nuclear	79.8 (5%)	225.8 (11%)	231.5 (10%)	253.1 (10%)	253.0 (10%)	4.8	0.3	0.9	-0.01	0.4
Net Imports	295.3	608.4	616.0	805.3	1 036.1	3.3	0.2	2.7	2.6	1.9
Coal	-56.7	-10.3	-36.8	10.6	46.0	-7.5	17.2		15.9	
Oil	348.7	610.5	597.8	694.2	853.9	2.6	-0.3	1.5	2.1	1.2
Gas	3.3	14.3	54.5	100.6	136.5	6.9	18.2	6.3	3.1	8.4
Electricity		-6.1	0.4	-0.1	-0.3	25.0			15.6	-9.9
Total Primary Energy Demand	2 004.6	2 651.8	2 944.0	3 305.5	3 664.9	1.3	1.3	1.2	1.0	1.2
Coal	397.5 (20%)	575.0 (22%)	616.6 (21%)	680.4 (21%)	832.2 (23%)	1.7	0.9	1.0	2.0	1.3
Oil	892.8 (45%)	1 100.2 (41%)	1 232.3 (42%)	1 375.5 (42%)	1 519.9 (41%)	1.0	1.4	1.1	1.0	1.2
Gas	522.3 (26%)	612.6 (23%)	689.3 (23%)	784.8 (24%)	805.5 (22%)	0.7	1.5	1.3	0.3	1.0
Hydro	45.6 (2%)	52.9 (2%)	56.3 (2%)	58.2 (2%)	56.5 (2%)	0.7	0.8	0.3	-0.3	0.2
NRE	66.7 (3%)	91.4 (3%)	117.7 (4%)	153.6 (5%)	198.1 (5%)	1.4	3.2	2.7	2.6	2.8
Nuclear	79.8 (4%)	225.8 (9%)	231.5 (8%)	253.1 (8%)	253.0 (7%)	4.8	0.3	0.9	-0.01	0.4
Input for Electricity and Heat Generation	- 588.4	-1 036.4	-1 127.4	-1 281.6	-1 437.7	2.6	1.1	1.3	1.2	1.2
Coal	-307.1 (52%)	-542.4 (52%)	-580.3 (51%)	-641.2 (50%)	-791.6 (55%)	2.6	0.8	1.0	2.1	1.4
Oil	-63.7 (11%)	-27.8 (3%)	-27.6 (2%)	-28.1 (2%)	-27.4 (2%)	-3.7	-0.1	0.2	-0.2	-0.1
Gas	-87.3 (15%)	-154.7 (15%)	-180.6 (16%)	-225.9 (18%)	-204.4 (14%)	2.6	2.0	2.3	-1.0	1.0
Hydro	-45.6 (8%)	-52.9 (5%)	-56.3 (5%)	-58.2 (5%)	-56.5 (4%)	0.7	0.8	0.3	-0.3	0.2
NRE	-4.9 (1%)	-32.9 (3%)	-51.2 (5%)	-75.1 (6%)	-104.9 (7%)	9.0	5.7	3.9	3.4	4.2
Nuclear	-79.8 (14%)	-225.8 (22%)	-231.5 (21%)	-253.1 (20%)	-253.0 (18%)	4.8	0.3	0.9	-0.01	0.4
Other Transformation	- 109.7	- 337.3	- 362.1	- 372.7	- 387.6	5.2	0.9	0.3	0.4	0.5
Coal	-2.5 (2%)	-0.1 (0%)	-0.1 (0%)	-0.1 (0%)	-0.1 (0%)	-13.7	2.1	-0.3	-0.2	0.4
Oil	-56.0 (51%)	-238.5 (71%)	-249.9 (69%)	-255.2 (68%)	-269.6 (70%)	6.8	0.6	0.2	0.6	0.4
Gas	-44.4 (40%)	-80.8 (24%)	-90.6 (25%)	-92.2 (25%)	-88.0 (23%)	2.8	1.4	0.2	-0.5	0.3
NRE		-6.8 (2%)	-9.1 (3%)	-12.9 (3%)	-17.7 (5%)		3.8	3.5	3.2	3.5
Electricity	-6.8 (6%)	-10.3 (3%)	-11.4 (3%)	-11.4 (3%)	-11.3 (3%)	1.9	1.4		-0.1	0.3
Heat		-0.9 (0%)	-0.9 (0%)	-0.9 (0%)	-0.9 (0%)		0.1	-0.2	0.2	

