Annex

Table A1 | Regional groupings

Asia	People's Republic of China	
	Hong Kong	
	India	
	Japan	
	Korea	
	Chinese Taipei	
	ASEAN	Brunei Darussalam
		Cambodia
		Indonesia
		Lao P.D.R.
		Malaysia
		Myanmar
		Philippines
		Singapore
		Thailand
		Viet Nam
	Others	Bangladesh, D. P. R. Korea, Mongolia, Nepal, Pakistan, Sri Lanka, and Other Asia excluding Lao P.D.R. in IEA statistics
North America	United States	
	Canada	
Latin America	Brazil	
	Chile	
	Mexico	
	Others	Argentina, Bolivia, Colombia, Costa Rica, Cuba, Curaçao, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay, Venezuela, and Other Non–OECD Americas in IEA statistics
Europe	OECD Europe	France
		Germany
		Italy
		United Kingdom

		Others	Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Iceland, Ireland, Latvia, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, and Turkey
	Non-OECD Europe	Russia	
		Other non-OECD former Soviet Union	Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Lithuania, Moldova, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan
		Others	Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Gibraltar, Kosovo, Former Yugoslav Republic of Macedonia, Malta, Montenegro, Romania, and Serbia
Africa	Republic of South Africa		
	North Africa	Algeria, Egypt, Libya, Morocco, and Tunisia	
	Others	Angola, Benin, Botswana, Cameroon, Democratic Republic of Congo, Congo, Côte d'Ivoire, Eritrea, Ethiopia, Gabon, Ghana, Kenya, Mauritius, Mozambique, Namibia, Niger, Nigeria, Senegal, South Sudan, Sudan, Togo, United Republic of Tanzania, Zambia, Zimbabwe, and Other Africa in IEA statistics	
Middle East	Iran		
	Iraq		
	Kuwait		
	Oman		
	Qatar		
	Saudi Arabia		
	United Arab Emirates		
	Others	Bahrain, Israel, Jordan, Lebanon, Syrian Arab Republic, and Yemen	
Oceania	Australia		
	New Zealand		
International bunkers			

European Union	Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden, and the United Kingdom
OECD	Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States

Notes: (1) Other non-OECD former Soviet Union includes energy data of Estonia and Latvia before 1990, and (2) OECD does not include Israel.

Table A2 | Major energy and economic indicators

				Reference		Advanced Technologies		CAGR (%)		
								1990/	2015/2050	
		1990	2015	2030	2050	2030	2050	2015	Reference	Adv. Tech.
Total primary energy consumption (Mtoe)	**World**	**8,774**	**13,647**	**16,562**	**19,789**	**15,717**	**17,219**	**1.8**	**1.1**	**0.7**
	Asia	2,108	5,459	7,434	9,351	7,078	8,156	3.9	1.5	1.2
	China	871	2,973	3,695	4,021	3,485	3,416	5.0	0.9	0.4
	India	306	851	1,585	2,545	1,492	2,158	4.2	3.2	2.7
	Japan	439	430	433	391	425	369	-0.1	-0.3	-0.4
Oil consumption (Mtoe)	**World**	**3,235**	**4,334**	**5,024**	**5,849**	**4,625**	**4,656**	**1.2**	**0.9**	**0.2**
	Asia	618	1,330	1,820	2,323	1,720	1,974	3.1	1.6	1.1
	China	119	534	763	795	722	673	6.2	1.1	0.7
	India	61	206	377	683	358	582	5.0	3.5	3.0
	Japan	250	185	151	115	141	100	-1.2	-1.4	-1.7
Natural gas consumption (Mtoe)	**World**	**1,663**	**2,944**	**3,845**	**5,194**	**3,584**	**4,157**	**2.3**	**1.6**	**1.0**
	Asia	116	547	965	1,567	906	1,294	6.4	3.1	2.5
	China	13	159	343	561	333	448	10.6	3.7	3.0
	India	11	43	124	274	122	235	5.8	5.4	5.0
	Japan	44	100	98	98	86	82	3.3	-0.1	-0.6
Coal consumption (Mtoe)	**World**	**2,220**	**3,836**	**4,254**	**4,531**	**3,606**	**2,937**	**2.2**	**0.5**	**-0.8**
	Asia	785	2,739	3,320	3,754	2,848	2,499	5.1	0.9	-0.3
	China	528	1,982	2,096	1,935	1,806	1,219	5.4	-0.1	-1.4
	India	93	379	720	1,143	606	775	5.8	3.2	2.1
	Japan	76	117	112	104	103	76	1.7	-0.3	-1.2
Power generation (TWh)	**World**	**11,864**	**24,255**	**32,965**	**44,838**	**31,482**	**39,733**	**2.9**	**1.8**	**1.4**
	Asia	2,252	10,204	15,895	22,874	15,136	20,032	6.2	2.3	1.9
	China	621	5,844	8,441	10,763	8,036	9,298	9.4	1.8	1.3
	India	293	1,383	3,106	5,663	2,904	4,845	6.4	4.1	3.6
	Japan	873	1,035	1,136	1,150	1,109	1,091	0.7	0.3	0.1
Energy-related carbon dioxide emissions (Mt)	**World**	**77,751**	**120,668**	**139,852**	**161,725**	**122,382**	**108,897**	**1.8**	**0.8**	**-0.3**
	Asia	18,033	55,278	71,356	86,921	62,360	58,583	4.6	1.3	0.2
	China	8,575	34,222	39,309	38,563	34,461	25,442	5.7	0.3	-0.8
	India	1,988	7,726	14,813	25,118	12,801	17,228	5.6	3.4	2.3
	Japan	3,928	4,207	3,750	3,243	3,391	2,535	0.3	-0.7	-1.4
Primary energy consumption per GDP (toe/$2010 million)	**World**	**232**	**182**	**144**	**103**	**136**	**90**	**-1.0**	**-1.6**	**-2.0**
	Asia	278	244	174	114	166	100	-0.5	-2.2	-2.5
	China	1,050	334	182	100	172	85	-4.5	-3.4	-3.8
	India	651	372	258	160	243	136	-2.2	-2.4	-2.8
	Japan	94	72	62	47	61	44	-1.1	-1.2	-1.4
Primary energy consumption per capita (toe/person)	**World**	**1.66**	**1.86**	**1.95**	**2.04**	**1.85**	**1.77**	**0.5**	**0.3**	**-0.1**
	Asia	0.72	1.37	1.68	2.01	1.60	1.75	2.6	1.1	0.7
	China	0.77	2.17	2.61	3.00	2.46	2.55	4.2	0.9	0.5
	India	0.35	0.65	1.05	1.53	0.98	1.30	2.5	2.5	2.0
	Japan	3.55	3.39	3.59	3.62	3.52	3.42	-0.2	0.2	0.0
GDP ($2010 billion)	**World**	**37,797**	**75,059**	**115,303**	**191,400**	**115,303**	**191,400**	**2.8**	**2.7**	**2.7**
	Asia	7,586	22,344	42,637	81,910	42,637	81,910	4.4	3.8	3.8
	China	830	8,910	20,311	40,328	20,311	40,328	10.0	4.4	4.4
	India	470	2,288	6,133	15,857	6,133	15,857	6.5	5.7	5.7
	Japan	4,683	5,986	6,948	8,329	6,948	8,329	1.0	0.9	0.9
Population (Million)	**World**	**5,277**	**7,336**	**8,497**	**9,710**	**8,497**	**9,710**	**1.3**	**0.8**	**0.8**
	Asia	2,932	3,993	4,433	4,658	4,433	4,658	1.2	0.4	0.4
	China	1,135	1,371	1,415	1,340	1,415	1,340	0.8	-0.1	-0.1
	India	871	1,311	1,515	1,662	1,515	1,662	1.7	0.7	0.7
	Japan	124	127	121	108	121	108	0.1	-0.5	-0.5

Table A3 | Population

(Million)

	1990	2000	2015	2030	2040	2050	CAGR (%) 1990/2015	2015/2030	2030/2040	2040/2050	2015/2050
World	5,277 (100)	6,108 (100)	7,336 (100)	8,497 (100)	9,152 (100)	9,710 (100)	1.3	1.0	0.7	0.6	0.8
Asia	2,932 (55.6)	3,407 (55.8)	3,993 (54.4)	4,433 (52.2)	4,595 (50.2)	4,658 (48.0)	1.2	0.7	0.4	0.1	0.4
China	1,135 (21.5)	1,263 (20.7)	1,371 (18.7)	1,415 (16.6)	1,391 (15.2)	1,340 (13.8)	0.8	0.2	-0.2	-0.4	-0.1
India	871 (16.5)	1,053 (17.2)	1,311 (17.9)	1,515 (17.8)	1,608 (17.6)	1,662 (17.1)	1.7	1.0	0.6	0.3	0.7
Japan	124 (2.3)	127 (2.1)	127 (1.7)	121 (1.4)	114 (1.2)	108 (1.1)	0.1	-0.3	-0.5	-0.6	-0.5
Korea	43 (0.8)	47 (0.8)	51 (0.7)	53 (0.6)	52 (0.6)	50 (0.5)	0.7	0.3	-0.1	-0.4	0.0
Chinese Taipei	20 (0.4)	22 (0.4)	23 (0.3)	24 (0.3)	24 (0.3)	23 (0.2)	0.6	0.2	-0.1	-0.5	-0.1
ASEAN	430 (8.1)	505 (8.3)	608 (8.3)	696 (8.2)	736 (8.0)	761 (7.8)	1.4	0.9	0.6	0.3	0.6
Indonesia	181 (3.4)	212 (3.5)	258 (3.5)	295 (3.5)	312 (3.4)	322 (3.3)	1.4	0.9	0.6	0.3	0.6
Malaysia	18 (0.3)	23 (0.4)	30 (0.4)	36 (0.4)	39 (0.4)	41 (0.4)	2.1	1.2	0.7	0.5	0.9
Myanmar	42 (0.8)	48 (0.8)	54 (0.7)	61 (0.7)	63 (0.7)	64 (0.7)	1.0	0.8	0.4	0.1	0.5
Philippines	62 (1.2)	78 (1.3)	101 (1.4)	124 (1.5)	138 (1.5)	150 (1.5)	2.0	1.4	1.1	0.8	1.1
Singapore	3 (0.1)	4 (0.1)	6 (0.1)	6 (0.1)	7 (0.1)	7 (0.1)	2.4	0.9	0.3	0.0	0.5
Thailand	57 (1.1)	63 (1.0)	68 (0.9)	69 (0.8)	68 (0.7)	65 (0.7)	0.7	0.1	-0.2	-0.4	-0.1
Viet Nam	66 (1.3)	78 (1.3)	92 (1.3)	104 (1.2)	109 (1.2)	112 (1.2)	1.3	0.9	0.5	0.3	0.6
Asia excl. Japan	2,809 (53.2)	3,281 (53.7)	3,866 (52.7)	4,313 (50.8)	4,481 (49.0)	4,551 (46.9)	1.3	0.7	0.4	0.2	0.5
North America	277 (5.3)	313 (5.1)	357 (4.9)	397 (4.7)	419 (4.6)	436 (4.5)	1.0	0.7	0.5	0.4	0.6
United States	250 (4.7)	282 (4.6)	321 (4.4)	356 (4.2)	376 (4.1)	391 (4.0)	1.0	0.7	0.5	0.4	0.6
Latin America	442 (8.4)	522 (8.5)	629 (8.6)	715 (8.4)	754 (8.2)	777 (8.0)	1.4	0.9	0.5	0.3	0.6
OECD Europe	502 (9.5)	524 (8.6)	566 (7.7)	586 (6.9)	591 (6.5)	589 (6.1)	0.5	0.2	0.1	0.0	0.1
European Union	478 (9.1)	488 (8.0)	510 (6.9)	524 (6.2)	526 (5.7)	523 (5.4)	0.3	0.2	0.0	-0.1	0.1
Non-OECD Europe	341 (6.5)	339 (5.5)	341 (4.7)	344 (4.1)	341 (3.7)	337 (3.5)	0.0	0.1	-0.1	-0.1	0.0
Africa	631 (12.0)	813 (13.3)	1,185 (16.2)	1,691 (19.9)	2,085 (22.8)	2,509 (25.8)	2.6	2.4	2.1	1.9	2.2
Middle East	132 (2.5)	168 (2.7)	235 (3.2)	297 (3.5)	332 (3.6)	364 (3.7)	2.3	1.6	1.1	0.9	1.3
Oceania	20 (0.4)	23 (0.4)	28 (0.4)	33 (0.4)	36 (0.4)	39 (0.4)	1.3	1.1	0.8	0.7	0.9
OECD	1,065 (20.2)	1,151 (18.8)	1,275 (17.4)	1,358 (16.0)	1,392 (15.2)	1,409 (14.5)	0.7	0.4	0.2	0.1	0.3
Non-OECD	4,213 (79.8)	4,957 (81.2)	6,062 (82.6)	7,139 (84.0)	7,760 (84.8)	8,301 (85.5)	1.5	1.1	0.8	0.7	0.9

Source: United Nations "Population Estimates and Projections: The 2017 Revision", World Bank "World Development Indicators"

Note: Figures in parentheses are global shares (%).

Table A4 | GDP

($2010 billion)

	1990	2000	2015	2030	2040	2050	CAGR (%) 1990/2015	2015/2030	2030/2040	2040/2050	2015/2050
World	37,797 (100)	49,825 (100)	75,059 (100)	115,303 (100)	152,089 (100)	191,400 (100)	2.8	2.9	2.8	2.3	2.7
Asia	7,586 (20.1)	11,047 (22.2)	22,344 (29.8)	42,637 (37.0)	61,674 (40.6)	81,910 (42.8)	4.4	4.4	3.8	2.9	3.8
China	830 (2.2)	2,237 (4.5)	8,910 (11.9)	20,311 (17.6)	30,759 (20.2)	40,328 (21.1)	10.0	5.6	4.2	2.7	4.4
India	470 (1.2)	809 (1.6)	2,288 (3.0)	6,133 (5.3)	10,236 (6.7)	15,857 (8.3)	6.5	6.8	5.3	4.5	5.7
Japan	4,683 (12.4)	5,349 (10.7)	5,986 (8.0)	6,948 (6.0)	7,705 (5.1)	8,329 (4.4)	1.0	1.0	1.0	0.8	0.9
Korea	377 (1.0)	710 (1.4)	1,267 (1.7)	1,877 (1.6)	2,284 (1.5)	2,633 (1.4)	5.0	2.7	2.0	1.4	2.1
Chinese Taipei	162 (0.4)	309 (0.6)	527 (0.7)	715 (0.6)	851 (0.6)	975 (0.5)	4.8	2.1	1.8	1.4	1.8
ASEAN	741 (2.0)	1,180 (2.4)	2,490 (3.3)	4,955 (4.3)	7,383 (4.9)	10,390 (5.4)	5.0	4.7	4.1	3.5	4.2
Indonesia	310 (0.8)	453 (0.9)	988 (1.3)	2,124 (1.8)	3,329 (2.2)	4,819 (2.5)	4.7	5.2	4.6	3.8	4.6
Malaysia	82 (0.2)	163 (0.3)	330 (0.4)	629 (0.5)	895 (0.6)	1,205 (0.6)	5.7	4.4	3.6	3.0	3.8
Myanmar	7 (0.0)	13 (0.0)	59 (0.1)	153 (0.1)	252 (0.2)	384 (0.2)	9.1	6.5	5.1	4.3	5.5
Philippines	95 (0.3)	125 (0.3)	266 (0.4)	609 (0.5)	901 (0.6)	1,286 (0.7)	4.2	5.7	4.0	3.6	4.6
Singapore	68 (0.2)	134 (0.3)	287 (0.4)	407 (0.4)	487 (0.3)	547 (0.3)	6.0	2.4	1.8	1.2	1.9
Thailand	142 (0.4)	218 (0.4)	392 (0.5)	642 (0.6)	884 (0.6)	1,157 (0.6)	4.2	3.3	3.2	2.7	3.1
Viet Nam	29 (0.1)	61 (0.1)	155 (0.2)	367 (0.3)	607 (0.4)	957 (0.5)	6.9	5.9	5.2	4.7	5.3
Asia excl. Japan	2,903 (7.7)	5,698 (11.4)	16,358 (21.8)	35,689 (31.0)	53,969 (35.5)	73,581 (38.4)	7.2	5.3	4.2	3.1	4.4
North America	10,078 (26.7)	14,056 (28.2)	18,394 (24.5)	25,027 (21.7)	30,559 (20.1)	36,274 (19.0)	2.4	2.1	2.0	1.7	2.0
United States	9,064 (24.0)	12,713 (25.5)	16,597 (22.1)	22,629 (19.6)	27,677 (18.2)	32,902 (17.2)	2.4	2.1	2.0	1.7	2.0
Latin America	2,779 (7.4)	3,767 (7.6)	5,779 (7.7)	8,545 (7.4)	11,704 (7.7)	14,903 (7.8)	3.0	2.6	3.2	2.4	2.7
OECD Europe	12,666 (33.5)	15,889 (31.9)	19,517 (26.0)	24,815 (21.5)	28,286 (18.6)	31,565 (16.5)	1.7	1.6	1.3	1.1	1.4
European Union	11,888 (31.5)	14,768 (29.6)	17,885 (23.8)	22,762 (19.7)	26,005 (17.1)	29,079 (15.2)	1.6	1.6	1.3	1.1	1.4
Non-OECD Europe	2,142 (5.7)	1,496 (3.0)	2,658 (3.5)	3,862 (3.3)	5,106 (3.4)	6,671 (3.5)	0.9	2.5	2.8	2.7	2.7
Africa	876 (2.3)	1,145 (2.3)	2,261 (3.0)	4,224 (3.7)	6,841 (4.5)	10,197 (5.3)	3.9	4.3	4.9	4.1	4.4
Middle East	949 (2.5)	1,430 (2.9)	2,582 (3.4)	4,001 (3.5)	5,302 (3.5)	6,834 (3.6)	4.1	3.0	2.9	2.6	2.8
Oceania	721 (1.9)	995 (2.0)	1,524 (2.0)	2,192 (1.9)	2,619 (1.7)	3,045 (1.6)	3.0	2.5	1.8	1.5	2.0
OECD	29,226 (77.3)	38,029 (76.3)	48,159 (64.2)	63,177 (54.8)	74,658 (49.1)	85,986 (44.9)	2.0	1.8	1.7	1.4	1.7
Non-OECD	8,572 (22.7)	11,796 (23.7)	26,900 (35.8)	52,126 (45.2)	77,431 (50.9)	105,413 (55.1)	4.7	4.5	4.0	3.1	4.0

Source: World Bank "World Development Indicators", etc. (historical)

Note: Figures in parentheses are global shares (%).

Table A5 | GDP per capita

($2010 thousand/person)

							CAGR (%)				
	1990	2000	2015	2030	2040	2050	1990/ 2015	2015/ 2030	2030/ 2040	2040/ 2050	2015/ 2050
World	7.2	8.2	10.2	13.6	16.6	19.7	1.4	1.9	2.0	1.7	1.9
Asia	2.6	3.2	5.6	9.6	13.4	17.6	3.1	3.7	3.4	2.7	3.3
China	0.7	1.8	6.5	14.4	22.1	30.1	9.1	5.4	4.4	3.1	4.5
India	0.5	0.8	1.7	4.0	6.4	9.5	4.8	5.8	4.6	4.1	5.0
Japan	37.9	42.2	47.2	57.6	67.4	77.2	0.9	1.3	1.6	1.4	1.4
Korea	8.8	15.1	25.0	35.6	43.6	52.2	4.3	2.4	2.0	1.8	2.1
Chinese Taipei	7.9	13.9	22.4	29.6	35.7	42.8	4.2	1.9	1.9	1.8	1.9
ASEAN	1.7	2.3	4.1	7.1	10.0	13.7	3.5	3.8	3.5	3.1	3.5
Indonesia	1.7	2.1	3.8	7.2	10.7	15.0	3.3	4.3	4.0	3.5	4.0
Malaysia	4.5	6.9	10.9	17.3	22.8	29.3	3.6	3.1	2.8	2.5	2.9
Myanmar	0.2	0.3	1.1	2.5	4.0	6.0	8.0	5.7	4.7	4.2	5.0
Philippines	1.5	1.6	2.6	4.9	6.5	8.6	2.2	4.2	2.9	2.8	3.4
Singapore	22.2	33.4	51.9	64.1	74.2	83.3	3.5	1.4	1.5	1.2	1.4
Thailand	2.5	3.5	5.8	9.3	13.1	17.9	3.4	3.2	3.4	3.2	3.3
Viet Nam	0.4	0.8	1.7	3.5	5.6	8.5	5.5	5.0	4.7	4.3	4.7
Asia excl. Japan	1.0	1.7	4.2	8.3	12.0	16.2	5.8	4.6	3.8	3.0	3.9
North America	36.3	44.9	51.5	63.1	73.0	83.2	1.4	1.4	1.5	1.3	1.4
United States	36.3	45.1	51.6	63.5	73.6	84.1	1.4	1.4	1.5	1.3	1.4
Latin America	6.3	7.2	9.2	11.9	15.5	19.2	1.5	1.8	2.7	2.1	2.1
OECD Europe	25.2	30.4	34.5	42.3	47.9	53.6	1.3	1.4	1.2	1.1	1.3
European Union	24.9	30.3	35.1	43.5	49.4	55.6	1.4	1.4	1.3	1.2	1.3
Non-OECD Europe	6.3	4.4	7.8	11.2	15.0	19.8	0.9	2.5	2.9	2.8	2.7
Africa	1.4	1.4	1.9	2.5	3.3	4.1	1.3	1.8	2.8	2.2	2.2
Middle East	7.2	8.5	11.0	13.5	16.0	18.8	1.7	1.4	1.7	1.6	1.5
Oceania	35.4	43.3	53.7	65.6	72.3	78.4	1.7	1.3	1.0	0.8	1.1
OECD	27.5	33.0	37.8	46.5	53.6	61.0	1.3	1.4	1.4	1.3	1.4
Non-OECD	2.0	2.4	4.4	7.3	10.0	12.7	3.2	3.4	3.2	2.4	3.0

Source: World Bank "World Development Indicators", International Energy Agency "World Energy Balances", etc. (historical)

Table A6 | International energy prices

Real prices		2016	2020	2030	2040	2050	CAGR (%) 2016/2020	2020/2030	2030/2040	2040/2050	2016/2050
Oil	$2016/bbl	44	70	95	115	125	12.3	3.1	1.9	0.8	3.1
Natural gas											
Japan	$2016/MBtu	6.9	9.0	10.9	12.4	12.6	6.7	2.0	1.3	0.2	1.8
Europe (UK)	$2016/MBtu	4.7	7.1	8.3	9.3	9.5	10.9	1.5	1.2	0.3	2.1
United States	$2016/MBtu	2.5	3.8	4.5	5.5	6.0	11.0	1.7	2.0	0.9	2.6
Steam coal	$2016/t	73	83	100	121	132	3.1	1.9	1.9	0.8	1.7

Nominal prices		2016	2020	2030	2040	2050	CAGR (%) 2016/2020	2020/2030	2030/2040	2040/2050	2016/2050
Oil	$/bbl	44	76	125	185	245	14.6	5.2	4.0	2.9	5.2
Natural gas											
Japan	$/MBtu	6.9	9.7	14.4	19.9	24.7	8.9	4.0	3.3	2.2	3.8
Europe (UK)	$/MBtu	4.7	7.7	10.9	14.9	18.6	13.1	3.5	3.2	2.3	4.1
United States	$/MBtu	2.5	4.1	5.9	8.8	11.8	13.3	3.7	4.1	2.9	4.7
Steam coal	$/t	73	89	132	195	258	5.2	4.0	4.0	2.9	3.8

Note: 2% per annum of inflation rates are assumed.

Table A7 | Primary energy consumption [Reference Scenario]

(Mtoe)

	1990	2000	2015	2030	2040	2050	CAGR (%) 1990/2015	2015/2030	2030/2040	2040/2050	2015/2050
World	8,774 (100)	10,028 (100)	13,647 (100)	16,562 (100)	18,374 (100)	19,789 (100)	1.8	1.3	1.0	0.7	1.1
Asia	2,108 (24.0)	2,887 (28.8)	5,459 (40.0)	7,434 (44.9)	8,548 (46.5)	9,351 (47.3)	3.9	2.1	1.4	0.9	1.5
China	871 (9.9)	1,130 (11.3)	2,973 (21.8)	3,695 (22.3)	4,005 (21.8)	4,021 (20.3)	5.0	1.5	0.8	0.0	0.9
India	306 (3.5)	441 (4.4)	851 (6.2)	1,585 (9.6)	2,061 (11.2)	2,545 (12.9)	4.2	4.2	2.7	2.1	3.2
Japan	439 (5.0)	518 (5.2)	430 (3.1)	433 (2.6)	414 (2.3)	391 (2.0)	-0.1	0.0	-0.4	-0.6	-0.3
Korea	93 (1.1)	188 (1.9)	273 (2.0)	292 (1.8)	283 (1.5)	263 (1.3)	4.4	0.5	-0.3	-0.7	-0.1
Chinese Taipei	48 (0.5)	85 (0.8)	109 (0.8)	110 (0.7)	109 (0.6)	103 (0.5)	3.3	0.1	-0.2	-0.5	-0.1
ASEAN	233 (2.7)	379 (3.8)	621 (4.5)	982 (5.9)	1,259 (6.9)	1,544 (7.8)	4.0	3.1	2.5	2.1	2.6
Indonesia	99 (1.1)	156 (1.6)	225 (1.7)	394 (2.4)	511 (2.8)	619 (3.1)	3.4	3.8	2.7	1.9	2.9
Malaysia	22 (0.2)	49 (0.5)	86 (0.6)	120 (0.7)	142 (0.8)	158 (0.8)	5.6	2.3	1.7	1.1	1.8
Myanmar	11 (0.1)	13 (0.1)	20 (0.1)	35 (0.2)	50 (0.3)	69 (0.3)	2.5	3.9	3.6	3.3	3.6
Philippines	29 (0.3)	40 (0.4)	52 (0.4)	97 (0.6)	132 (0.7)	175 (0.9)	2.4	4.3	3.0	2.9	3.5
Singapore	12 (0.1)	19 (0.2)	26 (0.2)	30 (0.2)	33 (0.2)	34 (0.2)	3.2	1.2	0.8	0.4	0.8
Thailand	42 (0.5)	72 (0.7)	135 (1.0)	174 (1.1)	210 (1.1)	245 (1.2)	4.8	1.7	1.9	1.6	1.7
Viet Nam	18 (0.2)	29 (0.3)	74 (0.5)	128 (0.8)	178 (1.0)	240 (1.2)	5.8	3.7	3.3	3.0	3.4
Asia excl. Japan	1,669 (19.0)	2,369 (23.6)	5,029 (36.8)	7,001 (42.3)	8,134 (44.3)	8,960 (45.3)	4.5	2.2	1.5	1.0	1.7
North America	2,126 (24.2)	2,527 (25.2)	2,458 (18.0)	2,420 (14.6)	2,382 (13.0)	2,312 (11.7)	0.6	-0.1	-0.2	-0.3	-0.2
United States	1,915 (21.8)	2,273 (22.7)	2,188 (16.0)	2,154 (13.0)	2,116 (11.5)	2,049 (10.4)	0.5	-0.1	-0.2	-0.3	-0.2
Latin America	465 (5.3)	600 (6.0)	851 (6.2)	1,092 (6.6)	1,264 (6.9)	1,378 (7.0)	2.5	1.7	1.5	0.9	1.4
OECD Europe	1,629 (18.6)	1,752 (17.5)	1,706 (12.5)	1,658 (10.0)	1,606 (8.7)	1,561 (7.9)	0.2	-0.2	-0.3	-0.3	-0.3
European Union	1,647 (18.8)	1,695 (16.9)	1,586 (11.6)	1,545 (9.3)	1,499 (8.2)	1,458 (7.4)	-0.1	-0.2	-0.3	-0.3	-0.2
Non-OECD Europe	1,530 (17.4)	1,000 (10.0)	1,106 (8.1)	1,216 (7.3)	1,322 (7.2)	1,451 (7.3)	-1.3	0.6	0.8	0.9	0.8
Africa	393 (4.5)	496 (4.9)	788 (5.8)	1,086 (6.6)	1,349 (7.3)	1,635 (8.3)	2.8	2.2	2.2	1.9	2.1
Middle East	223 (2.5)	372 (3.7)	752 (5.5)	993 (6.0)	1,153 (6.3)	1,291 (6.5)	5.0	1.9	1.5	1.1	1.6
Oceania	99 (1.1)	120 (1.2)	146 (1.1)	153 (0.9)	152 (0.8)	150 (0.8)	1.6	0.3	-0.1	-0.1	0.1
OECD	4,524 (51.6)	5,281 (52.7)	5,236 (38.4)	5,240 (31.6)	5,162 (28.1)	5,032 (25.4)	0.6	0.0	-0.1	-0.3	-0.1
Non-OECD	4,048 (46.1)	4,472 (44.6)	8,029 (58.8)	10,812 (65.3)	12,613 (68.6)	14,096 (71.2)	2.8	2.0	1.6	1.1	1.6

Source: International Energy Agency "World Energy Balances" (historical)

Note: Figures in parentheses are global shares (%). World includes international bunkers.

