

Data Table 12.1 Commercial Energy Production, 1973–93

	Primary Electricity (a)													
	Total		Solid		Liquid		Gas		Geothermal & Wind		Hydro		Nuclear	
	Peta-	% Change	Peta-	% Change	Peta-	% Change	Peta-	% Change	Peta-	% Change	Peta-	% Change	Peta-	% Change
	joules 1993	Since 1973	joules 1993	Since 1973	joules 1993	Since 1973	joules 1993	Since 1973	joules 1993	Since 1973	joules 1993	Since 1973	joules 1993	Since 1973
WORLD	337,518	40	91,748	36	134,060	11	78,146	72	1,463	641	8,554	86	23,646	1,365
AFRICA	21,308	50	4,259	155	13,835	14	2,941	797	13	X	182	68	79	X
Algeria	4,584	99	1	162	2,481	16	2,102	1,190	0	X	1	(27)	0	X
Angola	1,066	207	0	X	1,055	209	7	175	0	X	5	102	0	X
Benin	13	X	0	X	13	X	0	X	0	X	0	X	0	X
Botswana	X	X	0	X	X	X	0	X	0	X	0	X	0	X
Burkina Faso	X	X	0	X	X	X	0	X	0	X	0	X	0	X
Burundi	1	3,312	0	X	X	X	0	X	0	X	0	X	0	X
Cameroon	270	6,879	0	X	260	X	0	X	0	X	10	145	0	X
Central African Rep	0	X	0	X	X	X	0	X	0	X	0	74	0	X
Chad	X	X	0	X	X	X	0	X	0	X	0	X	0	X
Congo	365	313	0	X	363	315	0	X	0	X	2	550	0	X
Cote d'Ivoire	18	2,880	0	X	14	X	0	X	0	X	4	385	0	X
Egypt	2,435	546	0	X	2,028	471	376	10,960	0	X	31	66	0	X
Equatorial Guinea	0	X	0	X	X	X	0	X	0	X	0	20	0	X
Eritrea	X	X	0	X	X	X	0	X	0	X	0	X	0	X
Ethiopia	7	494	0	X	X	X	0	X	3	X	4	269	0	X
Gabon	637	89	0	X	631	98	4	(78)	0	X	3	14,100	0	X
Gambia, The	X	X	0	X	X	X	0	X	0	X	0	X	0	X
Ghana	22	58	0	X	0	X	0	X	0	X	22	84	0	X
Guinea	1	256	0	X	X	X	0	X	0	X	1	151	0	X
Guinea-Bissau	X	X	0	X	X	X	0	X	0	X	0	X	0	X
Kenya	21	1,328	0	X	X	X	0	X	10	X	11	646	0	X
Lesotho	X	X	0	X	X	X	0	X	0	X	0	X	0	X
Liberia	1	(7)	0	X	X	X	0	X	0	X	1	(34)	0	X
Libya	3,054	(33)	0	X	2,806	(37)	248	107	0	X	0	X	0	X
Madagascar	1	71	0	X	X	X	0	X	0	X	1	145	0	X
Malawi	3	341	0	X	X	X	0	X	0	X	3	364	0	X
Mali	1	694	0	X	X	X	0	X	0	X	1	506	0	X
Mauritania	0	X	0	X	X	X	0	X	0	X	0	X	0	X
Mauritius	0	X	0	X	X	X	0	X	0	X	0	52	0	X
Morocco	21	(8)	18	29	0	X	1	(63)	0	X	2	(73)	0	X
Mozambique	1	(90)	1	(90)	X	X	0	X	0	X	0	(82)	0	X
Namibia	X	X	0	X	X	X	0	X	0	X	0	X	0	X
Niger	5	X	5	X	X	X	0	X	0	X	0	X	0	X
Nigeria	4,140	(3)	3	(63)	3,935	(8)	191	1,513	0	X	12	121	0	X
Rwanda	1	112	0	X	X	X	0	X	0	X	1	89	0	X
Senegal	X	X	0	X	X	X	0	X	0	X	0	X	0	X
Sierra Leone	X	X	0	X	X	X	0	X	0	X	0	X	0	X
Somalia	X	X	0	X	X	X	0	X	0	X	0	X	0	X
South Africa (b)	4,146	169	4,064	164	X	X	0	X	0	X	3	(1)	79	X
Sudan	3	316	0	X	X	X	0	X	0	X	3	836	0	X
Swaziland	X	X	0	X	X	X	0	X	0	X	0	X	0	X
Tanzania	2	78	0	X	X	X	0	X	0	X	2	95	0	X
Togo	0	X	0	X	X	X	0	X	0	X	0	50	0	X
Tunisia	209	24	0	X	196	21	13	144	0	X	0	21	0	X
Uganda	3	1	0	X	X	X	0	X	0	X	3	(6)	0	X
Zaire	78	365	3	(7)	54	X	0	X	0	X	22	75	0	X
Zambia	38	11	10	(57)	X	X	0	X	0	X	28	154	0	X
Zimbabwe	160	79	154	122	X	X	0	X	0	X	6	(68)	0	X
EUROPE	92,937	192	22,091	6	25,700	1,451	30,702	335	167	79	2,551	95	11,855	1,515
Albania	44	(61)	5	(58)	23	(74)	4	(46)	0	X	12	270	0	X
Austria	263	(18)	18	(66)	50	(54)	57	(38)	0	X	137	X	0	X
Belarus, Rep	122	X	28	X	84	X	10	X	0	X	0	X	0	X
Belgium	470	110	10	(95)	X	X	0	X	0	X	4	76	457	419,177
Bosnia and Herzegovina	14	X	0	X	X	X	0	X	0	X	14	X	0	X
Bulgaria	376	(11)	212	(47)	2	(75)	2	(74)	0	X	7	(7)	152	X
Croatia, Rep	179	X	3	X	90	X	70	X	0	X	16	X	0	X
Czech Rep	1,439	X	1,283	X	5	X	8	X	0	X	6	139	138	X
Denmark	525	17,831	0	X	346	12,071	175	X	4	X	0	14	0	X
Estonia, Rep	121	X	121	X	X	X	0	X	0	X	0	X	0	X
Finland	324	690	59	1,578	X	X	0	X	0	X	49	33	217	X
France	4,746	237	263	(62)	136	52	94	(68)	0	X	244	38	4,017	2,423
Germany	6,178	X	3,675	X	128	X	626	X	4	X	77	X	1,674	X
Greece	352	75	315	63	24	X	4	X	0	X	9	(5)	0	X
Hungary	533	(24)	133	(69)	87	(2)	163	(8)	0	X	1	56	151	X
Iceland	25	186	0	X	X	X	0	X	9	1,027	16	161	0	X
Ireland	152	170	48	(10)	X	X	100	X	1	X	4	54	0	X
Italy	1,226	35	11	(42)	194	318	730	24	132	42	160	8	0	X
Latvia, Rep	14	X	3	X	X	X	0	X	0	X	10	X	0	X
Lithuania, Rep	138	X	0	X	3	X	0	X	0	X	1	X	134	X
Macedonia, former Yugoslav Rep	86	X	82	X	X	X	0	X	0	X	3	X	0	X
Moldova, Rep	1	X	0	X	X	X	0	X	0	X	1	X	0	X
Netherlands	3,112	19	0	X	138	111	2,930	17	6	X	0	X	43	1,111
Norway	6,365	1,778	8	(22)	4,801	7,139	1,127	X	0	X	430	77	0	X
Poland, Rep	3,878	(17)	3,719	(16)	10	(45)	137	(30)	0	X	13	85	0	X
Portugal	35	10	3	(45)	X	X	0	X	1	X	31	23	0	X
Romania	1,345	(40)	318	(27)	279	(53)	702	(40)	0	X	46	74	0	X
Russian Federation	43,550	X	6,309	X	14,815	X	20,497	X	1	X	631	X	1,300	X
Slovak Rep	186	X	44	X	3	X	8	X	0	X	11	X	120	X
Slovenia, Rep	86	X	31	X	0	X	0	X	0	X	11	X	43	X
Spain	1,204	142	427	47	47	47	27	45,963	0	X	93	(29)	612	1,080
Sweden	950	298	10	3,312	0	X	0	X	2	X	271	40	670	4,088
Switzerland	386	136	0	X	X	X	0	X	0	X	132	51	255	550
Ukraine	4,501	X	2,802	X	178	X	662	X	0	X	40	X	821	X
United Kingdom	9,663	105	1,922	(41)	4,210	25,370	2,537	125	8	X	20	63	975	204
Yugoslavia, Fed Rep	347	X	230	X	48	X	33	X	0	X	36	X	0	X

