ANNEXES

TABLES FOR REFERENCE AND ALTERNATIVE POLICY SCENARIO PROJECTIONS

General Note to the Tables

For OECD countries and non-OECD countries, the analysis of energy demand is based on data up to 2004, published in mid-2006 in *Energy Balances of OECD Countries* and in *Energy Balances of Non-OECD Countries.*[1]

The tables show projections of energy demand, electricity generation and capacity, and CO_2 emissions[2] for the following regions:

- World
- OECD
- OECD North America
- United States
- OECD Pacific
- Japan
- OECD Europe
- European Union
- Transition economies
- Russia
- Developing countries
- Developing Asia
- China
- India
- Latin America
- Brazil
- Middle East
- Africa

The definitions for regions, fuels and sectors are in Annex C.

Both in the text of this book and in the tables, rounding may cause some differences between the total and the sum of the individual components.

1. In the *World Energy Outlook*, petrochemical feedstocks are included in the industry sector.
2. Total CO_2 emissions include emissions from "other transformation, own use and losses", as well as from power generation and heat plants, and total final consumption (as shown in the tables).

Reference Scenario: World

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**8 732**	**11 204**	**14 071**	**17 095**	**100**	**100**	**100**	**2.1**	**1.6**
Coal	2 183	2 773	3 666	4 441	25	26	26	2.6	1.8
Oil	3 181	3 940	4 750	5 575	35	34	33	1.7	1.3
of which international marine bunkers	*114*	*165*	*180*	*197*	*1*	*1*	*1*	*0.8*	*0.7*
Gas	1 680	2 302	3 017	3 869	21	21	23	2.5	2.0
Nuclear	525	714	810	861	6	6	5	1.2	0.7
Hydro	185	242	317	408	2	2	2	2.5	2.0
Biomass and waste	923	1 176	1 375	1 645	10	10	10	1.4	1.3
Other renewables	56	57	136	296	1	1	2	8.3	6.6
Power generation and heat plants	**2 800**	**4 133**	**5 483**	**6 926**	**100**	**100**	**100**	**2.6**	**2.0**
Coal	1 190	1 888	2 577	3 232	46	47	47	2.9	2.1
Oil	328	292	302	241	7	6	3	0.3	–0.7
Gas	486	875	1 229	1 683	21	22	24	3.1	2.5
Nuclear	525	714	810	861	17	15	12	1.2	0.7
Hydro	185	242	317	408	6	6	6	2.5	2.0
Biomass and waste	54	74	137	265	2	3	4	5.8	5.0
Other renewables	32	49	113	236	1	2	3	7.8	6.2
Other transformation, own use and losses	**878**	**1 064**	**1 313**	**1 583**	**100**	**100**	**100**	**1.9**	**1.5**
of which electricity	*189*	*263*	*368*	*486*	*25*	*28*	*31*	*3.1*	*2.4*
Total final consumption	**6 154**	**7 639**	**9 562**	**11 664**	**100**	**100**	**100**	**2.1**	**1.6**
Coal	765	641	823	923	8	9	8	2.3	1.4
Oil	2 543	3 228	3 965	4 786	42	41	41	1.9	1.5
Gas	1 004	1 219	1 516	1 839	16	16	16	2.0	1.6
Electricity	826	1 236	1 765	2 416	16	18	21	3.3	2.6
Heat	177	255	287	324	3	3	3	1.1	0.9
Biomass and waste	815	1 052	1 182	1 317	14	12	11	1.1	0.9
Other renewables	24	7	23	60	0	0	1	11.2	8.4
Industry	**2 134**	**2 511**	**3 283**	**3 932**	**100**	**100**	**100**	**2.5**	**1.7**
Coal	470	499	686	798	20	21	20	2.9	1.8
Oil	550	665	820	909	26	25	23	1.9	1.2
Gas	551	564	724	890	22	22	23	2.3	1.8
Electricity	382	512	729	940	20	22	24	3.3	2.4
Heat	72	100	109	116	4	3	3	0.8	0.6
Biomass and waste	109	169	212	275	7	6	7	2.1	1.9
Other renewables	0	1	1	4	0	0	0	5.8	7.4
Transport	**1 435**	**1 969**	**2 454**	**3 111**	**100**	**100**	**100**	**2.0**	**1.8**
Oil	1 370	1 861	2 286	2 884	94	93	93	1.9	1.7
Biofuels	6	15	54	92	1	2	3	12.1	7.1
Other fuels	59	93	114	135	5	5	4	1.8	1.4
Residential, services and agriculture	**2 339**	**2 905**	**3 497**	**4 221**	**100**	**100**	**100**	**1.7**	**1.4**
Coal	240	106	98	90	4	3	2	–0.7	–0.6
Oil	450	499	592	664	17	17	16	1.6	1.1
Gas	422	586	709	849	20	20	20	1.7	1.4
Electricity	421	689	987	1 409	24	28	33	3.3	2.8
Heat	105	154	177	207	5	5	5	1.3	1.1
Biomass and waste	696	864	911	946	30	26	22	0.5	0.3
Other renewables	4	7	22	56	0	1	1	11.5	8.5
Non-energy use	**246**	**254**	**329**	**400**	**100**	**100**	**100**	**2.4**	**1.8**

Reference Scenario: World

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**11 731**	**17 408**	**24 816**	**33 750**	**100**	**100**	**100**	**3.3**	**2.6**
Coal	4 478	6 917	10 609	14 703	40	43	44	4.0	2.9
Oil	1 313	1 161	1 195	940	7	5	3	0.3	–0.8
Gas	1 613	3 412	5 236	7 790	20	21	23	4.0	3.2
Nuclear	2 013	2 740	3 108	3 304	16	13	10	1.2	0.7
Hydro	2 148	2 809	3 682	4 749	16	15	14	2.5	2.0
Renewables (excluding hydro)	166	369	986	2 264	2	4	7	9.3	7.2
Biomass and waste	*125*	*227*	*422*	*805*	*1*	*2*	*2*	*5.8*	*5.0*
Wind	*4*	*82*	*433*	*1 132*	*0*	*2*	*3*	*16.3*	*10.6*
Geothermal	*36*	*56*	*100*	*174*	*0*	*0*	*1*	*5.5*	*4.5*
Solar	*1*	*4*	*30*	*142*	*0*	*0*	*0*	*19.7*	*14.5*
Tide and wave	*1*	*1*	*1*	*12*	*0*	*0*	*0*	*9.1*	*12.4*

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**4 054**	**5 652**	**7 875**	**100**	**100**	**100**	**3.1**	**2.6**
Coal	1 235	1 826	2 565	30	32	33	3.6	2.9
Oil	453	480	378	11	8	5	0.5	–0.7
Gas	1 055	1 604	2 468	26	28	31	3.9	3.3
Nuclear	364	391	416	9	7	5	0.7	0.5
Hydro	851	1 079	1 373	21	19	17	2.2	1.9
of which pumped storage	*79*	*79*	*79*	*2*	*1*	*1*	*0.0*	*0.0*
Renewables (excluding hydro)	96	271	674	2	5	9	9.9	7.8
Biomass and waste	*36*	*68*	*129*	*1*	*1*	*2*	*5.9*	*5.0*
Wind	*48*	*168*	*430*	*1*	*3*	*5*	*12.1*	*8.8*
Geothermal	*8*	*15*	*25*	*0*	*0*	*0*	*5.4*	*4.4*
Solar	*4*	*20*	*87*	*0*	*0*	*1*	*16.4*	*13.0*
Tide and wave	*0*	*0*	*3*	*0*	*0*	*0*	*4.0*	*9.9*

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**20 463**	**26 079**	**33 333**	**40 420**	**100**	**100**	**100**	**2.3**	**1.7**
Coal	8 081	10 625	14 217	17 293	41	43	43	2.7	1.9
Oil	8 561	10 199	12 239	14 334	39	37	35	1.7	1.3
of which international marine bunkers	*363*	*521*	*569*	*622*	*2*	*2*	*2*	*0.8*	*0.7*
Gas	3 820	5 254	6 877	8 793	20	21	22	2.5	2.0
Power generation and heat plants	**6 955**	**10 587**	**14 209**	**17 680**	**100**	**100**	**100**	**2.7**	**2.0**
Coal	4 764	7 600	10 353	12 946	72	73	73	2.9	2.1
Oil	1 053	934	960	762	9	7	4	0.3	–0.8
Gas	1 138	2 054	2 896	3 972	19	20	22	3.2	2.6
Total final consumption	**12 047**	**13 668**	**17 017**	**20 324**	**100**	**100**	**100**	**2.0**	**1.5**
Coal	3 188	2 817	3 636	4 102	21	21	20	2.3	1.5
Oil	6 595	8 091	9 972	12 124	59	59	60	1.9	1.6
of which transport	*3 758*	*5 112*	*6 328*	*7 993*	*37*	*37*	*39*	*2.0*	*1.7*
Gas	2 264	2 760	3 409	4 098	20	20	20	1.9	1.5

Reference Scenario: OECD

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**4 518**	**5 502**	**6 261**	**6 860**	**100**	**100**	**100**	**1.2**	**0.9**
Coal	1 063	1 129	1 231	1 301	21	20	19	0.8	0.5
Oil	1 894	2 236	2 468	2 591	41	39	38	0.9	0.6
Gas	844	1 199	1 429	1 648	22	23	24	1.6	1.2
Nuclear	449	604	645	621	11	10	9	0.6	0.1
Hydro	101	109	121	131	2	2	2	1.0	0.7
Biomass and waste	140	187	278	386	3	4	6	3.7	2.8
Other renewables	28	37	88	181	1	1	3	8.0	6.3
Power generation and heat plants	**1 701**	**2 197**	**2 549**	**2 820**	**100**	**100**	**100**	**1.4**	**1.0**
Coal	750	906	1 029	1 119	41	40	40	1.2	0.8
Oil	148	115	107	66	5	4	2	–0.7	–2.1
Gas	175	371	483	593	17	19	21	2.4	1.8
Nuclear	449	604	645	621	27	25	22	0.6	0.1
Hydro	101	109	121	131	5	5	5	1.0	0.7
Biomass and waste	52	61	91	147	3	4	5	3.8	3.5
Other renewables	25	31	72	144	1	3	5	8.0	6.1
Other transformation, own use and losses	**381**	**416**	**447**	**486**	**100**	**100**	**100**	**0.7**	**0.6**
of which electricity	*105*	*118*	*136*	*153*	*28*	*30*	*31*	*1.3*	*1.0*
Total final consumption	**3 135**	**3 826**	**4 393**	**4 892**	**100**	**100**	**100**	**1.3**	**1.0**
Coal	229	134	120	108	3	3	2	–1.0	–0.8
Oil	1 638	2 000	2 244	2 409	52	51	49	1.1	0.7
Gas	591	747	843	923	20	19	19	1.1	0.8
Electricity	547	753	914	1 093	20	21	22	1.8	1.4
Heat	40	59	71	83	2	2	2	1.6	1.3
Biomass and waste	87	127	187	239	3	4	5	3.6	2.5
Other renewables	3	6	15	37	0	0	1	8.4	7.1
Industry	**1 015**	**1 152**	**1 297**	**1 393**	**100**	**100**	**100**	**1.1**	**0.7**
Coal	159	115	108	100	10	8	7	–0.6	–0.5
Oil	323	376	431	433	33	33	31	1.2	0.5
Gas	261	310	342	370	27	26	27	0.9	0.7
Electricity	223	269	309	351	23	24	25	1.3	1.0
Heat	14	17	20	23	1	2	2	1.7	1.2
Biomass and waste	35	64	85	112	6	7	8	2.6	2.2
Other renewables	0	1	1	4	0	0	0	4.2	7.0
Transport	**986**	**1 283**	**1 484**	**1 660**	**100**	**100**	**100**	**1.3**	**1.0**
Oil	960	1 244	1 412	1 571	97	95	95	1.2	0.9
Biofuels	0	9	39	52	1	3	3	14.3	7.0
Other fuels	26	30	33	38	2	2	2	1.0	1.0
Residential, services and agriculture	**1 036**	**1 273**	**1 476**	**1 689**	**100**	**100**	**100**	**1.4**	**1.1**
Coal	68	17	11	7	1	1	0	–4.1	–3.5
Oil	259	263	266	257	21	18	15	0.1	–0.1
Gas	311	416	479	528	33	32	31	1.3	0.9
Electricity	316	475	593	728	37	40	43	2.0	1.7
Heat	27	42	50	60	3	3	4	1.6	1.4
Biomass and waste	52	54	63	75	4	4	4	1.4	1.2
Other renewables	3	6	14	34	0	1	2	8.7	7.1
Non-energy use	**98**	**119**	**137**	**150**	**100**	**100**	**100**	**1.3**	**0.9**

Reference Scenario: OECD

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**7 571**	**10 118**	**12 185**	**14 468**	**100**	**100**	**100**	**1.7**	**1.4**
Coal	3 059	3 842	4 548	5 391	38	37	37	1.5	1.3
Oil	695	527	482	297	5	4	2	–0.8	–2.2
Gas	770	1 854	2 515	3 345	18	21	23	2.8	2.3
Nuclear	1 725	2 319	2 475	2 382	23	20	16	0.6	0.1
Hydro	1 170	1 267	1 412	1 519	13	12	11	1.0	0.7
Renewables (excluding hydro)	152	310	753	1 534	3	6	11	8.4	6.3
Biomass and waste	*118*	*196*	*306*	*485*	*2*	*3*	*3*	*4.2*	*3.6*
Wind	*4*	*77*	*358*	*840*	*1*	*3*	*6*	*15.0*	*9.6*
Geothermal	*29*	*35*	*59*	*95*	*0*	*0*	*1*	*4.8*	*3.9*
Solar	*1*	*2*	*28*	*103*	*0*	*0*	*1*	*29.5*	*17.3*
Tide and wave	*1*	*1*	*1*	*11*	*0*	*0*	*0*	*9.1*	*12.3*

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**2 360**	**2 826**	**3 545**	**100**	**100**	**100**	**1.6**	**1.6**
Coal	656	749	928	28	27	26	1.2	1.3
Oil	234	226	140	10	8	4	–0.3	–2.0
Gas	654	866	1 209	28	31	34	2.6	2.4
Nuclear	305	309	296	13	11	8	0.1	–0.1
Hydro	428	458	486	18	16	14	0.6	0.5
of which pumped storage	*79*	*79*	*79*	*3*	*3*	*2*	*0.0*	*0.0*
Renewables (excluding hydro)	82	219	485	3	8	14	9.3	7.1
Biomass and waste	*31*	*49*	*78*	*1*	*2*	*2*	*4.3*	*3.6*
Wind	*43*	*142*	*325*	*2*	*5*	*9*	*11.4*	*8.1*
Geothermal	*5*	*8*	*13*	*0*	*0*	*0*	*4.6*	*3.7*
Solar	*3*	*19*	*66*	*0*	*1*	*2*	*18.5*	*12.8*
Tide and wave	*0*	*0*	*3*	*0*	*0*	*0*	*4.0*	*9.8*

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**11 051**	**12 827**	**14 391**	**15 495**	**100**	**100**	**100**	**1.1**	**0.7**
Coal	4 101	4 334	4 762	5 058	34	33	33	0.9	0.6
Oil	5 029	5 713	6 320	6 628	45	44	43	0.9	0.6
Gas	1 920	2 780	3 309	3 808	22	23	25	1.6	1.2
Power generation and heat plants	**3 904**	**4 905**	**5 636**	**6 115**	**100**	**100**	**100**	**1.3**	**0.9**
Coal	3 024	3 665	4 159	4 514	75	74	74	1.2	0.8
Oil	471	372	346	213	8	6	3	–0.7	–2.1
Gas	409	867	1 130	1 388	18	20	23	2.4	1.8
Total final consumption	**6 553**	**7 274**	**8 063**	**8 625**	**100**	**100**	**100**	**0.9**	**0.7**
Coal	1 012	589	528	474	8	7	5	–1.0	–0.8
Oil	4 196	4 967	5 598	6 030	68	69	70	1.1	0.7
of which transport	*2 688*	*3 445*	*3 966*	*4 418*	*47*	*49*	*51*	*1.3*	*1.0*
Gas	1 345	1 717	1 938	2 121	24	24	25	1.1	0.8

Reference Scenario: OECD North America

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**2 256**	**2 756**	**3 184**	**3 575**	**100**	**100**	**100**	**1.3**	**1.0**
Coal	486	581	670	740	21	21	21	1.3	0.9
Oil	927	1 137	1 292	1 415	41	41	40	1.2	0.8
Gas	517	637	740	824	23	23	23	1.4	1.0
Nuclear	179	238	254	275	9	8	8	0.6	0.6
Hydro	51	55	58	61	2	2	2	0.6	0.4
Biomass and waste	78	91	133	182	3	4	5	3.5	2.7
Other renewables	19	17	37	77	1	1	2	7.1	5.9
Power generation and heat plants	**845**	**1 086**	**1 272**	**1 450**	**100**	**100**	**100**	**1.4**	**1.1**
Coal	413	524	618	692	48	49	48	1.5	1.1
Oil	47	54	52	39	5	4	3	–0.4	–1.3
Gas	95	173	218	248	16	17	17	2.1	1.4
Nuclear	179	238	254	275	22	20	19	0.6	0.6
Hydro	51	55	58	61	5	5	4	0.6	0.4
Biomass and waste	41	27	40	72	2	3	5	3.8	3.9
Other renewables	19	15	31	62	1	2	4	6.9	5.6
Other transformation, own use and losses	**190**	**197**	**219**	**253**	**100**	**100**	**100**	**1.0**	**1.0**
of which electricity	*56*	*56*	*66*	*76*	*29*	*30*	*30*	*1.4*	*1.1*
Total final consumption	**1 552**	**1 906**	**2 218**	**2 506**	**100**	**100**	**100**	**1.4**	**1.1**
Coal	59	39	35	31	2	2	1	–1.0	–0.8
Oil	822	1 025	1 186	1 323	54	53	53	1.3	1.0
Gas	360	402	442	471	21	20	19	0.9	0.6
Electricity	271	371	450	548	19	20	22	1.8	1.5
Heat	3	4	6	7	0	0	0	3.9	2.4
Biomass and waste	37	64	92	110	3	4	4	3.4	2.1
Other renewables	0	2	6	15	0	0	1	8.4	7.6
Industry	**448**	**511**	**572**	**620**	**100**	**100**	**100**	**1.0**	**0.7**
Coal	49	36	33	30	7	6	5	–0.8	–0.7
Oil	131	153	181	187	30	32	30	1.5	0.8
Gas	157	171	181	192	34	32	31	0.5	0.4
Electricity	94	107	121	140	21	21	23	1.1	1.0
Heat	1	3	5	6	1	1	1	3.9	2.2
Biomass and waste	16	40	52	63	8	9	10	2.5	1.8
Other renewables	0	0	0	0	0	0	0	4.0	3.1
Transport	**575**	**738**	**871**	**996**	**100**	**100**	**100**	**1.5**	**1.2**
Oil	556	713	831	952	97	95	96	1.4	1.1
Biofuels	0	7	21	24	1	2	2	10.3	4.9
Other fuels	19	19	19	20	3	2	2	0.3	0.3
Residential, services and agriculture	**477**	**588**	**691**	**799**	**100**	**100**	**100**	**1.5**	**1.2**
Coal	10	3	2	1	1	0	0	–4.0	–4.2
Oil	83	90	92	92	15	13	12	0.2	0.1
Gas	185	212	243	259	36	35	32	1.2	0.8
Electricity	176	263	329	407	45	48	51	2.1	1.7
Heat	2	1	1	1	0	0	0	4.1	2.9
Biomass and waste	21	17	20	22	3	3	3	1.2	1.0
Other renewables	0	2	5	15	0	1	2	8.6	7.7
Non-energy use	**52**	**69**	**83**	**92**	**100**	**100**	**100**	**1.7**	**1.1**

Reference Scenario: OECD North America

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**3 809**	**4 970**	**5 999**	**7 255**	**100**	**100**	**100**	**1.7**	**1.5**
Coal	1 790	2 217	2 711	3 327	45	45	46	1.8	1.6
Oil	217	231	216	167	5	4	2	–0.6	–1.2
Gas	406	851	1 158	1 412	17	19	19	2.8	2.0
Nuclear	687	913	973	1 057	18	16	15	0.6	0.6
Hydro	593	637	679	713	13	11	10	0.6	0.4
Renewables (excluding hydro)	115	121	261	579	2	4	8	7.2	6.2
Biomass and waste	*90*	*83*	*125*	*221*	*2*	*2*	*3*	*3.8*	*3.8*
Wind	*3*	*16*	*87*	*264*	*0*	*1*	*4*	*16.9*	*11.5*
Geothermal	*21*	*22*	*39*	*62*	*0*	*1*	*1*	*5.2*	*4.0*
Solar	*1*	*1*	*10*	*31*	*0*	*0*	*0*	*28.7*	*16.0*
Tide and wave	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*8.0*	*16.8*

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**1 180**	**1 401**	**1 741**	**100**	**100**	**100**	**1.6**	**1.5**
Coal	365	434	546	31	31	31	1.6	1.6
Oil	96	99	73	8	7	4	0.3	–1.1
Gas	407	507	652	35	36	37	2.0	1.8
Nuclear	112	118	128	9	8	7	0.5	0.5
Hydro	178	183	190	15	13	11	0.2	0.3
of which pumped storage	*20*	*20*	*20*	*2*	*1*	*1*	*0.0*	*0.0*
Renewables (excluding hydro)	22	60	152	2	4	9	9.3	7.6
Biomass and waste	*12*	*18*	*33*	*1*	*1*	*2*	*4.2*	*4.1*
Wind	*7*	*30*	*92*	*1*	*2*	*5*	*13.9*	*10.3*
Geothermal	*3*	*6*	*9*	*0*	*0*	*0*	*5.0*	*3.9*
Solar	*1*	*6*	*18*	*0*	*0*	*1*	*25.6*	*14.5*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	*0.0*	*13.0*

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**5 554**	**6 694**	**7 721**	**8 528**	**100**	**100**	**100**	**1.3**	**0.9**
Coal	1 882	2 249	2 600	2 878	34	34	34	1.3	1.0
Oil	2 485	2 967	3 401	3 740	44	44	44	1.3	0.9
Gas	1 187	1 478	1 720	1 910	22	22	22	1.4	1.0
Power generation and heat plants	**1 991**	**2 648**	**3 114**	**3 433**	**100**	**100**	**100**	**1.5**	**1.0**
Coal	1 618	2 065	2 433	2 726	78	78	79	1.5	1.1
Oil	151	178	171	127	7	5	4	–0.4	–1.3
Gas	222	404	510	579	15	16	17	2.1	1.4
Total final consumption	**3 211**	**3 678**	**4 198**	**4 622**	**100**	**100**	**100**	**1.2**	**0.9**
Coal	262	168	151	135	5	4	3	–1.0	–0.8
Oil	2 122	2 587	3 029	3 402	70	72	74	1.4	1.1
of which transport	*1 584*	*2 030*	*2 416*	*2 767*	*55*	*58*	*60*	*1.6*	*1.2*
Gas	827	923	1 018	1 084	25	24	23	0.9	0.6

Reference Scenario: United States

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**1 924**	**2 324**	**2 653**	**2 929**	**100**	**100**	**100**	**1.2**	**0.9**
Coal	458	545	624	695	23	24	24	1.2	0.9
Oil	767	946	1 065	1 150	41	40	39	1.1	0.8
Gas	439	515	579	599	22	22	20	1.1	0.6
Nuclear	159	212	221	243	9	8	8	0.4	0.5
Hydro	23	23	25	26	1	1	1	0.6	0.3
Biomass and waste	62	71	110	155	3	4	5	4.2	3.1
Other renewables	14	11	28	60	0	1	2	8.4	6.6
Power generation and heat plants	**745**	**944**	**1 089**	**1 227**	**100**	**100**	**100**	**1.3**	**1.0**
Coal	391	495	578	653	52	53	53	1.4	1.1
Oil	27	33	32	23	4	3	2	–0.3	–1.4
Gas	90	147	173	169	16	16	14	1.5	0.5
Nuclear	159	212	221	243	22	20	20	0.4	0.5
Hydro	23	23	25	26	2	2	2	0.6	0.3
Biomass and waste	40	24	37	67	3	3	5	4.2	4.1
Other renewables	14	9	23	47	1	2	4	8.5	6.4
Other transformation, own use and losses	**154**	**144**	**151**	**160**	**100**	**100**	**100**	**0.4**	**0.4**
of which electricity	*49*	*45*	*50*	*56*	*31*	*33*	*35*	*1.1*	*0.9*
Total final consumption	**1 304**	**1 599**	**1 847**	**2 059**	**100**	**100**	**100**	**1.3**	**1.0**
Coal	54	34	31	28	2	2	1	–0.9	–0.8
Oil	695	865	989	1 088	54	54	53	1.2	0.9
Gas	303	335	367	382	21	20	19	0.8	0.5
Electricity	226	313	376	454	20	20	22	1.7	1.4
Heat	2	3	5	6	0	0	0	4.4	2.5
Biomass and waste	23	47	73	88	3	4	4	4.2	2.5
Other renewables	0	2	5	14	0	0	1	8.3	7.3
Industry	**357**	**404**	**448**	**472**	**100**	**100**	**100**	**0.9**	**0.6**
Coal	45	31	29	27	8	6	6	–0.6	–0.6
Oil	104	123	145	149	31	32	32	1.5	0.7
Gas	124	135	140	143	33	31	30	0.3	0.2
Electricity	75	81	87	97	20	19	20	0.6	0.7
Heat	0	2	4	5	1	1	1	4.5	2.4
Biomass and waste	9	31	42	52	8	9	11	3.0	2.1
Other renewables	0	0	0	0	0	0	0	3.5	3.0
Transport	**499**	**638**	**741**	**833**	**100**	**100**	**100**	**1.4**	**1.0**
Oil	484	617	707	796	97	95	96	1.3	1.0
Biofuels	0	7	20	23	1	3	3	10.2	4.8
Other fuels	16	14	14	14	2	2	2	–0.1	0.0
Residential, services and agriculture	**403**	**497**	**584**	**674**	**100**	**100**	**100**	**1.5**	**1.2**
Coal	10	3	2	1	1	0	0	–4.0	–4.2
Oil	63	65	63	64	13	11	9	–0.2	–0.1
Gas	164	186	213	225	37	36	33	1.2	0.7
Electricity	152	231	289	357	47	49	53	2.0	1.7
Heat	2	1	1	1	0	0	0	4.1	2.9
Biomass and waste	14	9	11	13	2	2	2	1.7	1.4
Other renewables	0	2	5	13	0	1	2	8.5	7.4
Non-energy use	**44**	**60**	**73**	**80**	**100**	**100**	**100**	**1.7**	**1.1**

Reference Scenario: United States

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**3 203**	**4 148**	**4 951**	**5 913**	**100**	**100**	**100**	**1.6**	**1.4**
Coal	1 700	2 090	2 529	3 128	50	51	53	1.7	1.6
Oil	131	139	138	100	3	3	2	0.0	–1.3
Gas	382	732	914	954	18	18	16	2.0	1.0
Nuclear	611	813	849	933	20	17	16	0.4	0.5
Hydro	273	271	291	297	7	6	5	0.6	0.3
Renewables (excluding hydro)	106	102	229	502	2	5	8	7.6	6.3
Biomass and waste	*86*	*72*	*112*	*204*	*2*	*2*	*3*	*4.2*	*4.1*
Wind	*3*	*14*	*77*	*219*	*0*	*2*	*4*	*16.5*	*11.1*
Geothermal	*16*	*15*	*30*	*49*	*0*	*1*	*1*	*6.1*	*4.5*
Solar	*1*	*1*	*10*	*29*	*0*	*0*	*0*	*29.8*	*16.2*
Tide and wave	*0*	*0*	*0*	*1*	*0*	*0*	*0*	–	–

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**995**	**1 166**	**1 431**	**100**	**100**	**100**	**1.5**	**1.4**
Coal	334	397	504	34	34	35	1.6	1.6
Oil	74	76	54	7	6	4	0.2	–1.2
Gas	373	440	529	38	38	37	1.5	1.4
Nuclear	98	101	111	10	9	8	0.3	0.5
Hydro	97	99	100	10	8	7	0.2	0.1
of which pumped storage	*20*	*20*	*20*	*2*	*2*	*1*	*0.0*	*0.0*
Renewables (excluding hydro)	19	53	132	2	5	9	9.7	7.7
Biomass and waste	*10*	*16*	*30*	*1*	*1*	*2*	*4.6*	*4.5*
Wind	*7*	*27*	*77*	*1*	*2*	*5*	*13.3*	*9.8*
Geothermal	*2*	*4*	*7*	*0*	*0*	*0*	*5.7*	*4.3*
Solar	*0*	*6*	*17*	*0*	*1*	*1*	*26.2*	*14.7*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	*0.0*	*11.3*

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**4 832**	**5 769**	**6 573**	**7 138**	**100**	**100**	**100**	**1.2**	**0.8**
Coal	1 774	2 110	2 421	2 702	37	37	38	1.3	1.0
Oil	2 047	2 448	2 798	3 044	42	43	43	1.2	0.8
Gas	1 011	1 212	1 353	1 392	21	21	19	1.0	0.5
Power generation and heat plants	**1 829**	**2 403**	**2 784**	**3 039**	**100**	**100**	**100**	**1.3**	**0.9**
Coal	1 532	1 949	2 273	2 567	81	82	84	1.4	1.1
Oil	88	110	107	76	5	4	3	–0.3	–1.4
Gas	210	344	404	396	14	14	13	1.5	0.5
Total final consumption	**2 731**	**3 101**	**3 517**	**3 812**	**100**	**100**	**100**	**1.1**	**0.8**
Coal	239	146	132	119	5	4	3	–0.9	–0.8
Oil	1 795	2 184	2 539	2 814	70	72	74	1.4	1.0
of which transport	*1 381*	*1 759*	*2 074*	*2 334*	*57*	*59*	*61*	*1.5*	*1.1*
Gas	697	771	846	880	25	24	23	0.8	0.5

Reference Scenario: OECD Pacific

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**640**	**880**	**1 030**	**1 119**	**100**	**100**	**100**	**1.4**	**0.9**
Coal	138	217	239	230	25	23	21	0.9	0.2
Oil	340	399	429	433	45	42	39	0.7	0.3
Gas	69	124	158	188	14	15	17	2.3	1.6
Nuclear	66	108	155	196	12	15	17	3.4	2.3
Hydro	11	12	13	13	1	1	1	0.3	0.4
Biomass and waste	10	14	23	36	2	2	3	4.8	3.8
Other renewables	5	6	13	24	1	1	2	6.9	5.4
Power generation and heat plants	**238**	**365**	**452**	**502**	**100**	**100**	**100**	**2.0**	**1.2**
Coal	60	139	159	152	38	35	30	1.3	0.3
Oil	54	30	25	13	8	6	3	–1.4	–3.0
Gas	40	67	82	99	18	18	20	1.9	1.5
Nuclear	66	108	155	196	29	34	39	3.4	2.3
Hydro	11	12	13	13	3	3	3	0.3	0.4
Biomass and waste	3	5	8	13	1	2	3	4.4	3.7
Other renewables	3	5	9	16	1	2	3	6.0	4.8
Other transformation, own use and losses	**62**	**82**	**86**	**89**	**100**	**100**	**100**	**0.5**	**0.3**
of which electricity	*11*	*16*	*18*	*19*	*19*	*21*	*21*	*1.3*	*0.7*
Total final consumption	**437**	**586**	**679**	**739**	**100**	**100**	**100**	**1.4**	**0.9**
Coal	49	39	40	40	7	6	5	0.4	0.1
Oil	268	345	379	395	59	56	53	0.9	0.5
Gas	26	55	72	83	9	11	11	2.5	1.6
Electricity	86	132	163	184	23	24	25	1.9	1.3
Heat	0	5	6	7	1	1	1	2.3	1.6
Biomass and waste	6	9	15	23	1	2	3	5.0	3.8
Other renewables	2	1	4	8	0	1	1	10.1	7.4
Industry	**179**	**233**	**265**	**283**	**100**	**100**	**100**	**1.2**	**0.8**
Coal	39	38	39	39	16	15	14	0.4	0.1
Oil	81	103	112	115	44	42	41	0.8	0.4
Gas	12	24	31	35	11	12	12	2.2	1.3
Electricity	43	58	68	75	25	26	27	1.5	1.0
Heat	0	3	4	4	1	1	2	2.3	1.6
Biomass and waste	4	7	10	15	3	4	5	3.5	3.2
Other renewables	0	0	0	0	0	0	0	–0.5	–0.2
Transport	**117**	**164**	**187**	**202**	**100**	**100**	**100**	**1.2**	**0.8**
Oil	115	161	183	197	98	98	97	1.2	0.8
Biofuels	0	0	0	1	0	0	0	53.6	23.6
Other fuels	2	3	4	4	2	2	2	2.4	1.7
Residential, services and agriculture	**127**	**174**	**210**	**236**	**100**	**100**	**100**	**1.7**	**1.2**
Coal	9	1	1	1	1	0	0	–1.1	–0.8
Oil	58	66	67	66	38	32	28	0.2	0.0
Gas	14	30	40	47	17	19	20	2.6	1.7
Electricity	42	72	92	105	42	44	44	2.2	1.4
Heat	0	2	3	3	1	1	1	2.2	1.5
Biomass and waste	2	2	5	7	1	2	3	8.0	4.9
Other renewables	1	1	3	8	1	2	3	12.0	8.4
Non-energy use	**15**	**16**	**17**	**18**	**100**	**100**	**100**	**0.6**	**0.5**

Reference Scenario: OECD Pacific

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**1 130**	**1 719**	**2 104**	**2 353**	**100**	**100**	**100**	**1.9**	**1.2**
Coal	253	630	746	738	37	35	31	1.6	0.6
Oil	274	164	140	72	10	7	3	–1.4	–3.1
Gas	198	340	414	510	20	20	22	1.8	1.6
Nuclear	255	413	594	751	24	28	32	3.4	2.3
Hydro	133	142	146	155	8	7	7	0.3	0.4
Renewables (excluding hydro)	17	30	63	127	2	3	5	7.1	5.8
Biomass and waste	*13*	*21*	*31*	*48*	*1*	*1*	*2*	*3.7*	*3.2*
Wind	*0*	*2*	*14*	*42*	*0*	*1*	*2*	*17.6*	*11.6*
Geothermal	*4*	*6*	*10*	*15*	*0*	*0*	*1*	*4.5*	*3.5*
Solar	*0*	*0*	*7*	*22*	*0*	*0*	*1*	*45.1*	*22.0*
Tide and wave	*0*	*0*	*0*	*1*	*0*	*0*	*0*	–	–