Table A8 | Primary energy consumption, coal [Reference Scenario]

(Mtoe)

	1990	2000	2015	2030	2040	2050	CAGR (%) 1990/2015	2015/2030	2030/2040	2040/2050	2015/2050
World	2,220 (100)	2,311 (100)	3,836 (100)	4,254 (100)	4,486 (100)	4,531 (100)	2.2	0.7	0.5	0.1	0.5
Asia	785 (35.4)	1,037 (44.9)	2,739 (71.4)	3,320 (78.0)	3,632 (81.0)	3,754 (82.9)	5.1	1.3	0.9	0.3	0.9
China	528 (23.8)	665 (28.8)	1,982 (51.7)	2,096 (49.3)	2,109 (47.0)	1,935 (42.7)	5.4	0.4	0.1	-0.9	-0.1
India	93 (4.2)	146 (6.3)	379 (9.9)	720 (16.9)	932 (20.8)	1,143 (25.2)	5.8	4.4	2.6	2.1	3.2
Japan	76 (3.4)	97 (4.2)	117 (3.1)	112 (2.6)	110 (2.5)	104 (2.3)	1.7	-0.3	-0.1	-0.6	-0.3
Korea	25 (1.1)	42 (1.8)	81 (2.1)	92 (2.2)	91 (2.0)	82 (1.8)	4.7	0.9	-0.1	-1.0	0.0
Chinese Taipei	11 (0.5)	30 (1.3)	40 (1.0)	42 (1.0)	39 (0.9)	33 (0.7)	5.1	0.4	-0.9	-1.5	-0.5
ASEAN	13 (0.6)	32 (1.4)	114 (3.0)	217 (5.1)	300 (6.7)	398 (8.8)	9.2	4.4	3.3	2.9	3.6
Indonesia	4 (0.2)	12 (0.5)	41 (1.1)	87 (2.0)	123 (2.7)	161 (3.6)	10.3	5.1	3.6	2.8	4.0
Malaysia	1 (0.1)	2 (0.1)	18 (0.5)	31 (0.7)	38 (0.8)	47 (1.0)	10.8	4.0	1.9	2.3	2.9
Myanmar	0 (0.0)	0 (0.0)	0 (0.0)	3 (0.1)	5 (0.1)	9 (0.2)	7.9	13.4	6.2	5.3	9.0
Philippines	2 (0.1)	5 (0.2)	13 (0.3)	25 (0.6)	36 (0.8)	49 (1.1)	8.8	4.7	3.4	3.2	3.9
Singapore	0 (0.0)	- (-)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	12.5	0.1	0.0	-0.5	-0.1
Thailand	4 (0.2)	8 (0.3)	17 (0.4)	24 (0.6)	30 (0.7)	34 (0.8)	6.1	2.4	2.2	1.3	2.0
Viet Nam	2 (0.1)	4 (0.2)	25 (0.7)	47 (1.1)	68 (1.5)	97 (2.1)	10.2	4.3	3.9	3.6	4.0
Asia excl. Japan	708 (31.9)	939 (40.7)	2,622 (68.3)	3,208 (75.4)	3,521 (78.5)	3,650 (80.6)	5.4	1.4	0.9	0.4	1.0
North America	485 (21.8)	565 (24.5)	393 (10.2)	289 (6.8)	230 (5.1)	168 (3.7)	-0.8	-2.0	-2.3	-3.1	-2.4
United States	460 (20.7)	534 (23.1)	374 (9.8)	278 (6.5)	221 (4.9)	162 (3.6)	-0.8	-2.0	-2.3	-3.1	-2.4
Latin America	21 (1.0)	27 (1.2)	47 (1.2)	59 (1.4)	68 (1.5)	72 (1.6)	3.3	1.4	1.6	0.6	1.2
OECD Europe	449 (20.2)	331 (14.3)	285 (7.4)	226 (5.3)	186 (4.1)	154 (3.4)	-1.8	-1.5	-1.9	-1.9	-1.7
European Union	455 (20.5)	321 (13.9)	263 (6.9)	210 (4.9)	173 (3.9)	144 (3.2)	-2.2	-1.5	-1.9	-1.8	-1.7
Non-OECD Europe	367 (16.5)	209 (9.0)	211 (5.5)	185 (4.3)	183 (4.1)	183 (4.0)	-2.2	-0.9	-0.1	0.0	-0.4
Africa	74 (3.3)	90 (3.9)	107 (2.8)	122 (2.9)	134 (3.0)	150 (3.3)	1.5	0.8	1.0	1.1	1.0
Middle East	3 (0.1)	8 (0.3)	10 (0.3)	16 (0.4)	18 (0.4)	19 (0.4)	4.9	3.3	1.2	0.8	2.0
Oceania	36 (1.6)	44 (1.9)	44 (1.2)	39 (0.9)	34 (0.8)	31 (0.7)	0.8	-0.9	-1.2	-1.1	-1.0
OECD	1,079 (48.6)	1,089 (47.1)	941 (24.5)	786 (18.5)	685 (15.3)	575 (12.7)	-0.5	-1.2	-1.4	-1.7	-1.4
Non-OECD	1,141 (51.4)	1,222 (52.9)	2,895 (75.5)	3,468 (81.5)	3,801 (84.7)	3,956 (87.3)	3.8	1.2	0.9	0.4	0.9

Source: International Energy Agency "World Energy Balances" (historical)

Note: Figures in parentheses are global shares (%). World includes international bunkers.

Table A9 | Primary energy consumption, oil [Reference Scenario]

(Mtoe)

	1990	2000	2015	2030	2040	2050	CAGR (%) 1990/2015	2015/2030	2030/2040	2040/2050	2015/2050
World	3,235 (100)	3,660 (100)	4,334 (100)	5,024 (100)	5,471 (100)	5,849 (100)	1.2	1.0	0.9	0.7	0.9
Asia	618 (19.1)	916 (25.0)	1,330 (30.7)	1,820 (36.2)	2,089 (38.2)	2,323 (39.7)	3.1	2.1	1.4	1.1	1.6
China	119 (3.7)	221 (6.0)	534 (12.3)	763 (15.2)	809 (14.8)	795 (13.6)	6.2	2.4	0.6	-0.2	1.1
India	61 (1.9)	112 (3.1)	206 (4.8)	377 (7.5)	521 (9.5)	683 (11.7)	5.0	4.1	3.3	2.7	3.5
Japan	250 (7.7)	255 (7.0)	185 (4.3)	151 (3.0)	133 (2.4)	115 (2.0)	-1.2	-1.3	-1.3	-1.4	-1.4
Korea	50 (1.5)	99 (2.7)	103 (2.4)	105 (2.1)	99 (1.8)	91 (1.6)	2.9	0.1	-0.5	-0.9	-0.3
Chinese Taipei	26 (0.8)	38 (1.0)	42 (1.0)	42 (0.8)	40 (0.7)	37 (0.6)	2.0	-0.1	-0.4	-0.7	-0.4
ASEAN	89 (2.7)	153 (4.2)	210 (4.9)	305 (6.1)	394 (7.2)	493 (8.4)	3.5	2.5	2.6	2.3	2.5
Indonesia	33 (1.0)	58 (1.6)	71 (1.6)	107 (2.1)	142 (2.6)	176 (3.0)	3.1	2.8	2.8	2.2	2.6
Malaysia	11 (0.4)	19 (0.5)	28 (0.6)	34 (0.7)	37 (0.7)	40 (0.7)	3.6	1.4	1.0	0.7	1.1
Myanmar	1 (0.0)	2 (0.1)	5 (0.1)	15 (0.3)	24 (0.4)	36 (0.6)	8.4	7.1	4.7	4.2	5.6
Philippines	11 (0.3)	16 (0.4)	18 (0.4)	34 (0.7)	49 (0.9)	68 (1.2)	2.0	4.4	3.7	3.4	3.9
Singapore	11 (0.4)	17 (0.5)	15 (0.4)	18 (0.4)	20 (0.4)	21 (0.4)	1.2	1.1	0.9	0.6	0.9
Thailand	18 (0.6)	32 (0.9)	54 (1.2)	64 (1.3)	75 (1.4)	87 (1.5)	4.5	1.1	1.7	1.4	1.4
Viet Nam	3 (0.1)	8 (0.2)	19 (0.4)	32 (0.6)	46 (0.8)	64 (1.1)	8.1	3.6	3.5	3.4	3.5
Asia excl. Japan	368 (11.4)	661 (18.1)	1,145 (26.4)	1,669 (33.2)	1,956 (35.8)	2,208 (37.7)	4.6	2.5	1.6	1.2	1.9
North America	833 (25.8)	958 (26.2)	888 (20.5)	805 (16.0)	751 (13.7)	695 (11.9)	0.3	-0.7	-0.7	-0.8	-0.7
United States	757 (23.4)	871 (23.8)	794 (18.3)	717 (14.3)	670 (12.3)	622 (10.6)	0.2	-0.7	-0.7	-0.8	-0.7
Latin America	238 (7.4)	303 (8.3)	377 (8.7)	449 (8.9)	487 (8.9)	491 (8.4)	1.9	1.2	0.8	0.1	0.8
OECD Europe	611 (18.9)	653 (17.8)	554 (12.8)	484 (9.6)	433 (7.9)	387 (6.6)	-0.4	-0.9	-1.1	-1.1	-1.0
European Union	608 (18.8)	625 (17.1)	516 (11.9)	450 (9.0)	401 (7.3)	357 (6.1)	-0.7	-0.9	-1.1	-1.2	-1.0
Non-OECD Europe	465 (14.4)	201 (5.5)	238 (5.5)	247 (4.9)	271 (5.0)	301 (5.1)	-2.6	0.3	0.9	1.1	0.7
Africa	86 (2.7)	97 (2.7)	176 (4.1)	252 (5.0)	340 (6.2)	458 (7.8)	2.9	2.4	3.1	3.0	2.8
Middle East	146 (4.5)	217 (5.9)	341 (7.9)	422 (8.4)	485 (8.9)	536 (9.2)	3.4	1.4	1.4	1.0	1.3
Oceania	35 (1.1)	40 (1.1)	49 (1.1)	48 (1.0)	46 (0.8)	44 (0.7)	1.4	0.0	-0.5	-0.6	-0.3
OECD	1,867 (57.7)	2,105 (57.5)	1,885 (43.5)	1,714 (34.1)	1,588 (29.0)	1,455 (24.9)	0.0	-0.6	-0.8	-0.9	-0.7
Non-OECD	1,166 (36.0)	1,281 (35.0)	2,068 (47.7)	2,815 (56.0)	3,315 (60.6)	3,780 (64.6)	2.3	2.1	1.6	1.3	1.7

Source: International Energy Agency "World Energy Balances" (historical)

Note: Figures in parentheses are global shares (%). World includes international bunkers.

Table A10 | Primary energy consumption, natural gas [Reference Scenario]

(Mtoe)

	1990	2000	2015	2030	2040	2050	CAGR (%) 1990/2015	2015/2030	2030/2040	2040/2050	2015/2050
World	1,663 (100)	2,071 (100)	2,944 (100)	3,845 (100)	4,550 (100)	5,194 (100)	2.3	1.8	1.7	1.3	1.6
Asia	116 (7.0)	232 (11.2)	547 (18.6)	965 (25.1)	1,285 (28.2)	1,567 (30.2)	6.4	3.9	2.9	2.0	3.1
China	13 (0.8)	21 (1.0)	159 (5.4)	343 (8.9)	468 (10.3)	561 (10.8)	10.6	5.3	3.2	1.8	3.7
India	11 (0.6)	23 (1.1)	43 (1.5)	124 (3.2)	195 (4.3)	274 (5.3)	5.8	7.3	4.6	3.5	5.4
Japan	44 (2.7)	66 (3.2)	100 (3.4)	98 (2.6)	100 (2.2)	98 (1.9)	3.3	-0.1	0.2	-0.2	-0.1
Korea	3 (0.2)	17 (0.8)	39 (1.3)	56 (1.4)	64 (1.4)	68 (1.3)	11.3	2.3	1.4	0.6	1.6
Chinese Taipei	1 (0.1)	6 (0.3)	15 (0.5)	22 (0.6)	25 (0.5)	27 (0.5)	9.9	2.7	1.3	0.9	1.7
ASEAN	30 (1.8)	74 (3.6)	140 (4.8)	216 (5.6)	280 (6.2)	344 (6.6)	6.3	2.9	2.7	2.1	2.6
Indonesia	16 (1.0)	27 (1.3)	38 (1.3)	72 (1.9)	101 (2.2)	131 (2.5)	3.6	4.4	3.4	2.6	3.6
Malaysia	7 (0.4)	25 (1.2)	38 (1.3)	50 (1.3)	57 (1.3)	61 (1.2)	7.1	1.9	1.4	0.6	1.4
Myanmar	1 (0.0)	1 (0.1)	3 (0.1)	5 (0.1)	7 (0.2)	10 (0.2)	5.7	3.0	4.4	3.4	3.5
Philippines	- (-)	0 (0.0)	3 (0.1)	9 (0.2)	15 (0.3)	24 (0.5)	-	7.6	5.4	4.8	6.2
Singapore	- (-)	1 (0.1)	9 (0.3)	11 (0.3)	11 (0.2)	11 (0.2)	-	1.0	0.4	0.0	0.6
Thailand	5 (0.3)	17 (0.8)	38 (1.3)	49 (1.3)	59 (1.3)	67 (1.3)	8.4	1.7	1.9	1.3	1.6
Viet Nam	0 (0.0)	1 (0.1)	10 (0.3)	18 (0.5)	27 (0.6)	38 (0.7)	38.6	4.4	4.0	3.3	4.0
Asia excl. Japan	72 (4.3)	167 (8.0)	446 (15.2)	866 (22.5)	1,185 (26.0)	1,469 (28.3)	7.6	4.5	3.2	2.2	3.5
North America	493 (29.6)	622 (30.0)	733 (24.9)	819 (21.3)	877 (19.3)	905 (17.4)	1.6	0.7	0.7	0.3	0.6
United States	438 (26.3)	548 (26.4)	646 (22.0)	724 (18.8)	772 (17.0)	794 (15.3)	1.6	0.8	0.7	0.3	0.6
Latin America	72 (4.3)	119 (5.7)	207 (7.0)	281 (7.3)	364 (8.0)	437 (8.4)	4.3	2.1	2.6	1.8	2.2
OECD Europe	262 (15.8)	394 (19.0)	389 (13.2)	425 (11.0)	431 (9.5)	426 (8.2)	1.6	0.6	0.1	-0.1	0.3
European Union	297 (17.9)	396 (19.1)	358 (12.1)	393 (10.2)	400 (8.8)	397 (7.6)	0.7	0.6	0.2	-0.1	0.3
Non-OECD Europe	600 (36.1)	487 (23.5)	526 (17.9)	598 (15.6)	676 (14.8)	751 (14.5)	-0.5	0.9	1.2	1.1	1.0
Africa	30 (1.8)	47 (2.3)	108 (3.7)	183 (4.8)	253 (5.6)	359 (6.9)	5.3	3.6	3.3	3.5	3.5
Middle East	72 (4.3)	145 (7.0)	397 (13.5)	523 (13.6)	602 (13.2)	677 (13.0)	7.1	1.9	1.4	1.2	1.5
Oceania	19 (1.1)	24 (1.2)	36 (1.2)	42 (1.1)	44 (1.0)	45 (0.9)	2.7	1.0	0.4	0.2	0.6
OECD	845 (50.8)	1,164 (56.2)	1,367 (46.4)	1,531 (39.8)	1,628 (35.8)	1,674 (32.2)	1.9	0.8	0.6	0.3	0.6
Non-OECD	818 (49.2)	908 (43.8)	1,577 (53.6)	2,305 (59.9)	2,905 (63.8)	3,493 (67.2)	2.7	2.6	2.3	1.9	2.3

Source: International Energy Agency "World Energy Balances" (historical)

Note: Figures in parentheses are global shares (%). World includes international bunkers.

Table A11 | Final energy consumption [Reference Scenario]

(Mtoe)

	1990	2000	2015	2030	2040	2050	CAGR (%) 1990/2015	2015/2030	2030/2040	2040/2050	2015/2050
World	6,268 (100)	7,036 (100)	9,384 (100)	11,346 (100)	12,617 (100)	13,675 (100)	1.6	1.3	1.1	0.8	1.1
Asia	1,551 (24.7)	1,990 (28.3)	3,617 (38.5)	4,838 (42.6)	5,560 (44.1)	6,140 (44.9)	3.4	2.0	1.4	1.0	1.5
China	654 (10.4)	781 (11.1)	1,906 (20.3)	2,346 (20.7)	2,532 (20.1)	2,555 (18.7)	4.4	1.4	0.8	0.1	0.8
India	243 (3.9)	315 (4.5)	578 (6.2)	1,056 (9.3)	1,383 (11.0)	1,729 (12.6)	3.5	4.1	2.7	2.3	3.2
Japan	287 (4.6)	328 (4.7)	291 (3.1)	279 (2.5)	266 (2.1)	251 (1.8)	0.1	-0.3	-0.5	-0.6	-0.4
Korea	65 (1.0)	127 (1.8)	174 (1.9)	191 (1.7)	189 (1.5)	180 (1.3)	4.0	0.6	-0.1	-0.5	0.1
Chinese Taipei	29 (0.5)	49 (0.7)	69 (0.7)	71 (0.6)	71 (0.6)	70 (0.5)	3.4	0.2	0.0	-0.2	0.0
ASEAN	173 (2.8)	270 (3.8)	436 (4.6)	645 (5.7)	817 (6.5)	1,006 (7.4)	3.8	2.6	2.4	2.1	2.4
Indonesia	80 (1.3)	120 (1.7)	163 (1.7)	245 (2.2)	314 (2.5)	382 (2.8)	2.9	2.8	2.5	2.0	2.5
Malaysia	14 (0.2)	30 (0.4)	52 (0.5)	71 (0.6)	82 (0.7)	92 (0.7)	5.4	2.1	1.5	1.2	1.7
Myanmar	9 (0.1)	11 (0.2)	18 (0.2)	31 (0.3)	43 (0.3)	59 (0.4)	2.6	3.7	3.4	3.2	3.5
Philippines	20 (0.3)	24 (0.3)	30 (0.3)	58 (0.5)	82 (0.6)	114 (0.8)	1.7	4.6	3.5	3.3	3.9
Singapore	5 (0.1)	8 (0.1)	17 (0.2)	20 (0.2)	22 (0.2)	23 (0.2)	5.0	1.2	0.8	0.4	0.8
Thailand	29 (0.5)	51 (0.7)	98 (1.0)	122 (1.1)	144 (1.1)	168 (1.2)	5.0	1.4	1.7	1.5	1.5
Viet Nam	16 (0.3)	25 (0.4)	58 (0.6)	96 (0.8)	128 (1.0)	167 (1.2)	5.3	3.4	2.9	2.7	3.1
Asia excl. Japan	1,264 (20.2)	1,662 (23.6)	3,326 (35.4)	4,559 (40.2)	5,294 (42.0)	5,889 (43.1)	3.9	2.1	1.5	1.1	1.6
North America	1,455 (23.2)	1,738 (24.7)	1,714 (18.3)	1,711 (15.1)	1,701 (13.5)	1,669 (12.2)	0.7	0.0	-0.1	-0.2	-0.1
United States	1,294 (20.6)	1,546 (22.0)	1,520 (16.2)	1,516 (13.4)	1,506 (11.9)	1,477 (10.8)	0.6	0.0	-0.1	-0.2	-0.1
Latin America	343 (5.5)	447 (6.4)	610 (6.5)	773 (6.8)	891 (7.1)	975 (7.1)	2.3	1.6	1.4	0.9	1.3
OECD Europe	1,134 (18.1)	1,233 (17.5)	1,202 (12.8)	1,188 (10.5)	1,157 (9.2)	1,123 (8.2)	0.2	-0.1	-0.3	-0.3	-0.2
European Union	1,136 (18.1)	1,180 (16.8)	1,114 (11.9)	1,168 (10.3)	1,138 (9.0)	1,106 (8.1)	-0.1	0.3	-0.3	-0.3	0.0
Non-OECD Europe	1,067 (17.0)	651 (9.3)	701 (7.5)	768 (6.8)	836 (6.6)	918 (6.7)	-1.7	0.6	0.9	0.9	0.8
Africa	292 (4.7)	369 (5.2)	573 (6.1)	804 (7.1)	1,005 (8.0)	1,216 (8.9)	2.7	2.3	2.3	1.9	2.2
Middle East	157 (2.5)	253 (3.6)	489 (5.2)	652 (5.7)	766 (6.1)	868 (6.3)	4.6	1.9	1.6	1.3	1.7
Oceania	66 (1.1)	83 (1.2)	95 (1.0)	102 (0.9)	104 (0.8)	104 (0.8)	1.5	0.5	0.1	0.0	0.3
OECD	3,102 (49.5)	3,624 (51.5)	3,622 (38.6)	3,652 (32.2)	3,619 (28.7)	3,549 (26.0)	0.6	0.1	-0.1	-0.2	-0.1
Non-OECD	2,964 (47.3)	3,138 (44.6)	5,380 (57.3)	7,184 (63.3)	8,399 (66.6)	9,465 (69.2)	2.4	1.9	1.6	1.2	1.6

Source: International Energy Agency "World Energy Balances" (historical)

Note: Figures in parentheses are global shares (%). World includes international bunkers.

Table A12 | Final energy consumption, industry [Reference Scenario]

(Mtoe)

	1990	2000	2015	2030	2040	2050	CAGR (%) 1990/2015	2015/2030	2030/2040	2040/2050	2015/2050
World	1,809 (100)	1,868 (100)	2,712 (100)	3,146 (100)	3,499 (100)	3,779 (100)	1.6	1.0	1.1	0.8	1.0
Asia	517 (28.6)	646 (34.6)	1,481 (54.6)	1,759 (55.9)	1,956 (55.9)	2,097 (55.5)	4.3	1.2	1.1	0.7	1.0
China	234 (12.9)	299 (16.0)	966 (35.6)	965 (30.7)	973 (27.8)	937 (24.8)	5.8	0.0	0.1	-0.4	-0.1
India	67 (3.7)	83 (4.5)	195 (7.2)	376 (12.0)	492 (14.1)	597 (15.8)	4.4	4.5	2.7	2.0	3.2
Japan	110 (6.1)	100 (5.3)	82 (3.0)	81 (2.6)	81 (2.3)	78 (2.1)	-1.1	-0.1	0.0	-0.3	-0.1
Korea	19 (1.1)	38 (2.1)	49 (1.8)	53 (1.7)	53 (1.5)	50 (1.3)	3.8	0.5	-0.1	-0.5	0.1
Chinese Taipei	12 (0.7)	19 (1.0)	23 (0.8)	23 (0.7)	23 (0.7)	23 (0.6)	2.4	0.1	0.0	-0.1	0.0
ASEAN	43 (2.4)	75 (4.0)	125 (4.6)	198 (6.3)	257 (7.3)	318 (8.4)	4.4	3.1	2.6	2.2	2.7
Indonesia	18 (1.0)	30 (1.6)	42 (1.5)	69 (2.2)	92 (2.6)	115 (3.0)	3.4	3.4	3.0	2.3	3.0
Malaysia	6 (0.3)	12 (0.6)	15 (0.6)	24 (0.8)	30 (0.9)	36 (0.9)	4.1	3.1	2.3	1.7	2.5
Myanmar	0 (0.0)	1 (0.1)	2 (0.1)	5 (0.2)	7 (0.2)	10 (0.3)	7.1	5.8	4.0	2.8	4.4
Philippines	5 (0.3)	5 (0.3)	7 (0.3)	13 (0.4)	18 (0.5)	24 (0.6)	1.9	4.0	3.0	3.0	3.4
Singapore	1 (0.0)	2 (0.1)	6 (0.2)	6 (0.2)	7 (0.2)	7 (0.2)	9.3	0.8	0.5	0.1	0.5
Thailand	9 (0.5)	17 (0.9)	31 (1.1)	38 (1.2)	46 (1.3)	53 (1.4)	5.2	1.5	1.7	1.4	1.6
Viet Nam	5 (0.3)	8 (0.4)	23 (0.8)	42 (1.3)	57 (1.6)	73 (1.9)	6.7	4.1	3.1	2.6	3.4
Asia excl. Japan	407 (22.5)	546 (29.2)	1,399 (51.6)	1,678 (53.4)	1,876 (53.6)	2,019 (53.4)	5.1	1.2	1.1	0.7	1.1
North America	331 (18.3)	388 (20.7)	304 (11.2)	305 (9.7)	305 (8.7)	299 (7.9)	-0.3	0.0	0.0	-0.2	-0.1
United States	284 (15.7)	332 (17.8)	262 (9.6)	264 (8.4)	265 (7.6)	259 (6.9)	-0.3	0.1	0.0	-0.2	0.0
Latin America	114 (6.3)	148 (7.9)	191 (7.0)	229 (7.3)	274 (7.8)	310 (8.2)	2.1	1.2	1.8	1.2	1.4
OECD Europe	328 (18.2)	326 (17.4)	280 (10.3)	279 (8.9)	276 (7.9)	271 (7.2)	-0.6	0.0	-0.1	-0.2	-0.1
European Union	347 (19.2)	309 (16.6)	254 (9.4)	279 (8.9)	279 (8.0)	278 (7.4)	-1.2	0.6	0.0	0.0	0.3
Non-OECD Europe	394 (21.8)	205 (11.0)	191 (7.0)	214 (6.8)	243 (6.9)	275 (7.3)	-2.9	0.8	1.3	1.3	1.0
Africa	55 (3.0)	58 (3.1)	87 (3.2)	126 (4.0)	173 (5.0)	222 (5.9)	1.9	2.5	3.2	2.5	2.7
Middle East	47 (2.6)	71 (3.8)	150 (5.5)	203 (6.4)	241 (6.9)	274 (7.3)	4.8	2.0	1.7	1.3	1.7
Oceania	23 (1.3)	28 (1.5)	28 (1.0)	30 (1.0)	30 (0.9)	30 (0.8)	0.9	0.5	0.0	-0.1	0.2
OECD	840 (46.5)	914 (48.9)	789 (29.1)	806 (25.6)	815 (23.3)	808 (21.4)	-0.2	0.1	0.1	-0.1	0.1
Non-OECD	968 (53.5)	954 (51.1)	1,923 (70.9)	2,340 (74.4)	2,684 (76.7)	2,970 (78.6)	2.8	1.3	1.4	1.0	1.3

Source: International Energy Agency "World Energy Balances" (historical)

Note: Figures in parentheses are global shares (%).

Table A13 | Final energy consumption, transport [Reference Scenario]

(Mtoe)

	1990	2000	2015	2030	2040	2050	CAGR (%) 1990/2015	2015/2030	2030/2040	2040/2050	2015/2050
World	1,573 (100)	1,961 (100)	2,703 (100)	3,230 (100)	3,528 (100)	3,765 (100)	2.2	1.2	0.9	0.7	1.0
Asia	186 (11.9)	320 (16.3)	648 (24.0)	989 (30.6)	1,149 (32.6)	1,274 (33.8)	5.1	2.9	1.5	1.0	2.0
China	33 (2.1)	87 (4.5)	299 (11.0)	504 (15.6)	541 (15.3)	537 (14.3)	9.2	3.6	0.7	-0.1	1.7
India	21 (1.3)	32 (1.6)	86 (3.2)	163 (5.0)	236 (6.7)	304 (8.1)	5.8	4.3	3.8	2.6	3.7
Japan	68 (4.3)	84 (4.3)	71 (2.6)	57 (1.8)	52 (1.5)	47 (1.2)	0.2	-1.4	-1.0	-1.0	-1.2
Korea	15 (0.9)	26 (1.3)	33 (1.2)	36 (1.1)	34 (0.9)	30 (0.8)	3.4	0.4	-0.6	-1.0	-0.3
Chinese Taipei	7 (0.4)	12 (0.6)	12 (0.5)	12 (0.4)	11 (0.3)	9 (0.2)	2.6	-0.4	-0.9	-1.4	-0.8
ASEAN	32 (2.1)	61 (3.1)	117 (4.3)	170 (5.3)	215 (6.1)	270 (7.2)	5.2	2.5	2.4	2.3	2.4
Indonesia	11 (0.7)	21 (1.1)	44 (1.6)	68 (2.1)	88 (2.5)	110 (2.9)	5.8	2.9	2.6	2.2	2.6
Malaysia	5 (0.3)	11 (0.6)	21 (0.8)	24 (0.7)	25 (0.7)	25 (0.7)	6.0	0.8	0.4	0.2	0.5
Myanmar	0 (0.0)	1 (0.1)	4 (0.1)	10 (0.3)	16 (0.5)	25 (0.7)	8.6	7.2	4.9	4.6	5.8
Philippines	5 (0.3)	8 (0.4)	11 (0.4)	24 (0.7)	35 (1.0)	50 (1.3)	3.5	5.5	4.0	3.6	4.5
Singapore	1 (0.1)	2 (0.1)	2 (0.1)	2 (0.1)	2 (0.1)	2 (0.1)	2.3	-0.1	-0.6	-1.0	-0.5
Thailand	9 (0.6)	15 (0.7)	24 (0.9)	26 (0.8)	28 (0.8)	30 (0.8)	3.9	0.6	0.8	0.6	0.7
Viet Nam	1 (0.1)	3 (0.2)	11 (0.4)	15 (0.5)	20 (0.6)	27 (0.7)	8.5	2.4	2.6	3.2	2.7
Asia excl. Japan	118 (7.5)	236 (12.0)	576 (21.3)	931 (28.8)	1,097 (31.1)	1,227 (32.6)	6.5	3.3	1.7	1.1	2.2
North America	531 (33.7)	640 (32.7)	690 (25.5)	640 (19.8)	609 (17.3)	584 (15.5)	1.1	-0.5	-0.5	-0.4	-0.5
United States	488 (31.0)	588 (30.0)	629 (23.3)	578 (17.9)	550 (15.6)	528 (14.0)	1.0	-0.6	-0.5	-0.4	-0.5
Latin America	103 (6.5)	140 (7.2)	222 (8.2)	284 (8.8)	316 (9.0)	332 (8.8)	3.1	1.7	1.1	0.5	1.2
OECD Europe	267 (17.0)	317 (16.2)	335 (12.4)	293 (9.1)	264 (7.5)	241 (6.4)	0.9	-0.9	-1.0	-0.9	-0.9
European Union	259 (16.5)	303 (15.5)	312 (11.6)	273 (8.4)	245 (6.9)	223 (5.9)	0.8	-0.9	-1.1	-0.9	-1.0
Non-OECD Europe	171 (10.9)	110 (5.6)	143 (5.3)	147 (4.6)	153 (4.3)	162 (4.3)	-0.7	0.2	0.4	0.5	0.3
Africa	38 (2.4)	54 (2.8)	105 (3.9)	149 (4.6)	196 (5.6)	247 (6.5)	4.2	2.4	2.8	2.3	2.5
Middle East	51 (3.2)	75 (3.8)	141 (5.2)	180 (5.6)	206 (5.8)	229 (6.1)	4.2	1.6	1.4	1.0	1.4
Oceania	24 (1.5)	30 (1.5)	37 (1.4)	37 (1.2)	37 (1.0)	36 (1.0)	1.8	0.0	-0.2	-0.2	-0.1
OECD	936 (59.5)	1,139 (58.1)	1,227 (45.4)	1,131 (35.0)	1,067 (30.2)	1,012 (26.9)	1.1	-0.5	-0.6	-0.5	-0.5
Non-OECD	435 (27.7)	547 (27.9)	1,095 (40.5)	1,588 (49.2)	1,862 (52.8)	2,092 (55.6)	3.8	2.5	1.6	1.2	1.9

Source: International Energy Agency "World Energy Balances" (historical)

Note: Figures in parentheses are global shares (%). World includes international bunkers.