Data Table 12.1 continued

	Total		Solid		Liquid		Gas		Primary Electricity (a)					
	Peta-joules		Peta-joules		Peta-joules		Peta-joules		Geothermal & Wind		Hydro		Nuclear	
	1993	% Change Since 1973	1993	% Change Since 1973	1993	% Change Since 1973	1993	% Change Since 1973	1993	% Change Since 1973	1993	% Change Since 1973	1993	% Change Since 1973
NORTH & CENTRAL AMERICA	87,427	27	21,948	59	28,029	3	26,454	(1)	947	1,709	2,307	41	7,746	1,068
Belize	X	X	0	X	X	X	0	X	0	X	0	X	0	X
Canada	13,195	60	1,571	271	4,162	(1)	5,263	88	1	X	1,165	80	1,034	1,307
Costa Rica	14	242	0	X	X	X	0	X	0	X	14	259	0	X
Cuba	43	556	0	X	41	610	1	80	0	X	0	43	0	X
Dominican Rep	6	2,744	0	X	X	X	0	X	0	X	6	2,361	0	X
El Salvador	21	1,227	0	X	X	X	0	X	15	X	6	319	0	X
Guatemala	22	1,820	0	X	15	X	0	X	0	X	7	543	0	X
Haiti	1	153	0	X	X	X	0	X	0	X	1	136	0	X
Honduras	8	519	0	X	X	X	0	X	0	X	8	646	0	X
Jamaica	0	X	0	X	X	X	0	X	0	X	0	(36)	0	X
Mexico	8,067	362	160	52	6,548	510	977	95	237	658,233	94	69	52	X
Nicaragua	20	1,636	0	X	X	X	0	X	19	X	1	(5)	0	X
Panama	8	X	0	X	X	X	0	X	0	X	8	X	0	X
Trinidad and Tobago	470	7	0	X	268	(27)	202	186	0	X	0	X	0	X
United States	65,547	9	20,218	52	16,992	(21)	20,008	(15)	675	1,191	995	0	6,659	1,030
SOUTH AMERICA	15,355	35	844	360	10,468	5	2,475	170	0	X	1,478	416	89	X
Argentina	2,411	105	4	(64)	1,311	43	925	296	0	X	87	1,506	85	X
Bolivia	164	8	0	X	52	(44)	107	88	0	X	5	96	0	X
Brazil	2,491	296	85	42	1,382	291	173	2,144	0	X	845	357	5	X
Chile	222	26	47	35	44	(42)	67	45	0	X	63	237	0	X
Colombia	1,812	208	591	685	971	137	149	99	0	X	101	281	0	X
Ecuador	784	75	0	X	758	70	5	271	0	X	21	1,219	0	X
Guyana	0	X	0	X	X	X	0	X	0	X	0	X	0	X
Paraguay	113	10,267	0	X	X	X	0	X	0	X	113	16,241	0	X
Peru	325	79	2	153	264	77	18	27	0	X	41	152	0	X
Suriname	15	318	0	X	11	X	0	X	0	X	4	(2)	0	X
Uruguay	26	364	0	X	X	X	0	X	0	X	26	634	0	X
Venezuela	6,990	(13)	114	9,161	5,674	(24)	1,031	115	0	X	171	683	0	X
ASIA	113,332	67	37,897	162	54,936	8	14,412	671	337	3,675	1,894	190	3,835	3,180
Afghanistan, Islamic State	9	(92)	0	X	0	X	7	(93)	0	X	2	4	0	X
Armenia	11	X	0	X	X	X	0	X	0	X	11	X	0	X
Azerbaijan	714	X	0	X	474	X	231	X	0	X	9	X	0	X
Bangladesh	217	744	0	X	5	2,337	209	759	0	X	3	343	0	X
Bhutan	6	28,471	0	X	X	X	0	X	0	X	6	27,671	0	X
Cambodia	0	X	0	X	X	X	0	X	0	X	0	X	0	X
China	31,359	143	24,045	133	6,080	171	661	184	0	X	546	427	27	X
Georgia, Rep	28	X	0	X	4	X	0	X	0	X	23	X	0	X
India	8,088	233	6,141	211	1,158	284	460	1,838	2	X	254	160	74	500
Indonesia	7,145	148	808	21,781	4,192	50	2,062	3,127	39	X	44	850	0	X
Iran, Islamic Rep	8,448	(35)	43	66	7,310	(41)	1,056	49	0	X	40	212	0	X
Iraq	1,476	(65)	0	X	1,374	(67)	99	110	0	X	2	200	0	X
Israel	1	X	0	X	0	X	1	(48)	0	X	0	X	0	X
Japan	3,466	224	186	(66)	32	25	90	(22)	65	628	380	20	2,719	2,529
Jordan	0	X	0	X	0	X	0	X	0	X	0	X	0	X
Kazakhstan, Rep	4,025	X	2,809	X	961	X	227	X	0	X	27	X	0	X
Korea, Dem People's Rep	2,671	201	2,585	206	X	X	0	X	0	X	86	100	X	X
Korea, Rep	832	145	178	(47)	X	X	0	X	0	X	22	339	634	X
Kuwait	4,329	(34)	0	X	4,155	(36)	174	60	0	X	0	X	0	X
Kyrgyz Rep	66	X	29	X	4	X	1	X	0	X	32	X	0	X
Lao People's Dem Rep	3	248	0	X	X	X	0	X	0	X	3	286	0	X
Lebanon	1	(42)	0	X	X	X	0	X	0	X	1	(55)	0	X
Malaysia	2,167	1,038	8	X	1,307	619	835	17,932	0	X	18	327	0	X
Mongolia	84	138	84	138	X	X	0	X	0	X	0	X	0	X
Myanmar	75	58	1	327	30	(27)	38	853	0	X	5	166	0	X
Nepal	3	934	0	X	X	X	0	X	0	X	3	943	0	X
Oman	1,720	181	0	X	1,621	165	98	X	0	X	0	X	0	X
Pakistan	766	311	61	116	127	818	496	295	0	X	77	485	5	333
Philippines	276	2,801	33	3,312	21	X	0	X	207	X	15	93	0	X
Saudi Arabia	19,171	20	0	X	17,770	11	1,401	7,187	0	X	0	X	0	X
Singapore	X	X	0	X	X	X	0	X	0	X	0	X	0	X
Sri Lanka	14	449	0	X	X	X	0	X	0	X	14	344	0	X
Syrian Arab Rep	1,234	432	0	X	1,134	389	76	X	0	X	24	10,731	0	X
Tajikistan, Rep	70	X	5	X	2	X	2	X	0	X	62	X	0	X
Thailand	678	5,396	170	3,105	155	58,664	339	X	0	X	13	114	0	X
Turkey	779	119	484	144	163	11	7	X	3	X	122	958	0	X
Turkmenistan, Rep	2,430	X	0	X	211	X	2,219	X	0	X	0	X	0	X
United Arab Emirates	5,273	68	0	X	4,378	41	895	2,600	0	X	0	X	0	X
Uzbekistan, Rep	X	X	45	X	170	X	1,529	X	0	X	26	X	0	X
Viet Nam	489	549	173	134	264	X	0	X	22	X	30	1,870	0	X
Yemen, Rep	X	X	0	X	480	X	0	X	0	X	0	X	0	X
OCEANIA	7,159	144	4,707	162	1,091	28	1,162	718	57	35	141	48	0	X
Australia	6,658	141	4,634	167	1,006	19	959	627	0	X	61	42	0	X
Fiji	1	X	0	X	X	X	0	X	0	X	1	X	0	X
New Zealand	496	193	74	24	85	1,150	203	1,873	57	36	77	51	0	X
Papua New Guinea	2	251	0	X	X	X	0	X	0	X	2	211	0	X
Solomon Islands	X	X	0	X	X	X	0	X	0	X	0	X	0	X

Source: United Nations Statistical Division.

Notes: a. The production of primary electricity was assessed at the equivalent of 100 percent efficiency for hydroelectric and wind generation (at the heat value of electricity).

1 kilowatt hour = 3.6 million joules, at 33 percent efficiency for nuclear power generation, and at 10 percent efficiency for geothermal generation.

b. Data are for the South Africa Customs Union (Botswana, Lesotho, Namibia, South Africa, and Swaziland).

1 petajoule = 1,000,000,000,000 joules = 947,800,000,000 Btus = 163,400 "U.N. standard" barrels of oil = 34,140 "U.N. standard" metric tons of coal.

World and regional totals include countries not listed. 0 = zero or less than half of the unit of measure; X = not available or indeterminate; negative numbers are shown in parentheses.

For additional information, see Sources and Technical Notes.