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**386**	**443**	**518**	**100**	**100**	**100**	**1.3**	**1.1**
Coal	94	113	123	24	25	24	1.6	1.0
Oil	69	61	40	18	14	8	–1.2	–2.0
Gas	89	111	153	23	25	30	2.0	2.1
Nuclear	61	74	94	16	17	18	1.7	1.7
Hydro	65	68	71	17	15	14	0.4	0.3
of which pumped storage	*28*	*28*	*28*	*7*	*6*	*6*	*0.0*	*0.0*
Renewables (excluding hydro)	7	16	37	2	4	7	8.5	6.8
Biomass and waste	*3*	*5*	*8*	*1*	*1*	*1*	*4.9*	*3.7*
Wind	*2*	*5*	*13*	*0*	*1*	*3*	*11.1*	*8.6*
Geothermal	*1*	*1*	*2*	*0*	*0*	*0*	*4.0*	*3.2*
Solar	*1*	*5*	*14*	*0*	*1*	*3*	*13.8*	*9.8*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**1 564**	**2 055**	**2 295**	**2 316**	**100**	**100**	**100**	**1.0**	**0.5**
Coal	519	803	897	858	39	39	37	1.0	0.3
Oil	885	960	1 028	1 025	47	45	44	0.6	0.3
Gas	160	292	369	433	14	16	19	2.2	1.5
Power generation and heat plants	**538**	**847**	**960**	**923**	**100**	**100**	**100**	**1.1**	**0.3**
Coal	276	596	683	647	70	71	70	1.2	0.3
Oil	167	94	81	42	11	8	5	–1.3	–3.0
Gas	94	157	195	234	19	20	25	2.0	1.5
Total final consumption	**957**	**1 118**	**1 242**	**1 298**	**100**	**100**	**100**	**1.0**	**0.6**
Coal	219	174	181	179	16	15	14	0.4	0.1
Oil	679	817	895	930	73	72	72	0.8	0.5
of which transport	*320*	*440*	*502*	*540*	*39*	*40*	*42*	*1.2*	*0.8*
Gas	60	126	165	189	11	13	15	2.5	1.6

Reference Scenario: Japan

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**446**	**533**	**586**	**606**	**100**	**100**	**100**	**0.9**	**0.5**
Coal	77	116	116	98	22	20	16	0.0	–0.7
Oil	253	253	253	236	47	43	39	0.0	–0.3
Gas	48	72	89	100	14	15	17	1.9	1.3
Nuclear	53	74	101	133	14	17	22	2.9	2.3
Hydro	8	8	8	8	2	1	1	–0.2	0.0
Biomass and waste	5	6	13	19	1	2	3	6.8	4.4
Other renewables	3	4	7	11	1	1	2	5.6	4.3
Power generation and heat plants	**171**	**219**	**256**	**275**	**100**	**100**	**100**	**1.4**	**0.9**
Coal	25	60	61	45	27	24	16	0.2	–1.1
Oil	48	24	19	9	11	7	3	–2.1	–3.7
Gas	33	47	56	64	21	22	23	1.7	1.2
Nuclear	53	74	101	133	34	40	48	2.9	2.3
Hydro	8	8	8	8	4	3	3	–0.2	0.0
Biomass and waste	2	4	5	8	2	2	3	3.1	2.6
Other renewables	1	3	5	8	1	2	3	4.7	3.9
Other transformation, own use and losses	**41**	**52**	**52**	**51**	**100**	**100**	**100**	**–0.1**	**–0.1**
of which electricity	*7*	*9*	*10*	*9*	*17*	*19*	*19*	*0.6*	*0.1*
Total final consumption	**306**	**354**	**383**	**391**	**100**	**100**	**100**	**0.7**	**0.4**
Coal	32	27	28	27	8	7	7	0.2	0.0
Oil	189	214	219	213	60	57	55	0.2	0.0
Gas	15	27	32	34	8	8	9	1.8	1.0
Electricity	65	83	94	101	23	25	26	1.1	0.7
Heat	0	1	1	1	0	0	0	1.9	1.3
Biomass and waste	3	2	7	12	1	2	3	11.0	6.3
Other renewables	1	1	2	3	0	1	1	8.5	5.6
Industry	**130**	**136**	**145**	**145**	**100**	**100**	**100**	**0.6**	**0.2**
Coal	32	27	28	27	20	19	19	0.2	0.0
Oil	59	61	62	59	45	43	41	0.2	–0.2
Gas	5	11	14	14	8	10	10	2.0	1.0
Electricity	32	34	36	37	25	25	25	0.5	0.3
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	3	2	5	8	2	4	6	7.6	4.9
Other renewables	0	0	0	0	0	0	0	–	–
Transport	**76**	**94**	**98**	**98**	**100**	**100**	**100**	**0.4**	**0.2**
Oil	74	92	96	95	98	98	97	0.3	0.1
Biofuels	0	0	0	1	0	0	1	–	–
Other fuels	1	2	2	2	2	2	2	1.8	1.2
Residential, services and agriculture	**89**	**115**	**131**	**139**	**100**	**100**	**100**	**1.2**	**0.7**
Coal	0	0	0	0	0	0	0	–	–
Oil	45	50	51	51	44	39	36	0.2	0.0
Gas	11	16	18	20	14	14	14	1.5	0.9
Electricity	31	48	57	62	41	43	45	1.6	1.0
Heat	0	1	1	1	1	1	1	1.9	1.3
Biomass and waste	0	0	2	3	0	1	2	46.7	19.6
Other renewables	1	1	2	3	1	1	2	8.4	5.6
Non-energy use	**11**	**10**	**9**	**9**	**100**	**100**	**100**	**–0.6**	**–0.4**

Reference Scenario: Japan

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**838**	**1 071**	**1 208**	**1 280**	**100**	**100**	**100**	**1.1**	**0.7**
Coal	116	294	303	226	27	25	18	0.3	–1.0
Oil	251	133	103	49	12	9	4	–2.3	–3.8
Gas	166	244	281	330	23	23	26	1.3	1.2
Nuclear	202	282	389	510	26	32	40	2.9	2.3
Hydro	89	94	92	94	9	8	7	–0.2	0.0
Renewables (excluding hydro)	13	23	40	71	2	3	6	5.1	4.4
Biomass and waste	*12*	*19*	*26*	*37*	*2*	*2*	*3*	*3.1*	*2.7*
Wind	*0*	*1*	*5*	*16*	*0*	*0*	*1*	*12.8*	*10.0*
Geothermal	*2*	*3*	*5*	*7*	*0*	*0*	*1*	*3.4*	*2.7*
Solar	*0*	*0*	*4*	*10*	*0*	*0*	*1*	*101.5*	*38.9*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**261**	**271**	**305**	**100**	**100**	**100**	**0.4**	**0.6**
Coal	44	44	43	17	16	14	0.0	–0.1
Oil	58	49	32	22	18	11	–1.6	–2.3
Gas	61	70	96	24	26	31	1.2	1.7
Nuclear	45	50	66	17	19	22	0.9	1.5
Hydro	47	47	48	18	17	16	0.1	0.1
of which pumped storage	*25*	*25*	*25*	*9*	*9*	*8*	*0.0*	*0.0*
Renewables (excluding hydro)	5	10	20	2	4	7	6.7	5.5
Biomass and waste	*2*	*4*	*6*	*1*	*1*	*2*	*4.9*	*3.6*
Wind	*1*	*2*	*5*	*0*	*1*	*2*	*6.5*	*6.7*
Geothermal	*1*	*1*	*1*	*0*	*0*	*0*	*3.0*	*2.5*
Solar	*1*	*3*	*8*	*0*	*1*	*3*	*10.6*	*7.7*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**1 057**	**1 211**	**1 250**	**1 154**	**100**	**100**	**100**	**0.3**	**–0.2**
Coal	292	414	420	345	34	34	30	0.1	–0.7
Oil	650	623	620	577	51	50	50	0.0	–0.3
Gas	115	174	210	233	14	17	20	1.7	1.1
Power generation and heat plants	**354**	**454**	**466**	**384**	**100**	**100**	**100**	**0.2**	**–0.6**
Coal	125	269	274	203	59	59	53	0.2	–1.1
Oil	151	74	59	28	16	13	7	–2.1	–3.7
Gas	78	111	134	153	24	29	40	1.7	1.2
Total final consumption	**660**	**715**	**744**	**734**	**100**	**100**	**100**	**0.4**	**0.1**
Coal	151	129	132	129	18	18	18	0.2	0.0
Oil	474	523	537	525	73	72	72	0.2	0.0
of which transport	*206*	*252*	*261*	*259*	*35*	*35*	*35*	*0.3*	*0.1*
Gas	36	62	75	79	9	10	11	1.7	0.9

Reference Scenario: OECD Europe

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**1 622**	**1 866**	**2 047**	**2 165**	**100**	**100**	**100**	**0.8**	**0.6**
Coal	438	330	322	331	18	16	15	–0.2	0.0
Oil	627	700	747	743	38	36	34	0.6	0.2
Gas	258	439	531	637	24	26	29	1.7	1.4
Nuclear	204	259	236	150	14	12	7	–0.8	–2.1
Hydro	38	42	50	56	2	2	3	1.7	1.1
Biomass and waste	52	83	122	168	4	6	8	3.6	2.8
Other renewables	4	14	38	80	1	2	4	9.5	6.9
Power generation and heat plants	**618**	**746**	**825**	**869**	**100**	**100**	**100**	**0.9**	**0.6**
Coal	277	243	252	275	33	31	32	0.3	0.5
Oil	48	31	30	13	4	4	2	–0.5	–3.2
Gas	40	131	182	247	18	22	28	3.0	2.5
Nuclear	204	259	236	150	35	29	17	–0.8	–2.1
Hydro	38	42	50	56	6	6	6	1.7	1.1
Biomass and waste	8	29	43	62	4	5	7	3.7	3.0
Other renewables	3	11	32	66	2	4	8	9.9	7.0
Other transformation, own use and losses	**129**	**138**	**142**	**144**	**100**	**100**	**100**	**0.3**	**0.2**
of which electricity	*38*	*46*	*52*	*58*	*33*	*36*	*40*	*1.1*	*0.9*
Total final consumption	**1 146**	**1 333**	**1 496**	**1 646**	**100**	**100**	**100**	**1.1**	**0.8**
Coal	121	56	45	37	4	3	2	–2.0	–1.6
Oil	548	630	679	691	47	45	42	0.7	0.4
Gas	204	290	329	369	22	22	22	1.1	0.9
Electricity	190	250	300	362	19	20	22	1.7	1.4
Heat	37	50	58	68	4	4	4	1.4	1.2
Biomass and waste	44	54	79	106	4	5	6	3.6	2.6
Other renewables	1	3	6	14	0	0	1	7.4	6.4
Industry	**388**	**408**	**460**	**490**	**100**	**100**	**100**	**1.1**	**0.7**
Coal	70	41	36	31	10	8	6	–1.3	–1.1
Oil	112	120	138	131	29	30	27	1.3	0.3
Gas	92	114	130	143	28	28	29	1.2	0.9
Electricity	86	104	121	136	25	26	28	1.4	1.0
Heat	13	11	11	12	3	2	3	0.6	0.6
Biomass and waste	14	17	23	34	4	5	7	2.6	2.6
Other renewables	0	0	0	3	0	0	1	9.1	11.2
Transport	**295**	**381**	**426**	**462**	**100**	**100**	**100**	**1.0**	**0.7**
Oil	289	371	398	422	97	93	91	0.6	0.5
Biofuels	0	2	18	27	1	4	6	22.2	10.5
Other fuels	6	8	10	14	2	2	3	2.0	2.0
Residential, services and agriculture	**432**	**511**	**574**	**654**	**100**	**100**	**100**	**1.1**	**1.0**
Coal	50	13	8	5	3	1	1	–4.4	–3.7
Oil	117	107	107	99	21	19	15	0.0	–0.3
Gas	112	174	196	222	34	34	34	1.1	0.9
Electricity	99	140	172	216	27	30	33	1.9	1.7
Heat	24	39	47	56	8	8	9	1.5	1.3
Biomass and waste	29	35	38	45	7	7	7	0.9	1.0
Other renewables	1	3	5	11	0	1	2	7.3	5.7
Non-energy use	**31**	**33**	**37**	**40**	**100**	**100**	**100**	**0.8**	**0.7**

Reference Scenario: OECD Europe

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**2 632**	**3 429**	**4 082**	**4 860**	**100**	**100**	**100**	**1.6**	**1.3**
Coal	1 016	994	1 090	1 326	29	27	27	0.8	1.1
Oil	203	132	126	59	4	3	1	–0.4	–3.1
Gas	167	663	943	1 423	19	23	29	3.3	3.0
Nuclear	782	992	907	574	29	22	12	–0.8	–2.1
Hydro	443	488	587	651	14	14	13	1.7	1.1
Renewables (excluding hydro)	20	159	429	828	5	10	17	9.4	6.5
Biomass and waste	*15*	*92*	*150*	*216*	*3*	*4*	*4*	*4.6*	*3.4*
Wind	*1*	*59*	*257*	*535*	*2*	*6*	*11*	*14.3*	*8.8*
Geothermal	*4*	*7*	*10*	*18*	*0*	*0*	*0*	*3.6*	*3.6*
Solar	*0*	*1*	*10*	*50*	*0*	*0*	*1*	*25.0*	*17.0*
Tide and wave	*1*	*1*	*1*	*9*	*0*	*0*	*0*	*9.2*	*11.5*

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**794**	**982**	**1 287**	**100**	**100**	**100**	**2.0**	**1.9**
Coal	197	202	260	25	21	20	0.2	1.1
Oil	69	66	27	9	7	2	–0.4	–3.6
Gas	158	249	404	20	25	31	4.2	3.7
Nuclear	132	116	74	17	12	6	–1.2	–2.2
Hydro	185	207	225	23	21	18	1.0	0.8
of which pumped storage	*31*	*31*	*31*	*4*	*3*	*2*	*0.0*	*0.0*
Renewables (excluding hydro)	53	142	296	7	14	23	9.3	6.8
Biomass and waste	*16*	*26*	*37*	*2*	*3*	*3*	*4.3*	*3.2*
Wind	*35*	*107*	*220*	*4*	*11*	*17*	*10.8*	*7.4*
Geothermal	*1*	*1*	*2*	*0*	*0*	*0*	*3.8*	*3.7*
Solar	*1*	*7*	*35*	*0*	*1*	*3*	*18.1*	*13.9*
Tide and wave	*0*	*0*	*2*	*0*	*0*	*0*	*4.3*	*9.1*

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**3 934**	**4 078**	**4 375**	**4 651**	**100**	**100**	**100**	**0.6**	**0.5**
Coal	1 700	1 282	1 264	1 321	31	29	28	–0.1	0.1
Oil	1 660	1 787	1 891	1 864	44	43	40	0.5	0.2
Gas	574	1 009	1 219	1 466	25	28	32	1.7	1.4
Power generation and heat plants	**1 376**	**1 409**	**1 562**	**1 759**	**100**	**100**	**100**	**0.9**	**0.9**
Coal	1 130	1 003	1 043	1 141	71	67	65	0.4	0.5
Oil	152	100	94	43	7	6	2	–0.5	–3.2
Gas	93	306	425	575	22	27	33	3.0	2.5
Total final consumption	**2 384**	**2 478**	**2 624**	**2 705**	**100**	**100**	**100**	**0.5**	**0.3**
Coal	532	247	196	161	10	7	6	–2.1	–1.6
Oil	1 395	1 563	1 674	1 697	63	64	63	0.6	0.3
of which transport	*784*	*976*	*1 048*	*1 111*	*39*	*40*	*41*	*0.6*	*0.5*
Gas	458	668	755	847	27	29	31	1.1	0.9

Reference Scenario: European Union

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**1 546**	**1 756**	**1 894**	**1 973**	**100**	**100**	**100**	**0.7**	**0.4**
Coal	427	311	290	283	18	15	14	–0.6	–0.4
Oil	591	656	695	685	37	37	35	0.5	0.2
Gas	255	417	500	597	24	26	30	1.7	1.4
Nuclear	203	257	231	147	15	12	7	–1.0	–2.1
Hydro	23	26	31	33	1	2	2	1.6	1.0
Biomass and waste	44	77	115	158	4	6	8	3.7	2.8
Other renewables	3	11	32	70	1	2	4	10.2	7.3
Power generation and heat plants	**601**	**712**	**768**	**788**	**100**	**100**	**100**	**0.7**	**0.4**
Coal	276	238	236	244	33	31	31	–0.1	0.1
Oil	48	31	30	13	4	4	2	–0.4	–3.3
Gas	39	122	170	232	17	22	29	3.1	2.5
Nuclear	203	257	231	147	36	30	19	–1.0	–2.1
Hydro	23	26	31	33	4	4	4	1.6	1.0
Biomass and waste	8	28	41	57	4	5	7	3.5	2.8
Other renewables	3	10	30	62	1	4	8	10.3	7.2
Other transformation, own use and losses	**122**	**127**	**129**	**128**	**100**	**100**	**100**	**0.1**	**0.0**
of which electricity	*37*	*43*	*47*	*51*	*34*	*36*	*40*	*0.8*	*0.7*
Total final consumption	**1 086**	**1 244**	**1 380**	**1 504**	**100**	**100**	**100**	**0.9**	**0.7**
Coal	114	44	31	22	4	2	1	–3.3	–2.7
Oil	513	589	630	636	47	46	42	0.6	0.3
Gas	204	282	315	349	23	23	23	1.0	0.8
Electricity	177	228	269	319	18	19	21	1.5	1.3
Heat	41	51	59	70	4	4	5	1.4	1.2
Biomass and waste	36	49	74	101	4	5	7	3.9	2.8
Other renewables	0	1	2	7	0	0	0	9.0	8.2
Industry	**371**	**378**	**418**	**441**	**100**	**100**	**100**	**0.9**	**0.6**
Coal	65	32	24	18	9	6	4	–2.8	–2.2
Oil	105	112	127	118	30	30	27	1.1	0.2
Gas	92	112	127	138	30	30	31	1.1	0.8
Electricity	80	94	106	119	25	25	27	1.2	0.9
Heat	15	11	12	13	3	3	3	0.6	0.6
Biomass and waste	14	17	23	34	5	5	8	2.6	2.7
Other renewables	0	0	0	2	0	0	0	37.4	28.4
Transport	**279**	**361**	**401**	**434**	**100**	**100**	**100**	**1.0**	**0.7**
Oil	273	351	374	394	97	93	91	0.6	0.4
Biofuels	0	2	18	27	1	4	6	22.2	10.5
Other fuels	6	8	10	13	2	2	3	2.0	2.0
Residential, services and agriculture	**407**	**475**	**527**	**593**	**100**	**100**	**100**	**0.9**	**0.9**
Coal	48	11	6	3	2	1	1	–5.3	–4.9
Oil	107	97	97	89	20	18	15	0.0	–0.3
Gas	112	168	186	207	35	35	35	0.9	0.8
Electricity	92	128	155	191	27	29	32	1.7	1.5
Heat	26	40	48	57	8	9	10	1.6	1.4
Biomass and waste	22	30	33	40	6	6	7	1.1	1.2
Other renewables	0	1	2	6	0	0	1	8.6	7.0
Non-energy use	**29**	**30**	**33**	**36**	**100**	**100**	**100**	**0.9**	**0.7**

Reference Scenario: European Union

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**2 444**	**3 154**	**3 673**	**4 303**	**100**	**100**	**100**	**1.4**	**1.2**
Coal	1 012	975	1 015	1 165	31	28	27	0.4	0.7
Oil	205	131	126	56	4	3	1	–0.4	–3.2
Gas	159	605	868	1 332	19	24	31	3.3	3.1
Nuclear	778	988	885	564	31	24	13	–1.0	–2.1
Hydro	271	300	359	385	10	10	9	1.6	1.0
Renewables (excluding hydro)	19	156	419	802	5	11	19	9.4	6.5
Biomass and waste	*14*	*90*	*145*	*201*	*3*	*4*	*5*	*4.4*	*3.2*
Wind	*1*	*59*	*255*	*529*	*2*	*7*	*12*	*14.3*	*8.8*
Geothermal	*3*	*6*	*8*	*13*	*0*	*0*	*0*	*3.2*	*3.5*
Solar	*0*	*1*	*10*	*50*	*0*	*0*	*1*	*20.0*	*14.9*
Tide and wave	*1*	*1*	*1*	*9*	*0*	*0*	*0*	*9.2*	*11.5*

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**723**	**886**	**1 158**	**100**	**100**	**100**	**1.9**	**1.8**
Coal	191	186	226	26	21	20	–0.2	0.6
Oil	71	68	29	10	8	2	–0.5	–3.4
Gas	146	234	388	20	26	33	4.4	3.8
Nuclear	131	114	74	18	13	6	–1.3	–2.2
Hydro	131	143	151	18	16	13	0.8	0.5
of which pumped storage	*28*	*28*	*28*	*4*	*3*	*2*	*0.0*	*0.0*
Renewables (excluding hydro)	52	140	291	7	16	25	9.4	6.8
Biomass and waste	*16*	*25*	*35*	*2*	*3*	*3*	*4.2*	*3.1*
Wind	*34*	*106*	*217*	*5*	*12*	*19*	*10.8*	*7.3*
Geothermal	*1*	*1*	*2*	*0*	*0*	*0*	*3.3*	*3.5*
Solar	*1*	*7*	*34*	*0*	*1*	*3*	*18.5*	*14.0*
Tide and wave	*0*	*0*	*2*	*0*	*0*	*0*	*4.3*	*9.1*

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**3 808**	**3 847**	**4 048**	**4 216**	**100**	**100**	**100**	**0.5**	**0.4**
Coal	1 666	1 211	1 136	1 124	31	28	27	–0.6	–0.3
Oil	1 571	1 675	1 759	1 715	44	43	41	0.4	0.1
Gas	571	962	1 152	1 377	25	28	33	1.7	1.4
Power generation and heat plants	**1 382**	**1 366**	**1 470**	**1 593**	**100**	**100**	**100**	**0.7**	**0.6**
Coal	1 128	980	974	1 007	72	66	63	–0.1	0.1
Oil	158	100	96	42	7	7	3	–0.4	–3.3
Gas	94	285	400	544	21	27	34	3.1	2.5
Total final consumption	**2 264**	**2 306**	**2 409**	**2 460**	**100**	**100**	**100**	**0.4**	**0.2**
Coal	500	201	138	100	9	6	4	–3.3	–2.7
Oil	1 304	1 457	1 548	1 559	63	64	63	0.6	0.3
of which transport	*741*	*924*	*985*	*1 038*	*40*	*41*	*42*	*0.6*	*0.4*
Gas	458	649	723	802	28	30	33	1.0	0.8

Reference Scenario: Transition Economies

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**1 488**	**1 077**	**1 259**	**1 420**	**100**	**100**	**100**	**1.4**	**1.1**
Coal	330	203	228	203	19	18	14	1.1	0.0
Oil	454	223	263	298	21	21	21	1.5	1.1
Gas	599	536	633	745	50	50	52	1.5	1.3
Nuclear	60	73	81	104	7	6	7	1.0	1.4
Hydro	23	26	29	35	2	2	2	1.1	1.1
Biomass and waste	0	17	18	23	2	1	2	0.9	1.2
Other renewables	21	1	5	13	0	0	1	21.3	12.2
Power generation and heat plants	**574**	**535**	**604**	**654**	**100**	**100**	**100**	**1.1**	**0.8**
Coal	171	133	149	116	25	25	18	1.0	–0.5
Oil	80	26	23	16	5	4	2	–1.3	–1.8
Gas	240	272	312	366	51	52	56	1.3	1.2
Nuclear	60	73	81	104	14	13	16	1.0	1.4
Hydro	23	26	29	35	5	5	5	1.1	1.1
Biomass and waste	0	4	4	5	1	1	1	–1.2	0.5
Other renewables	0	0	5	12	0	1	2	24.9	13.5
Other transformation, own use and losses	**200**	**157**	**176**	**202**	**100**	**100**	**100**	**1.1**	**1.0**
of which electricity	*43*	*39*	*44*	*50*	*25*	*25*	*25*	*1.1*	*1.0*
Total final consumption	**1 014**	**704**	**825**	**947**	**100**	**100**	**100**	**1.5**	**1.1**
Coal	104	44	51	56	6	6	6	1.5	1.0
Oil	340	168	204	234	24	25	25	1.8	1.3
Gas	306	227	278	329	32	34	35	1.8	1.4
Electricity	121	95	116	144	13	14	15	1.9	1.6
Heat	123	159	162	167	23	20	18	0.2	0.2
Biomass and waste	0	12	14	17	2	2	2	1.6	1.4
Other renewables	21	0	0	1	0	0	0	1.8	5.6
Industry	**446**	**245**	**289**	**337**	**100**	**100**	**100**	**1.5**	**1.2**
Coal	44	31	38	42	13	13	13	1.9	1.2
Oil	79	28	35	40	11	12	12	2.0	1.4
Gas	199	81	103	129	33	36	38	2.2	1.8
Electricity	76	45	57	72	18	20	21	2.1	1.8
Heat	47	58	54	50	24	19	15	–0.6	–0.6
Biomass and waste	0	2	2	3	1	1	1	1.6	1.5
Other renewables	0	0	0	0	0	0	0	37.1	25.4
Transport	**154**	**140**	**176**	**204**	**100**	**100**	**100**	**2.1**	**1.4**
Oil	135	90	115	133	64	66	66	2.2	1.5
Biofuels	0	0	0	0	0	0	0	13.1	8.3
Other fuels	18	50	60	70	35	34	34	1.8	1.3
Residential, services and agriculture	**340**	**302**	**341**	**385**	**100**	**100**	**100**	**1.1**	**0.9**
Coal	54	11	12	12	4	3	3	0.5	0.3
Oil	78	35	37	39	11	11	10	0.5	0.5
Gas	95	105	124	140	35	36	36	1.5	1.1
Electricity	36	41	50	62	14	15	16	1.8	1.6
Heat	76	101	107	117	33	31	30	0.6	0.6
Biomass and waste	0	10	12	14	3	3	4	1.5	1.3
Other renewables	1	0	0	1	0	0	0	1.1	4.4
Non-energy use	**75**	**17**	**19**	**22**	**100**	**100**	**100**	**1.1**	**1.1**

Reference Scenario: Transition Economies

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**1 840**	**1 536**	**1 882**	**2 281**	**100**	**100**	**100**	**1.9**	**1.5**
Coal	501	322	401	332	21	21	15	2.0	0.1
Oil	252	54	43	28	4	2	1	–2.0	–2.5
Gas	586	575	766	1 056	37	41	46	2.6	2.4
Nuclear	231	279	312	399	18	17	18	1.0	1.4
Hydro	269	303	342	403	20	18	18	1.1	1.1
Renewables (excluding hydro)	0	3	19	62	0	1	3	17.9	12.3
Biomass and waste	*0*	*2*	*3*	*23*	*0*	*0*	*1*	*2.9*	*9.7*
Wind	*0*	*0*	*11*	*28*	*0*	*1*	*1*	*53.9*	*24.5*
Geothermal	*0*	*0*	*5*	*11*	*0*	*0*	*0*	*25.3*	*13.5*
Solar	*0*	*1*	*0*	*1*	*0*	*0*	*0*	*–13.3*	*1.1*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**405**	**456**	**555**	**100**	**100**	**100**	**1.1**	**1.2**
Coal	109	99	87	27	22	16	–0.9	–0.9
Oil	30	28	15	7	6	3	–0.6	–2.5
Gas	137	183	268	34	40	48	2.7	2.6
Nuclear	40	42	54	10	9	10	0.3	1.1
Hydro	88	100	116	22	22	21	1.1	1.0
of which pumped storage	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Renewables (excluding hydro)	1	5	15	0	1	3	20.4	12.9
Biomass and waste	*0*	*1*	*4*	*0*	*0*	*1*	*3.1*	*8.5*
Wind	*0*	*4*	*9*	*0*	*1*	*2*	*34.8*	*17.7*
Geothermal	*0*	*1*	*2*	*0*	*0*	*0*	*24.2*	*13.2*
Solar	*0*	*0*	*1*	*0*	*0*	*0*	*49.5*	*27.3*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**3 731**	**2 560**	**2 977**	**3 193**	**100**	**100**	**100**	**1.4**	**0.9**
Coal	1 109	783	890	782	31	30	25	1.2	0.0
Oil	1 230	573	663	735	22	22	23	1.3	1.0
Gas	1 392	1 204	1 425	1 675	47	48	52	1.5	1.3
Power generation and heat plants	**1 515**	**1 287**	**1 440**	**1 412**	**100**	**100**	**100**	**1.0**	**0.4**
Coal	690	557	622	488	43	43	35	1.0	–0.5
Oil	263	90	75	54	7	5	4	–1.6	–2.0
Gas	562	641	743	871	50	52	62	1.3	1.2
Total final consumption	**2 015**	**1 169**	**1 412**	**1 625**	**100**	**100**	**100**	**1.7**	**1.3**
Coal	416	224	264	291	19	19	18	1.5	1.0
Oil	908	427	517	591	37	37	36	1.8	1.3
of which transport	*330*	*232*	*296*	*343*	*20*	*21*	*21*	*2.2*	*1.5*
Gas	691	518	630	743	44	45	46	1.8	1.4

Reference Scenario: Russia

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**n.a.**	**640**	**751**	**854**	**100**	**100**	**100**	**1.5**	**1.1**
Coal	n.a.	104	114	106	16	15	12	0.8	0.1
Oil	n.a.	130	152	170	20	20	20	1.4	1.0
Gas	n.a.	345	413	478	54	55	56	1.6	1.3
Nuclear	n.a.	38	46	68	6	6	8	1.8	2.3
Hydro	n.a.	15	16	17	2	2	2	0.6	0.5
Biomass and waste	n.a.	7	7	6	1	1	1	–0.5	–0.3
Other renewables	n.a.	0	4	8	0	0	1	24.1	13.1
Power generation and heat plants	**n.a.**	**350**	**395**	**436**	**100**	**100**	**100**	**1.1**	**0.9**
Coal	n.a.	76	82	71	22	21	16	0.7	–0.3
Oil	n.a.	17	16	12	5	4	3	–0.5	–1.4
Gas	n.a.	199	228	257	57	58	59	1.2	1.0
Nuclear	n.a.	38	46	68	11	12	16	1.8	2.3
Hydro	n.a.	15	16	17	4	4	4	0.6	0.5
Biomass and waste	n.a.	4	3	3	1	1	1	–1.7	–1.7
Other renewables	n.a.	0	4	8	0	1	2	23.9	13.0
Other transformation, own use and losses	**n.a.**	**93**	**105**	**121**	**100**	**100**	**100**	**1.1**	**1.0**
of which electricity	*n.a.*	*24*	*27*	*31*	*26*	*26*	*26*	*1.3*	*1.1*
Total final consumption	**n.a.**	**425**	**494**	**561**	**100**	**100**	**100**	**1.4**	**1.1**
Coal	n.a.	17	20	20	4	4	4	1.2	0.7
Oil	n.a.	95	114	129	22	23	23	1.6	1.2
Gas	n.a.	125	160	192	29	32	34	2.3	1.7
Electricity	n.a.	55	67	82	13	14	15	1.7	1.5
Heat	n.a.	130	131	135	31	27	24	0.1	0.1
Biomass and waste	n.a.	3	3	3	1	1	1	1.0	1.1
Other renewables	n.a.	0	0	0	0	0	0	–	–
Industry	**n.a.**	**146**	**169**	**189**	**100**	**100**	**100**	**1.3**	**1.0**
Coal	n.a.	10	12	13	7	7	7	1.8	1.0
Oil	n.a.	15	18	20	10	11	11	1.6	1.1
Gas	n.a.	44	58	71	30	35	38	2.7	1.9
Electricity	n.a.	29	35	43	20	21	23	1.8	1.6
Heat	n.a.	48	44	40	33	26	21	–0.7	–0.6
Biomass and waste	n.a.	1	1	1	0	1	1	1.4	1.6
Other renewables	n.a.	0	0	0	0	0	0	–	–
Transport	**n.a.**	**95**	**119**	**139**	**100**	**100**	**100**	**2.1**	**1.5**
Oil	n.a.	54	68	78	57	57	56	2.1	1.4
Biofuels	n.a.	0	0	0	0	0	0	20.0	11.4
Other fuels	n.a.	41	51	61	43	43	44	2.1	1.5
Residential, services and agriculture	**n.a.**	**176**	**198**	**223**	**100**	**100**	**100**	**1.1**	**0.9**
Coal	n.a.	6	7	7	4	3	3	0.5	0.3
Oil	n.a.	19	20	22	11	10	10	0.6	0.5
Gas	n.a.	47	57	67	27	29	30	1.9	1.4
Electricity	n.a.	20	24	30	11	12	14	1.9	1.6
Heat	n.a.	82	87	94	47	44	42	0.5	0.5
Biomass and waste	n.a.	2	2	2	1	1	1	0.4	0.4
Other renewables	n.a.	0	0	0	0	0	0	–	–
Non-energy use	**n.a.**	**8**	**9**	**10**	**100**	**100**	**100**	**0.6**	**0.9**

Reference Scenario: Russia

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**n.a.**	**926**	**1 104**	**1 324**	**100**	**100**	**100**	**1.6**	**1.4**
Coal	n.a.	161	183	173	17	17	13	1.2	0.3
Oil	n.a.	24	21	14	3	2	1	–1.0	–2.1
Gas	n.a.	419	526	642	45	48	48	2.1	1.7
Nuclear	n.a.	145	176	261	16	16	20	1.8	2.3
Hydro	n.a.	176	188	200	19	17	15	0.6	0.5
Renewables (excluding hydro)	n.a.	2	10	34	0	1	3	15.1	11.1
Biomass and waste	*n.a.*	*2*	*2*	*13*	*0*	*0*	*1*	*0.0*	*8.0*
Wind	*n.a.*	*0*	*5*	*12*	*0*	*0*	*1*	*81.0*	*33.3*
Geothermal	*n.a.*	*0*	*4*	*9*	*0*	*0*	*1*	*22.6*	*12.4*
Solar	*n.a.*	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Tide and wave	*n.a.*	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**220**	**242**	**286**	**100**	**100**	**100**	**0.9**	**1.0**
Coal	48	46	46	22	19	16	–0.5	–0.2
Oil	9	9	6	4	4	2	0.3	–1.5
Gas	94	112	140	43	46	49	1.5	1.5
Nuclear	22	24	35	10	10	12	0.8	1.9
Hydro	46	49	52	21	20	18	0.5	0.5
of which pumped storage	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Renewables (excluding hydro)	1	3	8	0	1	3	15.6	10.8
Biomass and waste	*0*	*0*	*2*	*0*	*0*	*1*	*0.0*	*6.3*
Wind	*0*	*2*	*4*	*0*	*1*	*1*	*57.6*	*25.6*
Geothermal	*0*	*1*	*1*	*0*	*0*	*0*	*21.6*	*12.1*
Solar	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**n.a.**	**1 512**	**1 746**	**1 883**	**100**	**100**	**100**	**1.3**	**0.8**
Coal	n.a.	418	457	415	28	26	22	0.8	0.0
Oil	n.a.	323	370	406	21	21	22	1.2	0.9
Gas	n.a.	772	920	1 062	51	53	56	1.6	1.2
Power generation and heat plants	**n.a.**	**853**	**936**	**943**	**100**	**100**	**100**	**0.9**	**0.4**
Coal	n.a.	325	350	303	38	37	32	0.7	–0.3
Oil	n.a.	59	52	38	7	6	4	–1.0	–1.6
Gas	n.a.	469	534	601	55	57	64	1.2	1.0
Total final consumption	**n.a.**	**597**	**734**	**845**	**100**	**100**	**100**	**1.9**	**1.3**
Coal	n.a.	90	105	110	15	14	13	1.4	0.8
Oil	n.a.	227	272	307	38	37	36	1.6	1.2
of which transport	*n.a.*	*128*	*161*	*186*	*22*	*22*	*22*	*2.1*	*1.4*
Gas	n.a.	279	357	428	47	49	51	2.3	1.7

