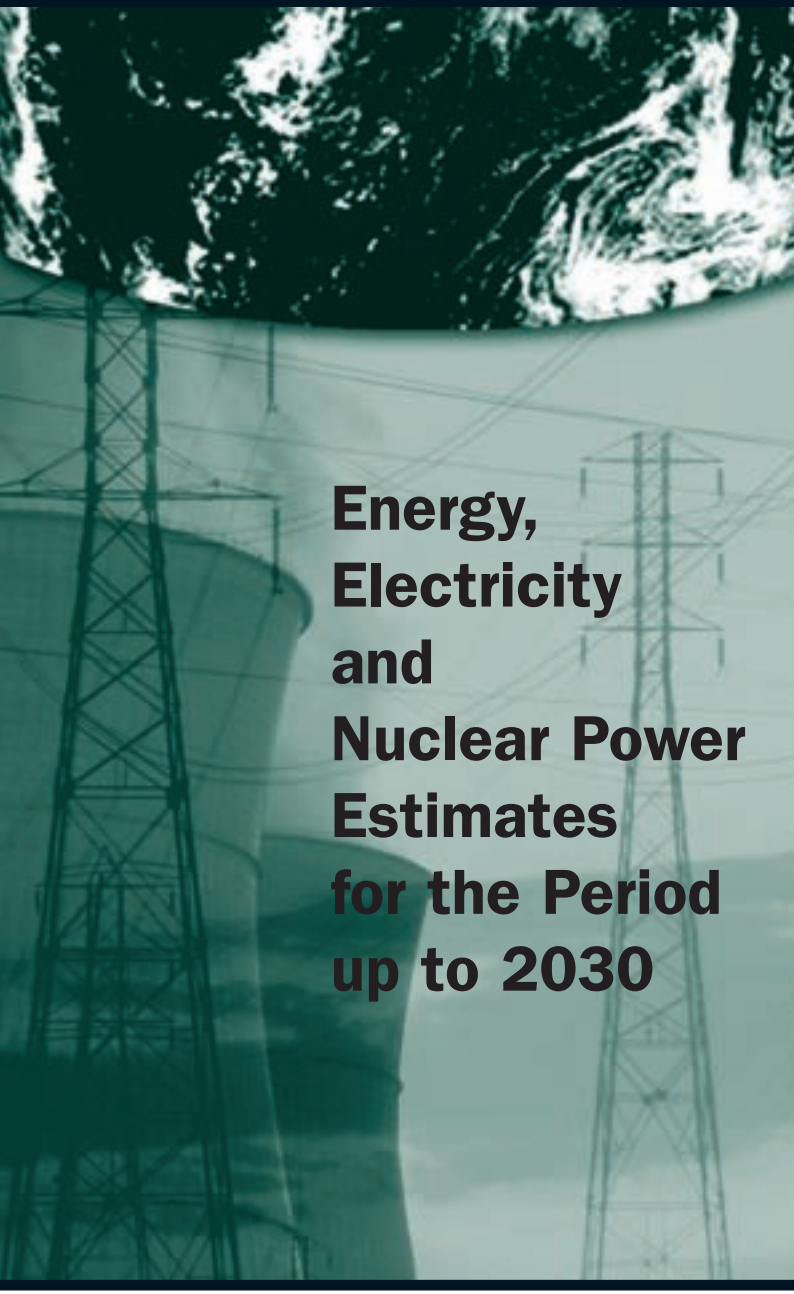
REFERENCE DATA SERIES No. 1 2007 Edition



Energy, Electricity and Nuclear Power Estimates for the Period up to 2030

IAEA
International Atomic Energy Agency

REFERENCE DATA SERIES No. 1

ENERGY, ELECTRICITY AND NUCLEAR POWER ESTIMATES FOR THE PERIOD UP TO 2030

2007 Edition

INTERNATIONAL ATOMIC ENERGY AGENCY
VIENNA, 2007

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INTRODUCTION

Reference Data Series No. 1 is an annual publication — currently in its twenty-seventh edition — containing estimates of energy, electricity and nuclear power trends up to the year 2030.

Nuclear data presented in Table 1 are based on actual statistical data collected by the IAEA's Power Reactor Information System (PRIS). Energy and electricity data for 2006, however, are estimated, since the latest available information from the Department of Economic and Social Affairs of the United Nations is for 2004. Population data originate from the World Population Prospects (2003 Revision), published by the Population Division of the UN Department of Economic and Social Affairs, and the 2005 values are estimates.

The future growth of energy, electricity and nuclear power up to the year 2030 is presented as low and high estimates in order to encompass the uncertainties associated with the future. These estimates should be viewed as very general growth trends whose validity must constantly be subjected to critical review.

The energy forecasts carried out in increasing numbers over the last years by international, national and private organizations are based on a multiplicity of different assumptions and different aggregating procedures, which make their comparison and synthesis very difficult. The basic differences refer to such fundamental input data as:

— World and regional scenarios of economic development;
— Correlation of economic growth and energy consumption;
— Assumptions on physical, economic and political constraints applying to energy production and consumption;
— Future prices of different energy sources.

The projections presented in this booklet are based on a compromise among:

— National projections supplied by each country for a recent OECD/NEA study;
— Indicators of development published by the World Bank in its World Development Indicators;
— Estimates of energy, electricity and nuclear power growth continuously carried out by the IAEA in the wake of recent global and regional projections made by other international organizations.

The nuclear generating capacity estimates presented in Table 3 are derived from a country by country 'bottom-up' approach. They are established by a group of experts participating each year in the IAEA's consultancy on Nuclear Capacity Projections and based upon a review of nuclear power projects and programmes in Member States.

The low and high estimates reflect contrasting but not extreme underlying assumptions on the different driving factors that have an impact on nuclear power deployment. These factors, and the ways they might evolve, vary from country to country. The estimates presented provide a plausible range of nuclear capacity growth by region and worldwide. They are not intended to be predictive nor to reflect the whole range of possible futures from the lowest to the highest feasible.

In the low estimates, the present barriers to nuclear power development are assumed to prevail in most countries during the coming three decades:

— Low economic and electricity demand growth rates in OECD countries;
— Public opposition to nuclear power, leading to policy decisions not to consider the nuclear option in spite of its competitive costs and potential contribution to reducing environmental impacts from electricity generation;
— Institutional and financing issues preventing the implementation of previously planned nuclear programmes, in particular in countries in transition and in developing countries;

— Inadequate mechanisms for nuclear technology transfer and nuclear project funding in developing countries.

The high estimates reflect a moderate revival of nuclear power development that could result in particular from a more comprehensive comparative assessment of the different options for electricity generation, integrating economic, social, health and environmental aspects. They are based upon a review of national nuclear power programmes, assessing their technical and economic feasibility. They assume that some policy measures would be taken to facilitate the implementation of these programmes, such as strengthening of international cooperation, enhanced technology adaptation and transfer, and establishment of innovative funding mechanisms. These estimates also take into account the global concern over climate change caused by the increasing concentration of greenhouse gases in the atmosphere, and the signing of the recent Kyoto Protocol.

The data on electricity produced by nuclear power plants is converted to joules based on the average efficiency of a nuclear power plant, i.e. 33 per cent; data on electricity generated by geothermal heat is converted to joules based on the average efficiency of a geothermal power plant, i.e. 10 per cent. The conversion to joules of electricity generated by hydropower or by the other non-thermal sources such as wind, tide, and solar is based on the energy content of the electricity generated (the equivalent of assuming a 100 per cent efficiency).

The total energy requirement has been calculated by summing the primary energy production, the net energy trade minus changes in international bunkers and domestic stocks.

The values shown in Table 9 refer to primary energy used for the generation of electricity. Owing to differences in conversion efficiencies, the percentage values are different from the shares of electricity generation presented in Tables 1 and 5.

Energy Units

1 MW(e) = 10^6 watts
1 GW(e) = 1000 MW(e) = 10^9 watts
1 GJ = 1 gigajoule = 10^9 joules
1 EJ = 1 exajoule = 10^{18} joules
1 EJ = 23.9 megatonnes of oil equivalent (MTOE)
1 TW·h = 1 terawatt-hour = 10^9 kW·h = 3.6×10^{-3} EJ

GROUPING OF COUNTRIES AND AREAS

The countries and geographical areas included in each grouping are listed below
(IAEA Member States are denoted by an asterisk)

North America

Canada*
United States of America*

Latin America

Anguilla
Antigua and Barbuda
Argentina*
Aruba
Bahamas
Barbados
Belize*
Bermuda
Bolivia*
Brazil*
Cayman Islands
Chile*
Colombia*
Costa Rica*
Cuba*
Dominica
Dominican Republic*
Ecuador*
El Salvador*
Grenada
Guadeloupe
Guatemala*
Guyana
Haiti*
Honduras*
Jamaica*
Martinique
Mexico*
Montserrat
Netherlands Antilles
Nicaragua*
Panama*
Paraguay*
Peru*
Puerto Rico
S.Georgia & S.Sandwich Islands
Saint Kitts and Nevis
Saint Lucia
Saint Pierre and Miquelon
Saint Vincent & the Grenadines
Suriname
Trinidad and Tobago
Turks and Caicos Islands
Uruguay*
Venezuela*

Western Europe

Andorra
Austria*
Belgium*
Cyprus*
Denmark*
Finland*
France*
Germany*
Gibraltar
Greece*
Greenland
Holy See*
Iceland*
Ireland*
Italy*
Liechtenstein*
Luxembourg*
Malta*
Monaco*
Netherlands*
Norway*
Portugal*
San Marino
Spain*
Svalbard and Jan Mayen Islands
Sweden*
Switzerland*
Turkey*
United Kingdom*

Eastern Europe

Albania*
Armenia*
Azerbaijan*
Belarus*
Bosnia and Herzegovina*
Bulgaria*
Croatia*
Czech Republic*
Estonia*
Georgia*
Hungary*
Kazakhstan*
Kyrgyzstan*
Latvia*
Lithuania*
Montenegro*
Poland*
Republic of Moldova*
Romania*
Russian Federation*
Serbia*
Slovakia*
Slovenia*
Tajikistan*
The Frmr.Yug.Rep. of Macedonia*
Turkmenistan
Ukraine*
Uzbekistan*

Africa

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

Middle East and South Asia

Afghanistan*
Bahrain
Bangladesh*
Bhutan
British Indian Ocean Territory
Cocos (Keeling) Islands
French Southern Territories
Heard Island&McDonald Islands
India*
Iran, Islamic Republic of*
Iraq*
Israel*
Jordan*
Kuwait*
Lebanon*
Nepal
Oman
Pakistan*
Qatar*
Saudi Arabia*
Sri Lanka*
Syrian Arab Republic*
T.T.U.T.J of T. Palestinian A.
United Arab Emirates*
Yemen*

