

RUSSIA
ENERGY BALANCE TABLES

2002										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	121.4	383.5	518.9	13.9	38.1	11.7				1 087.5
Net Imports	- 15.2	- 263.7	- 172.7				- 1.1			- 452.7
TPED	106.1	120.0	346.3	13.9	38.1	11.7	- 1.1			635.0
Electricity and Heat Generation	- 84.8	- 25.7	- 207.3	- 13.9	- 38.1	- 9.3	63.5	142.9		- 172.7
Petroleum Refineries		- 12.1	- 3.4				- 2.3	- 6.8		- 24.7
Others	- 3.5	- 6.5	- 49.4				- 7.2	- 5.4		- 72.1
TFED	17.8	75.7	86.2			2.3	50.4	130.7		363.1
Industry	11.1	20.9	41.7			0.6	29.4	53.3		156.9
Transport		50.0					3.1			53.1
Residential	6.4	3.9	42.2			1.7	12.3	67.2		133.6
Commercial	0.4	0.9	2.3				5.6	10.2		19.4

2010										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	136.8	401.3	522.7	15.9	53.9	14.1				1 144.6
Net Imports	- 18.8	- 269.6	- 182.8				- 2.3			- 473.6
TPED	118.0	132	339.9	15.9	53.9	14.1	- 2.3			671.1
Electricity and Heat Generation	- 96.5	- 18.8	- 190.9	- 15.9	- 53.9	- 11.2	73.2	136.7		- 177.3
Petroleum Refineries		- 13.0	- 3.6				- 2.4	- 7.2		- 26.3
Others	- 4.0	- 6.6	- 48.3				- 7.3	- 5.5		- 71.6
TFED	17.4	93.3	97.1			2.9	61.1	124.0		395.8
Industry	11.1	27.0	53.8			0.7	36.3	54.5		183.3
Transport		60.6					4.5			65.1
Residential	6.1	4.7	41.4			2.2	13.4	61.3		129.1
Commercial	0.3	0.9	1.9				6.9	8.2		18.2

2020										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	137.1	425.6	552.7	16.6	65.5	16.4				1 213.9
Net Imports	- 18.8	- 280.4	- 188.1				- 3.6			- 490.9
TPED	118.3	145.2	364.6	16.6	65.5	16.4	- 3.6			723.0
Electricity and Heat Generation	- 97.9	- 17.3	- 198.2	- 16.6	- 65.5	- 12.6	87.0	133.4		- 187.7
Petroleum Refineries		- 14.0	- 3.8			- 0.1	- 2.5	- 7.6		- 28.0
Others	- 4.0	- 6.6	- 48.7				- 7.3	- 5.5		- 72.1
TFED	16.5	107.2	113.8			3.7	73.5	120.3		435.1
Industry	11.2	34.1	68.4			0.8	44.7	55.9		215.1
Transport		67.2					5.5			72.8
Residential	5.1	5.0	43.5			2.8	14.8	58.2		129.5
Commercial	0.2	0.9	1.9			0.1	8.5	6.2		17.8

2030										Mtoe
	Coal	Oil	Gas	Hydro	Nuclear	NRE	Electricity	Heat	Total	
Production	136.2	445.2	582.7	17.0	82.9	19.1				1 283.1
Net Imports	- 18.8	- 294.0	- 196.7				- 4.5			- 514.0
TPED	117.4	151.2	385.9	17.0	82.9	19.1	- 4.5			769.1
Electricity and Heat Generation	- 97.8	- 14.8	- 197.1	- 17.0	- 82.9	- 13.7	99.0	131.4		- 192.7
Petroleum Refineries		- 14.6	- 3.9			- 0.1	- 2.6	- 7.7		- 28.8
Others	- 4.0	- 6.6	- 48.9				- 7.3	- 5.4		- 72.1
TFED	15.7	115.3	136.1			5.4	84.8	118.3		475.4
Industry	11.3	38.8	82.1			0.9	52.1	57.4		242.5
Transport		70.2					6.3			76.5
Residential	4.2	5.4	52.2			4.4	16.1	56.2		138.4
Commercial	0.2	0.9	1.9			0.1	10.3	4.7		18.1