Reference Scenario: Developing Countries

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**2 612**	**4 460**	**6 372**	**8 619**	**100**	**100**	**100**	**3.3**	**2.6**
Coal	790	1 442	2 207	2 936	32	35	34	3.9	2.8
Oil	719	1 317	1 839	2 490	30	29	29	3.1	2.5
Gas	236	567	955	1 475	13	15	17	4.9	3.7
Nuclear	15	37	84	136	1	1	2	7.7	5.1
Hydro	61	107	166	243	2	3	3	4.1	3.2
Biomass and waste	783	972	1 078	1 236	22	17	14	0.9	0.9
Other renewables	7	18	43	102	0	1	1	8.0	6.8
Power generation and heat plants	**524**	**1 401**	**2 331**	**3 452**	**100**	**100**	**100**	**4.7**	**3.5**
Coal	268	848	1 399	1 997	61	60	58	4.7	3.3
Oil	100	150	172	159	11	7	5	1.2	0.2
Gas	71	233	434	724	17	19	21	5.8	4.5
Nuclear	15	37	84	136	3	4	4	7.7	5.1
Hydro	61	107	166	243	8	7	7	4.1	3.2
Biomass and waste	2	9	42	113	1	2	3	15.0	10.2
Other renewables	7	18	35	80	1	2	2	6.5	6.0
Other transformation, own use and losses	**297**	**491**	**689**	**895**	**100**	**100**	**100**	**3.1**	**2.3**
of which electricity	*42*	*106*	*189*	*284*	*22*	*27*	*32*	*5.4*	*3.9*
Total final consumption	**2 005**	**3 109**	**4 344**	**5 825**	**100**	**100**	**100**	**3.1**	**2.4**
Coal	432	464	651	759	15	15	13	3.1	1.9
Oil	566	1 060	1 518	2 143	34	35	37	3.3	2.7
Gas	108	245	395	587	8	9	10	4.5	3.4
Electricity	157	388	735	1 178	12	17	20	6.0	4.4
Heat	14	37	55	74	1	1	1	3.6	2.7
Biomass and waste	728	914	981	1 061	29	23	18	0.6	0.6
Other renewables	0	1	8	22	0	0	0	22.6	13.3
Industry	**673**	**1 114**	**1 697**	**2 202**	**100**	**100**	**100**	**3.9**	**2.7**
Coal	268	354	540	656	32	32	30	3.9	2.4
Oil	147	261	355	435	23	21	20	2.8	2.0
Gas	91	173	278	391	16	16	18	4.4	3.2
Electricity	83	198	363	516	18	21	23	5.7	3.8
Heat	11	25	35	43	2	2	2	3.0	2.1
Biomass and waste	74	104	125	160	9	7	7	1.7	1.7
Other renewables	0	0	0	0	0	0	0	–	–
Transport	**296**	**547**	**794**	**1 248**	**100**	**100**	**100**	**3.4**	**3.2**
Oil	275	526	758	1 180	96	96	95	3.4	3.2
Biofuels	6	6	15	40	1	2	3	8.1	7.3
Other fuels	14	14	20	27	3	3	2	3.4	2.6
Residential, services and agriculture	**963**	**1 330**	**1 680**	**2 147**	**100**	**100**	**100**	**2.1**	**1.9**
Coal	117	78	76	71	6	5	3	–0.2	–0.3
Oil	114	201	289	368	15	17	17	3.4	2.3
Gas	16	65	106	180	5	6	8	4.6	4.0
Electricity	69	174	345	619	13	21	29	6.4	5.0
Heat	3	11	19	30	1	1	1	5.1	3.9
Biomass and waste	644	800	837	857	60	50	40	0.4	0.3
Other renewables	0	1	8	22	0	0	1	22.4	13.3
Non-energy use	**73**	**119**	**174**	**228**	**100**	**100**	**100**	**3.5**	**2.5**

Reference Scenario: Developing Countries

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**2 321**	**5 754**	**10 749**	**17 001**	**100**	**100**	**100**	**5.8**	**4.3**
Coal	917	2 753	5 659	8 979	48	53	53	6.8	4.7
Oil	366	580	670	616	10	6	4	1.3	0.2
Gas	257	983	1 955	3 389	17	18	20	6.4	4.9
Nuclear	57	142	322	523	2	3	3	7.7	5.1
Hydro	709	1 239	1 928	2 827	22	18	17	4.1	3.2
Renewables (excluding hydro)	14	56	215	668	1	2	4	13.0	10.0
Biomass and waste	*7*	*29*	*113*	*298*	*1*	*1*	*2*	*13.1*	*9.4*
Wind	*0*	*5*	*64*	*263*	*0*	*1*	*2*	*26.2*	*16.5*
Geothermal	*8*	*20*	*36*	*69*	*0*	*0*	*0*	*5.5*	*4.9*
Solar	*0*	*2*	*2*	*38*	*0*	*0*	*0*	*0.6*	*11.9*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**1 289**	**2 369**	**3 775**	**100**	**100**	**100**	**5.7**	**4.2**
Coal	470	978	1 550	36	41	41	6.9	4.7
Oil	189	227	223	15	10	6	1.7	0.6
Gas	265	555	992	21	23	26	7.0	5.2
Nuclear	18	41	66	1	2	2	7.5	5.0
Hydro	334	521	771	26	22	20	4.1	3.3
of which pumped storage	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Renewables (excluding hydro)	13	47	173	1	2	5	12.5	10.5
Biomass and waste	*5*	*18*	*47*	*0*	*1*	*1*	*12.8*	*9.1*
Wind	*4*	*22*	*95*	*0*	*1*	*3*	*16.4*	*12.7*
Geothermal	*3*	*5*	*10*	*0*	*0*	*0*	*5.6*	*4.8*
Solar	*1*	*1*	*21*	*0*	*0*	*1*	*0.0*	*13.5*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**5 317**	**10 171**	**15 396**	**21 111**	**100**	**100**	**100**	**3.8**	**2.8**
Coal	2 871	5 508	8 565	11 453	54	56	54	4.1	2.9
Oil	1 938	3 392	4 688	6 349	33	30	30	3.0	2.4
Gas	507	1 271	2 143	3 310	12	14	16	4.9	3.7
Power generation and heat plants	**1 535**	**4 395**	**7 133**	**10 153**	**100**	**100**	**100**	**4.5**	**3.3**
Coal	1 050	3 378	5 571	7 944	77	78	78	4.7	3.3
Oil	319	472	539	496	11	8	5	1.2	0.2
Gas	167	545	1 024	1 713	12	14	17	5.9	4.5
Total final consumption	**3 479**	**5 226**	**7 541**	**10 073**	**100**	**100**	**100**	**3.4**	**2.6**
Coal	1 760	2 004	2 844	3 337	38	38	33	3.2	2.0
Oil	1 491	2 697	3 857	5 503	52	51	55	3.3	2.8
of which transport	*740*	*1 435*	*2 066*	*3 233*	*27*	*27*	*32*	*3.4*	*3.2*
Gas	228	525	841	1 234	10	11	12	4.4	3.3

Reference Scenario: Developing Asia

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**1 638**	**2 916**	**4 262**	**5 796**	**100**	**100**	**100**	**3.5**	**2.7**
Coal	696	1 309	2 054	2 750	45	48	47	4.2	2.9
Oil	321	713	1 032	1 482	24	24	26	3.4	2.9
Gas	74	203	344	522	7	8	9	4.9	3.7
Nuclear	10	29	69	122	1	2	2	8.3	5.7
Hydro	24	47	84	126	2	2	2	5.4	3.9
Biomass and waste	506	600	645	717	21	15	12	0.7	0.7
Other renewables	6	15	35	78	1	1	1	8.1	6.6
Power generation and heat plants	**323**	**1 011**	**1 728**	**2 532**	**100**	**100**	**100**	**5.0**	**3.6**
Coal	222	775	1 311	1 882	77	76	74	4.9	3.5
Oil	46	56	64	52	6	4	2	1.2	–0.3
Gas	16	85	144	215	8	8	8	4.9	3.6
Nuclear	10	29	69	122	3	4	5	8.3	5.7
Hydro	24	47	84	126	5	5	5	5.4	3.9
Biomass and waste	0	4	27	73	0	2	3	18.3	11.5
Other renewables	6	15	30	62	1	2	2	6.4	5.7
Other transformation, own use and losses	**162**	**300**	**438**	**568**	**100**	**100**	**100**	**3.5**	**2.5**
of which electricity	*24*	*71*	*137*	*207*	*24*	*31*	*36*	*6.2*	*4.2*
Total final consumption	**1 278**	**1 975**	**2 823**	**3 833**	**100**	**100**	**100**	**3.3**	**2.6**
Coal	406	434	618	722	22	22	19	3.3	2.0
Oil	249	581	868	1 313	29	31	34	3.7	3.2
Gas	35	86	150	241	4	5	6	5.2	4.0
Electricity	85	252	522	840	13	18	22	6.8	4.7
Heat	14	37	55	74	2	2	2	3.6	2.7
Biomass and waste	489	585	604	627	30	21	16	0.3	0.3
Other renewables	0	0	6	15	0	0	0	–	–
Industry	**438**	**756**	**1 199**	**1 551**	**100**	**100**	**100**	**4.3**	**2.8**
Coal	245	328	512	625	43	43	40	4.1	2.5
Oil	77	158	223	270	21	19	17	3.1	2.1
Gas	29	61	101	148	8	8	10	4.6	3.4
Electricity	51	144	283	393	19	24	25	6.3	3.9
Heat	11	25	35	43	3	3	3	3.0	2.1
Biomass and waste	26	39	46	72	5	4	5	1.6	2.4
Other renewables	0	0	0	0	0	0	0	–	–
Transport	**122**	**265**	**411**	**741**	**100**	**100**	**100**	**4.1**	**4.0**
Oil	108	257	397	713	97	97	96	4.0	4.0
Biofuels	0	0	4	16	0	1	2	49.9	25.6
Other fuels	14	8	10	13	3	2	2	2.0	1.8
Residential, services and agriculture	**659**	**857**	**1 074**	**1 363**	**100**	**100**	**100**	**2.1**	**1.8**
Coal	114	73	71	66	9	7	5	–0.3	–0.4
Oil	50	116	168	221	14	16	16	3.4	2.5
Gas	5	24	49	92	3	5	7	6.7	5.3
Electricity	29	91	212	404	11	20	30	8.0	5.9
Heat	3	11	19	30	1	2	2	5.1	3.9
Biomass and waste	458	542	550	535	63	51	39	0.1	–0.1
Other renewables	0	0	6	15	0	1	1	–	–
Non-energy use	**59**	**96**	**139**	**178**	**100**	**100**	**100**	**3.4**	**2.4**

Reference Scenario: Developing Asia

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**1 274**	**3 758**	**7 663**	**12 165**	**100**	**100**	**100**	**6.7**	**4.6**
Coal	727	2 442	5 273	8 423	65	69	69	7.2	4.9
Oil	166	222	258	211	6	3	2	1.4	–0.2
Gas	59	406	747	1 113	11	10	9	5.7	4.0
Nuclear	39	110	263	467	3	3	4	8.3	5.7
Hydro	277	545	972	1 467	15	13	12	5.4	3.9
Renewables (excluding hydro)	7	33	150	484	1	2	4	14.7	10.9
Biomass and waste	*0*	*10*	*69*	*192*	*0*	*1*	*2*	*18.7*	*11.8*
Wind	*0*	*4*	*50*	*220*	*0*	*1*	*2*	*26.5*	*17.0*
Geothermal	*7*	*17*	*29*	*48*	*0*	*0*	*0*	*5.1*	*4.1*
Solar	*0*	*2*	*2*	*24*	*0*	*0*	*0*	*0.6*	*10.0*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**789**	**1 567**	**2 513**	**100**	**100**	**100**	**6.4**	**4.6**
Coal	421	913	1 457	53	58	58	7.3	4.9
Oil	62	72	61	8	5	2	1.4	–0.1
Gas	107	209	342	14	13	14	6.3	4.6
Nuclear	14	33	59	2	2	2	8.3	5.7
Hydro	177	304	462	22	19	18	5.0	3.8
of which pumped storage	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Renewables (excluding hydro)	9	34	131	1	2	5	13.1	10.9
Biomass and waste	*2*	*11*	*30*	*0*	*1*	*1*	*18.5*	*11.6*
Wind	*4*	*18*	*81*	*0*	*1*	*3*	*15.1*	*12.5*
Geothermal	*3*	*4*	*7*	*0*	*0*	*0*	*5.2*	*4.1*
Solar	*1*	*1*	*13*	*0*	*0*	*1*	*0.0*	*11.5*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**3 563**	**7 265**	**11 341**	**15 653**	**100**	**100**	**100**	**4.1**	**3.0**
Coal	2 567	5 071	8 058	10 819	70	71	69	4.3	3.0
Oil	850	1 746	2 530	3 694	24	22	24	3.4	2.9
Gas	146	448	753	1 140	6	7	7	4.8	3.7
Power generation and heat plants	**1 052**	**3 462**	**5 764**	**8 156**	**100**	**100**	**100**	**4.7**	**3.4**
Coal	868	3 083	5 221	7 484	89	91	92	4.9	3.5
Oil	146	178	204	166	5	4	2	1.2	–0.3
Gas	38	200	339	506	6	6	6	4.9	3.6
Total final consumption	**2 355**	**3 472**	**5 136**	**6 963**	**100**	**100**	**100**	**3.6**	**2.7**
Coal	1 642	1 866	2 691	3 168	54	52	45	3.4	2.1
Oil	644	1 432	2 141	3 309	41	42	48	3.7	3.3
of which transport	*290*	*695*	*1 076*	*1 946*	*20*	*21*	*28*	*4.1*	*4.0*
Gas	69	174	304	486	5	6	7	5.2	4.0

Reference Scenario: China

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**877**	**1 626**	**2 509**	**3 395**	**100**	**100**	**100**	**4.0**	**2.9**
Coal	534	999	1 604	2 065	61	64	61	4.4	2.8
Oil	116	319	497	758	20	20	22	4.1	3.4
Gas	16	44	89	157	3	4	5	6.7	5.1
Nuclear	0	13	32	67	1	1	2	8.5	6.4
Hydro	11	30	56	81	2	2	2	5.7	3.8
Biomass and waste	200	221	222	239	14	9	7	0.1	0.3
Other renewables	0	0	8	29	0	0	1	–	–
Power generation and heat plants	**173**	**639**	**1 138**	**1 613**	**100**	**100**	**100**	**5.4**	**3.6**
Coal	145	566	994	1 360	89	87	84	5.2	3.4
Oil	16	22	21	17	3	2	1	–0.4	–0.9
Gas	1	6	21	40	1	2	2	12.1	7.7
Nuclear	0	13	32	67	2	3	4	8.5	6.4
Hydro	11	30	56	81	5	5	5	5.7	3.8
Biomass and waste	0	1	12	32	0	1	2	21.6	13.0
Other renewables	0	0	3	16	0	0	1	–	–
Other transformation, own use and losses	**85**	**176**	**267**	**347**	**100**	**100**	**100**	**3.9**	**2.6**
of which electricity	*12*	*41*	*88*	*130*	*23*	*33*	*38*	*7.2*	*4.5*
Total final consumption	**689**	**1 050**	**1 596**	**2 181**	**100**	**100**	**100**	**3.9**	**2.9**
Coal	332	349	505	579	33	32	27	3.4	2.0
Oil	88	261	425	680	25	27	31	4.5	3.7
Gas	12	33	59	103	3	4	5	5.4	4.5
Electricity	43	151	337	525	14	21	24	7.6	4.9
Heat	13	36	54	73	3	3	3	3.7	2.8
Biomass and waste	200	219	211	207	21	13	9	–0.4	–0.2
Other renewables	0	0	5	13	0	0	1	–	–
Industry	**274**	**470**	**792**	**1 002**	**100**	**100**	**100**	**4.9**	**2.9**
Coal	189	256	415	502	54	52	50	4.5	2.6
Oil	35	70	101	113	15	13	11	3.4	1.9
Gas	10	20	29	42	4	4	4	3.5	2.9
Electricity	30	100	209	282	21	26	28	7.0	4.1
Heat	11	25	34	43	5	4	4	3.0	2.2
Biomass and waste	0	0	4	20	0	0	2	–	–
Other renewables	0	0	0	0	0	0	0	–	–
Transport	**41**	**110**	**195**	**413**	**100**	**100**	**100**	**5.4**	**5.2**
Oil	30	104	186	396	94	95	96	5.5	5.3
Biofuels	0	0	2	8	0	1	2	–	–
Other fuels	11	6	7	9	6	4	2	1.7	1.6
Residential, services and agriculture	**337**	**406**	**519**	**664**	**100**	**100**	**100**	**2.2**	**1.9**
Coal	102	63	58	48	16	11	7	–0.8	–1.0
Oil	18	59	92	119	15	18	18	4.2	2.7
Gas	3	13	29	60	3	6	9	7.9	6.2
Electricity	11	41	110	215	10	21	32	9.3	6.6
Heat	2	11	19	29	3	4	4	5.2	3.9
Biomass and waste	200	219	206	179	54	40	27	–0.6	–0.8
Other renewables	0	0	5	13	0	1	2	–	–
Non-energy use	**38**	**63**	**89**	**101**	**100**	**100**	**100**	**3.2**	**1.8**

Reference Scenario: China

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**650**	**2 237**	**4 942**	**7 624**	**100**	**100**	**100**	**7.5**	**4.8**
Coal	471	1 739	3 966	5 980	78	80	78	7.8	4.9
Oil	49	72	64	54	3	1	1	–1.1	–1.1
Gas	3	19	83	169	1	2	2	14.0	8.7
Nuclear	0	50	124	256	2	3	3	8.5	6.4
Hydro	127	354	650	937	16	13	12	5.7	3.8
Renewables (excluding hydro)	0	2	56	228	0	1	3	32.7	19.0
Biomass and waste	*0*	*2*	*33*	*93*	*0*	*1*	*1*	*26.4*	*14.9*
Wind	*0*	*0*	*21*	*121*	*0*	*0*	*2*	–	–
Geothermal	*0*	*0*	*2*	*5*	*0*	*0*	*0*	–	–
Solar	*0*	*0*	*0*	*9*	*0*	*0*	*0*	–	–
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**442**	**960**	**1 496**	**100**	**100**	**100**	**7.3**	**4.8**
Coal	307	688	1 041	69	72	70	7.6	4.8
Oil	16	19	16	4	2	1	2.1	0.2
Gas	8	29	62	2	3	4	13.2	8.5
Nuclear	6	15	31	1	2	2	8.6	6.5
Hydro	105	195	281	24	20	19	5.8	3.9
of which pumped storage	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Renewables (excluding hydro)	1	13	65	0	1	4	23.9	16.4
Biomass and waste	*0*	*5*	*15*	*0*	*1*	*1*	*26.5*	*14.7*
Wind	*1*	*7*	*45*	*0*	*1*	*3*	*22.9*	*16.9*
Geothermal	*0*	*0*	*1*	*0*	*0*	*0*	–	–
Solar	*0*	*0*	*5*	*0*	*0*	*0*	*0.0*	*17.8*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**2 289**	**4 769**	**7 744**	**10 425**	**100**	**100**	**100**	**4.5**	**3.1**
Coal	1 952	3 897	6 336	8 167	82	82	78	4.5	2.9
Oil	304	779	1 219	1 924	16	16	18	4.2	3.5
Gas	32	93	190	334	2	2	3	6.7	5.1
Power generation and heat plants	**623**	**2 355**	**4 100**	**5 603**	**100**	**100**	**100**	**5.2**	**3.4**
Coal	568	2 269	3 981	5 450	96	97	97	5.2	3.4
Oil	52	72	68	56	3	2	1	–0.4	–0.9
Gas	3	14	50	97	1	1	2	12.1	7.7
Total final consumption	**1 579**	**2 211**	**3 375**	**4 494**	**100**	**100**	**100**	**3.9**	**2.8**
Coal	1 332	1 509	2 212	2 554	68	66	57	3.5	2.0
Oil	225	640	1 055	1 750	29	31	39	4.6	3.9
of which transport	*83*	*290*	*522*	*1 108*	*13*	*15*	*25*	*5.5*	*5.3*
Gas	22	61	109	190	3	3	4	5.4	4.5

Reference Scenario: India

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**361**	**573**	**776**	**1 104**	**100**	**100**	**100**	**2.8**	**2.6**
Coal	105	196	283	450	34	36	41	3.4	3.3
Oil	63	127	184	268	22	24	24	3.4	2.9
Gas	10	23	40	68	4	5	6	5.0	4.2
Nuclear	2	4	18	36	1	2	3	13.8	8.4
Hydro	6	7	12	21	1	2	2	4.5	4.2
Biomass and waste	176	214	236	253	37	30	23	0.9	0.6
Other renewables	0	0	2	7	0	0	1	19.4	12.2
Power generation and heat plants	**73**	**182**	**284**	**481**	**100**	**100**	**100**	**4.2**	**3.8**
Coal	58	147	213	356	81	75	74	3.4	3.5
Oil	4	9	11	11	5	4	2	2.5	0.8
Gas	3	13	20	32	7	7	7	4.0	3.6
Nuclear	2	4	18	36	2	6	8	13.8	8.4
Hydro	6	7	12	21	4	4	4	4.5	4.2
Biomass and waste	0	1	9	19	1	3	4	20.6	11.7
Other renewables	0	0	2	5	0	1	1	17.1	11.4
Other transformation, own use and losses	**19**	**45**	**62**	**84**	**100**	**100**	**100**	**2.9**	**2.4**
of which electricity	*7*	*19*	*31*	*50*	*42*	*50*	*59*	*4.4*	*3.7*
Total final consumption	**294**	**403**	**535**	**738**	**100**	**100**	**100**	**2.6**	**2.3**
Coal	41	36	55	78	9	10	11	4.0	3.0
Oil	54	107	159	242	26	30	33	3.7	3.2
Gas	6	9	18	33	2	3	4	6.8	5.3
Electricity	18	38	75	149	10	14	20	6.2	5.4
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	176	213	227	234	53	42	32	0.6	0.4
Other renewables	0	0	0	1	0	0	0	–	–
Industry	**75**	**109**	**162**	**231**	**100**	**100**	**100**	**3.7**	**2.9**
Coal	28	29	45	64	26	28	28	4.3	3.2
Oil	13	33	48	67	30	30	29	3.7	2.8
Gas	6	8	15	25	7	9	11	6.2	4.5
Electricity	9	17	26	45	15	16	20	4.2	3.9
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	20	23	27	30	21	16	13	1.2	1.0
Other renewables	0	0	0	0	0	0	0	–	–
Transport	**28**	**36**	**50**	**81**	**100**	**100**	**100**	**3.0**	**3.1**
Oil	26	36	49	77	98	97	95	2.9	3.0
Biofuels	0	0	0	2	0	0	3	–	–
Other fuels	3	1	1	2	2	3	3	5.1	3.6
Residential, services and agriculture	**187**	**243**	**294**	**374**	**100**	**100**	**100**	**1.7**	**1.7**
Coal	11	8	10	14	3	3	4	2.4	2.4
Oil	12	26	38	54	11	13	14	3.3	2.8
Gas	0	1	2	8	0	1	2	12.1	10.0
Electricity	8	19	43	94	8	15	25	8.0	6.5
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	156	190	200	202	78	68	54	0.5	0.2
Other renewables	0	0	0	1	0	0	0	–	–
Non-energy use	**4**	**15**	**28**	**52**	**100**	**100**	**100**	**6.1**	**5.0**

Reference Scenario: India

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**289**	**668**	**1 226**	**2 314**	**100**	**100**	**100**	**5.7**	**4.9**
Coal	189	461	836	1 631	69	68	70	5.6	5.0
Oil	13	36	49	46	5	4	2	2.8	1.0
Gas	10	63	99	163	9	8	7	4.1	3.7
Nuclear	6	17	71	140	3	6	6	13.8	8.4
Hydro	72	85	138	246	13	11	11	4.5	4.2
Renewables (excluding hydro)	0	6	33	89	1	3	4	17.5	11.2
Biomass and waste	*0*	*2*	*15*	*34*	*0*	*1*	*1*	*20.6*	*11.7*
Wind	*0*	*4*	*18*	*49*	*1*	*1*	*2*	*15.3*	*10.4*
Geothermal	*0*	*0*	*0*	*1*	*0*	*0*	*0*	–	–
Solar	*0*	*0*	*0*	*5*	*0*	*0*	*0*	*23.4*	*31.5*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**131**	**228**	**436**	**100**	**100**	**100**	**5.2**	**4.7**
Coal	72	128	251	55	56	58	5.3	4.9
Oil	8	11	10	6	5	2	2.5	0.9
Gas	14	23	42	10	10	10	4.7	4.4
Nuclear	3	10	19	2	4	4	12.7	8.0
Hydro	31	48	87	24	21	20	4.0	4.0
of which pumped storage	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Renewables (excluding hydro)	3	9	27	3	4	6	9.7	8.3
Biomass and waste	*0*	*2*	*5*	*0*	*1*	*1*	*19.9*	*11.4*
Wind	*3*	*7*	*18*	*2*	*3*	*4*	*7.8*	*7.2*
Geothermal	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Solar	*0*	*0*	*3*	*0*	*0*	*1*	*0.0*	*19.8*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**588**	**1 103**	**1 620**	**2 544**	**100**	**100**	**100**	**3.6**	**3.3**
Coal	401	734	1 078	1 741	67	67	68	3.5	3.4
Oil	164	314	450	645	29	28	25	3.3	2.8
Gas	23	54	92	157	5	6	6	5.0	4.2
Power generation and heat plants	**245**	**629**	**907**	**1 490**	**100**	**100**	**100**	**3.4**	**3.4**
Coal	225	572	826	1 382	91	91	93	3.4	3.5
Oil	11	26	35	33	4	4	2	2.5	0.8
Gas	8	30	46	75	5	5	5	4.0	3.6
Total final consumption	**328**	**441**	**671**	**1 005**	**100**	**100**	**100**	**3.9**	**3.2**
Coal	171	160	249	356	36	37	35	4.1	3.1
Oil	144	261	382	575	59	57	57	3.5	3.1
of which transport	*72*	*98*	*135*	*211*	*22*	*20*	*21*	*2.9*	*3.0*
Gas	13	19	40	74	4	6	7	6.8	5.3

Reference Scenario: Latin America

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**339**	**484**	**626**	**845**	**100**	**100**	**100**	**2.4**	**2.2**
Coal	17	22	27	37	5	4	4	1.8	1.9
Oil	157	218	256	317	45	41	38	1.5	1.5
Gas	54	98	153	245	20	24	29	4.1	3.6
Nuclear	2	5	10	9	1	2	1	6.0	2.2
Hydro	31	51	69	93	10	11	11	2.8	2.4
Biomass and waste	77	88	106	129	18	17	15	1.8	1.5
Other renewables	1	2	5	14	0	1	2	7.6	7.8
Power generation and heat plants	**69**	**122**	**180**	**272**	**100**	**100**	**100**	**3.6**	**3.1**
Coal	5	8	10	16	6	6	6	2.8	3.0
Oil	14	25	20	11	20	11	4	–2.0	–3.2
Gas	14	27	61	117	23	34	43	7.5	5.7
Nuclear	2	5	10	9	4	5	3	6.0	2.2
Hydro	31	51	69	93	42	38	34	2.8	2.4
Biomass and waste	2	5	7	13	4	4	5	3.6	4.2
Other renewables	1	2	4	12	2	2	5	7.0	7.3
Other transformation, own use and losses	**51**	**57**	**72**	**94**	**100**	**100**	**100**	**2.1**	**1.9**
of which electricity	*8*	*15*	*21*	*30*	*26*	*29*	*31*	*3.0*	*2.7*
Total final consumption	**262**	**380**	**486**	**650**	**100**	**100**	**100**	**2.3**	**2.1**
Coal	7	10	12	15	3	3	2	1.4	1.4
Oil	127	178	217	280	47	45	43	1.8	1.8
Gas	25	54	73	103	14	15	16	2.7	2.5
Electricity	35	60	91	141	16	19	22	3.8	3.3
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	68	77	93	108	20	19	17	1.7	1.3
Other renewables	0	0	0	2	0	0	0	19.7	14.6
Industry	**99**	**151**	**195**	**253**	**100**	**100**	**100**	**2.3**	**2.0**
Coal	7	10	12	15	7	6	6	1.5	1.4
Oil	27	35	44	54	23	22	21	2.0	1.7
Gas	19	38	49	64	25	25	25	2.2	2.0
Electricity	17	29	43	67	19	22	26	3.7	3.3
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	30	39	48	53	26	25	21	1.9	1.2
Other renewables	0	0	0	0	0	0	0	–	–
Transport	**76**	**116**	**143**	**197**	**100**	**100**	**100**	**1.9**	**2.1**
Oil	70	105	125	166	90	87	84	1.6	1.8
Biofuels	6	6	10	20	6	7	10	4.5	4.5
Other fuels	0	5	8	11	4	5	6	4.2	3.2
Residential, services and agriculture	**80**	**103**	**137**	**186**	**100**	**100**	**100**	**2.6**	**2.3**
Coal	0	0	0	0	0	0	0	–2.3	–2.1
Oil	25	29	37	47	28	27	25	2.4	1.9
Gas	6	11	16	28	11	12	15	3.5	3.6
Electricity	17	32	48	74	31	35	40	4.0	3.3
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	32	31	34	34	30	25	19	0.8	0.4
Other renewables	0	0	0	2	0	0	1	19.3	14.5
Non-energy use	**6**	**9**	**11**	**14**	**100**	**100**	**100**	**1.7**	**1.6**

Reference Scenario: Latin America

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**491**	**874**	**1 304**	**1 983**	**100**	**100**	**100**	**3.7**	**3.2**
Coal	15	30	43	77	3	3	4	3.1	3.6
Oil	41	83	76	44	9	6	2	–0.8	–2.4
Gas	55	131	308	655	15	24	33	8.1	6.4
Nuclear	10	19	37	34	2	3	2	6.0	2.2
Hydro	364	589	799	1 084	67	61	55	2.8	2.4
Renewables (excluding hydro)	7	21	40	89	2	3	4	6.0	5.7
Biomass and waste	*7*	*18*	*28*	*51*	*2*	*2*	*3*	*3.8*	*4.0*
Wind	*0*	*0*	*8*	*22*	*0*	*1*	*1*	*31.0*	*16.4*
Geothermal	*1*	*2*	*4*	*12*	*0*	*0*	*1*	*5.3*	*6.5*
Solar	*0*	*0*	*0*	*5*	*0*	*0*	*0*	–	–
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**206**	**331**	**504**	**100**	**100**	**100**	**4.4**	**3.5**
Coal	5	8	13	3	2	3	3.7	3.4
Oil	28	29	19	14	9	4	0.2	–1.5
Gas	38	107	212	18	32	42	10.0	6.9
Nuclear	3	5	4	1	1	1	4.9	1.8
Hydro	128	174	236	62	53	47	2.8	2.4
of which pumped storage	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Renewables (excluding hydro)	4	8	20	2	2	4	7.3	6.7
Biomass and waste	*3*	*4*	*8*	*2*	*1*	*2*	*3.4*	*3.7*
Wind	*0*	*3*	*7*	*0*	*1*	*1*	*26.8*	*14.7*
Geothermal	*0*	*1*	*2*	*0*	*0*	*0*	*5.4*	*6.5*
Solar	*0*	*0*	*3*	*0*	*0*	*1*	–	–
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**602**	**907**	**1 151**	**1 551**	**100**	**100**	**100**	**2.2**	**2.1**
Coal	57	85	103	139	9	9	9	1.7	1.9
Oil	426	601	707	873	66	61	56	1.5	1.4
Gas	119	221	341	539	24	30	35	4.0	3.5
Power generation and heat plants	**98**	**176**	**247**	**374**	**100**	**100**	**100**	**3.2**	**2.9**
Coal	21	35	44	67	20	18	18	2.2	2.6
Oil	45	77	62	33	44	25	9	–2.0	–3.2
Gas	32	64	142	273	36	57	73	7.5	5.7
Total final consumption	**439**	**656**	**815**	**1 067**	**100**	**100**	**100**	**2.0**	**1.9**
Coal	32	47	55	67	7	7	6	1.4	1.4
Oil	350	489	605	790	75	74	74	2.0	1.9
of which transport	*200*	*301*	*361*	*479*	*46*	*44*	*45*	*1.7*	*1.8*
Gas	56	119	155	209	18	19	20	2.4	2.2

Reference Scenario: Brazil

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**131**	**200**	**265**	**349**	**100**	**100**	**100**	**2.6**	**2.2**
Coal	10	14	15	18	7	6	5	0.6	0.9
Oil	58	85	108	142	42	41	41	2.3	2.0
Gas	3	16	26	41	8	10	12	4.6	3.8
Nuclear	1	3	6	6	2	2	2	6.9	2.9
Hydro	18	28	38	50	14	14	14	2.9	2.3
Biomass and waste	42	54	71	90	27	27	26	2.4	1.9
Other renewables	0	0	0	2	0	0	1	50.1	25.4
Power generation and heat plants	**22**	**43**	**61**	**80**	**100**	**100**	**100**	**3.3**	**2.5**
Coal	1	3	2	2	6	3	2	–3.2	–1.9
Oil	1	3	2	3	7	4	4	–1.1	0.0
Gas	0	4	8	13	9	13	16	6.4	4.6
Nuclear	1	3	6	6	7	10	8	6.9	2.9
Hydro	18	28	38	50	65	63	62	2.9	2.3
Biomass and waste	1	2	4	6	6	6	7	4.2	3.3
Other renewables	0	0	0	1	0	1	1	44.6	22.7
Other transformation, own use and losses	**18**	**23**	**29**	**37**	**100**	**100**	**100**	**2.1**	**1.9**
of which electricity	*3*	*7*	*9*	*10*	*29*	*30*	*28*	*2.3*	*1.7*
Total final consumption	**112**	**171**	**226**	**298**	**100**	**100**	**100**	**2.6**	**2.2**
Coal	4	7	8	11	4	4	4	1.7	1.7
Oil	53	78	101	131	46	45	44	2.3	2.0
Gas	2	9	13	21	5	6	7	4.0	3.5
Electricity	18	30	42	56	17	19	19	3.1	2.4
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	35	47	61	78	28	27	26	2.4	2.0
Other renewables	0	0	0	1	0	0	0	–	–
Industry	**48**	**77**	**98**	**125**	**100**	**100**	**100**	**2.3**	**1.9**
Coal	4	7	8	11	9	8	9	1.7	1.7
Oil	14	18	23	28	24	23	23	2.2	1.7
Gas	2	7	11	17	9	11	14	3.8	3.4
Electricity	10	15	19	26	19	20	21	2.5	2.2
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	19	30	37	43	39	38	34	2.0	1.4
Other renewables	0	0	0	0	0	0	0	–	–
Transport	**32**	**52**	**70**	**103**	**100**	**100**	**100**	**2.8**	**2.7**
Oil	27	44	58	79	85	82	77	2.5	2.3
Biofuels	6	6	10	20	12	15	20	4.6	4.6
Other fuels	0	1	2	4	3	3	4	5.0	3.8
Residential, services and agriculture	**29**	**38**	**52**	**63**	**100**	**100**	**100**	**2.8**	**2.0**
Coal	0	0	0	0	0	0	0	–	–
Oil	9	12	15	18	31	29	28	2.1	1.5
Gas	0	0	1	1	1	1	1	3.0	2.4
Electricity	8	15	22	29	39	43	46	3.7	2.6
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	11	11	14	15	29	27	23	2.1	1.2
Other renewables	0	0	0	1	0	0	1	–	–
Non-energy use	**3**	**4**	**5**	**6**	**100**	**100**	**100**	**1.6**	**1.5**