South East Asia and the Pacific

Australia*
Brunei Darussalam
Cook Islands
Fiji
Indonesia*
Kiribati
Malaysia*
Maldives
Marshall Islands*
Micronesia (Fed. States of)
Myanmar*
New Zealand*
Niue
Norfolk Islands
Northern Mariana Islands
Palau*
Papua New Guinea
Pitcairn Islands
Samoa
Singapore*
Solomon Islands
Thailand*
Timor Leste
Tokelau
Tuvalu
US Minor Outlying Islands
Vanuatu
Wallis and Futuna Islands

Far East

Cambodia
China*
Dem. P.R. of Korea
Japan*
Korea, Republic of*
Lao P.D.R.
Macau, China
Mongolia*
Philippines*
Taiwan, China
Vietnam*

TABLE 1. NUCLEAR POWER REACTORS IN THE WORLD (end of 2006)

Group and Country	In Operation		Long-term Shut Down Reactors		Under Construction		Electricity Supplied by Nuclear Power Reactors in 2006	
	Number of Units	Total MW(e)	Number of Units	Total MW(e)	Number of Units	Total MW(e)	TW.h	Percent of Total Electricity
North America								
Canada	18	12610	4	2568			92.4	15.8
United States of America	103	99257	1	1065			788.3	19.4
Latin America								
Argentina	2	935			1	692	7.2	6.9
Brazil	2	1901					13.0	3.1
Mexico	2	1360					10.4	4.9
Western Europe								
Belgium	7	5824					44.3	54.4
Finland	4	2696			1	1600	22.0	28.0
France	59	63260					428.7	78.1
Germany	17	20339					158.7	31.4
Netherlands	1	482					3.3	3.5
Spain	8	7450					57.4	19.8
Sweden	10	9097					65.1	48.0
Switzerland	5	3220					26.4	37.4
United Kingdom	19	10965					69.4	18.4
Eastern Europe								
Armenia	1	376					2.4	42.0
Bulgaria	2	1906			2	1906	18.2	43.7
Czech Republic	6	3523					24.5	31.5
Hungary	4	1755					12.5	37.7

TABLE 1. NUCLEAR POWER REACTORS IN THE WORLD (end of 2006)

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	Number of Units	Total MW(e)	Number of Units	Total MW(e)	Number of Units	Total MW(e)	TW.h	Percent of Total Electricity
Lithuania	1	1185					7.9	72.3
Romania	1	655			1	655	5.2	9.0
Russian Federation	31	21743			5	4525	144.6	15.9
Slovakia	5	2034					16.6	57.2
Slovenia	1	666					5.3	40.3
Ukraine	15	13107			2	1900	84.9	47.6
Africa								
South Africa	2	1800					10.1	4.4
Middle East and South Asia								
India	16	3577			7	3112	15.6	2.6
Iran, Islamic Republic of					1	915		
Pakistan	2	425			1	300	2.5	2.7
Far East								
China	10	7572			4	3610	51.8	1.8
Japan	55	47587	1	246	1	866	291.5	30.0
Korea, Republic of	20	17454			1	960	141.2	38.6
World Total (a)	435	369682	6	3879	29	23641	2659.7	15.2

Notes:

(a) Including the following data in Taiwan, China:

— 6 units in operation with total capacity of 4921 MW(e); 2 units under construction with total capacity of 2600 MW(e);

— 38.3 TW·h of nuclear electricity generation, representing 19.5% of the total electricity generated.

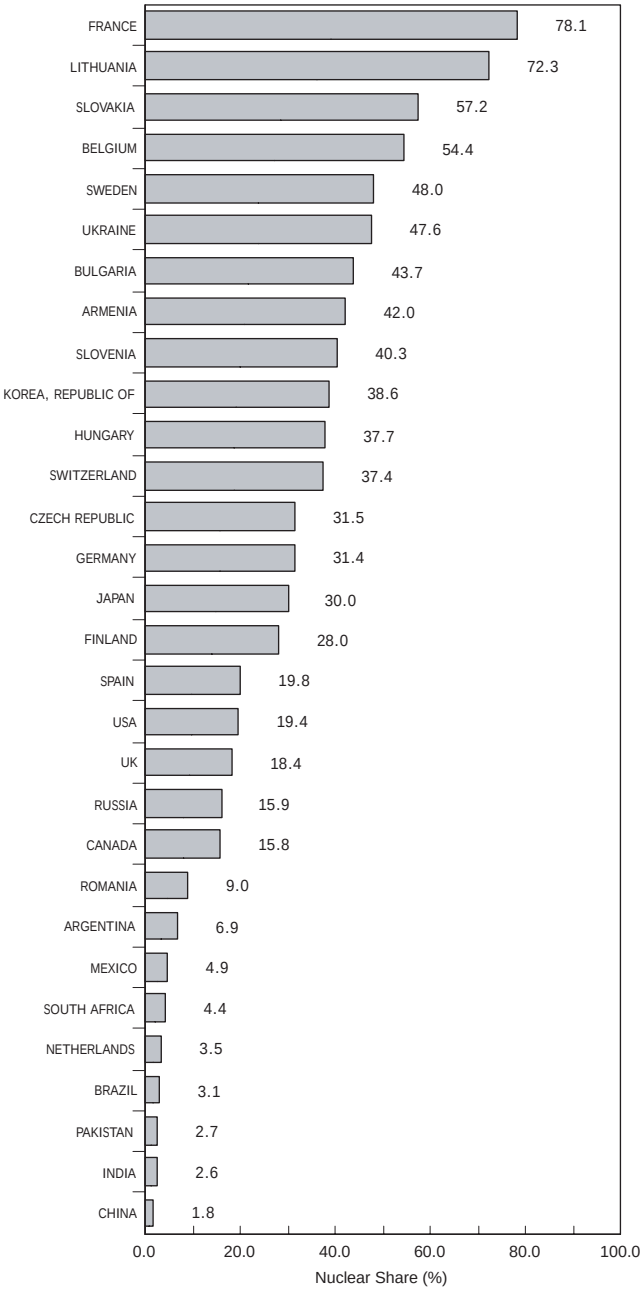


FIGURE 1. NUCLEAR SHARE OF TOTAL ELECTRICITY GENERATION IN 2006

Note: The nuclear share of electricity generation in Taiwan, China was 19.5%.

TABLE 2. NUMBER OF COUNTRIES WITH NUCLEAR POWER REACTORS IN OPERATION OR UNDER CONSTRUCTION (end of 2006)

Country Group	Number of Countries in Group	Countries with Nuclear Power Reactors			
		In Operation	Long-term Shut Down	Under Construction (1)	Total (2)
North America	2	2	2		2
Latin America	45	3		1	3
Western Europe	29	9		1	9
Eastern Europe	27	10		4	10
Africa	57	1			1
Middle East and South Asia	25	2		3	3
South East Asia and the Pacific	27				
Far East	11	3	1	3	3
World Total	223	30	3	12	31

Notes:
(1) May include countries having reactors already in operation.
(2) Total number of countries in each group that have nuclear power reactors in operation, or under construction.

TABLE 3. ESTIMATES OF TOTAL AND NUCLEAR ELECTRICAL GENERATING CAPACITY

Country Group	2006			2010 (*)			2020 (*)			2030 (*)		
	Total Elect. GW(e)	Nuclear		Total Elect. GW(e)	Nuclear		Total Elect. GW(e)	Nuclear		Total Elect. GW(e)	Nuclear	
		GW(e)	%		GW(e)	%		GW(e)	%		GW(e)	%
North America	1331	111.9	8.4	1363 1400	114 115	8.4 8.2	1480 1550	125 132	8.4 8.5	1634 1723	129 168	7.9 9.8
Latin America	288	4.2	1.5	313 342	4.1 4.9	1.3 1.4	395 530	7.9 7.9	2.0 1.5	499 809	8.6 19	1.7 2.4
Western Europe	753	123.3	16.4	780 806	121 122	15.5 15.1	862 940	91 131	10.5 14.0	961 1105	71 149	7.3 13.5
Eastern Europe	466	47.0	10.1	468 484	48 49	10.2 10.2	504 590	70 85	13.9 14.3	542 718	81 111	14.8 15.4
Africa	106	1.8	1.7	112 123	1.8 1.8	1.6 1.5	139 188	3.1 5.1	2.2 2.7	176 287	3.1 12	1.8 4.0
Middle East and South Asia	266	4.0	1.5	295 313	10 11	3.4 3.5	383 470	16 27	4.3 5.7	496 686	21 46	4.2 6.8
South East Asia and the Pacific	161			178 187			224 275	 0.9	 0.3	277 398	0.9 7.4	0.3 1.9
Far East	889	77.5	8.7	918 1028	79 82	8.7 8.0	1078 1427	112 136	10.3 9.5	1256 1944	133 179	10.6 9.2
World Total Low Estimate	4260	369.7	8.7	4427	378	8.5	5066	425	8.4	5842	447	7.6
World Total High Estimate				4684	385	8.2	5971	525	8.8	7670	691	9.0

Note:
(*) Nuclear capacity estimates take into account the scheduled decommissioning of the older units at the end of their lifetime.

