

CANADA
ENERGY BALANCE TABLES

2002										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	32.7	133.3	150.3	30.2	22.6	11.6				380.5
Net Imports	1.2	- 45.1	- 72.6				- 6.1			- 122.7
TPED	33.8	88.2	77.7	30.2	22.6	11.6	- 6.1			257.9
Electricity and Heat Generation	- 30.9	- 3.6	- 11.3	- 30.2	- 22.6	- 2.1	50.3	0.8		- 49.5
Petroleum Refineries		- 6.5	- 1.0				- 0.5			- 8.0
Others	- 0.1	- 1.5	- 17.4				- 1.8			- 20.9
TFED	2.9	76.5	48.0			9.4	41.8	0.8		179.5
Industry	2.8	18.0	22.8			7.6	18.4	0.8		70.4
Transport		48.5					0.1			48.6
Residential		3.0	13.9			1.8	12.3			31.1
Commercial		6.9	11.3				11.2			29.4

2010										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	40.2	205.7	139.8	32.6	20.8	14.9				454.0
Net Imports	- 16.8	- 105.1	- 45.6				- 1.5			- 169.0
TPED	23.5	100.6	94.2	32.6	20.8	14.9	- 1.5			285.0
Electricity and Heat Generation	- 20.6	- 3.4	- 16.1	- 32.6	- 20.8	- 3.8	52.4	1.0		- 43.9
Petroleum Refineries		- 7.4	- 1.1				- 0.6			- 9.1
Others	- 0.1	- 2.2	- 22.8				- 2.4			- 27.6
TFED	2.7	87.6	54.1			11.1	47.9	1.0		204.4
Industry	2.7	21.4	25.5			9.2	21.8	1.0		81.6
Transport		56.0	0.1				0.1			56.2
Residential		2.8	15.7			1.9	13.9			34.3
Commercial		7.4	12.8				12.2			32.4

2020										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	40.6	230.7	125.2	33.8	19.3	19.4				469.0
Net Imports	- 17.1	- 116.2	- 13.9				- 1.3			- 148.6
TPED	23.5	114.5	111.3	33.8	19.3	19.4	- 1.3			320.4
Electricity and Heat Generation	- 20.6	- 3.5	- 24.9	- 33.8	- 19.3	- 6.2	59.6	1.1		- 47.6
Petroleum Refineries		- 7.6	- 1.2				- 0.6			- 9.3
Others	- 0.1	- 2.4	- 23.4				- 2.5			- 28.5
TFED	2.8	100.6	61.8			13.2	55.2	1.1		234.7
Industry	2.8	23.6	28.6			11.2	26.0	1.1		93.3
Transport		66.5	0.1				0.1			66.7
Residential		2.5	18.3			2.0	15.7			38.5
Commercial		8.0	14.8				13.4			36.1

2030										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	42.2	235.7	109.3	33.5	17.2	24.3				462.1
Net Imports	- 17.9	- 111.2	15.5				- 1.5			- 115.1
TPED	24.3	124.6	124.8	33.5	17.2	24.3	- 1.5			347.0
Electricity and Heat Generation	- 21.4	- 3.3	- 32.8	- 33.5	- 17.2	- 9.2	65.8	1.3		- 50.4
Petroleum Refineries		- 7.7	- 1.2				- 0.6			- 9.4
Others	- 0.1	- 2.3	- 22.3				- 2.4			- 27.2
TFED	2.7	111.2	68.4			15.1	61.2	1.3		260.0
Industry	2.7	25.1	31.0			13.0	29.9	1.2		103.0
Transport		75.4	0.1				0.1			75.6
Residential		2.3	21.1			2.1	16.9			42.4
Commercial		8.5	16.3				14.3			39.1