Reference Scenario: Brazil

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**223**	**387**	**549**	**731**	**100**	**100**	**100**	**3.2**	**2.5**
Coal	5	10	7	6	3	1	1	–3.0	–1.8
Oil	6	12	11	13	3	2	2	–1.0	0.1
Gas	0	19	41	65	5	8	9	7.2	4.8
Nuclear	2	12	24	24	3	4	3	6.9	2.9
Hydro	207	321	442	581	83	80	79	2.9	2.3
Renewables (excluding hydro)	4	13	23	41	3	4	6	5.7	4.7
Biomass and waste	*4*	*12*	*20*	*29*	*3*	*4*	*4*	*4.2*	*3.3*
Wind	*0*	*0*	*4*	*11*	*0*	*1*	*2*	*44.6*	*22.1*
Geothermal	*0*	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Solar	*0*	*0*	*0*	*1*	*0*	*0*	*0*	–	–
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**87**	**131**	**172**	**100**	**100**	**100**	**3.8**	**2.7**
Coal	1	2	1	2	1	1	0.8	–1.0
Oil	4	6	6	4	4	4	4.0	1.9
Gas	9	20	26	10	15	15	7.8	4.4
Nuclear	2	3	3	2	2	2	4.8	2.0
Hydro	69	96	127	80	74	74	3.1	2.4
of which pumped storage	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Renewables (excluding hydro)	2	4	9	2	3	5	6.8	5.8
Biomass and waste	*2*	*3*	*5*	*2*	*2*	*3*	*3.9*	*3.1*
Wind	*0*	*1*	*4*	*0*	*1*	*2*	*39.7*	*20.4*
Geothermal	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Solar	*0*	*0*	*1*	*0*	*0*	*0*	–	–
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**193**	**323**	**412**	**551**	**100**	**100**	**100**	**2.2**	**2.1**
Coal	29	50	52	62	16	13	11	0.3	0.8
Oil	158	238	302	395	74	73	72	2.2	2.0
Gas	6	35	59	93	11	14	17	4.7	3.8
Power generation and heat plants	**12**	**33**	**37**	**47**	**100**	**100**	**100**	**0.9**	**1.4**
Coal	8	15	11	9	46	30	20	–3.2	–1.9
Oil	4	9	8	9	26	21	18	–1.1	0.0
Gas	0	9	18	29	27	49	62	6.4	4.6
Total final consumption	**165**	**267**	**347**	**462**	**100**	**100**	**100**	**2.4**	**2.1**
Coal	18	31	38	48	12	11	10	1.7	1.7
Oil	143	216	278	366	81	80	79	2.3	2.1
of which transport	*81*	*133*	*174*	*240*	*50*	*50*	*52*	*2.5*	*2.3*
Gas	4	20	31	48	7	9	10	4.0	3.5

Reference Scenario: Middle East

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**235**	**479**	**752**	**1 023**	**100**	**100**	**100**	**4.2**	**3.0**
Coal	3	9	14	19	2	2	2	3.6	2.8
Oil	151	265	390	464	55	52	45	3.6	2.2
Gas	78	202	340	525	42	45	51	4.8	3.7
Nuclear	0	0	2	2	0	0	0	–	–
Hydro	1	1	3	4	0	0	0	7.1	3.9
Biomass and waste	1	1	2	6	0	0	1	7.8	6.7
Other renewables	0	1	1	3	0	0	0	5.2	5.6
Power generation and heat plants	**63**	**152**	**254**	**387**	**100**	**100**	**100**	**4.8**	**3.7**
Coal	2	8	12	17	5	5	4	3.5	2.8
Oil	29	54	75	85	35	30	22	3.1	1.8
Gas	30	89	161	274	58	63	71	5.6	4.4
Nuclear	0	0	2	2	0	1	0	–	–
Hydro	1	1	3	4	1	1	1	7.1	3.9
Biomass and waste	0	0	1	4	0	0	1	–	–
Other renewables	0	0	0	1	0	0	0	42.8	28.5
Other transformation, own use and losses	**20**	**58**	**80**	**110**	**100**	**100**	**100**	**3.0**	**2.5**
of which electricity	*4*	*10*	*16*	*24*	*17*	*20*	*22*	*4.5*	*3.5*
Total final consumption	**172**	**320**	**502**	**656**	**100**	**100**	**100**	**4.2**	**2.8**
Coal	0	1	1	2	0	0	0	6.4	3.6
Oil	116	193	288	342	60	57	52	3.7	2.2
Gas	38	84	143	203	26	28	31	4.9	3.4
Electricity	17	41	68	105	13	13	16	4.8	3.7
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	1	1	1	2	0	0	0	1.9	2.4
Other renewables	0	1	1	2	0	0	0	4.8	4.4
Industry	**66**	**120**	**194**	**268**	**100**	**100**	**100**	**4.5**	**3.1**
Coal	0	1	1	2	1	1	1	6.4	3.6
Oil	28	53	70	89	44	36	33	2.6	2.1
Gas	35	59	108	153	49	56	57	5.7	3.8
Electricity	3	8	15	23	7	8	9	5.6	4.1
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	0	0	0	0	0	0	0	1.5	1.5
Other renewables	0	0	0	0	0	0	0	–	–
Transport	**59**	**100**	**151**	**167**	**100**	**100**	**100**	**3.8**	**2.0**
Oil	59	100	150	166	100	100	100	3.8	2.0
Biofuels	0	0	0	0	0	0	0	19.0	14.0
Other fuels	0	0	0	0	0	0	0	1.5	1.5
Residential, services and agriculture	**41**	**91**	**140**	**195**	**100**	**100**	**100**	**4.0**	**3.0**
Coal	0	0	0	0	0	0	0	–	–
Oil	23	32	51	61	35	36	31	4.4	2.5
Gas	3	26	35	50	28	25	25	2.8	2.6
Electricity	14	32	53	82	35	38	42	4.5	3.6
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	1	1	1	1	1	1	0	1.0	1.0
Other renewables	0	1	1	2	1	1	1	4.6	4.4
Non-energy use	**5**	**9**	**17**	**26**	**100**	**100**	**100**	**6.5**	**4.4**

Reference Scenario: Middle East

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**240**	**588**	**976**	**1 502**	**100**	**100**	**100**	**4.7**	**3.7**
Coal	10	37	56	83	6	6	6	3.8	3.1
Oil	117	218	289	321	37	30	21	2.6	1.5
Gas	101	317	586	1 028	54	60	68	5.7	4.6
Nuclear	0	0	7	7	0	1	0	–	–
Hydro	12	17	35	45	3	4	3	7.1	3.9
Renewables (excluding hydro)	0	0	3	19	0	0	1	46.9	25.7
Biomass and waste	*0*	*0*	*3*	*9*	*0*	*0*	*1*	–	–
Wind	*0*	*0*	*1*	*5*	*0*	*0*	*0*	*42.1*	*25.5*
Geothermal	*0*	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Solar	*0*	*0*	*0*	*4*	*0*	*0*	*0*	*0.0*	*20.5*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**182**	**300**	**464**	**100**	**100**	**100**	**4.6**	**3.7**
Coal	5	7	11	3	2	2	3.6	3.2
Oil	79	104	123	44	35	26	2.5	1.7
Gas	89	171	304	49	57	66	6.2	4.9
Nuclear	0	1	1	0	0	0	–	–
Hydro	9	16	20	5	5	4	5.0	3.0
of which pumped storage	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Renewables (excluding hydro)	0	1	5	0	0	1	31.3	22.4
Biomass and waste	*0*	*0*	*1*	*0*	*0*	*0*	*42.4*	*22.0*
Wind	*0*	*0*	*2*	*0*	*0*	*0*	*30.6*	*22.0*
Geothermal	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Solar	*0*	*0*	*2*	*0*	*0*	*1*	*0.0*	*23.0*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**602**	**1 183**	**1 841**	**2 460**	**100**	**100**	**100**	**4.1**	**2.9**
Coal	12	36	54	75	3	3	3	3.9	2.9
Oil	413	690	1 014	1 186	58	55	48	3.6	2.1
Gas	177	458	772	1 198	39	42	49	4.9	3.8
Power generation and heat plants	**172**	**407**	**658**	**973**	**100**	**100**	**100**	**4.5**	**3.4**
Coal	9	31	46	65	8	7	7	3.5	2.8
Oil	92	169	236	268	42	36	28	3.1	1.8
Gas	71	207	376	641	51	57	66	5.6	4.4
Total final consumption	**381**	**676**	**1 048**	**1 310**	**100**	**100**	**100**	**4.1**	**2.6**
Coal	2	4	8	10	1	1	1	6.3	3.5
Oil	294	483	720	847	71	69	65	3.7	2.2
of which transport	*145*	*264*	*397*	*439*	*39*	*38*	*34*	*3.8*	*2.0*
Gas	85	189	319	453	28	30	35	4.9	3.4

Reference Scenario: Africa

	Energy demand (Mtoe)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total primary energy supply	**401**	**582**	**732**	**954**	**100**	**100**	**100**	**2.1**	**1.9**
Coal	74	101	112	131	17	15	14	0.9	1.0
Oil	90	121	161	226	21	22	24	2.6	2.4
Gas	31	64	119	183	11	16	19	5.7	4.1
Nuclear	2	3	4	4	1	1	0	0.9	0.4
Hydro	5	8	11	20	1	1	2	3.1	3.8
Biomass and waste	199	283	324	385	49	44	40	1.2	1.2
Other renewables	0	1	2	7	0	0	1	9.7	8.5
Power generation and heat plants	**69**	**116**	**169**	**261**	**100**	**100**	**100**	**3.4**	**3.2**
Coal	39	57	65	82	49	39	31	1.2	1.4
Oil	11	16	13	11	14	8	4	–2.1	–1.5
Gas	11	31	68	118	27	40	45	7.4	5.2
Nuclear	2	3	4	4	3	2	1	0.9	0.4
Hydro	5	8	11	20	6	6	8	3.1	3.8
Biomass and waste	0	0	7	23	0	4	9	41.2	21.3
Other renewables	0	1	1	4	1	1	2	5.8	6.7
Other transformation, own use and losses	**64**	**76**	**100**	**122**	**100**	**100**	**100**	**2.5**	**1.8**
of which electricity	*6*	*10*	*14*	*23*	*13*	*14*	*19*	*3.4*	*3.3*
Total final consumption	**294**	**434**	**532**	**687**	**100**	**100**	**100**	**1.9**	**1.8**
Coal	19	19	20	20	4	4	3	0.4	0.2
Oil	74	109	145	207	25	27	30	2.7	2.5
Gas	9	20	30	40	5	6	6	3.5	2.7
Electricity	21	35	54	92	8	10	13	4.0	3.8
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	171	251	283	324	58	53	47	1.1	1.0
Other renewables	0	0	1	2	0	0	0	–	–
Industry	**69**	**86**	**108**	**130**	**100**	**100**	**100**	**2.1**	**1.6**
Coal	16	15	15	15	17	14	11	0.2	0.0
Oil	16	15	19	22	17	18	17	2.3	1.6
Gas	8	15	21	26	18	19	20	3.0	2.2
Electricity	12	16	23	33	19	21	25	3.2	2.8
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	18	25	31	34	30	28	26	1.7	1.1
Other renewables	0	0	0	0	0	0	0	–	–
Transport	**39**	**65**	**89**	**142**	**100**	**100**	**100**	**2.9**	**3.1**
Oil	39	64	85	136	98	96	95	2.7	2.9
Biofuels	0	0	1	3	0	1	2	58.9	27.3
Other fuels	0	1	3	3	2	3	2	7.8	4.3
Residential, services and agriculture	**183**	**278**	**328**	**404**	**100**	**100**	**100**	**1.5**	**1.4**
Coal	3	5	5	6	2	2	1	1.1	1.0
Oil	16	25	33	39	9	10	10	2.8	1.8
Gas	1	4	6	10	1	2	3	3.8	3.6
Electricity	9	19	31	59	7	10	15	4.7	4.5
Heat	0	0	0	0	0	0	0	–	–
Biomass and waste	153	226	251	287	81	77	71	1.0	0.9
Other renewables	0	0	1	2	0	0	1	–	–
Non-energy use	**4**	**5**	**7**	**10**	**100**	**100**	**100**	**2.9**	**2.6**

Reference Scenario: Africa

	Electricity generation (TWh)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total generation	**316**	**534**	**807**	**1 351**	**100**	**100**	**100**	**3.8**	**3.6**
Coal	165	244	287	397	46	36	29	1.5	1.9
Oil	42	58	47	39	11	6	3	–1.9	–1.4
Gas	43	130	314	592	24	39	44	8.4	6.0
Nuclear	8	13	15	15	2	2	1	0.9	0.4
Hydro	56	88	122	232	16	15	17	3.1	3.8
Renewables (excluding hydro)	0	2	22	76	0	3	6	24.7	15.3
Biomass and waste	*0*	*0*	*14*	*46*	*0*	*2*	*3*	*41.3*	*21.3*
Wind	*0*	*1*	*5*	*16*	*0*	*1*	*1*	*18.8*	*12.3*
Geothermal	*0*	*1*	*3*	*9*	*0*	*0*	*1*	*11.7*	*9.7*
Solar	*0*	*0*	*0*	*6*	*0*	*0*	*0*	*14.6*	*30.7*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	Capacity (GW)			Shares (%)			Growth (% p.a.)	
	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total capacity	**112**	**172**	**294**	**100**	**100**	**100**	**4.0**	**3.8**
Coal	39	50	69	35	29	23	2.2	2.2
Oil	19	22	20	17	13	7	1.0	0.2
Gas	32	67	134	28	39	45	7.1	5.7
Nuclear	2	2	2	2	1	1	0.0	0.0
Hydro	20	28	53	18	16	18	3.1	3.8
of which pumped storage	*0*	*0*	*0*	*0*	*0*	*0*	–	–
Renewables (excluding hydro)	0	4	17	0	3	6	23.6	15.2
Biomass and waste	*0*	*2*	*7*	*0*	*1*	*2*	*41.2*	*21.1*
Wind	*0*	*2*	*5*	*0*	*1*	*2*	*19.6*	*12.7*
Geothermal	*0*	*0*	*1*	*0*	*0*	*0*	*11.7*	*9.6*
Solar	*0*	*0*	*3*	*0*	*0*	*1*	*0.0*	*23.2*
Tide and wave	*0*	*0*	*0*	*0*	*0*	*0*	–	–

	CO_2 emissions (Mt)				Shares (%)			Growth (% p.a.)	
	1990	2004	2015	2030	2004	2015	2030	2004-2015	2004-2030
Total CO_2 emissions	**550**	**815**	**1 063**	**1 447**	**100**	**100**	**100**	**2.4**	**2.2**
Coal	235	316	350	419	39	33	29	0.9	1.1
Oil	249	354	436	595	43	41	41	1.9	2.0
Gas	65	144	277	433	18	26	30	6.1	4.3
Power generation and heat plants	**214**	**350**	**465**	**649**	**100**	**100**	**100**	**2.6**	**2.4**
Coal	152	229	260	328	65	56	50	1.2	1.4
Oil	35	47	37	29	13	8	5	–2.2	–1.8
Gas	26	74	167	292	21	36	45	7.7	5.4
Total final consumption	**304**	**422**	**542**	**733**	**100**	**100**	**100**	**2.3**	**2.1**
Coal	83	87	90	91	21	17	12	0.3	0.2
Oil	202	292	390	557	69	72	76	2.7	2.5
of which transport	*104*	*174*	*232*	*369*	*41*	*43*	*50*	*2.7*	*2.9*
Gas	19	42	62	85	10	12	12	3.6	2.7

Alternative Policy Scenario: World

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**8 732**	**11 204**	**13 537**	**15 405**	**1.7**	**1.2**	**–3.8**	**–9.9**
Coal	2 183	2 773	3 431	3 512	2.0	0.9	–6.4	–20.9
Oil	3 181	3 940	4 534	4 955	1.3	0.9	–4.6	–11.1
of which international marine bunkers	*114*	*165*	*173*	*177*	*0.4*	*0.3*	*–3.8*	*–9.8*
Gas	1 680	2 302	2 877	3 370	2.0	1.5	–4.6	–12.9
Nuclear	525	714	852	1 070	1.6	1.6	5.1	24.3
Hydro	185	242	321	422	2.6	2.2	1.5	3.2
Biomass and waste	923	1 176	1 374	1 703	1.4	1.4	–0.0	3.6
Other renewables	56	57	148	373	9.1	7.5	8.4	26.1
Power generation and heat plants	**2 800**	**4 133**	**5 246**	**6 134**	**2.2**	**1.5**	**–4.3**	**–11.4**
Coal	1 190	1 888	2 403	2 496	2.2	1.1	–6.8	–22.8
Oil	328	292	284	210	–0.3	–1.3	–5.8	–12.6
Gas	486	875	1 121	1 311	2.3	1.6	–8.7	–22.1
Nuclear	525	714	852	1 070	1.6	1.6	5.1	24.3
Hydro	185	242	321	422	2.6	2.2	1.5	3.2
Biomass and waste	54	74	150	345	6.7	6.1	9.7	30.1
Other renewables	32	49	115	280	8.0	6.9	1.8	18.9
Other transformation, own use and losses	**878**	**1 064**	**1 261**	**1 439**	**1.6**	**1.2**	**–3.9**	**–9.1**
of which electricity	*189*	*263*	*348*	*420*	*2.6*	*1.8*	*–5.6*	*–13.6*
Total final consumption	**6 154**	**7 639**	**9 207**	**10 542**	**1.7**	**1.2**	**–3.7**	**–9.6**
Coal	765	641	774	763	1.7	0.7	–5.9	–17.3
Oil	2 543	3 228	3 783	4 242	1.5	1.1	–4.6	–11.4
Gas	1 004	1 219	1 487	1 721	1.8	1.3	–1.9	–6.4
Electricity	826	1 236	1 682	2 121	2.8	2.1	–4.7	–12.2
Heat	177	255	280	306	0.9	0.7	–2.3	–5.4
Biomass and waste	815	1 052	1 168	1 295	1.0	0.8	–1.2	–1.6
Other renewables	24	7	33	93	14.7	10.3	40.3	54.3
Industry	**2 134**	**2 511**	**3 174**	**3 595**	**2.2**	**1.4**	**–3.3**	**–8.6**
Coal	470	499	645	662	2.4	1.1	–6.0	–17.0
Oil	550	665	789	826	1.6	0.8	–3.9	–9.1
Gas	551	564	711	847	2.1	1.6	–1.8	–4.8
Electricity	382	512	698	845	2.9	1.9	–4.3	–10.1
Heat	72	100	108	116	0.7	0.6	–0.9	–0.5
Biomass and waste	109	169	222	295	2.5	2.2	4.4	7.2
Other renewables	0	1	1	5	6.3	8.3	5.2	24.3
Transport	**1 435**	**1 969**	**2 354**	**2 804**	**1.6**	**1.4**	**–4.1**	**–9.9**
Oil	1 370	1 861	2 166	2 520	1.4	1.2	–5.2	–12.6
Biofuels	6	15	73	147	15.1	9.0	34.1	58.7
Other fuels	59	93	115	138	1.9	1.5	1.3	2.2
Residential, services and agriculture	**2 339**	**2 905**	**3 362**	**3 772**	**1.3**	**1.0**	**–3.9**	**–10.6**
Coal	240	106	92	69	–1.3	–1.6	–6.5	–23.6
Oil	450	499	571	594	1.2	0.7	–3.5	–10.4
Gas	422	586	691	773	1.5	1.1	–2.4	–8.9
Electricity	421	689	935	1 208	2.8	2.2	–5.3	–14.3
Heat	105	154	171	190	1.0	0.8	–3.2	–8.3
Biomass and waste	696	864	870	850	0.1	–0.1	–4.6	–10.1
Other renewables	4	7	32	88	15.2	10.4	42.1	56.4
Non-energy use	**246**	**254**	**317**	**370**	**2.0**	**1.4**	**–3.7**	**–7.6**

Alternative Policy Scenario: World

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**11 731**	**17 408**	**23 682**	**29 835**	**2.8**	**2.1**	**–4.6**	**–11.6**
Coal	4 478	6 917	9 751	10 914	3.2	1.8	–8.1	–25.8
Oil	1 313	1 161	1 154	869	–0.1	–1.1	–3.4	–7.6
Gas	1 613	3 412	4 730	6 170	3.0	2.3	–9.6	–20.8
Nuclear	2 013	2 740	3 268	4 106	1.6	1.6	5.1	24.3
Hydro	2 148	2 809	3 738	4 903	2.6	2.2	1.5	3.2
Renewables (excluding hydro)	166	369	1 041	2 872	9.9	8.2	5.5	26.8
Biomass and waste	*125*	*227*	*455*	*983*	*6.5*	*5.8*	*8.0*	*22.2*
Wind	*4*	*82*	*449*	*1 440*	*16.7*	*11.6*	*3.8*	*27.3*
Geothermal	*36*	*56*	*100*	*185*	*5.5*	*4.7*	*0.3*	*6.3*
Solar	*1*	*4*	*34*	*238*	*21.0*	*16.8*	*12.8*	*67.8*
Tide and wave	*1*	*1*	*2*	*25*	*11.3*	*15.8*	*24.3*	*117.2*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**4 054**	**5 418**	**7 104**	**2.7**	**2.2**	**–4.1**	**–9.8**
Coal	1 235	1 664	1 885	2.7	1.6	–8.9	–26.5
Oil	453	466	336	0.3	–1.1	–3.0	–11.2
Gas	1 055	1 491	2 059	3.2	2.6	–7.0	–16.6
Nuclear	364	412	519	1.1	1.4	5.3	24.7
Hydro	851	1 100	1 431	2.4	2.0	1.9	4.2
of which pumped storage	*79*	*79*	*79*	*0.0*	*0.0*	–	–
Renewables (excluding hydro)	96	285	874	10.4	8.9	5.3	29.6
Biomass and waste	*36*	*74*	*158*	*6.7*	*5.8*	*7.9*	*22.0*
Wind	*48*	*174*	*538*	*12.5*	*9.8*	*3.7*	*25.3*
Geothermal	*8*	*15*	*26*	*5.4*	*4.6*	*0.3*	*6.0*
Solar	*4*	*22*	*145*	*17.7*	*15.2*	*12.9*	*65.6*
Tide and wave	*0*	*0*	*7*	*6.0*	*13.3*	*23.7*	*116.9*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**20 463**	**26 079**	**31 586**	**34 080**	**1.8**	**1.0**	**–5.2**	**–15.7**
Coal	8 081	10 625	13 293	13 594	2.1	1.0	–6.5	–21.4
Oil	8 561	10 199	11 737	12 835	1.3	0.9	–4.1	–10.5
of which international marine bunkers	*363*	*521*	*547*	*561*	*0.4*	*0.3*	–3.8	–9.8
Gas	3 820	5 254	6 556	7 651	2.0	1.5	–4.7	–13.0
Power generation and heat plants	**6 955**	**10 587**	**13 203**	**13 749**	**2.0**	**1.0**	**–7.1**	**–22.2**
Coal	4 764	7 600	9 653	9 987	2.2	1.1	–6.8	–22.9
Oil	1 053	934	905	667	–0.3	–1.3	–5.8	–12.5
Gas	1 138	2 054	2 645	3 095	2.3	1.6	–8.7	–22.1
Total final consumption	**12 047**	**13 668**	**16 335**	**18 065**	**1.6**	**1.1**	**–4.0**	**–11.1**
Coal	3 188	2 817	3 424	3 391	1.8	0.7	–5.8	–17.3
Oil	6 595	8 091	9 565	10 833	1.5	1.1	–4.1	–10.6
of which transport	*3 758*	*5 112*	*6 048*	*7 076*	*1.5*	*1.3*	*–4.4*	*–11.5*
Gas	2 264	2 760	3 345	3 841	1.8	1.3	–1.9	–6.3

Alternative Policy Scenario: OECD

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**4 518**	**5 502**	**6 128**	**6 359**	**1.0**	**0.6**	**–2.1**	**–7.3**
Coal	1 063	1 129	1 173	985	0.4	–0.5	–4.7	–24.4
Oil	1 894	2 236	2 383	2 345	0.6	0.2	–3.4	–9.5
Gas	844	1 199	1 372	1 471	1.2	0.8	–4.0	–10.8
Nuclear	449	604	676	754	1.0	0.9	4.8	21.4
Hydro	101	109	123	135	1.1	0.8	1.2	3.4
Biomass and waste	140	187	308	451	4.6	3.4	10.5	16.9
Other renewables	28	37	94	219	8.8	7.0	7.6	20.6
Power generation and heat plants	**1 701**	**2 197**	**2 498**	**2 579**	**1.2**	**0.6**	**–2.0**	**–8.6**
Coal	750	906	978	818	0.7	–0.4	–5.0	–26.9
Oil	148	115	102	58	–1.1	–2.6	–4.7	–11.9
Gas	175	371	450	494	1.8	1.1	–6.7	–16.7
Nuclear	449	604	676	754	1.0	0.9	4.8	21.4
Hydro	101	109	123	135	1.1	0.8	1.2	3.4
Biomass and waste	52	61	96	153	4.3	3.6	5.5	4.0
Other renewables	25	31	73	167	8.2	6.7	1.6	16.3
Other transformation, own use and losses	**381**	**416**	**435**	**451**	**0.4**	**0.3**	**–2.6**	**–7.1**
of which electricity	*105*	*118*	*131*	*135*	*0.9*	*0.5*	*–3.9*	*–11.4*
Total final consumption	**3 135**	**3 826**	**4 283**	**4 528**	**1.0**	**0.7**	**–2.5**	**–7.4**
Coal	229	134	116	100	–1.2	–1.1	–3.2	–7.9
Oil	1 638	2 000	2 165	2 172	0.7	0.3	–3.5	–9.8
Gas	591	747	821	852	0.9	0.5	–2.6	–7.7
Electricity	547	753	879	974	1.4	1.0	–3.8	–11.0
Heat	40	59	70	82	1.5	1.3	–0.9	–1.7
Biomass and waste	87	127	211	298	4.8	3.3	13.0	25.0
Other renewables	3	6	21	51	11.5	8.4	36.6	37.7
Industry	**1 015**	**1 152**	**1 264**	**1 302**	**0.8**	**0.5**	**–2.6**	**–6.5**
Coal	159	115	104	92	–0.9	–0.8	–3.4	–8.2
Oil	323	376	422	413	1.1	0.4	–2.0	–4.7
Gas	261	310	331	341	0.6	0.4	–3.2	–7.6
Electricity	223	269	298	318	0.9	0.6	–3.7	–9.4
Heat	14	17	20	22	1.4	1.0	–2.6	–4.9
Biomass and waste	35	64	87	112	2.9	2.2	2.7	–0.3
Other renewables	0	1	1	4	4.8	8.0	6.2	26.7
Transport	**986**	**1 283**	**1 439**	**1 514**	**1.0**	**0.6**	**–3.1**	**–8.8**
Oil	960	1 244	1 352	1 388	0.8	0.4	–4.2	–11.6
Biofuels	0	9	52	84	17.3	9.0	32.5	62.8
Other fuels	26	30	35	42	1.4	1.4	5.0	11.3
Residential, services and agriculture	**1 036**	**1 273**	**1 448**	**1 572**	**1.2**	**0.8**	**–1.9**	**–6.9**
Coal	68	17	11	6	–4.2	–3.7	–1.2	–5.4
Oil	259	263	259	234	–0.1	–0.4	–2.5	–8.7
Gas	311	416	467	483	1.0	0.6	–2.5	–8.6
Electricity	316	475	569	640	1.7	1.2	–4.0	–12.1
Heat	27	42	50	60	1.6	1.4	–0.2	–0.4
Biomass and waste	52	54	72	102	2.7	2.5	14.9	36.9
Other renewables	3	6	20	47	12.0	8.4	38.6	38.8
Non-energy use	**98**	**119**	**133**	**139**	**1.0**	**0.6**	**–3.0**	**–7.3**

Alternative Policy Scenario: OECD

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**7 571**	**10 118**	**11 728**	**12 895**	**1.4**	**0.9**	**–3.7**	**–10.9**
Coal	3 059	3 842	4 265	3 803	1.0	0.0	–6.2	–29.5
Oil	695	527	456	257	–1.3	–2.7	–5.3	–13.4
Gas	770	1 854	2 213	2 614	1.6	1.3	–12.0	–21.9
Nuclear	1 725	2 319	2 593	2 892	1.0	0.9	4.8	21.4
Hydro	1 170	1 267	1 429	1 570	1.1	0.8	1.2	3.4
Renewables (excluding hydro)	152	310	773	1 759	8.6	6.9	2.7	14.7
Biomass and waste	*118*	*196*	*316*	*483*	*4.4*	*3.5*	*3.1*	*–0.3*
Wind	*4*	*77*	*364*	*993*	*15.1*	*10.3*	*1.7*	*18.2*
Geothermal	*29*	*35*	*59*	*100*	*4.9*	*4.1*	*0.5*	*5.4*
Solar	*1*	*2*	*32*	*159*	*31.0*	*19.3*	*13.9*	*54.3*
Tide and wave	*1*	*1*	*2*	*24*	*11.3*	*15.6*	*24.3*	*109.5*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**2 360**	**2 719**	**3 199**	**1.3**	**1.2**	**–3.8**	**–9.8**
Coal	656	683	630	0.4	–0.2	–8.8	–32.1
Oil	234	215	112	–0.8	–2.8	–4.5	–19.9
Gas	654	808	1 026	1.9	1.7	–6.7	–15.1
Nuclear	305	324	362	0.5	0.7	5.1	22.3
Hydro	428	462	500	0.7	0.6	0.9	2.7
of which pumped storage	*79*	*79*	*79*	*0.0*	*0.0*	–	–
Renewables (excluding hydro)	82	226	568	9.6	7.7	3.4	17.1
Biomass and waste	*31*	*51*	*78*	*4.7*	*3.6*	*4.4*	*0.0*
Wind	*43*	*145*	*369*	*11.6*	*8.6*	*1.9*	*13.5*
Geothermal	*5*	*8*	*14*	*4.7*	*3.9*	*0.4*	*5.3*
Solar	*3*	*21*	*101*	*19.9*	*14.6*	*13.5*	*53.4*
Tide and wave	*0*	*0*	*6*	*6.0*	*13.0*	*23.7*	*109.3*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**11 051**	**12 827**	**13 828**	**13 184**	**0.7**	**0.1**	**–3.9**	**–14.9**
Coal	4 101	4 334	4 534	3 792	0.4	–0.5	–4.8	–25.0
Oil	5 029	5 713	6 114	5 990	0.6	0.2	–3.3	–9.6
Gas	1 920	2 780	3 180	3 402	1.2	0.8	–3.9	–10.7
Power generation and heat plants	**3 904**	**4 905**	**5 333**	**4 631**	**0.8**	**–0.2**	**–5.4**	**–24.3**
Coal	3 024	3 665	3 949	3 288	0.7	–0.4	–5.1	–27.2
Oil	471	372	330	187	–1.1	–2.6	–4.7	–11.9
Gas	409	867	1 054	1 156	1.8	1.1	–6.7	–16.8
Total final consumption	**6 553**	**7 274**	**7 814**	**7 827**	**0.7**	**0.3**	**–3.1**	**–9.3**
Coal	1 012	589	514	442	–1.2	–1.1	–2.7	–6.9
Oil	4 196	4 967	5 410	5 421	0.8	0.3	–3.4	–10.1
of which transport	*2 688*	*3 445*	*3 814*	*3 915*	*0.9*	*0.5*	*–3.8*	*–11.4*
Gas	1 345	1 717	1 891	1 965	0.9	0.5	–2.4	–7.4

Alternative Policy Scenario: OECD North America

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**2 256**	**2 756**	**3 102**	**3 285**	**1.1**	**0.7**	**–2.6**	**–8.1**
Coal	486	581	641	598	0.9	0.1	–4.3	–19.3
Oil	927	1 137	1 249	1 271	0.9	0.4	–3.4	–10.2
Gas	517	637	721	757	1.1	0.7	–2.6	–8.1
Nuclear	179	238	254	310	0.6	1.0	–	12.7
Hydro	51	55	59	63	0.6	0.5	0.3	2.9
Biomass and waste	78	91	140	196	4.0	3.0	5.3	7.9
Other renewables	19	17	39	89	7.7	6.5	6.2	15.7
Power generation and heat plants	**845**	**1 086**	**1 238**	**1 322**	**1.2**	**0.8**	**–2.7**	**–8.8**
Coal	413	524	590	553	1.1	0.2	–4.4	–20.0
Oil	47	54	51	36	–0.5	–1.6	–1.5	–7.8
Gas	95	173	212	222	1.9	1.0	–2.9	–10.5
Nuclear	179	238	254	310	0.6	1.0	–	12.7
Hydro	51	55	59	63	0.6	0.5	0.3	2.9
Biomass and waste	41	27	40	68	3.8	3.7	–0.1	–5.6
Other renewables	19	15	31	69	6.9	6.1	–0.7	12.3
Other transformation, own use and losses	**190**	**197**	**214**	**236**	**0.7**	**0.7**	**–2.3**	**–6.4**
of which electricity	*56*	*56*	*64*	*69*	*1.2*	*0.8*	*–2.9*	*–9.2*
Total final consumption	**1 552**	**1 906**	**2 160**	**2 301**	**1.1**	**0.7**	**–2.6**	**–8.2**
Coal	59	39	34	29	–1.3	–1.1	–3.0	–6.5
Oil	822	1 025	1 144	1 183	1.0	0.6	–3.6	–10.6
Gas	360	402	431	437	0.6	0.3	–2.5	–7.3
Electricity	271	371	437	497	1.5	1.1	–2.9	–9.3
Heat	3	4	6	7	3.6	2.1	–3.0	–5.9
Biomass and waste	37	64	100	128	4.1	2.7	7.7	16.9
Other renewables	0	2	8	20	12.2	8.7	45.2	29.6
Industry	**448**	**511**	**556**	**576**	**0.8**	**0.5**	**–2.9**	**–7.0**
Coal	49	36	32	28	–1.1	–0.9	–3.2	–6.9
Oil	131	153	177	178	1.3	0.6	–2.2	–5.0
Gas	157	171	175	175	0.2	0.1	–3.5	–8.9
Electricity	94	107	117	129	0.8	0.7	–3.0	–8.2
Heat	1	3	5	6	3.6	2.0	–3.5	–7.2
Biomass and waste	16	40	51	60	2.3	1.6	–2.3	–4.9
Other renewables	0	0	0	0	4.0	3.1	–	–
Transport	**575**	**738**	**844**	**896**	**1.2**	**0.7**	**–3.1**	**–10.1**
Oil	556	713	796	830	1.0	0.6	–4.2	–12.8
Biofuels	0	7	29	46	13.8	7.5	40.4	89.2
Other fuels	19	19	19	20	0.4	0.3	1.2	1.3
Residential, services and agriculture	**477**	**588**	**679**	**743**	**1.3**	**0.9**	**–1.8**	**–7.0**
Coal	10	3	2	1	–3.9	–4.1	0.8	4.1
Oil	83	90	91	89	0.1	0.0	–0.9	–3.4
Gas	185	212	238	242	1.0	0.5	–2.0	–6.7
Electricity	176	263	319	368	1.8	1.3	–2.9	–9.7
Heat	2	1	1	1	4.1	2.9	–0.0	–0.0
Biomass and waste	21	17	20	22	1.2	1.0	–0.0	–0.0
Other renewables	0	2	8	20	12.5	8.8	46.8	30.1
Non-energy use	**52**	**69**	**81**	**86**	**1.4**	**0.8**	**–2.6**	**–6.0**