Data Table 12.2 Energy Consumption, 1973–93

	Commercial Energy Consumption								Traditional Fuels					
	Total		Per Capita		Per Constant		Imports as a % of Consumption		Total		Per Capita		% of Total Consumption	
	Peta- joules	% Change	Giga- joules	% Change	Mega- joules	% Change			Peta- joules	% Change	Mega- joules	% Change		
	1993	Since 1973	1993	Since 1973	1993	Since 1973			1993	Since 1973	1993	Since 1973	1993	1973
WORLD	325,296	49	59	6	X	X	X	X	19,926	47	3,594	4	6	6
AFRICA	8,805	144	13	41	X	X	(280)	(134)	4,815	76	6,991	0	35	43
Algeria	1,183	387	44	173	18	144	(858)	(274)	19	64	714	(8)	2	5
Angola	26	(30)	3	(51)	X	X	(795)	(3,835)	56	(12)	5,455	(50)	68	63
Benin	7	27	1	(48)	4	(28)	103	(71)	48	67	9,482	(5)	87	84
Botswana	X	X	X	X	0	X	X	X	13	102	9,420	2	100	100
Burkina Faso	8	237	1	150	3	57	100	100	85	62	8,652	(2)	91	96
Burundi	3	241	0	X	2	77	103	100	44	60	7,222	(4)	94	97
Cameroon	36	138	3	41	4	17	90	(639)	114	72	9,130	(2)	76	81
Central African Rep	3	18	1	(23)	3	(2)	97	133	34	67	10,694	4	92	89
Chad	1	(55)	0	X	1	(71)	153	200	35	55	5,900	(0)	97	91
Congo	24	331	10	146	10	67	(1,009)	(1,379)	22	77	8,945	(1)	48	69
Cote d'Ivoire	109	195	8	35	11	115	117	119	103	111	7,723	(1)	49	57
Egypt	1,226	337	20	149	30	36	(25)	(84)	45	59	752	(2)	4	9
Equatorial Guinea	2	184	5	80	13	X	54	100	4	20	11,522	(20)	69	84
Eritrea	X	X	X	X	X	X	X	X	0	X	0	X	X	X
Ethiopia	45	104	1	X	X	X	108	93	414	84	7,984	9	90	91
Gabon	32	(11)	26	(59)	7	(52)	(823)	(1,859)	26	138	21,166	10	45	24
Gambia, The	3	241	3	75	10	59	97	100	9	27	8,579	(38)	75	89
Ghana	67	55	4	(13)	10	10	83	75	152	101	9,213	15	69	64
Guinea	15	35	2	(27)	6	X	98	100	35	43	5,594	(8)	70	69
Guinea-Bissau	3	105	3	18	13	6	100	100	4	11	4,012	(38)	58	72
Kenya	90	87	3	(20)	10	(14)	160	97	344	84	13,049	(11)	79	80
Lesotho	X	X	X	X	0	X	X	X	6	168	3,338	56	100	100
Liberia	5	(74)	2	(84)	X	X	96	100	48	56	17,045	(17)	91	62
Libya	457	722	91	268	X	X	(8,069)	(562)	5	18	1,037	(47)	1	7
Madagascar	15	1	1	(51)	5	(10)	128	93	76	56	5,483	(17)	84	77
Malawi	11	58	1	(29)	8	(20)	93	82	133	198	12,596	39	92	86
Mali	7	96	1	65	3	12	102	100	54	68	5,279	(2)	88	90
Mauritania	39	508	18	267	37	297	105	118	0	58	37	(4)	0	1
Mauritius	21	123	19	74	8	(20)	125	143	17	(13)	15,392	(31)	44	67
Morocco	297	166	11	63	13	19	88	108	14	147	529	57	4	5
Mozambique	14	(63)	1	(74)	7	X	101	114	147	57	9,758	4	91	71
Namibia	X	X	X	X	0	X	X	X	0	X	0	X	X	X
Niger	15	255	2	114	6	175	100	67	47	83	5,484	(3)	76	86
Nigeria	705	420	7	221	19	220	(3,066)	(481)	1,010	82	9,590	3	59	80
Rwanda	7	387	1	186	3	154	71	100	53	16	6,986	(37)	88	97
Senegal	38	112	5	26	8	28	356	126	49	75	6,257	1	57	61
Sierra Leone	6	(46)	1	(75)	10	(59)	84	233	30	49	6,903	(2)	83	64
Somalia	X	X	X	X	X	X	106	X	71	143	7,975	39	100	89
South Africa (a)	3,578	X	79	X	42	X	X	(15)	131	13	3,314	(31)	4	100
Sudan	48	(40)	2	(63)	X	X	101	110	220	78	8,261	1	82	61
Swaziland	X	X	X	X	0	X	0	X	18	111	22,852	19	100	66
Tanzania	30	(21)	1	(61)	6	(56)	112	100	330	135	11,769	25	92	79
Togo	9	92	2	(7)	8	61	102	100	10	139	2,665	34	53	48
Tunisia	218	264	25	125	18	42	(147)	7	31	55	3,593	(2)	12	25
Uganda	16	(5)	1	(37)	2	X	89	81	137	85	6,870	(2)	90	81
Zaire	73	45	2	(15)	X	X	84	4	365	70	8,854	(9)	83	81
Zambia	51	(18)	6	(56)	22	(32)	64	33	130	91	14,536	(2)	72	52
Zimbabwe	208	67	19	(12)	32	1	18	25	70	57	6,513	(16)	25	26
EUROPE	108,523	90	148	73	X	X	59	18	552	(14)	761	(21)	1	1
Albania	43	(11)	13	(38)	X	X	(38)	37	15	(3)	4,485	(34)	26	25
Austria	966	16	123	12	7	(26)	67	75	30	191	3,766	179	3	1
Belarus, Rep	1,249	X	123	X	58	X	X	91	X	X	X	X	X	X
Belgium	1,976	14	197	X	12	(22)	105	90	6	40	557	36	0	0
Bosnia and Herzegovina	29	X	8	X	X	X	X	52	X	X	X	X	X	X
Bulgaria	965	(6)	109	(9)	45	X	63	70	13	29	1,448	26	1	1
Croatia, Rep	263	X	58	X	X	X	43	0	X	0	X	X	0	X
Czech Rep	1,659	X	161	X	54	X	X	18	0	X	0	X	0	X
Denmark	762	(1)	148	(3)	7	(30)	110	31	5	1,178	943	1,141	1	0
Estonia, Rep	214	X	138	X	1	X	X	45	0	X	0	X	0	X
Finland	1,014	54	200	42	12	9	104	63	30	(56)	5,892	(59)	3	9
France	9,153	36	159	23	9	(9)	91	53	101	(2)	1,757	(12)	1	2
Germany	13,724	2	170	X	9	(39)	0	57	0	X	0	X	0	0
Greece	989	123	95	91	19	47	118	74	13	(29)	1,274	(39)	1	4
Hungary	990	3	97	5	47	(16)	41	53	24	(1)	2,319	1	2	2
Iceland	54	68	205	35	10	(10)	87	54	0	X	0	X	0	0
Ireland	428	62	121	40	10	(27)	88	67	0	72	139	50	0	0
Italy	6,749	40	118	34	8	(14)	100	74	48	31	848	26	1	1
Latvia, Rep	187	X	72	X	30	X	X	84	X	X	X	X	X	X
Lithuania, Rep	368	X	99	X	83	X	X	62	X	X	X	X	X	X
Macedonia, former Yugoslav Rep	139	X	66	X	X	X	X	45	0	X	0	X	0	X
Moldova, Rep	234	X	53	X	59	X	X	102	X	X	X	X	X	X
Netherlands	3,306	44	216	26	13	(4)	29	13	2	(250)	150	(232)	0	(0)
Norway	904	61	210	48	10	(20)	54	(588)	9	73	2,198	60	1	1
Poland, Rep	4,056	8	106	(6)	69	X	(12)	4	X	X	X	X	X	X
Portugal	603	140	61	119	12	41	100	106	6	31	573	20	1	2
Romania	1,762	(20)	77	(27)	70	X	4	30	19	(66)	841	(69)	1	3
Russian Federation	30,042	X	203	X	102	X	X	(40)	0	X	0	X	0	X
Slovak Rep	672	X	126	X	53	X	X	74	0	X	0	X	0	X
Slovenia, Rep	194	X	100	X	X	X	X	56	X	X	X	X	X	X
Spain	3,359	72	85	52	10	9	89	78	18	(53)	466	(58)	1	2
Sweden	1,660	20	191	12	10	(8)	89	46	122	(4)	14,062	(10)	7	8
Switzerland	985	34	139	20	5	8	82	57	14	103	2,052	81	1	1
Ukraine	8,058	X	156	X	105	X	X	46	0	X	0	X	0	X
United Kingdom	9,518	10	164	7	13	(21)	53	1	4	27	72	23	0	0
Yugoslavia, Fed Rep	381	X	36	X	X	X	X	17	X	X	X	X	X	X

	Commercial Energy Consumption								Traditional Fuels					
	Total		Per Capita		Per Constant		Imports as a % of Consumption		Total		Per Capita		% of Total Consumption	
	Peta- joules	% Change	Giga- joules	% Change	Mega- joules	% Change			Peta- joules	% Change	Mega- joules	% Change		
	1993	Since 1973	1993	Since 1973	1993	Since 1973			1993	Since 1973	1993	Since 1973		
NORTH & CENTRAL AMERICA	97,154	19	220	(10)	X	X	14	11	1,825	106	4,130	53	2	1
Belize	4	92	20	20	9	(39)	115	100	4	53	18,789	(3)	49	55
Canada	9,198	47	319	12	21	(15)	(26)	(43)	67	96	2,326	53	1	1
Costa Rica	63	115	19	21	10	4	90	79	35	(24)	10,784	(56)	36	61
Cuba	369	26	34	5	X	X	103	96	205	31	18,848	8	36	35
Dominican Rep	148	101	20	30	24	(1)	105	96	25	(25)	3,360	(53)	15	32
El Salvador	72	170	13	90	13	97	99	74	39	5	7,050	(26)	35	58
Guatemala	72	88	7	4	8	6	107	89	104	89	10,335	7	59	59
Haiti	9	64	1	(13)	11	55	97	100	57	35	8,213	(7)	86	88
Honduras	43	120	8	18	8	7	111	81	58	89	10,897	0	57	61
Jamaica	104	(5)	43	(23)	29	(13)	109	100	6	(32)	2,493	(45)	5	7
Mexico	4,941	155	55	66	30	30	15	(57)	248	48	2,755	(9)	5	8
Nicaragua	52	112	13	20	15	165	106	67	39	78	9,450	(2)	43	47
Panama	61	X	24	X	10	9,449	0	89	16	3	6,366	(34)	21	98
Trinidad and Tobago	267	100	209	56	58	55	(164)	(78)	3	(42)	2,210	(55)	1	4
United States	81,751	13	317	(7)	16	(28)	18	21	916	297	3,553	226	1	0
SOUTH AMERICA	10,095	94	33	30	X	X	(104)	(43)	2,748	26	8,888	(17)	21	30
Argentina	2,019	56	60	17	16	14	16	(9)	116	0	3,421	(25)	5	8
Bolivia	86	140	12	56	16	64	(328)	(92)	19	55	2,723	(0)	18	26
Brazil	3,800	120	24	43	13	14	83	46	2,021	20	12,912	(21)	35	49
Chile	539	61	39	17	17	(31)	45	62	84	72	6,050	24	13	13
Colombia	829	95	24	29	18	(11)	(29)	(117)	235	81	6,927	22	22	23
Ecuador	245	305	22	141	18	93	(624)	(208)	74	67	6,757	(1)	23	42
Guyana	15	(38)	18	(46)	38	(38)	102	100	4	(39)	5,355	(46)	23	23
Paraguay	51	350	11	146	11	64	95	(131)	55	59	11,699	(14)	52	75
Peru	314	30	14	(17)	2,276	3	34	(3)	88	7	3,828	(33)	22	25
Suriname	24	(24)	58	(32)	17	(29)	89	75	1	349	2,959	302	5	1
Uruguay	77	(1)	24	(13)	10	(32)	101	69	28	109	8,948	87	27	15
Venezuela	2,083	125	100	27	36	51	(735)	(226)	22	32	1,046	(25)	1	2
ASIA	95,679	185	28	92	X	X	(83)	(9)	9,009	47	2,690	1	9	15
Afghanistan, Islamic State	22	1	1	(32)	X	X	(394)	64	51	31	2,863	9	70	64
Armenia	49	X	14	X	22	X	X	96	0	X	0	X	0	X
Azerbaijan	546	X	74	X	134	X	X	23	0	X	0	X	0	X
Bangladesh	313	417	3	259	14	113	72	33	277	27	2,401	(20)	47	78
Bhutan	2	3,312	1	1,783	6	X	100	(150)	12	79	7,345	21	85	99
Cambodia	7	443	1	456	5	X	100	100	54	21	5,560	(11)	88	97
China	29,679	179	25	110	69	(43)	(1)	(2)	2,018	54	1,687	15	6	11
Georgia, Rep	159	X	29	X	51	X	X	91	X	X	X	X	X	X
India	9,338	258	10	128	27	46	26	21	2,824	58	3,132	4	23	41
Indonesia	2,658	394	14	237	24	46	(418)	(125)	1,465	54	7,642	4	36	64
Iran, Islamic Rep	3,264	227	51	60	18	X	(1,171)	(164)	29	95	446	(5)	1	1
Iraq	933	357	48	142	X	X	(1,949)	(24)	1	(13)	53	(54)	0	1
Israel	505	148	96	54	10	9	50	118	0	0	24	(38)	0	0
Japan	17,505	41	141	24	6	(30)	103	87	10	(37)	78	(45)	0	0
Jordan	147	509	30	104	22	X	119	109	0	108	16	5	0	0
Kazakhstan, Rep	3,381	X	199	X	167	X	X	(16)	0	X	0	X	0	X
Korea, Dem People's Rep	2,925	168	127	84	X	X	4	8	40	33	1,753	(8)	1	3
Korea, Rep	4,504	452	102	325	21	8	71	98	26	(83)	584	(87)	1	16
Kuwait	471	241	265	71	X	X	(4,440)	(798)	0	X	0	X	0	0
Kyrgyz Rep	150	X	33	X	49	X	X	57	0	X	0	X	0	X
Lao People's Dem Rep	5	(32)	1	(61)	3	X	88	40	39	35	8,366	(15)	89	79
Lebanon	121	35	43	29	X	X	113	101	5	9	1,653	5	4	5
Malaysia	996	401	52	206	25	34	11	(114)	90	61	4,686	(3)	8	22
Mongolia	105	170	45	58	X	X	36	19	13	0	5,689	(41)	11	25
Myanmar	71	73	2	41	6	(11)	11	3	193	48	4,324	(4)	73	76
Nepal	19	239	1	121	6	55	91	84	206	88	9,882	12	92	95
Oman	162	3,905	81	1,324	14	704	(13,764)	(957)	0	X	0	X	0	0
Pakistan	1,135	286	9	118	25	24	46	36	296	101	2,228	8	21	33
Philippines	787	97	12	22	20	12	93	84	382	44	5,892	(9)	33	40
Saudi Arabia	2,933	2,037	171	718	X	X	(10,943)	0	0	X	0	X	0	0
Singapore	745	184	267	123	22	(31)	201	202	0	X	0	X	0	0
Sri Lanka	78	71	4	15	9	(33)	159	113	89	45	4,996	6	53	58
Syrian Arab Rep	565	626	41	266	X	X	(168)	(105)	0	8	9	(45)	0	0
Tajikistan, Rep	258	X	45	X	126	X	X	75	0	X	0	X	0	X
Thailand	1,628	426	28	254	18	23	109	63	526	75	9,141	19	24	49
Turkey	1,979	189	33	84	18	13	53	67	96	(63)	1,606	(76)	5	27
Turkmenistan, Rep	555	X	142	X	X	X	X	(327)	X	X	X	X	X	X
United Arab Emirates	1,039	1,992	572	313	X	X	(6,199)	(364)	0	X	0	X	0	0
Uzbekistan, Rep	1,903	X	87	X	132	X	X	(13)	0	X	0	X	0	X
Viet Nam	316	(3)	4	(44)	6	X	73	(48)	251	54	3,516	(1)	44	33
Yemen, Rep	X	X	X	X	X	X	100	X	X	X	X	X	X	X
OCEANIA	4,595	93	166	44	X	X	1	(61)	185	16	6,693	(14)	4	6
Australia	3,917	99	222	53	16	15	(16)	(77)	109	6	6,191	(19)	3	5
Fiji	11	35	15	2	14	(16)	175	109	12	54	15,606	12	52	48
New Zealand	565	76	162	49	14	29	54	15	0	(80)	140	(83)	0	1
Papua New Guinea	33	72	8	9	7	(3)	101	97	60	34	14,550	(15)	64	70
Solomon Islands	2	X	6	16	X	X	109	X	3	121	9,107	11	62	61