Table A14 | Final energy consumption, buildings, etc. [Reference Scenario]

(Mtoe)

	1990	2000	2015	2030	2040	2050	CAGR (%) 1990/2015	2015/2030	2030/2040	2040/2050	2015/2050
World	2,409 (100)	2,591 (100)	3,132 (100)	3,911 (100)	4,367 (100)	4,779 (100)	1.1	1.5	1.1	0.9	1.2
Asia	733 (30.4)	836 (32.3)	1,124 (35.9)	1,593 (40.7)	1,872 (42.9)	2,126 (44.5)	1.7	2.4	1.6	1.3	1.8
China	344 (14.3)	335 (12.9)	483 (15.4)	661 (16.9)	767 (17.6)	814 (17.0)	1.4	2.1	1.5	0.6	1.5
India	142 (5.9)	173 (6.7)	250 (8.0)	420 (10.7)	525 (12.0)	671 (14.0)	2.3	3.5	2.3	2.5	2.9
Japan	76 (3.1)	103 (4.0)	99 (3.2)	103 (2.6)	97 (2.2)	90 (1.9)	1.1	0.3	-0.6	-0.7	-0.3
Korea	24 (1.0)	37 (1.4)	44 (1.4)	50 (1.3)	50 (1.1)	48 (1.0)	2.4	0.8	0.0	-0.3	0.2
Chinese Taipei	7 (0.3)	10 (0.4)	12 (0.4)	14 (0.4)	14 (0.3)	14 (0.3)	2.5	1.0	0.3	0.0	0.5
ASEAN	87 (3.6)	113 (4.4)	147 (4.7)	211 (5.4)	262 (6.0)	317 (6.6)	2.1	2.5	2.2	1.9	2.2
Indonesia	44 (1.8)	59 (2.3)	70 (2.2)	97 (2.5)	119 (2.7)	140 (2.9)	1.9	2.2	2.0	1.6	2.0
Malaysia	3 (0.1)	5 (0.2)	9 (0.3)	14 (0.4)	17 (0.4)	20 (0.4)	5.2	2.8	1.9	1.4	2.1
Myanmar	8 (0.4)	9 (0.4)	12 (0.4)	15 (0.4)	19 (0.4)	23 (0.5)	1.3	1.7	2.0	2.0	1.9
Philippines	10 (0.4)	10 (0.4)	11 (0.3)	19 (0.5)	25 (0.6)	34 (0.7)	0.1	4.0	3.0	3.0	3.4
Singapore	1 (0.0)	2 (0.1)	3 (0.1)	3 (0.1)	3 (0.1)	3 (0.1)	3.2	1.3	0.6	0.1	0.8
Thailand	11 (0.4)	14 (0.5)	21 (0.7)	29 (0.7)	35 (0.8)	41 (0.9)	2.7	2.1	2.0	1.6	1.9
Viet Nam	10 (0.4)	14 (0.5)	21 (0.7)	33 (0.8)	43 (1.0)	55 (1.2)	3.0	3.0	2.7	2.6	2.8
Asia excl. Japan	657 (27.3)	734 (28.3)	1,025 (32.7)	1,491 (38.1)	1,775 (40.7)	2,036 (42.6)	1.8	2.5	1.8	1.4	2.0
North America	460 (19.1)	537 (20.7)	574 (18.3)	607 (15.5)	621 (14.2)	623 (13.0)	0.9	0.4	0.2	0.0	0.2
United States	403 (16.7)	473 (18.2)	506 (16.2)	537 (13.7)	549 (12.6)	551 (11.5)	0.9	0.4	0.2	0.0	0.2
Latin America	101 (4.2)	120 (4.6)	160 (5.1)	212 (5.4)	246 (5.6)	272 (5.7)	1.9	1.9	1.5	1.0	1.5
OECD Europe	438 (18.2)	475 (18.3)	485 (15.5)	509 (13.0)	508 (11.6)	501 (10.5)	0.4	0.3	0.0	-0.1	0.1
European Union	430 (17.9)	454 (17.5)	450 (14.4)	515 (13.2)	511 (11.7)	501 (10.5)	0.2	0.9	-0.1	-0.2	0.3
Non-OECD Europe	436 (18.1)	287 (11.1)	274 (8.7)	291 (7.4)	298 (6.8)	307 (6.4)	-1.8	0.4	0.2	0.3	0.3
Africa	188 (7.8)	242 (9.3)	362 (11.6)	499 (12.8)	595 (13.6)	695 (14.5)	2.7	2.2	1.8	1.6	1.9
Middle East	40 (1.7)	75 (2.9)	129 (4.1)	170 (4.4)	197 (4.5)	222 (4.6)	4.8	1.9	1.4	1.2	1.6
Oceania	15 (0.6)	19 (0.7)	24 (0.8)	29 (0.7)	31 (0.7)	33 (0.7)	2.0	1.2	0.7	0.5	0.9
OECD	1,036 (43.0)	1,201 (46.4)	1,260 (40.2)	1,344 (34.4)	1,359 (31.1)	1,353 (28.3)	0.8	0.4	0.1	0.0	0.2
Non-OECD	1,373 (57.0)	1,390 (53.6)	1,872 (59.8)	2,567 (65.6)	3,008 (68.9)	3,425 (71.7)	1.2	2.1	1.6	1.3	1.7

Source: International Energy Agency "World Energy Balances" (historical)

Note: Figures in parentheses are global shares (%).

Table A15 | Final energy consumption, electricity [Reference Scenario]

(TWh)

	1990	2000	2015	2030	2040	2050	CAGR (%) 1990/2015	2015/2030	2030/2040	2040/2050	2015/2050
World	9,714 (100)	12,698 (100)	20,200 (100)	27,596 (100)	33,166 (100)	38,647 (100)	3.0	2.1	1.9	1.5	1.9
Asia	1,834 (18.9)	3,254 (25.6)	8,605 (42.6)	13,392 (48.5)	16,753 (50.5)	19,824 (51.3)	6.4	3.0	2.3	1.7	2.4
China	454 (4.7)	1,037 (8.2)	4,877 (24.1)	7,111 (25.8)	8,505 (25.6)	9,312 (24.1)	10.0	2.5	1.8	0.9	1.9
India	215 (2.2)	376 (3.0)	1,027 (5.1)	2,387 (8.7)	3,454 (10.4)	4,733 (12.2)	6.5	5.8	3.8	3.2	4.5
Japan	771 (7.9)	969 (7.6)	949 (4.7)	1,043 (3.8)	1,059 (3.2)	1,059 (2.7)	0.8	0.6	0.2	0.0	0.3
Korea	94 (1.0)	263 (2.1)	495 (2.5)	591 (2.1)	628 (1.9)	641 (1.7)	6.9	1.2	0.6	0.2	0.7
Chinese Taipei	77 (0.8)	160 (1.3)	231 (1.1)	261 (0.9)	275 (0.8)	284 (0.7)	4.5	0.8	0.5	0.3	0.6
ASEAN	130 (1.3)	320 (2.5)	786 (3.9)	1,500 (5.4)	2,132 (6.4)	2,899 (7.5)	7.5	4.4	3.6	3.1	3.8
Indonesia	28 (0.3)	79 (0.6)	203 (1.0)	453 (1.6)	668 (2.0)	913 (2.4)	8.2	5.5	4.0	3.2	4.4
Malaysia	20 (0.2)	61 (0.5)	133 (0.7)	222 (0.8)	286 (0.9)	347 (0.9)	7.9	3.5	2.5	2.0	2.8
Myanmar	2 (0.0)	3 (0.0)	13 (0.1)	38 (0.1)	62 (0.2)	95 (0.2)	8.5	7.2	5.0	4.3	5.7
Philippines	21 (0.2)	37 (0.3)	68 (0.3)	155 (0.6)	242 (0.7)	373 (1.0)	4.8	5.7	4.6	4.4	5.0
Singapore	13 (0.1)	27 (0.2)	48 (0.2)	59 (0.2)	63 (0.2)	65 (0.2)	5.3	1.4	0.8	0.3	0.9
Thailand	38 (0.4)	88 (0.7)	175 (0.9)	272 (1.0)	358 (1.1)	445 (1.2)	6.3	3.0	2.8	2.2	2.7
Viet Nam	6 (0.1)	22 (0.2)	143 (0.7)	297 (1.1)	448 (1.3)	656 (1.7)	13.4	5.0	4.2	3.9	4.4
Asia excl. Japan	1,063 (10.9)	2,285 (18.0)	7,656 (37.9)	12,349 (44.7)	15,694 (47.3)	18,765 (48.6)	8.2	3.2	2.4	1.8	2.6
North America	3,052 (31.4)	3,981 (31.4)	4,284 (21.2)	4,804 (17.4)	5,183 (15.6)	5,482 (14.2)	1.4	0.8	0.8	0.6	0.7
United States	2,634 (27.1)	3,499 (27.6)	3,781 (18.7)	4,249 (15.4)	4,575 (13.8)	4,826 (12.5)	1.5	0.8	0.7	0.5	0.7
Latin America	517 (5.3)	798 (6.3)	1,289 (6.4)	1,898 (6.9)	2,428 (7.3)	2,922 (7.6)	3.7	2.6	2.5	1.9	2.4
OECD Europe	2,236 (23.0)	2,711 (21.4)	3,040 (15.0)	3,362 (12.2)	3,554 (10.7)	3,706 (9.6)	1.2	0.7	0.6	0.4	0.6
European Union	2,161 (22.2)	2,528 (19.9)	2,741 (13.6)	3,055 (11.1)	3,242 (9.8)	3,394 (8.8)	1.0	0.7	0.6	0.5	0.6
Non-OECD Europe	1,463 (15.1)	1,006 (7.9)	1,222 (6.1)	1,524 (5.5)	1,820 (5.5)	2,168 (5.6)	-0.7	1.5	1.8	1.8	1.7
Africa	257 (2.6)	361 (2.8)	620 (3.1)	1,018 (3.7)	1,508 (4.5)	2,296 (5.9)	3.6	3.4	4.0	4.3	3.8
Middle East	199 (2.0)	379 (3.0)	890 (4.4)	1,283 (4.6)	1,569 (4.7)	1,863 (4.8)	6.2	2.5	2.0	1.7	2.1
Oceania	157 (1.6)	207 (1.6)	250 (1.2)	315 (1.1)	352 (1.1)	386 (1.0)	1.9	1.5	1.1	0.9	1.2
OECD	6,426 (66.2)	8,313 (65.5)	9,343 (46.3)	10,603 (38.4)	11,416 (34.4)	12,073 (31.2)	1.5	0.8	0.7	0.6	0.7
Non-OECD	3,288 (33.8)	4,384 (34.5)	10,857 (53.7)	16,992 (61.6)	21,750 (65.6)	26,574 (68.8)	4.9	3.0	2.5	2.0	2.6

Source: International Energy Agency "World Energy Balances" (historical)

Note: Figures in parentheses are global shares (%).

Table A16 | Electricity generation [Reference Scenario]

(TWh)

	1990	2000	2015	2030	2040	2050	CAGR (%) 1990/2015	2015/2030	2030/2040	2040/2050	2015/2050
World	11,864 (100)	15,471 (100)	24,255 (100)	32,965 (100)	39,101 (100)	44,838 (100)	2.9	2.1	1.7	1.4	1.8
Asia	2,252 (19.0)	4,013 (25.9)	10,204 (42.1)	15,895 (48.2)	19,641 (50.2)	22,874 (51.0)	6.2	3.0	2.1	1.5	2.3
China	621 (5.2)	1,356 (8.8)	5,844 (24.1)	8,441 (25.6)	9,970 (25.5)	10,763 (24.0)	9.4	2.5	1.7	0.8	1.8
India	293 (2.5)	570 (3.7)	1,383 (5.7)	3,106 (9.4)	4,311 (11.0)	5,663 (12.6)	6.4	5.5	3.3	2.8	4.1
Japan	873 (7.4)	1,088 (7.0)	1,035 (4.3)	1,136 (3.4)	1,152 (2.9)	1,150 (2.6)	0.7	0.6	0.1	0.0	0.3
Korea	105 (0.9)	289 (1.9)	549 (2.3)	655 (2.0)	694 (1.8)	707 (1.6)	6.8	1.2	0.6	0.2	0.7
Chinese Taipei	88 (0.7)	181 (1.2)	255 (1.1)	288 (0.9)	303 (0.8)	312 (0.7)	4.3	0.8	0.5	0.3	0.6
ASEAN	154 (1.3)	370 (2.4)	868 (3.6)	1,670 (5.1)	2,374 (6.1)	3,220 (7.2)	7.2	4.5	3.6	3.1	3.8
Indonesia	33 (0.3)	93 (0.6)	234 (1.0)	520 (1.6)	762 (1.9)	1,035 (2.3)	8.2	5.5	3.9	3.1	4.3
Malaysia	23 (0.2)	69 (0.4)	150 (0.6)	250 (0.8)	321 (0.8)	388 (0.9)	7.8	3.5	2.5	1.9	2.8
Myanmar	2 (0.0)	5 (0.0)	16 (0.1)	66 (0.2)	103 (0.3)	149 (0.3)	7.7	9.9	4.6	3.7	6.6
Philippines	26 (0.2)	45 (0.3)	82 (0.3)	186 (0.6)	287 (0.7)	434 (1.0)	4.7	5.6	4.4	4.2	4.9
Singapore	16 (0.1)	32 (0.2)	50 (0.2)	62 (0.2)	67 (0.2)	69 (0.2)	4.8	1.4	0.8	0.3	0.9
Thailand	44 (0.4)	96 (0.6)	178 (0.7)	260 (0.8)	341 (0.9)	422 (0.9)	5.7	2.6	2.8	2.2	2.5
Viet Nam	9 (0.1)	27 (0.2)	153 (0.6)	320 (1.0)	487 (1.2)	716 (1.6)	12.2	5.0	4.3	3.9	4.5
Asia excl. Japan	1,380 (11.6)	2,925 (18.9)	9,169 (37.8)	14,760 (44.8)	18,490 (47.3)	21,724 (48.5)	7.9	3.2	2.3	1.6	2.5
North America	3,685 (31.1)	4,631 (29.9)	4,968 (20.5)	5,538 (16.8)	5,929 (15.2)	6,218 (13.9)	1.2	0.7	0.7	0.5	0.6
United States	3,203 (27.0)	4,026 (26.0)	4,297 (17.7)	4,829 (14.6)	5,169 (13.2)	5,414 (12.1)	1.2	0.8	0.7	0.5	0.7
Latin America	623 (5.3)	1,009 (6.5)	1,598 (6.6)	2,314 (7.0)	2,906 (7.4)	3,426 (7.6)	3.8	2.5	2.3	1.7	2.2
OECD Europe	2,668 (22.5)	3,227 (20.9)	3,559 (14.7)	3,913 (11.9)	4,099 (10.5)	4,231 (9.4)	1.2	0.6	0.5	0.3	0.5
European Union	2,577 (21.7)	3,006 (19.4)	3,204 (13.2)	3,571 (10.8)	3,774 (9.7)	3,935 (8.8)	0.9	0.7	0.6	0.4	0.6
Non-OECD Europe	1,888 (15.9)	1,428 (9.2)	1,738 (7.2)	2,083 (6.3)	2,383 (6.1)	2,713 (6.1)	-0.3	1.2	1.4	1.3	1.3
Africa	316 (2.7)	442 (2.9)	781 (3.2)	1,266 (3.8)	1,832 (4.7)	2,717 (6.1)	3.7	3.3	3.8	4.0	3.6
Middle East	244 (2.1)	472 (3.1)	1,111 (4.6)	1,585 (4.8)	1,902 (4.9)	2,215 (4.9)	6.2	2.4	1.8	1.5	2.0
Oceania	187 (1.6)	249 (1.6)	296 (1.2)	370 (1.1)	409 (1.0)	444 (1.0)	1.9	1.5	1.0	0.8	1.2
OECD	7,652 (64.5)	9,730 (62.9)	10,794 (44.5)	12,189 (37.0)	13,031 (33.3)	13,670 (30.5)	1.4	0.8	0.7	0.5	0.7
Non-OECD	4,212 (35.5)	5,741 (37.1)	13,461 (55.5)	20,776 (63.0)	26,070 (66.7)	31,168 (69.5)	4.8	2.9	2.3	1.8	2.4

Source: International Energy Agency "World Energy Balances" (historical)

Note: Figures in parentheses are global shares (%).

Table A17 | Primary energy consumption per capita [Reference Scenario]

(toe/person)

							CAGR (%)				
	1990	2000	2015	2030	2040	2050	1990/ 2015	2015/ 2030	2030/ 2040	2040/ 2050	2015/ 2050
World	1.66	1.64	1.86	1.95	2.01	2.04	0.5	0.3	0.3	0.2	0.3
Asia	0.72	0.85	1.37	1.68	1.86	2.01	2.6	1.4	1.0	0.8	1.1
China	0.77	0.89	2.17	2.61	2.88	3.00	4.2	1.2	1.0	0.4	0.9
India	0.35	0.42	0.65	1.05	1.28	1.53	2.5	3.2	2.1	1.8	2.5
Japan	3.55	4.08	3.39	3.59	3.62	3.62	-0.2	0.4	0.1	0.0	0.2
Korea	2.17	4.00	5.39	5.54	5.39	5.21	3.7	0.2	-0.3	-0.3	-0.1
Chinese Taipei	2.34	3.81	4.63	4.57	4.56	4.54	2.8	-0.1	0.0	0.0	-0.1
ASEAN	0.54	0.75	1.02	1.41	1.71	2.03	2.6	2.2	1.9	1.7	2.0
Indonesia	0.54	0.74	0.87	1.33	1.64	1.92	1.9	2.8	2.1	1.6	2.3
Malaysia	1.20	2.09	2.83	3.31	3.62	3.84	3.5	1.0	0.9	0.6	0.9
Myanmar	0.25	0.27	0.37	0.58	0.79	1.07	1.5	3.1	3.1	3.1	3.1
Philippines	0.46	0.51	0.52	0.78	0.95	1.17	0.4	2.8	2.0	2.1	2.4
Singapore	3.78	4.63	4.63	4.80	5.00	5.19	0.8	0.2	0.4	0.4	0.3
Thailand	0.74	1.15	1.99	2.53	3.10	3.79	4.0	1.6	2.1	2.0	1.9
Viet Nam	0.27	0.37	0.80	1.23	1.63	2.13	4.5	2.9	2.9	2.7	2.8
Asia excl. Japan	0.59	0.72	1.30	1.62	1.82	1.97	3.2	1.5	1.1	0.8	1.2
North America	7.66	8.08	6.88	6.10	5.69	5.30	-0.4	-0.8	-0.7	-0.7	-0.7
United States	7.67	8.06	6.81	6.04	5.63	5.24	-0.5	-0.8	-0.7	-0.7	-0.7
Latin America	1.05	1.15	1.35	1.53	1.68	1.77	1.0	0.8	0.9	0.6	0.8
OECD Europe	3.25	3.35	3.01	2.83	2.72	2.65	-0.3	-0.4	-0.4	-0.3	-0.4
European Union	3.44	3.47	3.11	2.95	2.85	2.79	-0.4	-0.4	-0.4	-0.2	-0.3
Non-OECD Europe	4.48	2.95	3.24	3.53	3.88	4.30	-1.3	0.6	1.0	1.0	0.8
Africa	0.62	0.61	0.66	0.64	0.65	0.65	0.3	-0.2	0.1	0.1	-0.1
Middle East	1.69	2.22	3.19	3.35	3.47	3.54	2.6	0.3	0.4	0.2	0.3
Oceania	4.86	5.22	5.14	4.58	4.19	3.85	0.2	-0.8	-0.9	-0.8	-0.8
OECD	4.25	4.59	4.11	3.86	3.71	3.57	-0.1	-0.4	-0.4	-0.4	-0.4
Non-OECD	0.96	0.90	1.32	1.51	1.63	1.70	1.3	0.9	0.7	0.4	0.7

Source: World Bank "World Development Indicators", International Energy Agency "World Energy Balances", etc. (historical)

Note: World includes international bunkers.

Table A18 | Primary energy consumption per GDP [Reference Scenario]

(toe/$2010 million)

							CAGR (%)				
	1990	2000	2015	2030	2040	2050	1990/ 2015	2015/ 2030	2030/ 2040	2040/ 2050	2015/ 2050
World	232	201	182	144	121	103	-1.0	-1.6	-1.7	-1.5	-1.6
Asia	278	261	244	174	139	114	-0.5	-2.2	-2.3	-1.9	-2.2
China	1,050	505	334	182	130	100	-4.5	-4.0	-3.3	-2.6	-3.4
India	651	545	372	258	201	160	-2.2	-2.4	-2.5	-2.2	-2.4
Japan	94	97	72	62	54	47	-1.1	-0.9	-1.5	-1.3	-1.2
Korea	246	265	215	156	124	100	-0.5	-2.1	-2.3	-2.1	-2.2
Chinese Taipei	295	274	207	154	128	106	-1.4	-1.9	-1.9	-1.8	-1.9
ASEAN	314	322	249	198	171	149	-0.9	-1.5	-1.5	-1.4	-1.5
Indonesia	318	343	228	185	154	128	-1.3	-1.4	-1.9	-1.8	-1.6
Malaysia	267	301	260	191	159	131	-0.1	-2.0	-1.8	-1.9	-1.9
Myanmar	1,593	960	336	230	198	179	-6.0	-2.5	-1.5	-1.0	-1.8
Philippines	304	319	196	160	146	136	-1.7	-1.4	-0.9	-0.7	-1.0
Singapore	171	139	89	75	67	62	-2.6	-1.2	-1.0	-0.8	-1.0
Thailand	296	332	345	271	238	212	0.6	-1.6	-1.3	-1.1	-1.4
Viet Nam	606	470	478	349	293	250	-1.0	-2.1	-1.7	-1.6	-1.8
Asia excl. Japan	575	416	307	196	151	122	-2.5	-3.0	-2.6	-2.1	-2.6
North America	211	180	134	97	78	64	-1.8	-2.1	-2.1	-2.0	-2.1
United States	211	179	132	95	76	62	-1.9	-2.1	-2.2	-2.0	-2.1
Latin America	167	159	147	128	108	92	-0.5	-0.9	-1.7	-1.5	-1.3
OECD Europe	129	110	87	67	57	49	-1.5	-1.8	-1.6	-1.4	-1.6
European Union	139	115	89	68	58	50	-1.8	-1.8	-1.6	-1.4	-1.6
Non-OECD Europe	714	668	416	315	259	217	-2.1	-1.8	-1.9	-1.7	-1.8
Africa	449	433	348	257	197	160	-1.0	-2.0	-2.6	-2.0	-2.2
Middle East	235	260	291	248	217	189	0.9	-1.1	-1.3	-1.4	-1.2
Oceania	138	121	96	70	58	49	-1.4	-2.1	-1.9	-1.6	-1.9
OECD	155	139	109	83	69	59	-1.4	-1.8	-1.8	-1.7	-1.8
Non-OECD	472	379	298	207	163	134	-1.8	-2.4	-2.4	-2.0	-2.3

Source: World Bank "World Development Indicators", International Energy Agency "World Energy Balances", etc. (historical)

Note: World includes international bunkers.

Table A19 | Energy-related carbon dioxide emissions [Reference Scenario]

(Mt)

	1990	2000	2015	2030	2040	2050	CAGR (%) 1990/2015	2015/2030	2030/2040	2040/2050	2015/2050
World	21,205 (100)	23,416 (100)	32,910 (100)	38,142 (100)	41,613 (100)	44,107 (100)	1.8	1.0	0.9	0.6	0.8
Asia	4,918 (23.2)	6,891 (29.4)	15,076 (45.8)	19,461 (51.0)	22,011 (52.9)	23,706 (53.7)	4.6	1.7	1.2	0.7	1.3
China	2,339 (11.0)	3,164 (13.5)	9,333 (28.4)	10,721 (28.1)	11,088 (26.6)	10,517 (23.8)	5.7	0.9	0.3	-0.5	0.3
India	542 (2.6)	899 (3.8)	2,107 (6.4)	4,040 (10.6)	5,400 (13.0)	6,850 (15.5)	5.6	4.4	2.9	2.4	3.4
Japan	1,071 (5.1)	1,195 (5.1)	1,147 (3.5)	1,023 (2.7)	966 (2.3)	884 (2.0)	0.3	-0.8	-0.6	-0.9	-0.7
Korea	239 (1.1)	433 (1.9)	582 (1.8)	656 (1.7)	652 (1.6)	603 (1.4)	3.6	0.8	-0.1	-0.8	0.1
Chinese Taipei	115 (0.5)	225 (1.0)	255 (0.8)	277 (0.7)	263 (0.6)	239 (0.5)	3.2	0.6	-0.5	-1.0	-0.2
ASEAN	362 (1.7)	711 (3.0)	1,288 (3.9)	2,111 (5.5)	2,812 (6.8)	3,602 (8.2)	5.2	3.4	2.9	2.5	3.0
Indonesia	134 (0.6)	262 (1.1)	451 (1.4)	811 (2.1)	1,120 (2.7)	1,440 (3.3)	5.0	4.0	3.3	2.5	3.4
Malaysia	54 (0.3)	121 (0.5)	227 (0.7)	323 (0.8)	372 (0.9)	421 (1.0)	5.9	2.4	1.4	1.3	1.8
Myanmar	4 (0.0)	10 (0.0)	25 (0.1)	68 (0.2)	111 (0.3)	169 (0.4)	7.5	6.9	5.0	4.4	5.6
Philippines	39 (0.2)	69 (0.3)	108 (0.3)	218 (0.6)	314 (0.8)	440 (1.0)	4.2	4.8	3.7	3.4	4.1
Singapore	29 (0.1)	48 (0.2)	50 (0.2)	56 (0.1)	59 (0.1)	59 (0.1)	2.2	0.7	0.5	0.1	0.5
Thailand	81 (0.4)	152 (0.6)	252 (0.8)	319 (0.8)	381 (0.9)	428 (1.0)	4.7	1.6	1.8	1.2	1.5
Viet Nam	17 (0.1)	44 (0.2)	168 (0.5)	308 (0.8)	449 (1.1)	635 (1.4)	9.6	4.1	3.8	3.5	3.9
Asia excl. Japan	3,847 (18.1)	5,696 (24.3)	13,928 (42.3)	18,438 (48.3)	21,046 (50.6)	22,821 (51.7)	5.3	1.9	1.3	0.8	1.4
North America	5,236 (24.7)	6,126 (26.2)	5,574 (16.9)	5,066 (13.3)	4,786 (11.5)	4,438 (10.1)	0.3	-0.6	-0.6	-0.8	-0.6
United States	4,820 (22.7)	5,617 (24.0)	5,071 (15.4)	4,598 (12.1)	4,328 (10.4)	4,004 (9.1)	0.2	-0.7	-0.6	-0.8	-0.7
Latin America	909 (4.3)	1,206 (5.2)	1,724 (5.2)	2,137 (5.6)	2,469 (5.9)	2,651 (6.0)	2.6	1.4	1.5	0.7	1.2
OECD Europe	3,971 (18.7)	3,897 (16.6)	3,436 (10.4)	3,057 (8.0)	2,752 (6.6)	2,471 (5.6)	-0.6	-0.8	-1.0	-1.1	-0.9
European Union	4,068 (19.2)	3,783 (16.2)	3,176 (9.6)	2,835 (7.4)	2,552 (6.1)	2,292 (5.2)	-1.0	-0.8	-1.0	-1.1	-0.9
Non-OECD Europe	4,104 (19.4)	2,455 (10.5)	2,543 (7.7)	2,577 (6.8)	2,749 (6.6)	2,928 (6.6)	-1.9	0.1	0.6	0.6	0.4
Africa	593 (2.8)	718 (3.1)	1,168 (3.5)	1,605 (4.2)	2,064 (5.0)	2,705 (6.1)	2.7	2.1	2.5	2.7	2.4
Middle East	573 (2.7)	945 (4.0)	1,822 (5.5)	2,310 (6.1)	2,630 (6.3)	2,910 (6.6)	4.7	1.6	1.3	1.0	1.3
Oceania	281 (1.3)	337 (1.4)	395 (1.2)	385 (1.0)	366 (0.9)	347 (0.8)	1.4	-0.2	-0.5	-0.5	-0.4
OECD	11,120 (52.4)	12,402 (53.0)	11,687 (35.5)	10,860 (28.5)	10,277 (24.7)	9,551 (21.7)	0.2	-0.5	-0.6	-0.7	-0.6
Non-OECD	9,464 (44.6)	10,174 (43.4)	20,051 (60.9)	25,738 (67.5)	29,551 (71.0)	32,605 (73.9)	3.0	1.7	1.4	1.0	1.4

Source: Compiled from International Energy Agency "World Energy Balances" (historical)

Note: Figures in parentheses are global shares (%). World includes international bunkers.