CANADA

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)	518	961	1 194	1 517	1 792	2.8	2.8	2.4	1.7	2.3
Population (million)	24.5	31.3	33.3	35.4	37.0	1.1	0.8	0.6	0.4	0.6
GDP per capita (2000 PPP US\$)	21 185	30 672	35 815	42 821	48 386	1.7	2.0	1.8	1.2	1.6
GDP in Services (2000 PPP US\$ billion)	297	585	742	973	1 209	3.1	3.0	2.7	2.2	2.6
GDP in Industry (2000 PPP US\$ billion)	185	282	351	443	525	1.9	2.8	2.4	1.7	2.2
Urbanisation level (%)	76	80	83	85	87	0.3	0.4	0.3	0.2	0.3

ENERGY PROJECTIONS

	Mtoe					Growth rate (% per annum)				
	1980	2002	2010	2020	2030	80-02	02-10	10-20	20-30	02-30
Production	207.4	380.5	454.0	469.0	462.1	2.8	2.2	0.3	-0.1	0.7
Coal	20.5 (10%)	32.7 (9%)	40.2 (9%)	40.6 (9%)	42.2 (9%)	2.1	2.6	0.1	0.4	0.9
Oil	83.6 (40%)	133.3 (35%)	205.7 (45%)	230.7 (49%)	235.7 (51%)	2.1	5.6	1.2	0.2	2.1
Gas	63.6 (31%)	150.3 (39%)	139.8 (31%)	125.2 (27%)	109.3 (24%)	4.0	-0.9	-1.1	-1.3	-1.1
Hydro	21.6 (10%)	30.2 (8%)	32.6 (7%)	33.8 (7%)	33.5 (7%)	1.5	1.0	0.4	-0.1	0.4
NRE	7.6 (4%)	11.6 (3%)	14.9 (3%)	19.4 (4%)	24.3 (5%)	1.9	3.2	2.7	2.3	2.7
Nuclear	10.4 (5%)	22.6 (6%)	20.8 (5%)	19.3 (4%)	17.2 (4%)	3.6	-1.0	-0.7	-1.2	-1.0
Net Imports	-12.0	-122.7	-169.0	-148.6	-115.1	11.2	4.1	-1.3	-2.5	-0.2
Coal	0.3	1.2	-16.8	-17.1	-17.9	5.7		0.2	0.4	
Oil	8.4	-45.1	-105.1	-116.2	-111.2		11.1	1.0	-0.4	3.3
Gas	-18.4	-72.6	-45.6	-13.9	15.5	6.4	-5.6	-11.2		
Electricity	-2.3	-6.1	-1.5	-1.3	-1.5	4.5	-16.3	-1.2	1.5	-4.8
Total Primary Energy Demand	193.0	257.9	285.0	320.4	347.0	1.3	1.3	1.2	0.8	1.1