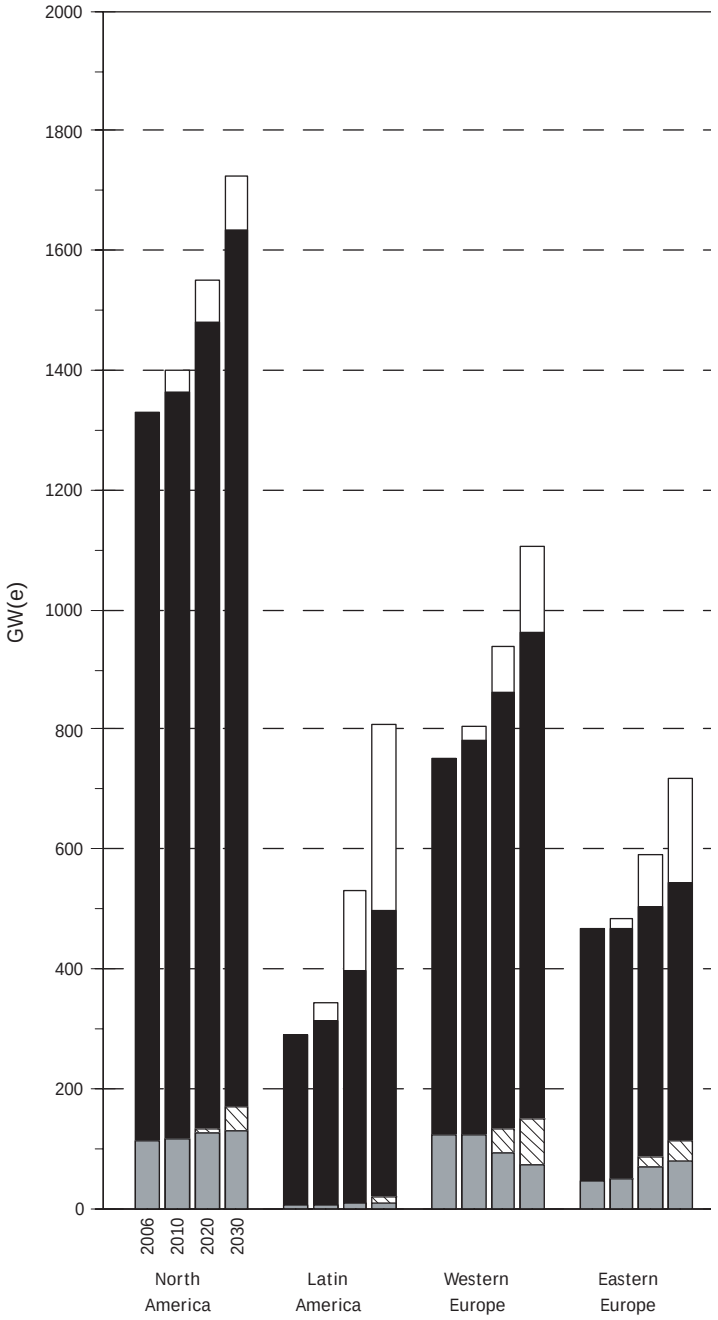


FIGURE 2. TOTAL AND NUCLEAR ELECTRICAL GENERATING CAPACITY

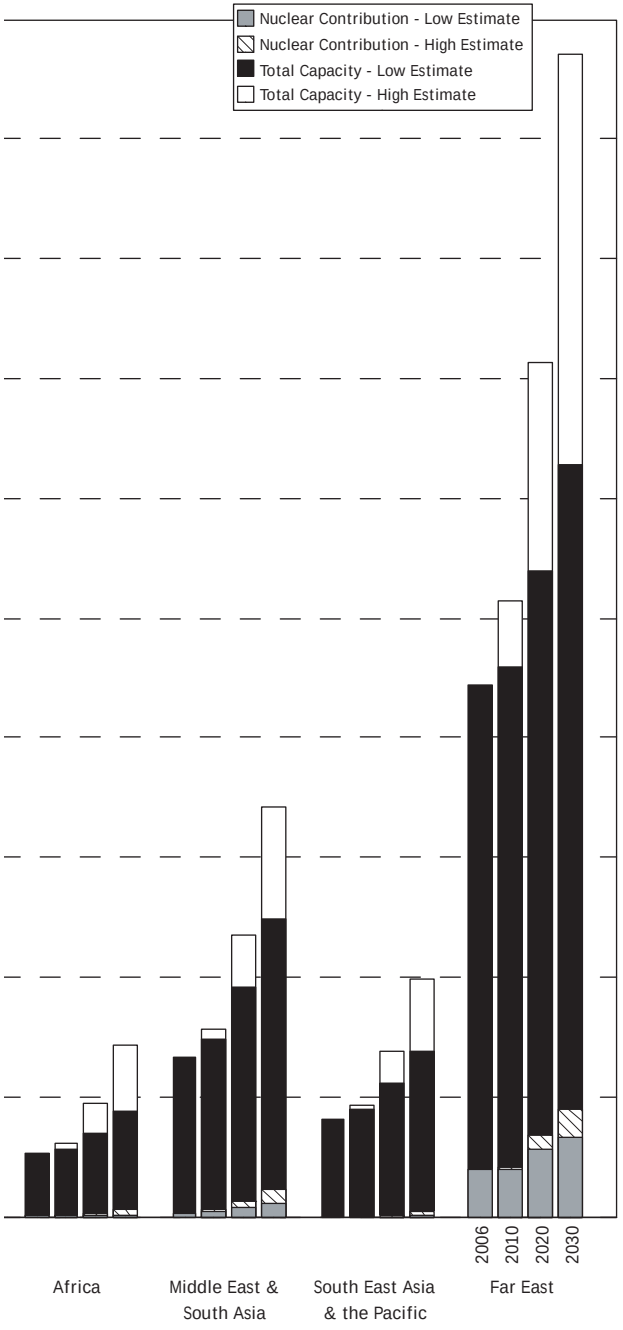

Nuclear Contribution - Low Estimate
Nuclear Contribution - High Estimate
Total Capacity - Low Estimate
Total Capacity - High Estimate
2006
2010
2020
2030
Africa
Middle East & South Asia
South East Asia & the Pacific
Far East

TABLE 4. ESTIMATES OF TOTAL ELECTRICITY GENERATION AND CONTRIBUTION BY NUCLEAR POWER (*)

Country Group	2006			2010			2020			2030		
	Total Elect. TW.h	Nuclear		Total Elect. TW.h	Nuclear		Total Elect. TW.h	Nuclear		Total Elect. TW.h	Nuclear	
		TW.h	%		TW.h	%		TW.h	%		TW.h	%
North America	4637	880.7	19.0	4728 4921	910 913	19.2 18.6	5397 6023	1006 1066	18.6 17.7	6038 7324	1042 1355	17.3 18.5
Latin America	1172	30.5	2.6	1240 1347	30 36	2.4 2.7	1685 2136	59 59	3.5 2.8	2305 3496	65 148	2.8 4.2
Western Europe	3008	875.3	29.1	3173 3276	889 897	28.0 27.4	3460 4217	684 988	19.8 23.4	3750 5453	544 1151	14.5 21.1
Eastern Europe	1810	322.1	17.8	1874 1980	315 323	16.8 16.3	2164 2715	472 571	21.8 21.0	2458 3913	564 777	23.0 19.9
Africa	546	10.1	1.8	605 629	14 14	2.4 2.3	785 996	25 41	3.3 4.1	988 1563	26 95	2.6 6.1
Middle East and South Asia	1152	18.1	1.6	1231 1352	59 65	4.8 4.8	1636 2143	101 166	6.2 7.7	2116 3270	136 301	6.4 9.2
South East Asia and the Pacific	662			736 759			939 1083	 5.5	 0.5	1169 1537	5.8 48	0.5 3.1
Far East	4537	522.8	11.5	4708 5284	543 559	11.5 10.6	5754 8076	772 940	13.4 11.6	6961 12046	942 1267	13.5 10.5
World Total Low Estimate	17525	2659.7	15.2	18295	2760	15.1	21820	3120	14.3	25785	3325	12.9
World Total High Estimate				19548	2809	14.4	27388	3837	14.0	38602	5141	13.3

(*) The nuclear generation data presented in this table and the nuclear capacity data presented in Table 3 cannot be used to calculate average annual capacity factors for nuclear plants, as Table 3 presents year-end capacity and not the effective capacity average over the year.

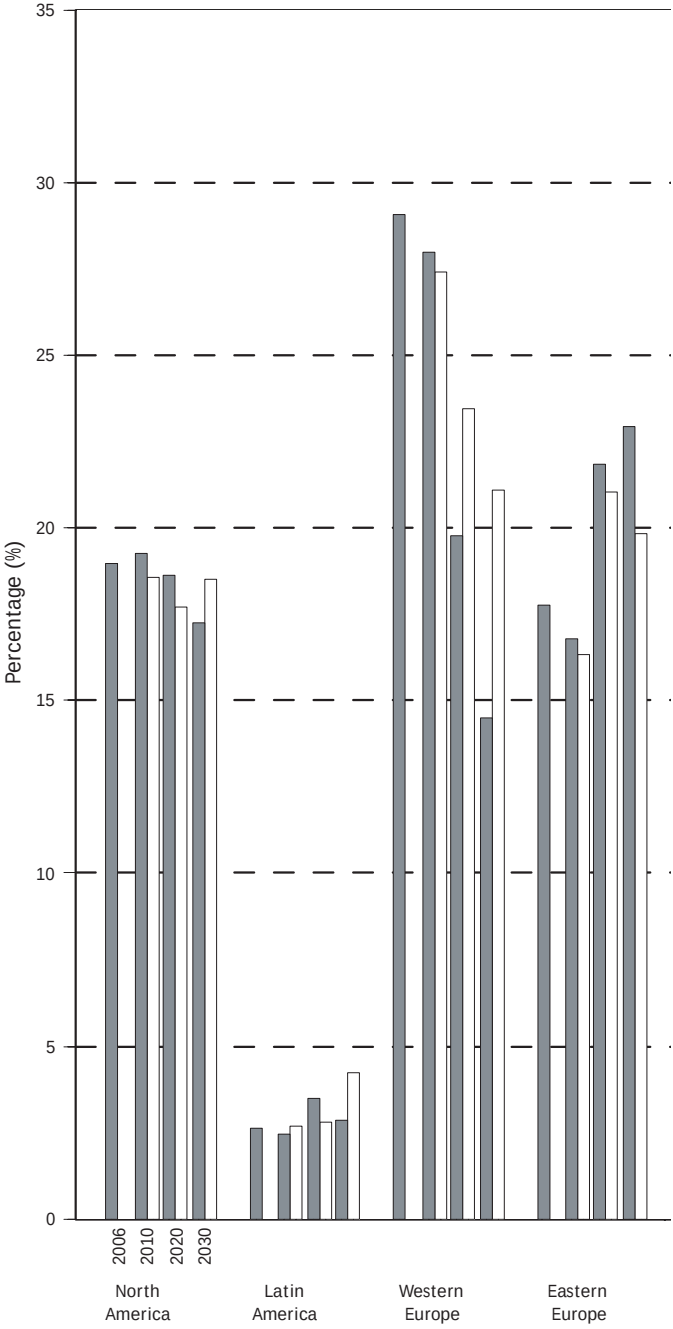


FIGURE 3. PERCENTAGE OF ELECTRICITY SUPPLIED BY NUCLEAR POWER

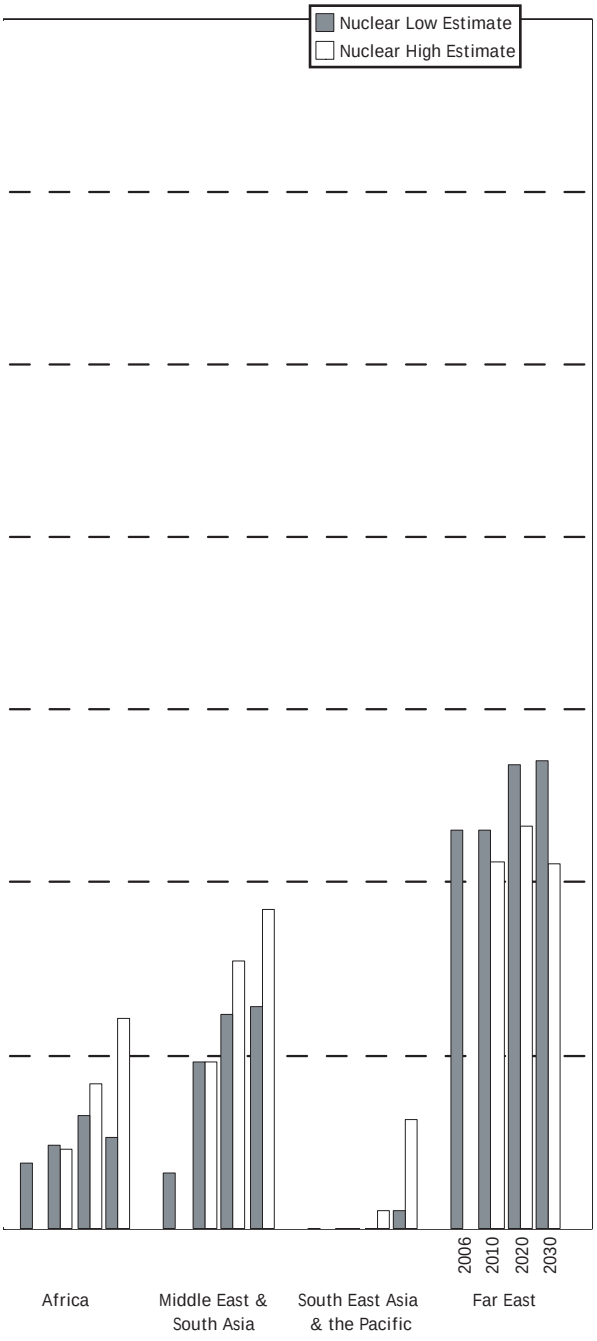

Nuclear Low Estimate
Nuclear High Estimate
2006
2010
2020
2030
Africa
Middle East & South Asia
South East Asia & the Pacific
Far East