Source: United Nations Statistical Division.

Notes: Commercial energy consumption does not include bunkers for aircraft and ships in international transport or additions to stocks.

Imports are net imports (gross imports minus exports) and may exceed consumption due to additions to stocks and use in bunkers.

a. Data are for the South Africa Customs Union (Botswana, Lesotho, Namibia, South Africa, and Swaziland).

1 petajoule = 1,000,000,000,000 joules = 947,800,000,000 Btus = 163,400 "U.N. standard" barrels of oil = 34,140 "U.N. standard" metric tons of coal.

1 gigajoule = 1,000,000,000 joules = 947,800 Btus; 1 megajoule = 1,000,000 joules = 947.8 Btus. World and regional totals include countries not listed.

0 = zero or less than half of the unit of measure; X = not available or indeterminate; negative numbers are shown in parentheses.

For additional information, see Sources and Technical Notes.

Data Table 12.3 Reserves and Resources of Commercial Energy, 1993

	Anthracite/Bituminous Coals		Subbituminous/Lignite Coals		Crude Oil (million metric tons) 1993	Natural Gas (billion cubic meters) 1993	Uranium (metric tons)		Hydroelectric (megawatts)			
	(million metric tons) 1993		(million metric tons) 1993				Recoverable at		Known			
	Proved Reserves in Place	Proved Recoverable Reserves	Proved Reserves in Place	Proved Recoverable Reserves			Proved Recoverable Reserves	Proved Recoverable Reserves	Less Than		Exploitable Potential	Installed Capacity 1993
									\$80 per kg 1993	\$130 per kg 1993		
WORLD	1,087,982	519,358	741,463	512,252	140,676	141,335	1,532,000	698,870	X	612,505		
AFRICA	132,951	60,405	1,509	1,267	10,494	10,166	431,570	138,340	X	20,689		
Algeria	X	43	X	X	1,183	3,700	26,000	X	287 a	274		
Angola	X	X	X	X	736	51	X	X	100,000	322		
Benin	X	X	X	X	4	X	X	X	500 a	0		
Botswana	7,000	3,500	X	X	X	X	X	X	1 a	0		
Burkina Faso	X	X	X	X	X	X	X	X	200 a	30		
Burundi	X	X	X	X	X	X	X	X	1,366	36		
Cameroon	X	X	X	X	54	110	X	X	115,000	725		
Central African Rep	X	X	4	4	X	X	8,000	8,000	2,000 a	22		
Chad	X	X	X	X	X	X	X	X	30 a	0		
Congo	X	X	X	X	113	77	X	X	50,000	89		
Cote d'Ivoire	X	X	X	X	7	14	X	X	14,000	900		
Egypt	25	13	X	40	472	706	X	X	3,210 a	2,825		
Equatorial Guinea	X	X	X	X	2	37	X	X	2,000 a	X		
Eritrea	X	X	X	X	X	X	X	X	X	X		
Ethiopia	X	X	14	X	X	23	X	X	162,000	378		
Gabon	X	X	X	X	182	14	9,780	4,650	32,500	326		
Gambia, The	X	X	X	X	X	X	X	X	X	0		
Ghana	X	X	X	X	0	23	X	X	11,550	1,072		
Guinea	X	X	X	X	X	X	X	X	26,000	61		
Guinea-Bissau	X	X	X	X	X	X	X	X	300	0		
Kenya	X	X	X	X	X	X	X	X	30,000	611		
Lesotho	X	X	X	X	X	X	X	X	2,000	0		
Liberia	X	X	X	X	X	X	X	X	11,000	81		
Libya	X	X	X	X	5,931	1,296	X	X	X	0		
Madagascar	1,000	X	75	X	X	2	X	X	23,061	130		
Malawi	15	2	X	X	X	X	X	X	6,000	146		
Mali	X	X	X	X	X	X	X	X	10,000	45		
Mauritania	X	X	X	X	X	X	X	X	X	61		
Mauritius	X	X	X	X	X	X	X	X	65 a	59		
Morocco	134	45	44	X	0	3	X	X	4,000	713		
Mozambique	X	240	X	X	X	77	X	X	72,000	2,081		
Namibia	X	X	X	X	X	147	80,620	16,000	1,060	249		
Niger	X	70	X	X	X	X	159,170	6,650	235 a	0		
Nigeria	X	21	338	169	1,693	3,451	X	X	40,000	1,970		
Rwanda	X	X	X	X	X	57	X	X	3,000	59		
Senegal	X	X	X	X	X	X	X	X	500 a	0		
Sierra Leone	X	X	X	X	X	X	X	X	6,800	X		
Somalia	X	X	X	X	X	6	0	6,600	50 a	0		
South Africa (b)	121,218	55,333	X	X	6	27	144,400	96,440	X	593		
Sudan	X	X	X	X	41	86	X	X	1,900	225		
Swaziland	1,000	116	X	999	X	X	X	X	400	51		
Tanzania	304	200	X	X	X	116	X	X	20,000	339		
Togo	X	X	X	X	X	X	X	X	270 a	73		
Tunisia	X	X	X	X	45	92	X	X	65 a	79		
Uganda	X	X	X	X	X	X	X	X	10,200	155		
Zaire	720	88	X	X	25	1	1,800	X	530,000	2,829		
Zambia	X	X	69	55	X	X	1,800	X	309,009	2,259		
Zimbabwe	1,535	734	965	X	X	X	X	X	19,281	666		
EUROPE	114,691	55,765	117,674	70,470	9,569	55,461	331,916	214,116	X	179,398		
Albania	X	X	15	X	22	2	X	X	17,000	1,395		
Austria	X	X	347	31	15	22	X	X	56,800	11,739		
Belarus, Rep	X	X	X	X	X	X	X	X	X	X		
Belgium	715	410	X	X	X	X	X	X	500	130		
Bosnia and Herzegovina	X	X	X	X	X	X	X	X	X	1,220		
Bulgaria	48	13	4,791	2,698	1	2	X	X	2,240	2,150		
Croatia, Rep	7	6	38	33	25	35	X	X	X	2,058		
Czech Rep	X	X	X	X	2	5	16	6	X	1,144		
Denmark (c)	X	X	183	X	101	142	X	X	14	52		
Estonia, Rep	X	X	X	X	X	X	X	X	X	X		
Finland	X	X	X	X	X	X	0	1,500	22,600	2,550		
France	594	113	129	26	20	36	17,080	13,800	101,976	24,810		
Germany	44,000	24,000	78,000	43,300	51	341	0	3,000	27,000	4,376		
Greece	X	X	5,312	3,000	6	8	300	X	16,000	2,617		
Hungary	1,407	596	8,306	3,865	19	97	620	510	4,500	48		
Iceland	X	X	X	X	X	X	X	X	64,000	875		
Ireland	19	14	X	X	X	15	X	X	194	229		
Italy	X	X	75	34	44	270	4,800	X	65,000	17,832		
Latvia, Rep	X	X	X	X	X	X	X	X	X	1,503		
Lithuania, Rep	X	X	X	X	8	X	X	X	X	111		
Macedonia, former Yugoslav Rep	X	X	X	X	X	X	X	X	X	X		
Moldova, Rep	X	X	X	X	X	X	X	X	X	X		
Netherlands	1,406	497	X	X	16	1,875	X	X	500	36		
Norway	X	X	69	4	1,494	2,028	X	X	171,400	27,035		
Poland, Rep	64,650	29,100	14,413	13,000	5	124	X	X	12,000	867		
Portugal	8	3	38	33	X	X	7,300	1,400	30,500	3,405		
Romania	1	1	3,199	3,117	218	445	X	X	40,000	6,253		
Russian Federation	X	X	X	X	6,670	48,160	219,600	80,100	X	42,853		
Slovak Rep	X	X	447	228	X	8	X	X	X	1,198		
Slovenia, Rep	87	X	358	X	X	X	X	1,800	X	820		
Spain	1,750	850	950	600	2	19	18,000	23,300	69,100	14,700		
Sweden	X	X	4	1	X	X	2,000	2,000	70,000	16,638		
Switzerland	X	X	X	X	X	0	X	X	41,000	11,758		
Ukraine	X	X	X	X	235	1,172	62,200	86,700	X	4,700		
United Kingdom (d)	X	162	1,000	500	605	610	X	X	5,600	1,064		
Yugoslavia, Fed Rep	X	X	X	X	11	45	X	X	X	4,101		