Coal	21.2 (11%)	33.8 (13%)	23.5 (8%)	23.5 (7%)	24.3 (7%)	2.1	-4.5		0.3	-1.2
Oil	88.9 (46%)	88.2 (34%)	100.6 (35%)	114.5 (36%)	124.6 (36%)		1.7	1.3	0.8	1.2
Gas	45.6 (24%)	77.7 (30%)	94.2 (33%)	111.3 (35%)	124.8 (36%)	2.5	2.4	1.7	1.1	1.7
Hydro	21.6 (11%)	30.2 (12%)	32.6 (11%)	33.8 (11%)	33.5 (10%)	1.5	1.0	0.4	-0.1	0.4
NRE	7.6 (4%)	11.6 (4%)	14.9 (5%)	19.4 (6%)	24.3 (7%)	1.9	3.2	2.7	2.3	2.7
Nuclear	10.4 (5%)	22.6 (9%)	20.8 (7%)	19.3 (6%)	17.2 (5%)	3.6	-1.0	-0.7	-1.2	-1.0
Input for Electricity and Heat Generation	-52.2	-100.6	-97.3	-108.3	-117.4	3.0	-0.4	1.1	0.8	0.6
Coal	-15.0 (29%)	-30.9 (31%)	-20.6 (21%)	-20.6 (19%)	-21.4 (18%)	3.3	-4.9		0.4	-1.3
Oil	-3.2 (6%)	-3.6 (4%)	-3.4 (3%)	-3.5 (3%)	-3.3 (3%)	0.6	-0.9	0.6	-0.6	-0.3
Gas	-1.8 (3%)	-11.3 (11%)	-16.1 (17%)	-24.9 (23%)	-32.8 (28%)	8.8	4.6	4.5	2.8	3.9
Hydro	-21.6 (41%)	-30.2 (30%)	-32.6 (33%)	-33.8 (31%)	-33.5 (29%)	1.5	1.0	0.4	-0.1	0.4
NRE	-0.2 (0%)	-2.1 (2%)	-3.8 (4%)	-6.2 (6%)	-9.2 (8%)	10.7	7.6	4.9	4.0	5.3
Nuclear	-10.4 (20%)	-22.6 (22%)	-20.8 (21%)	-19.3 (18%)	-17.2 (15%)	3.6	-1.0	-0.7	-1.2	-1.0
Other Transformation	-12.1	-28.9	-36.7	-37.8	-36.6	4.0	3.0	0.3	-0.3	0.9
Coal	-0.004 (0%)	-0.1 (0%)	-0.1 (0%)	-0.1 (0%)	-0.1 (0%)	15.7	2.1	-0.3	-0.2	0.4
Oil	-6.3 (52%)	-8.0 (28%)	-9.6 (26%)	-9.9 (26%)	-10.0 (27%)	1.1	2.3	0.3	0.05	0.8
Gas	-5.4 (45%)	-18.4 (64%)	-23.9 (65%)	-24.6 (65%)	-23.5 (64%)	5.7	3.3	0.3	-0.5	0.9
NRE										
Electricity	-0.4 (3%)	-2.3 (8%)	-3.0 (8%)	-3.1 (8%)	-3.0 (8%)	8.5	3.3	0.3	-0.3	0.9
Heat										