Table A20 | World [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	7,205	8,774	10,028	13,647	16,562	18,374	19,789	100	100	100	1.8	1.3	0.9	1.1
Coal	1,783	2,220	2,311	3,836	4,254	4,486	4,531	25	28	23	2.2	0.7	0.3	0.5
Oil	3,102	3,235	3,660	4,334	5,024	5,471	5,849	37	32	30	1.2	1.0	0.8	0.9
Natural gas	1,232	1,663	2,071	2,944	3,845	4,550	5,194	19	22	26	2.3	1.8	1.5	1.6
Nuclear	186	526	676	671	907	980	1,055	6.0	4.9	5.3	1.0	2.0	0.8	1.3
Hydro	148	184	225	334	425	466	500	2.1	2.5	2.5	2.4	1.6	0.8	1.2
Geothermal	12	34	52	74	177	224	257	0.4	0.5	1.3	3.1	6.0	1.9	3.6
Solar, wind, etc.	0.1	2.7	8.0	126	306	446	608	0.0	0.9	3.1	16.7	6.1	3.5	4.6
Biomass and waste	741	909	1,023	1,323	1,620	1,746	1,790	10	9.7	9.0	1.5	1.4	0.5	0.9

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	5,368	6,268	7,036	9,384	11,346	12,617	13,675	100	100	100	1.6	1.3	0.9	1.1
Industry	1,766	1,809	1,868	2,712	3,146	3,499	3,779	29	29	28	1.6	1.0	0.9	1.0
Transport	1,248	1,573	1,961	2,703	3,230	3,528	3,765	25	29	28	2.2	1.2	0.8	1.0
Buildings, etc.	2,000	2,409	2,591	3,132	3,911	4,367	4,779	38	33	35	1.1	1.5	1.0	1.2
Non-energy use	354	478	617	836	1,060	1,223	1,352	7.6	8.9	9.9	2.3	1.6	1.2	1.4
Coal	703	754	548	1,044	1,096	1,122	1,108	12	11	8.1	1.3	0.3	0.1	0.2
Oil	2,446	2,599	3,115	3,840	4,511	4,942	5,322	41	41	39	1.6	1.1	0.8	0.9
Natural gas	814	945	1,117	1,401	1,772	2,017	2,231	15	15	16	1.6	1.6	1.2	1.3
Electricity	586	835	1,092	1,737	2,373	2,852	3,324	13	19	24	3.0	2.1	1.7	1.9
Heat	121	336	248	271	288	297	299	5.4	2.9	2.2	-0.9	0.4	0.2	0.3
Hydrogen	-	-	-	-	0.4	0.7	0.8	-	-	0.0	n.a.	n.a.	3.1	n.a.
Renewables	698	799	917	1,090	1,306	1,386	1,391	13	12	10	1.3	1.2	0.3	0.7

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	8,283	11,864	15,471	24,255	32,965	39,101	44,838	100	100	100	2.9	2.1	1.5	1.8
Coal	3,137	4,425	6,005	9,538	11,758	13,157	13,997	37	39	31	3.1	1.4	0.9	1.1
Oil	1,659	1,358	1,252	990	1,002	979	892	11	4.1	2.0	-1.3	0.1	-0.6	-0.3
Natural gas	999	1,752	2,753	5,543	7,939	10,337	12,868	15	23	29	4.7	2.4	2.4	2.4
Nuclear	713	2,013	2,591	2,571	3,480	3,759	4,047	17	11	9.0	1.0	2.0	0.8	1.3
Hydro	1,717	2,142	2,619	3,888	4,943	5,419	5,818	18	16	13	2.4	1.6	0.8	1.2
Geothermal	14	36	52	80	191	245	288	0.3	0.3	0.6	3.2	5.9	2.1	3.7
Solar PV	-	0.0	1.0	247	751	1,154	1,667	0.0	1.0	3.7	45.5	7.7	4.1	5.6
Wind	0.0	3.9	31	838	1,891	2,710	3,585	0.0	3.5	8.0	24.0	5.6	3.3	4.2
CSP and marine	0.5	1.5	2.2	27	136	237	385	0.0	0.1	0.9	12.2	11.5	5.3	7.9
Biomass and waste	44	131	164	528	872	1,099	1,287	1.1	2.2	2.9	5.7	3.4	2.0	2.6
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	27,958	37,797	49,825	75,059	115,303	152,089	191,400	2.8	2.9	2.6	2.7
Population (million)	4,436	5,277	6,108	7,336	8,497	9,152	9,710	1.3	1.0	0.7	0.8
CO_2 emissions (Mt)	18,411	21,205	23,416	32,910	38,142	41,613	44,107	1.8	1.0	0.7	0.8
GDP per capita ($2010 thousand)	6.3	7.2	8.2	10	14	17	20	1.4	1.9	1.9	1.9
Primary energy consump. per capita (toe)	1.6	1.7	1.6	1.9	1.9	2.0	2.0	0.5	0.3	0.2	0.3
Primary energy consumption per GDP[*2]	258	232	201	182	144	121	103	-1.0	-1.6	-1.6	-1.6
CO_2 emissions per GDP[*3]	659	561	470	438	331	274	230	-1.0	-1.9	-1.8	-1.8
CO_2 per primary energy consumption[*4]	2.6	2.4	2.3	2.4	2.3	2.3	2.2	0.0	-0.3	-0.2	-0.2

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A21 | Asia [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
Total[*1]	1,439	2,108	2,887	5,459	7,434	8,548	9,351	100	100	100	3.9	2.1	1.2	1.5
Coal	466	785	1,037	2,739	3,320	3,632	3,754	37	50	40	5.1	1.3	0.6	0.9
Oil	477	618	916	1,330	1,820	2,089	2,323	29	24	25	3.1	2.1	1.2	1.6
Natural gas	51	116	232	547	965	1,285	1,567	5.5	10	17	6.4	3.9	2.5	3.1
Nuclear	25	77	132	111	298	369	441	3.6	2.0	4.7	1.5	6.8	2.0	4.0
Hydro	20	32	41	131	182	205	221	1.5	2.4	2.4	5.8	2.2	1.0	1.5
Geothermal	2.6	8.2	23	34	92	115	127	0.4	0.6	1.4	5.9	6.8	1.6	3.8
Solar, wind, etc.	-	1.5	2.2	51	129	194	265	0.1	0.9	2.8	15.3	6.3	3.7	4.8
Biomass and waste	397	471	503	515	625	657	652	22	9.4	7.0	0.4	1.3	0.2	0.7

Final energy consumption

	Mtoe							Shares (%)			1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	1,129	1,551	1,990	3,617	4,838	5,560	6,140	100	100	100	3.4	2.0	1.2	1.5
Industry	383	517	646	1,481	1,759	1,956	2,097	33	41	34	4.3	1.2	0.9	1.0
Transport	126	186	320	648	989	1,149	1,274	12	18	21	5.1	2.9	1.3	2.0
Buildings, etc.	567	733	836	1,124	1,593	1,872	2,126	47	31	35	1.7	2.4	1.5	1.8
Non-energy use	54	115	188	365	496	583	642	7.4	10	10	4.7	2.1	1.3	1.6
Coal	301	424	378	901	951	974	960	27	25	16	3.1	0.4	0.0	0.2
Oil	327	453	727	1,164	1,633	1,896	2,135	29	32	35	3.9	2.3	1.3	1.7
Natural gas	21	47	88	252	446	576	688	3.0	7.0	11	6.9	3.9	2.2	2.9
Electricity	88	158	280	740	1,152	1,441	1,705	10	20	28	6.4	3.0	2.0	2.4
Heat	7.5	14	30	89	105	114	115	0.9	2.5	1.9	7.6	1.1	0.5	0.7
Hydrogen	-	-	-	-	0.2	0.3	0.3	-	-	0.0	n.a.	n.a.	3.5	n.a.
Renewables	386	456	488	471	551	558	536	29	13	8.7	0.1	1.0	-0.1	0.4

Electricity generation

	(TWh)							Shares (%)			1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	1,196	2,252	4,013	10,204	15,895	19,641	22,874	100	100	100	6.2	3.0	1.8	2.3
Coal	298	863	1,994	6,203	8,742	10,331	11,449	38	61	50	8.2	2.3	1.4	1.8
Oil	476	469	430	250	226	194	139	21	2.5	0.6	-2.5	-0.7	-2.4	-1.7
Natural gas	90	240	565	1,296	2,246	3,148	4,046	11	13	18	7.0	3.7	3.0	3.3
Nuclear	97	294	505	425	1,143	1,417	1,692	13	4.2	7.4	1.5	6.8	2.0	4.0
Hydro	232	367	479	1,521	2,121	2,385	2,569	16	15	11	5.8	2.2	1.0	1.5
Geothermal	3.0	8.4	20	24	63	78	86	0.4	0.2	0.4	4.3	6.7	1.6	3.7
Solar PV	-	0.0	0.6	95	374	617	925	0.0	0.9	4.0	49.6	9.6	4.6	6.7
Wind	-	0.0	2.4	239	696	1,071	1,465	0.0	2.3	6.4	42.5	7.4	3.8	5.3
CSP and marine	-	0.0	0.0	2.0	8.2	17	37	0.0	0.0	0.2	25.5	9.7	7.8	8.6
Biomass and waste	0.0	10	17	150	277	383	466	0.5	1.5	2.0	11.4	4.1	2.6	3.3
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
GDP ($2010 billion)	4,455	7,586	11,047	22,344	42,637	61,674	81,910	4.4	4.4	3.3	3.8
Population (million)	2,440	2,932	3,407	3,993	4,433	4,595	4,658	1.2	0.7	0.2	0.4
CO_2 emissions (Mt)	3,268	4,918	6,891	15,076	19,461	22,011	23,706	4.6	1.7	1.0	1.3
GDP per capita ($2010 thousand)	1.8	2.6	3.2	5.6	9.6	13	18	3.1	3.7	3.1	3.3
Primary energy consump. per capita (toe)	0.6	0.7	0.8	1.4	1.7	1.9	2.0	2.6	1.4	0.9	1.1
Primary energy consumption per GDP[*2]	323	278	261	244	174	139	114	-0.5	-2.2	-2.1	-2.2
CO_2 emissions per GDP[*3]	733	648	624	675	456	357	289	0.2	-2.6	-2.3	-2.4
CO_2 per primary energy consumption[*4]	2.3	2.3	2.4	2.8	2.6	2.6	2.5	0.7	-0.4	-0.2	-0.2

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A22 | China [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	598	871	1,130	2,973	3,695	4,005	4,021	100	100	100	5.0	1.5	0.4	0.9
Coal	313	528	665	1,982	2,096	2,109	1,935	61	67	48	5.4	0.4	-0.4	-0.1
Oil	89	119	221	534	763	809	795	14	18	20	6.2	2.4	0.2	1.1
Natural gas	12	13	21	159	343	468	561	1.5	5.3	14	10.6	5.3	2.5	3.7
Nuclear	-	-	4.4	45	165	223	282	-	1.5	7.0	n.a.	9.1	2.7	5.4
Hydro	5.0	11	19	96	122	132	135	1.3	3.2	3.4	9.1	1.6	0.5	1.0
Geothermal	-	-	1.7	5.1	7.4	8.7	9.2	-	0.2	0.2	n.a.	2.5	1.1	1.7
Solar, wind, etc.	-	0.0	1.0	41	95	136	176	0.0	1.4	4.4	33.0	5.7	3.1	4.2
Biomass and waste	180	200	198	114	106	120	129	23	3.8	3.2	-2.2	-0.5	1.0	0.4

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	487	654	781	1,906	2,346	2,532	2,555	100	100	100	4.4	1.4	0.4	0.8
Industry	181	234	299	966	965	973	937	36	51	37	5.8	0.0	-0.1	-0.1
Transport	24	33	87	299	504	541	537	5.1	16	21	9.2	3.6	0.3	1.7
Buildings, etc.	272	344	335	483	661	767	814	53	25	32	1.4	2.1	1.0	1.5
Non-energy use	10	43	60	158	215	250	266	6.6	8.3	10	5.3	2.1	1.1	1.5
Coal	214	308	274	701	628	574	486	47	37	19	3.3	-0.7	-1.3	-1.0
Oil	59	85	180	480	700	747	739	13	25	29	7.2	2.5	0.3	1.2
Natural gas	6.4	8.9	12	105	206	269	315	1.4	5.5	12	10.4	4.6	2.1	3.2
Electricity	21	39	89	419	612	731	801	6.0	22	31	10.0	2.5	1.4	1.9
Heat	7.4	13	25	83	98	107	109	2.0	4.4	4.3	7.6	1.1	0.5	0.8
Hydrogen	-	-	-	-	0.1	0.2	0.2	-	-	0.0	n.a.	n.a.	2.8	n.a.
Renewables	180	200	199	116	102	103	105	31	6.1	4.1	-2.2	-0.9	0.2	-0.3

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	301	621	1,356	5,844	8,441	9,970	10,763	100	100	100	9.4	2.5	1.2	1.8
Coal	159	441	1,060	4,109	5,112	5,616	5,509	71	70	51	9.3	1.5	0.4	0.8
Oil	82	50	47	9.7	9.0	7.6	4.9	8.1	0.2	0.0	-6.4	-0.5	-3.0	-1.9
Natural gas	0.7	2.8	5.8	145	427	663	853	0.4	2.5	7.9	17.2	7.4	3.5	5.2
Nuclear	-	-	17	171	632	856	1,081	-	2.9	10	n.a.	9.1	2.7	5.4
Hydro	58	127	222	1,114	1,414	1,531	1,574	20	19	15	9.1	1.6	0.5	1.0
Geothermal	-	0.1	0.1	0.1	0.4	0.4	0.5	0.0	0.0	0.0	3.2	7.6	1.3	4.0
Solar PV	-	0.0	0.0	45	212	302	395	0.0	0.8	3.7	49.3	10.8	3.2	6.4
Wind	-	0.0	0.6	186	507	791	1,088	0.0	3.2	10	58.0	6.9	3.9	5.2
CSP and marine	-	0.0	0.0	0.0	2.5	6.0	12	0.0	0.0	0.1	6.6	33.0	8.3	18.2
Biomass and waste	-	-	2.4	64	126	195	244	-	1.1	2.3	n.a.	4.6	3.4	3.9
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	341	830	2,237	8,910	20,311	30,759	40,328	10.0	5.6	3.5	4.4
Population (million)	981	1,135	1,263	1,371	1,415	1,391	1,340	0.8	0.2	-0.3	-0.1
CO_2 emissions (Mt)	1,505	2,339	3,164	9,333	10,721	11,088	10,517	5.7	0.9	-0.1	0.3
GDP per capita ($2010 thousand)	0.3	0.7	1.8	6.5	14	22	30	9.1	5.4	3.8	4.5
Primary energy consump. per capita (toe)	0.6	0.8	0.9	2.2	2.6	2.9	3.0	4.2	1.2	0.7	0.9
Primary energy consumption per GDP[*2]	1,752	1,050	505	334	182	130	100	-4.5	-4.0	-3.0	-3.4
CO_2 emissions per GDP[*3]	4,410	2,819	1,414	1,048	528	360	261	-3.9	-4.5	-3.5	-3.9
CO_2 per primary energy consumption[*4]	2.5	2.7	2.8	3.1	2.9	2.8	2.6	0.6	-0.5	-0.5	-0.5

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A23 | India [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
Total[*1]	200	306	441	851	1,585	2,061	2,545	100	100	100	4.2	4.2	2.4	3.2
Coal	44	93	146	379	720	932	1,143	30	45	45	5.8	4.4	2.3	3.2
Oil	33	61	112	206	377	521	683	20	24	27	5.0	4.1	3.0	3.5
Natural gas	1.3	11	23	43	124	195	274	3.5	5.1	11	5.8	7.3	4.0	5.4
Nuclear	0.8	1.6	4.4	9.8	48	67	79	0.5	1.1	3.1	7.5	11.2	2.5	6.2
Hydro	4.0	6.2	6.4	12	24	31	38	2.0	1.4	1.5	2.7	4.8	2.4	3.4
Geothermal	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Solar, wind, etc.	-	0.0	0.2	4.8	21	38	59	0.0	0.6	2.3	27.8	10.4	5.3	7.4
Biomass and waste	116	133	149	196	269	277	268	44	23	11	1.6	2.1	0.0	0.9

Final energy consumption

	Mtoe							Shares (%)			1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	174	243	315	578	1,056	1,383	1,729	100	100	100	3.5	4.1	2.5	3.2
Industry	41	67	83	195	376	492	597	27	34	35	4.4	4.5	2.3	3.2
Transport	17	21	32	86	163	236	304	8.6	15	18	5.8	4.3	3.2	3.7
Buildings, etc.	110	142	173	250	420	525	671	59	43	39	2.3	3.5	2.4	2.9
Non-energy use	5.7	13	27	46	97	130	158	5.5	8.0	9.1	5.1	5.0	2.5	3.6
Coal	25	39	35	108	211	277	341	16	19	20	4.2	4.5	2.4	3.3
Oil	27	50	94	174	332	467	622	21	30	36	5.1	4.4	3.2	3.7
Natural gas	0.7	5.6	9.7	29	72	105	137	2.3	5.0	8.0	6.8	6.2	3.3	4.6
Electricity	7.8	18	32	88	205	297	407	7.6	15	24	6.5	5.8	3.5	4.5
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	7.5	n.a.
Renewables	114	130	144	178	237	237	221	54	31	13	1.3	1.9	-0.3	0.6

Electricity generation

	(TWh)							Shares (%)			1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	120	293	570	1,383	3,106	4,311	5,663	100	100	100	6.4	5.5	3.0	4.1
Coal	61	192	390	1,042	2,085	2,753	3,485	65	75	62	7.0	4.7	2.6	3.5
Oil	8.8	13	29	23	30	27	17	4.5	1.7	0.3	2.2	1.8	-2.7	-0.8
Natural gas	0.6	10.0	56	68	254	448	719	3.4	4.9	13	8.0	9.2	5.3	7.0
Nuclear	3.0	6.1	17	37	185	257	303	2.1	2.7	5.3	7.5	11.2	2.5	6.2
Hydro	47	72	74	138	280	364	447	24	10.0	7.9	2.7	4.8	2.4	3.4
Geothermal	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Solar PV	-	-	0.0	5.6	56	151	281	-	0.4	5.0	n.a.	16.5	8.4	11.8
Wind	-	0.0	1.7	43	154	226	300	0.0	3.1	5.3	33.4	8.9	3.4	5.7
CSP and marine	-	-	-	-	3.1	5.9	13	-	-	0.2	n.a.	n.a.	7.4	n.a.
Biomass and waste	-	-	1.3	27	59	78	99	-	1.9	1.7	n.a.	5.4	2.6	3.8
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
GDP ($2010 billion)	274	470	809	2,288	6,133	10,236	15,857	6.5	6.8	4.9	5.7
Population (million)	697	871	1,053	1,311	1,515	1,608	1,662	1.7	1.0	0.5	0.7
CO_2 emissions (Mt)	263	542	899	2,107	4,040	5,400	6,850	5.6	4.4	2.7	3.4
GDP per capita ($2010 thousand)	0.4	0.5	0.8	1.7	4.0	6.4	9.5	4.8	5.8	4.4	5.0
Primary energy consump. per capita (toe)	0.3	0.4	0.4	0.6	1.0	1.3	1.5	2.5	3.2	1.9	2.5
Primary energy consumption per GDP[*2]	731	651	545	372	258	201	160	-2.2	-2.4	-2.4	-2.4
CO_2 emissions per GDP[*3]	962	1,154	1,112	921	659	528	432	-0.9	-2.2	-2.1	-2.1
CO_2 per primary energy consumption[*4]	1.3	1.8	2.0	2.5	2.5	2.6	2.7	1.3	0.2	0.3	0.2

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A24 | Japan [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	345	439	518	430	433	414	391	100	100	100	-0.1	0.0	-0.5	-0.3
Coal	60	76	97	117	112	110	104	17	27	27	1.7	-0.3	-0.4	-0.3
Oil	234	250	255	185	151	133	115	57	43	29	-1.2	-1.3	-1.4	-1.4
Natural gas	21	44	66	100	98	100	98	10	23	25	3.3	-0.1	0.0	-0.1
Nuclear	22	53	84	2.5	38	33	33	12	0.6	8.4	-11.5	20.0	-0.7	7.7
Hydro	7.6	7.5	7.3	7.3	7.9	8.1	8.1	1.7	1.7	2.1	-0.1	0.5	0.2	0.3
Geothermal	0.8	1.6	3.1	2.4	5.4	7.4	8.7	0.4	0.6	2.2	1.7	5.6	2.4	3.8
Solar, wind, etc.	-	1.4	0.9	3.9	6.9	9.0	11	0.3	0.9	2.8	4.2	4.0	2.3	3.0
Biomass and waste	-	4.5	4.7	11	13	14	14	1.0	2.7	3.6	3.8	0.9	0.4	0.6

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	232	287	328	291	279	266	251	100	100	100	0.1	-0.3	-0.5	-0.4
Industry	91	110	100	82	81	81	78	38	28	31	-1.1	-0.1	-0.2	-0.1
Transport	54	68	84	71	57	52	47	24	24	19	0.2	-1.4	-1.0	-1.2
Buildings, etc.	58	76	103	99	103	97	90	26	34	36	1.1	0.3	-0.6	-0.3
Non-energy use	28	34	41	39	38	37	36	12	13	14	0.6	-0.2	-0.3	-0.3
Coal	25	30	24	24	22	21	20	11	8.1	7.8	-1.0	-0.4	-0.7	-0.5
Oil	157	171	194	152	128	115	102	59	52	41	-0.5	-1.1	-1.1	-1.1
Natural gas	5.8	15	22	29	34	34	34	5.3	10	14	2.7	0.9	0.1	0.4
Electricity	44	66	83	82	90	91	91	23	28	36	0.8	0.6	0.1	0.3
Heat	0.1	0.2	0.5	0.5	0.5	0.5	0.4	0.1	0.2	0.2	3.8	-0.1	-1.2	-0.7
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	-0.8	n.a.
Renewables	-	4.1	3.8	3.8	4.3	4.3	4.1	1.4	1.3	1.6	-0.2	0.8	-0.3	0.2

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	573	873	1,088	1,035	1,136	1,152	1,150	100	100	100	0.7	0.6	0.1	0.3
Coal	55	118	234	343	326	337	336	13	33	29	4.4	-0.4	0.2	-0.1
Oil	265	284	179	103	59	37	14	33	9.9	1.2	-4.0	-3.7	-6.9	-5.5
Natural gas	81	171	254	410	381	390	384	20	40	33	3.6	-0.5	0.0	-0.2
Nuclear	83	202	322	9.4	145	125	125	23	0.9	11	-11.5	20.0	-0.7	7.7
Hydro	88	87	85	85	92	94	94	10.0	8.2	8.2	-0.1	0.5	0.2	0.3
Geothermal	0.9	1.7	3.3	2.6	6.1	8.5	9.9	0.2	0.2	0.9	1.6	5.9	2.4	3.9
Solar PV	-	0.0	0.3	36	63	81	95	0.0	3.5	8.3	52.1	3.8	2.1	2.8
Wind	-	-	0.1	5.2	14	21	29	-	0.5	2.5	n.a.	7.0	3.7	5.1
CSP and marine	-	-	-	-	0.1	0.1	0.4	-	-	0.0	n.a.	n.a.	11.0	n.a.
Biomass and waste	-	9.6	10	41	50	57	61	1.1	4.0	5.3	6.0	1.3	1.0	1.1
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	2,977	4,683	5,349	5,986	6,948	7,705	8,329	1.0	1.0	0.9	0.9
Population (million)	117	124	127	127	121	114	108	0.1	-0.3	-0.6	-0.5
CO_2 emissions (Mt)	916	1,071	1,195	1,147	1,023	966	884	0.3	-0.8	-0.7	-0.7
GDP per capita ($2010 thousand)	25	38	42	47	58	67	77	0.9	1.3	1.5	1.4
Primary energy consump. per capita (toe)	3.0	3.6	4.1	3.4	3.6	3.6	3.6	-0.2	0.4	0.0	0.2
Primary energy consumption per GDP[*2]	116	94	97	72	62	54	47	-1.1	-0.9	-1.4	-1.2
CO_2 emissions per GDP[*3]	308	229	223	192	147	125	106	-0.7	-1.7	-1.6	-1.7
CO_2 per primary energy consumption[*4]	2.7	2.4	2.3	2.7	2.4	2.3	2.3	0.4	-0.8	-0.2	-0.5

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A25 | Korea [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	41	93	188	273	292	283	263	100	100	100	4.4	0.5	-0.5	-0.1
Coal	14	25	42	81	92	91	82	27	30	31	4.7	0.9	-0.6	0.0
Oil	27	50	99	103	105	99	91	54	38	35	2.9	0.1	-0.7	-0.3
Natural gas	-	2.7	17	39	56	64	68	2.9	14	26	11.3	2.3	1.0	1.6
Nuclear	0.9	14	28	43	31	19	11	15	16	4.1	4.7	-2.2	-5.1	-3.9
Hydro	0.2	0.5	0.3	0.2	0.3	0.3	0.3	0.6	0.1	0.1	-4.3	3.8	0.0	1.6
Geothermal	-	-	-	0.1	0.2	0.2	0.2	-	0.0	0.1	n.a.	1.8	0.6	1.1
Solar, wind, etc.	-	0.0	0.0	0.6	1.8	2.8	4.4	0.0	0.2	1.7	18.1	7.1	4.6	5.7
Biomass and waste	-	0.7	1.4	5.9	6.9	6.9	6.7	0.8	2.2	2.5	8.7	1.1	-0.2	0.4

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	31	65	127	174	191	189	180	100	100	100	4.0	0.6	-0.3	0.1
Industry	10	19	38	49	53	53	50	30	28	28	3.8	0.5	-0.3	0.1
Transport	4.8	15	26	33	36	34	30	22	19	17	3.4	0.4	-0.8	-0.3
Buildings, etc.	13	24	37	44	50	50	48	38	25	27	2.4	0.8	-0.2	0.2
Non-energy use	3.1	6.7	25	47	52	52	52	10	27	29	8.1	0.6	0.0	0.2
Coal	9.7	12	9.1	12	11	9.8	8.1	18	6.8	4.5	0.0	-0.3	-1.6	-1.1
Oil	19	44	80	90	93	89	82	67	52	45	2.9	0.2	-0.7	-0.3
Natural gas	-	0.7	11	20	26	27	27	1.0	12	15	14.6	1.5	0.2	0.7
Electricity	2.8	8.1	23	43	51	54	55	13	24	31	6.9	1.2	0.4	0.7
Heat	-	-	3.3	4.4	4.7	4.3	3.8	-	2.5	2.1	n.a.	0.6	-1.1	-0.4
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	2.8	n.a.
Renewables	-	0.7	1.3	4.7	5.2	5.2	5.1	1.1	2.7	2.8	7.6	0.8	-0.1	0.3

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	37	105	289	549	655	694	707	100	100	100	6.8	1.2	0.4	0.7
Coal	2.5	18	111	237	293	314	305	17	43	43	10.9	1.4	0.2	0.7
Oil	29	19	35	13	9.6	5.3	-	18	2.3	-	-1.6	-1.8	-100	-100
Natural gas	-	9.6	29	123	203	261	300	9.1	22	42	10.7	3.4	2.0	2.6
Nuclear	3.5	53	109	165	119	72	41	50	30	5.9	4.7	-2.2	-5.1	-3.9
Hydro	2.0	6.4	4.0	2.1	3.7	3.7	3.7	6.0	0.4	0.5	-4.3	3.8	0.0	1.6
Geothermal	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Solar PV	-	0.0	0.0	3.9	14	20	29	0.0	0.7	4.1	39.2	8.9	3.7	5.9
Wind	-	-	0.0	1.2	4.1	6.9	11	-	0.2	1.6	n.a.	8.6	5.1	6.6
CSP and marine	-	-	-	2.0	2.4	5.2	11	-	0.4	1.5	n.a.	1.3	7.7	4.9
Biomass and waste	-	-	0.1	3.2	5.0	5.4	5.6	-	0.6	0.8	n.a.	3.2	0.6	1.7
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	149	377	710	1,267	1,877	2,284	2,633	5.0	2.7	1.7	2.1
Population (million)	38	43	47	51	53	52	50	0.7	0.3	-0.2	0.0
CO_2 emissions (Mt)	126	239	433	582	656	652	603	3.6	0.8	-0.4	0.1
GDP per capita ($2010 thousand)	3.9	8.8	15	25	36	44	52	4.3	2.4	1.9	2.1
Primary energy consump. per capita (toe)	1.1	2.2	4.0	5.4	5.5	5.4	5.2	3.7	0.2	-0.3	-0.1
Primary energy consumption per GDP[*2]	277	246	265	215	156	124	100	-0.5	-2.1	-2.2	-2.2
CO_2 emissions per GDP[*3]	845	634	610	460	349	285	229	-1.3	-1.8	-2.1	-2.0
CO_2 per primary energy consumption[*4]	3.1	2.6	2.3	2.1	2.2	2.3	2.3	-0.7	0.3	0.1	0.2

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A26 | Chinese Taipei [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	28	48	85	109	110	109	103	100	100	100	3.3	0.1	-0.3	-0.1
Coal	3.9	11	30	40	42	39	33	24	36	32	5.1	0.4	-1.2	-0.5
Oil	20	26	38	42	42	40	37	54	39	36	2.0	-0.1	-0.5	-0.4
Natural gas	1.6	1.4	5.6	15	22	25	27	2.9	14	26	9.9	2.7	1.1	1.7
Nuclear	2.1	8.6	10	9.5	-	-	-	18	8.7	-	0.4	-100	n.a.	-100
Hydro	0.3	0.5	0.4	0.4	0.4	0.4	0.4	1.1	0.4	0.4	-1.4	0.5	0.0	0.2
Geothermal	-	0.0	-	-	-	-	-	0.0	-	-	-100	n.a.	n.a.	n.a.
Solar, wind, etc.	-	0.0	0.1	0.3	0.8	1.2	1.6	0.0	0.3	1.6	12.1	6.4	3.7	4.9
Biomass and waste	-	-	0.6	1.8	3.3	3.6	3.5	-	1.7	3.3	n.a.	3.9	0.3	1.8

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	19	29	49	69	71	71	70	100	100	100	3.4	0.2	-0.1	0.0
Industry	10	12	19	23	23	23	23	42	33	33	2.4	0.1	0.0	0.0
Transport	2.9	6.6	12	12	12	11	9.3	22	18	13	2.6	-0.4	-1.2	-0.8
Buildings, etc.	3.6	6.5	10	12	14	14	14	22	17	20	2.5	1.0	0.1	0.5
Non-energy use	2.0	4.0	7.8	22	23	23	23	14	31	33	7.0	0.3	0.2	0.2
Coal	2.2	3.6	5.0	7.6	7.7	7.2	6.7	12	11	9.7	3.1	0.0	-0.6	-0.4
Oil	12	18	28	38	37	36	34	62	55	49	3.0	-0.2	-0.4	-0.3
Natural gas	1.4	0.9	1.6	2.8	3.6	3.9	4.2	3.0	4.1	6.0	4.8	1.6	0.8	1.1
Electricity	3.2	6.6	14	20	22	24	24	22	29	35	4.5	0.8	0.4	0.6
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	1.1	n.a.
Renewables	-	0.0	0.1	0.3	0.4	0.4	0.4	0.1	0.4	0.6	11.9	2.0	0.5	1.1

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	43	88	181	255	288	303	312	100	100	100	4.3	0.8	0.4	0.6
Coal	6.0	24	88	119	135	127	116	28	47	37	6.5	0.9	-0.8	-0.1
Oil	26	23	30	13	13	11	8.2	26	5.0	2.6	-2.4	0.0	-2.2	-1.3
Natural gas	-	1.2	17	76	121	140	157	1.4	30	50	17.9	3.1	1.3	2.1
Nuclear	8.2	33	39	36	-	-	-	37	14	-	0.4	-100	n.a.	-100
Hydro	2.9	6.4	4.6	4.5	4.8	4.8	4.8	7.2	1.8	1.5	-1.4	0.5	0.0	0.2
Geothermal	-	0.0	-	-	-	-	-	0.0	-	-	-100	n.a.	n.a.	n.a.
Solar PV	-	-	-	0.9	2.8	4.5	6.4	-	0.3	2.1	n.a.	8.0	4.2	5.9
Wind	-	-	0.0	1.5	4.8	7.4	11	-	0.6	3.5	n.a.	8.0	4.2	5.8
CSP and marine	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Biomass and waste	-	-	1.7	3.8	7.2	8.2	8.6	-	1.5	2.8	n.a.	4.3	0.9	2.4
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	73	162	309	527	715	851	975	4.8	2.1	1.6	1.8
Population (million)	18	20	22	23	24	24	23	0.6	0.2	-0.3	-0.1
CO_2 emissions (Mt)	75	115	225	255	277	263	239	3.2	0.6	-0.7	-0.2
GDP per capita ($2010 thousand)	4.1	7.9	14	22	30	36	43	4.2	1.9	1.9	1.9
Primary energy consump. per capita (toe)	1.6	2.3	3.8	4.6	4.6	4.6	4.5	2.8	-0.1	0.0	-0.1
Primary energy consumption per GDP[*2]	380	295	274	207	154	128	106	-1.4	-1.9	-1.9	-1.9
CO_2 emissions per GDP[*3]	1,015	714	727	485	388	309	245	-1.5	-1.5	-2.3	-1.9
CO_2 per primary energy consumption[*4]	2.7	2.4	2.7	2.3	2.5	2.4	2.3	-0.1	0.5	-0.4	0.0

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A27 | ASEAN [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	142	233	379	621	982	1,259	1,544	100	100	100	4.0	3.1	2.3	2.6
Coal	3.6	13	32	114	217	300	398	5.4	18	26	9.2	4.4	3.1	3.6
Oil	58	89	153	210	305	394	493	38	34	32	3.5	2.5	2.4	2.5
Natural gas	8.6	30	74	140	216	280	344	13	23	22	6.3	2.9	2.4	2.6
Nuclear	-	-	-	-	2.2	14	23	-	-	1.5	n.a.	n.a.	12.5	n.a.
Hydro	0.8	2.3	4.1	9.2	18	20	22	1.0	1.5	1.4	5.6	4.6	1.1	2.6
Geothermal	1.8	6.6	18	27	79	99	109	2.8	4.3	7.0	5.7	7.5	1.6	4.1
Solar, wind, etc.	-	-	-	0.3	2.3	4.9	9.4	-	0.1	0.6	n.a.	13.5	7.2	9.9
Biomass and waste	70	93	98	119	141	145	143	40	19	9.2	1.0	1.1	0.1	0.5

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	112	173	270	436	645	817	1,006	100	100	100	3.8	2.6	2.2	2.4
Industry	22	43	75	125	198	257	318	25	29	32	4.4	3.1	2.4	2.7
Transport	17	32	61	117	170	215	270	19	27	27	5.2	2.5	2.3	2.4
Buildings, etc.	71	87	113	147	211	262	317	50	34	32	2.1	2.5	2.1	2.2
Non-energy use	2.4	11	21	47	66	83	101	6.3	11	10	6.0	2.3	2.1	2.2
Coal	2.1	6.0	13	34	50	61	70	3.5	7.8	7.0	7.2	2.6	1.7	2.1
Oil	41	67	123	193	285	370	468	38	44	47	4.4	2.6	2.5	2.6
Natural gas	2.5	7.5	17	37	62	83	104	4.4	8.6	10	6.6	3.5	2.6	3.0
Electricity	4.7	11	28	68	129	183	249	6.4	16	25	7.5	4.4	3.3	3.8
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	5.8	n.a.
Renewables	61	82	89	104	118	119	115	47	24	11	1.0	0.9	-0.2	0.3