NORTH AMERICA

	Mtoe					Growth rate (% per annum)				
	1980	2002	2010	2020	2030	80-02	02-10	10-20	20-30	02-30
Total Final Energy Demand	1 372.7	1 654.3	1 874.6	2 148.6	2 405.0	0.9	1.6	1.4	1.1	1.3
Coal	55.8 (4%)	32.6 (2%)	36.2 (2%)	39.1 (2%)	40.5 (2%)	-2.4	1.3	0.8	0.4	0.8
Oil	717.2 (52%)	843.3 (51%)	954.8 (51%)	1 091.9 (51%)	1 222.9 (51%)	0.7	1.6	1.4	1.1	1.3
Gas	357.3 (26%)	377.4 (23%)	418.1 (22%)	466.6 (22%)	513.1 (21%)	0.2	1.3	1.1	1.0	1.1
NRE	41.4 (3%)	51.7 (3%)	57.3 (3%)	65.6 (3%)	75.5 (3%)	1.0	1.3	1.4	1.4	1.4
Electricity	200.1 (15%)	344.0 (21%)	402.3 (21%)	479.5 (22%)	546.9 (23%)	2.5	2.0	1.8	1.3	1.7
Heat	1.0 (0%)	5.4 (0%)	5.8 (0%)	6.0 (0%)	6.1 (0%)	7.8	0.8	0.3	0.2	0.4
Industry	505.8	480.0	526.0	584.3	639.0	-0.2	1.2	1.1	0.9	1.0
Coal	52.3 (10%)	29.1 (6%)	32.8 (6%)	35.8 (6%)	37.3 (6%)	-2.6	1.5	0.9	0.4	0.9
Oil	166.1 (33%)	135.7 (28%)	149.6 (28%)	162.3 (28%)	173.2 (27%)	-0.9	1.2	0.8	0.7	0.9
Gas	170.3 (34%)	165.8 (35%)	177.0 (34%)	196.6 (34%)	216.3 (34%)	-0.1	0.8	1.1	1.0	1.0
NRE	39.4 (8%)	37.8 (8%)	42.0 (8%)	48.0 (8%)	55.0 (9%)	-0.2	1.3	1.4	1.4	1.4
Electricity	76.5 (15%)	106.2 (22%)	118.8 (23%)	135.7 (23%)	151.1 (24%)	1.5	1.4	1.3	1.1	1.3
Heat	1.0 (0%)	5.4 (1%)	5.8 (1%)	6.0 (1%)	6.1 (1%)	7.9	0.8	0.3	0.2	0.4
Transport	461.3	654.6	753.1	879.0	1 001.1	1.6	1.8	1.6	1.3	1.5
Coal										
Oil	461.0 (100%)	651.9 (100%)	749.5 (100%)	873.7 (99%)	993.7 (99%)	1.6	1.8	1.5	1.3	1.5
Gas		0.4 (0%)	0.6 (0%)	1.0 (0%)	1.6 (0%)		5.6	5.3	4.6	5.1
NRE		1.8 (0%)	2.6 (0%)	3.9 (0%)	5.5 (1%)		4.5	4.0	3.5	4.0
Electricity	0.3 (0%)	0.4 (0%)	0.4 (0%)	0.4 (0%)	0.4 (0%)	2.3	-0.4			-0.1
Residential	244.6	294.9	320.9	353.1	381.7	0.9	1.1	1.0	0.8	0.9
Coal	1.6 (1%)	1.3 (0%)	1.2 (0%)	1.1 (0%)	1.0 (0%)	-1.1	-1.1	-1.1	-1.0	-1.1
Oil	52.8 (22%)	33.3 (11%)	32.7 (10%)	32.1 (9%)	31.7 (8%)	-2.1	-0.2	-0.2	-0.1	-0.2
Gas	119.2 (49%)	128.1 (43%)	139.7 (44%)	148.8 (42%)	154.5 (40%)	0.3	1.1	0.6	0.4	0.7
NRE	1.9 (1%)	10.9 (4%)	11.5 (4%)	12.4 (4%)	13.8 (4%)	8.2	0.6	0.8	1.0	0.8
Electricity	69.0 (28%)	121.3 (41%)	135.8 (42%)	158.6 (45%)	180.8 (47%)	2.6	1.4	1.6	1.3	1.4
Heat										
Commercial	161.1	224.9	274.6	332.2	383.1	1.5	2.5	1.9	1.4	1.9
Coal	1.8 (1%)	2.2 (1%)	2.2 (1%)	2.2 (1%)	2.2 (1%)	0.9	-0.1	-0.1	-0.1	-0.1
Oil	37.2 (23%)	22.4 (10%)	23.0 (8%)	23.7 (7%)	24.4 (6%)	-2.3	0.3	0.3	0.3	0.3
Gas	67.7 (42%)	83.0 (37%)	100.9 (37%)	120.3 (36%)	140.7 (37%)	0.9	2.5	1.8	1.6	1.9
NRE		1.2 (1%)	1.2 (0%)	1.2 (0%)	1.2 (0%)					
Electricity	54.3 (34%)	116.0 (52%)	147.3 (54%)	184.8 (56%)	214.6 (56%)	3.5	3.0	2.3	1.5	2.2
Heat	0.03 (0%)					-5.2				