RUSSIA

MACRO ASSUMPTIONS

	1992	2002	2010	2020	2030	Growth Rate (% per annum)				
						92-02	02-10	10-20	20-30	02-30
GDP (2000 PPP US\$ billion)	1 820	1 658	2 514	3 574	4 752	-0.9	5.3	3.6	2.9	3.8
Population (million)	148	145	138	129	121	-0.2	-0.7	-0.6	-0.7	-0.7
GDP per capita (2000 PPP US\$)	12 275	11 441	18 285	27 688	39 376	-0.7	6.0	4.2	3.6	4.5
GDP in Services (2000 PPP US\$ billion)	894	862	1 310	1 926	2 651	-0.4	5.4	3.9	3.2	4.1
GDP in Industry (2000 PPP US\$ billion)	708	412	629	941	1 273	-5.3	5.4	4.1	3.1	4.1
Urbanisation level (%)	73	73	74	75	78	0.0	0.1	0.2	0.4	0.2

ENERGY PROJECTIONS

	Mtoe					Growth rate (% per annum)				
	1992	2002	2010	2020	2030	92-02	02-10	10-20	20-30	02-30
Production	1 118.7	1 087.5	1 144.6	1 213.9	1 283.1	-0.3	0.6	0.6	0.6	0.6
Coal	143.9 (13%)	121.4 (11%)	136.8 (12%)	137.1 (11%)	136.2 (11%)	-1.7	1.5	0.03	-0.1	0.4
Oil	398.8 (36%)	383.5 (35%)	401.3 (35%)	425.6 (35%)	445.2 (35%)	-0.4	0.6	0.6	0.5	0.5
Gas	517.2 (46%)	518.9 (48%)	522.7 (46%)	552.7 (46%)	582.7 (45%)	0.0	0.1	0.6	0.5	0.4
Hydro	14.8 (1%)	13.9 (1%)	15.9 (1%)	16.6 (1%)	17.0 (1%)		1.6	0.4	0.2	0.7
NRE	12.5 (1%)	11.7 (1%)	14.1 (1%)	16.4 (1%)	19.1 (1%)	-0.6	2.3	1.5	1.6	1.8
Nuclear	31.5 (3%)	38.1 (3%)	53.9 (5%)	65.5 (5%)	82.9 (6%)	1.9	4.4	2.0	2.4	2.8
Net Imports	- 328.7	- 452.7	- 473.6	- 490.9	- 514.0	3.3	0.6	0.4	0.5	0.5
Coal	- 1.4	- 15.2	- 18.8	- 18.8	- 18.8	27.0	2.7			0.8
Oil	- 173.8	- 263.7	- 269.6	- 280.4	- 294.0	4.3	0.3	0.4	0.5	0.4
Gas	- 152.1	- 172.7	- 182.8	- 188.1	- 196.7	1.3	0.7	0.3	0.5	0.5
Electricity	- 1.4	- 1.1	- 2.3	- 3.6	- 4.5	-2.2	9.6	4.5	2.2	5.1
Total Primary Energy Demand	776.2	635.0	671.1	723.0	769.1	- 2.0	0.7	0.7	0.6	0.7