Alternative Policy Scenario: OECD North America

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**3 809**	**4 970**	**5 829**	**6 595**	**1.5**	**1.1**	**–2.8**	**–9.1**
Coal	1 790	2 217	2 578	2 588	1.4	0.6	–4.9	–22.2
Oil	217	231	213	153	–0.7	–1.6	–1.5	–8.0
Gas	406	851	1 125	1 286	2.6	1.6	–2.8	–8.9
Nuclear	687	913	973	1 191	0.6	1.0	–	12.7
Hydro	593	637	681	734	0.6	0.5	0.3	2.9
Renewables (excluding hydro)	115	121	259	644	7.1	6.6	–0.9	11.2
Biomass and waste	*90*	*83*	*125*	*207*	*3.8*	*3.6*	*0.1*	*–6.2*
Wind	*3*	*16*	*84*	*324*	*16.4*	*12.4*	*–3.9*	*23.0*
Geothermal	*21*	*22*	*39*	*63*	*5.2*	*4.1*	–	*1.8*
Solar	*1*	*1*	*11*	*46*	*29.7*	*17.8*	*8.5*	*48.7*
Tide and wave	*0*	*0*	*0*	*4*	*8.0*	*19.8*	–	*95.9*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**1 180**	**1 364**	**1 602**	**1.3**	**1.2**	**–2.6**	**–8.0**
Coal	365	412	418	1.1	0.5	–5.0	–23.5
Oil	96	97	65	0.1	–1.5	–1.9	–10.0
Gas	407	492	592	1.7	1.4	–3.0	–9.2
Nuclear	112	118	144	0.5	1.0	–	12.5
Hydro	178	183	195	0.3	0.4	0.2	2.5
of which pumped storage	*20*	*20*	*20*	*0.0*	*0.0*	–	–
Renewables (excluding hydro)	22	61	188	9.6	8.5	2.3	23.4
Biomass and waste	*12*	*18*	*31*	*4.3*	*3.9*	*1.0*	*–5.5*
Wind	*7*	*31*	*120*	*14.1*	*11.4*	*2.0*	*30.4*
Geothermal	*3*	*6*	*9*	*5.0*	*3.9*	–	*1.8*
Solar	*1*	*7*	*27*	*26.6*	*16.3*	*9.1*	*49.5*
Tide and wave	*0*	*0*	*1*	*0.0*	*16.0*	–	*97.0*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**5 554**	**6 694**	**7 469**	**7 447**	**1.0**	**0.4**	**–3.3**	**–12.7**
Coal	1 882	2 249	2 490	2 326	0.9	0.1	–4.2	–19.2
Oil	2 485	2 967	3 301	3 360	1.0	0.5	–2.9	–10.2
Gas	1 187	1 478	1 678	1 762	1.2	0.7	–2.5	–7.7
Power generation and heat plants	**1 991**	**2 648**	**2 989**	**2 816**	**1.1**	**0.2**	**–4.0**	**–18.0**
Coal	1 618	2 065	2 326	2 180	1.1	0.2	–4.4	–20.0
Oil	151	178	168	117	–0.5	–1.6	–1.5	–7.9
Gas	222	404	495	519	1.9	1.0	–2.9	–10.5
Total final consumption	**3 211**	**3 678**	**4 076**	**4 177**	**0.9**	**0.5**	**–2.9**	**–9.6**
Coal	262	168	149	131	–1.1	–1.0	–1.4	–3.2
Oil	2 122	2 587	2 932	3 033	1.1	0.6	–3.2	–10.8
of which transport	*1 584*	*2 030*	*2 330*	*2 426*	*1.3*	*0.7*	*–3.6*	*–12.3*
Gas	827	923	996	1 013	0.7	0.4	–2.2	–6.6

Alternative Policy Scenario: United States

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**1 924**	**2 324**	**2 588**	**2 701**	**1.0**	**0.6**	**–2.4**	**–7.8**
Coal	458	545	598	569	0.8	0.2	–4.1	–18.1
Oil	767	946	1 030	1 035	0.8	0.3	–3.3	–10.1
Gas	439	515	567	561	0.9	0.3	–2.0	–6.3
Nuclear	159	212	221	278	0.4	1.0	–	14.4
Hydro	23	23	25	26	0.7	0.3	0.1	–
Biomass and waste	62	71	117	164	4.7	3.3	5.8	5.6
Other renewables	14	11	30	68	9.1	7.1	6.7	13.4
Power generation and heat plants	**745**	**944**	**1 062**	**1 127**	**1.1**	**0.7**	**–2.5**	**–8.2**
Coal	391	495	553	530	1.0	0.3	–4.2	–18.8
Oil	27	33	32	21	–0.4	–1.8	–1.9	–9.0
Gas	90	147	171	163	1.4	0.4	–0.8	–3.8
Nuclear	159	212	221	278	0.4	1.0	–	14.4
Hydro	23	23	25	26	0.7	0.3	0.1	–
Biomass and waste	40	24	37	58	4.1	3.5	–0.6	–12.9
Other renewables	14	9	22	51	8.2	6.8	–2.4	9.0
Other transformation, own use and losses	**154**	**144**	**148**	**150**	**0.2**	**0.2**	**–2.1**	**–6.1**
of which electricity	*49*	*45*	*49*	*51*	*0.9*	*0.5*	*–2.7*	*–9.1*
Total final consumption	**1 304**	**1 599**	**1 800**	**1 894**	**1.1**	**0.7**	**–2.5**	**–8.0**
Coal	54	34	30	26	–1.2	–1.0	–2.9	–5.8
Oil	695	865	954	975	0.9	0.5	–3.5	–10.4
Gas	303	335	357	353	0.6	0.2	–2.6	–7.5
Electricity	226	313	366	412	1.4	1.1	–2.8	–9.2
Heat	2	3	5	6	4.1	2.3	–3.1	–6.3
Biomass and waste	23	47	80	106	5.0	3.2	9.1	19.7
Other renewables	0	2	8	18	12.0	8.3	45.4	28.3
Industry	**357**	**404**	**435**	**439**	**0.7**	**0.3**	**–2.8**	**–7.0**
Coal	45	31	28	25	–0.9	–0.8	–3.1	–6.2
Oil	104	123	142	142	1.3	0.5	–2.1	–5.0
Gas	124	135	135	130	0.0	–0.1	–3.5	–8.8
Electricity	75	81	84	88	0.4	0.3	–3.0	–8.6
Heat	0	2	4	4	4.2	2.1	–3.9	–8.2
Biomass and waste	9	31	41	49	2.7	1.8	–2.4	–5.2
Other renewables	0	0	0	0	3.5	3.0	–	–
Transport	**499**	**638**	**720**	**753**	**1.1**	**0.6**	**–2.9**	**–9.6**
Oil	484	617	678	697	0.9	0.5	–4.1	–12.4
Biofuels	0	7	28	43	13.5	7.3	38.8	88.1
Other fuels	16	14	14	13	–0.3	–0.3	–2.4	–6.3
Residential, services and agriculture	**403**	**497**	**574**	**627**	**1.3**	**0.9**	**–1.8**	**–7.0**
Coal	10	3	2	1	–3.9	–4.1	0.8	4.1
Oil	63	65	63	61	–0.3	–0.2	–0.9	–3.5
Gas	164	186	208	210	1.1	0.5	–2.0	–6.7
Electricity	152	231	281	323	1.8	1.3	–2.8	–9.4
Heat	2	1	1	1	4.1	2.9	–	–
Biomass and waste	14	9	11	13	1.7	1.4	–0.0	–0.0
Other renewables	0	2	8	17	12.4	8.5	47.0	28.9
Non-energy use	**44**	**60**	**71**	**75**	**1.5**	**0.8**	**–2.6**	**–6.0**

Alternative Policy Scenario: United States

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**3 203**	**4 148**	**4 816**	**5 380**	**1.4**	**1.0**	**–2.7**	**–9.0**
Coal	1 700	2 090	2 410	2 473	1.3	0.6	–4.7	–20.9
Oil	131	139	136	91	–0.2	–1.6	–1.8	–8.7
Gas	382	732	908	928	2.0	0.9	–0.7	–2.7
Nuclear	611	813	849	1 067	0.4	1.0	–	14.4
Hydro	273	271	291	297	0.7	0.3	0.1	–
Renewables (excluding hydro)	106	102	222	524	7.3	6.5	–3.1	4.5
Biomass and waste	*86*	*72*	*112*	*177*	*4.1*	*3.5*	*–0.6*	*–12.9*
Wind	*3*	*14*	*69*	*253*	*15.5*	*11.7*	*–9.6*	*15.5*
Geothermal	*16*	*15*	*30*	*49*	*6.1*	*4.5*	–	–
Solar	*1*	*1*	*11*	*43*	*30.8*	*17.9*	*8.6*	*46.5*
Tide and wave	*0*	*0*	*0*	*2*	–	–	–	*156.4*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**995**	**1 137**	**1 317**	**1.2**	**1.1**	**–2.5**	**–7.9**
Coal	334	378	393	1.1	0.6	–4.7	–22.0
Oil	74	74	48	0.0	–1.6	–2.2	–11.2
Gas	373	432	494	1.3	1.1	–1.9	–6.7
Nuclear	98	101	127	0.3	1.0	–	14.4
Hydro	97	99	100	0.2	0.1	0.1	–
of which pumped storage	*20*	*20*	*20*	*0.0*	*0.0*	–	–
Renewables (excluding hydro)	19	53	155	9.7	8.3	0.2	17.4
Biomass and waste	*10*	*16*	*27*	*4.6*	*3.9*	*0.4*	*–12.4*
Wind	*7*	*26*	*96*	*13.1*	*10.8*	*–1.9*	*23.8*
Geothermal	*2*	*4*	*7*	*5.7*	*4.3*	–	–
Solar	*0*	*7*	*25*	*27.2*	*16.4*	*9.2*	*46.9*
Tide and wave	*0*	*0*	*0*	*0.0*	*15.4*	–	*156.4*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**4 832**	**5 769**	**6 371**	**6 266**	**0.9**	**0.3**	**–3.1**	**–12.2**
Coal	1 774	2 110	2 323	2 217	0.9	0.2	–4.0	–18.0
Oil	2 047	2 448	2 719	2 739	1.0	0.4	–2.8	–10.0
Gas	1 011	1 212	1 329	1 310	0.8	0.3	–1.8	–5.9
Power generation and heat plants	**1 829**	**2 403**	**2 683**	**2 536**	**1.0**	**0.2**	**–3.6**	**–16.6**
Coal	1 532	1 949	2 177	2 086	1.0	0.3	–4.2	–18.8
Oil	88	110	105	69	–0.4	–1.8	–1.9	–9.0
Gas	210	344	400	381	1.4	0.4	–0.8	–3.8
Total final consumption	**2 731**	**3 101**	**3 419**	**3 452**	**0.9**	**0.4**	**–2.8**	**–9.4**
Coal	239	146	131	116	–1.0	–0.9	–1.0	–1.8
Oil	1 795	2 184	2 461	2 515	1.1	0.5	–3.0	–10.6
of which transport	*1 381*	*1 759*	*2 005*	*2 058*	*1.2*	*0.6*	*–3.3*	*–11.8*
Gas	697	771	827	821	0.6	0.2	–2.2	–6.7

Alternative Policy Scenario: OECD Pacific

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**640**	**880**	**1 005**	**1 054**	**1.2**	**0.7**	**–2.4**	**–5.9**
Coal	138	217	224	172	0.3	–0.9	–6.2	–25.4
Oil	340	399	414	400	0.4	0.0	–3.4	–7.6
Gas	69	124	154	155	2.0	0.9	–2.9	–17.2
Nuclear	66	108	157	227	3.5	2.9	1.4	15.8
Hydro	11	12	13	14	0.4	0.5	1.2	3.5
Biomass and waste	10	14	30	56	7.2	5.5	29.1	53.9
Other renewables	5	6	13	31	7.4	6.5	5.6	29.3
Power generation and heat plants	**238**	**365**	**442**	**468**	**1.7**	**1.0**	**–2.2**	**–6.7**
Coal	60	139	147	100	0.5	–1.3	–7.7	–34.1
Oil	54	30	22	9	–2.6	–4.6	–12.5	–34.7
Gas	40	67	80	73	1.7	0.4	–2.7	–25.8
Nuclear	66	108	157	227	3.5	2.9	1.4	15.8
Hydro	11	12	13	14	0.4	0.5	1.2	3.5
Biomass and waste	3	5	13	26	8.8	6.3	58.4	91.9
Other renewables	3	5	9	20	6.4	5.8	4.5	28.1
Other transformation, own use and losses	**62**	**82**	**84**	**82**	**0.2**	**0.0**	**–2.7**	**–7.0**
of which electricity	*11*	*16*	*17*	*17*	*0.9*	*0.3*	*–3.4*	*–9.5*
Total final consumption	**437**	**586**	**661**	**694**	**1.1**	**0.7**	**–2.7**	**–6.1**
Coal	49	39	39	37	0.1	–0.2	–2.9	–7.8
Oil	268	345	368	367	0.6	0.2	–3.0	–7.0
Gas	26	55	70	76	2.2	1.3	–3.2	–8.0
Electricity	86	132	157	166	1.6	0.9	–3.5	–9.5
Heat	0	5	6	7	2.0	1.4	–3.0	–5.3
Biomass and waste	6	9	17	30	6.2	4.9	12.7	31.9
Other renewables	2	1	4	11	10.9	8.6	8.6	32.3
Industry	**179**	**233**	**259**	**272**	**1.0**	**0.6**	**–2.1**	**–4.0**
Coal	39	38	38	36	0.1	–0.2	–3.0	–8.0
Oil	81	103	110	111	0.7	0.3	–1.6	–3.9
Gas	12	24	30	32	2.0	1.1	–3.0	–6.9
Electricity	43	58	66	71	1.2	0.8	–2.4	–5.7
Heat	0	3	4	4	2.0	1.4	–3.8	–5.4
Biomass and waste	4	7	10	17	3.7	3.7	1.2	14.3
Other renewables	0	0	0	1	1.2	5.6	21.3	336.9
Transport	**117**	**164**	**181**	**187**	**0.9**	**0.5**	**–3.1**	**–7.1**
Oil	115	161	176	180	0.8	0.4	–3.8	–8.5
Biofuels	0	0	1	3	70.4	28.9	213.8	199.8
Other fuels	2	3	4	5	3.0	2.1	6.0	10.6
Residential, services and agriculture	**127**	**174**	**203**	**217**	**1.4**	**0.9**	**–3.3**	**–7.9**
Coal	9	1	1	1	–1.1	–0.8	–0.0	–0.0
Oil	58	66	65	60	–0.1	–0.3	–3.2	–8.1
Gas	14	30	38	42	2.3	1.3	–3.8	–9.6
Electricity	42	72	88	91	1.8	0.9	–4.6	–12.8
Heat	0	2	3	3	2.0	1.3	–2.0	–5.2
Biomass and waste	2	2	5	10	9.6	6.5	17.8	46.8
Other renewables	1	1	4	9	12.7	9.2	7.5	21.3
Non-energy use	**15**	**16**	**17**	**17**	**0.4**	**0.3**	**–2.1**	**–6.1**

Alternative Policy Scenario: OECD Pacific

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**1 130**	**1 719**	**2 034**	**2 136**	**1.5**	**0.8**	**–3.3**	**–9.2**
Coal	253	630	682	469	0.7	–1.1	–8.7	–36.4
Oil	274	164	122	46	–2.6	–4.8	–12.6	–36.2
Gas	198	340	403	397	1.6	0.6	–2.7	–22.2
Nuclear	255	413	603	870	3.5	2.9	1.4	15.8
Hydro	133	142	148	161	0.4	0.5	1.2	3.5
Renewables (excluding hydro)	17	30	76	194	9.0	7.5	21.2	52.8
Biomass and waste	*13*	*21*	*40*	*69*	*6.0*	*4.7*	*28.1*	*44.1*
Wind	*0*	*2*	*18*	*73*	*20.1*	*14.0*	*26.9*	*75.0*
Geothermal	*4*	*6*	*10*	*15*	*4.5*	*3.7*	–	*4.2*
Solar	*0*	*0*	*8*	*34*	*46.3*	*24.1*	*9.6*	*58.7*
Tide and wave	*0*	*0*	*0*	*2*	–	–	–	*151.8*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**386**	**428**	**483**	**1.0**	**0.9**	**–3.2**	**–6.8**
Coal	94	108	86	1.2	–0.3	–4.0	–29.6
Oil	69	53	20	–2.5	–4.7	–13.5	–50.7
Gas	89	106	140	1.6	1.8	–4.0	–8.2
Nuclear	61	75	108	1.9	2.2	1.3	15.2
Hydro	65	68	72	0.4	0.4	0.1	2.4
of which pumped storage	*28*	*28*	*28*	*0.0*	*0.0*	–	–
Renewables (excluding hydro)	7	18	55	9.6	8.5	11.8	49.8
Biomass and waste	*3*	*7*	*11*	*7.4*	*5.1*	*29.0*	*39.7*
Wind	*2*	*5*	*21*	*11.7*	*10.6*	*6.4*	*59.3*
Geothermal	*1*	*1*	*2*	*4.0*	*3.4*	*–0.0*	*4.1*
Solar	*1*	*5*	*21*	*14.1*	*11.6*	*3.0*	*52.5*
Tide and wave	*0*	*0*	*0*	–	–	–	*122.1*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**1 564**	**2 055**	**2 187**	**1 918**	**0.6**	**–0.3**	**–4.7**	**–17.2**
Coal	519	803	838	620	0.4	–1.0	–6.6	–27.8
Oil	885	960	990	941	0.3	–0.1	–3.7	–8.1
Gas	160	292	359	357	1.9	0.8	–2.9	–17.5
Power generation and heat plants	**538**	**847**	**892**	**625**	**0.5**	**–1.2**	**–7.1**	**–32.3**
Coal	276	596	630	424	0.5	–1.3	–7.8	–34.4
Oil	167	94	71	27	–2.5	–4.6	–12.4	–35.2
Gas	94	157	190	173	1.7	0.4	–2.7	–25.8
Total final consumption	**957**	**1 118**	**1 204**	**1 203**	**0.7**	**0.3**	**–3.0**	**–7.3**
Coal	219	174	176	166	0.1	–0.2	–2.7	–7.3
Oil	679	817	868	863	0.5	0.2	–3.1	–7.2
of which transport	*320*	*440*	*483*	*494*	*0.9*	*0.4*	*–3.8*	*–8.5*
Gas	60	126	160	174	2.2	1.2	–3.2	–7.9

Alternative Policy Scenario: Japan

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**446**	**533**	**571**	**563**	**0.6**	**0.2**	**–2.5**	**–7.0**
Coal	77	116	108	74	–0.6	–1.7	–6.6	–24.5
Oil	253	253	243	218	–0.4	–0.6	–3.7	–7.7
Gas	48	72	86	78	1.6	0.3	–2.5	–21.8
Nuclear	53	74	101	143	2.9	2.6	–	7.9
Hydro	8	8	8	8	–0.2	0.0	–	–
Biomass and waste	5	6	17	27	9.4	5.7	29.9	37.9
Other renewables	3	4	7	15	6.2	5.4	6.3	31.6
Power generation and heat plants	**171**	**219**	**249**	**250**	**1.2**	**0.5**	**–2.7**	**–9.1**
Coal	25	60	55	26	–0.7	–3.1	–9.6	–42.2
Oil	48	24	16	5	–3.7	–5.9	–16.6	–45.5
Gas	33	47	55	45	1.5	–0.2	–2.2	–30.1
Nuclear	53	74	101	143	2.9	2.6	–	7.9
Hydro	8	8	8	8	–0.2	0.0	–	–
Biomass and waste	2	4	8	12	7.3	4.5	54.9	60.9
Other renewables	1	3	5	10	5.1	4.8	4.6	27.2
Other transformation, own use and losses	**41**	**52**	**50**	**47**	**–0.3**	**–0.4**	**–2.7**	**–7.6**
of which electricity	*7*	*9*	*9*	*8*	*0.2*	*–0.3*	*–3.9*	*–11.0*
Total final consumption	**306**	**354**	**373**	**365**	**0.5**	**0.1**	**–2.8**	**–6.5**
Coal	32	27	27	25	–0.1	–0.3	–2.9	–7.9
Oil	189	214	213	199	0.0	–0.3	–2.8	–6.6
Gas	15	27	31	32	1.5	0.7	–3.2	–7.3
Electricity	65	83	91	90	0.8	0.3	–3.9	–10.7
Heat	0	1	1	1	1.9	1.3	–	–
Biomass and waste	3	2	8	14	12.1	7.2	11.7	22.9
Other renewables	1	1	2	5	9.5	7.1	10.6	42.4
Industry	**130**	**136**	**142**	**138**	**0.4**	**0.1**	**–2.0**	**–4.5**
Coal	32	27	27	25	–0.1	–0.3	–2.9	–7.9
Oil	59	61	62	57	0.1	–0.3	–1.0	–2.8
Gas	5	11	13	13	1.6	0.6	–4.0	–8.8
Electricity	32	34	35	34	0.2	0.0	–2.8	–7.5
Heat	0	0	0	0	–	–	–	–
Biomass and waste	3	2	5	9	7.7	5.5	0.7	16.3
Other renewables	0	0	0	0	–	–	–	–
Transport	**76**	**94**	**96**	**92**	**0.1**	**–0.1**	**–2.8**	**–6.0**
Oil	74	92	93	88	0.0	–0.2	–3.7	–7.8
Biofuels	0	0	1	2	–	–	231.1	216.2
Other fuels	1	2	2	2	2.5	1.7	8.0	14.1
Residential, services and agriculture	**89**	**115**	**126**	**127**	**0.9**	**0.4**	**–3.5**	**–8.8**
Coal	0	0	0	0	–	–	–	–
Oil	45	50	50	46	–0.1	–0.3	–3.3	–8.3
Gas	11	16	18	18	1.2	0.6	–3.1	–7.0
Electricity	31	48	54	54	1.2	0.5	–4.8	–13.2
Heat	0	1	1	1	1.9	1.3	–	–
Biomass and waste	0	0	2	3	48.0	19.7	10.0	2.9
Other renewables	1	1	2	5	9.4	7.1	10.6	42.4
Non-energy use	**11**	**10**	**9**	**8**	**–0.9**	**–0.8**	**–3.0**	**–9.4**

Alternative Policy Scenario: Japan

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**838**	**1 071**	**1 161**	**1 142**	**0.7**	**0.2**	**–3.9**	**–10.7**
Coal	116	294	271	129	–0.7	–3.1	–10.5	–43.1
Oil	251	133	86	27	–3.9	–6.0	–16.6	–45.7
Gas	166	244	275	246	1.1	0.0	–2.0	–25.6
Nuclear	202	282	389	550	2.9	2.6	–	7.9
Hydro	89	94	92	94	–0.2	0.0	–	–
Renewables (excluding hydro)	13	23	48	97	6.8	5.6	19.2	37.4
Biomass and waste	*12*	*19*	*31*	*44*	*4.7*	*3.4*	*19.4*	*17.1*
Wind	*0*	*1*	*7*	*27*	*16.5*	*12.4*	*42.5*	*75.0*
Geothermal	*2*	*3*	*5*	*7*	*3.4*	*3.1*	–	*9.2*
Solar	*0*	*0*	*5*	*17*	*103.7*	*41.7*	*13.0*	*69.6*
Tide and wave	*0*	*0*	*0*	*1*	–	–	–	*129.5*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**261**	**263**	**276**	**0.1**	**0.2**	**–3.2**	**–9.7**
Coal	44	44	26	0.0	–2.0	–	–39.1
Oil	58	41	12	–3.2	–5.9	–16.5	–62.9
Gas	61	68	87	0.9	1.4	–3.7	–8.5
Nuclear	45	50	71	0.9	1.8	–	7.9
Hydro	47	47	48	0.1	0.1	–	–
of which pumped storage	*25*	*25*	*25*	*0.0*	*0.0*	–	–
Renewables (excluding hydro)	5	12	30	8.4	7.2	20.0	53.7
Biomass and waste	*2*	*5*	*7*	*7.1*	*4.3*	*24.4*	*21.2*
Wind	*1*	*2*	*9*	*9.2*	*8.9*	*31.5*	*71.5*
Geothermal	*1*	*1*	*1*	*3.0*	*2.9*	–	*9.1*
Solar	*1*	*4*	*13*	*11.8*	*10.0*	*12.8*	*71.1*
Tide and wave	*0*	*0*	*0*	–	–	–	*130.4*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**1 057**	**1 211**	**1 188**	**955**	**–0.2**	**–0.9**	**–5.0**	**–17.2**
Coal	292	414	390	248	–0.5	–2.0	–7.3	–28.2
Oil	650	623	594	527	–0.4	–0.6	–4.2	–8.6
Gas	115	174	204	181	1.5	0.1	–2.6	–22.4
Power generation and heat plants	**354**	**454**	**428**	**240**	**–0.5**	**–2.4**	**–8.3**	**–37.6**
Coal	125	269	248	117	–0.7	–3.1	–9.6	–42.2
Oil	151	74	49	15	–3.7	–5.9	–16.6	–45.5
Gas	78	111	131	107	1.5	–0.1	–2.2	–30.1
Total final consumption	**660**	**715**	**721**	**680**	**0.1**	**–0.2**	**–3.1**	**–7.3**
Coal	151	129	128	119	–0.1	–0.3	–2.9	–8.0
Oil	474	523	521	489	0.0	–0.3	–3.0	–7.0
of which transport	*206*	*252*	*252*	*239*	*0.0*	*–0.2*	*–3.7*	*–7.8*
Gas	36	62	72	73	1.4	0.6	–3.5	–7.8

Alternative Policy Scenario: OECD Europe

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**1 622**	**1 866**	**2 021**	**2 020**	**0.7**	**0.3**	**–1.2**	**–6.7**
Coal	438	330	307	215	–0.6	–1.6	–4.5	–35.0
Oil	627	700	720	674	0.3	–0.1	–3.6	–9.3
Gas	258	439	498	558	1.2	0.9	–6.2	–12.4
Nuclear	204	259	265	217	0.2	–0.7	12.0	45.0
Hydro	38	42	52	58	1.9	1.3	2.2	3.8
Biomass and waste	52	83	138	199	4.7	3.4	12.7	18.7
Other renewables	4	14	42	98	10.4	7.8	9.6	22.7
Power generation and heat plants	**618**	**746**	**819**	**789**	**0.9**	**0.2**	**–0.8**	**–9.2**
Coal	277	243	240	165	–0.1	–1.5	–4.8	–40.1
Oil	48	31	28	13	–0.9	–3.3	–3.6	–1.0
Gas	40	131	158	199	1.7	1.6	–13.1	–19.4
Nuclear	204	259	265	217	0.2	–0.7	12.0	45.0
Hydro	38	42	52	58	1.9	1.3	2.2	3.8
Biomass and waste	8	29	43	59	3.7	2.8	0.5	–3.8
Other renewables	3	11	33	78	10.2	7.7	3.0	17.1
Other transformation, own use and losses	**129**	**138**	**138**	**132**	**0.0**	**–0.2**	**–3.0**	**–8.5**
of which electricity	*38*	*46*	*49*	*49*	*0.6*	*0.3*	*–5.4*	*–14.8*
Total final consumption	**1 146**	**1 333**	**1 462**	**1 533**	**0.8**	**0.5**	**–2.3**	**–6.9**
Coal	121	56	43	34	–2.3	–1.9	–3.6	–9.2
Oil	548	630	653	622	0.3	–0.1	–3.8	–10.0
Gas	204	290	320	339	0.9	0.6	–2.6	–8.1
Electricity	190	250	285	310	1.2	0.8	–5.3	–14.2
Heat	37	50	58	68	1.3	1.2	–0.4	–0.8
Biomass and waste	44	54	95	140	5.3	3.7	19.4	31.9
Other renewables	1	3	9	21	11.1	8.1	45.4	49.9
Industry	**388**	**408**	**448**	**454**	**0.9**	**0.4**	**–2.4**	**–7.3**
Coal	70	41	34	28	–1.7	–1.5	–4.1	–9.6
Oil	112	120	135	124	1.1	0.1	–2.1	–5.0
Gas	92	114	127	134	0.9	0.6	–2.8	–6.2
Electricity	86	104	114	118	0.9	0.5	–5.2	–12.8
Heat	13	11	11	12	0.5	0.5	–1.9	–3.5
Biomass and waste	14	17	26	35	3.8	2.7	14.6	1.6
Other renewables	0	0	0	3	9.1	11.2	–	–
Transport	**295**	**381**	**413**	**431**	**0.7**	**0.5**	**–3.0**	**–6.8**
Oil	289	371	380	378	0.2	0.1	–4.4	–10.4
Biofuels	0	2	21	36	24.1	11.7	19.2	33.8
Other fuels	6	8	11	17	3.0	2.9	11.8	26.4
Residential, services and agriculture	**432**	**511**	**566**	**612**	**0.9**	**0.7**	**–1.4**	**–6.4**
Coal	50	13	8	5	–4.5	–4.0	–1.7	–8.1
Oil	117	107	104	85	–0.3	–0.9	–3.4	–14.1
Gas	112	174	191	199	0.8	0.5	–2.8	–10.5
Electricity	99	140	162	181	1.3	1.0	–5.9	–16.3
Heat	24	39	47	56	1.5	1.3	–0.1	–0.2
Biomass and waste	29	35	47	70	2.8	2.7	22.3	53.5
Other renewables	1	3	8	18	11.3	7.7	49.4	63.6
Non-energy use	**31**	**33**	**35**	**36**	**0.4**	**0.3**	**–4.3**	**–10.9**

Alternative Policy Scenario: OECD Europe

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**2 632**	**3 429**	**3 866**	**4 163**	**1.1**	**0.7**	**–5.3**	**–14.3**
Coal	1 016	994	1 005	746	0.1	–1.1	–7.8	–43.8
Oil	203	132	121	58	–0.8	–3.1	–3.5	–0.7
Gas	167	663	685	931	0.3	1.3	–27.4	–34.6
Nuclear	782	992	1 017	832	0.2	–0.7	12.0	45.0
Hydro	443	488	600	676	1.9	1.3	2.2	3.8
Renewables (excluding hydro)	20	159	438	921	9.6	7.0	2.1	11.3
Biomass and waste	*15*	*92*	*151*	*207*	*4.6*	*3.2*	*0.4*	*–4.0*
Wind	*1*	*59*	*262*	*596*	*14.5*	*9.3*	*2.2*	*11.4*
Geothermal	*4*	*7*	*11*	*21*	*3.9*	*4.3*	*2.7*	*19.0*
Solar	*0*	*1*	*12*	*78*	*27.4*	*19.0*	*22.8*	*55.8*
Tide and wave	*1*	*1*	*2*	*18*	*11.5*	*14.7*	*25.6*	*108.7*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**794**	**926**	**1 115**	**1.4**	**1.3**	**–5.7**	**–13.4**
Coal	197	162	126	–1.7	–1.7	–19.7	–51.3
Oil	69	66	27	–0.4	–3.6	–	–
Gas	158	210	294	2.7	2.4	–15.5	–27.3
Nuclear	132	131	110	–0.1	–0.7	12.8	48.3
Hydro	185	211	232	1.2	0.9	1.7	3.1
of which pumped storage	*31*	*31*	*31*	*0.0*	*0.0*	–	–
Renewables (excluding hydro)	53	146	325	9.6	7.2	2.9	9.8
Biomass and waste	*16*	*27*	*36*	*4.5*	*3.1*	*1.8*	*–3.3*
Wind	*35*	*109*	*227*	*11.0*	*7.5*	*1.6*	*3.6*
Geothermal	*1*	*1*	*3*	*4.0*	*4.3*	*2.6*	*18.5*
Solar	*1*	*9*	*54*	*20.5*	*15.8*	*24.4*	*55.9*
Tide and wave	*0*	*0*	*5*	*6.4*	*12.3*	*24.9*	*110.8*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**3 934**	**4 078**	**4 172**	**3 818**	**0.2**	**–0.3**	**–4.6**	**–17.9**
Coal	1 700	1 282	1 206	846	–0.6	–1.6	–4.6	–35.9
Oil	1 660	1 787	1 823	1 689	0.2	–0.2	–3.6	–9.4
Gas	574	1 009	1 143	1 283	1.1	0.9	–6.2	–12.5
Power generation and heat plants	**1 376**	**1 409**	**1 452**	**1 189**	**0.3**	**–0.7**	**–7.0**	**–32.4**
Coal	1 130	1 003	993	683	–0.1	–1.5	–4.8	–40.1
Oil	152	100	91	42	–0.9	–3.3	–3.6	–1.0
Gas	93	306	369	464	1.7	1.6	–13.1	–19.4
Total final consumption	**2 384**	**2 478**	**2 533**	**2 448**	**0.2**	**0.0**	**–3.5**	**–9.5**
Coal	532	247	189	146	–2.4	–2.0	–3.7	–9.5
Oil	1 395	1 563	1 609	1 524	0.3	–0.1	–3.8	–10.2
of which transport	*784*	*976*	*1 001*	*995*	*0.2*	*0.1*	*–4.4*	*–10.4*
Gas	458	668	735	778	0.9	0.6	–2.6	–8.2