Note: Net imports include intraregional trade

ENERGY SECURITY

	1980	2002	2010	2020	2030
Diversity of Primary Energy Demand (Rated between 1 and 100)	80	85	85	85	85
Net Energy Import Ratio (%)	14	23	21	24	28
Net Oil Import Dependency (%)	39	55	49	50	56

NORTH AMERICA
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)	2 801	4 436	5 031	5 840	6 634	2.1	1.6	1.5	1.3	1.4
Coal	1 303 (47%)	2 045 (46%)	2 302 (46%)	2 678 (46%)	3 487 (53%)	2.1	1.5	1.5	2.7	1.9
Oil	277 (10%)	109 (2%)	110 (2%)	115 (2%)	115 (2%)	-4.2	0.2	0.4		0.2
Gas	380 (14%)	716 (16%)	847 (17%)	1 076 (18%)	982 (15%)	2.9	2.1	2.4	-0.9	1.1
Hydro	530 (19%)	615 (14%)	656 (13%)	677 (12%)	657 (10%)	0.7	0.8	0.3	-0.3	0.2
NRE	7	96 (2%)	235 (5%)	326 (6%)	422 (6%)	12.5	11.9	3.3	2.6	5.4
Nuclear	304 (11%)	856 (19%)	881 (18%)	968 (17%)	971 (15%)	4.8	0.4	0.9		0.5
Total Installed Generation Capacity (GW)	661	1 002	1 165	1 221	1 411	1.9	1.9	0.5	1.5	1.2
Thermal	473 (71%)	726 (72%)	860 (74%)	891 (73%)	1 062 (75%)	2.0	2.1	0.4	1.8	1.4
Coal		332 (33%)	340 (29%)	374 (31%)	500 (35%)		0.3	0.9	2.9	1.5
Oil		265 (26%)	300 (26%)	269 (22%)	289 (20%)		1.6	-1.1	0.7	0.3
Gas		129 (13%)	219 (19%)	248 (20%)	273 (19%)		6.9	1.3	1.0	2.7
Hydro	130 (20%)	148 (15%)	150 (13%)	152 (12%)	154 (11%)	0.6	0.1	0.1	0.1	0.1
NRE	1	19 (2%)	41 (4%)	56 (5%)	73 (5%)	12.5	10.3	3.2	2.7	5.0
Nuclear	58 (9%)	110 (11%)	115 (10%)	122 (10%)	122 (9%)	3.0	0.6	0.7		0.4

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)	353	241	207	173	151	-1.7	-1.9	-1.8	-1.4	-1.7
Industry (toe per US\$ million GDP in Industry)	379	190	167	146	130	-3.1	-1.5	-1.4	-1.1	-1.3
Commercial (toe per US\$ million GDP in Services)	37	26	24	22	19	-1.5	-1.0	-1.2	-1.2	-1.1
Energy Intensity (kgoe per capita)	7 941	8 290	8 573	8 877	9 198	0.2	0.4	0.3	0.4	0.4
Industry	2 003	1 500	1 532	1 569	1 604	-1.3	0.3	0.2	0.2	0.2
Transport	1 827	2 046	2 193	2 360	2 512	0.5	0.9	0.7	0.6	0.7
Residential	969	922	934	948	958	-0.2	0.2	0.1	0.1	0.1
Commercial	638	703	799	892	961	0.4	1.6	1.1	0.7	1.1
CO₂ Emissions (million tonnes)	4 995	6 469	7 153	8 030	9 078	1.2	1.3	1.2	1.2	1.2
Electricity Generation	1 605	2 550	2 756	3 100	3 631	2.1	1.0	1.2	1.6	1.3
Transformation other than Electricity Generation	280	470	512	517	533	2.4	1.1	0.1	0.3	0.5
Industry	1 038	855	931	1 020	1 099	-0.9	1.1	0.9	0.7	0.9
Transport	1 349	1 919	2 210	2 582	2 943	1.6	1.8	1.6	1.3	1.5
Residential	443	405	430	449	461	-0.4	0.8	0.4	0.3	0.5
Commercial	280	271	314	361	411	-0.2	1.9	1.4	1.3	1.5
CO₂ Emissions Intensity										
CO ₂ emissions per GDP (tonnes per US\$ million)	879	586	500	417	368	-1.8	-2.0	-1.8	-1.2	-1.6
CO ₂ emissions per capita (tonnes per capita)	19.8	20.2	20.8	21.6	22.8	0.1	0.4	0.3	0.6	0.4

ENERGY INVESTMENT REQUIREMENTS

(Cumulative from 2003 -)	2010	2020	2030
Total (2000 US\$ billion)	579 - 778	1 124 - 1 510	1 689 - 2 215
Coal Production & Transportation	21 - 23	40 - 43	71 - 78
Oil & Gas Production & Processing	178 - 266	308 - 453	379 - 554
Oil & Gas International Trade	36 - 51	66 - 95	99 - 143
Oil & Gas Domestic Pipeline	89 - 127	195 - 278	247 - 353
Electricity Generation & Transmission	255 - 311	516 - 642	893 - 1 088