Data Table 12.3 continued

	Anthracite/Bituminous Coals (million metric tons) 1993		Subbituminous/Lignite Coals (million metric tons) 1993		Crude Oil (million metric tons) 1993	Natural Gas (billion cubic meters) 1993	Uranium (metric tons) Recoverable at Less Than		Hydroelectric (megawatts)	
	Proved Reserves in Place	Proved Recoverable Reserves	Proved Reserves in Place	Proved Recoverable Reserves			\$80 per kg 1993	\$130 per kg 1993	Known Exploitable Potential	Installed Capacity 1993
NORTH & CENTRAL AMERICA	234,968	111,864	219,639	138,528	11,717	9,017	394,500	379,100	X	151,878
Belize	X	X	X	X	X	X	X	X	X	0
Canada	6,435	4,509	14,355	4,114	758	2,232	278,000	119,000	614,882	62,725
Costa Rica	X	X	27	X	X	X	X	X	37,000	868
Cuba	X	X	X	X	14	3	X	X	X	49
Dominican Rep	X	X	X	X	X	X	X	X	2,517	376
El Salvador	X	X	X	X	X	X	X	X	4,009	406
Guatemala	X	X	X	X	66	0	X	X	43,370	443
Haiti	X	X	13	X	X	X	X	X	430	70
Honduras	X	X	21	X	X	X	X	X	24,000	483
Jamaica	X	X	X	X	X	X	X	X	335	0
Mexico	1,569	860	732	351	6,906	1,951	4,500	6,100	80,000	8,247
Nicaragua	X	X	X	X	X	X	X	X	6,552	111
Panama	X	X	X	X	X	X	X	X	16,233	552
Trinidad and Tobago	X	X	X	X	73	232	X	X	X	0
United States	226,964	106,495	204,491	134,063	3,900	4,599	112,000	254,000	376,000	77,384
SOUTH AMERICA	6,225	5,649	15,298	4,548	11,608	5,430	168,390	2,400	X	90,082
Argentina	X	X	195	130	310	517	4,600	2,400	390,038	7,213
Bolivia	X	1	X	X	17	126	X	X	50,000	380
Brazil	X	X	10,162	2,845	542	137	162,000	X	1,116,900	48,193
Chile	79	31	4,500	1,150	41	110	X	X	162,262	2,431
Colombia	5,449	4,240	411	299	462	212	X	X	418,200	7,759
Ecuador	X	X	30	24	274	108	X	X	180,000	1,497
Guyana	X	X	X	X	X	X	X	X	63,100	4
Paraguay	X	X	X	X	X	X	X	X	39,630	6,490
Peru	X	960	X	100	109	200	1,790	X	412,000	2,507
Suriname	X	X	X	X	11	X	X	X	12,840	290
Uruguay	X	X	X	X	X	X	X	X	6,750	2,331
Venezuela	697	417	X	X	9,842	4,020	X	X	261,700	10,989
ASIA	403,974	133,074	160,784	95,411	97,041	52,529	9,130	52,150	X	157,779
Afghanistan, Islamic State	112	66	X	X	X	99	X	X	25,000	a 299
Armenia	X	X	X	X	X	X	X	X	X	750
Azerbaijan	X	X	X	X	157	538	X	X	X	1,700
Bangladesh	1,054	X	X	X	1	370	X	X	800	a 230
Bhutan	X	X	X	X	X	X	X	X	X	356
Cambodia	X	X	X	X	X	X	X	X	83,000	0
China (d)	177,600	62,200	108,800	52,300	3,264	1,670	X	X	2,168,304	59,655
Georgia, Rep	X	X	X	X	X	3	X	X	X	1,725
India	196,892	68,047	26,000	1,900	776	686	X	X	205,000	19,843
Indonesia	X	962	X	31,101	759	2,000	0	5,420	709,000	2,169
Iran, Islamic Rep	3,754	193	2,295	X	12,700	20,659	X	X	56,000	1,957
Iraq	X	X	X	X	13,417	3,100	X	X	70,000	910
Israel	X	X	X	X	1	1	X	X	1,600	0
Japan	8,296	804	175	17	8	30	0	6,600	134,750	21,020
Jordan	X	X	X	X	0	28	X	X	87	0
Kazakhstan, Rep	X	X	X	X	723	1,498	X	X	X	3,500
Korea, Dem People's Rep	2,000	300	300	300	X	X	X	X	X	5,000
Korea, Rep	276	183	X	X	X	X	0	31,000	3,467	2,469
Kuwait	X	X	X	X	13,358	1,360	X	X	X	0
Kyrgyz Rep	1,080	X	1,580	812	12	5	X	X	X	2,833
Lao People's Dem Rep	X	X	X	X	X	X	X	X	22,638	235
Lebanon	X	X	X	X	X	X	X	X	1,000	267
Malaysia	15	4	126	X	585	2,150	X	X	59,229	1,439
Mongolia	12,000	X	12,000	X	X	X	X	X	X	0
Myanmar	5	2	X	X	7	278	X	X	160,000	288
Nepal	X	X	0	X	X	0	X	X	144,000	249
Oman	X	X	X	X	659	550	X	X	X	0
Pakistan	X	X	X	734	27	646	X	X	85,000	4,732
Philippines	1	0	369	262	33	98	X	X	31,951	2,055
Saudi Arabia	X	X	X	X	35,620	5,260	X	X	X	0
Singapore	X	X	X	X	X	X	X	X	X	0
Sri Lanka	X	X	X	X	X	X	X	X	7,175	1,160
Syrian Arab Rep	X	X	X	X	340	250	X	X	4,500	900
Tajikistan, Rep	X	X	X	X	X	7	X	X	X	4,054
Thailand	X	0	1,422	999	27	175	X	X	8,169	2,459
Turkey	590	162	7,705	6,986	66	11	9,130	9,130	216,000	9,810
Turkmenistan, Rep	X	X	X	X	73	2,860	X	X	X	10
United Arab Emirates	X	X	X	X	12,330	5,794	X	X	X	0
Uzbekistan, Rep	X	X	X	X	X	1,870	X	X	X	1,904
Viet Nam	300	150	12	X	68	105	X	X	6,490	1,864
Yemen, Rep	X	X	X	X	544	429	X	X	X	0
OCEANIA	66,253	45,367	51,139	45,690	248	1,065	462,000	55,000	X	12,679
Australia	66,220	45,340	50,600	45,600	199	555	462,000	55,000	25,248	7,189
Fiji	X	X	X	X	X	X	X	X	515	85
New Zealand	33	27	539	90	17	85	X	X	60,000	5,059
Papua New Guinea	X	X	X	X	31	425	X	X	98,000	240
Solomon Islands	X	X	X	X	X	X	X	X	37	0

Sources: World Energy Council and the World Bank.

Notes: a. Technical potential. b. Data are for the South Africa Customs Union (Botswana, Lesotho, Namibia, South Africa, and Swaziland). c. Denmark includes Greenland.

d. China's and the United Kingdom's coal reserves contrast sharply with previous estimates; see Sources and Technical Notes. e. Data from another source; see Sources and Technical Notes.

World totals include countries for which no data are listed here. 0 = zero or less than half of the unit of measure. X = not available.

For additional information, see Sources and Technical Notes.

Data Table 12.4 Production, Consumption, and Reserves of Selected Metals, 1980–94