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	62	154	370	868	1,670	2,374	3,220	100	100	100	7.2	4.5	3.3	3.8
Coal	3.0	28	79	311	720	1,088	1,582	18	36	49	10.2	5.7	4.0	4.8
Oil	47	66	72	29	23	22	13	43	3.4	0.4	-3.2	-1.7	-2.7	-2.2
Natural gas	0.7	26	154	384	599	811	1,046	17	44	32	11.3	3.0	2.8	2.9
Nuclear	-	-	-	-	8.4	53	88	-	-	2.7	n.a.	n.a.	12.5	n.a.
Hydro	9.8	27	47	107	208	238	259	18	12	8.1	5.6	4.6	1.1	2.6
Geothermal	2.1	6.6	16	21	56	68	75	4.3	2.4	2.3	4.8	6.7	1.5	3.7
Solar PV	-	-	-	2.9	21	46	92	-	0.3	2.9	n.a.	14.1	7.8	10.4
Wind	-	-	-	1.2	6.3	11	16	-	0.1	0.5	n.a.	11.7	4.7	7.7
CSP and marine	-	-	-	-	0.1	0.3	0.5	-	-	0.0	n.a.	n.a.	8.3	n.a.
Biomass and waste	-	0.6	1.0	12	29	38	48	0.4	1.3	1.5	12.5	6.4	2.5	4.1
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	440	741	1,180	2,490	4,955	7,383	10,390	5.0	4.7	3.8	4.2
Population (million)	347	430	505	608	696	736	761	1.4	0.9	0.4	0.6
CO_2 emissions (Mt)	205	362	711	1,288	2,111	2,812	3,602	5.2	3.4	2.7	3.0
GDP per capita ($2010 thousand)	1.3	1.7	2.3	4.1	7.1	10	14	3.5	3.8	3.3	3.5
Primary energy consump. per capita (toe)	0.4	0.5	0.8	1.0	1.4	1.7	2.0	2.6	2.2	1.8	2.0
Primary energy consumption per GDP[*2]	323	314	322	249	198	171	149	-0.9	-1.5	-1.4	-1.5
CO_2 emissions per GDP[*3]	466	489	602	517	426	381	347	0.2	-1.3	-1.0	-1.1
CO_2 per primary energy consumption[*4]	1.4	1.6	1.9	2.1	2.1	2.2	2.3	1.2	0.2	0.4	0.3

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A28 | Indonesia [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	56	99	156	225	394	511	619	100	100	100	3.4	3.8	2.3	2.9
Coal	0.2	3.5	12	41	87	123	161	3.6	18	26	10.3	5.1	3.2	4.0
Oil	20	33	58	71	107	142	176	34	32	29	3.1	2.8	2.5	2.6
Natural gas	4.9	16	27	38	72	101	131	16	17	21	3.6	4.4	3.0	3.6
Nuclear	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydro	0.1	0.5	0.9	1.2	1.7	1.8	2.0	0.5	0.5	0.3	3.6	2.3	1.0	1.6
Geothermal	-	1.9	8.4	17	62	80	88	2.0	7.7	14	9.2	8.9	1.7	4.8
Solar, wind, etc.	-	-	-	0.0	0.0	0.1	0.2	-	0.0	0.0	n.a.	29.9	8.4	17.2
Biomass and waste	30	44	50	57	63	64	60	44	25	9.7	1.1	0.7	-0.2	0.2

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	50	80	120	163	245	314	382	100	100	100	2.9	2.8	2.2	2.5
Industry	6.7	18	30	42	69	92	115	23	26	30	3.4	3.4	2.6	3.0
Transport	6.0	11	21	44	68	88	110	13	27	29	5.8	2.9	2.4	2.6
Buildings, etc.	36	44	59	70	97	119	140	55	43	37	1.9	2.2	1.8	2.0
Non-energy use	1.2	7.4	9.8	7.2	11	14	17	9.2	4.4	4.4	-0.1	3.0	2.0	2.4
Coal	0.1	2.2	4.7	9.6	15	20	25	2.7	5.9	6.4	6.1	3.0	2.5	2.7
Oil	17	27	48	63	99	132	166	34	39	43	3.4	3.0	2.6	2.8
Natural gas	2.4	6.0	12	17	31	43	55	7.5	10	14	4.2	4.1	2.9	3.4
Electricity	0.6	2.4	6.8	17	39	57	79	3.0	11	21	8.2	5.5	3.6	4.4
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	5.6	n.a.
Renewables	29	42	49	56	62	62	58	53	34	15	1.1	0.7	-0.3	0.1

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	7.5	33	93	234	520	762	1,035	100	100	100	8.2	5.5	3.5	4.3
Coal	-	9.8	34	131	314	472	657	30	56	63	10.9	6.0	3.8	4.7
Oil	6.2	15	18	20	14	14	9.5	47	8.4	0.9	1.0	-2.3	-1.9	-2.0
Natural gas	-	0.7	26	59	134	204	287	2.2	25	28	19.2	5.6	3.9	4.6
Nuclear	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydro	1.3	5.7	10	14	19	21	24	17	5.9	2.3	3.6	2.3	1.0	1.6
Geothermal	-	1.1	4.9	10	36	46	51	3.4	4.3	4.9	9.2	8.9	1.7	4.8
Solar PV	-	-	-	0.0	0.4	1.4	2.2	-	0.0	0.2	n.a.	34.5	8.6	19.0
Wind	-	-	-	0.0	0.0	0.1	0.1	-	0.0	0.0	n.a.	13.4	6.1	9.2
CSP and marine	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Biomass and waste	-	-	0.0	1.1	2.6	3.5	4.4	-	0.5	0.4	n.a.	5.8	2.6	4.0
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	182	310	453	988	2,124	3,329	4,819	4.7	5.2	4.2	4.6
Population (million)	147	181	212	258	295	312	322	1.4	0.9	0.4	0.6
CO_2 emissions (Mt)	72	134	262	451	811	1,120	1,440	5.0	4.0	2.9	3.4
GDP per capita ($2010 thousand)	1.2	1.7	2.1	3.8	7.2	11	15	3.3	4.3	3.7	4.0
Primary energy consump. per capita (toe)	0.4	0.5	0.7	0.9	1.3	1.6	1.9	1.9	2.8	1.9	2.3
Primary energy consumption per GDP[*2]	307	318	343	228	185	154	128	-1.3	-1.4	-1.8	-1.6
CO_2 emissions per GDP[*3]	394	432	578	457	382	336	299	0.2	-1.2	-1.2	-1.2
CO_2 per primary energy consumption[*4]	1.3	1.4	1.7	2.0	2.1	2.2	2.3	1.6	0.2	0.6	0.4

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A29 | Malaysia [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
Total[*1]	12	22	49	86	120	142	158	100	100	100	5.6	2.3	1.4	1.8
Coal	0.1	1.4	2.3	18	31	38	47	6.2	20	30	10.8	4.0	2.1	2.9
Oil	7.9	11	19	28	34	37	40	53	32	25	3.6	1.4	0.8	1.1
Natural gas	2.2	6.8	25	38	50	57	61	31	44	38	7.1	1.9	1.0	1.4
Nuclear	-	-	-	-	-	3.7	3.7	-	-	2.3	n.a.	n.a.	n.a.	n.a.
Hydro	0.1	0.3	0.6	1.2	2.4	2.8	3.1	1.6	1.4	2.0	5.1	4.7	1.3	2.8
Geothermal	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Solar, wind, etc.	-	-	-	0.0	0.1	0.3	0.5	-	0.0	0.3	n.a.	11.9	6.8	9.0
Biomass and waste	1.6	1.9	1.9	1.9	2.6	2.8	3.0	8.5	2.3	1.9	0.2	2.0	0.6	1.2

Final energy consumption

	Mtoe							Shares (%)			1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	7.2	14	30	52	71	82	92	100	100	100	5.4	2.1	1.3	1.7
Industry	3.1	5.6	12	15	24	30	36	40	29	39	4.1	3.1	2.0	2.5
Transport	2.1	4.9	11	21	24	25	25	35	41	27	6.0	0.8	0.3	0.5
Buildings, etc.	1.7	2.6	5.0	9.4	14	17	20	19	18	21	5.2	2.8	1.6	2.1
Non-energy use	0.3	0.8	2.2	5.9	8.5	10	12	6.0	11	13	8.1	2.5	1.6	2.0
Coal	0.1	0.5	1.0	1.8	2.8	3.4	4.0	3.7	3.4	4.3	5.1	3.0	1.8	2.3
Oil	5.3	9.3	18	28	34	37	40	67	54	43	4.4	1.3	0.8	1.0
Natural gas	0.0	1.1	3.9	9.6	14	16	17	7.9	19	19	9.1	2.3	1.2	1.7
Electricity	0.7	1.7	5.3	11	19	25	30	12	22	32	7.9	3.5	2.2	2.8
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	3.3	n.a.
Renewables	1.0	1.3	1.3	1.2	1.6	1.6	1.7	9.1	2.4	1.8	-0.1	1.7	0.2	0.9

Electricity generation

	(TWh)							Shares (%)			1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	10	23	69	150	250	321	388	100	100	100	7.8	3.5	2.2	2.8
Coal	-	2.9	7.7	63	131	164	221	13	42	57	13.1	4.9	2.7	3.6
Oil	8.5	11	3.6	1.7	2.0	1.7	1.2	46	1.2	0.3	-7.0	0.8	-2.4	-1.1
Natural gas	0.1	5.5	51	70	87	103	108	24	47	28	10.7	1.4	1.1	1.2
Nuclear	-	-	-	-	-	14	14	-	-	3.6	n.a.	n.a.	n.a.	n.a.
Hydro	1.4	4.0	7.0	14	28	32	36	17	9.3	9.3	5.1	4.7	1.3	2.8
Geothermal	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Solar PV	-	-	-	0.3	1.5	3.5	5.6	-	0.2	1.4	n.a.	11.9	6.8	9.0
Wind	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
CSP and marine	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Biomass and waste	-	-	-	0.8	1.8	2.5	3.1	-	0.5	0.8	n.a.	6.2	2.6	4.1
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
GDP ($2010 billion)	46	82	163	330	629	895	1,205	5.7	4.4	3.3	3.8
Population (million)	14	18	23	30	36	39	41	2.1	1.2	0.6	0.9
CO_2 emissions (Mt)	29	54	121	227	323	372	421	5.9	2.4	1.3	1.8
GDP per capita ($2010 thousand)	3.3	4.5	6.9	11	17	23	29	3.6	3.1	2.7	2.9
Primary energy consump. per capita (toe)	0.9	1.2	2.1	2.8	3.3	3.6	3.8	3.5	1.0	0.8	0.9
Primary energy consumption per GDP[*2]	260	267	301	260	191	159	131	-0.1	-2.0	-1.9	-1.9
CO_2 emissions per GDP[*3]	630	666	744	689	514	416	349	0.1	-1.9	-1.9	-1.9
CO_2 per primary energy consumption[*4]	2.4	2.5	2.5	2.6	2.7	2.6	2.7	0.2	0.1	-0.1	0.0

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A30 | Myanmar [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	9.4	11	13	20	35	50	69	100	100	100	2.5	3.9	3.4	3.6
Coal	0.2	0.1	0.3	0.4	2.9	5.4	8.9	0.6	2.2	13	7.9	13.4	5.7	9.0
Oil	1.3	0.7	2.0	5.4	15	24	36	6.8	27	53	8.4	7.1	4.5	5.6
Natural gas	0.3	0.8	1.2	3.0	4.7	7.3	10	7.1	15	15	5.7	3.0	3.9	3.5
Nuclear	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydro	0.1	0.1	0.2	0.8	3.2	4.2	5.1	1.0	4.1	7.3	8.6	9.5	2.4	5.4
Geothermal	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Solar, wind, etc.	-	-	-	-	0.1	0.1	0.2	-	-	0.3	n.a.	n.a.	6.8	n.a.
Biomass and waste	7.6	9.0	9.2	10	11	11	11	84	51	16	0.5	0.3	0.2	0.3

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	8.4	9.4	11	18	31	43	59	100	100	100	2.6	3.7	3.3	3.5
Industry	0.6	0.4	1.1	2.2	5.1	7.5	9.9	4.2	12	17	7.1	5.8	3.4	4.4
Transport	0.6	0.4	1.2	3.5	10.0	16	25	4.7	20	43	8.6	7.2	4.8	5.8
Buildings, etc.	7.0	8.5	9.1	12	15	19	23	90	66	39	1.3	1.7	2.0	1.9
Non-energy use	0.1	0.1	0.1	0.3	0.4	0.6	0.7	1.0	1.5	1.1	4.2	3.3	2.1	2.6
Coal	0.1	0.1	0.3	0.4	0.5	0.6	0.6	0.5	2.1	1.0	8.3	2.0	0.8	1.3
Oil	1.2	0.6	1.5	5.4	15	24	36	6.2	31	62	9.3	7.0	4.5	5.6
Natural gas	0.1	0.2	0.3	0.7	1.3	1.9	2.6	2.4	4.0	4.4	4.7	3.9	3.7	3.8
Electricity	0.1	0.1	0.3	1.2	3.3	5.4	8.1	1.6	6.5	14	8.5	7.2	4.6	5.7
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	6.6	n.a.
Renewables	6.9	8.4	9.0	10	11	11	11	89	57	19	0.7	0.3	0.2	0.3

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	1.5	2.5	5.1	16	66	103	149	100	100	100	7.7	9.9	4.2	6.6
Coal	0.0	0.0	-	0.3	12	25	46	1.6	1.8	31	8.2	28.3	7.0	15.7
Oil	0.5	0.3	0.7	0.1	0.2	0.2	0.2	11	0.3	0.1	-6.2	7.5	1.1	3.8
Natural gas	0.2	1.0	2.5	6.2	16	28	42	39	39	28	7.7	6.5	4.9	5.6
Nuclear	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydro	0.8	1.2	1.9	9.4	37	49	59	48	59	39	8.6	9.5	2.4	5.4
Geothermal	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Solar PV	-	-	-	-	0.3	0.8	1.8	-	-	1.2	n.a.	n.a.	10.1	n.a.
Wind	-	-	-	-	0.4	0.6	0.8	-	-	0.5	n.a.	n.a.	3.0	n.a.
CSP and marine	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Biomass and waste	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	5.9	6.7	13	59	153	252	384	9.1	6.5	4.7	5.5
Population (million)	34	42	48	54	61	63	64	1.0	0.8	0.3	0.5
CO_2 emissions (Mt)	5.2	4.1	9.9	25	68	111	169	7.5	6.9	4.7	5.6
GDP per capita ($2010 thousand)	0.2	0.2	0.3	1.1	2.5	4.0	6.0	8.0	5.7	4.4	5.0
Primary energy consump. per capita (toe)	0.3	0.3	0.3	0.4	0.6	0.8	1.1	1.5	3.1	3.1	3.1
Primary energy consumption per GDP[*2]	1,597	1,593	960	336	230	198	179	-6.0	-2.5	-1.2	-1.8
CO_2 emissions per GDP[*3]	888	606	741	421	445	439	441	-1.4	0.4	0.0	0.1
CO_2 per primary energy consumption[*4]	0.6	0.4	0.8	1.3	1.9	2.2	2.5	4.9	2.9	1.2	1.9

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A31 | Philippines [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	22	29	40	52	97	132	175	100	100	100	2.4	4.3	3.0	3.5
Coal	0.5	1.5	5.2	13	25	36	49	5.3	24	28	8.8	4.7	3.3	3.9
Oil	10	11	16	18	34	49	68	38	34	39	2.0	4.4	3.5	3.9
Natural gas	-	-	0.0	2.9	8.7	15	24	-	5.5	13	n.a.	7.6	5.1	6.2
Nuclear	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydro	0.3	0.5	0.7	0.7	0.9	0.9	1.0	1.8	1.4	0.5	1.4	1.5	0.1	0.7
Geothermal	1.8	4.7	10.0	9.5	17	19	21	16	18	12	2.9	3.8	1.1	2.2
Solar, wind, etc.	-	-	-	0.1	0.5	1.1	1.8	-	0.1	1.0	n.a.	13.8	6.2	9.4
Biomass and waste	9.4	11	8.1	8.6	12	12	12	39	17	6.6	-1.0	2.0	0.0	0.8

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	17	20	24	30	58	82	114	100	100	100	1.7	4.6	3.4	3.9
Industry	3.4	4.7	5.3	7.4	13	18	24	24	25	21	1.9	4.0	3.0	3.4
Transport	3.5	4.5	8.1	11	24	35	50	23	36	44	3.5	5.5	3.8	4.5
Buildings, etc.	9.4	10	10	11	19	25	34	52	36	30	0.1	4.0	3.0	3.4
Non-energy use	0.3	0.2	0.3	1.0	2.2	3.5	5.6	1.2	3.5	4.9	6.3	4.9	4.9	4.9
Coal	0.2	0.6	0.8	2.3	4.1	5.3	6.4	3.1	7.7	5.6	5.4	4.0	2.2	3.0
Oil	7.0	8.1	13	15	31	45	65	41	51	57	2.5	5.0	3.7	4.3
Natural gas	-	-	-	0.1	0.4	0.7	1.1	-	0.2	1.0	n.a.	15.2	5.0	9.3
Electricity	1.5	1.8	3.1	5.8	13	21	32	9.3	20	28	4.8	5.7	4.5	5.0
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	6.0	n.a.
Renewables	7.8	9.1	6.9	6.4	9.2	9.6	9.1	46	21	8.0	-1.4	2.5	0.0	1.0

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	18	26	45	82	186	287	434	100	100	100	4.7	5.6	4.3	4.9
Coal	0.2	1.9	17	37	92	144	219	7.3	45	51	12.5	6.3	4.5	5.2
Oil	12	12	9.2	5.9	4.8	4.1	0.9	47	7.1	0.2	-2.9	-1.4	-8.2	-5.3
Natural gas	-	-	0.0	19	53	92	157	-	23	36	n.a.	7.1	5.6	6.2
Nuclear	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydro	3.5	6.1	7.8	8.7	11	11	11	23	11	2.6	1.4	1.5	0.1	0.7
Geothermal	2.1	5.5	12	11	19	22	24	21	13	5.5	2.9	3.8	1.1	2.2
Solar PV	-	-	-	0.1	3.4	8.1	14	-	0.2	3.2	n.a.	23.7	7.4	14.1
Wind	-	-	-	0.7	2.8	4.4	6.7	-	0.9	1.6	n.a.	9.2	4.5	6.5
CSP and marine	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Biomass and waste	-	0.4	-	0.4	0.7	0.9	1.1	1.6	0.4	0.3	-0.6	4.0	2.6	3.2
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	80	95	125	266	609	901	1,286	4.2	5.7	3.8	4.6
Population (million)	47	62	78	101	124	138	150	2.0	1.4	0.9	1.1
CO_2 emissions (Mt)	33	39	69	108	218	314	440	4.2	4.8	3.6	4.1
GDP per capita ($2010 thousand)	1.7	1.5	1.6	2.6	4.9	6.5	8.6	2.2	4.2	2.8	3.4
Primary energy consump. per capita (toe)	0.5	0.5	0.5	0.5	0.8	1.0	1.2	0.4	2.8	2.0	2.4
Primary energy consumption per GDP[*2]	280	304	319	196	160	146	136	-1.7	-1.4	-0.8	-1.0
CO_2 emissions per GDP[*3]	414	409	550	406	358	348	342	0.0	-0.8	-0.2	-0.5
CO_2 per primary energy consumption[*4]	1.5	1.3	1.7	2.1	2.2	2.4	2.5	1.7	0.5	0.6	0.6

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A32 | Thailand [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	22	42	72	135	174	210	245	100	100	100	4.8	1.7	1.7	1.7
Coal	0.5	3.8	7.7	17	24	30	34	9.1	12	14	6.1	2.4	1.8	2.0
Oil	11	18	32	54	64	75	87	43	40	35	4.5	1.1	1.6	1.4
Natural gas	-	5.0	17	38	49	59	67	12	28	27	8.4	1.7	1.6	1.6
Nuclear	-	-	-	-	-	3.7	8.8	-	-	3.6	n.a.	n.a.	n.a.	n.a.
Hydro	0.1	0.4	0.5	0.4	0.6	0.7	0.7	1.0	0.3	0.3	-0.2	3.1	0.1	1.4
Geothermal	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	1.1	4.9
Solar, wind, etc.	-	-	-	0.2	1.4	2.9	6.0	-	0.2	2.4	n.a.	12.9	7.4	9.7
Biomass and waste	11	15	15	25	33	35	37	35	19	15	2.2	1.7	0.6	1.1

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	15	29	51	98	122	144	168	100	100	100	5.0	1.4	1.6	1.5
Industry	4.0	8.7	17	31	38	46	53	30	31	31	5.2	1.5	1.6	1.6
Transport	3.2	9.0	15	24	26	28	30	31	24	18	3.9	0.6	0.7	0.7
Buildings, etc.	7.8	11	14	21	29	35	41	37	22	24	2.7	2.1	1.8	1.9
Non-energy use	0.2	0.4	5.6	23	29	36	44	1.5	23	26	17.2	1.6	2.2	1.9
Coal	0.1	1.3	3.5	8.2	8.9	9.5	10	4.5	8.3	6.0	7.6	0.6	0.6	0.6
Oil	7.3	15	29	52	61	72	83	52	53	50	5.1	1.1	1.5	1.4
Natural gas	-	0.1	1.1	7.2	11	14	19	0.5	7.3	11	17.1	2.6	2.9	2.8
Electricity	1.1	3.3	7.6	15	23	31	38	11	15	23	6.3	3.0	2.5	2.7
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	4.2	n.a.
Renewables	6.7	9.2	9.4	16	18	18	17	32	16	10	2.2	0.6	-0.1	0.2

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	14	44	96	178	260	341	422	100	100	100	5.7	2.6	2.5	2.5
Coal	1.4	11	18	35	65	93	116	25	19	28	4.7	4.3	3.0	3.5
Oil	12	10	10	1.0	0.6	0.1	-	23	0.6	-	-8.9	-3.5	-100	-100
Natural gas	-	18	62	127	150	165	161	40	71	38	8.2	1.1	0.4	0.7
Nuclear	-	-	-	-	-	14	34	-	-	8.0	n.a.	n.a.	n.a.	n.a.
Hydro	1.3	5.0	6.0	4.7	7.5	7.6	7.7	11	2.7	1.8	-0.2	3.1	0.1	1.4
Geothermal	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	1.1	4.9
Solar PV	-	-	-	2.4	14	29	62	-	1.3	15	n.a.	12.5	7.8	9.8
Wind	-	-	-	0.3	2.3	4.0	5.7	-	0.2	1.3	n.a.	14.0	4.5	8.5
CSP and marine	-	-	-	-	0.1	0.3	0.5	-	-	0.1	n.a.	n.a.	8.3	n.a.
Biomass and waste	-	-	0.5	7.7	21	27	35	-	4.3	8.2	n.a.	6.8	2.6	4.4
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	67	142	218	392	642	884	1,157	4.2	3.3	3.0	3.1
Population (million)	47	57	63	68	69	68	65	0.7	0.1	-0.3	-0.1
CO_2 emissions (Mt)	34	81	152	252	319	381	428	4.7	1.6	1.5	1.5
GDP per capita ($2010 thousand)	1.4	2.5	3.5	5.8	9.3	13	18	3.4	3.2	3.3	3.3
Primary energy consump. per capita (toe)	0.5	0.7	1.2	2.0	2.5	3.1	3.8	4.0	1.6	2.0	1.9
Primary energy consumption per GDP[*2]	331	296	332	345	271	238	212	0.6	-1.6	-1.2	-1.4
CO_2 emissions per GDP[*3]	512	570	697	642	497	431	370	0.5	-1.7	-1.5	-1.6
CO_2 per primary energy consumption[*4]	1.5	1.9	2.1	1.9	1.8	1.8	1.7	-0.1	-0.1	-0.2	-0.2

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A33 | Viet Nam [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
Total[*1]	14	18	29	74	128	178	240	100	100	100	5.8	3.7	3.2	3.4
Coal	2.3	2.2	4.4	25	47	68	97	12	34	41	10.2	4.3	3.7	4.0
Oil	1.8	2.7	7.8	19	32	46	64	15	25	27	8.1	3.6	3.5	3.5
Natural gas	-	0.0	1.1	9.5	18	27	38	0.0	13	16	38.6	4.4	3.7	4.0
Nuclear	-	-	-	-	2.2	6.4	11	-	-	4.4	n.a.	n.a.	8.2	n.a.
Hydro	0.1	0.5	1.3	4.8	9.2	10	11	2.6	6.5	4.4	9.8	4.4	0.7	2.2
Geothermal	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Solar, wind, etc.	-	-	-	0.0	0.1	0.3	0.5	-	0.0	0.2	n.a.	17.8	7.7	11.9
Biomass and waste	10	12	14	16	19	19	18	70	21	7.6	0.9	1.2	-0.1	0.5

Final energy consumption

	Mtoe							Shares (%)			1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	13	16	25	58	96	128	167	100	100	100	5.3	3.4	2.8	3.1
Industry	3.8	4.5	7.9	23	42	57	73	28	39	44	6.7	4.1	2.9	3.4
Transport	0.6	1.4	3.5	11	15	20	27	8.6	18	16	8.5	2.4	2.9	2.7
Buildings, etc.	8.6	10	14	21	33	43	55	63	36	33	3.0	3.0	2.6	2.8
Non-energy use	0.0	0.0	0.1	3.6	6.3	8.5	11	0.2	6.1	6.5	21.5	3.8	2.8	3.2
Coal	1.5	1.3	3.2	12	19	22	25	8.3	20	15	9.1	3.1	1.4	2.1
Oil	1.7	2.3	6.5	18	31	44	62	15	31	37	8.5	3.7	3.5	3.6
Natural gas	-	-	0.0	1.5	3.6	5.2	7.0	-	2.6	4.2	n.a.	6.1	3.4	4.5
Electricity	0.2	0.5	1.9	12	26	38	56	3.3	21	34	13.4	5.0	4.0	4.4
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	9.1	n.a.
Renewables	9.7	12	13	15	18	18	17	74	25	10	0.8	1.2	-0.1	0.5

Electricity generation

	(TWh)							Shares (%)			1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	3.6	8.7	27	153	320	487	716	100	100	100	12.2	5.0	4.1	4.5
Coal	1.4	2.0	3.1	45	106	190	322	23	30	45	13.3	5.8	5.7	5.8
Oil	0.7	1.3	4.5	0.7	1.1	1.2	1.0	15	0.5	0.1	-2.2	2.4	-0.1	1.0
Natural gas	-	0.0	4.4	51	97	151	224	0.1	33	31	43.6	4.4	4.3	4.3
Nuclear	-	-	-	-	8.4	25	41	-	-	5.7	n.a.	n.a.	8.2	n.a.
Hydro	1.5	5.4	15	56	106	117	122	62	37	17	9.8	4.4	0.7	2.2
Geothermal	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Solar PV	-	-	-	-	0.7	2.2	3.5	-	-	0.5	n.a.	n.a.	8.6	n.a.
Wind	-	-	-	0.1	0.7	1.5	2.7	-	0.1	0.4	n.a.	12.7	6.7	9.2
CSP and marine	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Biomass and waste	-	-	-	0.1	0.2	0.2	0.3	-	0.0	0.0	n.a.	6.5	2.6	4.3
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
GDP ($2010 billion)	17	29	61	155	367	607	957	6.9	5.9	4.9	5.3
Population (million)	54	66	78	92	104	109	112	1.3	0.9	0.4	0.6
CO_2 emissions (Mt)	15	17	44	168	308	449	635	9.6	4.1	3.7	3.9
GDP per capita ($2010 thousand)	0.3	0.4	0.8	1.7	3.5	5.6	8.5	5.5	5.0	4.5	4.7
Primary energy consump. per capita (toe)	0.3	0.3	0.4	0.8	1.2	1.6	2.1	4.5	2.9	2.8	2.8
Primary energy consumption per GDP[*2]	851	606	470	478	349	293	250	-1.0	-2.1	-1.6	-1.8
CO_2 emissions per GDP[*3]	860	579	711	1,088	839	739	663	2.6	-1.7	-1.2	-1.4
CO_2 per primary energy consumption[*4]	1.0	1.0	1.5	2.3	2.4	2.5	2.7	3.5	0.4	0.5	0.4

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A34 | North America [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	1,997	2,126	2,527	2,458	2,420	2,382	2,312	100	100	100	0.6	-0.1	-0.2	-0.2
Coal	397	485	565	393	289	230	168	23	16	7.3	-0.8	-2.0	-2.7	-2.4
Oil	885	833	958	888	805	751	695	39	36	30	0.3	-0.7	-0.7	-0.7
Natural gas	522	493	622	733	819	877	905	23	30	39	1.6	0.7	0.5	0.6
Nuclear	80	179	227	243	229	208	183	8.4	9.9	7.9	1.2	-0.4	-1.1	-0.8
Hydro	46	49	53	54	61	62	62	2.3	2.2	2.7	0.4	0.8	0.1	0.4
Geothermal	4.6	14	13	9.0	21	26	31	0.7	0.4	1.3	-1.8	5.8	1.9	3.6
Solar, wind, etc.	-	0.3	2.1	25	63	89	124	0.0	1.0	5.4	19.0	6.4	3.4	4.7
Biomass and waste	62	73	87	113	132	138	144	3.4	4.6	6.2	1.7	1.1	0.4	0.7

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	1,466	1,455	1,738	1,714	1,711	1,701	1,669	100	100	100	0.7	0.0	-0.1	-0.1
Industry	437	331	388	304	305	305	299	23	18	18	-0.3	0.0	-0.1	-0.1
Transport	470	531	640	690	640	609	584	36	40	35	1.1	-0.5	-0.5	-0.5
Buildings, etc.	446	460	537	574	607	621	623	32	34	37	0.9	0.4	0.1	0.2
Non-energy use	114	134	173	145	160	166	164	9.2	8.4	9.8	0.3	0.7	0.1	0.4
Coal	60	59	36	22	19	17	15	4.0	1.3	0.9	-3.9	-1.0	-1.3	-1.2
Oil	769	752	874	847	776	727	676	52	49	41	0.5	-0.6	-0.7	-0.6
Natural gas	374	346	413	380	403	410	406	24	22	24	0.4	0.4	0.0	0.2
Electricity	200	262	342	368	413	446	471	18	21	28	1.4	0.8	0.7	0.7
Heat	1.0	2.8	6.1	6.1	6.7	7.0	7.1	0.2	0.4	0.4	3.2	0.6	0.3	0.4
Hydrogen	-	-	-	-	0.1	0.1	0.1	-	-	0.0	n.a.	n.a.	1.4	n.a.
Renewables	62	33	66	90	94	94	94	2.3	5.2	5.6	4.1	0.3	0.0	0.1