TABLE 5. ESTIMATES OF TOTAL ENERGY REQUIREMENT (EJ), PERCENTAGE USED FOR ELECTRICITY GENERATION, AND PERCENTAGE SUPPLIED BY NUCLEAR ENERGY (*)

Country Group	2006			2010			2020			2030		
	Total Energy Requierement	% Used for Elect. Gen.	% Supplied by Nuclear	Total Energy Requierement	% Used for Elect. Gen.	% Supplied by Nuclear	Total Energy Requierement	% Used for Elect. Gen.	% Supplied by Nuclear	Total Energy Requierement	% Used for Elect. Gen.	% Supplied by Nuclear
North America	108.5	31.4	8.9	111 115	31 31	9.0 8.7	118 132	33 33	9.3 8.8	127 151	34 36	8.9 9.8
Latin America	30.9	23.3	1.1	34 35	22 23	1.0 1.1	43 54	24 24	1.5 1.2	54 80	26 27	1.3 2.0
Western Europe	72.5	35.9	13.3	75 76	37 37	13.0 12.9	79 85	37 42	9.4 12.7	84 96	37 48	7.1 13.1
Eastern Europe	57.7	36.4	5.7	60 63	36 37	5.7 5.6	68 80	37 39	7.6 7.8	76 99	37 46	8.1 8.6
Africa	36.8	13.8	0.4	39 41	14 14	0.4 0.4	49 56	15 16	0.6 0.8	58 74	16 20	0.5 1.4
Middle East and South Asia	42.1	32.2	0.6	47 49	31 32	1.4 1.4	60 71	32 35	1.8 2.5	76 101	33 38	2.0 3.2
South East Asia and the Pacific	22.4			24 26	28 26		30 37	29 27	0.2	37 51	29 28	0.2 1.0
Far East	112.3	36.9	5.0	122 129	35 37	4.8 4.7	149 183	35 40	5.6 5.6	179 252	36 44	5.7 5.5
World Total Low Estimate	483.2	30.7	6.0	512	31	5.9	596	32	5.7	690	33	5.3
World Total High Estimate				535	32	5.7	698	35	6.0	904	38	6.2

Note:
(*) Total energy requirement is estimated as production of primary energy plus net trade (import - export) minus international bunkers and stock changes.

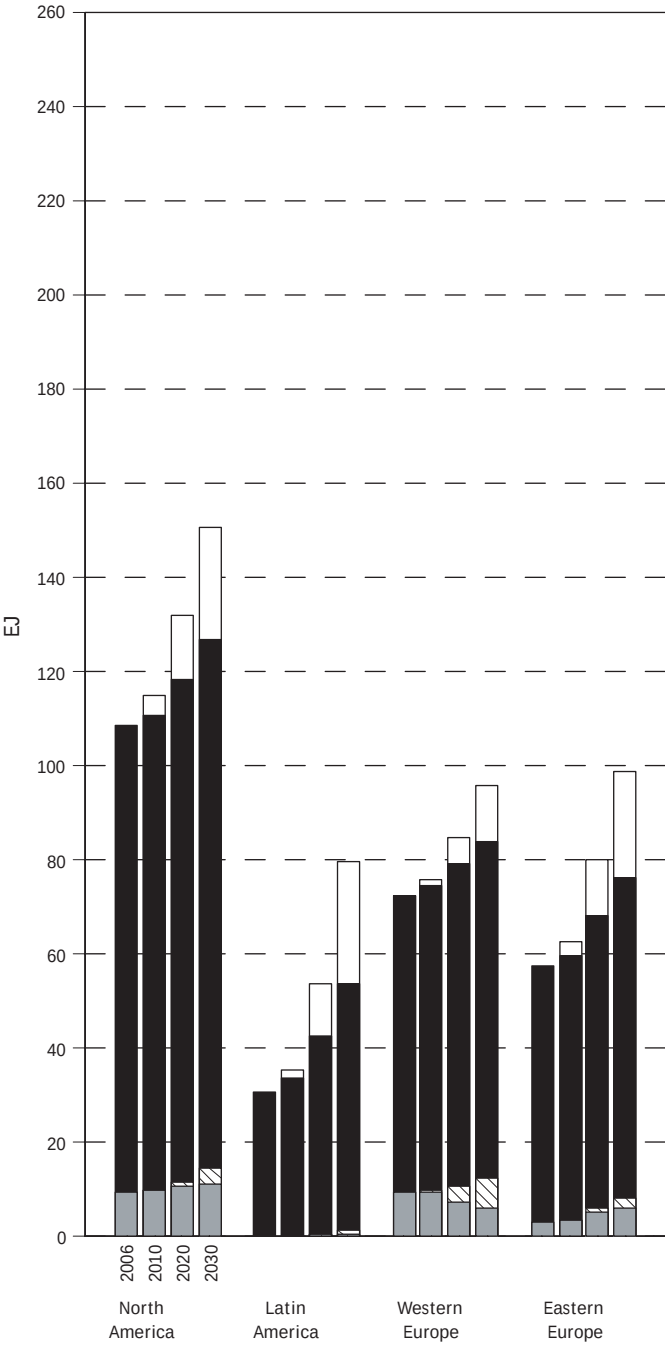


FIGURE 4. ESTIMATES OF TOTAL ENERGY REQUIREMENT

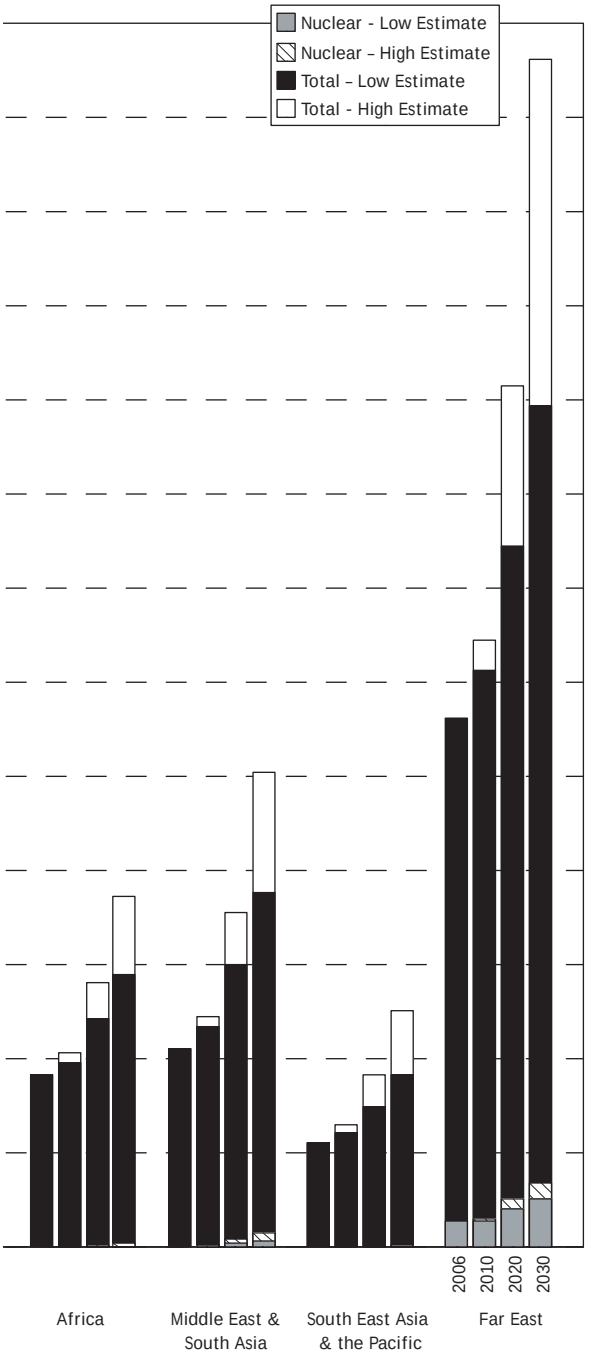

Nuclear - Low Estimate
Nuclear – High Estimate
Total – Low Estimate
Total - High Estimate
2006
2010
2020
2030
Africa
Middle East & South Asia
South East Asia & the Pacific
Far East

TABLE 6. TOTAL ENERGY REQUIREMENT (EJ) BY TYPE OF FUEL IN 2006 (*)

Country Group	Solids (a)	Liquids	Gases	Biomass (b)	Hydro	Nuclear	Renewables (c)	Total
North America	20.76	43.12	27.18	4.79	2.43	9.61	0.65	108.53
Latin America	1.28	13.64	7.30	5.52	2.46	0.33	0.31	30.85
Western Europe	10.68	25.56	19.27	5.02	1.72	9.56	0.73	72.55
Eastern Europe	11.75	11.48	28.11	1.90	1.12	3.51	-0.17	57.71
Africa	4.34	7.20	3.12	21.60	0.35	0.11	0.05	36.78
Middle East and South Asia	12.59	12.59	10.12	5.92	0.64	0.20	0.03	42.08
South East Asia and the Pacific	3.47	9.38	5.92	3.17	0.26		0.22	22.42
Far East	59.61	31.80	7.87	4.83	2.04	5.70	0.47	112.32
World Total	124.48	154.77	108.89	52.75	11.02	29.03	2.29	483.23

Notes:

(*) Total energy requirement = production of primary energy plus net trade (import - export) minus international bunkers and stock changes.

(a) Solids do not include commercial wood.

(b) The column headed 'Biomass' includes commercial wood, combustible renewables, waste and other biomass products.

(c) The column headed 'Renewables' includes geothermal, wind, solar, tide energy and net electricity trade.