	Annual Production (000 metric tons)					Annual Consumption (000 metric tons)			
	1980	1985	1990	1994		1980	1985	1990	1994
ALUMINUM {a}									
Australia	27,179.0	31,838.9	40,697.0	41,733.0	United States	4,453.5	4,282.0	4,330.4	5,407.1
Guinea	11,862.0	11,790.0	16,150.0	17,040.0	Japan	1,639.0	1,694.8	2,414.3	2,174.8
Jamaica	12,054.0	6,239.0	10,936.7	11,571.3	China	550.0	630.0	861.0	1,318.0
Brazil	5,538.0	5,846.0	9,875.6	8,280.8	Germany	1,272.3	1,390.9	1,378.5	1,300.0
China	1,500.0	1,650.0	3,655.0	7,260.0	U.S.S.R. {b}	1,850.0	1,750.0	2,790.0	1,185.0
India	1,785.0	2,281.0	5,277.0	5,280.0	France	600.9	586.1	723.0	665.0
Russian Federation {c}	4,600.0	4,600.0	5,500.0	4,000.0	Korea, Rep	87.5	145.6	368.9	557.0
Suriname	4,646.0	3,738.0	3,266.8	3,200.5	Italy	458.0	470.0	652.0	554.0
Venezuela	0.0	0.0	786.0	2,540.0	United Kingdom	550.0	350.4	453.7	477.3
Greece	3,286.0	2,453.0	2,496.0	2,168.0	India	233.8	297.6	433.3	475.3
Ten Countries Total	72,450.0	70,435.9	98,640.1	103,073.6	Ten Countries Total	11,695.0	11,597.4	14,405.1	14,113.5
World Total	89,220.0	84,189.0	114,850.8	111,024.2	World Total	15,297.9	15,861.5	19,251.8	20,201.1
Bauxite, World Reserves 1994 (000 metric tons)				23,000,000	World Reserves Life Index (years)				207
Bauxite, World Reserve Base 1994 (000 metric tons)				28,000,000	World Reserve Base Life Index (years)				252
CADMIUM									
Japan	2.2	2.5	2.5	2.6	Japan	1.1	1.9	4.8	6.6
Canada	1.3	1.7	1.5	2.2	Belgium	1.7	1.9	2.7	2.6
Belgium	1.5	1.3	2.0	1.6	United States	3.9	3.7	3.1	2.2
U.S.S.R. {b}	2.9	3.0	2.4	1.5 d	France	1.2	1.1	1.4	1.5
China	0.3	0.5	1.1	1.3 d	U.S.S.R. {b}	2.4	2.9	2.0	1.0 d
United States	1.6	1.6	1.9	1.1	United Kingdom	1.3	1.4	0.9	0.7
Germany	1.2	1.1	3.0	1.1	Germany	2.2	1.6	0.7	0.7
Australia	1.0	0.9	0.6	0.9	China	0.3	0.4	0.4	0.6 d
Italy	0.6	0.5	0.7	0.6	India	0.1	0.2	0.3	0.4
Korea, Rep	0.4	0.1	0.6	0.6	Korea, Rep	0.2	0.3	0.4	0.4
Ten Countries Total	13.0	13.2	16.2	13.5	Ten Countries Total	13.3	13.5	16.8	16.7
World Total	18.2	19.1	20.3	18.3 d	World Total	17.0	17.6	20.3	18.3 d
World Reserves 1994 (000 metric tons)				540	World Reserves Life Index (years)				X e
World Reserve Base 1994 (000 metric tons)				970	World Reserve Base Life Index (years)				X e
COPPER									
Chile	1,063.0	1,359.8	1,628.3	2,219.9	United States	1,867.7	1,958.0	2,213.5	2,674.3
United States	1,181.0	1,104.8	1,497.5	1,795.4	Japan	1,158.3	1,226.3	1,446.6	1,374.9
Canada	716.4	738.6	704.5	617.3	Germany	870.8	886.8	854.7	983.1
U.S.S.R. {b}	590.0	600.0	640.0	540.0 d	China	386.0	420.0	528.0	745.7 d
China	115.0	185.0	375.0	432.1	U.S.S.R. {b}	1,300.0	1,305.0	1,140.0	560.0 d
Australia	243.5	259.8	296.0	415.6	France	433.4	397.8	458.8	495.0
Zambia	595.8	452.6	445.0	384.4	Korea, Rep	84.0	206.6	251.6	476.2
Poland	343.0	431.3	384.0	376.8	Italy	388.0	362.0	474.8	467.9
Peru	336.1	391.3	372.8	359.9	Belgium	303.9	309.6	376.0	404.9
Indonesia	59.0	88.7	144.0	333.8	United Kingdom	450.5	346.5	324.7	377.3
Ten Countries Total	5,242.8	5,611.9	6,487.1	7,475.2	Ten Countries Total	7,242.6	7,418.6	8,068.7	8,559.3
World Total	7,739.0	8,088.2	8,814.0	9,522.6	World Total	9,374.6	9,699.9	10,780.2	11,084.2
World Reserves 1994 (000 metric tons)				310,000	World Reserves Life Index (years)				33
World Reserve Base 1994 (000 metric tons)				590,000	World Reserve Base Life Index (years)				62
LEAD									
Australia	397.4	498.0	570.0	523.8	United States	1,094.0	1,141.7	1,275.2	1,374.8
China	160.0	200.0	363.9	376.2	Germany	433.1	440.0	391.8	347.9
United States	550.4	424.4	493.4	374.0	Japan	392.5	394.9	416.4	345.0
Peru	184.5	201.5	187.7	216.7	United Kingdom	295.5	274.3	301.6	267.6
Canada	349.1	268.3	241.3	172.6	Italy	275.0	235.0	258.0	262.2
Mexico	145.5	206.7	174.1	164.4	France	212.8	208.0	254.2	246.7
Kazakhstan {c}	420.0	440.0	245.0	160.0 d	China	210.0	220.0	250.0	214.1
Sweden	72.2	75.9	84.2	112.8	U.S.S.R. {b}	800.0	800.0	380.0	200.0
Namibia	50.2	34.6	19.4	93.1	Korea, Rep	33.0	63.2	147.4	175.1
Morocco	114.8	106.8	66.9	75.7	Mexico	85.1	105.6	118.8	162.0
Ten Countries Total	2,444.1	2,456.2	2,445.9	2,269.3	Ten Countries Total	3,831.0	3,882.7	3,793.4	3,595.4
World Total	3,448.2	3,431.2	3,150.3	2,764.7	World Total	4,435.6	5,236.6	5,676.5	5,342.2
World Reserves 1994 (000 metric tons)				63,000	World Reserves Life Index (years)				23
World Reserve Base 1994 (000 metric tons)				130,000	World Reserve Base Life Index (years)				47
MERCURY									
China	0.7	0.7	1.0	0.7	United States	2.0	1.7	1.2	X
Algeria	0.8	0.8	0.6	0.4	Spain	0.2	0.6	0.8	X
Spain	1.5	0.9	0.0	0.3	Algeria	X	0.2	0.7	X
Kyrgyz Rep	X	X	X	0.3	United Kingdom	0.4	0.3	0.4	X
Finland	0.1	0.1	0.1	0.1	China	0.5	0.4	0.3	X
United States	1.1	0.6	0.6	0.1 d	Brazil	X	0.2	0.3	X
Russian Federation {c}	2.1	2.2	0.8	0.1 d	Germany	0.5	0.3	0.2	X
Tajikistan Rep	X	X	X	0.1	Mexico	X	0.2	0.2	X
Slovak Rep {f}	0.2	0.2	0.1	0.1	Belgium	0.1	0.3	0.1	X
Ukraine	X	X	X	0.1	U.S.S.R. {b}	0.9	X	X	X
Ten Countries Total	6.5	5.5	3.3	2.1	Ten Countries Total	4.6	4.1	4.2	X
World Total	6.9	6.8	4.1	2.9 d	World Total	6.9	7.4	6.6	X
World Reserves 1994 (000 metric tons)				130	World Reserves Life Index (years)				45
World Reserve Base 1994 (000 metric tons)				240	World Reserve Base Life Index (years)				83
				3					3

Data Table 12.4 continued

Annual Production (000 metric tons)					Annual Consumption (000 metric tons)				
	1980	1985	1990	1994		1980	1985	1990	1994
NICKEL									
U.S.S.R. (b)	154.2	185.1	212.0	243.0 d	Japan	122.0	136.1	164.9	164.9
Canada	184.8	170.0	196.2	150.1	United States	143.1	143.1	124.6	137.3
Indonesia	53.3	40.3	68.6	81.2	Germany	78.1	87.0	88.8	93.9
New Caledonia	86.6	72.4	85.0	73.6	U.S.S.R. (b)	132.0	138.0	115.0	64.0 d
Australia	74.3	85.8	67.0	71.9	Italy	27.1	29.0	27.3	44.6
Dominican Republic	16.3	25.4	28.7	31.6	France	38.4	31.9	44.8	42.2
Cuba	36.6	32.1	40.8	31.0	United Kingdom	22.8	24.8	32.6	38.0
China	10.9	25.0	26.0	30.7	China	18.0	21.0	27.5	26.8
South Africa	25.7	25.0	30.0	30.1	Finland	9.3	14.7	19.0	23.4
Colombia	0.0	15.5	18.4	20.8	Sweden	20.0	17.0	19.4	23.0
Ten Countries Total	642.7	676.6	772.7	764.0	Ten Countries Total	610.8	642.6	663.9	829.9
World Total	779.7	812.6	880.3	802.5	World Total	716.7	775.2	839.6	882.0
World Reserves 1994 (000 metric tons)				47,000	World Reserves Life Index (years)				59
World Reserve Base 1994 (000 metric tons)				110,000	World Reserve Base Life Index (years)				137
TIN									
China	14.6	15.0	35.8	46.0 d	United States	56.4	37.8	37.2	33.5
Indonesia	32.5	21.7	31.7	30.6	Japan	30.9	31.6	33.8	29.4
Peru	1.1	3.8	4.8	20.0	China	12.5	11.5	16.9	26.1
Brazil	6.9	26.5	39.1	17.0	Germany	19.0	17.8	18.6	18.2
Bolivia	27.3	16.1	17.3	16.1	U.S.S.R. (b)	25.0	31.5	24.0	14.5 d
Malaysia	61.4	36.9	28.5	6.5	United Kingdom	9.9	24.8	10.2	10.4
Australia	11.6	6.4	7.4	6.4	Korea, Rep	1.8	2.6	6.9	9.8
U.S.S.R. (b)	36.0	13.5	13.0	5.0 d	France	10.1	6.9	8.1	9.2
Portugal	0.3	0.2	1.3	4.3	Netherlands	5.0	4.5	6.1	7.9
Thailand	33.7	16.9	14.6	3.1	Thailand	0.8	0.6	2.6	5.1
Ten Countries Total	225.4	157.0	193.5	155.0	Ten Countries Total	171.4	169.6	164.4	164.1
World Total	247.3	180.7	210.8	169.4	World Total	232.5	215.4	231.9	216.8
World Reserves 1994 (000 metric tons)				7,000	World Reserves Life Index (years)				41
World Reserve Base 1994 (000 metric tons)				10,000	World Reserve Base Life Index (years)				59
ZINC									
Canada	1,059.0	1,172.2	1,203.2	1,007.3 d	United States	879.0	962.0	992.0	1,118.3
Australia	495.3	759.1	945.0	945.0 d	Japan	752.0	780.0	814.3	723.1
China	160.0	300.0	619.0	900.0 d	China	259.0	349.0	500.0	611.9
Peru	487.6	523.4	583.9	602.6 d	Germany	474.0	480.0	484.0	531.6
United States	317.1	251.9	543.2	513.1 d	Italy	236.0	218.0	270.0	336.1
Mexico	235.8	275.4	306.7	369.7 d	U.S.S.R. (b)	1,030.0	1,000.0	640.0	330.0 d
Sweden	167.4	216.4	164.1	173.3 d	France	330.0	247.0	284.0	296.7
Kazakhstan (c)	785.0	810.0	550.0	250.0 d	Korea, Rep	68.0	120.0	230.0	264.9
Korea, Dem People's Rep	140.0	180.0	230.0	210.0 d	Belgium	155.0	169.0	177.6	225.0
Ireland	228.7	191.6	166.5	210.0 d	Australia	100.4	86.6	113.9	215.4
Ten Countries Total	4,075.9	4,680.0	5,311.6	5,181.0	Ten Countries Total	4,283.4	4,411.6	4,505.8	4,653.0
World Total	6,064.4	6,125.0	7,158.2	6,895.1 d	World Total	6,283.0	6,552.0	6,696.0	6,950.3
World Reserves 1994 (000 metric tons)				140,000	World Reserves Life Index (years)				20
World Reserve Base 1994 (000 metric tons)				330,000	World Reserve Base Life Index (years)				48
IRON ORE									
China	68,072.0	80,000.0	168,300.0	234,660.0 d	China	120,394.0	140,354.0	193,471.0	222,771.0 g
Brazil	114,726.7	128,251.0	152,300.0	151,000.0 d	U.S.S.R. (b)	197,840.0	203,760.0	199,679.0	168,938.0 g
Australia	95,529.4	97,447.0	110,508.0	120,534.0 d	Japan	108,693.0	102,215.0	39,642.0	113,783.0 g
Russian Federation (c)	244,702.6	247,639.0	236,000.0	75,000.0 d	United States	90,832.0	64,679.0	38,140.0	63,039.0 g
Ukraine	X	X	105,866.0	70,000.0 d	Brazil	18,383.0	36,419.0	38,004.0	44,965.0 g
India	41,934.4	42,545.0	54,579.0	61,000.0 d	Germany	50,072.0	45,204.0	43,809.0	41,350.0 g
United States	70,726.8	49,533.0	56,408.0	55,651.0 d	Korea, Rep	9,675.0	11,709.0	22,798.0	32,001.0 g
Canada	48,751.7	39,502.0	34,855.0	30,568.0 d	France	37,875.0	26,606.0	24,256.0	20,199.0 g
South Africa	26,310.3	24,414.0	30,291.0	29,385.0 d	Belgium	15,756.0	13,353.0	20,262.0	17,975.0 g
Macedonia, former Yugoslav Rep	X	X	X	20,000.0 d	United Kingdom	9,326.0	15,176.0	14,753.0	15,826.0 g
Ten Countries Total	710,753.9	709,331.0	949,107.0	847,798.0	Ten Countries Total	658,846.0	659,475.0	634,814.0	740,847.0
World Total	890,924.3	860,640.0	984,048.0	988,797.0 d	World Total	890,924.3	860,640.0	979,047.0	970,422.0 g
World Reserves 1994 (000 metric tons)				150,000,000	World Reserves Life Index (years)				152
World Reserve Base 1994 (000 metric tons)				230,000,000	World Reserve Base Life Index (years)				233
STEEL, CRUDE									
Japan	111,396.9	105,281.0	110,339.0	99,600.0 d	U.S.S.R. (b)	150,330.0	157,161.0	152,556.0	131,865.0 h
United States	101,456.7	80,069.0	89,726.0	88,793.0 d	Japan	79,007.0	73,377.0	99,032.0	99,149.0 h
China	37,120.8	46,721.0	66,100.0	88,680.0 d	United States	114,433.0	105,593.0	105,335.0	93,325.0 h
Russian Federation (c)	147,943.5	154,670.0	154,414.0	58,000.0 d	China	43,005.0	71,428.0	68,419.0	71,042.0 h
Germany	51,147.0	48,350.0	43,891.0	37,600.0 d	Germany	44,631.0	39,995.0	39,550.0	39,085.0 h
Korea, Rep	8,558.5	13,539.0	23,125.0	33,000.0 d	Italy	26,764.0	21,880.0	28,489.0	26,593.0 h
Ukraine	X	X	52,646.0	30,500.0 d	Korea, Rep	6,100.0	11,310.0	21,480.0	26,190.0 h
Italy	26,501.1	23,789.0	25,439.0	25,701.0 d	India	10,900.0	14,400.0	21,700.0	20,300.0 h
Brazil	15,338.9	20,456.0	20,567.0	25,000.0 d	France	20,159.0	14,812.0	18,076.0	16,588.0 h
India	10,384.0	12,185.0	15,313.0	18,500.0 d	United Kingdom	16,050.0	14,350.0	16,690.0	14,600.0 h
Ten Countries Total	509,847.4	505,060.0	548,914.0	505,374.0	Ten Countries Total	511,379.0	524,306.0	571,327.0	538,740.0
World Total	713,813.1	718,131.0	771,373.0	725,129.0 d	World Total	718,921.0	720,568.0	773,383.0	732,002.0 h