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	2,801	3,685	4,631	4,968	5,538	5,929	6,218	100	100	100	1.2	0.7	0.6	0.6
Coal	1,303	1,782	2,247	1,537	1,189	982	708	48	31	11	-0.6	-1.7	-2.6	-2.2
Oil	277	147	133	47	32	25	14	4.0	0.9	0.2	-4.5	-2.4	-4.1	-3.4
Natural gas	380	391	668	1,440	1,888	2,296	2,615	11	29	42	5.3	1.8	1.6	1.7
Nuclear	304	685	871	932	879	799	701	19	19	11	1.2	-0.4	-1.1	-0.8
Hydro	530	570	612	632	712	721	725	15	13	12	0.4	0.8	0.1	0.4
Geothermal	5.4	16	15	19	44	56	65	0.4	0.4	1.1	0.6	5.9	2.0	3.6
Solar PV	-	0.0	0.2	35	119	163	226	0.0	0.7	3.6	45.4	8.5	3.3	5.5
Wind	-	3.1	5.9	219	443	574	739	0.1	4.4	12	18.6	4.8	2.6	3.5
CSP and marine	-	0.7	0.6	14	67	116	192	0.0	0.3	3.1	12.9	10.8	5.4	7.7
Biomass and waste	1.8	90	80	93	164	199	231	2.5	1.9	3.7	0.1	3.9	1.7	2.6
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	7,310	10,078	14,056	18,394	25,027	30,559	36,274	2.4	2.1	1.9	2.0
Population (million)	252	277	313	357	397	419	436	1.0	0.7	0.5	0.6
CO_2 emissions (Mt)	5,170	5,236	6,126	5,574	5,066	4,786	4,438	0.3	-0.6	-0.7	-0.6
GDP per capita ($2010 thousand)	29	36	45	51	63	73	83	1.4	1.4	1.4	1.4
Primary energy consump. per capita (toe)	7.9	7.7	8.1	6.9	6.1	5.7	5.3	-0.4	-0.8	-0.7	-0.7
Primary energy consumption per GDP[*2]	273	211	180	134	97	78	64	-1.8	-2.1	-2.1	-2.1
CO_2 emissions per GDP[*3]	707	520	436	303	202	157	122	-2.1	-2.7	-2.5	-2.6
CO_2 per primary energy consumption[*4]	2.6	2.5	2.4	2.3	2.1	2.0	1.9	-0.3	-0.5	-0.4	-0.5

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A35 | United States [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	1,805	1,915	2,273	2,188	2,154	2,116	2,049	100	100	100	0.5	-0.1	-0.2	-0.2
Coal	376	460	534	374	278	221	162	24	17	7.9	-0.8	-2.0	-2.7	-2.4
Oil	797	757	871	794	717	670	622	40	36	30	0.2	-0.7	-0.7	-0.7
Natural gas	477	438	548	646	724	772	794	23	30	39	1.6	0.8	0.5	0.6
Nuclear	69	159	208	216	209	191	165	8.3	9.9	8.1	1.2	-0.2	-1.2	-0.8
Hydro	24	23	22	22	25	26	26	1.2	1.0	1.3	-0.3	1.1	0.1	0.5
Geothermal	4.6	14	13	9.0	21	26	31	0.7	0.4	1.5	-1.8	5.8	1.9	3.6
Solar, wind, etc.	-	0.3	2.1	22	57	81	115	0.0	1.0	5.6	18.5	6.5	3.6	4.8
Biomass and waste	54	62	73	99	118	124	130	3.3	4.5	6.3	1.9	1.2	0.5	0.8

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	1,311	1,294	1,546	1,520	1,516	1,506	1,477	100	100	100	0.6	0.0	-0.1	-0.1
Industry	387	284	332	262	264	265	259	22	17	18	-0.3	0.1	-0.1	0.0
Transport	425	488	588	629	578	550	528	38	41	36	1.0	-0.6	-0.5	-0.5
Buildings, etc.	397	403	473	506	537	549	551	31	33	37	0.9	0.4	0.1	0.2
Non-energy use	102	119	153	123	137	142	139	9.2	8.1	9.4	0.1	0.7	0.1	0.3
Coal	56	56	33	20	17	15	13	4.3	1.3	0.9	-4.1	-1.0	-1.2	-1.1
Oil	689	683	793	758	689	646	601	53	50	41	0.4	-0.6	-0.7	-0.7
Natural gas	337	303	360	333	354	360	355	23	22	24	0.4	0.4	0.0	0.2
Electricity	174	226	301	325	365	393	415	18	21	28	1.5	0.8	0.6	0.7
Heat	-	2.2	5.3	5.5	6.1	6.5	6.6	0.2	0.4	0.4	3.8	0.8	0.4	0.5
Hydrogen	-	-	-	-	0.1	0.1	0.1	-	-	0.0	n.a.	n.a.	1.3	n.a.
Renewables	54	23	54	79	84	85	86	1.8	5.2	5.8	5.1	0.4	0.1	0.2

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	2,427	3,203	4,026	4,297	4,829	5,169	5,414	100	100	100	1.2	0.8	0.6	0.7
Coal	1,243	1,700	2,129	1,471	1,150	949	690	53	34	13	-0.6	-1.6	-2.5	-2.1
Oil	263	131	118	39	28	20	11	4.1	0.9	0.2	-4.7	-2.3	-4.4	-3.5
Natural gas	370	382	634	1,373	1,807	2,171	2,451	12	32	45	5.3	1.8	1.5	1.7
Nuclear	266	612	798	830	801	732	635	19	19	12	1.2	-0.2	-1.2	-0.8
Hydro	279	273	253	251	295	298	300	8.5	5.8	5.5	-0.3	1.1	0.1	0.5
Geothermal	5.4	16	15	19	44	56	65	0.5	0.4	1.2	0.6	5.9	2.0	3.6
Solar PV	-	0.0	0.2	32	112	155	216	0.0	0.7	4.0	44.9	8.7	3.3	5.6
Wind	-	3.1	5.7	193	391	508	662	0.1	4.5	12	18.0	4.8	2.7	3.6
CSP and marine	-	0.7	0.5	9.1	59	108	183	0.0	0.2	3.4	11.0	13.3	5.8	9.0
Biomass and waste	0.5	86	72	80	143	173	200	2.7	1.9	3.7	-0.3	3.9	1.7	2.6
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	6,529	9,064	12,713	16,597	22,629	27,677	32,902	2.4	2.1	1.9	2.0
Population (million)	227	250	282	321	356	376	391	1.0	0.7	0.5	0.6
CO_2 emissions (Mt)	4,744	4,820	5,617	5,071	4,598	4,328	4,004	0.2	-0.7	-0.7	-0.7
GDP per capita ($2010 thousand)	29	36	45	52	64	74	84	1.4	1.4	1.4	1.4
Primary energy consump. per capita (toe)	7.9	7.7	8.1	6.8	6.0	5.6	5.2	-0.5	-0.8	-0.7	-0.7
Primary energy consumption per GDP[*2]	276	211	179	132	95	76	62	-1.9	-2.1	-2.1	-2.1
CO_2 emissions per GDP[*3]	727	532	442	305	203	156	122	-2.2	-2.7	-2.5	-2.6
CO_2 per primary energy consumption[*4]	2.6	2.5	2.5	2.3	2.1	2.0	2.0	-0.3	-0.5	-0.4	-0.5

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A36 | Latin America [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	382	465	600	851	1,092	1,264	1,378	100	100	100	2.5	1.7	1.2	1.4
Coal	13	21	27	47	59	68	72	4.5	5.6	5.3	3.3	1.4	1.1	1.2
Oil	223	238	303	377	449	487	491	51	44	36	1.9	1.2	0.4	0.8
Natural gas	48	72	119	207	281	364	437	16	24	32	4.3	2.1	2.2	2.2
Nuclear	0.6	3.2	5.3	8.7	26	28	28	0.7	1.0	2.1	4.0	7.6	0.4	3.4
Hydro	19	33	50	60	77	82	88	7.2	7.1	6.4	2.4	1.7	0.7	1.1
Geothermal	1.2	5.1	6.3	6.5	19	27	35	1.1	0.8	2.6	1.0	7.3	3.2	4.9
Solar, wind, etc.	-	0.0	0.2	4.6	13	22	32	0.0	0.5	2.3	25.0	7.2	4.5	5.7
Biomass and waste	78	92	89	139	167	184	193	20	16	14	1.7	1.2	0.7	0.9

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	288	343	447	610	773	891	975	100	100	100	2.3	1.6	1.2	1.3
Industry	98	114	148	191	229	274	310	33	31	32	2.1	1.2	1.5	1.4
Transport	85	103	140	222	284	316	332	30	36	34	3.1	1.7	0.8	1.2
Buildings, etc.	89	101	120	160	212	246	272	29	26	28	1.9	1.9	1.3	1.5
Non-energy use	16	26	38	38	48	55	61	7.5	6.3	6.3	1.6	1.5	1.2	1.3
Coal	6.1	7.8	11	15	18	21	21	2.3	2.5	2.2	2.7	1.2	0.8	0.9
Oil	159	179	240	304	374	414	432	52	50	44	2.1	1.4	0.7	1.0
Natural gas	27	38	53	78	100	120	137	11	13	14	3.0	1.7	1.6	1.6
Electricity	27	44	69	111	163	209	251	13	18	26	3.7	2.6	2.2	2.4
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.1	0.1	0.1	-	-	0.0	n.a.	n.a.	3.5	n.a.
Renewables	69	74	74	102	118	128	133	22	17	14	1.3	0.9	0.6	0.7

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	380	623	1,009	1,598	2,314	2,906	3,426	100	100	100	3.8	2.5	2.0	2.2
Coal	7.8	23	43	106	148	190	215	3.8	6.7	6.3	6.2	2.2	1.9	2.0
Oil	111	128	198	198	183	168	102	21	12	3.0	1.8	-0.5	-2.9	-1.9
Natural gas	35	60	141	436	702	1,063	1,406	9.6	27	41	8.3	3.2	3.5	3.4
Nuclear	2.3	12	20	33	101	109	109	2.0	2.1	3.2	4.0	7.6	0.4	3.4
Hydro	218	386	584	701	899	959	1,027	62	44	30	2.4	1.7	0.7	1.1
Geothermal	1.4	5.9	7.8	10	29	44	58	1.0	0.6	1.7	2.2	7.3	3.5	5.1
Solar PV	-	0.0	0.0	2.5	14	27	49	0.0	0.2	1.4	36.8	12.3	6.3	8.8
Wind	-	0.0	0.2	40	120	200	292	0.0	2.5	8.5	52.8	7.6	4.6	5.8
CSP and marine	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Biomass and waste	3.9	7.6	14	69	118	146	167	1.2	4.3	4.9	9.3	3.6	1.7	2.5
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	2,404	2,779	3,767	5,779	8,545	11,704	14,903	3.0	2.6	2.8	2.7
Population (million)	361	442	522	629	715	754	777	1.4	0.9	0.4	0.6
CO_2 emissions (Mt)	801	909	1,206	1,724	2,137	2,469	2,651	2.6	1.4	1.1	1.2
GDP per capita ($2010 thousand)	6.7	6.3	7.2	9.2	12	16	19	1.5	1.8	2.4	2.1
Primary energy consump. per capita (toe)	1.1	1.1	1.2	1.4	1.5	1.7	1.8	1.0	0.8	0.8	0.8
Primary energy consumption per GDP[*2]	159	167	159	147	128	108	92	-0.5	-0.9	-1.6	-1.3
CO_2 emissions per GDP[*3]	333	327	320	298	250	211	178	-0.4	-1.2	-1.7	-1.5
CO_2 per primary energy consumption[*4]	2.1	2.0	2.0	2.0	2.0	2.0	1.9	0.1	-0.2	-0.1	-0.1

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A37 | OECD Europe [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
Total[*1]	1,494	1,629	1,752	1,706	1,658	1,606	1,561	100	100	100	0.2	-0.2	-0.3	-0.3
Coal	464	449	331	285	226	186	154	28	17	9.9	-1.8	-1.5	-1.9	-1.7
Oil	688	611	653	554	484	433	387	38	32	25	-0.4	-0.9	-1.1	-1.0
Natural gas	206	262	394	389	425	431	426	16	23	27	1.6	0.6	0.0	0.3
Nuclear	60	205	245	222	203	206	216	13	13	14	0.3	-0.6	0.3	-0.1
Hydro	36	39	47	49	51	52	54	2.4	2.9	3.4	0.9	0.3	0.2	0.3
Geothermal	3.0	4.9	7.2	15	21	24	26	0.3	0.9	1.7	4.6	2.2	1.1	1.6
Solar, wind, etc.	0.1	0.3	2.7	40	77	100	121	0.0	2.4	7.7	21.1	4.4	2.3	3.2
Biomass and waste	36	55	72	149	168	173	176	3.4	8.7	11	4.0	0.8	0.2	0.5

Final energy consumption

	Mtoe							Shares (%)			1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	1,081	1,134	1,233	1,202	1,188	1,157	1,123	100	100	100	0.2	-0.1	-0.3	-0.2
Industry	356	328	326	280	279	276	271	29	23	24	-0.6	0.0	-0.1	-0.1
Transport	209	267	317	335	293	264	241	24	28	21	0.9	-0.9	-1.0	-0.9
Buildings, etc.	425	438	475	485	509	508	501	39	40	45	0.4	0.3	-0.1	0.1
Non-energy use	90	101	115	103	108	109	109	8.9	8.6	9.8	0.1	0.3	0.1	0.2
Coal	156	125	63	46	43	41	38	11	3.9	3.4	-3.9	-0.4	-0.7	-0.6
Oil	551	524	572	501	437	390	347	46	42	31	-0.2	-0.9	-1.1	-1.0
Natural gas	161	203	268	255	267	267	265	18	21	24	0.9	0.3	0.0	0.1
Electricity	147	192	233	261	289	306	319	17	22	28	1.2	0.7	0.5	0.6
Heat	35	43	41	47	48	47	47	3.8	3.9	4.2	0.3	0.2	-0.1	0.0
Hydrogen	-	-	-	-	0.0	0.1	0.1	-	-	0.0	n.a.	n.a.	2.7	n.a.
Renewables	31	47	55	92	103	106	107	4.2	7.6	9.6	2.7	0.8	0.2	0.5

Electricity generation

	(TWh)							Shares (%)			1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	2,049	2,668	3,227	3,559	3,913	4,099	4,231	100	100	100	1.2	0.6	0.4	0.5
Coal	887	1,030	968	859	731	603	482	39	24	11	-0.7	-1.1	-2.1	-1.6
Oil	364	206	179	57	40	28	17	7.7	1.6	0.4	-5.0	-2.3	-4.3	-3.4
Natural gas	138	169	513	585	731	780	785	6.3	16	19	5.1	1.5	0.4	0.8
Nuclear	230	787	939	853	781	791	829	29	24	20	0.3	-0.6	0.3	-0.1
Hydro	416	451	549	569	596	610	623	17	16	15	0.9	0.3	0.2	0.3
Geothermal	2.7	3.6	6.2	15	22	26	29	0.1	0.4	0.7	5.9	2.7	1.3	1.9
Solar PV	-	0.0	0.1	100	176	220	267	0.0	2.8	6.3	43.0	3.8	2.1	2.9
Wind	0.0	0.8	22	306	527	684	802	0.0	8.6	19	27.0	3.7	2.1	2.8
CSP and marine	0.5	0.7	1.6	9.9	36	51	70	0.0	0.3	1.6	10.9	9.0	3.4	5.7
Biomass and waste	11	21	48	204	273	305	325	0.8	5.7	7.7	9.6	2.0	0.9	1.3
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
GDP ($2010 billion)	9,940	12,666	15,889	19,517	24,815	28,286	31,565	1.7	1.6	1.2	1.4
Population (million)	479	502	524	566	586	591	589	0.5	0.2	0.0	0.1
CO_2 emissions (Mt)	4,165	3,971	3,897	3,436	3,057	2,752	2,471	-0.6	-0.8	-1.1	-0.9
GDP per capita ($2010 thousand)	21	25	30	34	42	48	54	1.3	1.4	1.2	1.3
Primary energy consump. per capita (toe)	3.1	3.2	3.3	3.0	2.8	2.7	2.6	-0.3	-0.4	-0.3	-0.4
Primary energy consumption per GDP[*2]	150	129	110	87	67	57	49	-1.5	-1.8	-1.5	-1.6
CO_2 emissions per GDP[*3]	419	313	245	176	123	97	78	-2.3	-2.4	-2.2	-2.3
CO_2 per primary energy consumption[*4]	2.8	2.4	2.2	2.0	1.8	1.7	1.6	-0.8	-0.6	-0.8	-0.7

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A38 | Non-OECD Europe [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	1,241	1,530	1,000	1,106	1,216	1,322	1,451	100	100	100	-1.3	0.6	0.9	0.8
Coal	362	367	209	211	185	183	183	24	19	13	-2.2	-0.9	-0.1	-0.4
Oil	464	465	201	238	247	271	301	30	21	21	-2.6	0.3	1.0	0.7
Natural gas	355	600	487	526	598	676	751	39	48	52	-0.5	0.9	1.1	1.0
Nuclear	21	59	64	82	118	112	121	3.9	7.4	8.3	1.3	2.5	0.1	1.1
Hydro	20	23	23	25	28	29	30	1.5	2.2	2.1	0.4	0.9	0.3	0.5
Geothermal	-	0.0	0.1	0.2	0.6	0.6	0.7	0.0	0.0	0.0	9.3	6.4	1.0	3.3
Solar, wind, etc.	-	-	0.0	1.5	4.8	8.7	14	-	0.1	0.9	n.a.	7.9	5.3	6.4
Biomass and waste	21	17	16	23	35	42	52	1.1	2.1	3.6	1.3	2.7	2.0	2.3

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	869	1,067	651	701	768	836	918	100	100	100	-1.7	0.6	0.9	0.8
Industry	394	394	205	191	214	243	275	37	27	30	-2.9	0.8	1.3	1.0
Transport	107	171	110	143	147	153	162	16	20	18	-0.7	0.2	0.5	0.3
Buildings, etc.	301	436	287	274	291	298	307	41	39	33	-1.8	0.4	0.3	0.3
Non-energy use	67	66	49	93	115	142	174	6.2	13	19	1.4	1.5	2.1	1.8
Coal	152	113	36	34	33	34	34	11	4.9	3.7	-4.7	-0.1	0.1	0.0
Oil	310	278	145	203	217	238	264	26	29	29	-1.2	0.4	1.0	0.7
Natural gas	215	260	200	213	241	264	289	24	30	32	-0.8	0.8	0.9	0.9
Electricity	95	126	87	105	131	157	186	12	15	20	-0.7	1.5	1.8	1.7
Heat	78	276	171	129	128	128	130	26	18	14	-3.0	-0.1	0.1	0.0
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	3.3	n.a.
Renewables	21	13	11	16	17	16	16	1.2	2.3	1.7	0.9	0.3	-0.5	-0.1

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	1,461	1,888	1,428	1,738	2,083	2,383	2,713	100	100	100	-0.3	1.2	1.3	1.3
Coal	471	429	338	386	412	461	483	23	22	18	-0.4	0.4	0.8	0.6
Oil	357	256	70	21	18	18	15	14	1.2	0.6	-9.5	-0.9	-1.0	-1.0
Natural gas	295	714	503	706	787	984	1,170	38	41	43	0.0	0.7	2.0	1.5
Nuclear	79	226	242	313	453	431	464	12	18	17	1.3	2.5	0.1	1.1
Hydro	232	262	272	289	329	340	347	14	17	13	0.4	0.9	0.3	0.5
Geothermal	-	0.0	0.1	0.5	1.8	2.1	2.2	0.0	0.0	0.1	11.8	9.5	1.1	4.6
Solar PV	-	-	-	4.6	16	28	43	-	0.3	1.6	n.a.	8.8	5.0	6.6
Wind	-	-	0.0	12	38	70	113	-	0.7	4.2	n.a.	8.1	5.6	6.6
CSP and marine	-	-	-	-	0.0	0.0	0.1	-	-	0.0	n.a.	n.a.	12.7	n.a.
Biomass and waste	27	0.0	2.6	5.0	26	47	75	0.0	0.3	2.8	20.4	11.5	5.5	8.0
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	1,748	2,142	1,496	2,658	3,862	5,106	6,671	0.9	2.5	2.8	2.7
Population (million)	317	341	339	341	344	341	337	0.0	0.1	-0.1	0.0
CO_2 emissions (Mt)	3,497	4,104	2,455	2,543	2,577	2,749	2,928	-1.9	0.1	0.6	0.4
GDP per capita ($2010 thousand)	5.5	6.3	4.4	7.8	11	15	20	0.9	2.5	2.9	2.7
Primary energy consump. per capita (toe)	3.9	4.5	3.0	3.2	3.5	3.9	4.3	-1.3	0.6	1.0	0.8
Primary energy consumption per GDP[*2]	710	714	668	416	315	259	217	-2.1	-1.8	-1.8	-1.8
CO_2 emissions per GDP[*3]	2,000	1,916	1,641	957	667	538	439	-2.7	-2.4	-2.1	-2.2
CO_2 per primary energy consumption[*4]	2.8	2.7	2.5	2.3	2.1	2.1	2.0	-0.6	-0.5	-0.2	-0.4

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A39 | European Union [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
Total[*1]	n.a.	1,647	1,695	1,586	1,545	1,499	1,458	100	100	100	-0.1	-0.2	-0.3	-0.2
Coal	n.a.	455	321	263	210	173	144	28	17	9.9	-2.2	-1.5	-1.9	-1.7
Oil	n.a.	608	625	516	450	401	357	37	33	24	-0.7	-0.9	-1.2	-1.0
Natural gas	n.a.	297	396	358	393	400	397	18	23	27	0.7	0.6	0.0	0.3
Nuclear	n.a.	207	246	223	204	206	216	13	14	15	0.3	-0.6	0.3	-0.1
Hydro	n.a.	25	31	29	31	31	32	1.5	1.8	2.2	0.6	0.3	0.2	0.2
Geothermal	n.a.	3.2	4.6	6.5	8.3	9.1	9.9	0.2	0.4	0.7	2.9	1.7	0.9	1.2
Solar, wind, etc.	n.a.	0.3	2.4	39	76	99	120	0.0	2.5	8.2	21.5	4.5	2.3	3.3
Biomass and waste	n.a.	48	67	149	171	176	180	2.9	9.4	12	4.7	0.9	0.2	0.5

Final energy consumption

	Mtoe							Shares (%)			1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	n.a.	1,136	1,180	1,114	1,168	1,138	1,106	100	100	100	-0.1	0.3	-0.3	0.0
Industry	n.a.	347	309	254	279	279	278	31	23	25	-1.2	0.6	0.0	0.3
Transport	n.a.	259	303	312	273	245	223	23	28	20	0.8	-0.9	-1.0	-1.0
Buildings, etc.	n.a.	430	454	450	515	511	501	38	40	45	0.2	0.9	-0.1	0.3
Non-energy use	n.a.	100	113	97	101	103	103	8.8	8.7	9.3	-0.1	0.3	0.1	0.2
Coal	n.a.	122	52	36	33	31	29	11	3.2	2.6	-4.8	-0.5	-0.7	-0.6
Oil	n.a.	506	543	465	405	360	320	45	42	29	-0.3	-0.9	-1.2	-1.1
Natural gas	n.a.	227	272	241	253	253	251	20	22	23	0.2	0.3	0.0	0.1
Electricity	n.a.	186	217	236	263	279	292	16	21	26	1.0	0.7	0.5	0.6
Heat	n.a.	55	45	46	111	110	109	4.9	4.1	9.9	-0.7	6.1	-0.1	2.5
Hydrogen	n.a.	-	-	-	0.0	0.1	0.1	-	-	0.0	n.a.	n.a.	2.7	n.a.
Renewables	n.a.	40	50	90	103	104	105	3.5	8.1	9.5	3.3	0.8	0.1	0.4

Electricity generation

	(TWh)							Shares (%)			1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	n.a.	2,577	3,006	3,204	3,571	3,774	3,935	100	100	100	0.9	0.7	0.5	0.6
Coal	n.a.	1,050	968	826	716	597	483	41	26	12	-1.0	-0.9	-2.0	-1.5
Oil	n.a.	224	181	61	45	32	20	8.7	1.9	0.5	-5.1	-2.1	-4.0	-3.2
Natural gas	n.a.	193	480	497	633	684	697	7.5	15	18	3.9	1.6	0.5	1.0
Nuclear	n.a.	795	945	857	782	792	829	31	27	21	0.3	-0.6	0.3	-0.1
Hydro	n.a.	290	357	341	358	365	372	11	11	9.5	0.6	0.3	0.2	0.2
Geothermal	n.a.	3.2	4.8	6.5	8.5	9.5	10	0.1	0.2	0.3	2.9	1.8	0.9	1.3
Solar PV	n.a.	0.0	0.1	102	185	236	290	0.0	3.2	7.4	43.6	4.0	2.3	3.0
Wind	n.a.	0.8	22	302	529	689	809	0.0	9.4	21	26.9	3.8	2.1	2.9
CSP and marine	n.a.	0.7	1.6	9.5	35	53	79	0.0	0.3	2.0	11.1	9.0	4.2	6.3
Biomass and waste	n.a.	20	46	201	275	313	343	0.8	6.3	8.7	9.8	2.1	1.1	1.5
Hydrogen	n.a.	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
GDP ($2010 billion)	n.a.	11,888	14,768	17,885	22,762	26,005	29,079	1.6	1.6	1.2	1.4
Population (million)	n.a.	478	488	510	524	526	523	0.3	0.2	0.0	0.1
CO_2 emissions (Mt)	n.a.	4,068	3,783	3,176	2,835	2,552	2,292	-1.0	-0.8	-1.1	-0.9
GDP per capita ($2010 thousand)	n.a.	25	30	35	43	49	56	1.4	1.4	1.2	1.3
Primary energy consump. per capita (toe)	n.a.	3.4	3.5	3.1	3.0	2.8	2.8	-0.4	-0.4	-0.3	-0.3
Primary energy consumption per GDP[*2]	n.a.	139	115	89	68	58	50	-1.8	-1.8	-1.5	-1.6
CO_2 emissions per GDP[*3]	n.a.	342	256	178	125	98	79	-2.6	-2.3	-2.3	-2.3
CO_2 per primary energy consumption[*4]	n.a.	2.5	2.2	2.0	1.8	1.7	1.6	-0.8	-0.6	-0.8	-0.7

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A40 | Africa [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	273	393	496	788	1,086	1,349	1,635	100	100	100	2.8	2.2	2.1	2.1
Coal	52	74	90	107	122	134	150	19	14	9.2	1.5	0.8	1.1	1.0
Oil	61	86	97	176	252	340	458	22	22	28	2.9	2.4	3.0	2.8
Natural gas	12	30	47	108	183	253	359	7.5	14	22	5.3	3.6	3.4	3.5
Nuclear	-	2.2	3.4	3.2	8.6	19	24	0.6	0.4	1.5	1.5	6.9	5.2	5.9
Hydro	4.1	4.8	6.4	10	19	29	39	1.2	1.3	2.4	3.1	4.1	3.7	3.9
Geothermal	-	0.3	0.4	3.9	16	23	29	0.1	0.5	1.7	11.0	9.7	3.1	5.9
Solar, wind, etc.	-	0.0	0.0	1.0	8.6	18	29	0.0	0.1	1.8	35.7	15.2	6.3	10.0
Biomass and waste	143	196	250	377	478	532	547	50	48	33	2.7	1.6	0.7	1.1

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	218	292	369	573	804	1,005	1,216	100	100	100	2.7	2.3	2.1	2.2
Industry	46	55	58	87	126	173	222	19	15	18	1.9	2.5	2.9	2.7
Transport	27	38	54	105	149	196	247	13	18	20	4.2	2.4	2.6	2.5
Buildings, etc.	139	188	242	362	499	595	695	64	63	57	2.7	2.2	1.7	1.9
Non-energy use	5.4	11	15	18	29	40	53	3.8	3.2	4.4	2.0	3.1	3.0	3.1
Coal	22	20	19	20	24	29	32	6.7	3.5	2.6	0.1	1.3	1.4	1.3
Oil	54	71	89	154	226	305	409	24	27	34	3.2	2.6	3.0	2.8
Natural gas	2.8	8.6	14	34	56	78	101	2.9	5.9	8.3	5.6	3.5	3.0	3.2
Electricity	14	22	31	53	88	130	197	7.6	9.3	16	3.6	3.4	4.2	3.8
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	5.5	n.a.
Renewables	126	171	216	312	410	463	477	59	54	39	2.4	1.8	0.8	1.2

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	184	316	442	781	1,266	1,832	2,717	100	100	100	3.7	3.3	3.9	3.6
Coal	100	165	209	257	321	373	446	52	33	16	1.8	1.5	1.7	1.6
Oil	22	41	51	88	116	152	206	13	11	7.6	3.1	1.9	2.9	2.5
Natural gas	14	45	92	285	489	741	1,268	14	37	47	7.7	3.7	4.9	4.4
Nuclear	-	8.4	13	12	33	73	91	2.7	1.6	3.4	1.5	6.9	5.2	5.9
Hydro	47	56	75	121	220	336	455	18	15	17	3.1	4.1	3.7	3.9
Geothermal	-	0.3	0.4	4.5	18	26	33	0.1	0.6	1.2	11.0	9.7	3.1	5.9
Solar PV	-	-	0.0	2.6	18	36	64	-	0.3	2.3	n.a.	13.6	6.6	9.6
Wind	-	-	0.2	7.5	22	39	72	-	1.0	2.6	n.a.	7.3	6.2	6.7
CSP and marine	-	-	-	0.0	19	42	66	-	0.0	2.4	n.a.	71.2	6.4	30.5
Biomass and waste	0.2	0.5	1.1	1.9	7.7	11	14	0.1	0.2	0.5	5.9	9.7	3.1	5.9
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	717	876	1,145	2,261	4,224	6,841	10,197	3.9	4.3	4.5	4.4
Population (million)	477	631	813	1,185	1,691	2,085	2,509	2.6	2.4	2.0	2.2
CO_2 emissions (Mt)	403	593	718	1,168	1,605	2,064	2,705	2.7	2.1	2.6	2.4
GDP per capita ($2010 thousand)	1.5	1.4	1.4	1.9	2.5	3.3	4.1	1.3	1.8	2.5	2.2
Primary energy consump. per capita (toe)	0.6	0.6	0.6	0.7	0.6	0.6	0.7	0.3	-0.2	0.1	-0.1
Primary energy consumption per GDP[*2]	381	449	433	348	257	197	160	-1.0	-2.0	-2.3	-2.2
CO_2 emissions per GDP[*3]	563	677	627	516	380	302	265	-1.1	-2.0	-1.8	-1.9
CO_2 per primary energy consumption[*4]	1.5	1.5	1.4	1.5	1.5	1.5	1.7	-0.1	0.0	0.6	0.3

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A41 | Middle East [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	121	223	372	752	993	1,153	1,291	100	100	100	5.0	1.9	1.3	1.6
Coal	1.2	3.0	8.1	9.8	16	18	19	1.3	1.3	1.5	4.9	3.3	1.0	2.0
Oil	90	146	217	341	422	485	536	66	45	41	3.4	1.4	1.2	1.3
Natural gas	29	72	145	397	523	602	677	32	53	52	7.1	1.9	1.3	1.5
Nuclear	-	-	-	0.8	24	36	42	-	0.1	3.2	n.a.	25.7	2.9	12.1
Hydro	0.8	1.0	0.7	1.5	2.1	2.3	2.5	0.5	0.2	0.2	1.6	2.1	1.0	1.5
Geothermal	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Solar, wind, etc.	-	0.4	0.7	0.7	4.2	7.6	13	0.2	0.1	1.0	2.3	12.3	5.8	8.5
Biomass and waste	0.3	0.4	0.4	0.9	0.9	0.8	0.8	0.2	0.1	0.1	2.8	0.0	-0.7	-0.4