Alternative Policy Scenario: European Union

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**1 546**	**1 756**	**1 877**	**1 847**	**0.6**	**0.2**	**–0.9**	**–6.4**
Coal	427	311	281	182	–0.9	–2.0	–3.1	–35.9
Oil	591	656	671	620	0.2	–0.2	–3.5	–9.5
Gas	255	417	469	523	1.1	0.9	–6.2	–12.4
Nuclear	203	257	259	214	0.1	–0.7	12.3	45.7
Hydro	23	26	32	35	1.9	1.2	2.8	5.2
Biomass and waste	44	77	131	189	4.9	3.5	13.6	20.0
Other renewables	3	11	34	85	10.9	8.2	6.7	21.5
Power generation and heat plants	**601**	**712**	**767**	**720**	**0.7**	**0.0**	**–0.1**	**–8.6**
Coal	276	238	229	147	–0.3	–1.8	–3.0	–39.9
Oil	48	31	29	12	–0.8	–3.5	–4.1	–6.1
Gas	39	122	147	186	1.7	1.6	–13.6	–19.9
Nuclear	203	257	259	214	0.1	–0.7	12.3	45.7
Hydro	23	26	32	35	1.9	1.2	2.8	5.2
Biomass and waste	8	28	41	54	3.5	2.6	–0.0	–5.3
Other renewables	3	10	31	73	10.6	7.9	3.1	17.4
Other transformation, own use and losses	**122**	**127**	**125**	**117**	**–0.2**	**–0.3**	**–2.9**	**–8.6**
of which electricity	*37*	*43*	*44*	*43*	*0.3*	*0.1*	*–5.2*	*–15.1*
Total final consumption	**1 086**	**1 244**	**1 351**	**1 403**	**0.8**	**0.5**	**–2.1**	**–6.7**
Coal	114	44	30	20	–3.6	–3.0	–2.6	–8.7
Oil	513	589	607	572	0.3	–0.1	–3.7	–10.0
Gas	204	282	307	322	0.8	0.5	–2.4	–7.9
Electricity	177	228	255	273	1.0	0.7	–5.1	–14.4
Heat	41	51	59	69	1.3	1.2	–0.6	–1.3
Biomass and waste	36	49	90	135	5.7	4.0	21.1	34.3
Other renewables	0	1	4	12	13.1	10.1	50.0	55.9
Industry	**371**	**378**	**410**	**410**	**0.7**	**0.3**	**–2.0**	**–7.1**
Coal	65	32	23	16	–3.1	–2.6	–3.3	–10.4
Oil	105	112	125	113	1.0	0.0	–1.4	–4.1
Gas	92	112	123	130	0.9	0.6	–2.6	–5.9
Electricity	80	94	101	102	0.7	0.3	–5.2	–13.9
Heat	15	11	11	12	0.5	0.5	–1.8	–3.5
Biomass and waste	14	17	26	34	3.9	2.7	14.8	1.6
Other renewables	0	0	0	2	37.4	28.4	–	–
Transport	**279**	**361**	**389**	**404**	**0.7**	**0.4**	**–3.1**	**–6.8**
Oil	273	351	357	352	0.2	0.0	–4.5	–10.7
Biofuels	0	2	21	36	24.1	11.7	19.2	33.8
Other fuels	6	8	11	16	3.1	3.0	12.6	27.8
Residential, services and agriculture	**407**	**475**	**520**	**557**	**0.8**	**0.6**	**–1.3**	**–6.1**
Coal	48	11	6	3	–5.3	–4.9	–0.1	–0.4
Oil	107	97	94	76	–0.3	–0.9	–3.2	–14.5
Gas	112	168	181	185	0.7	0.4	–2.7	–10.4
Electricity	92	128	146	160	1.2	0.9	–5.7	–16.1
Heat	26	40	48	57	1.5	1.3	–0.3	–0.8
Biomass and waste	22	30	42	65	3.2	3.1	26.4	62.1
Other renewables	0	1	4	10	12.9	9.4	52.0	75.3
Non-energy use	**29**	**30**	**32**	**32**	**0.5**	**0.3**	**–3.7**	**–10.6**

Alternative Policy Scenario: European Union

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**2 444**	**3 154**	**3 484**	**3 681**	**0.9**	**0.6**	**–5.2**	**–14.5**
Coal	1 012	975	955	657	–0.2	–1.5	–5.9	–43.6
Oil	205	131	121	53	–0.7	–3.4	–4.0	–5.3
Gas	159	605	617	856	0.2	1.3	–29.0	–35.7
Nuclear	778	988	995	822	0.1	–0.7	12.3	45.7
Hydro	271	300	369	405	1.9	1.2	2.8	5.2
Renewables (excluding hydro)	19	156	427	888	9.6	6.9	1.9	10.7
Biomass and waste	*14*	*90*	*144*	*191*	*4.4*	*2.9*	*–0.0*	*–5.2*
Wind	*1*	*59*	*261*	*586*	*14.5*	*9.2*	*2.1*	*10.8*
Geothermal	*3*	*6*	*8*	*17*	*3.5*	*4.3*	*3.6*	*23.9*
Solar	*0*	*1*	*12*	*77*	*22.0*	*16.8*	*19.8*	*54.2*
Tide and wave	*1*	*1*	*2*	*18*	*11.5*	*14.6*	*25.6*	*107.1*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**723**	**833**	**1 000**	**1.3**	**1.3**	**–5.9**	**–13.7**
Coal	191	151	109	–2.1	–2.1	–18.8	–51.7
Oil	71	68	29	–0.5	–3.4	–	–
Gas	146	198	281	2.8	2.6	–15.7	–27.4
Nuclear	131	127	107	–0.3	–0.8	11.3	45.5
Hydro	131	146	157	1.0	0.7	2.0	3.7
of which pumped storage	*28*	*28*	*28*	*0.0*	*0.0*	–	–
Renewables (excluding hydro)	52	144	317	9.6	7.2	2.6	8.9
Biomass and waste	*16*	*25*	*33*	*4.3*	*2.9*	*0.6*	*–5.3*
Wind	*34*	*108*	*223*	*11.0*	*7.5*	*1.6*	*2.8*
Geothermal	*1*	*1*	*2*	*3.6*	*4.4*	*3.6*	*23.7*
Solar	*1*	*9*	*53*	*20.6*	*15.9*	*21.8*	*54.4*
Tide and wave	*0*	*0*	*5*	*6.4*	*12.2*	*24.9*	*109.2*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**3 808**	**3 847**	**3 879**	**3 465**	**0.1**	**–0.4**	**–4.2**	**–17.8**
Coal	1 666	1 211	1 102	711	–0.9	–2.0	–3.0	–36.8
Oil	1 571	1 675	1 697	1 551	0.1	–0.3	–3.5	–9.6
Gas	571	962	1 080	1 204	1.1	0.9	–6.2	–12.6
Power generation and heat plants	**1 382**	**1 366**	**1 383**	**1 080**	**0.1**	**–0.9**	**–5.9**	**–32.2**
Coal	1 128	980	945	605	–0.3	–1.8	–3.0	–39.9
Oil	158	100	92	39	–0.8	–3.5	–4.1	–6.5
Gas	94	285	346	436	1.8	1.6	–13.5	–20.0
Total final consumption	**2 264**	**2 306**	**2 330**	**2 227**	**0.1**	**–0.1**	**–3.3**	**–9.5**
Coal	500	201	134	90	–3.6	–3.0	–2.8	–9.2
Oil	1 304	1 457	1 491	1 398	0.2	–0.2	–3.7	–10.3
of which transport	*741*	*924*	*940*	*927*	*0.2*	*0.0*	*–4.5*	*–10.7*
Gas	458	649	705	738	0.8	0.5	–2.4	–7.9

Alternative Policy Scenario: Transition Economies

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**1 488**	**1 077**	**1 210**	**1 285**	**1.1**	**0.7**	**–3.9**	**–9.5**
Coal	330	203	218	183	0.6	–0.4	–4.7	–9.7
Oil	454	223	248	263	1.0	0.6	–5.8	–11.8
Gas	599	536	608	639	1.2	0.7	–3.9	–14.3
Nuclear	60	73	83	124	1.2	2.1	1.8	19.3
Hydro	23	26	29	36	1.1	1.2	0.1	3.0
Biomass and waste	0	17	19	26	1.2	1.7	2.6	14.3
Other renewables	21	1	6	15	21.9	12.8	4.8	15.4
Power generation and heat plants	**574**	**535**	**580**	**597**	**0.7**	**0.4**	**–3.8**	**–8.6**
Coal	171	133	142	106	0.6	–0.9	–5.0	–8.7
Oil	80	26	23	15	–1.3	–2.0	–0.7	–5.5
Gas	240	272	295	295	0.7	0.3	–5.6	–19.4
Nuclear	60	73	83	124	1.2	2.1	1.8	19.3
Hydro	23	26	29	36	1.1	1.2	0.1	3.0
Biomass and waste	0	4	4	8	–0.2	2.5	11.9	67.0
Other renewables	0	0	5	13	25.0	13.9	0.8	8.9
Other transformation, own use and losses	**200**	**157**	**165**	**177**	**0.5**	**0.5**	**–6.3**	**–12.4**
of which electricity	*43*	*39*	*41*	*44*	*0.5*	*0.5*	*–6.1*	*–12.8*
Total final consumption	**1 014**	**704**	**795**	**851**	**1.1**	**0.7**	**–3.7**	**–10.2**
Coal	104	44	49	49	1.1	0.4	–4.1	–12.3
Oil	340	168	190	204	1.1	0.8	–6.7	–12.8
Gas	306	227	272	297	1.6	1.0	–2.3	–9.7
Electricity	121	95	112	130	1.6	1.2	–3.5	–10.0
Heat	123	159	157	152	–0.1	–0.2	–2.8	–8.5
Biomass and waste	0	12	14	17	1.6	1.4	0.2	0.0
Other renewables	21	0	0	2	8.0	8.7	91.8	114.6
Industry	**446**	**245**	**279**	**301**	**1.2**	**0.8**	**–3.6**	**–10.5**
Coal	44	31	36	37	1.4	0.7	–4.5	–12.2
Oil	79	28	33	36	1.5	0.9	–4.4	–11.5
Gas	199	81	100	114	1.9	1.3	–3.6	–11.7
Electricity	76	45	54	66	1.7	1.5	–3.9	–8.3
Heat	47	58	53	46	–0.8	–0.9	–2.3	–8.7
Biomass and waste	0	2	2	3	1.6	1.5	–	–
Other renewables	0	0	0	0	37.1	25.4	–	–
Transport	**154**	**140**	**166**	**184**	**1.5**	**1.0**	**–5.8**	**–9.6**
Oil	135	90	105	115	1.4	0.9	–8.9	–14.0
Biofuels	0	0	0	0	18.4	10.3	64.8	58.7
Other fuels	18	50	60	69	1.8	1.3	–0.0	–1.4
Residential, services and agriculture	**340**	**302**	**332**	**346**	**0.9**	**0.5**	**–2.6**	**–10.1**
Coal	54	11	11	10	0.2	–0.3	–3.2	–14.0
Oil	78	35	36	35	0.3	0.1	–2.5	–10.2
Gas	95	105	121	125	1.3	0.7	–2.3	–11.2
Electricity	36	41	48	53	1.5	1.0	–3.7	–13.8
Heat	76	101	104	107	0.3	0.2	–3.0	–8.5
Biomass and waste	0	10	12	14	1.4	1.3	–0.6	–1.3
Other renewables	1	0	0	1	7.7	8.2	99.3	153.0
Non-energy use	**75**	**17**	**18**	**20**	**0.5**	**0.7**	**–5.7**	**–11.1**

Alternative Policy Scenario: Transition Economies

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**1 840**	**1 536**	**1 821**	**2 093**	**1.6**	**1.2**	**–3.2**	**–8.3**
Coal	501	322	373	269	1.3	–0.7	–7.1	–19.1
Oil	252	54	43	24	–2.1	–3.1	–0.8	–13.7
Gas	586	575	723	821	2.1	1.4	–5.6	–22.2
Nuclear	231	279	317	477	1.2	2.1	1.8	19.3
Hydro	269	303	342	415	1.1	1.2	0.1	3.0
Renewables (excluding hydro)	0	3	24	87	20.7	13.8	28.7	39.8
Biomass and waste	*0*	*2*	*8*	*35*	*12.8*	*11.6*	*175.3*	*55.6*
Wind	*0*	*0*	*11*	*40*	*54.5*	*26.2*	*4.3*	*42.5*
Geothermal	*0*	*0*	*5*	*11*	*25.3*	*13.5*	–	–
Solar	*0*	*1*	*0*	*1*	*–13.3*	*2.3*	–	*35.6*
Tide and wave	*0*	*0*	*0*	*0*	–	–	–	*500.0*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**405**	**443**	**505**	**0.8**	**0.9**	**–2.9**	**–8.9**
Coal	109	98	71	–1.0	–1.6	–1.4	–17.8
Oil	30	27	15	–0.6	–2.6	–0.2	–2.2
Gas	137	170	214	2.0	1.7	–7.2	–20.0
Nuclear	40	43	64	0.5	1.8	1.6	19.0
Hydro	88	100	119	1.1	1.1	0.1	2.7
of which pumped storage	*0*	*0*	*0*	–	–	–	–
Renewables (excluding hydro)	1	6	22	22.1	14.4	17.2	41.6
Biomass and waste	*0*	*1*	*6*	*10.6*	*10.3*	*117.1*	*53.1*
Wind	*0*	*4*	*14*	*35.2*	*19.3*	*3.4*	*44.8*
Geothermal	*0*	*1*	*2*	*24.2*	*13.1*	–	*–2.6*
Solar	*0*	*0*	*1*	*49.5*	*28.8*	–	*35.6*
Tide and wave	*0*	*0*	*0*	–	–	–	*531.6*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**3 731**	**2 560**	**2 842**	**2 786**	**1.0**	**0.3**	**–4.5**	**–12.7**
Coal	1 109	783	848	705	0.7	–0.4	–4.7	–9.9
Oil	1 230	573	626	649	0.8	0.5	–5.5	–11.7
Gas	1 392	1 204	1 368	1 431	1.2	0.7	–4.0	–14.5
Power generation and heat plants	**1 515**	**1 287**	**1 368**	**1 197**	**0.6**	**–0.3**	**–5.0**	**–15.2**
Coal	690	557	592	446	0.6	–0.8	–4.9	–8.6
Oil	263	90	75	50	–1.6	–2.2	–0.7	–5.7
Gas	562	641	701	701	0.8	0.3	–5.6	–19.5
Total final consumption	**2 015**	**1 169**	**1 354**	**1 446**	**1.3**	**0.8**	**–4.1**	**–11.0**
Coal	416	224	253	256	1.1	0.5	–4.2	–12.1
Oil	908	427	484	516	1.1	0.7	–6.4	–12.6
of which transport	*330*	*232*	*270*	*295*	*1.4*	*0.9*	*–8.7*	*–13.9*
Gas	691	518	616	674	1.6	1.0	–2.2	–9.3

Alternative Policy Scenario: Russia

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**n.a.**	**640**	**715**	**780**	**1.0**	**0.8**	**–4.8**	**–8.7**
Coal	n.a.	104	111	102	0.6	–0.1	–2.1	–3.8
Oil	n.a.	130	140	149	0.7	0.5	–7.7	–12.2
Gas	n.a.	345	391	417	1.1	0.7	–5.4	–12.7
Nuclear	n.a.	38	46	77	1.8	2.8	–	13.5
Hydro	n.a.	15	16	18	0.6	0.7	–	5.1
Biomass and waste	n.a.	7	7	6	–0.5	–0.3	0.5	0.1
Other renewables	n.a.	0	4	9	24.4	13.5	3.0	11.3
Power generation and heat plants	**n.a.**	**350**	**378**	**402**	**0.7**	**0.5**	**–4.3**	**–7.9**
Coal	n.a.	76	81	70	0.6	–0.3	–0.7	–0.7
Oil	n.a.	17	16	12	–0.6	–1.4	–1.9	–0.6
Gas	n.a.	199	212	213	0.6	0.3	–7.1	–17.2
Nuclear	n.a.	38	46	77	1.8	2.8	–	13.5
Hydro	n.a.	15	16	18	0.6	0.7	–	5.1
Biomass and waste	n.a.	4	3	3	–1.7	–1.7	–	–
Other renewables	n.a.	0	4	9	24.0	13.2	0.8	4.9
Other transformation, own use and losses	**n.a.**	**93**	**96**	**104**	**0.2**	**0.4**	**–9.2**	**–14.4**
of which electricity	*n.a.*	*24*	*26*	*28*	*0.6*	*0.6*	*–6.6*	*–11.2*
Total final consumption	**n.a.**	**425**	**471**	**510**	**0.9**	**0.7**	**–4.6**	**–9.1**
Coal	n.a.	17	19	18	0.8	0.3	–4.9	–10.1
Oil	n.a.	95	104	112	0.8	0.6	–8.8	–13.5
Gas	n.a.	125	154	177	1.9	1.4	–3.5	–7.6
Electricity	n.a.	55	64	75	1.3	1.1	–4.4	–8.6
Heat	n.a.	130	128	124	–0.2	–0.2	–2.7	–7.8
Biomass and waste	n.a.	3	3	3	1.1	1.1	1.1	0.1
Other renewables	n.a.	0	0	1	–	–	170.9	787.4
Industry	**n.a.**	**146**	**161**	**174**	**0.9**	**0.7**	**–4.6**	**–8.3**
Coal	n.a.	10	12	12	1.3	0.7	–5.0	–7.6
Oil	n.a.	15	17	18	0.9	0.7	–7.6	–10.1
Gas	n.a.	44	55	64	2.1	1.5	–5.8	–9.9
Electricity	n.a.	29	34	41	1.4	1.4	–4.1	–5.4
Heat	n.a.	48	43	37	–0.9	–1.0	–2.2	–8.0
Biomass and waste	n.a.	1	1	1	1.4	1.6	–	–
Other renewables	n.a.	0	0	0	–	–	–	–
Transport	**n.a.**	**95**	**113**	**128**	**1.6**	**1.1**	**–5.6**	**–8.2**
Oil	n.a.	54	61	66	1.1	0.8	–10.1	–14.9
Biofuels	n.a.	0	0	0	26.4	13.6	75.6	63.1
Other fuels	n.a.	41	51	61	2.1	1.5	0.0	0.0
Residential, services and agriculture	**n.a.**	**176**	**190**	**200**	**0.7**	**0.5**	**–3.8**	**–10.2**
Coal	n.a.	6	6	6	0.0	–0.4	–5.2	–15.7
Oil	n.a.	19	19	19	0.2	0.0	–4.4	–12.1
Gas	n.a.	47	55	60	1.5	1.0	–3.9	–11.1
Electricity	n.a.	20	23	25	1.3	1.0	–6.2	–15.5
Heat	n.a.	82	85	87	0.2	0.2	–2.9	–7.7
Biomass and waste	n.a.	2	2	2	0.1	0.0	–3.3	–8.6
Other renewables	n.a.	0	0	1	–	–	182.3	823.5
Non-energy use	**n.a.**	**8**	**8**	**9**	**–0.6**	**0.4**	**–11.8**	**–11.6**

Alternative Policy Scenario: Russia

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**n.a.**	**926**	**1 067**	**1 256**	**1.3**	**1.2**	**–3.4**	**–5.1**
Coal	n.a.	161	178	150	1.0	–0.3	–2.3	–13.1
Oil	n.a.	24	20	13	–1.4	–2.2	–4.1	–3.3
Gas	n.a.	419	490	544	1.4	1.0	–6.8	–15.2
Nuclear	n.a.	145	176	297	1.8	2.8	–	13.5
Hydro	n.a.	176	188	210	0.6	0.7	–	5.1
Renewables (excluding hydro)	n.a.	2	14	42	18.1	12.0	32.9	22.0
Biomass and waste	*n.a.*	*2*	*5*	*16*	*9.4*	*8.8*	*169.2*	*20.4*
Wind	*n.a.*	*0*	*5*	*17*	*82.2*	*35.0*	*7.4*	*38.9*
Geothermal	*n.a.*	*0*	*4*	*9*	*22.6*	*12.4*	–	–
Solar	*n.a.*	*0*	*0*	*0*	–	–	–	–
Tide and wave	*n.a.*	*0*	*0*	*0*	–	–	–	–

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**220**	**234**	**270**	**0.6**	**0.8**	**–3.4**	**–5.7**
Coal	48	45	40	–0.7	–0.7	–2.5	–13.1
Oil	9	9	6	0.3	–1.5	–	–
Gas	94	104	120	0.9	0.9	–6.9	–14.2
Nuclear	22	24	40	0.8	2.4	–	13.5
Hydro	46	49	55	0.5	0.7	–	5.2
of which pumped storage	*0*	*0*	*0*	–	–	–	–
Renewables (excluding hydro)	1	3	10	17.7	11.8	21.4	26.9
Biomass and waste	*0*	*1*	*3*	*6.7*	*7.0*	*103.5*	*18.8*
Wind	*0*	*2*	*6*	*58.4*	*27.3*	*5.6*	*40.7*
Geothermal	*0*	*1*	*1*	*21.6*	*12.0*	–	*–3.0*
Solar	*0*	*0*	*0*	–	–	–	–
Tide and wave	*0*	*0*	*0*	–	–	–	–

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**n.a.**	**1 512**	**1 661**	**1 685**	**0.9**	**0.4**	**–4.9**	**–10.5**
Coal	n.a.	418	449	403	0.7	–0.1	–1.7	–3.0
Oil	n.a.	323	343	358	0.6	0.4	–7.2	–11.8
Gas	n.a.	772	869	925	1.1	0.7	–5.5	–13.0
Power generation and heat plants	**n.a.**	**853**	**895**	**837**	**0.4**	**–0.1**	**–4.4**	**–11.2**
Coal	n.a.	325	347	301	0.6	–0.3	–0.7	–0.7
Oil	n.a.	59	51	38	–1.2	–1.7	–1.9	–0.6
Gas	n.a.	469	496	498	0.5	0.2	–7.1	–17.2
Total final consumption	**n.a.**	**597**	**693**	**761**	**1.4**	**0.9**	**–5.5**	**–9.9**
Coal	n.a.	90	100	100	0.9	0.4	–5.0	–9.4
Oil	n.a.	227	249	266	0.8	0.6	–8.4	–13.4
of which transport	*n.a.*	*128*	*145*	*159*	*1.1*	*0.8*	*–10.0*	*–14.8*
Gas	n.a.	279	345	396	1.9	1.4	–3.4	–7.5

Alternative Policy Scenario: Developing Countries

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**2 612**	**4 460**	**6 025**	**7 583**	**2.8**	**2.1**	**–5.4**	**–12.0**
Coal	790	1 442	2 040	2 344	3.2	1.9	–7.5	–20.2
Oil	719	1 317	1 730	2 170	2.5	1.9	–5.9	–12.8
Gas	236	567	897	1 260	4.3	3.1	–6.1	–14.6
Nuclear	15	37	93	192	8.7	6.5	11.4	40.9
Hydro	61	107	169	251	4.3	3.4	2.0	3.2
Biomass and waste	783	972	1 047	1 226	0.7	0.9	–2.8	–0.8
Other renewables	7	18	48	140	9.0	8.1	10.5	37.2
Power generation and heat plants	**524**	**1 401**	**2 168**	**2 958**	**4.0**	**2.9**	**–7.0**	**–14.3**
Coal	268	848	1 284	1 571	3.8	2.4	–8.2	–21.3
Oil	100	150	159	137	0.5	–0.4	–7.2	–13.6
Gas	71	233	377	522	4.5	3.2	–13.1	–27.8
Nuclear	15	37	93	192	8.7	6.5	11.4	40.9
Hydro	61	107	169	251	4.3	3.4	2.0	3.2
Biomass and waste	2	9	50	184	16.8	12.3	18.6	62.3
Other renewables	7	18	36	100	6.7	6.9	2.5	25.3
Other transformation, own use and losses	**297**	**491**	**661**	**810**	**2.7**	**1.9**	**–4.2**	**–9.4**
of which electricity	*42*	*106*	*176*	*242*	*4.7*	*3.2*	*–6.7*	*–14.9*
Total final consumption	**2 005**	**3 109**	**4 130**	**5 163**	**2.6**	**2.0**	**–4.9**	**–11.4**
Coal	432	464	609	615	2.5	1.1	–6.6	–19.0
Oil	566	1 060	1 428	1 866	2.7	2.2	–5.9	–13.0
Gas	108	245	395	573	4.4	3.3	–0.2	–2.5
Electricity	157	388	691	1 018	5.4	3.8	–6.0	–13.6
Heat	14	37	53	72	3.4	2.6	–2.6	–2.7
Biomass and waste	728	914	943	980	0.3	0.3	–3.9	–7.6
Other renewables	0	1	12	40	26.9	15.9	45.9	80.1
Industry	**673**	**1 114**	**1 632**	**1 992**	**3.5**	**2.3**	**–3.8**	**–9.6**
Coal	268	354	505	533	3.3	1.6	–6.6	–18.7
Oil	147	261	333	377	2.2	1.4	–6.1	–13.3
Gas	91	173	280	392	4.5	3.2	0.7	0.1
Electricity	83	198	346	461	5.2	3.3	–4.8	–10.8
Heat	11	25	35	48	3.2	2.6	2.4	11.4
Biomass and waste	74	104	132	180	2.2	2.1	5.6	12.6
Other renewables	0	0	0	0	–	–	–	–
Transport	**296**	**547**	**750**	**1 106**	**2.9**	**2.7**	**–5.5**	**–11.3**
Oil	275	526	708	1 018	2.7	2.6	–6.5	–13.8
Biofuels	6	6	21	62	11.3	9.1	38.0	53.4
Other fuels	14	14	20	27	3.3	2.5	–0.9	–1.4
Residential, services and agriculture	**963**	**1 330**	**1 581**	**1 854**	**1.6**	**1.3**	**–5.8**	**–13.6**
Coal	117	78	70	52	–0.9	–1.5	–7.7	–26.9
Oil	114	201	276	325	2.9	1.9	–4.5	–11.7
Gas	16	65	104	166	4.3	3.7	–2.4	–8.2
Electricity	69	174	318	515	5.6	4.3	–7.8	–16.9
Heat	3	11	17	23	3.9	2.8	–11.9	–23.3
Biomass and waste	644	800	786	734	–0.2	–0.3	–6.1	–14.3
Other renewables	0	1	12	40	26.7	15.9	46.8	80.6
Non-energy use	**73**	**119**	**167**	**211**	**3.1**	**2.2**	**–3.9**	**–7.5**

Alternative Policy Scenario: Developing Countries

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**2 321**	**5 754**	**10 133**	**14 847**	**5.3**	**3.7**	**–5.7**	**–12.7**
Coal	917	2 753	5 113	6 843	5.8	3.6	–9.7	–23.8
Oil	366	580	655	587	1.1	0.0	–2.3	–4.6
Gas	257	983	1 795	2 735	5.6	4.0	–8.2	–19.3
Nuclear	57	142	358	737	8.7	6.5	11.4	40.9
Hydro	709	1 239	1 967	2 919	4.3	3.4	2.0	3.2
Renewables (excluding hydro)	14	56	244	1 026	14.3	11.8	13.6	53.6
Biomass and waste	*7*	*29*	*132*	*465*	*14.7*	*11.2*	*17.2*	*56.2*
Wind	*0*	*5*	*74*	*407*	*27.8*	*18.5*	*15.5*	*54.7*
Geothermal	*8*	*20*	*36*	*75*	*5.5*	*5.2*	*0.0*	*8.6*
Solar	*0*	*2*	*2*	*78*	*0.6*	*15.0*	–	*104.7*
Tide and wave	*0*	*0*	*0*	*1*	–	–	–	*439.4*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**1 289**	**2 256**	**3 400**	**5.2**	**3.8**	**–4.8**	**–9.9**
Coal	470	884	1 184	5.9	3.6	–9.7	–23.6
Oil	189	223	209	1.5	0.4	–1.9	–6.3
Gas	265	513	819	6.2	4.4	–7.5	–17.4
Nuclear	18	45	93	8.5	6.4	10.9	40.0
Hydro	334	538	813	4.4	3.5	3.2	5.4
of which pumped storage	*0*	*0*	*0*	–	–	–	–
Renewables (excluding hydro)	13	53	284	13.7	12.6	12.7	63.6
Biomass and waste	*5*	*21*	*73*	*14.1*	*11.0*	*13.6*	*56.2*
Wind	*4*	*26*	*156*	*17.9*	*14.9*	*15.5*	*63.8*
Geothermal	*3*	*5*	*11*	*5.6*	*5.2*	*0.0*	*8.4*
Solar	*1*	*1*	*43*	*0.0*	*16.6*	–	*104.4*
Tide and wave	*0*	*0*	*0*	–	–	–	*441.3*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**5 317**	**10 171**	**14 369**	**17 550**	**3.2**	**2.1**	**–6.7**	**–16.9**
Coal	2 871	5 508	7 911	9 097	3.3	1.9	–7.6	–20.6
Oil	1 938	3 392	4 450	5 636	2.5	2.0	–5.1	–11.2
Gas	507	1 271	2 008	2 817	4.2	3.1	–6.3	–14.9
Power generation and heat plants	**1 535**	**4 395**	**6 502**	**7 921**	**3.6**	**2.3**	**–8.9**	**–22.0**
Coal	1 050	3 378	5 113	6 254	3.8	2.4	–8.2	–21.3
Oil	319	472	500	429	0.5	–0.4	–7.2	–13.5
Gas	167	545	890	1 238	4.6	3.2	–13.1	–27.7
Total final consumption	**3 479**	**5 226**	**7 167**	**8 792**	**2.9**	**2.0**	**–5.0**	**–12.7**
Coal	1 760	2 004	2 658	2 693	2.6	1.1	–6.5	–19.3
Oil	1 491	2 697	3 671	4 896	2.8	2.3	–4.8	–11.0
of which transport	*740*	*1 435*	*1 964*	*2 866*	*2.9*	*2.7*	*–5.0*	*–11.4*
Gas	228	525	838	1 202	4.3	3.2	–0.3	–2.5

Alternative Policy Scenario: Developing Asia

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**1 638**	**2 916**	**4 027**	**5 111**	**3.0**	**2.2**	**–5.5**	**–11.8**
Coal	696	1 309	1 902	2 197	3.5	2.0	–7.4	–20.1
Oil	321	713	968	1 286	2.8	2.3	–6.2	–13.2
Gas	74	203	335	495	4.6	3.5	–2.7	–5.1
Nuclear	10	29	78	175	9.6	7.2	13.9	43.7
Hydro	24	47	87	138	5.8	4.2	3.9	9.3
Biomass and waste	506	600	619	718	0.3	0.7	–4.0	0.1
Other renewables	6	15	38	102	8.8	7.7	7.1	30.9
Power generation and heat plants	**323**	**1 011**	**1 624**	**2 220**	**4.4**	**3.1**	**–6.1**	**–12.3**
Coal	222	775	1 210	1 489	4.1	2.5	–7.8	–20.9
Oil	46	56	63	50	1.1	–0.4	–1.4	–2.7
Gas	16	85	126	163	3.6	2.5	–12.8	–24.4
Nuclear	10	29	78	175	9.6	7.2	13.9	43.7
Hydro	24	47	87	138	5.8	4.2	3.9	9.3
Biomass and waste	0	4	30	127	19.4	13.9	11.2	73.6
Other renewables	6	15	30	77	6.7	6.5	2.3	24.2
Other transformation, own use and losses	**162**	**300**	**415**	**504**	**3.0**	**2.0**	**–5.4**	**–11.2**
of which electricity	*24*	*71*	*127*	*174*	*5.4*	*3.5*	*–7.6*	*–16.1*
Total final consumption	**1 278**	**1 975**	**2 669**	**3 368**	**2.8**	**2.1**	**–5.5**	**–12.1**
Coal	406	434	576	582	2.6	1.1	–6.8	–19.5
Oil	249	581	812	1 136	3.1	2.6	–6.5	–13.5
Gas	35	86	158	260	5.7	4.3	5.3	7.9
Electricity	85	252	487	719	6.2	4.1	–6.7	–14.4
Heat	14	37	53	72	3.4	2.6	–2.6	–2.7
Biomass and waste	489	585	575	574	–0.2	–0.1	–4.8	–8.4
Other renewables	0	0	7	24	–	–	32.5	58.0
Industry	**438**	**756**	**1 149**	**1 391**	**3.9**	**2.4**	**–4.2**	**–10.3**
Coal	245	328	477	506	3.5	1.7	–6.8	–19.0
Oil	77	158	205	224	2.4	1.3	–8.1	–16.9
Gas	29	61	109	172	5.4	4.0	8.9	16.2
Electricity	51	144	268	349	5.8	3.4	–5.3	–11.3
Heat	11	25	35	48	3.2	2.6	2.4	11.4
Biomass and waste	26	39	54	92	3.1	3.4	17.2	27.4
Other renewables	0	0	0	0	–	–	–	–
Transport	**122**	**265**	**392**	**668**	**3.6**	**3.6**	**–4.7**	**–9.8**
Oil	108	257	373	623	3.4	3.5	–6.0	–12.6
Biofuels	0	0	9	33	61.8	29.1	132.7	103.6
Other fuels	14	8	10	13	2.0	1.8	–0.0	–0.1
Residential, services and agriculture	**659**	**857**	**995**	**1 145**	**1.4**	**1.1**	**–7.4**	**–16.0**
Coal	114	73	65	46	–1.1	–1.7	–8.3	–29.2
Oil	50	116	158	190	2.8	1.9	–6.0	–14.0
Gas	5	24	48	87	6.5	5.1	–1.9	–5.2
Electricity	29	91	192	328	7.0	5.1	–9.5	–18.8
Heat	3	11	17	23	3.9	2.8	–11.9	–23.3
Biomass and waste	458	542	509	445	–0.6	–0.8	–7.6	–16.7
Other renewables	0	0	7	24	–	–	33.0	58.3
Non-energy use	**59**	**96**	**133**	**164**	**3.0**	**2.1**	**–4.3**	**–7.7**