Sources: U.S. Bureau of Mines, World Bureau of Metal Statistics, and International Iron and Steel Institute.

Notes: a. Production refers to bauxite, consumption to aluminum. b. Data refer to all components of the former U.S.S.R.

c. Data are for the country named for 1994 only. Data for prior years are for the former U.S.S.R. d. Data are for 1993. e. A production reserve ratio would be misleading because production data include secondary metals. f. Slovak Rep data for years prior to 1994 refer to Czechoslovakia in its entirety. g. Data are for 1992. h. Data are for 1991. The world reserves life index equals world reserves estimated for 1994 divided by world production for 1994.

The world reserve base life index equals the world reserve base estimated for 1994 divided by world production for 1994. 0 = zero or less than half the unit of measure; X = not available. For additional information, see Sources and Technical Notes.

Data Table 12.5 Industrial Waste in Selected Countries

	Year of Estimate	Waste Generated from		Waste (metric tons)						
		Surface Treatment of Metals and Plastics (metric tons)	Biocide Production (metric tons)	Waste (metric tons)			Waste from Production and Use of (metric tons)			
				Oil	Containing PCBs	Clinical and Pharmaceutical	Photographic Materials	Organic Solvents	Paints and Pigments	Resins and Latex
Austria	1990	14,731	450	60,300	81	8,254	1,400	27,253	15,000	X
Canada	1985	186,200	4,500	367,000	120,000	X	X	262,000	72,700	74,000 a
Czechoslovakia (former)	1987	2,561,174	183	565,764	X	X	X	20,723	13,875	131,519
Finland	1987	1,813	361	35,684	1,789	97	547	7,384	5,787	2,123
France	1990	X	X	409,000	17,000 b	X	X	285,000 b	X	X
Germany, Fed Rep	1987	219,527	X	859,456	10,537	X	X	454,489	225,525	867,015
Greece	1990	X	X	25,000	1,800	1,500	X	21,000	6,000	150
Hungary	1989	12,000	10,300	455,000	134	X	X	49,000	11,000	X
Ireland	1991	7,000	5	1,000 c	X	X	X	12,500	X	45,000
Japan	1985	8,877,000 d	X	3,672,000 d	X	X	X	X	X	2,894,000
Luxembourg	1990	22,200	5	3,900	480	356	29	284	540	X
Netherlands	1990	22,000	1,800	279,000	400	1,000	21,000	69,000	25,000	20,000
New Zealand	1990	3,030	1,100	18,151	4	2,770	451	3,690	29,381	12,892
Norway	1988	8,000	400	55,000	2,000 e	X	6,000	9,000	16,000	X
Poland	1990	X	X	41,400	X	X	X	X	175,900	X
Portugal	1989	X	X	16,473	703	X	X	X	X	X
Spain	1990	X	X	320,000	2,200	X	X	5,400	X	X
United States (f)	1990	1,982,379	13,216	4,960,000	5,015,060	2,800,000	X	70,000,000	693,833	41,000,000

Source: Organisation for Economic Co-Operation and Development.

Notes: a. Data for resins and latex are from 1987; PCB waste includes 6,500 metric tons in storage. b. Data for PCBs and organic solvents are from 1989.

c. Waste oil is only lubricating oil; data for organic solvents include miscellaneous chemical wastes.

d. Waste oil includes waste solvents; waste generated from the surface treatment of metals is total waste metals; data for resins and latex refer to plastics and rubber.

e. Data for PCBs refer to 1987. f. Data are from 1989 through 1991; PCB data are from a survey and do not represent total PCB waste; organic solvents include all organic chemicals; resins and latex refer to plastics and rubber. X = not available.

For additional information, see Sources and Technical Notes.

Sources and Technical Notes

Data Table 12.1

Commercial Energy Production, 1973–93

Source: United Nations Statistical Division (UNSTAT), *1993 Energy Statistics Yearbook* (UNSTAT, New York, 1995).

Energy data are compiled by UNSTAT, primarily from responses to questionnaires sent to national governments, supplemented by official national statistical publications and by data from intergovernmental organizations. When official numbers are not available, UNSTAT prepares estimates based on the professional and commercial literature.

Total production of commercially traded fuels includes solid, liquid, and gaseous fuels and primary electricity production. *Solid* fuels include bituminous coal, lignite, peat, and oil shale burned directly. *Liquid* fuels include crude petroleum and natural gas liquids. *Gas* includes natural gas and other petroleum gases. *Primary electricity* is valued differently depending on its source. Wind, tidal, wave, solar, and hydroelectric power generation are expressed as the energy value of electricity (1 kilowatt hour = 3.6 million joules). Nuclear and geothermal power generation are valued on a fossil-fuel-avoided basis rather than on an energy-output basis. For example, a nuclear power plant that produces 1,000 kilowatt-hours of electricity provides the equivalent heat of 0.123 metric ton of coal. However, more than 0.123 metric ton of coal would be required to produce 1,000 kilowatt-

hours of electricity. Much of the energy released from coal combustion (or from a nuclear or geothermal plant) in a power plant is used in the mechanical work of turning dynamos or is lost in waste heat, so less energy is embodied in the final electricity than in the initial coal. The efficiency of a thermal electric plant is the ratio between the amount of final electricity produced and the initial energy supplied. Although this rating varies widely from country to country and from plant to plant, UNSTAT and other international energy organizations use a standard factor of 33 percent efficiency to estimate the fossil fuel value of nuclear electricity and 10 percent efficiency to estimate the fossil fuel value of geothermal energy. Electricity production data generally refer to gross production. Data for the Dominican Republic, Finland, France (including Monaco), Mexico, the United States, Zambia, and Zimbabwe refer to net production. Gross production is the amount of electricity produced by a generating station before consumption by station auxiliaries and transformer losses within the station are deducted. Net production is the amount of electricity remaining after these deductions. Typically, net production is 5 to 10 percent less than gross production. Energy production from pumped storage is not included in gross or net electricity generation.

Electricity production includes both public and self-producer power plants. Public power plants produce electricity for many users. They may be operated by private, cooperative, or

governmental organizations. Self-producer power plants are operated by organizations or companies to produce electricity for internal applications, such as factory operations.

Fuelwood, charcoal, bagasse, animal and vegetal wastes, and all forms of solar energy are excluded from production figures, even when traded commercially.

One petajoule (10^{15} joules) is the same as 0.0009478 Quads (10^{15} British thermal units) and is the equivalent of 163,400 "U.N. standard" barrels of oil or 34,140 "U.N. standard" metric tons of coal. The heat content of various fuels has been converted to coal-equivalent and then petajoule-equivalent values using country- and year-specific conversion factors. For example, a metric ton of bituminous coal produced in Argentina has an energy value of 0.843 metric ton of standard coal equivalent (7 million kilocalories). A metric ton of bituminous coal produced in Turkey has a 1991 energy value of 0.925 metric ton of standard coal equivalent. The original national production data for bituminous coal were multiplied by these conversion factors and then by 29.3076×10^{-6} to yield petajoule equivalents. Other fuels were converted to coal-equivalent and petajoule-equivalent terms in a similar manner.

South Africa refers to the South Africa Customs Union: Botswana, Lesotho, Namibia, South Africa, and Swaziland.

For additional information, refer to the United Nations *1993 Energy Statistics Yearbook*.

Data Table 12.2
Energy Consumption, 1973–93

Sources: United Nations Statistical Division (UNSTAT), *1993 Energy Statistics Yearbook* (UNSTAT, New York, 1995). Gross National Product (GNP): The World Bank, *World Tables*, on diskette (The World Bank, Washington, D.C., 1995).

Commercial energy consumption refers to “apparent consumption” and is defined as domestic production plus net imports, minus net stock increases, and minus aircraft and marine bunkers. *Total consumption* includes energy from solid, liquid, and gaseous fuels, plus primary electricity (see the definition in the Sources and Notes to Table 12.1). Energy consumption *per constant 1987 US\$ of GNP* is calculated using GNP data from the World Bank and is a measure of relative energy efficiency. Included under *imports as a percentage of consumption* are imports minus exports. A negative value (in parentheses) indicates that exports are greater than imports.

Traditional fuels includes estimates of the consumption of fuelwood, charcoal, bagasse, and animal and vegetal wastes. Fuelwood and charcoal consumption data are estimated from population data and country-specific per capita consumption figures. These per capita estimates were prepared by the Food and Agriculture Organization of the United Nations (FAO) after an assessment of the available consumption data. Data were supplied by the answers to questionnaires or come from official publications by Bangladesh, Bhutan, Brazil, the Central African Republic, Chile, Colombia, Costa Rica, Cuba, Cyprus, El Salvador, The Gambia, Japan, Kenya, the Democratic People's Republic of Korea, the Republic of Korea, Luxembourg, Malawi, Mauritius, Nepal, Panama, Portugal, the former Soviet Union, Sri Lanka, Sweden, Thailand, and Uruguay. Estimates by the FAO of per capita consumption of nonconiferous fuelwood have ranged from 0.0016 cubic meter per capita per year in Jordan to 0.9783 cubic meter per capita per year in Benin.