CANADA

	Mtoe					Growth rate (% per annum)				
	1980	2002	2010	2020	2030	80-02	02-10	10-20	20-30	02-30
Total Final Energy Demand	148.5	179.5	204.4	234.7	260.0	0.9	1.6	1.4	1.0	1.3
Coal	4.2 (3%)	2.9 (2%)	2.7 (1%)	2.8 (1%)	2.7 (1%)	-1.7	-0.5	0.2	-0.2	-0.2
Oil	75.4 (51%)	76.5 (43%)	87.6 (43%)	100.6 (43%)	111.2 (43%)	0.1	1.7	1.4	1.0	1.3
Gas	34.6 (23%)	48.0 (27%)	54.1 (26%)	61.8 (26%)	68.4 (26%)	1.5	1.5	1.3	1.0	1.3
NRE	7.4 (5%)	9.4 (5%)	11.1 (5%)	13.2 (6%)	15.1 (6%)	1.1	2.0	1.8	1.4	1.7
Electricity	25.9 (17%)	41.8 (23%)	47.9 (23%)	55.2 (24%)	61.2 (24%)	2.2	1.7	1.4	1.0	1.4
Heat	1.0 (1%)	0.8 (0%)	1.0 (0%)	1.1 (0%)	1.3 (0%)	-0.9	1.8	1.5	1.0	1.4
Industry	58.7	70.4	81.6	93.3	103.0	0.8	1.8	1.4	1.0	1.4
Coal	4.1 (7%)	2.8 (4%)	2.7 (3%)	2.8 (3%)	2.7 (3%)	-1.7	-0.5	0.2	-0.2	-0.1
Oil	17.0 (29%)	18.0 (26%)	21.4 (26%)	23.6 (25%)	25.1 (24%)	0.3	2.2	1.0	0.6	1.2
Gas	18.8 (32%)	22.8 (32%)	25.5 (31%)	28.6 (31%)	31.0 (30%)	0.9	1.4	1.2	0.8	1.1
NRE	5.5 (9%)	7.6 (11%)	9.2 (11%)	11.2 (12%)	13.0 (13%)	1.5	2.3	2.0	1.6	1.9
Electricity	12.3 (21%)	18.4 (26%)	21.8 (27%)	26.0 (28%)	29.9 (29%)	1.8	2.2	1.8	1.4	1.8
Heat	1.0 (2%)	0.8 (1%)	1.0 (1%)	1.1 (1%)	1.2 (1%)	-0.8	1.8	1.5	1.0	1.4
Transport	43.1	48.6	56.2	66.7	75.6	0.6	1.8	1.7	1.3	1.6
Coal										
Oil	43.1 (100%)	48.5 (100%)	56.0 (100%)	66.5 (100%)	75.4 (100%)	0.5	1.8	1.7	1.3	1.6
Gas			0.1 (0%)	0.1 (0%)	0.1 (0%)		5.1	2.9	2.1	3.2
NRE										
Electricity		0.1 (0%)	0.1 (0%)	0.1 (0%)	0.1 (0%)		0.3			0.1
Residential	28.4	31.1	34.3	38.5	42.4	0.4	1.2	1.2	1.0	1.1
Coal	0.08 (0%)	0.03 (0%)	0.02 (0%)	0.01 (0%)	0.01 (0%)	-4.5	-4.7	-4.5	-5.2	-4.8
Oil	10.4 (37%)	3.0 (10%)	2.8 (8%)	2.5 (6%)	2.3 (5%)	-5.5	-1.2	-1.2	-0.8	-1.0
Gas	8.7 (31%)	13.9 (45%)	15.7 (46%)	18.3 (47%)	21.1 (50%)	2.1	1.5	1.5	1.5	1.5
NRE	1.9 (7%)	1.8 (6%)	1.9 (6%)	2.0 (5%)	2.1 (5%)	-0.2	0.6	0.5	0.4	0.5
Electricity	7.3 (26%)	12.3 (39%)	13.9 (40%)	15.7 (41%)	16.9 (40%)	2.4	1.6	1.3	0.7	1.2
Heat										
Commercial	18.3	29.4	32.4	36.1	39.1	2.2	1.2	1.1	0.8	1.0
Coal										
Oil	5.0 (27%)	6.9 (24%)	7.4 (23%)	8.0 (22%)	8.5 (22%)	1.5	0.8	0.8	0.6	0.7
Gas	7.0 (38%)	11.3 (38%)	12.8 (40%)	14.8 (41%)	16.3 (42%)	2.2	1.6	1.4	1.0	1.3
NRE										
Electricity	6.2 (34%)	11.2 (38%)	12.2 (38%)	13.4 (37%)	14.3 (37%)	2.7	1.1	0.9	0.7	0.9
Heat										

ENERGY SECURITY

	1980	2002	2010	2020	2030
Diversity of Primary Energy Demand (Rated between 1 and 100)	81	89	86	84	83
Net Energy Import Ratio (%)	-6	-48	-59	-46	-33
Net Oil Import Dependency (%)	9	-51	-105	-102	-89