Coal	132.2 (17%)	106.1 (17%)	118.0 (18%)	118.3 (16%)	117.4 (15%)	-2.2	1.3	0.03	-0.1	0.4
Oil	221.0 (28%)	120.0 (19%)	131.7 (20%)	145.2 (20%)	151.2 (20%)	-5.9	1.2	1.0	0.4	0.8
Gas	364.2 (47%)	346.3 (55%)	339.9 (51%)	364.6 (50%)	385.9 (50%)	-0.5	-0.2	0.7	0.6	0.4
Hydro	14.8 (2%)	14.2 (2%)	16.2 (2%)	16.8 (2%)	17.2 (2%)	-0.2	1.6	0.4	0.2	0.7
NRE	12.5 (2%)	11.7 (2%)	14.1 (2%)	16.4 (2%)	19.1 (2%)	-0.6	2.3	1.5	1.6	1.8
Nuclear	31.5 (4%)	38.1 (6%)	53.9 (8%)	65.5 (9%)	82.9 (11%)		4.4	2.0	2.4	2.8
Input for Electricity and Heat Generation	- 413.6	- 379.1	- 387.2	- 408.1	- 423.1	- 0.9	0.3	0.5	0.4	0.4
Coal	- 86.2 (21%)	- 84.8 (22%)	- 96.5 (25%)	- 97.9 (24%)	- 97.8 (23%)	-0.2	1.6	0.1		0.5
Oil	- 59.2 (14%)	- 25.7 (7%)	- 18.8 (5%)	- 17.3 (4%)	- 14.8 (3%)	-8.0	-3.8	-0.8	-1.5	-2.0
Gas	- 217.5 (53%)	- 207.3 (55%)	- 190.9 (49%)	- 198.2 (49%)	- 197.1 (47%)	-0.5	-1.0	0.4	-0.1	-0.2
Hydro	- 14.8 (4%)	- 13.9 (4%)	- 15.9 (4%)	- 16.6 (4%)	- 17.0 (4%)	-0.6	1.6	0.4	0.2	0.7
NRE	- 4.4 (1%)	- 9.3 (2%)	- 11.2 (3%)	- 12.6 (3%)	- 13.7 (3%)	7.9	2.3	1.3	0.8	1.4
Nuclear	- 31.5 (8%)	- 38.1 (10%)	- 53.9 (14%)	- 65.5 (16%)	- 82.9 (20%)	1.9	4.4	2.0	2.4	2.8
Other Transformation	- 85.0	- 96.8	- 97.9	- 100.1	- 100.9	1.3	0.1	0.2	0.1	0.1
Coal	- 0.4 (1%)	- 3.5 (4%)	- 4.0 (4%)	- 4.0 (4%)	- 4.0 (4%)	23.4	1.5		-0.1	0.4
Oil	- 19.8 (23%)	- 18.6 (19%)	- 19.5 (20%)	- 20.6 (21%)	- 21.2 (21%)	-0.6	0.6	0.5	0.3	0.5
Gas	- 40.0 (47%)	- 52.8 (55%)	- 51.9 (53%)	- 52.5 (52%)	- 52.8 (52%)	2.8	-0.2	0.1		
NRE	- 0.1 (0%)			- 0.1 (0%)	- 0.1 (0%)				0.2	
Electricity	- 9.4 (11%)	- 9.5 (10%)	- 9.7 (10%)	- 9.9 (10%)	- 9.8 (10%)	0.1	0.2	0.2		0.1
Heat	- 15.2 (18%)	- 12.2 (13%)	- 12.7 (13%)	- 13.1 (13%)	- 13.1 (13%)	-2.2	0.5	0.3		0.2