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	84	157	253	489	652	766	868	100	100	100	4.6	1.9	1.4	1.7
Industry	30	47	71	150	203	241	274	30	31	32	4.8	2.0	1.5	1.7
Transport	26	51	75	141	180	206	229	32	29	26	4.2	1.6	1.2	1.4
Buildings, etc.	22	40	75	129	170	197	222	25	26	26	4.8	1.9	1.3	1.6
Non-energy use	5.6	20	32	69	99	122	143	12	14	16	5.2	2.4	1.9	2.1
Coal	0.3	0.2	0.5	2.6	3.9	4.9	5.7	0.1	0.5	0.7	11.1	2.8	1.9	2.3
Oil	67	108	153	236	304	357	400	69	48	46	3.2	1.7	1.4	1.5
Natural gas	9.8	31	65	173	232	267	300	20	35	35	7.1	2.0	1.3	1.6
Electricity	6.5	17	33	77	110	135	160	11	16	18	6.2	2.5	1.9	2.1
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	4.4	n.a.
Renewables	0.2	0.7	1.0	1.3	1.5	1.6	1.8	0.5	0.3	0.2	2.3	0.7	1.1	0.9

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	95	244	472	1,111	1,585	1,902	2,215	100	100	100	6.2	2.4	1.7	2.0
Coal	0.1	11	30	30	51	57	63	4.3	2.7	2.8	4.3	3.6	1.1	2.2
Oil	47	108	188	322	378	390	393	44	29	18	4.5	1.1	0.2	0.6
Natural gas	39	114	246	737	1,013	1,233	1,474	47	66	67	7.7	2.1	1.9	2.0
Nuclear	-	-	-	2.9	91	140	161	-	0.3	7.2	n.a.	25.7	2.9	12.1
Hydro	9.7	12	8.0	18	24	27	30	4.9	1.6	1.3	1.6	2.1	1.0	1.5
Geothermal	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Solar PV	-	-	-	1.2	16	29	47	-	0.1	2.1	n.a.	19.1	5.5	11.1
Wind	-	0.0	0.0	0.4	5.7	16	28	0.0	0.0	1.2	26.4	20.4	8.2	13.3
CSP and marine	-	-	-	0.2	6.0	10	20	-	0.0	0.9	n.a.	23.9	6.2	13.4
Biomass and waste	-	-	-	0.1	0.3	0.4	0.5	-	0.0	0.0	n.a.	8.3	2.2	4.8
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	858	949	1,430	2,582	4,001	5,302	6,834	4.1	3.0	2.7	2.8
Population (million)	92	132	168	235	297	332	364	2.3	1.6	1.0	1.3
CO_2 emissions (Mt)	332	573	945	1,822	2,310	2,630	2,910	4.7	1.6	1.2	1.3
GDP per capita ($2010 thousand)	9.3	7.2	8.5	11	13	16	19	1.7	1.4	1.7	1.5
Primary energy consump. per capita (toe)	1.3	1.7	2.2	3.2	3.3	3.5	3.5	2.6	0.3	0.3	0.3
Primary energy consumption per GDP[*2]	142	235	260	291	248	217	189	0.9	-1.1	-1.4	-1.2
CO_2 emissions per GDP[*3]	387	603	661	706	577	496	426	0.6	-1.3	-1.5	-1.4
CO_2 per primary energy consumption[*4]	2.7	2.6	2.5	2.4	2.3	2.3	2.3	-0.2	-0.3	-0.2	-0.2

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A42 | Oceania [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	79	99	120	146	153	152	150	100	100	100	1.6	0.3	-0.1	0.1
Coal	28	36	44	44	39	34	31	37	30	21	0.8	-0.9	-1.1	-1.0
Oil	34	35	40	49	48	46	44	35	33	29	1.4	0.0	-0.5	-0.3
Natural gas	8.3	19	24	36	42	44	45	19	25	30	2.7	1.0	0.3	0.6
Nuclear	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydro	2.7	3.2	3.5	3.3	3.5	3.6	3.6	3.2	2.2	2.4	0.1	0.6	0.0	0.3
Geothermal	1.0	1.5	1.9	4.9	7.7	8.1	8.5	1.5	3.3	5.7	4.9	3.1	0.5	1.6
Solar, wind, etc.	0.0	0.1	0.1	2.1	5.5	8.2	11	0.1	1.4	7.4	11.9	6.6	3.6	4.9
Biomass and waste	4.1	4.7	6.2	6.5	7.1	7.1	7.0	4.8	4.4	4.7	1.3	0.6	-0.1	0.2

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	54	66	83	95	102	104	104	100	100	100	1.5	0.5	0.1	0.3
Industry	20	23	28	28	30	30	30	35	30	29	0.9	0.5	0.0	0.2
Transport	19	24	30	37	37	37	36	36	39	34	1.8	0.0	-0.2	-0.1
Buildings, etc.	11	15	19	24	29	31	33	22	25	31	2.0	1.2	0.6	0.9
Non-energy use	3.1	4.6	6.1	5.5	5.7	5.7	5.6	6.9	5.8	5.4	0.7	0.2	-0.1	0.1
Coal	5.3	5.2	4.7	2.9	2.6	2.3	2.0	7.9	3.1	1.9	-2.3	-0.7	-1.5	-1.1
Oil	31	33	40	49	49	47	45	50	51	43	1.6	0.0	-0.4	-0.2
Natural gas	5.4	10	14	16	18	18	18	16	17	17	1.8	0.6	0.1	0.3
Electricity	8.5	14	18	22	27	30	33	20	23	32	1.9	1.5	1.0	1.2
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	3.4	n.a.
Renewables	4.0	4.1	5.6	5.9	6.4	6.3	6.1	6.2	6.2	5.9	1.5	0.5	-0.2	0.1

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	118	187	249	296	370	409	444	100	100	100	1.9	1.5	0.9	1.2
Coal	70	122	176	160	164	159	151	65	54	34	1.1	0.1	-0.4	-0.2
Oil	5.2	3.6	1.8	6.8	6.6	6.1	5.4	1.9	2.3	1.2	2.6	-0.2	-1.0	-0.7
Natural gas	8.7	20	26	59	82	94	103	11	20	23	4.4	2.2	1.1	1.6
Nuclear	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydro	32	37	41	38	41	41	41	20	13	9.3	0.1	0.6	0.0	0.3
Geothermal	1.2	2.1	2.9	7.9	13	13	14	1.1	2.6	3.1	5.4	3.2	0.5	1.6
Solar PV	-	-	0.0	6.0	18	33	46	-	2.0	10	n.a.	7.8	4.7	6.0
Wind	-	-	0.2	14	39	55	74	-	4.7	17	n.a.	7.1	3.3	4.9
CSP and marine	-	0.1	0.1	0.1	0.1	0.1	0.2	0.0	0.0	0.0	-0.3	-0.9	6.7	3.4
Biomass and waste	0.7	1.3	1.7	4.2	6.1	7.6	8.6	0.7	1.4	1.9	5.0	2.5	1.7	2.1
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	526	721	995	1,524	2,192	2,619	3,045	3.0	2.5	1.7	2.0
Population (million)	18	20	23	28	33	36	39	1.3	1.1	0.8	0.9
CO_2 emissions (Mt)	227	281	337	395	385	366	347	1.4	-0.2	-0.5	-0.4
GDP per capita ($2010 thousand)	30	35	43	54	66	72	78	1.7	1.3	0.9	1.1
Primary energy consump. per capita (toe)	4.4	4.9	5.2	5.1	4.6	4.2	3.9	0.2	-0.8	-0.9	-0.8
Primary energy consumption per GDP[*2]	149	138	121	96	70	58	49	-1.4	-2.1	-1.7	-1.9
CO_2 emissions per GDP[*3]	432	389	339	259	176	140	114	-1.6	-2.5	-2.1	-2.3
CO_2 per primary energy consumption[*4]	2.9	2.8	2.8	2.7	2.5	2.4	2.3	-0.2	-0.5	-0.4	-0.4

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A43 | OECD [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	4,060	4,524	5,281	5,236	5,240	5,162	5,032	100	100	100	0.6	0.0	-0.2	-0.1
Coal	966	1,079	1,089	941	786	685	575	24	18	11	-0.5	-1.2	-1.6	-1.4
Oil	1,938	1,867	2,105	1,885	1,714	1,588	1,455	41	36	29	0.0	-0.6	-0.8	-0.7
Natural gas	778	845	1,164	1,367	1,531	1,628	1,674	19	26	33	1.9	0.8	0.4	0.6
Nuclear	162	451	586	514	506	473	449	10.0	9.8	8.9	0.5	-0.1	-0.6	-0.4
Hydro	94	102	115	119	130	132	134	2.3	2.3	2.7	0.6	0.6	0.2	0.3
Geothermal	10	27	30	35	64	81	96	0.6	0.7	1.9	1.1	4.2	2.0	2.9
Solar, wind, etc.	0.1	2.2	5.9	73	158	214	278	0.0	1.4	5.5	15.1	5.3	2.8	3.9
Biomass and waste	111	150	185	301	348	360	370	3.3	5.8	7.3	2.8	1.0	0.3	0.6

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	2,937	3,102	3,624	3,622	3,652	3,619	3,549	100	100	100	0.6	0.1	-0.1	-0.1
Industry	940	840	914	789	806	815	808	27	22	23	-0.2	0.1	0.0	0.1
Transport	781	936	1,139	1,227	1,131	1,067	1,012	30	34	29	1.1	-0.5	-0.6	-0.5
Buildings, etc.	972	1,036	1,201	1,260	1,344	1,359	1,353	33	35	38	0.8	0.4	0.0	0.2
Non-energy use	243	290	370	345	370	378	375	9.4	9.5	11	0.7	0.5	0.1	0.2
Coal	259	233	139	111	103	96	87	7.5	3.1	2.5	-2.9	-0.5	-0.8	-0.7
Oil	1,570	1,580	1,831	1,726	1,584	1,474	1,360	51	48	38	0.4	-0.6	-0.8	-0.7
Natural gas	559	590	744	718	768	781	776	19	20	22	0.8	0.5	0.1	0.2
Electricity	408	553	715	803	912	982	1,038	18	22	29	1.5	0.8	0.7	0.7
Heat	36	46	51	58	60	59	58	1.5	1.6	1.6	0.9	0.3	-0.2	0.0
Hydrogen	-	-	-	-	0.2	0.3	0.3	-	-	0.0	n.a.	n.a.	1.9	n.a.
Renewables	105	101	144	207	225	227	228	3.2	5.7	6.4	2.9	0.6	0.1	0.3

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	5,656	7,652	9,730	10,794	12,189	13,031	13,670	100	100	100	1.4	0.8	0.6	0.7
Coal	2,319	3,083	3,764	3,198	2,802	2,520	2,127	40	30	16	0.1	-0.9	-1.4	-1.2
Oil	980	723	623	260	177	127	68	9.4	2.4	0.5	-4.0	-2.5	-4.7	-3.8
Natural gas	618	775	1,544	2,814	3,582	4,228	4,720	10	26	35	5.3	1.6	1.4	1.5
Nuclear	621	1,729	2,249	1,971	1,942	1,813	1,724	23	18	13	0.5	-0.1	-0.6	-0.4
Hydro	1,093	1,184	1,342	1,381	1,510	1,538	1,558	15	13	11	0.6	0.6	0.2	0.3
Geothermal	11	29	33	50	103	133	160	0.4	0.5	1.2	2.3	4.9	2.2	3.4
Solar PV	-	0.0	0.7	182	397	528	681	0.0	1.7	5.0	44.3	5.3	2.7	3.8
Wind	0.0	3.8	29	556	1,058	1,381	1,706	0.1	5.2	12	22.0	4.4	2.4	3.3
CSP and marine	0.5	1.5	2.2	26	105	172	273	0.0	0.2	2.0	12.1	9.7	4.9	6.9
Biomass and waste	13	123	143	353	512	590	651	1.6	3.3	4.8	4.3	2.5	1.2	1.8
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	21,475	29,226	38,029	48,159	63,177	74,658	85,986	2.0	1.8	1.6	1.7
Population (million)	984	1,065	1,151	1,275	1,358	1,392	1,409	0.7	0.4	0.2	0.3
CO_2 emissions (Mt)	10,864	11,120	12,402	11,687	10,860	10,277	9,551	0.2	-0.5	-0.6	-0.6
GDP per capita ($2010 thousand)	22	27	33	38	47	54	61	1.3	1.4	1.4	1.4
Primary energy consump. per capita (toe)	4.1	4.2	4.6	4.1	3.9	3.7	3.6	-0.1	-0.4	-0.4	-0.4
Primary energy consumption per GDP[*2]	189	155	139	109	83	69	59	-1.4	-1.8	-1.7	-1.8
CO_2 emissions per GDP[*3]	506	380	326	243	172	138	111	-1.8	-2.3	-2.2	-2.2
CO_2 per primary energy consumption[*4]	2.7	2.5	2.3	2.2	2.1	2.0	1.9	-0.4	-0.5	-0.4	-0.5

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A44 | Non-OECD [Reference Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	2,967	4,048	4,472	8,029	10,812	12,613	14,096	100	100	100	2.8	2.0	1.3	1.6
Coal	817	1,141	1,222	2,895	3,468	3,801	3,956	28	36	28	3.8	1.2	0.7	0.9
Oil	986	1,166	1,281	2,068	2,815	3,315	3,780	29	26	27	2.3	2.1	1.5	1.7
Natural gas	454	818	908	1,577	2,305	2,905	3,493	20	20	25	2.7	2.6	2.1	2.3
Nuclear	24	74	89	157	401	507	605	1.8	2.0	4.3	3.0	6.4	2.1	3.9
Hydro	54	82	110	216	295	334	366	2.0	2.7	2.6	3.9	2.1	1.1	1.5
Geothermal	2.2	7.6	22	39	113	143	161	0.2	0.5	1.1	6.8	7.3	1.8	4.1
Solar, wind, etc.	-	0.5	2.1	53	147	233	330	0.0	0.7	2.3	20.8	7.0	4.1	5.3
Biomass and waste	631	759	838	1,022	1,265	1,374	1,401	19	13	9.9	1.2	1.4	0.5	0.9

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	2,252	2,964	3,138	5,380	7,184	8,399	9,465	100	100	100	2.4	1.9	1.4	1.6
Industry	825	968	954	1,923	2,340	2,684	2,970	33	36	31	2.8	1.3	1.2	1.3
Transport	289	435	547	1,095	1,588	1,862	2,092	15	20	22	3.8	2.5	1.4	1.9
Buildings, etc.	1,027	1,373	1,390	1,872	2,567	3,008	3,425	46	35	36	1.2	2.1	1.5	1.7
Non-energy use	111	187	247	491	690	845	977	6.3	9.1	10	3.9	2.3	1.8	2.0
Coal	444	521	409	933	993	1,026	1,020	18	17	11	2.4	0.4	0.1	0.3
Oil	697	817	1,010	1,732	2,431	2,899	3,347	28	32	35	3.1	2.3	1.6	1.9
Natural gas	256	354	372	684	995	1,219	1,428	12	13	15	2.7	2.5	1.8	2.1
Electricity	178	283	377	934	1,461	1,871	2,285	9.5	17	24	4.9	3.0	2.3	2.6
Heat	85	290	197	214	228	238	241	9.8	4.0	2.5	-1.2	0.4	0.3	0.3
Hydrogen	-	-	-	-	0.2	0.4	0.5	-	-	0.0	n.a.	n.a.	3.9	n.a.
Renewables	592	698	773	884	1,075	1,147	1,143	24	16	12	0.9	1.3	0.3	0.7

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	2,628	4,212	5,741	13,461	20,776	26,070	31,168	100	100	100	4.8	2.9	2.0	2.4
Coal	817	1,342	2,242	6,340	8,956	10,637	11,869	32	47	38	6.4	2.3	1.4	1.8
Oil	678	635	628	729	825	852	824	15	5.4	2.6	0.6	0.8	0.0	0.3
Natural gas	381	977	1,209	2,729	4,357	6,110	8,147	23	20	26	4.2	3.2	3.2	3.2
Nuclear	93	283	341	601	1,538	1,946	2,323	6.7	4.5	7.5	3.0	6.5	2.1	3.9
Hydro	624	959	1,277	2,508	3,433	3,882	4,260	23	19	14	3.9	2.1	1.1	1.5
Geothermal	2.6	7.8	19	30	88	112	128	0.2	0.2	0.4	5.5	7.4	1.9	4.2
Solar PV	-	0.0	0.3	64	354	626	986	0.0	0.5	3.2	51.5	12.0	5.3	8.1
Wind	-	0.0	2.8	282	833	1,329	1,879	0.0	2.1	6.0	43.3	7.5	4.2	5.6
CSP and marine	-	0.0	0.0	0.3	31	65	112	0.0	0.0	0.4	16.0	36.7	6.7	18.6
Biomass and waste	31	7.7	21	175	360	510	637	0.2	1.3	2.0	13.3	4.9	2.9	3.8
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	6,482	8,572	11,796	26,900	52,126	77,431	105,413	4.7	4.5	3.6	4.0
Population (million)	3,452	4,213	4,957	6,062	7,139	7,760	8,301	1.5	1.1	0.8	0.9
CO_2 emissions (Mt)	6,999	9,464	10,174	20,051	25,738	29,551	32,605	3.0	1.7	1.2	1.4
GDP per capita ($2010 thousand)	1.9	2.0	2.4	4.4	7.3	10.0	13	3.2	3.4	2.8	3.0
Primary energy consump. per capita (toe)	0.9	1.0	0.9	1.3	1.5	1.6	1.7	1.3	0.9	0.6	0.7
Primary energy consumption per GDP[*2]	458	472	379	298	207	163	134	-1.8	-2.4	-2.2	-2.3
CO_2 emissions per GDP[*3]	1,080	1,104	862	745	494	382	309	-1.6	-2.7	-2.3	-2.5
CO_2 per primary energy consumption[*4]	2.4	2.3	2.3	2.5	2.4	2.3	2.3	0.3	-0.3	-0.1	-0.2

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A45 | World [Advanced Technologies Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	7,205	8,774	10,028	13,647	15,717	16,693	17,219	100	100	100	1.8	0.9	0.5	0.7
Coal	1,783	2,220	2,311	3,836	3,606	3,372	2,937	25	28	17	2.2	-0.4	-1.0	-0.8
Oil	3,102	3,235	3,660	4,334	4,625	4,655	4,656	37	32	27	1.2	0.4	0.0	0.2
Natural gas	1,232	1,663	2,071	2,944	3,584	3,976	4,157	19	22	24	2.3	1.3	0.7	1.0
Nuclear	186	526	676	671	1,180	1,441	1,754	6.0	4.9	10	1.0	3.8	2.0	2.8
Hydro	148	184	225	334	425	466	500	2.1	2.5	2.9	2.4	1.6	0.8	1.2
Geothermal	12	34	52	74	240	340	420	0.4	0.5	2.4	3.1	8.1	2.8	5.1
Solar, wind, etc.	0.1	2.7	8.0	126	415	677	996	0.0	0.9	5.8	16.7	8.2	4.5	6.1
Biomass and waste	741	909	1,023	1,323	1,639	1,761	1,794	10	9.7	10	1.5	1.4	0.5	0.9

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	5,368	6,268	7,036	9,384	10,787	11,439	11,831	100	100	100	1.6	0.9	0.5	0.7
Industry	1,766	1,809	1,868	2,712	3,044	3,233	3,273	29	29	28	1.6	0.8	0.4	0.5
Transport	1,248	1,573	1,961	2,703	2,990	3,055	3,100	25	29	26	2.2	0.7	0.2	0.4
Buildings, etc.	2,000	2,409	2,591	3,132	3,692	3,929	4,106	38	33	35	1.1	1.1	0.5	0.8
Non-energy use	354	478	617	836	1,060	1,223	1,352	7.6	8.9	11	2.3	1.6	1.2	1.4
Coal	703	754	548	1,044	1,064	1,046	979	12	11	8.3	1.3	0.1	-0.4	-0.2
Oil	2,446	2,599	3,115	3,840	4,191	4,265	4,320	41	41	37	1.6	0.6	0.2	0.3
Natural gas	814	945	1,117	1,401	1,708	1,876	1,987	15	15	17	1.6	1.3	0.8	1.0
Electricity	586	835	1,092	1,737	2,288	2,670	3,012	13	19	25	3.0	1.9	1.4	1.6
Heat	121	336	248	271	276	273	259	5.4	2.9	2.2	-0.9	0.1	-0.3	-0.1
Hydrogen	-	-	-	-	0.4	1.1	2.6	-	-	0.0	n.a.	n.a.	10.5	n.a.
Renewables	698	799	917	1,090	1,261	1,308	1,272	13	12	11	1.3	1.0	0.0	0.4

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	8,283	11,864	15,471	24,255	31,482	35,926	39,733	100	100	100	2.9	1.8	1.2	1.4
Coal	3,137	4,425	6,005	9,538	8,920	8,069	6,672	37	39	17	3.1	-0.4	-1.4	-1.0
Oil	1,659	1,358	1,252	990	790	638	440	11	4.1	1.1	-1.3	-1.5	-2.9	-2.3
Natural gas	999	1,752	2,753	5,543	7,039	8,100	8,591	15	23	22	4.7	1.6	1.0	1.3
Nuclear	713	2,013	2,591	2,571	4,527	5,530	6,729	17	11	17	1.0	3.8	2.0	2.8
Hydro	1,717	2,142	2,619	3,888	4,943	5,419	5,818	18	16	15	2.4	1.6	0.8	1.2
Geothermal	14	36	52	80	269	376	467	0.3	0.3	1.2	3.2	8.4	2.8	5.2
Solar PV	-	0.0	1.0	247	1,068	1,874	2,794	0.0	1.0	7.0	45.5	10.3	4.9	7.2
Wind	0.0	3.9	31	838	2,686	4,145	5,761	0.0	3.5	15	24.0	8.1	3.9	5.7
CSP and marine	0.5	1.5	2.2	27	212	458	870	0.0	0.1	2.2	12.2	14.9	7.3	10.5
Biomass and waste	44	131	164	528	1,024	1,313	1,586	1.1	2.2	4.0	5.7	4.5	2.2	3.2
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	27,958	37,797	49,825	75,059	115,303	152,089	191,400	2.8	2.9	2.6	2.7
Population (million)	4,436	5,277	6,108	7,336	8,497	9,152	9,710	1.3	1.0	0.7	0.8
CO_2 emissions (Mt)	18,411	21,205	23,416	32,910	33,377	32,055	29,699	1.8	0.1	-0.6	-0.3
GDP per capita ($2010 thousand)	6.3	7.2	8.2	10	14	17	20	1.4	1.9	1.9	1.9
Primary energy consump. per capita (toe)	1.6	1.7	1.6	1.9	1.8	1.8	1.8	0.5	0.0	-0.2	-0.1
Primary energy consumption per GDP[*2]	258	232	201	182	136	110	90	-1.0	-1.9	-2.1	-2.0
CO_2 emissions per GDP[*3]	659	561	470	438	289	211	155	-1.0	-2.7	-3.1	-2.9
CO_2 per primary energy consumption[*4]	2.6	2.4	2.3	2.4	2.1	1.9	1.7	0.0	-0.8	-1.0	-1.0

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A46 | Asia [Advanced Technologies Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	1,439	2,108	2,887	5,459	7,078	7,794	8,156	100	100	100	3.9	1.7	0.7	1.2
Coal	466	785	1,037	2,739	2,848	2,769	2,499	37	50	31	5.1	0.3	-0.7	-0.3
Oil	477	618	916	1,330	1,720	1,860	1,974	29	24	24	3.1	1.7	0.7	1.1
Natural gas	51	116	232	547	906	1,141	1,294	5.5	10	16	6.4	3.4	1.8	2.5
Nuclear	25	77	132	111	516	722	918	3.6	2.0	11	1.5	10.8	2.9	6.2
Hydro	20	32	41	131	182	205	221	1.5	2.4	2.7	5.8	2.2	1.0	1.5
Geothermal	2.6	8.2	23	34	122	180	222	0.4	0.6	2.7	5.9	8.8	3.0	5.5
Solar, wind, etc.	-	1.5	2.2	51	171	279	406	0.1	0.9	5.0	15.3	8.3	4.4	6.1
Biomass and waste	397	471	503	515	611	635	622	22	9.4	7.6	0.4	1.2	0.1	0.5

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	1,129	1,551	1,990	3,617	4,619	5,068	5,337	100	100	100	3.4	1.6	0.7	1.1
Industry	383	517	646	1,481	1,700	1,798	1,797	33	41	34	4.3	0.9	0.3	0.6
Transport	126	186	320	648	918	1,002	1,058	12	18	20	5.1	2.4	0.7	1.4
Buildings, etc.	567	733	836	1,124	1,505	1,686	1,839	47	31	34	1.7	2.0	1.0	1.4
Non-energy use	54	115	188	365	496	583	642	7.4	10	12	4.7	2.1	1.3	1.6
Coal	301	424	378	901	924	909	850	27	25	16	3.1	0.2	-0.4	-0.2
Oil	327	453	727	1,164	1,550	1,699	1,827	29	32	34	3.9	1.9	0.8	1.3
Natural gas	21	47	88	252	426	525	593	3.0	7.0	11	6.9	3.6	1.7	2.5
Electricity	88	158	280	740	1,108	1,338	1,527	10	20	29	6.4	2.7	1.6	2.1
Heat	7.5	14	30	89	101	104	98	0.9	2.5	1.8	7.6	0.8	-0.1	0.3
Hydrogen	-	-	-	-	0.2	0.7	1.6	-	-	0.0	n.a.	n.a.	11.3	n.a.
Renewables	386	456	488	471	510	494	441	29	13	8.3	0.1	0.5	-0.7	-0.2

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	1,196	2,252	4,013	10,204	15,136	17,884	20,032	100	100	100	6.2	2.7	1.4	1.9
Coal	298	863	1,994	6,203	6,760	6,519	5,776	38	61	29	8.2	0.6	-0.8	-0.2
Oil	476	469	430	250	184	136	79	21	2.5	0.4	-2.5	-2.0	-4.1	-3.2
Natural gas	90	240	565	1,296	2,097	2,757	3,248	11	13	16	7.0	3.3	2.2	2.7
Nuclear	97	294	505	425	1,981	2,769	3,523	13	4.2	18	1.5	10.8	2.9	6.2
Hydro	232	367	479	1,521	2,121	2,385	2,569	16	15	13	5.8	2.2	1.0	1.5
Geothermal	3.0	8.4	20	24	82	119	147	0.4	0.2	0.7	4.3	8.6	3.0	5.3
Solar PV	-	0.0	0.6	95	524	979	1,504	0.0	0.9	7.5	49.6	12.1	5.4	8.2
Wind	-	0.0	2.4	239	1,041	1,718	2,504	0.0	2.3	13	42.5	10.3	4.5	6.9
CSP and marine	-	0.0	0.0	2.0	15	37	85	0.0	0.0	0.4	25.5	14.2	9.1	11.2
Biomass and waste	0.0	10	17	150	332	466	598	0.5	1.5	3.0	11.4	5.4	3.0	4.0
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	4,455	7,586	11,047	22,344	42,637	61,674	81,910	4.4	4.4	3.3	3.8
Population (million)	2,440	2,932	3,407	3,993	4,433	4,595	4,658	1.2	0.7	0.2	0.4
CO_2 emissions (Mt)	3,268	4,918	6,891	15,076	17,007	16,968	15,977	4.6	0.8	-0.3	0.2
GDP per capita ($2010 thousand)	1.8	2.6	3.2	5.6	9.6	13	18	3.1	3.7	3.1	3.3
Primary energy consump. per capita (toe)	0.6	0.7	0.8	1.4	1.6	1.7	1.8	2.6	1.0	0.5	0.7
Primary energy consumption per GDP[*2]	323	278	261	244	166	126	100	-0.5	-2.5	-2.5	-2.5
CO_2 emissions per GDP[*3]	733	648	624	675	399	275	195	0.2	-3.4	-3.5	-3.5
CO_2 per primary energy consumption[*4]	2.3	2.3	2.4	2.8	2.4	2.2	2.0	0.7	-0.9	-1.0	-1.0

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A47 | China [Advanced Technologies Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	598	871	1,130	2,973	3,485	3,591	3,416	100	100	100	5.0	1.1	-0.1	0.4
Coal	313	528	665	1,982	1,806	1,599	1,219	61	67	36	5.4	-0.6	-1.9	-1.4
Oil	89	119	221	534	722	717	673	14	18	20	6.2	2.0	-0.4	0.7
Natural gas	12	13	21	159	333	422	448	1.5	5.3	13	10.6	5.1	1.5	3.0
Nuclear	-	-	4.4	45	274	411	548	-	1.5	16	n.a.	12.9	3.5	7.4
Hydro	5.0	11	19	96	122	132	135	1.3	3.2	4.0	9.1	1.6	0.5	1.0
Geothermal	-	-	1.7	5.1	7.1	7.9	8.1	-	0.2	0.2	n.a.	2.2	0.7	1.4
Solar, wind, etc.	-	0.0	1.0	41	118	180	251	0.0	1.4	7.3	33.0	7.3	3.9	5.3
Biomass and waste	180	200	198	114	104	122	135	23	3.8	4.0	-2.2	-0.6	1.3	0.5

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	487	654	781	1,906	2,240	2,304	2,215	100	100	100	4.4	1.1	-0.1	0.4
Industry	181	234	299	966	934	897	804	36	51	36	5.8	-0.2	-0.7	-0.5
Transport	24	33	87	299	470	476	456	5.1	16	21	9.2	3.1	-0.2	1.2
Buildings, etc.	272	344	335	483	621	682	689	53	25	31	1.4	1.7	0.5	1.0
Non-energy use	10	43	60	158	215	250	266	6.6	8.3	12	5.3	2.1	1.1	1.5
Coal	214	308	274	701	613	543	446	47	37	20	3.3	-0.9	-1.6	-1.3
Oil	59	85	180	480	664	665	630	13	25	28	7.2	2.2	-0.3	0.8
Natural gas	6.4	8.9	12	105	194	237	260	1.4	5.5	12	10.4	4.1	1.5	2.6
Electricity	21	39	89	419	587	673	704	6.0	22	32	10.0	2.3	0.9	1.5
Heat	7.4	13	25	83	94	97	92	2.0	4.4	4.2	7.6	0.8	-0.1	0.3
Hydrogen	-	-	-	-	0.1	0.6	1.4	-	-	0.1	n.a.	n.a.	12.0	n.a.
Renewables	180	200	199	116	88	88	82	31	6.1	3.7	-2.2	-1.9	-0.4	-1.0