Similar estimates were prepared for coniferous fuelwood and for charcoal. Although the energy values of fuelwood and charcoal vary widely, UNSTAT uses standard factors of 0.33 metric ton of coal equivalent per cubic meter of fuelwood and 0.986 metric ton of coal equivalent per metric ton of charcoal.

Bagasse production is based on sugar production data in the *Sugar Yearbook* of the International Sugar Organization. It is assumed that 3.26 metric tons of fuel bagasse at 50 percent moisture are produced per metric ton of extracted cane sugar. The energy of a

metric ton of bagasse is valued at 0.264 metric ton of coal equivalent.

A petajoule is one quadrillion (10^{15}) joules. A gigajoule is one billion (10^9) joules. A megajoule is one million (10^6) joules.

Data Table 12.3
Reserves and Resources of
Commercial Energy, 1993

Sources: World Energy Council (WEC), *1995 Survey of Energy Resources* (WEC, London, 1995). Hydroelectric technical potential: The World Bank, *A Survey of the Future Role of Hydroelectric Power in 100 Developing Countries* (The World Bank, Washington, D.C., 1984). Hydroelectric installed capacity: United Nations Statistical Division (UNSTAT), *1993 Energy Statistics Yearbook* (UNSTAT, New York, 1995).

Energy resource estimates are based on geological, economic, and technical criteria. Resources are first graded according to the degree of confidence in the extent and location of the resource, based on available geological information, and are then judged on the technical and economic feasibility of their exploitation.

Proved reserves in place represent the total resource that is known to exist in specific locations and in specific quantities and qualities. *Proved recoverable reserves* are the fraction of proved reserves in place that can be extracted under present and expected local economic conditions with existing available technology. Additional energy resources, comprising those that are not currently economic, are not shown in this table.

The coal, oil, and gas sectors of the energy industry each have their own categories for estimating reserves. The WEC attempts to reconcile these categories to fit their cross-sectoral reserve concepts. Each country estimates its resource reserves using its own judgment and interpretation of commonly held concepts. Inter-country comparisons should be made with this caveat in mind. Reserve estimates are not final measured quantities. Those estimates change as exploration, exploitation, and technology advances and as economic conditions change.

There is no internationally accepted standard for categorizing coals of different ranks, although the WEC has used all the information available to do so. Anthracite makes up only a small fraction (3 to 4 percent) of *anthracite/bituminous coals*. Lignite makes up 57 percent (globally) of the proved reserves in place of *subbituminous/lignite coals*, and 63 percent of global proved recoverable reserves.

Crude oil also includes liquids obtained by condensation or extraction from natural gas.

Uranium data refer to known uranium deposits of a size and quality that could be recovered within specified production cost ranges (under \$80 per kilogram and under \$130 per kilogram) using currently proven mining and processing technologies.

Hydroelectric known exploitable potential refers to that part of a country's annual gross theoretical capacity (the amount of energy that would be obtained if all flows were exploited with 100 percent efficiency) that could be exploited using current technology and under current and expected local economic conditions. This includes both large- and small-scale schemes. Hydroelectric technical potential refers to the annual energy potential of all sites where it is physically possible to construct dams, with no consideration of economic return or adverse effects of site development.

Installed capacity refers to the combined generating capacity of hydroelectric plants installed in the country as of December 31, 1990.

Data Table 12.4
Production, Consumption, and
Reserves of Selected Metals, 1980–94

Sources: Production data for 1980, 1985, 1990, and 1994: U.S. Bureau of Mines (U.S. BOM), *Minerals Yearbook 1983, 1986, and Various Years* (U.S. Government Printing Office, Washington, D.C., 1985, 1987, and 1995, respectively).

Consumption data for aluminum, cadmium, copper, lead, nickel, tin, and zinc: World Bureau of Metal Statistics, *World Metal Statistics* (World Bureau of Metal Statistics, Ware, U.K., December 1979, December 1980, December 1985, July 1990, August 1991, September 1991, October 1991, December 1992, and June 1995). Consumption data for mercury: Roskill Information Services Ltd., *Roskill's Metals Databook, 5th Edition, 1984* (Roskill, London, 1984); Roskill Information Services Ltd., *Statistical Supplement to the Economics of Mercury, 4th Edition, 1978* (Roskill, London, 1980); Roskill Information Services Ltd., *The Economics of Mercury, 7th Edition, 1990* (Roskill, London, 1990); and U.S. BOM, *Mineral Industry Surveys, Mercury in 1989* (U.S. Government Printing Office, Washington, D.C., 1989). Consumption data for iron ore and crude steel: International Iron and Steel Institute, *Steel Statistical Yearbook 1985 and 1992* (International Iron and Steel Institute, Brussels, 1985 and 1992), and the United Nations Conference on Trade and Development (UNCTAD), *UNCTAD Commodity Yearbook 1994* (New York, 1995). Reserves and reserve base data: U.S. BOM, *Mineral Commodity Summaries 1993* (U.S.

Government Printing Office, Washington, D.C., 1993).

The U.S. BOM publishes production, trade, consumption, and other data on commodities for the United States as well as for all other countries of the world (depending on the availability of reliable data). These data are based on information from government mineral and statistical agencies, the United Nations, and U.S. and foreign technical and trade literature.

The World Bureau of Metal Statistics publishes consumption data on the metals presented, excluding mercury, iron, and steel. Data on the metals included were supplied by metal companies, government agencies, trade groups, and statistical bureaus. Obviously incorrect data have been revised, but most data were compiled and reported without adjustment or retrospective revisions.

The countries listed represent the top 10 producers of each material in 1992 and the top 10 consumers in 1991.

The *annual production* data are the metal content of the ore mined for *copper*, *lead*, *mercury*, *nickel*, *tin*, and *zinc*. *Aluminum* (bauxite) and *iron ore* production are expressed in gross weight of ore mined (i.e., marketable product). Iron ore production refers to iron ore, iron ore concentrates, and iron ore agglomerates (sinter and pellets). *Cadmium* refers to the production of the refined metal. Production of *crude steel*, is defined as the total of usable ingots, continuously cast semifinished products, and liquid steel for castings. The United Nations' definition of crude steel is the equivalent of the term "raw steel" as used by the United States.

Annual consumption of metal refers to the domestic use of refined metals, which include metals refined from either primary (raw) or secondary (recovered) materials. Metal used in a product that is then exported is considered to be consumed by the producing country rather than by the importing country. Data on *mercury* consumption must be viewed with caution; they include estimates on consumption of secondary materials, which are generally not reported. Consumption of *iron ore* is the quantity of iron ore and is calculated as apparent consumption—the net of production plus imports minus exports. Such a value for consumption makes no allowance for stock inventories. This can lead to discrepancies in the published consumption data evident in the latest report by the UNCTAD Intergovernmental Group of Experts on Iron Ore. For example, Brazil had a "reported consumption" (i.e., domestic and imported ores consumed in iron and steel plants, as well as ores consumed for nonmetallurgical uses) of 23.7 million metric tons in 1990, compared to an apparent consumption of 40 mil-

lion metric tons. Apparent consumption of iron ore was chosen because data for reported consumption were only available for a limited number of countries and years. Because different countries report different grades of iron ore, consumption data are not strictly comparable among countries. Because world consumption of iron ore is roughly equal to world production, world production data were used for world consumption totals. Worldwide stock inventories are assumed to be negligible. Consumption of *crude steel* is calculated as apparent consumption. The International Iron and Steel Institute converted imports and exports into crude steel equivalents by using a factor of $1.3/(1 + 0.175c)$, where c is the domestic proportion of crude steel that is continuously cast. Such an adjustment avoids distortion of the export or import share relative to domestic production.

The *world reserve base life index* and the *world reserves life index* are expressed in years remaining. They were computed by dividing the 1992 world reserve base and world reserves by the respective world production rate for 1992. The underlying assumption is constant world production at the 1992 level and capacity.

The reserve base is the portion of the mineral resource that meets grade, quality, thickness, and depth criteria defined by current mining and production practices. The reserve base includes both measured and indicated reserves and refers to those resources that are both currently economic and marginally economic, as well as some of those that are currently subeconomic.

Mineral reserves are those deposits whose quantity and grade have been determined by samples and measurements and could be profitably recovered at the time of the assessment. Changes in geologic information, technology, costs of extraction and production, and prices of mined product can affect the reserve estimates. Reserves do not signify that extraction facilities are actually in place and operative.

Data Table 12.5

Industrial Waste in Selected Countries

Sources: Organisation for Economic Co-Operation and Development (OECD), *Environmental Data Compendium 1993* (OECD, Paris, 1993). Waste definitions: *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal* (United Nations Environment Programme, 1989) Annex I; and Roger Batstone, James E. Smith, Jr., and David Wilson (eds.), *The Safe Disposal of Hazardous Wastes*, Vol. 1 (The World Bank Technical Paper No. 93, Washington, D.C., 1989), pp. 19–23.

Industrial waste data are collected by various means, and definitions might vary across countries. The OECD generally collects data using questionnaires completed by government representatives. Comparisons should be made cautiously, because (a) definitions vary from country to country, (b) the mix of hazardous materials in each category also varies, (c) these data do not include all industrial or hazardous waste (some data are based only on surveys of particular segments of an industry), and (d) these data do not measure potential toxicity.

Waste generated from surface treatment of metals and plastics includes acids and alkalis (surface metal treatment is the largest source of acid wastes) as well as other toxics. *Waste generated from biocide production* results from the manufacturing and use of insecticides, herbicides, and fungicides (not including those quantities applied correctly, but including spills, residues, etc.). *Waste oil* includes used motor oil, contaminated fuel oils, waste from industrial processes, and waste vegetable oils, among others. *Waste containing PCBs* includes waste from their manufacture, from the scraping of equipment containing PCBs, and from certain hydraulic fluids used in mining equipment and aircraft. *Clinical and pharmaceutical waste* includes waste pharmaceuticals, laboratory chemical residues arising from their production and preparation, and clinical (i.e., infectious) waste from hospitals, medical centers, clinics, and research institutions. Waste from the production and use of *photographic materials* includes waste chemicals from photographic processing. *Waste organic solvents* arise from dry cleaning and metal cleaning, from chemical processes, as well as from the production of numerous manufactured products such as paints, toiletries, thinners, and degreasants. Waste from *paints and pigments* includes waste from the manufacture and use of inks, dyes, pigments, paints, lacquers, and varnishes. Waste from *resins and latex* comes from the production, formulation, and use of resins, latex, plasticizers, glues, and other adhesives.