CANADA
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)	373	601	628	712	782	2.2	0.5	1.3	1.0	0.9
Coal	60 (16%)	117 (20%)	83 (13%)	88 (12%)	97 (12%)	3.1	-4.3	0.6	1.0	-0.7
Oil	14 (4%)	14 (2%)	13 (2%)	14 (2%)	13 (2%)	0.2	-1.0	0.6	-0.6	-0.3
Gas	9 (2%)	34 (6%)	57 (9%)	103 (14%)	153 (19%)	6.1	6.6	6.2	4.0	5.5
Hydro	251 (67%)	351 (58%)	379 (60%)	393 (55%)	389 (50%)	1.5	1.0	0.4	-0.1	0.4
NRE	1	9 (2%)	24 (4%)	43 (6%)	64 (8%)	9.4	12.4	6.0	4.2	7.1
Nuclear	38 (10%)	76 (13%)	72 (12%)	71 (10%)	66 (8%)	3.2	-0.5	-0.2	-0.7	-0.5
Total Installed Generation Capacity (GW)	83	122	131	147	162	1.8	0.9	1.2	1.0	1.0
Thermal	28 (34%)	40 (32%)	42 (32%)	53 (36%)	62 (38%)	1.5	0.8	2.3	1.7	1.6
Coal	13 (16%)	17 (14%)	18 (13%)	19 (13%)	19 (12%)	1.3	0.3	0.5	0.3	0.4
Oil	8 (10%)	7 (6%)	7 (6%)	8 (5%)	8 (5%)	-0.5	-0.3	1.0	0.3	0.4
Gas	4 (4%)	15 (12%)	17 (13%)	26 (18%)	35 (22%)	6.8	1.8	4.2	3.0	3.1
Hydro	48 (58%)	69 (57%)	71 (54%)	73 (50%)	75 (46%)	1.7	0.3	0.3	0.3	0.3
NRE	0.4 (0%)	2 (2%)	4 (3%)	8 (5%)	12 (7%)	7.4	11.1	5.7	4.1	6.6
Nuclear	6 (7%)	11 (9%)	14 (10%)	14 (9%)	14 (8%)	2.9	2.7			0.8

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)	372	268	239	211	194	-1.5	-1.5	-1.2	-0.9	-1.2
Industry (toe per US\$ million GDP in Industry)	318	250	233	211	196	-1.1	-0.9	-1.0	-0.7	-0.9
Commercial (toe per US\$ million GDP in Services)	62	50	44	37	32	-0.9	-1.7	-1.6	-1.4	-1.6
Energy Intensity (kgoe per capita)	7 887	8 233	8 547	9 047	9 368	0.2	0.5	0.6	0.3	0.5
Industry	2 400	2 249	2 446	2 636	2 780	-0.3	1.1	0.8	0.5	0.8
Transport	1 759	1 552	1 684	1 882	2 040	-0.6	1.0	1.1	0.8	1.0
Residential	1 162	992	1 029	1 088	1 146	-0.7	0.5	0.6	0.5	0.5
Commercial	749	939	972	1 020	1 055	1.0	0.4	0.5	0.3	0.4
CO₂ Emissions (million tonnes)	421	574	608	687	751	1.4	0.7	1.2	0.9	1.0
Electricity Generation	71	157	128	149	170	3.7	-2.5	1.5	1.3	0.3
Transformation other than Electricity Generation	34	70	88	90	87	3.3	2.9	0.3	-0.3	0.8
Industry	106	115	130	143	152	0.4	1.6	1.0	0.6	1.0
Transport	126	142	165	196	222	0.6	1.8	1.7	1.3	1.6
Residential	52	42	45	50	56	-1.0	1.0	1.1	1.1	1.1
Commercial	32	48	53	59	64	1.8	1.3	1.1	0.8	1.1
CO₂ Emissions Intensity										
CO ₂ emissions per GDP (tonnes per US\$ million)	812	597	509	453	419	-1.4	-2.0	-1.2	-0.8	-1.3
CO ₂ emissions per capita (tonnes per capita)	17.2	18.3	18.2	19.4	20.3	0.3	-0.1	0.6	0.5	0.4

ENERGY INVESTMENT REQUIREMENTS

(Cumulative from 2003 -)	2010	2020	2030
Total (2000 US\$ billion)	148 - 213	255 - 361	335 - 464
Coal Production & Transportation	1.9 - 2.2	2.9 - 3.2	4.1 - 4.5
Oil & Gas Production & Processing	89.5 - 133.5	143.9 - 212.3	175.4 - 256.5
Oil & Gas International Trade	22.1 - 32.7	34.7 - 50.0	47.0 - 64.2
Oil & Gas Domestic Pipeline	8.1 - 11.6	16.7 - 23.8	23.3 - 33.3
Electricity Generation & Transmission	26.3 - 33.0	57.2 - 71.3	85.1 - 105.4