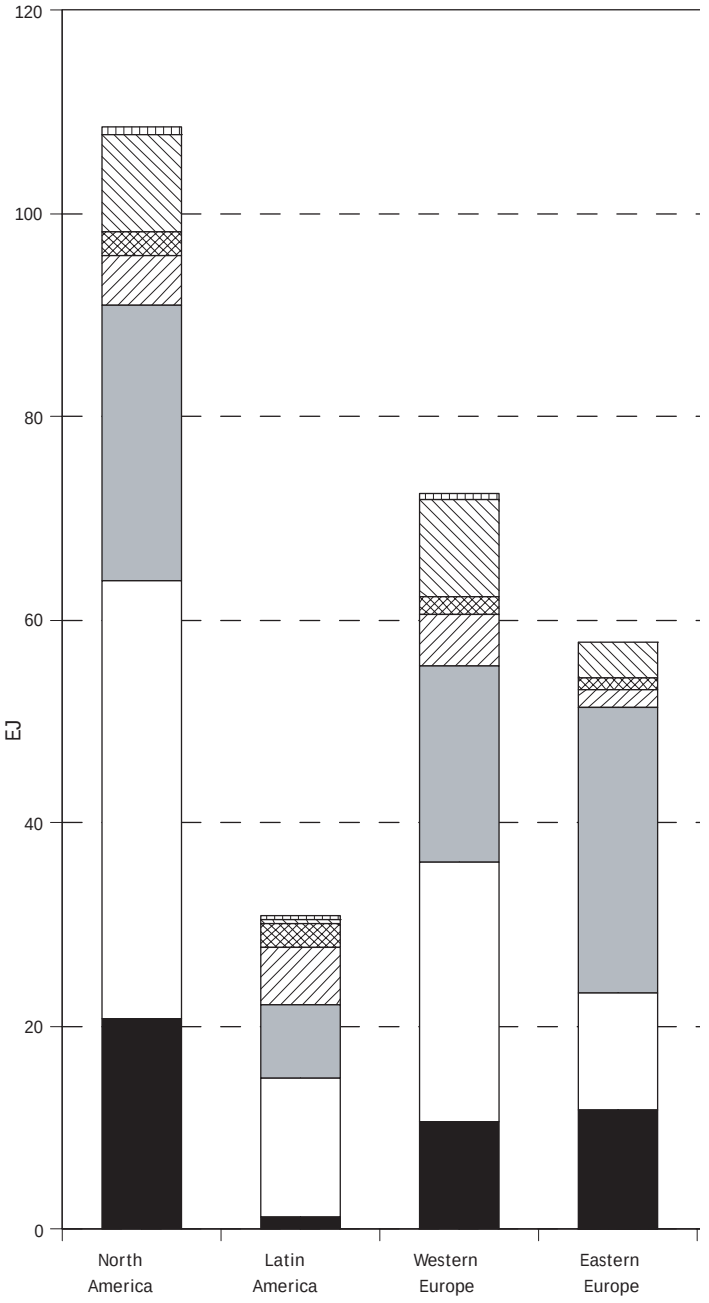
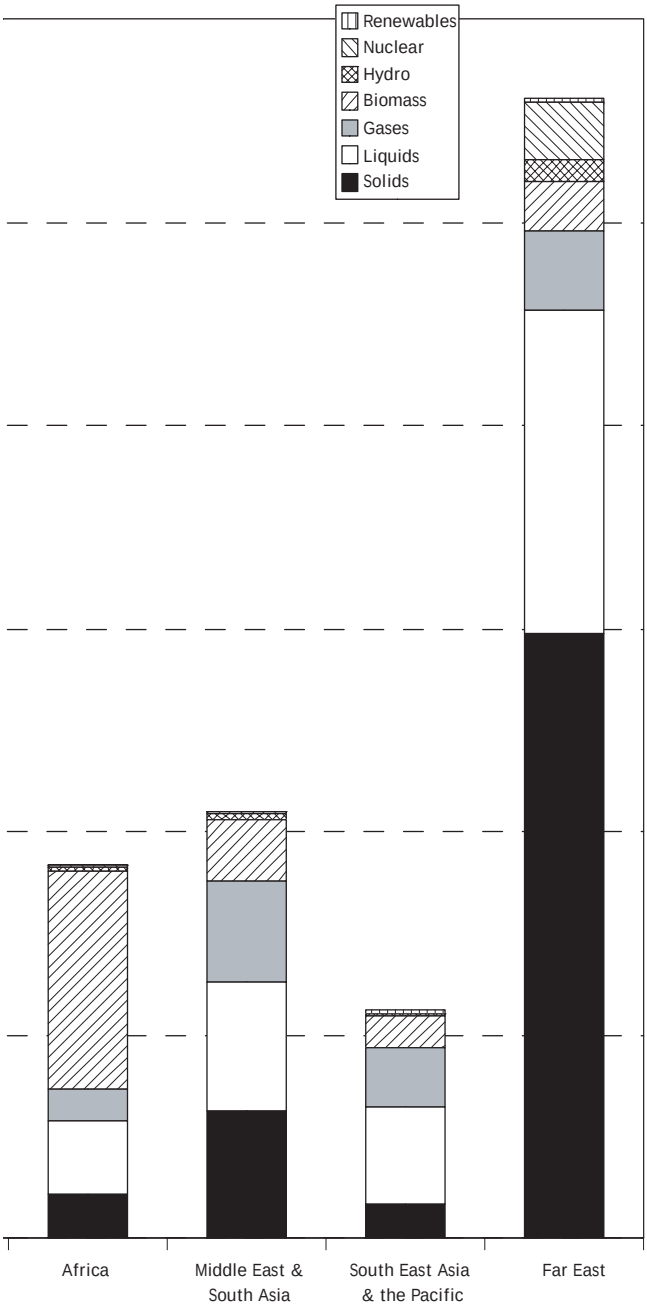


FIGURE 5. TOTAL ENERGY REQUIREMENT BY FUEL TYPE IN 2006


Renewables
Nuclear
Hydro
Biomass
Gases
Liquids
Solids
Africa
Middle East & South Asia
South East Asia & the Pacific
Far East

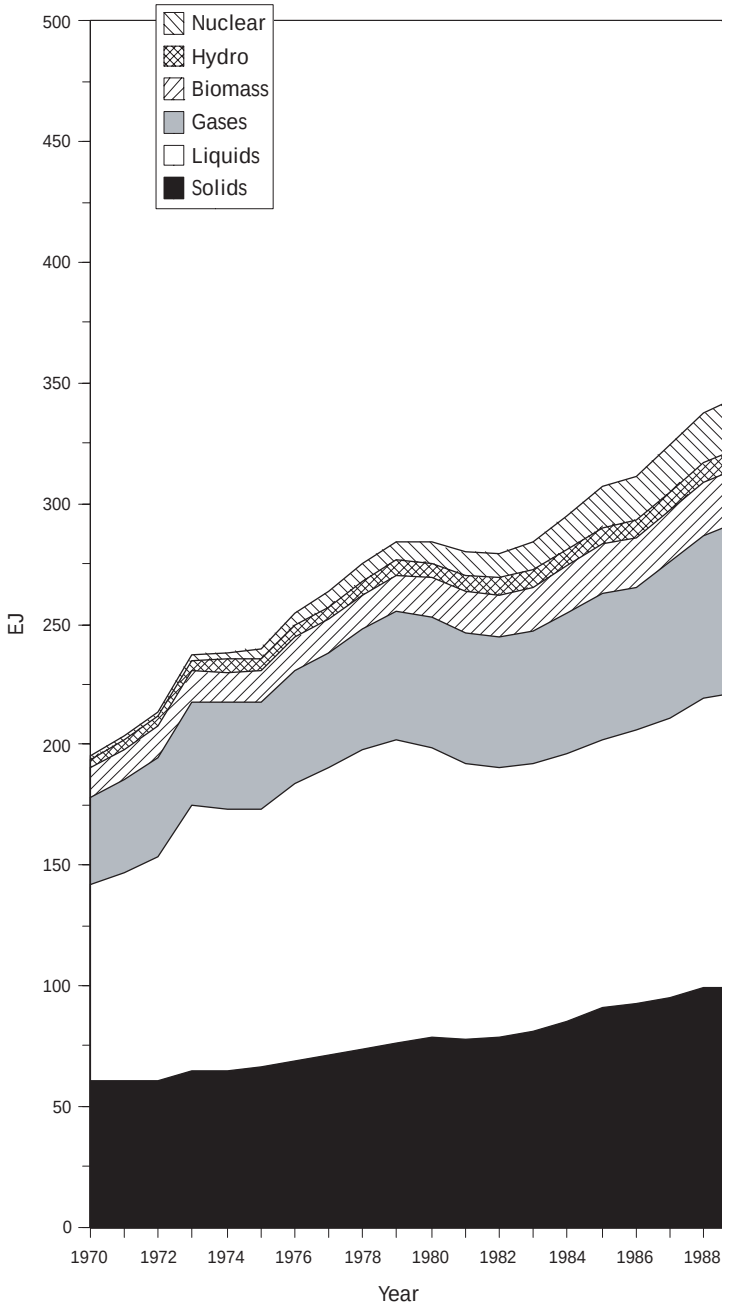


FIGURE 6. BREAKDOWN OF WORLD TOTAL ENERGY REQUIREMENT DURING THE PERIOD 1970—2006

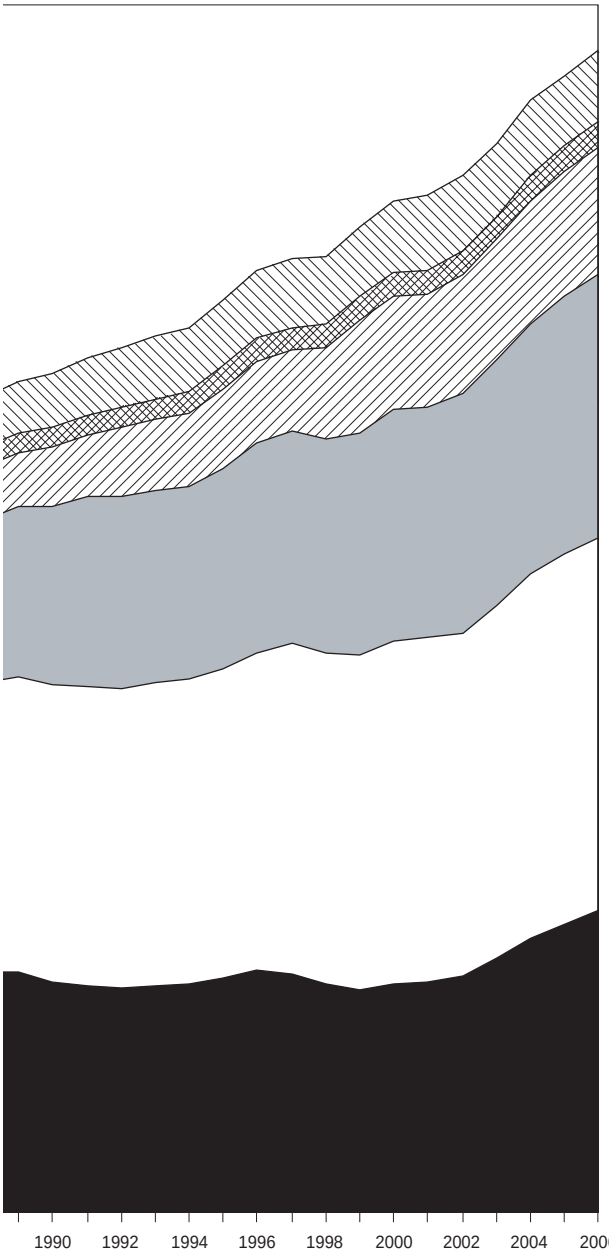

1990
1992
1994
1996
1998
2000
2002
2004
2006

TABLE 7. FUEL SHARES (%) OF ENERGY REQUIREMENT IN 2006 (*)

Country Group	Solids (a)	Liquids	Gases	Biomass (b)	Hydro	Nuclear	Renewables (c)	Total
North America	19.13	39.73	25.04	4.41	2.24	8.85	0.59	100.00
Latin America	4.14	44.23	23.65	17.91	7.98	1.08	1.02	100.00
Western Europe	14.72	35.24	26.57	6.92	2.37	13.18	1.00	100.00
Eastern Europe	20.36	19.89	48.71	3.29	1.95	6.09	-0.29	100.00
Africa	11.81	19.58	8.49	58.74	0.95	0.30	0.14	100.00
Middle East and South Asia	29.91	29.91	24.05	14.06	1.53	0.47	0.06	100.00
South East Asia and the Pacific	15.49	41.85	26.40	14.13	1.14		0.99	100.00
Far East	0.00	28.31	7.01	4.30	1.82	5.08	0.42	100.00
World Total	25.76	32.03	22.53	10.92	2.28	6.01	0.47	100.00

Notes:
(*) Total energy requirement = production of primary energy plus net trade (import - export) minus international bunkers and stock changes.
(a) Solids do not include commercial wood.
(b) The column headed 'Biomass' includes commercial wood, combustible renewables, waste and other biomass products.
(c) The column headed 'Renewables' includes geothermal, wind, solar, tide energy and net electricity trade.