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	301	621	1,356	5,844	8,036	9,041	9,298	100	100	100	9.4	2.1	0.7	1.3
Coal	159	441	1,060	4,109	3,933	3,417	2,316	71	70	25	9.3	-0.3	-2.6	-1.6
Oil	82	50	47	9.7	7.2	4.9	2.3	8.1	0.2	0.0	-6.4	-2.0	-5.6	-4.1
Natural gas	0.7	2.8	5.8	145	472	630	594	0.4	2.5	6.4	17.2	8.2	1.2	4.1
Nuclear	-	-	17	171	1,052	1,577	2,103	-	2.9	23	n.a.	12.9	3.5	7.4
Hydro	58	127	222	1,114	1,414	1,531	1,574	20	19	17	9.1	1.6	0.5	1.0
Geothermal	-	0.1	0.1	0.1	0.5	0.6	0.7	0.0	0.0	0.0	3.2	9.4	2.1	5.2
Solar PV	-	0.0	0.0	45	272	429	596	0.0	0.8	6.4	49.3	12.7	4.0	7.6
Wind	-	0.0	0.6	186	729	1,210	1,783	0.0	3.2	19	58.0	9.5	4.6	6.7
CSP and marine	-	0.0	0.0	0.0	6.1	16	39	0.0	0.0	0.4	6.6	41.1	9.8	22.2
Biomass and waste	-	-	2.4	64	152	225	290	-	1.1	3.1	n.a.	6.0	3.3	4.4
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	341	830	2,237	8,910	20,311	30,759	40,328	10.0	5.6	3.5	4.4
Population (million)	981	1,135	1,263	1,371	1,415	1,391	1,340	0.8	0.2	-0.3	-0.1
CO_2 emissions (Mt)	1,505	2,339	3,164	9,333	9,399	8,579	6,939	5.7	0.0	-1.5	-0.8
GDP per capita ($2010 thousand)	0.3	0.7	1.8	6.5	14	22	30	9.1	5.4	3.8	4.5
Primary energy consump. per capita (toe)	0.6	0.8	0.9	2.2	2.5	2.6	2.6	4.2	0.9	0.2	0.5
Primary energy consumption per GDP[*2]	1,752	1,050	505	334	172	117	85	-4.5	-4.3	-3.5	-3.8
CO_2 emissions per GDP[*3]	4,410	2,819	1,414	1,048	463	279	172	-3.9	-5.3	-4.8	-5.0
CO_2 per primary energy consumption[*4]	2.5	2.7	2.8	3.1	2.7	2.4	2.0	0.6	-1.0	-1.4	-1.2

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A48 | India [Advanced Technologies Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	200	306	441	851	1,492	1,837	2,158	100	100	100	4.2	3.8	1.9	2.7
Coal	44	93	146	379	606	697	775	30	45	36	5.8	3.2	1.2	2.1
Oil	33	61	112	206	358	465	582	20	24	27	5.0	3.8	2.5	3.0
Natural gas	1.3	11	23	43	122	178	235	3.5	5.1	11	5.8	7.2	3.3	5.0
Nuclear	0.8	1.6	4.4	9.8	78	122	156	0.5	1.1	7.2	7.5	14.9	3.5	8.2
Hydro	4.0	6.2	6.4	12	24	31	38	2.0	1.4	1.8	2.7	4.8	2.4	3.4
Geothermal	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Solar, wind, etc.	-	0.0	0.2	4.8	36	68	107	0.0	0.6	5.0	27.8	14.3	5.6	9.3
Biomass and waste	116	133	149	196	267	276	264	44	23	12	1.6	2.1	-0.1	0.8

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	174	243	315	578	1,009	1,258	1,494	100	100	100	3.5	3.8	2.0	2.8
Industry	41	67	83	195	359	440	491	27	34	33	4.4	4.1	1.6	2.7
Transport	17	21	32	86	151	204	246	8.6	15	16	5.8	3.8	2.5	3.0
Buildings, etc.	110	142	173	250	402	483	599	59	43	40	2.3	3.2	2.0	2.5
Non-energy use	5.7	13	27	46	97	130	158	5.5	8.0	11	5.1	5.0	2.5	3.6
Coal	25	39	35	108	201	249	286	16	19	19	4.2	4.2	1.8	2.8
Oil	27	50	94	174	317	418	530	21	30	35	5.1	4.1	2.6	3.2
Natural gas	0.7	5.6	9.7	29	70	100	126	2.3	5.0	8.4	6.8	6.1	3.0	4.3
Electricity	7.8	18	32	88	197	275	364	7.6	15	24	6.5	5.5	3.1	4.1
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.0	0.0	0.1	-	-	0.0	n.a.	n.a.	12.9	n.a.
Renewables	114	130	144	178	225	216	188	54	31	13	1.3	1.6	-0.9	0.2

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	120	293	570	1,383	2,904	3,815	4,845	100	100	100	6.4	5.1	2.6	3.6
Coal	61	192	390	1,042	1,586	1,722	1,900	65	75	39	7.0	2.8	0.9	1.7
Oil	8.8	13	29	23	24	18	10	4.5	1.7	0.2	2.2	0.2	-4.1	-2.2
Natural gas	0.6	10.0	56	68	256	405	604	3.4	4.9	12	8.0	9.2	4.4	6.4
Nuclear	3.0	6.1	17	37	300	467	599	2.1	2.7	12	7.5	14.9	3.5	8.2
Hydro	47	72	74	138	280	364	447	24	10.0	9.2	2.7	4.8	2.4	3.4
Geothermal	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Solar PV	-	-	0.0	5.6	115	296	513	-	0.4	11	n.a.	22.2	7.8	13.8
Wind	-	0.0	1.7	43	262	417	586	0.0	3.1	12	33.4	12.8	4.1	7.8
CSP and marine	-	-	-	-	5.4	13	29	-	-	0.6	n.a.	n.a.	8.8	n.a.
Biomass and waste	-	-	1.3	27	76	113	156	-	1.9	3.2	n.a.	7.2	3.7	5.2
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	274	470	809	2,288	6,133	10,236	15,857	6.5	6.8	4.9	5.7
Population (million)	697	871	1,053	1,311	1,515	1,608	1,662	1.7	1.0	0.5	0.7
CO_2 emissions (Mt)	263	542	899	2,107	3,491	4,107	4,699	5.6	3.4	1.5	2.3
GDP per capita ($2010 thousand)	0.4	0.5	0.8	1.7	4.0	6.4	9.5	4.8	5.8	4.4	5.0
Primary energy consump. per capita (toe)	0.3	0.4	0.4	0.6	1.0	1.1	1.3	2.5	2.8	1.4	2.0
Primary energy consumption per GDP[*2]	731	651	545	372	243	179	136	-2.2	-2.8	-2.9	-2.8
CO_2 emissions per GDP[*3]	962	1,154	1,112	921	569	401	296	-0.9	-3.2	-3.2	-3.2
CO_2 per primary energy consumption[*4]	1.3	1.8	2.0	2.5	2.3	2.2	2.2	1.3	-0.4	-0.4	-0.4

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A49 | Japan [Advanced Technologies Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	345	439	518	430	425	397	369	100	100	100	-0.1	-0.1	-0.7	-0.4
Coal	60	76	97	117	103	91	76	17	27	21	1.7	-0.9	-1.5	-1.2
Oil	234	250	255	185	141	118	100	57	43	27	-1.2	-1.8	-1.7	-1.7
Natural gas	21	44	66	100	86	86	82	10	23	22	3.3	-1.0	-0.2	-0.6
Nuclear	22	53	84	2.5	58	56	56	12	0.6	15	-11.5	23.5	-0.2	9.3
Hydro	7.6	7.5	7.3	7.3	7.9	8.1	8.1	1.7	1.7	2.2	-0.1	0.5	0.2	0.3
Geothermal	0.8	1.6	3.1	2.4	6.7	9.9	14	0.4	0.6	3.7	1.7	7.1	3.6	5.1
Solar, wind, etc.	-	1.4	0.9	3.9	8.0	12	15	0.3	0.9	4.1	4.2	5.0	3.3	4.0
Biomass and waste	-	4.5	4.7	11	14	16	18	1.0	2.7	4.8	3.8	1.4	1.1	1.3

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	232	287	328	291	267	249	231	100	100	100	0.1	-0.6	-0.7	-0.7
Industry	91	110	100	82	81	80	77	38	28	33	-1.1	-0.1	-0.2	-0.2
Transport	54	68	84	71	51	42	37	24	24	16	0.2	-2.2	-1.6	-1.8
Buildings, etc.	58	76	103	99	98	90	81	26	34	35	1.1	-0.1	-0.9	-0.6
Non-energy use	28	34	41	39	38	37	36	12	13	15	0.6	-0.2	-0.3	-0.3
Coal	25	30	24	24	22	21	19	11	8.1	8.3	-1.0	-0.4	-0.8	-0.6
Oil	157	171	194	152	120	102	89	59	52	38	-0.5	-1.6	-1.5	-1.5
Natural gas	5.8	15	22	29	33	33	32	5.3	10	14	2.7	0.7	-0.1	0.2
Electricity	44	66	83	82	88	88	86	23	28	37	0.8	0.5	-0.1	0.2
Heat	0.1	0.2	0.5	0.5	0.5	0.4	0.4	0.1	0.2	0.2	3.8	-0.4	-1.3	-1.0
Hydrogen	-	-	-	-	0.0	0.1	0.1	-	-	0.0	n.a.	n.a.	6.3	n.a.
Renewables	-	4.1	3.8	3.8	4.3	4.2	4.0	1.4	1.3	1.7	-0.2	0.7	-0.4	0.1

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	573	873	1,088	1,035	1,109	1,108	1,091	100	100	100	0.7	0.5	-0.1	0.1
Coal	55	118	234	343	279	239	197	13	33	18	4.4	-1.4	-1.7	-1.6
Oil	265	284	179	103	49	28	9.7	33	9.9	0.9	-4.0	-4.8	-7.8	-6.5
Natural gas	81	171	254	410	313	315	302	20	40	28	3.6	-1.8	-0.2	-0.9
Nuclear	83	202	322	9.4	224	215	215	23	0.9	20	-11.5	23.5	-0.2	9.3
Hydro	88	87	85	85	92	94	94	10.0	8.2	8.7	-0.1	0.5	0.2	0.3
Geothermal	0.9	1.7	3.3	2.6	7.6	11	16	0.2	0.2	1.4	1.6	7.5	3.7	5.3
Solar PV	-	0.0	0.3	36	72	107	131	0.0	3.5	12	52.1	4.8	3.0	3.8
Wind	-	-	0.1	5.2	18	31	43	-	0.5	4.0	n.a.	8.5	4.6	6.3
CSP and marine	-	-	-	-	0.1	0.3	0.8	-	-	0.1	n.a.	n.a.	11.9	n.a.
Biomass and waste	-	9.6	10	41	55	67	82	1.1	4.0	7.5	6.0	1.9	2.0	2.0
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	2,977	4,683	5,349	5,986	6,948	7,705	8,329	1.0	1.0	0.9	0.9
Population (million)	117	124	127	127	121	114	108	0.1	-0.3	-0.6	-0.5
CO_2 emissions (Mt)	916	1,071	1,195	1,147	925	811	691	0.3	-1.4	-1.4	-1.4
GDP per capita ($2010 thousand)	25	38	42	47	58	67	77	0.9	1.3	1.5	1.4
Primary energy consump. per capita (toe)	3.0	3.6	4.1	3.4	3.5	3.5	3.4	-0.2	0.3	-0.1	0.0
Primary energy consumption per GDP[*2]	116	94	97	72	61	52	44	-1.1	-1.1	-1.6	-1.4
CO_2 emissions per GDP[*3]	308	229	223	192	133	105	83	-0.7	-2.4	-2.3	-2.4
CO_2 per primary energy consumption[*4]	2.7	2.4	2.3	2.7	2.2	2.0	1.9	0.4	-1.3	-0.7	-1.0

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A50 | ASEAN [Advanced Technologies Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	142	233	379	621	966	1,228	1,472	100	100	100	4.0	3.0	2.1	2.5
Coal	3.6	13	32	114	185	239	300	5.4	18	20	9.2	3.3	2.5	2.8
Oil	58	89	153	210	288	354	422	38	34	29	3.5	2.1	1.9	2.0
Natural gas	8.6	30	74	140	200	249	295	13	23	20	6.3	2.4	2.0	2.2
Nuclear	-	-	-	-	26	60	87	-	-	5.9	n.a.	n.a.	6.3	n.a.
Hydro	0.8	2.3	4.1	9.2	18	20	22	1.0	1.5	1.5	5.6	4.6	1.1	2.6
Geothermal	1.8	6.6	18	27	108	161	199	2.8	4.3	13	5.7	9.7	3.1	5.9
Solar, wind, etc.	-	-	-	0.3	3.9	9.2	17	-	0.1	1.2	n.a.	17.5	7.6	11.7
Biomass and waste	70	93	98	119	135	132	126	40	19	8.5	1.0	0.8	-0.4	0.2

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	112	173	270	436	613	742	873	100	100	100	3.8	2.3	1.8	2.0
Industry	22	43	75	125	192	238	277	25	29	32	4.4	2.9	1.9	2.3
Transport	17	32	61	117	158	189	227	19	27	26	5.2	2.1	1.8	1.9
Buildings, etc.	71	87	113	147	197	231	268	50	34	31	2.1	2.0	1.6	1.7
Non-energy use	2.4	11	21	47	66	83	101	6.3	11	12	6.0	2.3	2.1	2.2
Coal	2.1	6.0	13	34	49	56	61	3.5	7.8	6.9	7.2	2.4	1.1	1.7
Oil	41	67	123	193	271	335	402	38	44	46	4.4	2.3	2.0	2.1
Natural gas	2.5	7.5	17	37	60	76	89	4.4	8.6	10	6.6	3.2	2.0	2.5
Electricity	4.7	11	28	68	124	170	225	6.4	16	26	7.5	4.1	3.0	3.5
Heat	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.
Hydrogen	-	-	-	-	0.0	0.0	0.0	-	-	0.0	n.a.	n.a.	7.7	n.a.
Renewables	61	82	89	104	110	105	96	47	24	11	1.0	0.4	-0.7	-0.2

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	62	154	370	868	1,594	2,188	2,882	100	100	100	7.2	4.1	3.0	3.5
Coal	3.0	28	79	311	575	760	1,022	18	36	35	10.2	4.2	2.9	3.5
Oil	47	66	72	29	20	17	10	43	3.4	0.4	-3.2	-2.6	-3.1	-2.9
Natural gas	0.7	26	154	384	538	687	879	17	44	31	11.3	2.3	2.5	2.4
Nuclear	-	-	-	-	99	230	335	-	-	12	n.a.	n.a.	6.3	n.a.
Hydro	9.8	27	47	107	208	238	259	18	12	9.0	5.6	4.6	1.1	2.6
Geothermal	2.1	6.6	16	21	73	106	129	4.3	2.4	4.5	4.8	8.6	2.9	5.3
Solar PV	-	-	-	2.9	34	84	161	-	0.3	5.6	n.a.	17.9	8.1	12.2
Wind	-	-	-	1.2	12	22	34	-	0.1	1.2	n.a.	16.3	5.5	10.0
CSP and marine	-	-	-	-	0.1	0.3	0.6	-	-	0.0	n.a.	n.a.	9.9	n.a.
Biomass and waste	-	0.6	1.0	12	35	44	52	0.4	1.3	1.8	12.5	7.7	2.0	4.4
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	440	741	1,180	2,490	4,955	7,383	10,390	5.0	4.7	3.8	4.2
Population (million)	347	430	505	608	696	736	761	1.4	0.9	0.4	0.6
CO_2 emissions (Mt)	205	362	711	1,288	1,824	2,062	2,270	5.2	2.3	1.1	1.6
GDP per capita ($2010 thousand)	1.3	1.7	2.3	4.1	7.1	10	14	3.5	3.8	3.3	3.5
Primary energy consump. per capita (toe)	0.4	0.5	0.8	1.0	1.4	1.7	1.9	2.6	2.1	1.7	1.8
Primary energy consumption per GDP[*2]	323	314	322	249	195	166	142	-0.9	-1.6	-1.6	-1.6
CO_2 emissions per GDP[*3]	466	489	602	517	368	279	219	0.2	-2.2	-2.6	-2.4
CO_2 per primary energy consumption[*4]	1.4	1.6	1.9	2.1	1.9	1.7	1.5	1.2	-0.6	-1.0	-0.8

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A51 | United States [Advanced Technologies Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	1,805	1,915	2,273	2,188	2,037	1,917	1,800	100	100	100	0.5	-0.5	-0.6	-0.6
Coal	376	460	534	374	225	144	73	24	17	4.1	-0.8	-3.3	-5.5	-4.6
Oil	797	757	871	794	644	543	460	40	36	26	0.2	-1.4	-1.7	-1.5
Natural gas	477	438	548	646	664	643	558	23	30	31	1.6	0.2	-0.9	-0.4
Nuclear	69	159	208	216	209	207	236	8.3	9.9	13	1.2	-0.2	0.6	0.3
Hydro	24	23	22	22	25	26	26	1.2	1.0	1.4	-0.3	1.1	0.1	0.5
Geothermal	4.6	14	13	9.0	33	43	51	0.7	0.4	2.8	-1.8	9.1	2.1	5.1
Solar, wind, etc.	-	0.3	2.1	22	91	151	223	0.0	1.0	12	18.5	9.8	4.6	6.8
Biomass and waste	54	62	73	99	140	155	168	3.3	4.5	9.3	1.9	2.3	0.9	1.5

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	1,311	1,294	1,546	1,520	1,432	1,352	1,269	100	100	100	0.6	-0.4	-0.6	-0.5
Industry	387	284	332	262	255	243	221	22	17	17	-0.3	-0.2	-0.7	-0.5
Transport	425	488	588	629	535	475	437	38	41	34	1.0	-1.1	-1.0	-1.0
Buildings, etc.	397	403	473	506	505	493	473	31	33	37	0.9	0.0	-0.3	-0.2
Non-energy use	102	119	153	123	137	142	139	9.2	8.1	11	0.1	0.7	0.1	0.3
Coal	56	56	33	20	16	14	11	4.3	1.3	0.9	-4.1	-1.2	-1.8	-1.5
Oil	689	683	793	758	622	527	451	53	50	36	0.4	-1.3	-1.6	-1.5
Natural gas	337	303	360	333	332	321	300	23	22	24	0.4	0.0	-0.5	-0.3
Electricity	174	226	301	325	354	373	383	18	21	30	1.5	0.6	0.4	0.5
Heat	-	2.2	5.3	5.5	5.9	6.0	5.7	0.2	0.4	0.5	3.8	0.5	-0.1	0.1
Hydrogen	-	-	-	-	0.1	0.2	0.6	-	-	0.0	n.a.	n.a.	11.5	n.a.
Renewables	54	23	54	79	102	111	118	1.8	5.2	9.3	5.1	1.7	0.7	1.1

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	2,427	3,203	4,026	4,297	4,655	4,860	4,946	100	100	100	1.2	0.5	0.3	0.4
Coal	1,243	1,700	2,129	1,471	867	516	204	53	34	4.1	-0.6	-3.5	-7.0	-5.5
Oil	263	131	118	39	22	13	4.8	4.1	0.9	0.1	-4.7	-3.6	-7.4	-5.8
Natural gas	370	382	634	1,373	1,551	1,518	1,159	12	32	23	5.3	0.8	-1.4	-0.5
Nuclear	266	612	798	830	801	792	907	19	19	18	1.2	-0.2	0.6	0.3
Hydro	279	273	253	251	295	298	300	8.5	5.8	6.1	-0.3	1.1	0.1	0.5
Geothermal	5.4	16	15	19	71	91	108	0.5	0.4	2.2	0.6	9.3	2.2	5.1
Solar PV	-	0.0	0.2	32	171	316	448	0.0	0.7	9.1	44.9	11.8	4.9	7.8
Wind	-	3.1	5.7	193	611	906	1,205	0.1	4.5	24	18.0	8.0	3.5	5.4
CSP and marine	-	0.7	0.5	9.1	109	218	388	0.0	0.2	7.8	11.0	18.0	6.6	11.3
Biomass and waste	0.5	86	72	80	156	190	221	2.7	1.9	4.5	-0.3	4.5	1.8	2.9
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	6,529	9,064	12,713	16,597	22,629	27,677	32,902	2.4	2.1	1.9	2.0
Population (million)	227	250	282	321	356	376	391	1.0	0.7	0.5	0.6
CO_2 emissions (Mt)	4,744	4,820	5,617	5,071	3,931	3,141	2,422	0.2	-1.7	-2.4	-2.1
GDP per capita ($2010 thousand)	29	36	45	52	64	74	84	1.4	1.4	1.4	1.4
Primary energy consump. per capita (toe)	7.9	7.7	8.1	6.8	5.7	5.1	4.6	-0.5	-1.2	-1.1	-1.1
Primary energy consumption per GDP[*2]	276	211	179	132	90	69	55	-1.9	-2.5	-2.5	-2.5
CO_2 emissions per GDP[*3]	727	532	442	305	174	114	74	-2.2	-3.7	-4.2	-4.0
CO_2 per primary energy consumption[*4]	2.6	2.5	2.5	2.3	1.9	1.6	1.3	-0.3	-1.2	-1.8	-1.5

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A52 | European Union [Advanced Technologies Scenario]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
Total[*1]	n.a.	1,647	1,695	1,586	1,465	1,363	1,276	100	100	100	-0.1	-0.5	-0.7	-0.6
Coal	n.a.	455	321	263	151	101	63	28	17	4.9	-2.2	-3.6	-4.3	-4.0
Oil	n.a.	608	625	516	417	339	277	37	33	22	-0.7	-1.4	-2.0	-1.8
Natural gas	n.a.	297	396	358	352	319	269	18	23	21	0.7	-0.1	-1.4	-0.8
Nuclear	n.a.	207	246	223	229	242	265	13	14	21	0.3	0.2	0.7	0.5
Hydro	n.a.	25	31	29	31	31	32	1.5	1.8	2.5	0.6	0.3	0.2	0.2
Geothermal	n.a.	3.2	4.6	6.5	10	12	12	0.2	0.4	1.0	2.9	3.2	0.9	1.9
Solar, wind, etc.	n.a.	0.3	2.4	39	94	132	167	0.0	2.5	13	21.5	6.0	2.9	4.2
Biomass and waste	n.a.	48	67	149	179	185	188	2.9	9.4	15	4.7	1.2	0.3	0.7

Final energy consumption

	Mtoe							Shares (%)			1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	n.a.	1,136	1,180	1,114	1,107	1,027	954	100	100	100	-0.1	0.0	-0.7	-0.4
Industry	n.a.	347	309	254	270	261	245	31	23	26	-1.2	0.4	-0.5	-0.1
Transport	n.a.	259	303	312	248	202	171	23	28	18	0.8	-1.5	-1.8	-1.7
Buildings, etc.	n.a.	430	454	450	487	462	434	38	40	45	0.2	0.5	-0.6	-0.1
Non-energy use	n.a.	100	113	97	101	103	103	8.8	8.7	11	-0.1	0.3	0.1	0.2
Coal	n.a.	122	52	36	32	29	26	11	3.2	2.7	-4.8	-0.7	-1.1	-0.9
Oil	n.a.	506	543	465	378	307	250	45	42	26	-0.3	-1.4	-2.0	-1.8
Natural gas	n.a.	227	272	241	239	229	217	20	22	23	0.2	-0.1	-0.5	-0.3
Electricity	n.a.	186	217	236	254	264	270	16	21	28	1.0	0.5	0.3	0.4
Heat	n.a.	55	45	46	106	101	95	4.9	4.1	10.0	-0.7	5.8	-0.6	2.1
Hydrogen	n.a.	-	-	-	0.0	0.1	0.1	-	-	0.0	n.a.	n.a.	7.9	n.a.
Renewables	n.a.	40	50	90	98	97	95	3.5	8.1	9.9	3.3	0.5	-0.2	0.1

Electricity generation

	(TWh)							Shares (%)			1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	n.a.	2,577	3,006	3,204	3,474	3,604	3,711	100	100	100	0.9	0.5	0.3	0.4
Coal	n.a.	1,050	968	826	431	240	80	41	26	2.2	-1.0	-4.2	-8.1	-6.4
Oil	n.a.	224	181	61	31	16	5.4	8.7	1.9	0.1	-5.1	-4.4	-8.3	-6.7
Natural gas	n.a.	193	480	497	494	372	177	7.5	15	4.8	3.9	0.0	-5.0	-2.9
Nuclear	n.a.	795	945	857	879	929	1,017	31	27	27	0.3	0.2	0.7	0.5
Hydro	n.a.	290	357	341	358	365	372	11	11	10	0.6	0.3	0.2	0.2
Geothermal	n.a.	3.2	4.8	6.5	11	12	13	0.1	0.2	0.4	2.9	3.5	0.9	2.0
Solar PV	n.a.	0.0	0.1	102	246	328	410	0.0	3.2	11	43.6	6.0	2.6	4.0
Wind	n.a.	0.8	22	302	671	902	1,115	0.0	9.4	30	26.9	5.5	2.6	3.8
CSP and marine	n.a.	0.7	1.6	9.5	39	77	117	0.0	0.3	3.1	11.1	10.0	5.6	7.4
Biomass and waste	n.a.	20	46	201	310	362	402	0.8	6.3	11	9.8	2.9	1.3	2.0
Hydrogen	n.a.	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/ 2015	2015/ 2030	2030/ 2050	2015/ 2050
GDP ($2010 billion)	n.a.	11,888	14,768	17,885	22,762	26,005	29,079	1.6	1.6	1.2	1.4
Population (million)	n.a.	478	488	510	524	526	523	0.3	0.2	0.0	0.1
CO_2 emissions (Mt)	n.a.	4,068	3,783	3,176	2,402	1,882	1,424	-1.0	-1.8	-2.6	-2.3
GDP per capita ($2010 thousand)	n.a.	25	30	35	43	49	56	1.4	1.4	1.2	1.3
Primary energy consump. per capita (toe)	n.a.	3.4	3.5	3.1	2.8	2.6	2.4	-0.4	-0.7	-0.7	-0.7
Primary energy consumption per GDP[*2]	n.a.	139	115	89	64	52	44	-1.8	-2.1	-1.9	-2.0
CO_2 emissions per GDP[*3]	n.a.	342	256	178	106	72	49	-2.6	-3.4	-3.8	-3.6
CO_2 per primary energy consumption[*4]	n.a.	2.5	2.2	2.0	1.6	1.4	1.1	-0.8	-1.3	-1.9	-1.7

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe

Table A53 | World [Peak Oil Demand Case]

Primary energy consumption

	Mtoe							Shares (%)			CAGR (%)			
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050	1990/2015	2015/2030	2030/2050	2015/2050
Total[*1]	7,205	8,774	10,028	13,647	16,333	17,888	19,115	100	100	100	1.8	1.2	0.8	1.0
Coal	1,783	2,220	2,311	3,836	4,317	4,701	4,963	25	28	26	2.2	0.8	0.7	0.7
Oil	3,102	3,235	3,660	4,334	4,702	4,585	4,254	37	32	22	1.2	0.5	-0.5	-0.1
Natural gas	1,232	1,663	2,071	2,944	3,892	4,779	5,765	19	22	30	2.3	1.9	2.0	1.9
Nuclear	186	526	676	671	907	980	1,055	6.0	4.9	5.5	1.0	2.0	0.8	1.3
Hydro	148	184	225	334	425	466	500	2.1	2.5	2.6	2.4	1.6	0.8	1.2
Geothermal	12	34	52	74	177	224	257	0.4	0.5	1.3	3.1	6.0	1.9	3.6
Solar, wind, etc.	0.1	2.7	8.0	126	306	446	608	0.0	0.9	3.2	16.7	6.1	3.5	4.6
Biomass and waste	741	909	1,023	1,323	1,604	1,702	1,708	10	9.7	8.9	1.5	1.3	0.3	0.7

Final energy consumption

	Mtoe							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	5,368	6,268	7,036	9,384	11,057	11,878	12,446	100	100	100	1.6	1.1	0.6	0.8
Industry	1,766	1,809	1,868	2,712	3,146	3,499	3,779	29	29	30	1.6	1.0	0.9	1.0
Transport	1,248	1,573	1,961	2,703	2,940	2,787	2,530	25	29	20	2.2	0.6	-0.7	-0.2
Buildings, etc.	2,000	2,409	2,591	3,132	3,911	4,369	4,785	38	33	38	1.1	1.5	1.0	1.2
Non-energy use	354	478	617	836	1,060	1,223	1,352	7.6	8.9	11	2.3	1.6	1.2	1.4
Coal	703	754	548	1,044	1,096	1,122	1,108	12	11	8.9	1.3	0.3	0.1	0.2
Oil	2,446	2,599	3,115	3,840	4,200	4,074	3,757	41	41	30	1.6	0.6	-0.6	-0.1
Natural gas	814	945	1,117	1,401	1,761	1,994	2,190	15	15	18	1.6	1.5	1.1	1.3
Electricity	586	835	1,092	1,737	2,418	3,035	3,736	13	19	30	3.0	2.2	2.2	2.2
Heat	121	336	248	271	288	297	299	5.4	2.9	2.4	-0.9	0.4	0.2	0.3
Hydrogen	-	-	-	-	2.9	13	47	-	-	0.4	n.a.	n.a.	15.0	n.a.
Renewables	698	799	917	1,090	1,291	1,343	1,309	13	12	11	1.3	1.1	0.1	0.5

Electricity generation

	(TWh)							Shares (%)			1990/2015	2015/2030	2030/2050	2015/2050
	1980	1990	2000	2015	2030	2040	2050	1990	2015	2050				
Total	8,283	11,864	15,471	24,255	33,589	41,618	50,430	100	100	100	2.9	2.2	2.1	2.1
Coal	3,137	4,425	6,005	9,538	12,031	14,145	16,055	37	39	32	3.1	1.6	1.5	1.5
Oil	1,659	1,358	1,252	990	1,047	1,147	1,187	11	4.1	2.4	-1.3	0.4	0.6	0.5
Natural gas	999	1,752	2,753	5,543	8,244	11,698	16,106	15	23	32	4.7	2.7	3.4	3.1
Nuclear	713	2,013	2,591	2,571	3,480	3,759	4,047	17	11	8.0	1.0	2.0	0.8	1.3
Hydro	1,717	2,142	2,619	3,888	4,943	5,419	5,818	18	16	12	2.4	1.6	0.8	1.2
Geothermal	14	36	52	80	191	245	288	0.3	0.3	0.6	3.2	5.9	2.1	3.7
Solar PV	-	0.0	1.0	247	751	1,154	1,667	0.0	1.0	3.3	45.5	7.7	4.1	5.6
Wind	0.0	3.9	31	838	1,891	2,710	3,585	0.0	3.5	7.1	24.0	5.6	3.3	4.2
CSP and marine	0.5	1.5	2.2	27	136	237	385	0.0	0.1	0.8	12.2	11.5	5.3	7.9
Biomass and waste	44	131	164	528	872	1,099	1,287	1.1	2.2	2.6	5.7	3.4	2.0	2.6
Hydrogen	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.	n.a.

Energy and economic indicators

	1980	1990	2000	2015	2030	2040	2050	1990/2015	2015/2030	2030/2050	2015/2050
GDP ($2010 billion)	27,958	37,797	49,825	75,059	115,303	152,089	191,400	2.8	2.9	2.6	2.7
Population (million)	4,436	5,277	6,108	7,336	8,497	9,152	9,710	1.3	1.0	0.7	0.8
CO_2 emissions (Mt)	18,411	21,205	23,416	32,910	37,506	40,282	42,261	1.8	0.9	0.6	0.7
GDP per capita ($2010 thousand)	6.3	7.2	8.2	10	14	17	20	1.4	1.9	1.9	1.9
Primary energy consump. per capita (toe)	1.6	1.7	1.6	1.9	1.9	2.0	2.0	0.5	0.2	0.1	0.2
Primary energy consumption per GDP[*2]	258	232	201	182	142	118	100	-1.0	-1.7	-1.7	-1.7
CO_2 emissions per GDP[*3]	659	561	470	438	325	265	221	-1.0	-2.0	-1.9	-1.9
CO_2 per primary energy consumption[*4]	2.6	2.4	2.3	2.4	2.3	2.3	2.2	0.0	-0.3	-0.2	-0.2

*1 Trade of electricity, heat and hydrogen are not shown, *2 toe/$2010 million,
*3 t/$2010 million, *4 t/toe