RUSSIA

	Mtoe					Growth rate (% per annum)				
	1992	2002	2010	2020	2030	92-02	02-10	10-20	20-30	02-30
Total Final Energy Demand	517.2	363.1	395.8	435.1	475.4	-3.5	1.1	1.0	0.9	1.0
Coal	28.6 (6%)	17.8 (5%)	17.4 (4%)	16.5 (4%)	15.7 (3%)	-4.6	-0.2	-0.6	-0.5	-0.5
Oil	116.6 (23%)	75.7 (21%)	93.3 (24%)	107.2 (25%)	115.3 (24%)	-4.2	2.7	1.4	0.7	1.5
Gas	102.1 (20%)	86.2 (24%)	97.1 (25%)	113.8 (26%)	136.1 (29%)	-1.7	1.5	1.6	1.8	1.6
NRE	7.9 (2%)	2.3 (1%)	2.9 (1%)	3.7 (1%)	5.4 (1%)	-11.5	2.7	2.5	3.9	3.0
Electricity	57.6 (11%)	50.4 (14%)	61.1 (15%)	73.5 (17%)	84.8 (18%)	-1.3	2.4	1.9	1.4	1.9
Heat	204.4 (40%)	130.7 (36%)	124.0 (31%)	120.3 (28%)	118.3 (25%)	-4.4	-0.7	-0.3	-0.2	-0.4
Industry	249.3	156.9	183.3	215.1	242.5	-4.5	2.0	1.6	1.2	1.6
Coal	13.8 (6%)	11.1 (7%)	11.1 (6%)	11.2 (5%)	11.3 (5%)	-2.2		0.1	0.1	0.1
Oil	36.3 (15%)	20.9 (13%)	27.0 (15%)	34.1 (16%)	38.8 (16%)	-5.4	3.3	2.3	1.3	2.2
Gas	52.7 (21%)	41.7 (27%)	53.8 (29%)	68.4 (32%)	82.1 (34%)	-2.3	3.2	2.4	1.8	2.4
NRE	1.6 (1%)	0.6 (0%)	0.7 (0%)	0.8 (0%)	0.9 (0%)	-10.2	2.3	1.9	1.5	1.9
Electricity	42.1 (17%)	29.4 (19%)	36.3 (20%)	44.7 (21%)	52.1 (21%)	-3.5	2.6	2.1	1.5	2.1
Heat	102.9 (41%)	53.3 (34%)	54.5 (30%)	55.9 (26%)	57.4 (24%)	-6.4	0.3	0.3	0.3	0.3
Transport	77.4	53.1	65.1	72.8	76.5	-3.7	2.6	1.1	0.5	1.3
Coal										
Oil	71.4 (92%)	50.0 (94%)	60.6 (93%)	67.2 (92%)	70.2 (92%)	-3.5	2.4	1.0	0.4	1.2
Gas	1.1 (1%)									
NRE										
Electricity	5.0 (6%)	3.1 (6%)	4.5 (7%)	5.5 (8%)	6.3 (8%)	-4.6	4.7	2.1	1.2	2.5
Residential	163.4	133.6	129.1	129.5	138.4	-2.0	-0.4		0.7	0.1
Coal	9.5 (6%)	6.4 (5%)	6.1 (5%)	5.1 (4%)	4.2 (3%)	-3.9	-0.5	-1.8	-1.8	-1.5
Oil	8.6 (5%)	3.9 (3%)	4.7 (4%)	5.0 (4%)	5.4 (4%)	-7.7	2.5	0.6	0.7	1.2
Gas	40.6 (25%)	42.2 (32%)	41.4 (32%)	43.5 (34%)	52.2 (38%)	0.4	-0.2	0.5	1.8	0.8
NRE	5.7 (3%)	1.7 (1%)	2.2 (2%)	2.8 (2%)	4.4 (3%)	-11.1	2.8	2.6	4.5	3.3
Electricity	10.0 (6%)	12.3 (9%)	13.4 (10%)	14.8 (11%)	16.1 (12%)	2.1	1.1	1.0	0.9	1.0
Heat	89.0 (54%)	67.2 (50%)	61.3 (47%)	58.2 (45%)	56.2 (41%)	-2.8	-1.1	-0.5	-0.4	-0.6
Commercial	32.1	19.4	18.2	17.8	18.1	-4.9	-0.8	-0.2	0.2	-0.3
Coal	5.3 (16%)	0.4 (2%)	0.3 (2%)	0.2 (1%)	0.2 (1%)	-23.7	-2.6	-2.6	-2.6	-2.6
Oil	0.3 (1%)	0.9 (5%)	0.9 (5%)	0.9 (5%)	0.9 (5%)	10.4	0.4			0.1
Gas	7.8 (24%)	2.3 (12%)	1.9 (10%)	1.9 (10%)	1.9 (10%)	-11.4	-2.6	-0.2		-0.8
NRE	0.7 (2%)			0.1 (0%)	0.1 (1%)				4.9	
Electricity	5.6 (17%)	5.6 (29%)	6.9 (38%)	8.5 (48%)	10.3 (57%)	0.1	2.6	2.1	1.9	2.2
Heat	12.5 (39%)	10.2 (52%)	8.2 (45%)	6.2 (35%)	4.7 (26%)	-2.0	-2.7	-2.7	-2.7	-2.7

ENERGY SECURITY

	1980	2002	2010	2020	2030
Diversity of Primary Energy Demand (Rated between 1 and 100)	76	71	76	76	77
Net Energy Import Ratio (%)	-42	-71	-71	-68	-67
Net Oil Import Dependency (%)	-79	-220	-205	-193	-194