Alternative Policy Scenario: Developing Asia

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**1 274**	**3 758**	**7 180**	**10 571**	**6.1**	**4.1**	**–6.3**	**–13.1**
Coal	727	2 442	4 789	6 448	6.3	3.8	–9.2	–23.4
Oil	166	222	254	205	1.2	–0.3	–1.6	–3.0
Gas	59	406	662	882	4.5	3.0	–11.4	–20.8
Nuclear	39	110	300	672	9.6	7.2	13.9	43.7
Hydro	277	545	1 009	1 603	5.8	4.2	3.9	9.3
Renewables (excluding hydro)	7	33	165	762	15.7	12.8	10.1	57.5
Biomass and waste	*0*	*10*	*76*	*323*	*19.8*	*14.1*	*10.8*	*68.2*
Wind	*0*	*4*	*58*	*340*	*28.2*	*18.9*	*15.7*	*54.4*
Geothermal	*7*	*17*	*29*	*51*	*5.1*	*4.3*	–	*6.5*
Solar	*0*	*2*	*2*	*47*	*0.6*	*12.9*	–	*98.7*
Tide and wave	*0*	*0*	*0*	*1*	–	–	–	*444.4*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**789**	**1 477**	**2 251**	**5.9**	**4.1**	**–5.7**	**–10.4**
Coal	421	825	1 112	6.3	3.8	–9.7	–23.7
Oil	62	72	60	1.4	–0.1	–0.5	–1.0
Gas	107	188	270	5.3	3.6	–10.3	–21.1
Nuclear	14	38	84	9.6	7.2	13.3	42.6
Hydro	177	317	506	5.4	4.1	4.2	9.6
of which pumped storage	*0*	*0*	*0*	–	–	–	–
Renewables (excluding hydro)	9	38	218	14.1	13.1	10.0	66.0
Biomass and waste	*2*	*12*	*51*	*19.1*	*13.8*	*6.1*	*68.7*
Wind	*4*	*20*	*133*	*16.6*	*14.7*	*15.5*	*64.9*
Geothermal	*3*	*4*	*8*	*5.2*	*4.3*	–	*6.3*
Solar	*1*	*1*	*26*	*0.0*	*14.5*	–	*97.5*
Tide and wave	*0*	*0*	*0*	–	–	–	*441.7*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**3 563**	**7 265**	**10 580**	**12 937**	**3.5**	**2.2**	**–6.7**	**–17.3**
Coal	2 567	5 071	7 462	8 615	3.6	2.1	–7.4	–20.4
Oil	850	1 746	2 388	3 242	2.9	2.4	–5.6	–12.2
Gas	146	448	730	1 080	4.5	3.4	–3.0	–5.3
Power generation and heat plants	**1 052**	**3 462**	**5 313**	**6 470**	**4.0**	**2.4**	**–7.8**	**–20.7**
Coal	868	3 083	4 816	5 925	4.1	2.5	–7.8	–20.8
Oil	146	178	201	161	1.1	–0.4	–1.4	–2.7
Gas	38	200	295	383	3.6	2.5	–12.7	–24.2
Total final consumption	**2 355**	**3 472**	**4 842**	**5 966**	**3.1**	**2.1**	**–5.7**	**–14.3**
Coal	1 642	1 866	2 509	2 543	2.7	1.2	–6.8	–19.7
Oil	644	1 432	2 013	2 895	3.1	2.7	–6.0	–12.5
of which transport	*290*	*695*	*1 013*	*1 703*	*3.5*	*3.5*	*–5.9*	*–12.5*
Gas	69	174	320	528	5.7	4.3	5.4	8.5

Alternative Policy Scenario: China

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**877**	**1 626**	**2 385**	**3 006**	**3.5**	**2.4**	**–5.0**	**–11.4**
Coal	534	999	1 502	1 702	3.8	2.1	–6.4	–17.5
Oil	116	319	464	648	3.4	2.8	–6.6	–14.5
Gas	16	44	101	184	7.9	5.7	12.7	17.1
Nuclear	0	13	41	108	10.9	8.4	26.5	61.7
Hydro	11	30	57	85	5.8	4.0	1.5	5.9
Biomass and waste	200	221	211	235	–0.4	0.2	–5.2	–1.6
Other renewables	0	0	10	44	–	–	21.7	50.4
Power generation and heat plants	**173**	**639**	**1 085**	**1 451**	**4.9**	**3.2**	**–4.7**	**–10.0**
Coal	145	566	929	1 119	4.6	2.7	–6.5	–17.7
Oil	16	22	21	17	–0.5	–0.9	–0.4	–0.4
Gas	1	6	21	37	12.3	7.3	1.7	–7.6
Nuclear	0	13	41	108	10.9	8.4	26.5	61.7
Hydro	11	30	57	85	5.8	4.0	1.5	5.9
Biomass and waste	0	1	13	61	22.7	15.7	10.2	88.1
Other renewables	0	0	4	24	–	–	10.6	54.4
Other transformation, own use and losses	**85**	**176**	**252**	**308**	**3.3**	**2.2**	**–5.5**	**–11.2**
of which electricity	*12*	*41*	*82*	*112*	*6.5*	*3.9*	*–6.3*	*–13.9*
Total final consumption	**689**	**1 050**	**1 513**	**1 901**	**3.4**	**2.3**	**–5.2**	**–12.8**
Coal	332	349	473	474	2.8	1.2	–6.3	–18.2
Oil	88	261	397	582	3.9	3.1	–6.7	–14.4
Gas	12	33	68	126	6.9	5.3	16.1	22.4
Electricity	43	151	318	455	7.0	4.3	–5.8	–13.5
Heat	13	36	53	71	3.4	2.6	–2.7	–2.7
Biomass and waste	200	219	198	174	–0.9	–0.9	–6.0	–15.6
Other renewables	0	0	6	20	–	–	29.4	45.7
Industry	**274**	**470**	**764**	**888**	**4.5**	**2.5**	**–3.6**	**–11.4**
Coal	189	256	388	408	3.9	1.8	–6.4	–18.7
Oil	35	70	93	90	2.6	1.0	–8.5	–20.2
Gas	10	20	39	67	6.2	4.8	33.7	61.1
Electricity	30	100	198	248	6.4	3.6	–5.2	–12.0
Heat	11	25	35	48	3.3	2.6	2.4	11.4
Biomass and waste	0	0	11	25	–	–	197.7	29.4
Other renewables	0	0	0	0	–	–	–	–
Transport	**41**	**110**	**185**	**367**	**4.8**	**4.7**	**–5.4**	**–11.3**
Oil	30	104	175	344	4.9	4.7	–6.3	–13.1
Biofuels	0	0	3	13	–	–	76.1	65.2
Other fuels	11	6	7	9	1.7	1.6	–0.0	0.0
Residential, services and agriculture	**337**	**406**	**478**	**555**	**1.5**	**1.2**	**–7.8**	**–16.5**
Coal	102	63	54	39	–1.4	–1.8	–6.3	–18.9
Oil	18	59	87	102	3.6	2.1	–6.0	–14.3
Gas	3	13	29	58	7.8	6.0	–1.1	–4.0
Electricity	11	41	101	178	8.5	5.8	–7.9	–17.3
Heat	2	11	17	22	4.0	2.9	–12.1	–23.5
Biomass and waste	200	219	184	136	–1.6	–1.8	–10.3	–24.2
Other renewables	0	0	6	20	–	–	29.6	45.8
Non-energy use	**38**	**63**	**85**	**92**	**2.7**	**1.5**	**–4.7**	**–8.8**

Alternative Policy Scenario: China

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**650**	**2 237**	**4 696**	**6 786**	**7.0**	**4.4**	**–5.0**	**–11.0**
Coal	471	1 739	3 666	4 766	7.0	4.0	–7.6	–20.3
Oil	49	72	63	53	–1.1	–1.1	–0.3	–0.2
Gas	3	19	86	159	14.5	8.4	4.4	–6.1
Nuclear	0	50	157	414	10.9	8.4	26.5	61.7
Hydro	127	354	660	992	5.8	4.0	1.5	5.9
Renewables (excluding hydro)	0	2	64	401	34.3	21.6	13.6	75.6
Biomass and waste	*0*	*2*	*36*	*175*	*27.6*	*17.8*	*10.6*	*89.0*
Wind	*0*	*0*	*26*	*197*	–	–	*19.4*	*62.4*
Geothermal	*0*	*0*	*2*	*6*	–	–	–	*19.4*
Solar	*0*	*0*	*0*	*22*	–	–	–	*143.7*
Tide and wave	*0*	*0*	*0*	*0*	–	–	–	*600.0*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**442**	**916**	**1 371**	**6.8**	**4.4**	**–4.5**	**–8.4**
Coal	307	638	833	6.9	3.9	–7.2	–20.0
Oil	16	19	17	2.0	0.2	–1.0	1.6
Gas	8	27	54	12.4	7.9	–6.9	–12.7
Nuclear	6	19	50	11.0	8.5	26.5	61.7
Hydro	105	198	298	5.9	4.1	1.5	5.9
of which pumped storage	*0*	*0*	*0*	–	–	–	–
Renewables (excluding hydro)	1	15	120	25.2	19.2	12.0	82.9
Biomass and waste	*0*	*6*	*28*	*26.8*	*17.6*	*2.8*	*90.1*
Wind	*1*	*9*	*79*	*24.9*	*19.5*	*19.3*	*75.9*
Geothermal	*0*	*0*	*1*	–	–	–	*19.4*
Solar	*0*	*0*	*12*	*0.0*	*21.6*	–	*131.1*
Tide and wave	*0*	*0*	*0*	–	–	–	*595.0*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**2 289**	**4 769**	**7 298**	**8 801**	**3.9**	**2.4**	**–5.8**	**–15.6**
Coal	1 952	3 897	5 935	6 726	3.9	2.1	–6.3	–17.6
Oil	304	779	1 149	1 679	3.6	3.0	–5.7	–12.8
Gas	32	93	214	397	7.9	5.8	12.7	18.9
Power generation and heat plants	**623**	**2 355**	**3 842**	**4 629**	**4.6**	**2.6**	**–6.3**	**–17.4**
Coal	568	2 269	3 723	4 483	4.6	2.7	–6.5	–17.7
Oil	52	72	68	56	–0.5	–0.9	–0.4	–0.4
Gas	3	14	51	90	12.3	7.3	1.7	–7.6
Total final consumption	**1 579**	**2 211**	**3 198**	**3 865**	**3.4**	**2.2**	**–5.3**	**–14.0**
Coal	1 332	1 509	2 078	2 099	3.0	1.3	–6.0	–17.8
Oil	225	640	992	1 528	4.1	3.4	–5.9	–12.7
of which transport	*83*	*290*	*490*	*965*	*4.9*	*4.7*	*–6.1*	*–12.9*
Gas	22	61	127	238	6.9	5.4	17.0	25.4

Alternative Policy Scenario: India

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**361**	**573**	**733**	**964**	**2.3**	**2.0**	**–5.4**	**–12.7**
Coal	105	196	259	338	2.6	2.1	–8.4	–25.0
Oil	63	127	176	238	3.0	2.4	–4.3	–11.3
Gas	10	23	39	63	4.8	3.9	–2.2	–7.7
Nuclear	2	4	19	48	14.4	9.6	5.3	33.1
Hydro	6	7	13	25	5.0	4.9	5.5	20.3
Biomass and waste	176	214	224	241	0.4	0.5	–4.9	–4.7
Other renewables	0	0	3	10	20.9	14.0	14.1	53.2
Power generation and heat plants	**73**	**182**	**268**	**419**	**3.6**	**3.3**	**–5.8**	**–12.9**
Coal	58	147	197	275	2.7	2.4	–7.1	–22.8
Oil	4	9	11	11	2.5	0.8	–0.1	–0.1
Gas	3	13	19	29	3.8	3.2	–2.3	–9.7
Nuclear	2	4	19	48	14.4	9.6	5.3	33.1
Hydro	6	7	13	25	5.0	4.9	5.5	20.3
Biomass and waste	0	1	6	23	16.5	12.4	–31.7	18.9
Other renewables	0	0	2	8	18.5	12.8	13.9	39.7
Other transformation, own use and losses	**19**	**45**	**57**	**69**	**2.2**	**1.6**	**–7.5**	**–18.3**
of which electricity	*7*	*19*	*28*	*40*	*3.5*	*2.9*	*–8.8*	*–18.8*
Total final consumption	**294**	**403**	**508**	**652**	**2.1**	**1.9**	**–5.0**	**–11.7**
Coal	41	36	48	51	2.6	1.3	–13.4	–34.8
Oil	54	107	152	214	3.3	2.7	–4.5	–11.6
Gas	6	9	17	31	6.6	5.0	–2.2	–6.6
Electricity	18	38	72	135	5.9	5.0	–3.6	–9.5
Heat	0	0	0	0	–	–	–	–
Biomass and waste	176	213	218	218	0.2	0.1	–3.9	–6.7
Other renewables	0	0	1	3	–	–	15.0	115.9
Industry	**75**	**109**	**155**	**207**	**3.2**	**2.5**	**–4.4**	**–10.5**
Coal	28	29	40	46	3.2	1.9	–11.7	–27.5
Oil	13	33	47	61	3.4	2.4	–3.3	–8.9
Gas	6	8	15	24	6.1	4.3	–1.5	–2.9
Electricity	9	17	26	42	3.9	3.6	–3.1	–6.8
Heat	0	0	0	0	–	–	–	–
Biomass and waste	20	23	27	33	1.4	1.3	2.8	10.3
Other renewables	0	0	0	0	–	–	–	–
Transport	**28**	**36**	**49**	**74**	**2.7**	**2.8**	**–3.5**	**–9.0**
Oil	26	36	47	67	2.6	2.5	–3.7	–12.2
Biofuels	0	0	0	4	–	–	32.9	84.6
Other fuels	3	1	1	2	5.1	3.6	0.0	0.0
Residential, services and agriculture	**187**	**243**	**277**	**322**	**1.2**	**1.1**	**–5.7**	**–13.9**
Coal	11	8	8	5	0.3	–2.0	–21.0	–68.0
Oil	12	26	35	44	2.5	2.0	–7.9	–19.1
Gas	0	1	2	7	11.4	9.1	–6.4	–18.0
Electricity	8	19	41	83	7.6	5.9	–4.4	–11.7
Heat	0	0	0	0	–	–	–	–
Biomass and waste	156	190	191	181	0.0	–0.2	–4.8	–10.3
Other renewables	0	0	0	2	–	–	16.0	118.9
Non-energy use	**4**	**15**	**27**	**50**	**5.8**	**4.8**	**–3.0**	**–4.8**

Alternative Policy Scenario: India

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**289**	**668**	**1 163**	**2 041**	**5.2**	**4.4**	**–5.1**	**–11.8**
Coal	189	461	765	1 242	4.7	3.9	–8.4	–23.8
Oil	13	36	49	46	2.9	1.0	0.1	0.0
Gas	10	63	96	151	3.9	3.4	–2.2	–7.5
Nuclear	6	17	75	186	14.4	9.6	5.3	33.1
Hydro	72	85	145	296	5.0	4.9	5.5	20.3
Renewables (excluding hydro)	0	6	32	120	16.9	12.5	–5.2	35.3
Biomass and waste	*0*	*2*	*10*	*40*	*16.5*	*12.4*	*–31.7*	*18.9*
Wind	*0*	*4*	*21*	*70*	*17.0*	*11.9*	*16.7*	*41.9*
Geothermal	*0*	*0*	*0*	*1*	–	–	–	–
Solar	*0*	*0*	*0*	*9*	*23.4*	*34.6*	–	*83.7*
Tide and wave	*0*	*0*	*0*	*0*	–	–	–	*250.0*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**131**	**221**	**409**	**4.8**	**4.5**	**–3.4**	**–6.2**
Coal	72	117	191	4.5	3.8	–8.4	–23.8
Oil	8	11	10	2.5	0.9	–	–
Gas	14	22	39	4.4	4.1	–2.9	–8.1
Nuclear	3	10	25	13.2	9.2	5.3	33.1
Hydro	31	51	105	4.6	4.7	5.8	20.2
of which pumped storage	*0*	*0*	*0*	–	–	–	–
Renewables (excluding hydro)	3	10	39	10.1	9.9	3.9	46.1
Biomass and waste	*0*	*2*	*6*	*15.8*	*12.1*	*–31.4*	*18.9*
Wind	*3*	*8*	*27*	*9.2*	*8.9*	*15.9*	*48.1*
Geothermal	*0*	*0*	*0*	–	–	–	–
Solar	*0*	*0*	*5*	*0.0*	*22.7*	–	*85.1*
Tide and wave	*0*	*0*	*0*	–	–	–	*250.0*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**588**	**1 103**	**1 502**	**1 999**	**2.8**	**2.3**	**–7.3**	**–21.4**
Coal	401	734	981	1 286	2.7	2.2	–8.9	–26.1
Oil	164	314	431	568	2.9	2.3	–4.4	–12.0
Gas	23	54	90	145	4.7	3.9	–2.2	–7.8
Power generation and heat plants	**245**	**629**	**847**	**1 167**	**2.7**	**2.4**	**–6.6**	**–21.7**
Coal	225	572	767	1 067	2.7	2.4	–7.1	–22.8
Oil	11	26	35	33	2.5	0.8	–0.1	–0.1
Gas	8	30	45	68	3.8	3.2	–2.3	–9.7
Total final consumption	**328**	**441**	**615**	**789**	**3.1**	**2.3**	**–8.4**	**–21.5**
Coal	171	160	212	217	2.6	1.2	–14.8	–39.0
Oil	144	261	364	503	3.1	2.6	–4.8	–12.5
of which transport	*72*	*98*	*130*	*186*	*2.6*	*2.5*	*–3.7*	*–12.2*
Gas	13	19	39	69	6.6	5.0	–2.2	–6.8

Alternative Policy Scenario: Latin America

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**339**	**484**	**599**	**745**	**2.0**	**1.7**	**–4.3**	**–11.9**
Coal	17	22	24	28	0.6	0.9	–12.7	–24.4
Oil	157	218	241	267	0.9	0.8	–6.0	–15.9
Gas	54	98	145	201	3.6	2.8	–5.3	–18.0
Nuclear	2	5	10	12	6.0	3.2	–	28.8
Hydro	31	51	68	87	2.6	2.1	–1.7	–6.9
Biomass and waste	77	88	107	131	1.8	1.6	0.8	2.0
Other renewables	1	2	5	19	8.2	9.0	6.5	32.5
Power generation and heat plants	**69**	**122**	**171**	**232**	**3.1**	**2.5**	**–4.7**	**–14.7**
Coal	5	8	8	10	0.0	0.9	–26.1	–40.9
Oil	14	25	18	9	–2.8	–3.9	–8.4	–18.1
Gas	14	27	55	85	6.6	4.5	–8.5	–27.1
Nuclear	2	5	10	12	6.0	3.2	–	28.8
Hydro	31	51	68	87	2.6	2.1	–1.7	–6.9
Biomass and waste	2	5	9	15	6.3	4.7	33.2	13.0
Other renewables	1	2	4	15	7.0	8.1	–	20.3
Other transformation, own use and losses	**51**	**57**	**69**	**85**	**1.8**	**1.6**	**–3.1**	**–9.3**
of which electricity	*8*	*15*	*20*	*26*	*2.6*	*2.1*	*–4.2*	*–13.6*
Total final consumption	**262**	**380**	**465**	**575**	**1.9**	**1.6**	**–4.4**	**–11.5**
Coal	7	10	12	13	1.0	0.9	–4.4	–11.2
Oil	127	178	204	234	1.3	1.1	–6.1	–16.5
Gas	25	54	70	93	2.4	2.1	–3.2	–10.3
Electricity	35	60	87	122	3.4	2.7	–4.7	–13.4
Heat	0	0	0	0	–	–	–	–
Biomass and waste	68	77	91	109	1.6	1.3	–1.5	0.8
Other renewables	0	0	1	4	25.8	17.9	73.0	110.8
Industry	**99**	**151**	**188**	**228**	**2.0**	**1.6**	**–3.7**	**–10.0**
Coal	7	10	11	13	1.1	1.0	–4.4	–11.3
Oil	27	35	42	48	1.7	1.2	–3.4	–10.7
Gas	19	38	47	57	1.9	1.6	–3.5	–10.5
Electricity	17	29	41	59	3.4	2.8	–4.1	–11.8
Heat	0	0	0	0	–	–	–	–
Biomass and waste	30	39	46	50	1.5	1.0	–3.7	–5.9
Other renewables	0	0	0	0	–	–	–	–
Transport	**76**	**116**	**134**	**166**	**1.3**	**1.4**	**–6.7**	**–15.7**
Oil	70	105	115	130	0.8	0.8	–8.2	–21.4
Biofuels	6	6	11	25	5.2	5.4	7.4	23.5
Other fuels	0	5	8	11	4.0	3.0	–2.2	–3.4
Residential, services and agriculture	**80**	**103**	**133**	**169**	**2.3**	**1.9**	**–3.1**	**–9.2**
Coal	0	0	0	0	–2.4	–2.8	–1.1	–15.8
Oil	25	29	36	43	2.1	1.5	–3.0	–8.3
Gas	6	11	16	25	3.2	3.0	–2.7	–12.3
Electricity	17	32	46	63	3.4	2.7	–5.2	–15.0
Heat	0	0	0	0	–	–	–	–
Biomass and waste	32	31	34	34	0.7	0.3	–1.1	–2.3
Other renewables	0	0	1	4	25.6	17.9	75.9	111.7
Non-energy use	**6**	**9**	**11**	**13**	**1.4**	**1.3**	**–2.6**	**–8.6**

Alternative Policy Scenario: Latin America

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**491**	**874**	**1 244**	**1 716**	**3.3**	**2.6**	**–4.6**	**–13.5**
Coal	15	30	31	45	0.1	1.5	–28.2	–42.0
Oil	41	83	69	35	–1.6	–3.2	–8.8	–19.0
Gas	55	131	274	473	6.9	5.1	–11.1	–27.9
Nuclear	10	19	37	44	6.0	3.2	–	28.8
Hydro	364	589	786	1 009	2.6	2.1	–1.7	–6.9
Renewables (excluding hydro)	7	21	47	110	7.6	6.6	17.1	23.9
Biomass and waste	*7*	*18*	*34*	*56*	*5.9*	*4.4*	*24.8*	*10.7*
Wind	*0*	*0*	*8*	*32*	*31.0*	*18.1*	–	*46.0*
Geothermal	*1*	*2*	*4*	*13*	*5.3*	*7.0*	–	*12.7*
Solar	*0*	*0*	*0*	*8*	–	–	–	*87.6*
Tide and wave	*0*	*0*	*0*	*0*	–	–	–	*366.7*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**206**	**319**	**447**	**4.1**	**3.0**	**–3.5**	**–11.4**
Coal	5	7	8	1.9	1.7	–17.4	–35.5
Oil	28	29	18	0.1	–1.8	–1.9	–7.9
Gas	38	100	170	9.3	6.0	–6.4	–19.7
Nuclear	3	5	6	4.9	2.8	–	29.1
Hydro	128	170	218	2.6	2.1	–2.3	–7.5
of which pumped storage	*0*	*0*	*0*	–	–	–	–
Renewables (excluding hydro)	4	9	27	8.5	8.0	13.4	35.0
Biomass and waste	*3*	*6*	*9*	*5.4*	*4.1*	*23.6*	*10.7*
Wind	*0*	*3*	*11*	*26.8*	*16.5*	–	*47.5*
Geothermal	*0*	*1*	*2*	*5.4*	*7.0*	–	*12.7*
Solar	*0*	*0*	*5*	–	–	–	*87.6*
Tide and wave	*0*	*0*	*0*	–	–	–	*381.0*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**602**	**907**	**1 091**	**1 330**	**1.7**	**1.5**	**–5.2**	**–14.3**
Coal	57	85	88	103	0.2	0.7	–14.6	–26.2
Oil	426	601	679	785	1.1	1.0	–3.9	–10.1
Gas	119	221	324	442	3.6	2.7	–5.0	–17.9
Power generation and heat plants	**98**	**176**	**218**	**266**	**2.0**	**1.6**	**–12.0**	**–29.0**
Coal	21	35	32	39	–0.8	0.5	–28.3	–42.0
Oil	45	77	57	27	–2.8	–3.9	–8.3	–17.9
Gas	32	64	130	199	6.6	4.5	–8.5	–27.1
Total final consumption	**439**	**656**	**787**	**960**	**1.7**	**1.5**	**–3.5**	**–10.1**
Coal	32	47	53	60	1.0	0.9	–4.4	–11.2
Oil	350	489	584	711	1.6	1.4	–3.6	–10.0
of which transport	*200*	*301*	*347*	*426*	*1.3*	*1.3*	*–4.1*	*–11.0*
Gas	56	119	151	189	2.1	1.8	–2.8	–9.9

Alternative Policy Scenario: Brazil

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**131**	**200**	**252**	**311**	**2.1**	**1.7**	**–5.0**	**–11.0**
Coal	10	14	13	15	–0.6	0.2	–12.1	–17.8
Oil	58	85	101	119	1.6	1.3	–7.1	–16.2
Gas	3	16	26	35	4.6	3.1	–0.2	–15.0
Nuclear	1	3	6	9	6.9	4.2	–	40.9
Hydro	18	28	36	41	2.4	1.6	–6.1	–17.5
Biomass and waste	42	54	69	89	2.2	1.9	–1.9	–1.2
Other renewables	0	0	1	3	52.1	27.8	15.3	63.7
Power generation and heat plants	**22**	**43**	**57**	**68**	**2.7**	**1.8**	**–6.0**	**–15.2**
Coal	1	3	1	1	–10.4	–6.1	–57.3	–67.8
Oil	1	3	1	1	–6.7	–3.5	–47.2	–60.8
Gas	0	4	8	9	7.3	3.1	8.9	–31.5
Nuclear	1	3	6	9	6.9	4.2	–	40.9
Hydro	18	28	36	41	2.4	1.6	–6.1	–17.5
Biomass and waste	1	2	4	6	4.8	3.4	6.2	3.8
Other renewables	0	0	0	2	44.6	24.8	–	54.1
Other transformation, own use and losses	**18**	**23**	**28**	**33**	**1.7**	**1.4**	**–4.5**	**–11.3**
of which electricity	*3*	*7*	*8*	*9*	*1.8*	*1.1*	*–5.0*	*–14.3*
Total final consumption	**112**	**171**	**214**	**266**	**2.1**	**1.7**	**–5.0**	**–10.7**
Coal	4	7	8	9	1.2	1.2	–5.2	–12.1
Oil	53	78	94	111	1.7	1.4	–6.2	–15.3
Gas	2	9	13	20	3.7	3.2	–3.3	–6.5
Electricity	18	30	39	47	2.5	1.8	–6.1	–15.1
Heat	0	0	0	0	–	–	–	–
Biomass and waste	35	47	60	76	2.2	1.9	–2.6	–1.6
Other renewables	0	0	0	1	–	–	45.4	76.3
Industry	**48**	**77**	**94**	**112**	**1.9**	**1.5**	**–4.7**	**–10.0**
Coal	4	7	8	9	1.2	1.2	–5.2	–12.2
Oil	14	18	22	25	1.8	1.3	–4.1	–10.8
Gas	2	7	10	16	3.4	3.1	–3.7	–7.7
Electricity	10	15	18	23	2.0	1.6	–5.6	–13.9
Heat	0	0	0	0	–	–	–	–
Biomass and waste	19	30	35	39	1.6	1.1	–4.8	–7.3
Other renewables	0	0	0	0	–	–	–	–
Transport	**32**	**52**	**66**	**91**	**2.3**	**2.2**	**–5.8**	**–12.2**
Oil	27	44	53	64	1.7	1.5	–8.0	–19.1
Biofuels	6	6	11	23	5.1	5.1	5.4	13.2
Other fuels	0	1	2	4	4.8	3.7	–2.2	–2.4
Residential, services and agriculture	**29**	**38**	**50**	**57**	**2.4**	**1.5**	**–4.5**	**–10.1**
Coal	0	0	0	0	–	–	–	–
Oil	9	12	15	16	1.8	1.2	–3.8	–8.5
Gas	0	0	1	1	3.0	2.4	–	–
Electricity	8	15	21	25	3.1	1.9	–6.6	–16.2
Heat	0	0	0	0	–	–	–	–
Biomass and waste	11	11	13	14	1.9	1.0	–2.7	–5.4
Other renewables	0	0	0	1	–	–	47.5	76.9
Non-energy use	**3**	**4**	**5**	**6**	**1.3**	**1.2**	**–2.7**	**–6.3**

Alternative Policy Scenario: Brazil

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**223**	**387**	**514**	**616**	**2.6**	**1.8**	**–6.3**	**–15.7**
Coal	5	10	3	2	–10.4	–6.1	–58.2	–68.5
Oil	6	12	6	5	–6.3	–3.3	–45.2	–59.2
Gas	0	19	42	46	7.3	3.4	0.5	–29.7
Nuclear	2	12	24	34	6.9	4.2	–	40.9
Hydro	207	321	415	480	2.4	1.6	–6.1	–17.5
Renewables (excluding hydro)	4	13	24	49	6.2	5.4	5.2	19.0
Biomass and waste	*4*	*12*	*21*	*30*	*4.8*	*3.4*	*6.2*	*3.8*
Wind	*0*	*0*	*4*	*16*	*44.6*	*23.9*	–	*45.4*
Geothermal	*0*	*0*	*0*	*0*	–	–	–	–
Solar	*0*	*0*	*0*	*3*	–	–	–	*116.0*
Tide and wave	*0*	*0*	*0*	*0*	–	–	–	*250.0*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**87**	**124**	**149**	**3.3**	**2.1**	**–4.9**	**–13.6**
Coal	1	1	1	0.0	–1.5	–8.5	–12.2
Oil	4	5	5	3.1	0.8	–9.6	–24.5
Gas	9	21	24	8.2	4.0	4.3	–9.8
Nuclear	2	3	4	4.8	3.3	–	40.9
Hydro	69	89	103	2.4	1.6	–7.0	–18.5
of which pumped storage	*0*	*0*	*0*	–	–	–	–
Renewables (excluding hydro)	2	4	12	7.2	6.9	4.3	31.7
Biomass and waste	*2*	*3*	*5*	*4.5*	*3.3*	*5.8*	*3.6*
Wind	*0*	*1*	*5*	*39.7*	*22.3*	–	*47.8*
Geothermal	*0*	*0*	*0*	–	–	–	–
Solar	*0*	*0*	*2*	–	–	–	*116.0*
Tide and wave	*0*	*0*	*0*	–	–	–	*259.0*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**193**	**323**	**382**	**458**	**1.5**	**1.3**	**–7.4**	**–16.9**
Coal	29	50	44	49	–1.2	–0.1	–16.0	–20.6
Oil	158	238	279	329	1.5	1.3	–7.4	–16.7
Gas	6	35	59	79	4.7	3.1	–0.0	–15.2
Power generation and heat plants	**12**	**33**	**28**	**27**	**–1.4**	**–0.8**	**–22.4**	**–44.0**
Coal	8	15	5	3	–10.4	–6.1	–57.3	–67.8
Oil	4	9	4	3	–6.7	–3.5	–47.2	–60.8
Gas	0	9	20	20	7.3	3.1	8.9	–31.5
Total final consumption	**165**	**267**	**326**	**396**	**1.8**	**1.5**	**–6.0**	**–14.4**
Coal	18	31	36	43	1.2	1.2	–5.2	–12.1
Oil	143	216	261	308	1.7	1.4	–6.4	–15.8
of which transport	*81*	*133*	*160*	*194*	*1.7*	*1.5*	*–7.9*	*–19.1*
Gas	4	20	30	45	3.7	3.2	–3.3	–6.5

Alternative Policy Scenario: Middle East

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**235**	**479**	**693**	**861**	**3.4**	**2.3**	**–7.8**	**–15.8**
Coal	3	9	9	11	–0.6	0.6	–36.6	–42.9
Oil	151	265	370	423	3.1	1.8	–5.0	–8.9
Gas	78	202	304	405	3.8	2.7	–10.4	–23.0
Nuclear	0	0	2	2	–	–	–	–
Hydro	1	1	3	4	7.1	3.9	–	–
Biomass and waste	1	1	2	7	8.0	7.7	2.1	26.5
Other renewables	0	1	3	10	11.3	10.1	86.6	196.6
Power generation and heat plants	**63**	**152**	**210**	**266**	**3.0**	**2.2**	**–17.1**	**–31.3**
Coal	2	8	7	9	–1.4	0.5	–41.5	–45.0
Oil	29	54	66	68	1.8	0.9	–12.9	–20.5
Gas	30	89	132	176	3.7	2.7	–18.1	–35.9
Nuclear	0	0	2	2	–	–	–	–
Hydro	1	1	3	4	7.1	3.9	–	–
Biomass and waste	0	0	1	5	–	–	5.2	38.4
Other renewables	0	0	0	2	62.0	32.7	301.2	127.7
Other transformation, own use and losses	**20**	**58**	**78**	**104**	**2.8**	**2.3**	**–2.2**	**–5.6**
of which electricity	*4*	*10*	*16*	*22*	*4.1*	*3.0*	*–4.4*	*–11.3*
Total final consumption	**172**	**320**	**485**	**606**	**3.8**	**2.5**	**–3.4**	**–7.5**
Coal	0	1	1	1	5.7	2.1	–7.0	–32.1
Oil	116	193	278	320	3.4	2.0	–3.3	–6.6
Gas	38	84	137	183	4.5	3.0	–3.8	–9.8
Electricity	17	41	65	93	4.3	3.2	–4.4	–11.2
Heat	0	0	0	0	–	–	–	–
Biomass and waste	1	1	1	2	1.9	2.5	–0.6	2.0
Other renewables	0	1	2	8	10.3	9.2	76.9	219.6
Industry	**66**	**120**	**188**	**246**	**4.1**	**2.8**	**–3.4**	**–8.0**
Coal	0	1	1	1	5.7	2.1	–7.0	–32.1
Oil	28	53	68	84	2.4	1.8	–2.4	–5.9
Gas	35	59	104	139	5.3	3.4	–4.1	–9.4
Electricity	3	8	15	22	5.3	3.9	–2.8	–5.1
Heat	0	0	0	0	–	–	–	–
Biomass and waste	0	0	0	0	1.0	1.1	–5.6	–10.1
Other renewables	0	0	0	0	–	–	–	–
Transport	**59**	**100**	**144**	**156**	**3.4**	**1.7**	**–4.2**	**–6.4**
Oil	59	100	144	155	3.4	1.7	–4.2	–6.5
Biofuels	0	0	0	1	19.5	14.5	5.0	12.5
Other fuels	0	0	0	0	1.5	1.5	–	–
Residential, services and agriculture	**41**	**91**	**137**	**179**	**3.7**	**2.6**	**–2.6**	**–8.1**
Coal	0	0	0	0	–	–	–	–
Oil	23	32	50	56	4.2	2.2	–2.2	–8.1
Gas	3	26	34	44	2.5	2.1	–3.1	–11.3
Electricity	14	32	50	71	4.1	3.1	–4.8	–13.0
Heat	0	0	0	0	–	–	–	–
Biomass and waste	1	1	1	1	1.0	1.0	–	–
Other renewables	0	1	2	8	10.2	9.2	78.5	222.2
Non-energy use	**5**	**9**	**17**	**24**	**6.2**	**4.1**	**–2.4**	**–5.9**