TABLE 8. FUEL USE (EJ) FOR ELECTRICITY GENERATION BY TYPE OF FUEL IN 2006

Country Group	Thermal (a)	Hydro	Nuclear	Renewables (b)	Total
North America	22.21	2.43	9.61	0.63	34.87
Latin America	4.42	2.46	0.33	0.32	7.54
Western Europe	15.56	1.72	9.56	0.53	27.37
Eastern Europe	17.36	1.12	3.51	0.02	22.01
Africa	4.89	0.35	0.11	0.04	5.40
Middle East and South Asia	14.42	0.64	0.20	0.02	15.28
South East Asia and the Pacific	5.81	0.26		0.21	6.28
Far East	32.61	2.04	5.70	0.47	40.83
World Total	117.27	11.02	29.03	2.26	159.58

Notes:
(a) The column headed 'Thermal' is the total for solids, liquids, gases, biomass and waste.
(b) The column headed 'Renewables' includes geothermal, wind, solar and tide energy.

TABLE 9. PERCENTAGE CONTRIBUTION OF EACH FUEL TYPE TO ELECTRICITY GENERATION IN 2006

Country Group	Thermal (a)	Hydro	Nuclear	Renewables (b)	Total
North America	65.71	14.53	18.99	0.77	100.00
Latin America	38.28	58.31	2.61	0.81	100.00
Western Europe	52.32	15.86	29.14	2.68	100.00
Eastern Europe	64.95	17.21	17.80	0.05	100.00
Africa	80.01	17.74	1.84	0.41	100.00
Middle East and South Asia	82.42	15.51	1.57	0.50	100.00
South East Asia and the Pacific	88.17	10.73		1.10	100.00
Far East	75.65	12.50	11.52	0.33	100.00
World Total	66.46	17.46	15.18	0.89	100.00

Notes:
(a) The column headed 'Thermal' is the total for solids, liquids, gases, biomass and waste.
(b) The column headed 'Renewables' includes geothermal, wind, solar and tide energy.

TABLE 10. ESTIMATES OF POPULATION GROWTH BY REGION (*)

Country Group	2006		2010		2020		2030	
	Million Inhabitants	Growth Rate (%/a) 1996—2006	Million Inhabitants	Growth Rate (%/a) 2006—2010	Million Inhabitants	Growth Rate (%/a) 2010—2020	Million Inhabitants	Growth Rate (%/a) 2020—2030
North America	335	1.15	348	0.94	379	0.87	407	0.71
Latin America	566	1.47	595	1.25	659	1.04	711	0.76
Western Europe	470	3.86	475	0.28	484	0.19	488	0.09
Eastern Europe	405	0.69	402	-0.20	393	-0.22	380	-0.35
Africa	907	2.16	984	2.07	1188	1.90	1398	1.64
Middle East and South Asia	1702	2.21	1816	1.63	2091	1.42	2325	1.07
South East Asia and the Pacific	410	1.44	428	1.10	469	0.91	500	0.64
Far East	1731	0.92	1778	0.67	1872	0.52	1914	0.22
World Total	6526	1.68	6827	1.13	7535	0.99	8123	0.75

(*) Projection figures are the arithmetic average between low and high estimates.

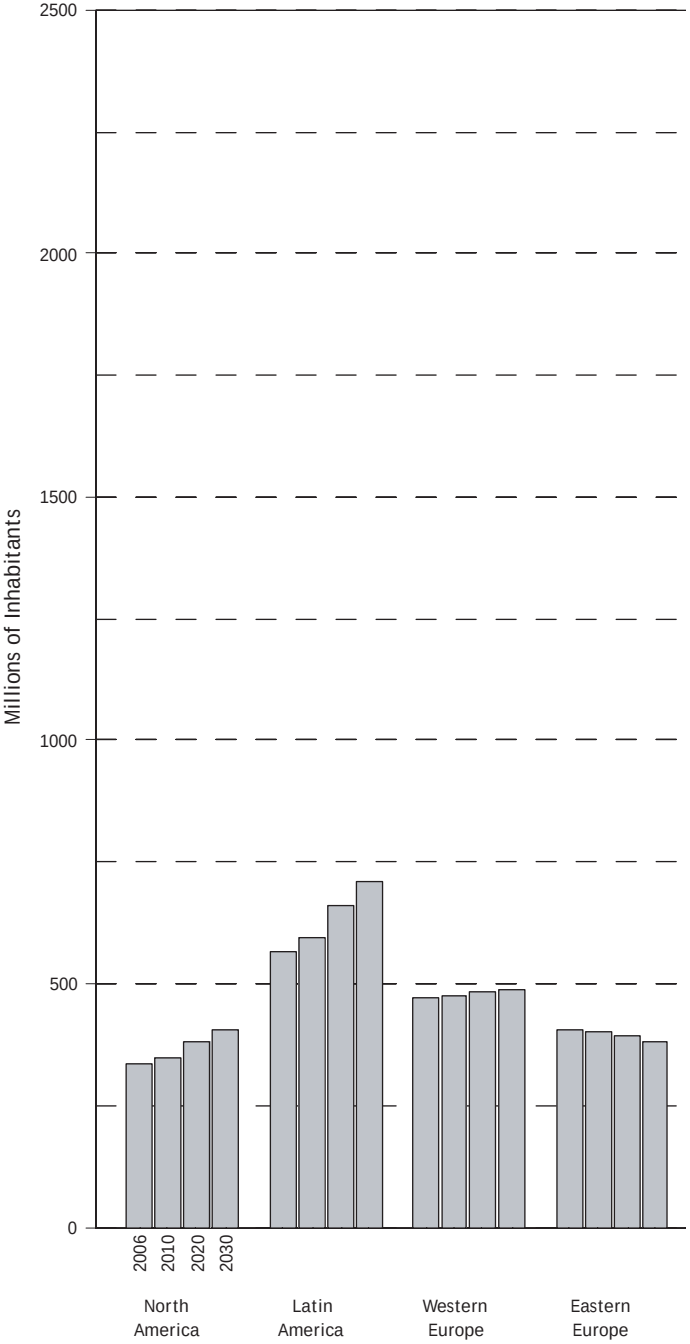


FIGURE 7. POPULATION ESTIMATES

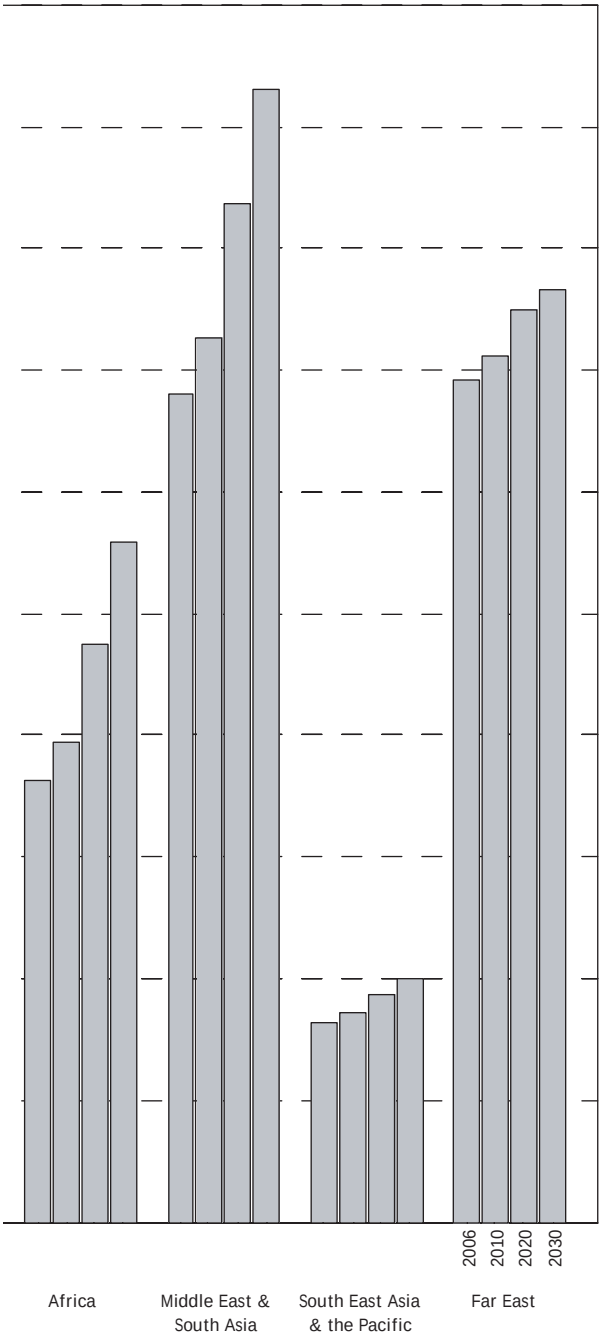

2006
2010
2020
2030
Africa
Middle East & South Asia
South East Asia & the Pacific
Far East