RUSSIA
ELECTRICITY GENERATION

	1992	2002	2010	2020	2030	Growth rate (% per annum)				
						92-02	02-10	10-20	20-30	02-30
Total Electricity Generation (TWh)	1 008	889	1 009	1 160	1 280	- 1.2	1.6	1.4	1.0	1.3
Coal	154 (15%)	170 (19%)	231 (23%)	246 (21%)	253 (20%)	1.0	3.9	0.6	0.3	1.4
Oil	100 (10%)	27 (3%)	12 (1%)	10 (1%)	2	- 12.2	- 9.4	- 2.1	- 13.7	- 8.5
Gas	461 (46%)	385 (43%)	371 (37%)	453 (39%)	496 (39%)	- 1.8	- 0.4	2.0	0.9	0.9
Hydro	172 (17%)	162 (18%)	185 (18%)	193 (17%)	197 (15%)	- 0.6	1.6	0.4	0.2	0.7
NRE	2	3	9 (1%)	15 (1%)	22 (2%)	4.6	14.3	5.6	3.8	7.4
Nuclear	120 (12%)	142 (16%)	201 (20%)	244 (21%)	308 (24%)	1.7	4.4	2.0	2.4	2.8
Total Installed Generation Capacity (GW)	213	223	270	309	352	0.4	2.4	1.4	1.3	1.6
Thermal	150 (70%)	156 (70%)	191 (71%)	222 (72%)	256 (73%)	0.4	2.6	1.5	1.4	1.8
Coal		89 (23%)	97 (30%)	130 (27%)	86 (24%)		5.9	0.1	0.3	1.8
Oil		15 (7%)	12 (4%)	9 (3%)	3 (1%)		- 2.8	- 2.8	- 10.4	- 5.6
Gas		89 (40%)	97 (36%)	130 (42%)	167 (47%)		1.1	2.9	2.5	2.3
Hydro	43 (20%)	45 (20%)	50 (19%)	52 (17%)	53 (15%)	0.4	1.3	0.4	0.2	0.6
NRE	0.01	1	2 (1%)	3 (1%)	4 (1%)	49.1	16.3	5.0	1.8	6.9
Nuclear	20 (9%)	21 (10%)	27 (10%)	32 (10%)	40 (11%)	0.5	2.8	1.9	2.3	2.3

ENERGY INTENSITY & CO₂ EMISSIONS

	1992	2002	2010	2020	2030	Growth Rates (% per annum)				
						92-02	02-10	10-20	20-30	02-30
Energy Intensity (toe per US\$ million GDP)	426	383	267	202	162	- 1.1	- 4.4	- 2.7	- 2.2	- 3.0
Industry (toe per US\$ million GDP in Industry)	352	381	292	228	191	0.8	- 3.3	- 2.4	- 1.8	- 2.4
Commercial (toe per US\$ million GDP in Services)	36	23	14	9	7	- 4.6	- 5.8	- 4.0	- 3.0	- 4.2
Energy Intensity (kgoe per capita)	5 234	4 381	4 880	5 601	6 373	- 1.8	1.4	1.4	1.3	1.3
Industry	1 681	1 083	1 333	1 666	2 010	- 4.3	2.6	2.3	1.9	2.2
Transport	522	367	474	564	634	- 3.5	3.3	1.8	1.2	2.0
Residential	1 102	922	939	1 003	1 147	- 1.8	0.2	0.7	1.3	0.8
Commercial	217	134	133	138	150	- 4.7	- 0.1	0.4	0.8	0.4
CO₂ Emissions (million tonnes)	1 497	1 521	1 587	1 685	1 749	0.2	0.5	0.6	0.4	0.5
Electricity Generation	756	846	834	853	843	1.1	- 0.2	0.2	- 0.1	
Transformation other than Electricity Generation	49	179	180	183	183	13.9	0.1	0.1		0.1
Industry	282	204	251	307	354	- 3.2	2.6	2.0	1.4	2.0
Transport	214	148	179	198	207	- 3.6	2.4	1.0	0.4	1.2
Residential	158	135	135	137	155	- 1.6		0.1	1.2	0.5
Commercial	40	10	8	8	8	- 13.3	- 1.7	- 0.4	- 0.3	- 0.7
CO₂ Emissions Intensity										
CO ₂ emissions per GDP (tonnes per US\$ million)	823	917	631	472	368	1.1	- 4.6	- 2.9	- 2.4	- 3.2
CO ₂ emissions per capita (tonnes per capita)	10.1	10.5	11.5	13.1	14.5	0.4	1.2	1.2	1.0	1.2

ENERGY INVESTMENT REQUIREMENTS

(Cumulative from 2003 -)	2010	2020	2030
Total (2000 US\$ billion)	261 - 327	492 - 637	709 - 923
Coal Production & Transportation	3.7 - 4.2	6.5 - 6.9	9.1 - 9.6
Oil & Gas Production & Processing	36 - 55	85 - 132	120 - 186
Oil & Gas International Trade	63 - 72	94 - 108	131 - 152
Oil & Gas Domestic Pipeline	6 - 9	28 - 40	44 - 63
Electricity Generation & Transmission	152 - 187	279 - 351	405 - 513