Alternative Policy Scenario: Middle East

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**240**	**588**	**933**	**1 333**	**4.3**	**3.2**	**–4.4**	**–11.3**
Coal	10	37	33	46	–1.1	0.8	–41.5	–44.8
Oil	117	218	285	310	2.5	1.4	–1.3	–3.4
Gas	101	317	568	891	5.4	4.1	–3.1	–13.3
Nuclear	0	0	7	7	–	–	–	–
Hydro	12	17	35	45	7.1	3.9	–	–
Renewables (excluding hydro)	0	0	6	34	53.9	28.7	67.6	84.0
Biomass and waste	*0*	*0*	*3*	*13*	–	–	*5.2*	*38.4*
Wind	*0*	*0*	*3*	*12*	*61.8*	*29.6*	*317.0*	*130.0*
Geothermal	*0*	*0*	*0*	*0*	–	–	–	*15.3*
Solar	*0*	*0*	*0*	*10*	*0.0*	*24.3*	–	*124.6*
Tide and wave	*0*	*0*	*0*	*0*	–	–	–	*500.0*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	**182**	**288**	**418**	**4.3**	**3.3**	**–4.0**	**–9.8**
Coal	5	7	10	3.0	2.6	–6.2	–12.9
Oil	79	101	112	2.2	1.3	–2.9	–8.8
Gas	89	162	265	5.6	4.3	–5.4	–12.8
Nuclear	0	1	1	–	–	–	–
Hydro	9	16	20	5.0	3.0	–	–
of which pumped storage	*0*	*0*	*0*	–	–	–	–
Renewables (excluding hydro)	0	1	11	42.2	25.9	139.2	108.2
Biomass and waste	*0*	*0*	*2*	*44.1*	*23.7*	*14.2*	*41.6*
Wind	*0*	*1*	*4*	*51.7*	*26.1*	*416.7*	*137.2*
Geothermal	*0*	*0*	*0*	–	–	–	*15.3*
Solar	*0*	*0*	*5*	*0.0*	*26.9*	–	*126.4*
Tide and wave	*0*	*0*	*0*	–	–	–	*531.6*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**602**	**1 183**	**1 699**	**2 060**	**3.3**	**2.2**	**–7.7**	**–16.2**
Coal	12	36	35	43	–0.3	0.7	–36.2	–43.2
Oil	413	690	975	1 099	3.2	1.8	–3.9	–7.4
Gas	177	458	690	918	3.8	2.7	–10.6	–23.3
Power generation and heat plants	**172**	**407**	**540**	**659**	**2.6**	**1.9**	**–17.9**	**–32.3**
Coal	9	31	27	36	–1.4	0.5	–41.5	–45.0
Oil	92	169	206	213	1.8	0.9	–12.9	–20.5
Gas	71	207	308	411	3.7	2.7	–18.1	–35.9
Total final consumption	**381**	**676**	**1 026**	**1 232**	**3.9**	**2.3**	**–2.1**	**–6.0**
Coal	2	4	8	7	5.6	2.0	–7.0	–31.9
Oil	294	483	712	816	3.6	2.0	–1.2	–3.6
of which transport	*145*	*264*	*395*	*437*	*3.7*	*2.0*	*–0.3*	*–0.6*
Gas	85	189	307	408	4.5	3.0	–3.8	–9.9

Alternative Policy Scenario: Africa

	Energy demand (Mtoe)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total primary energy supply	**401**	**582**	**706**	**866**	**1.8**	**1.5**	**–3.6**	**–9.2**
Coal	74	101	105	109	0.4	0.3	–5.5	–16.8
Oil	90	121	151	194	2.0	1.8	–6.7	–14.4
Gas	31	64	113	159	5.3	3.5	–4.7	–12.8
Nuclear	2	3	4	4	0.9	0.4	–	–
Hydro	5	8	12	23	4.2	4.3	12.3	13.1
Biomass and waste	199	283	319	369	1.1	1.0	–1.8	–4.0
Other renewables	0	1	3	9	12.1	10.0	26.5	42.7
Power generation and heat plants	**69**	**116**	**162**	**240**	**3.1**	**2.8**	**–3.6**	**–7.8**
Coal	39	57	60	64	0.4	0.4	–8.5	–22.6
Oil	11	16	12	10	–2.2	–1.8	–1.5	–6.6
Gas	11	31	64	99	6.8	4.5	–6.1	–16.1
Nuclear	2	3	4	4	0.9	0.4	–	–
Hydro	5	8	12	23	4.2	4.3	12.3	13.1
Biomass and waste	0	0	9	36	45.2	23.5	36.3	59.3
Other renewables	0	1	1	6	5.9	8.0	1.0	36.1
Other transformation, own use and losses	**64**	**76**	**99**	**117**	**2.4**	**1.6**	**–1.3**	**–4.3**
of which electricity	*6*	*10*	*14*	*21*	*3.1*	*2.9*	*–3.9*	*–9.3*
Total final consumption	**294**	**434**	**511**	**614**	**1.5**	**1.3**	**–4.0**	**–10.6**
Coal	19	19	20	19	0.2	–0.1	–1.5	–8.4
Oil	74	109	134	176	2.0	1.9	–7.3	–15.3
Gas	9	20	29	37	3.2	2.3	–3.3	–8.3
Electricity	21	35	52	84	3.6	3.4	–3.9	–9.2
Heat	0	0	0	0	–	–	–	–
Biomass and waste	171	251	275	295	0.8	0.6	–2.9	–8.9
Other renewables	0	0	1	4	–	–	77.5	54.3
Industry	**69**	**86**	**107**	**126**	**2.0**	**1.5**	**–1.1**	**–2.9**
Coal	16	15	15	13	0.0	–0.5	–2.0	–11.6
Oil	16	15	19	21	2.1	1.3	–2.4	–6.0
Gas	8	15	20	24	2.6	1.8	–4.0	–9.3
Electricity	12	16	22	31	3.0	2.6	–2.2	–5.5
Heat	0	0	0	0	–	–	–	–
Biomass and waste	18	25	31	38	2.0	1.5	2.8	10.3
Other renewables	0	0	0	0	–	–	–	–
Transport	**39**	**65**	**80**	**116**	**1.9**	**2.3**	**–10.0**	**–18.6**
Oil	39	64	76	109	1.6	2.1	–10.7	–19.5
Biofuels	0	0	1	3	60.8	27.3	14.4	1.3
Other fuels	0	1	3	3	7.8	4.3	–	–
Residential, services and agriculture	**183**	**278**	**317**	**362**	**1.2**	**1.0**	**–3.4**	**–10.4**
Coal	3	5	5	6	1.1	0.9	–0.0	–0.3
Oil	16	25	33	36	2.6	1.5	–2.6	–8.3
Gas	1	4	6	9	3.6	3.3	–2.3	–8.5
Electricity	9	19	30	53	4.2	4.0	–5.0	–11.3
Heat	0	0	0	0	–	–	–	–
Biomass and waste	153	226	242	254	0.6	0.5	–3.6	–11.3
Other renewables	0	0	1	4	–	–	80.3	54.9
Non-energy use	**4**	**5**	**7**	**10**	**2.6**	**2.4**	**–2.3**	**–6.0**

Alternative Policy Scenario: Africa

	Electricity generation (TWh)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total generation	**316**	**534**	**776**	**1 227**	**3.5**	**3.3**	**–3.8**	**–9.2**
Coal	165	244	260	304	0.6	0.9	–9.5	–23.3
Oil	42	58	46	37	–2.0	–1.7	–1.5	–6.7
Gas	43	130	291	490	7.6	5.2	–7.3	–17.3
Nuclear	8	13	15	15	0.9	0.4	–	–
Hydro	56	88	137	262	4.2	4.3	12.3	13.1
Renewables (excluding hydro)	0	2	26	119	27.1	17.3	23.1	56.2
Biomass and waste	*0*	*0*	*19*	*73*	*45.4*	*23.5*	*36.4*	*59.3*
Wind	*0*	*1*	*5*	*23*	*18.8*	*13.9*	–	*45.4*
Geothermal	*0*	*1*	*3*	*10*	*11.8*	*10.2*	*0.6*	*14.1*
Solar	*0*	*0*	*0*	*13*	*14.6*	*35.0*	–	*129.0*
Tide and wave	*0*	*0*	*0*	*0*	–	–	–	*600.0*

	Capacity (GW)			Growth (% p.a.)		Change vs. RS (%)	
	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total capacity	112	172	284	4.0	3.6	–0.1	–3.5
Coal	39	45	54	1.3	1.2	–9.0	–22.2
Oil	19	21	19	0.8	–0.1	–1.4	–5.8
Gas	32	63	114	6.4	5.0	–6.2	–14.9
Nuclear	2	2	2	0.0	0.0	–	–
Hydro	20	36	68	5.5	4.9	29.1	28.6
of which pumped storage	*0*	*0*	*0*	–	–	–	–
Renewables (excluding hydro)	0	5	28	25.3	17.5	16.1	64.7
Biomass and waste	*0*	*3*	*11*	*44.8*	*23.2*	*31.6*	*57.3*
Wind	*0*	*2*	*8*	*19.6*	*14.4*	–	*49.1*
Geothermal	*0*	*0*	*1*	*11.7*	*10.2*	*0.6*	*14.1*
Solar	*0*	*0*	*7*	*0.0*	*27.2*	–	*130.9*
Tide and wave	*0*	*0*	*0*	–	–	–	*595.0*

	CO_2 emissions (Mt)				Growth (% p.a.)		Change vs. RS (%)	
	1990	2004	2015	2030	2004-2015	2004-2030	2015	2030
Total CO_2 emissions	**550**	**815**	**998**	**1 222**	**1.9**	**1.6**	**–6.1**	**–15.5**
Coal	235	316	327	337	0.3	0.2	–6.7	–19.6
Oil	249	354	409	509	1.3	1.4	–6.3	–14.4
Gas	65	144	263	376	5.6	3.8	–4.9	–13.2
Power generation and heat plants	**214**	**350**	**431**	**526**	**1.9**	**1.6**	**–7.1**	**–19.0**
Coal	152	229	238	254	0.4	0.4	–8.5	–22.6
Oil	35	47	36	28	–2.3	–2.0	–1.2	–6.0
Gas	26	74	157	245	7.1	4.7	–6.3	–16.2
Total final consumption	**304**	**422**	**511**	**634**	**1.8**	**1.6**	**–5.6**	**–13.5**
Coal	83	87	88	83	0.1	–0.2	–1.6	–8.9
Oil	202	292	363	473	2.0	1.9	–6.9	–15.0
of which transport	*104*	*174*	*209*	*300*	*1.7*	*2.1*	*–9.9*	*–18.8*
Gas	19	42	60	78	3.3	2.4	–3.2	–8.2

ELECTRICITY ACCESS

In a continuing effort to improve our understanding of the electrification process, we have updated, for the third time, the database on electrification rates that we first built for the *WEO-2002*. The database has grown in content and quality – with more detailed data on urban and rural electrification but also with more precise data from industry, national surveys and international sources.

The latest available information has been incorporated to give the most accurate picture to date of electricity access in the world, by region and by country. Several major revisions have been made, notably for Brazil, India, Iraq, Ethiopia and Yemen. For India, better and more recent census data and rural surveys have revised the electrification rates upwards. In the case of Iraq, previous data reflected grid network coverage (around 90%), while a recent detailed study by the UNDP has revealed that only 15% of the population has reliable access to electricity. Conflicts have also been taken into account, for instance for Côte d'Ivoire where the negative impact of the civil war on electricity access has been incorporated into the database.

There is no single internationally accepted definition for electricity access. The definition used here covers electricity access at the household level; that is, the number of people who have electricity in their home. It is comprised of electricity sold commercially, both on-grid and off-grid. It also includes self-generated electricity for those countries where access to electricity has been assessed through surveys by national administrations. The data do not capture unauthorised connections. The main data sources are listed in the tables. The electrification rates shown in this annex indicate the number of people with electricity access as a percentage of total population. Rural and urban electrification rates have been collected for most countries, but only the regional averages are shown here.

Where country data appeared contradictory, out of date or unreliable, the IEA Secretariat made estimates based on cross-country comparisons, earlier surveys, data from other international organisations, annual statistical bulletins, publications and journals.[1] Population and urban/rural breakdown projections are taken from *World Population Prospects – The 2004 Revision*, published by the United Nations Population Division.

1. See *WEO* (2002) for approach and methodology.

Contents

The tables which follow show electricity access in 2005 for regional aggregates as well as for the following regions:

- Africa
- Developing Asia
- Latin America
- Middle East

Abbreviations

ADB – Asian Development Bank
ADIAC – Agence d'information d'Afrique centrale
AFREPREN – African Energy Policy Research Network
APERC – Asia Pacific Energy Research Centre
AREED – African Rural Energy Enterprise Development
BPE – Bureau of Public Enterprises, Nigeria
CNHDE – Center for National Health Development in Ethiopia
DHS – Demographic and Health Surveys
DOE – US Department of Energy
ECLAC – Economic Commission for Latin America and the Caribbean
EEPCo – Ethiopian Electric Power Corporation
ESMAP – Energy Sector Management Assistance Programme
GNESD – Global Network on Energy for Sustainable Development
GPOBA – Global Partnership on Output-Based Aid
ILO – International Labour Organization
JICA – Japan International Cooperation Agency
JIRAMA – Jiro sy Rano Malagasy (national water and electricity company), Madagascar
MEMR – Ministry of Energy and Mineral Resources, Indonesia
NRECA – National Rural Electric Cooperative Association
OECD – Organisation for Economic Co-operation and Development
OLADE – Latin American Energy Association
OME – Observatoire Méditerranéen de l'Energie
PLN – National Electric Company, Indonesia
SADC – South African Development Community
TERI – Tata Energy Research Institute, India
UNDP – United Nations Development Programme
USAID – The United States Agency for International Development

Table B1: **Electricity Access in 2005: Regional Aggregates**

	Population million	Urban population million	Population without electricity million	Population with electricity million	Electrification rate %	Urban electrification rate %	Rural electrification rate %
Africa	891	343	554	337	37.8	67.9	19.0
North Africa	*153*	*82*	*7*	*146*	*95.5*	*98.7*	*91.8*
Sub-Saharan Africa	*738*	*261*	*547*	*191*	*25.9*	*58.3*	*8.0*
Developing Asia	3 418	1 063	930	2 488	72.8	86.4	65.1
China and East Asia	*1 951*	*772*	*224*	*1 728*	*88.5*	*94.9*	*84.0*
South Asia	*1 467*	*291*	*706*	*760*	*51.8*	*69.7*	*44.7*
Latin America	449	338	45	404	90.0	98.0	65.6
Middle East	186	121	41	145	78.1	86.7	61.8
Developing countries	**4 943**	**1 866**	**1 569**	**3 374**	**68.3**	**85.2**	**56.4**
Transition economies and OECD	**1 510**	**1 090**	**8**	**1 501**	**99.5**	**100.0**	**98.1**
World	**6 452**	**2 956**	**1 577**	**4 875**	**75.6**	**90.4**	**61.7**

Table B2: **Electricity Access in 2005: Africa**

	Electrification rate %	Population without electricity million	Population with electricity million	Sources
Angola	15.0	13.5	2.4	Empresa Nacional de Electricidade de Angola (2005), SADC (2005)
Benin	22.0	6.5	1.8	ESMAP, Société Béninoise d'Electricité et d'Eau (2004)
Botswana	38.5	1.1	0.7	Botswana Power Corporation Annual Report (2005), SADC (2005)
Burkina Faso	7.0	12.4	0.9	OECD (2003), ESMAP, Mbendi.co.za
Cameroon	47.0	8.7	7.7	ILO/International Institute for Labour Studies (2004), *Cameroon Tribune* (2003)
Congo	19.5	3.2	0.8	ADIAC
Dem. Rep. of Congo	5.8	53.8	3.3	GNESD (2004), SADC (2005)
Côte d'Ivoire	50.0	9.1	9.1	UNDP (2003)
Eritrea	20.2	3.5	0.9	Risoe - Energy for Development (2003)
Ethiopia	15.0	60.8	10.7	EEPCo (2003), US Department of Commerce (2002), CNHDE (2004), Addis Ababa University
Gabon	47.9	0.7	0.7	ESMAP (2000)
Ghana	49.2	11.3	10.9	Energy Foundation of Ghana, Volta River Authority (2004)
Kenya	14.0	29.4	4.8	Kenya Power and Lighting Company (2004)
Lesotho	11.0	1.9	0.2	GNESD (2004)
Madagascar	15.0	15.2	2.7	GNESD (2004), JIRAMA (2004)
Malawi	7.0	11.8	0.9	AFREPREN (2001), SADC (2004)
Mauritius	93.6	0.1	1.2	AFREPREN (2002), SADC (2004)
Mozambique	6.3	18.6	1.3	SADC (2004)
Namibia	34.0	1.4	0.7	SADC (2005)
Nigeria	46.0	71.1	60.5	ESMAP (2005), Ministry of Power (2006), BPE (2006)

Table B2: **Electricity Access in 2005: Africa** *(continued)*

Senegal	33.0	7.8	3.8	GNESD (2004), Commission de Régulation du Secteur de l'Electricité du Sénégal (2004)
South Africa	70.0	14.0	32.6	SADC (2005)
Sudan	30.0	25.4	10.9	SADC (2005), Engineers Without Borders (2004)
Tanzania	11.0	34.2	4.2	SADC (2005), Helio International
Togo	17.0	5.1	1.0	ESMAP (1998)
Uganda	8.9	24.6	2.4	AFREPREN (2001), Ugandan National Administration (2005)
Zambia	19.0	9.5	2.2	AFREPREN (2001), DHS (2001/2002)
Zimbabwe	34.0	8.7	4.5	SADC (2005), AFREPREN
Other Africa	7.6	83.6	6.9	IEA estimate
Sub-Saharan Africa	**25.9**	**546.9**	**190.7**	
Algeria	98.1	0.6	32.3	Ministry of Energy and Mining, Sonelgaz (2004), OME (2006)
Egypt	98.0	1.5	72.4	US Department of Commerce (2004), OME (2006)
Libya	97.0	0.2	5.7	OME (2006)
Morocco	85.1	4.5	25.8	Ministry of Energy and Mines, Office National de l'Electricité *(Annual Report 2004)*
Tunisia	98.9	0.1	10.0	ESI Africa, Institut National de la Statistique, OME (2006)
North Africa	**95.5**	**6.9**	**146.1**	
Africa	**37.8**	**553.7**	**336.8**	

Table B3: **Electricity Access in 2005: Developing Asia**

	Electrification rate %	Population without electricity million	Population with electricity million	Sources
China	99.4	8.5	1 302.1	Ministry of Science and Technology, DOE, National Renewable Energy Laboratory
Brunei	99.2	0.0	0.4	APERC
Cambodia	20.1	10.9	2.7	World Bank (2004), Ministry of Planning
Chinese Taipei	99.2	0.2	22.9	IEA estimate
DPR Korea	22.0	17.7	5.0	IEA estimate
Indonesia	54.0	101.2	118.8	PLN *Annual Report* (2005), MEMR (2002)
Malaysia	97.8	0.6	24.7	GNESD (2000)
Mongolia	64.6	1.0	1.8	Helio International (2000)
Myanmar	11.3	45.1	5.7	Myanmar Electric Power Enterprise (2003)
Philippines	80.5	16.2	66.8	National Electrification Administration (2005), GPOBA (2003), JICA (2006)
Singapore	100.0	0.0	4.3	GNESD (2000)
Thailand	99.0	0.6	64.1	AFREPREN/GNESD (2004), Electricity Generating Authority *Annual Report* (2004)
Vietnam	84.2	13.2	70.3	World Bank (2005), Electricity of Vietnam (2005)
Other Asia	82.0	8.3	37.9	IEA estimate
China and East Asia	**88.5**	**223.5**	**1 727.5**	
Afghanistan	7.0	27.0	2.0	World Bank, USAID (2005)
Bangladesh	32.0	96.2	45.3	GNESD (2000), Bangladesh Power Development Board, USAID (2005)
India	55.5	487.2	607.6	USAID (2005), TERI (2006), Ministry of Power (2004/2005), Census (2001)
Nepal	33.0	18.1	8.9	ADB (2004), USAID (2005)
Pakistan	54.0	71.1	83.5	Water and Power Development Authority (2005), USAID (2005)
Sri Lanka	66.0	6.7	13.0	GNESD (2001), USAID (2005)
South Asia	**51.8**	**706.2**	**760.3**	
Developing Asia	**72.8**	**929.8**	**2 487.8**	

Table B4: **Electricity Access in 2005: Latin America**

	Electrification rate %	**Population without electricity** million	**Population with electricity** million	**Sources**
Argentina	95.4	1.8	37.1	GNESD (2004), ECLAC (2002)
Bolivia	64.4	3.3	5.9	ECLAC (2003), OLADE (2002)
Brazil	96.5	6.5	179.7	ECLAC (2003)
Chile	98.6	0.2	16.1	APERC, ECLAC (2003)
Colombia	86.1	6.3	39.2	ECLAC (2003)
Costa Rica	98.5	0.1	4.2	ECLAC (2002)
Cuba	95.8	0.5	10.9	OLADE (2002)
Dominican Republic	92.5	0.7	8.2	DHS (2002), OLADE (2002)
Ecuador	90.3	1.3	11.9	ECLAC (2002)
El Salvador	79.5	1.4	5.5	GNESD (2004), ECLAC (2004)
Guatemala	78.6	2.7	9.8	ESMAP (1998/1999), DHS, OLADE (2002)
Haiti	36.0	5.5	3.1	DHS (2000), Engineers Without Borders (2004)
Honduras	61.9	2.7	4.4	ECLAC (2003)
Jamaica	87.3	0.3	2.3	OLADE (2002)
Netherlands Antilles	99.6	0.0	0.2	IEA estimate
Nicaragua	69.3	1.7	3.8	ECLAC (2002), DHS (2001), Global Environment Facility (2001)
Panama	85.2	0.5	2.7	OLADE (2000)
Paraguay	85.8	0.9	5.2	OLADE (2002)
Peru	72.3	7.7	20.2	ECLAC (2004)
Trinidad and Tobago	99.1	0.0	1.3	OLADE (1997)
Uruguay	95.4	0.2	3.3	US Commercial Service (2005)
Venezuela	98.6	0.4	26.1	ECLAC (2003)
Other Latin America	87.3	0.4	2.9	IEA estimate
Latin America	**90.0**	**44.9**	**404.3**	

Table B5: **Electricity Access in 2005: Middle East**

	Electrification rate %	Population without electricity million	Population with electricity million	Sources
Bahrain	99.0	0.0	0.7	World Bank (2004)
Iran	97.3	1.8	66.6	Tavanir, World Energy Council, Sustainable Energy Watch (2005/2006)
Iraq	15.0	22.0	3.9	UNDP - Iraq Living Conditions Survey (2004)
Israel	96.6	0.2	6.7	Israel Electric Corporation *Annual Report* (2004), OME (2006)
Jordan	99.9	0.0	5.5	OME (2006), World Bank
Kuwait	100.0	0.0	2.5	IEA estimate
Lebanon	99.9	0.0	3.6	OME (2006)
Oman	95.5	0.1	2.5	IEA estimate
Qatar	70.5	0.2	0.6	IEA estimate
Saudi Arabia	96.7	0.8	23.6	Ministry of Water and Electricity (2005)
Syria	90.0	1.9	17.1	UNDP, OME (2006)
United Arab Emirates	91.9	0.4	4.1	IEA estimate based on World Bank
Yemen	36.2	13.2	7.5	Ministry of Electricity (2004), World Bank (2005), NRECA (2004)
Middle East	**78.1**	**40.7**	**144.8**	

ABBREVIATIONS AND DEFINITIONS

This annex provides general information on abbreviations, fuel, process and regional definitions, and country groupings used throughout *WEO-2006*. Conversion factors for oil, gas and coal have also been included. Readers interested in obtaining more detailed information should consult the annual IEA publications *Energy Balances of OECD Countries; Energy Balances of Non-OECD Countries; Energy Statistics of OECD Countries; Energy Statistics of Non-OECD Countries; Coal Information; Oil Information; Gas Information;* and *Renewables Information.*

Abbreviations

Oil	b/d	barrels per day
	kb/d	thousand barrels per day
	mb/d	million barrels per day
	mpg	miles per gallon
Gas	tcf	thousand cubic feet
	mcm	million cubic metres
	bcm	billion cubic metres
	tcm	trillion cubic metres
Oil and Gas	boe	barrels of oil equivalent
Energy	toe	tonne of oil equivalent
	Mtoe	million tonnes of oil equivalent
	MBtu	million British thermal units
	GJ	gigajoule (1 joule x 10^9)
	EJ	exajoule (1 joule x 10^{18})
	kWh	kilowatt-hour
	MWh	megawatt-hour
	GWh	gigawatt-hour
	TWh	terawatt-hour
Power	W	Watt (1 joule per second)
	kW	kilowatt (1 Watt x 10^3)
	MW	megawatt (1 Watt x 10^6)
	GW	gigawatt (1 Watt x 10^9)
	TW	terawatt (1 Watt x 10^{12})
Mass	kt	kilotonnes (1 tonne x 10^3)

	Mt	million tonnes (1 tonne x 10^6)
	Gt	gigatonnes (1 tonne x 10^9)
Coal	tce	tonne of coal equivalent
Area	ha/yr	hectare per year
	Gha	giga-hectare (1 hectare x 10^9)

Fuel Definitions

Biodiesel

Biodiesel is a diesel-equivalent, processed fuel made from the transesterification (a chemical process which removes the glycerine from the oil) of both vegetable oils and animal fats.

Biogas

A mixture of methane and carbon dioxide produced by bacterial degradation of organic matter in a limited amount of oxygen known as anaerobic digestion.

Biomass and Waste

Solid biomass and animal products, gas and liquids derived from biomass and the renewable part of municipal waste.

Brown Coal

Includes sub-bituminous coal and lignite where sub-bituminous coal is defined as non-agglomerating coal with a gross calorific value between 4 165 kcal/kg and 5 700 kcal/kg, and lignite is defined as non-agglomerating coal with a gross calorific value less than 4 165 kcal/kg.

Clean Coal Technologies (CCTs)

Clean coal technologies are designed to enhance the efficiency and the environmental acceptability of coal extraction, preparation and use.

Coal

Coal includes both primary coal (including hard coal and lignite) and derived fuels (including patent fuel, brown-coal briquettes, coke-oven coke, gas coke, coke-oven gas and blast-furnace gas). Peat is also included in this category.

Condensates

Condensates are liquid hydrocarbon mixtures recovered from non-associated gas reservoirs. They are composed of C_4 and higher carbon number hydrocarbons and normally have an API between 50° and 85°.

Dimethyl Ether (DME)

Clear, odourless gas currently produced by dehydration of methanol from natural gas, but which can also be produced from biomass or coal.

Ethanol

Ethanol is an alcohol made by fermenting any biomass high in carbohydrates. Today, ethanol is made from starches and sugars, but advanced technology will allow it to be made from cellulose and hemicellulose, the fibrous material that makes up the bulk of most plant matter.

Ethanol Gel

Flammable blended product which can be combusted cleanly in small cookstoves and heaters.

Gas

Includes natural gas (both associated and non-associated with petroleum deposits but excluding natural gas liquids) and gas-works gas.

Gas-to-Liquids (GTLs)

Fischer-Tropsch technology is used to convert natural gas into synthesis gas (syngas) and then, through catalytic reforming or synthesis, into very clean conventional oil products. The main fuel produced in most GTL plants is diesel.

Hard Coal

Coal of gross calorific value greater than 5 700 kcal/kg on an ash-free but moist basis and with a mean random reflectance of vitrinite of at least 0.6. Hard coal is further disaggregated into coking coal and steam coal.

Heavy Petroleum Products

Heavy petroleum products include heavy fuel oil.

Hydro

Hydro refers to the energy content of the electricity produced in hydropower plants, assuming 100% efficiency.

Light Petroleum Products

Light petroleum products include liquefied petroleum gas (LPG), naphtha and gasoline.

Middle Distillates

Middle distillates include jet fuel, diesel and heating oil.

Natural Gas Liquids (NGLs)

Natural gas liquids are the liquid or liquefied hydrocarbons produced in the manufacture, purification and stabilisation of natural gas. These are those portions of natural gas which are recovered as liquids in separators, field facilities, or gas-processing plants. NGLs include but are not limited to ethane, propane, butane, pentane, natural gasoline and condensates. They may also include small quantities of non-hydrocarbons.

Non-hydro Renewables

Includes biomass, geothermal, solar, wind, tide and wave energy for electricity generation.

Nuclear

Nuclear refers to the primary heat equivalent of the electricity produced by a nuclear plant with an average thermal efficiency of 33%.

Oil

Oil includes crude oil, condensates, natural gas liquids, refinery feedstocks and additives, other hydrocarbons and petroleum products (refinery gas, ethane, LPG, aviation gasoline, motor gasoline, jet fuels, kerosene, gas/diesel oil, heavy fuel oil, naphtha, white spirit, lubricants, bitumen, paraffin waxes, petroleum coke and other petroleum products).

Other Petroleum Products

Other petroleum products include refinery gas, ethane, lubricants, bitumen, petroleum coke and waxes.

Process Definitions

Electricity Generation

Electricity generation is the total amount of electricity generated by power plants. It includes own use and transmission and distribution losses.

Greenfield

The construction of plants or facilities in new areas or where no previous infrastructure exists.

International Marine Bunkers

International marine bunkers cover those quantities delivered to sea-going ships of all flags, including warships. Consumption by ships plying in inland and coastal waters is not included.

Ligno-Cellulosic Technology

Process to produce ethanol from wood or straw by using chemical acid or enzymatic hydrolysis to rupture the plant cells and then separate out the cellulose and hemi-cellulose components to convert to sugars. The residual lignin can be used for heat and power generation.

Lower Heating Value (LHV)

Lower heating value is the heat liberated by the complete combustion of a unit of fuel when the water produced is assumed to remain as a vapour and the heat is not recovered.

Natural Decline Rate

The base production decline rate of an oil or gas field without intervention to enhance production.

Observed Decline Rate

The production decline rate of an oil or gas field after all measures have been taken to maximise production. It is the aggregation of all the production increases and declines of new and mature oil or gas fields in a particular region.

Other Transformation, Own Use and Losses

Other transformation, own use and losses covers the use of energy by transformation industries and the energy losses in converting primary energy into a form that can be used in the final consuming sectors. It includes energy use and loss by gas works, petroleum refineries, coal and gas transformation and liquefaction. It also includes energy used in coal mines, in oil and gas extraction and in electricity and heat production. Transfers and statistical differences are also included in this category.

Other Sectors

Other sectors include the residential, services, public and agriculture sectors.

Power and Heat Generation

Power generation refers to fuel use in electricity plants, heat plants and combined heat and power (CHP) plants. Both public plants and small plants that produce fuel for their own use (autoproducers) are included.

Total Final Consumption (TFC)

Total final consumption is the sum of consumption by the different end-use sectors. TFC is broken down into energy demand in the following sectors: industry, transport, other (includes agriculture, residential, services and public) and non-energy use. Industry includes manufacturing, construction and mining industries. In final consumption, petrochemical feedstocks appear under industry use. Other non-energy uses are shown under non-energy use.

Total Primary Energy Demand

Total primary energy demand represents domestic demand only, including power generation, other transformation, own use and losses, and total final consumption. Except in the case of world primary energy demand, it excludes international marine bunkers.

Regional Definitions and Country Groupings

Africa

Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Democratic Republic of Congo, Côte d'Ivoire, Djibouti, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Reunion, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, United Republic of Tanzania, Togo, Tunisia, Uganda, Zambia and Zimbabwe.

Annex I Parties to the United Nations Framework Convention on Climate Change

Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, European Community, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom and United States.

Central Asia

Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan.

China
China refers to the People's Republic of China, including Hong Kong.

Developing Asia
Afghanistan, Bangladesh, Bhutan, Brunei, Cambodia, China, Chinese Taipei, Fiji, French Polynesia, India, Indonesia, Kiribati, Democratic People's Republic of Korea, Laos, Macau, Malaysia, Maldives, Mongolia, Myanmar, Nepal, New Caledonia, Pakistan, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Sri Lanka, Thailand, Tonga, Vietnam and Vanuatu.

Developing Countries
Includes countries in the Africa, Developing Asia, Latin America and Middle East regional groupings.

European Union
Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and United Kingdom.

G8 Countries
Canada, France, Germany, Italy, Japan, Russia, United Kingdom and United States.

Latin America
Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, French Guiana, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, St. Kitts and Nevis, Saint Lucia, St. Vincent and Grenadines, Suriname, Trinidad and Tobago, Uruguay and Venezuela.

MENA
Middle East and North Africa.

Middle East
Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates and Yemen. It includes the neutral zone between Saudi Arabia and Iraq.

North Africa
Algeria, Egypt, Libya, Morocco and Tunisia.

OECD Asia
Japan and Korea.

OECD Europe
Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, and United Kingdom.

OECD North America
United States, Canada and Mexico.

OECD Oceania
Australia and New Zealand.

OECD Pacific
Japan, Korea, Australia and New Zealand.

Organization of the Petroleum Exporting Countries
Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates and Venezuela.

Sub-Saharan Africa
Africa excluding North Africa.

Transition Economies
Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Estonia, Serbia and Montenegro, the former Yugoslav Republic of Macedonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Romania, Russia, Slovenia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. For statistical reasons, this region also includes Cyprus, Gibraltar and Malta.

Average Conversion Factors

Coal	1 Mtoe = 2.0003 million tonnes
Oil	1 Mtoe = 0.0209 mb/d
Gas	1 Mtoe = 1.2073 bcm

These are world averages for the period 2004 to 2030. Region-specific factors are used to convert Mtoe data in this publication to other units.

ACRONYMS

APS	Alternative Policy Scenario
BAPS	Beyond Alternative Policy Scenario
CCGT	combined-cycle gas turbine
CCS	CO_2 capture and storage
CCT	clean coal technology
CDM	Clean Development Mechanism (under the Kyoto Protocol)
CDU	crude distillation unit
CHP	combined heat and power; when referring to industrial CHP, the term co-generation is sometimes used
CNG	compressed natural gas
CO_2	carbon dioxide
DIC	Deferred Investment Case
DME	dimethyl ether
E&P	exploration and production
EOR	enhanced oil recovery
EPACT	Energy Policy Act (in the United States)
EPC	engineering, procurement and construction
ESCO	Energy Service Company
EU	European Union
EU CAP	European Union Common Agricultural Policy
EU ETS	European Union Emissions Trading Scheme
FAO	Food and Agriculture Organization of the United Nations
FDI	foreign direct investment
FFV	flex-fuel vehicle

GDP	gross domestic product
GHG	greenhouse gas
GTL	gas-to-liquids
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
IAEA	International Atomic Energy Agency
IAP	indoor air pollution
ICE	internal combustion engine
IEA	International Energy Agency
IGCC	integrated gasification combined cycle
IMF	International Monetary Fund
IOC	international oil company
IPP	independent power producer
LHV	lower heating value
LNG	liquefied natural gas
LPG	liquefied petroleum gas
MDG	Millennium Development Goal
MSC	multiple service contract
NEA	Nuclear Energy Agency
NIMBY	not-in-my-backyard
NGL	natural gas liquid
NOC	national oil company
OCGT	open-cycle gas turbine
OECD	Organisation for Economic Co-operation and Development
OPEC	Organization of the Petroleum Exporting Countries
PPP	purchasing power parity
PSA	production-sharing agreement

RS	Reference Scenario
TFC	total final consumption
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USGS	United States Geological Survey
WB	World Bank
WEM	World Energy Model
WHO	World Health Organization
WTI	West Texas Intermediate

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