TABLE 11. ESTIMATES OF TOTAL ENERGY AND ELECTRICITY REQUIREMENT PER CAPITA

Country Group	2006		2010		2020		2030	
	Energy Requirement per Capita (GJ/cap)	Electricity Requirement per Capita (MW.h/cap)	Energy Requirement per Capita (GJ/cap)	Electricity Requirement per Capita (MW.h/cap)	Energy Requirement per Capita (GJ/cap)	Electricity Requirement per Capita (MW.h/cap)	Energy Requirement per Capita (GJ/cap)	Electricity Requirement per Capita (MW.h/cap)
North America	324	13.8	318 — 331	13.6 — 14.1	312 — 348	13.6 — 14.1	312 — 370	14.8 — 18.0
Latin America	55	2.1	57 — 60	2.1 — 2.3	65 — 82	2.1 — 2.3	76 — 112	3.2 — 4.9
Western Europe	155	6.4	157 — 160	6.7 — 6.9	163 — 175	6.7 — 6.9	172 — 196	7.7 — 11.2
Eastern Europe	142	4.5	149 — 156	4.7 — 4.9	173 — 204	4.7 — 4.9	201 — 261	6.5 — 10.3
Africa	41	0.6	40 — 42	0.6 — 0.6	41 — 47	0.6 — 0.6	41 — 53	0.7 — 1.1
Middle East and South Asia	25	0.7	26 — 27	0.7 — 0.7	29 — 34	0.7 — 0.7	33 — 43	0.9 — 1.4
South East Asia and the Pacific	55	1.6	57 — 61	1.7 — 1.8	64 — 79	1.7 — 1.8	73 — 101	2.3 — 3.1
Far East	65	2.6	69 — 73	2.6 — 3.0	80 — 98	2.6 — 3.0	93 — 132	3.6 — 6.3
World Average	74	2.7	75 — 78	2.7 — 2.9	79 — 93	2.9 — 3.6	85 — 111	3.2 — 4.8

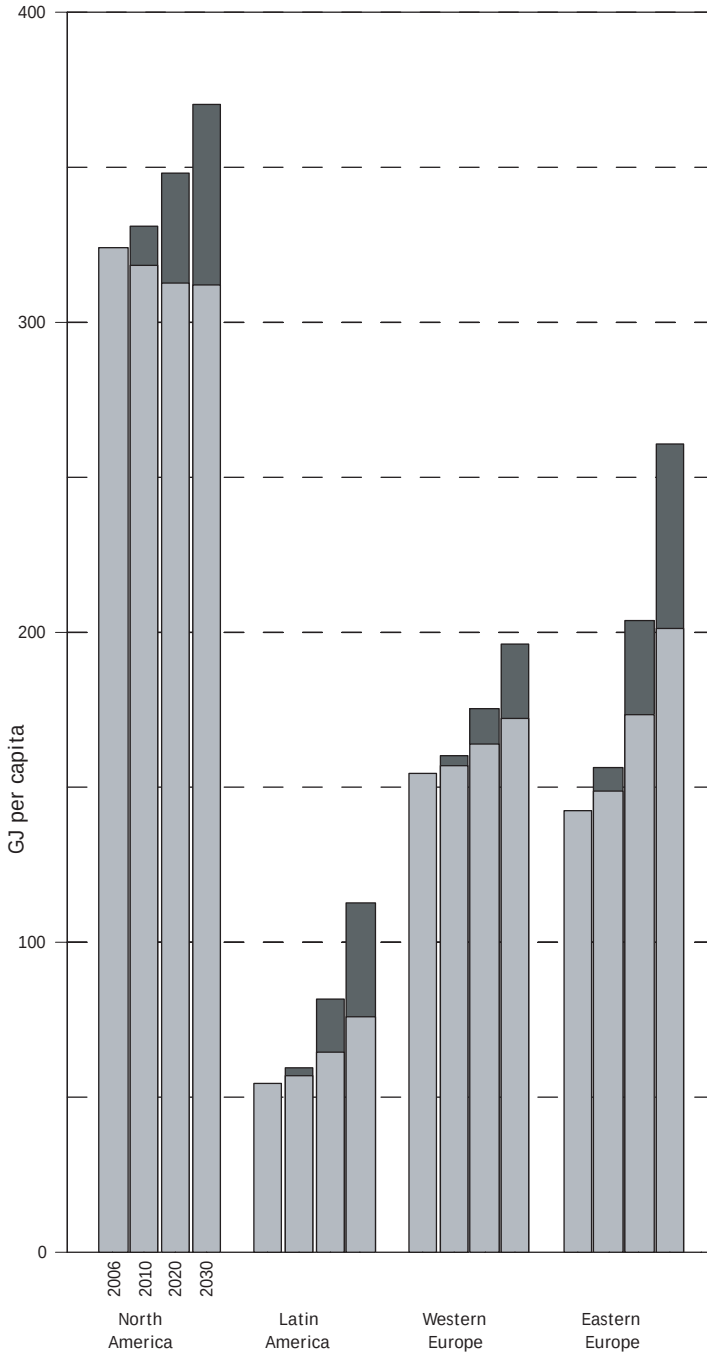
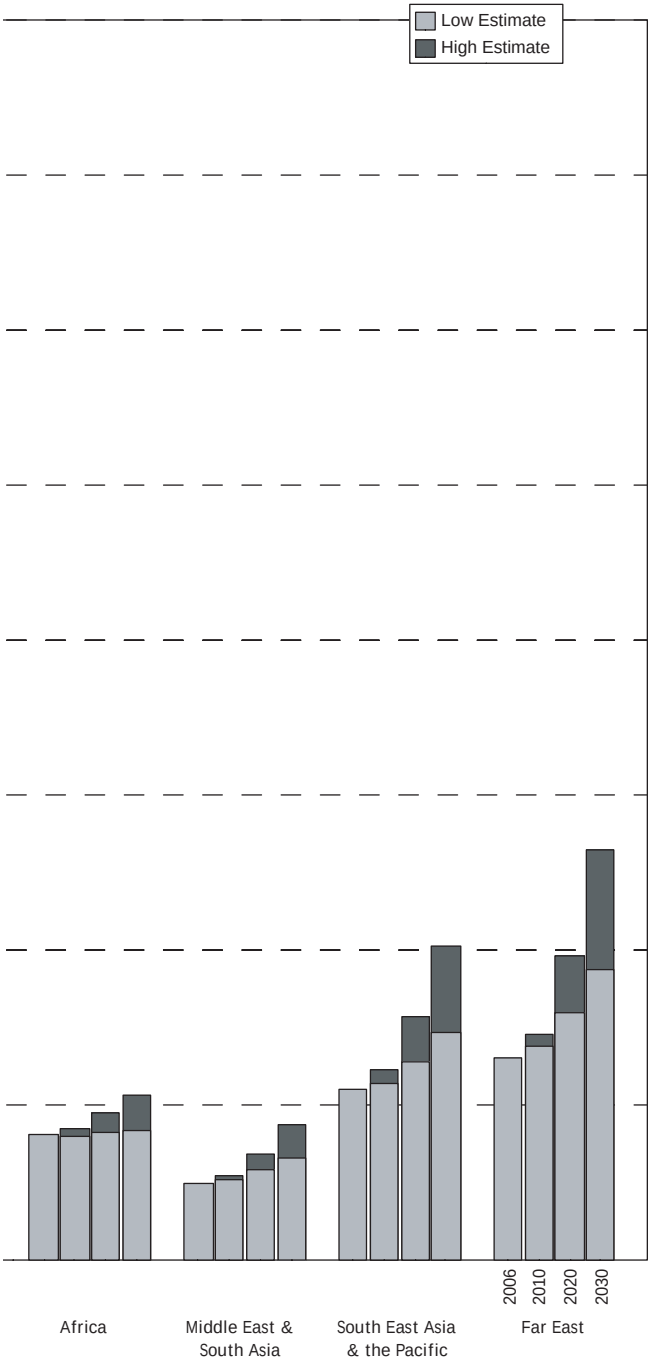


FIGURE 8. TOTAL ENERGY REQUIREMENT PER CAPITA


Low Estimate
High Estimate
2006
2010
2020
2030
Africa
Middle East & South Asia
South East Asia & the Pacific
Far East

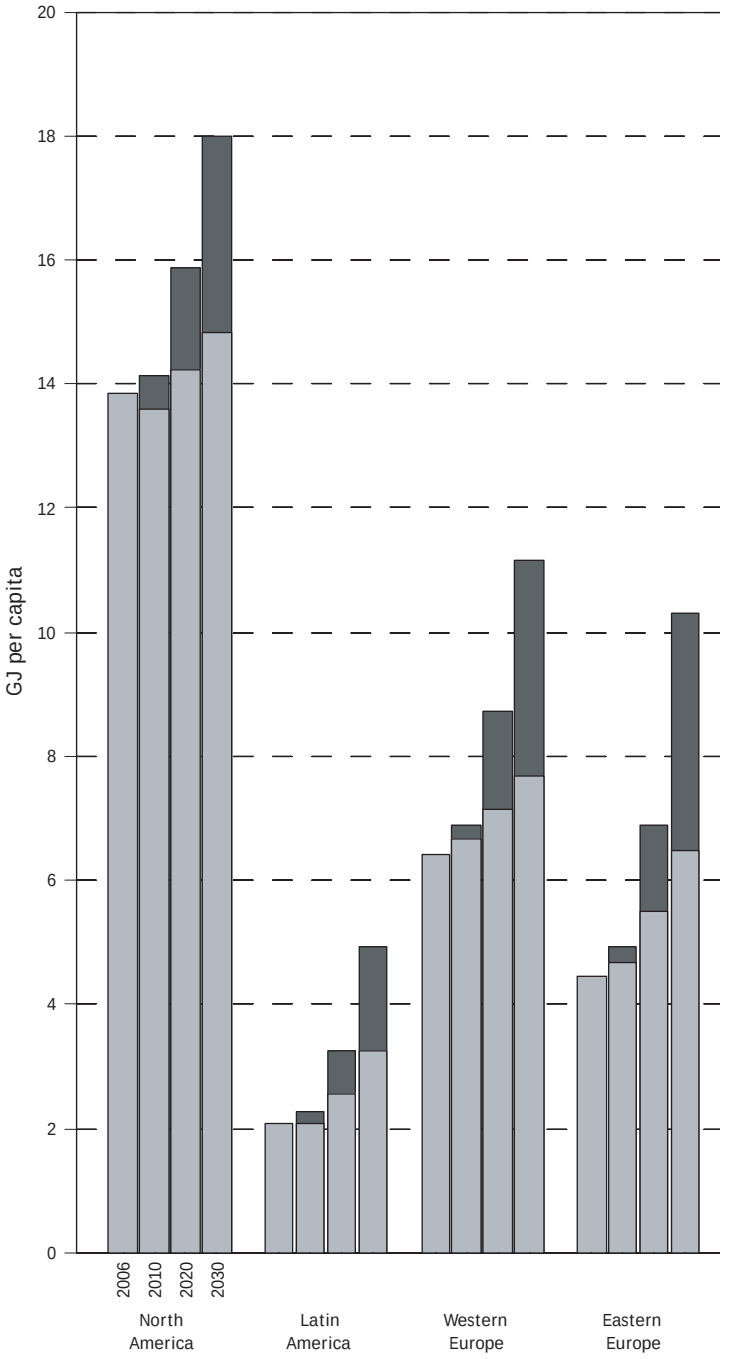


FIGURE 9. TOTAL ELECTRICITY REQUIREMENT PER CAPITA

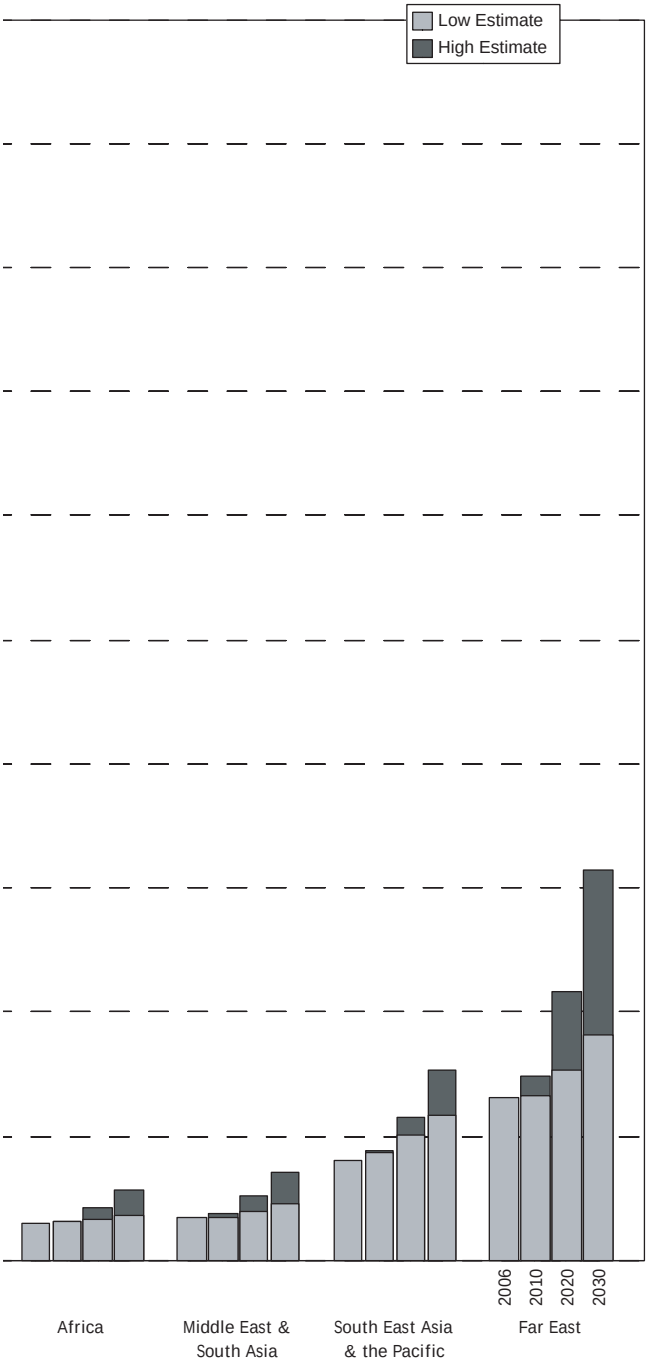

Low Estimate
High Estimate
2006
2010
2020
2030
Africa
Middle East & South Asia
South East Asia & the Pacific
Far East

TABLE 12. AVERAGE ANNUAL GROWTH RATES DURING THE PERIOD 1996—2006 (%)

Country Group	Population	Total Energy	Total Electricity	Nuclear Energy	Nuclear Capacity
North America	1.1	0.6	1.5	1.5	-0.4
Latin America	1.5	2.2	3.7	6.0	3.9
Western Europe	0.5	1.1	1.8	0.5	-0.1
Eastern Europe	-0.2	0.7	1.4	2.0	0.5
Africa	2.2	5.9	4.0	-1.5	0.0
Middle East and South Asia	2.1	4.1	5.2	8.9	7.9
South East Asia and the Pacific	1.4	2.3	3.9		
Far East	0.9	3.9	6.5	2.3	2.6
World Average	1.4	2.2	3.2	1.4	0.5

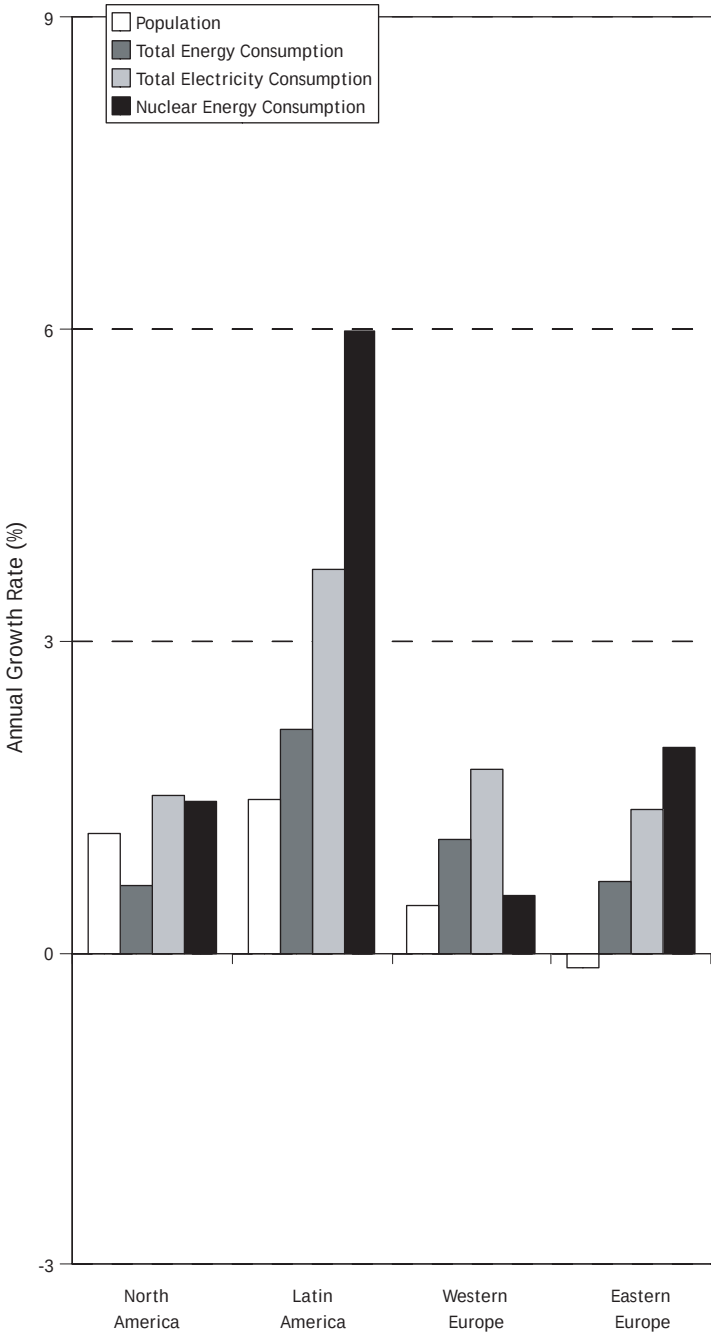


FIGURE 10. AVERAGE ANNUAL GROWTH RATES DURING THE PERIOD 1996—2006

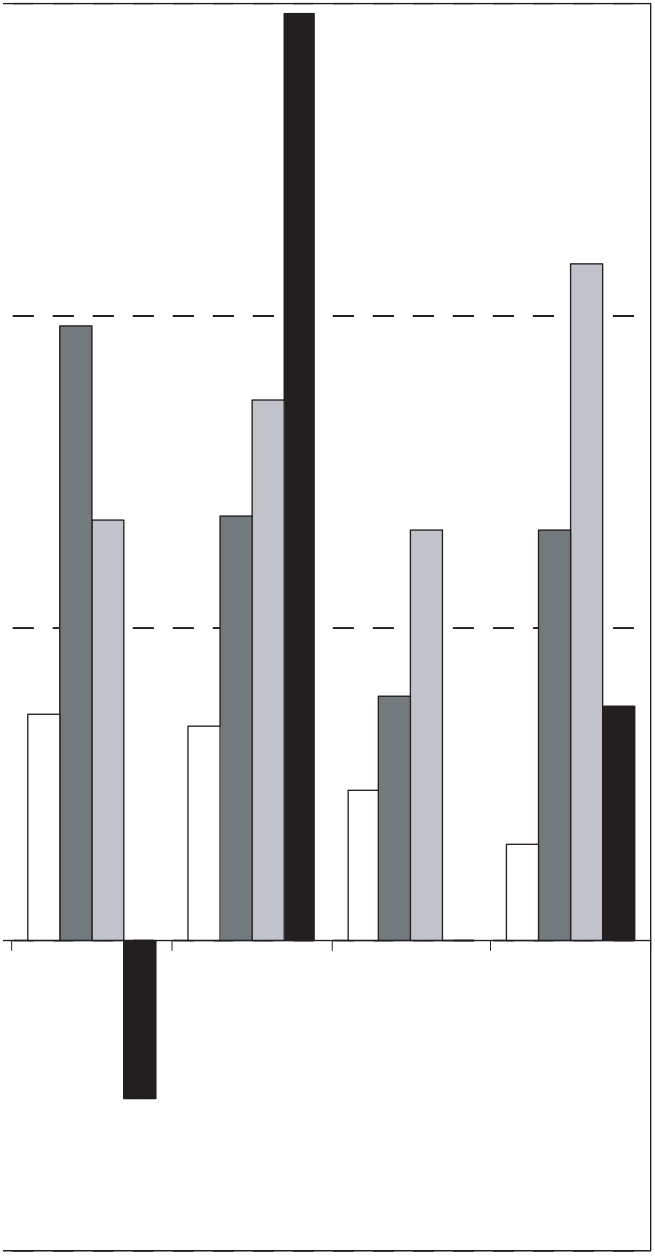

Africa
Middle East &
South Asia
South East Asia
& the Pacific
Far East

TABLE 13. ESTIMATES OF AVERAGE ANNUAL GROWTH RATES DURING THE PERIOD 2006—2030 (%)

Country Group	Population	Total Energy	Total Electricity	Nuclear Energy	Nuclear Capacity
North America	0.8	0.7 — 1.4	1.1 — 1.9	0.7 — 1.8	0.6 — 1.7
Latin America	1.0	2.3 — 4.0	2.9 — 4.7	3.2 — 6.8	3.0 — 6.6
Western Europe	0.2	0.6 — 1.2	0.9 — 2.5	-2.0 — 1.1	-2.3 — 0.8
Eastern Europe	-0.3	1.2 — 2.3	1.3 — 3.3	2.4 — 3.7	2.3 — 3.6
Africa	1.8	1.9 — 3.0	2.5 — 4.5	4.0 — 9.8	2.3 — 8.0
Middle East and South Asia	1.3	2.5 — 3.7	2.6 — 4.4	8.8 — 12.4	7.1 — 10.8
South East Asia and the Pacific	0.8	2.1 — 3.4	2.4 — 3.6		
Far East	0.4	2.0 — 3.4	1.8 — 4.2	2.5 — 3.8	2.3 — 3.5
World Average	0.9	1.5 — 2.6	1.6 — 3.3	0.9 — 2.8	0.8 — 2.6

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