

Appendix A

Reference case projections

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Table A1. World total primary energy consumption by region, Reference case, 2011–40
(quadrillion Btu)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	120.6	118.1	125.7	128.1	130.7	133.8	138.1	0.6
United States ^a	96.8	94.4	100.8	102.0	102.9	103.8	105.7	0.4
Canada	14.5	14.5	15.1	15.6	16.3	17.1	18.1	0.8
Mexico and Chile	9.3	9.2	9.8	10.5	11.6	12.8	14.3	1.6
OECD Europe	82.0	81.4	84.9	87.5	90.3	93.1	95.5	0.6
OECD Asia	39.4	39.0	43.4	45.0	46.2	47.4	48.5	0.8
Japan	21.2	20.8	21.9	22.3	22.3	22.2	21.5	0.1
South Korea	11.3	11.4	13.9	14.7	15.4	16.1	16.9	1.4
Australia and New Zealand	6.9	6.8	7.6	8.1	8.5	9.2	10.1	1.4
Total OECD	242.0	238.4	253.9	260.6	267.2	274.3	282.1	0.6
Non-OECD								
Non-OECD Europe and Eurasia	49.9	50.7	51.8	54.8	56.4	57.9	57.6	0.5
Russia	30.9	32.1	33.2	34.7	35.1	35.5	34.5	0.3
Other	19.0	18.6	18.7	20.1	21.3	22.4	23.1	0.8
Non-OECD Asia	168.2	175.9	222.7	246.4	269.9	295.1	322.1	2.2
China	109.4	115.0	147.3	159.4	170.4	180.7	190.1	1.8
India	25.0	26.2	32.8	38.4	44.9	52.8	62.3	3.2
Other	33.7	34.7	42.7	48.6	54.6	61.6	69.6	2.5
Middle East	29.9	31.7	40.8	45.4	50.7	56.6	61.8	2.4
Africa	20.1	21.5	26.1	30.0	33.8	38.4	44.0	2.6
Non-OECD Americas	30.5	31.0	33.5	36.7	39.7	43.3	47.3	1.5
Brazil	14.8	15.2	16.3	18.1	20.0	22.0	24.3	1.7
Other	15.7	15.8	17.2	18.6	19.8	21.2	23.0	1.4
Total Non-OECD	298.6	310.8	375.0	413.3	450.5	491.2	532.8	1.9
Total World	540.5	549.3	628.9	673.9	717.7	765.6	815.0	1.4

^aIncludes the 50 States and the District of Columbia.

Notes: Energy totals include net imports of coal coke and electricity generated from biomass in the United States. Totals may not equal sum of components due to independent rounding. The electricity portion of the national fuel consumption values consists of generation for domestic use plus an adjustment for electricity trade based on a fuel's share of total generation in the exporting country.

Sources: **History:** U.S. Energy Information Administration (EIA), International Energy Statistics database (as of May 2015), www.eia.gov/ies; and International Energy Agency, "Balances of OECD and Non-OECD Statistics" (2014), www.iea.org (subscription site). **Projections:** EIA, *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo; and World Energy Projection System Plus (2016), run IEO2016-reference_final_2016.02.19_115008.

Table A2. World total energy consumption by region and fuel, Reference case, 2011–40
(quadrillion Btu)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas								
Liquids	45.3	44.6	46.4	46.1	46.0	46.2	46.7	0.2
Natural gas	31.8	32.8	33.9	35.5	37.7	39.5	41.4	0.8
Coal	21.0	18.7	20.3	20.5	20.1	20.0	20.0	0.2
Nuclear	9.4	9.2	9.5	9.4	9.5	9.5	9.7	0.2
Other	13.1	12.9	15.6	16.6	17.5	18.6	20.3	1.6
Total	120.6	118.1	125.7	128.1	130.7	133.8	138.1	0.6
OECD Europe								
Liquids	30.4	29.6	28.3	28.0	28.2	28.5	28.8	-0.1
Natural gas	19.2	18.3	19.7	21.1	23.0	24.3	26.1	1.3
Coal	12.9	13.4	13.2	13.3	13.1	12.8	12.6	-0.2
Nuclear	8.8	8.6	7.9	8.3	8.8	9.0	8.5	0.0
Other	10.7	11.5	15.7	16.7	17.3	18.5	19.6	1.9
Total	82.0	81.4	84.9	87.5	90.3	93.1	95.5	0.6
OECD Asia								
Liquids	16.0	16.8	15.7	15.4	15.3	15.3	15.3	-0.3
Natural gas	8.2	8.4	9.5	10.5	11.1	12.1	13.0	1.6
Coal	9.7	9.7	10.2	10.1	10.1	10.1	10.1	0.1
Nuclear	3.0	1.6	3.9	4.5	4.7	4.6	4.4	3.7
Other	2.5	2.5	4.1	4.6	5.1	5.4	5.7	3.0
Total	39.4	39.0	43.4	45.0	46.2	47.4	48.5	0.8
Total OECD								
Liquids	91.7	90.9	90.4	89.5	89.5	90.0	90.8	0.0
Natural gas	59.2	59.5	63.1	67.1	71.7	75.9	80.5	1.1
Coal	43.6	41.8	43.7	44.0	43.3	42.9	42.7	0.1
Nuclear	21.2	19.3	21.3	22.1	23.0	23.1	22.5	0.6
Other	26.3	27.0	35.5	37.9	39.8	42.5	45.5	1.9
Total	242.0	238.4	253.9	260.6	267.2	274.3	282.1	0.6
Non-OECD								
Non-OECD Europe and Eurasia								
Liquids	10.8	10.7	12.0	12.7	12.7	12.8	12.6	0.6
Natural gas	23.4	23.7	23.1	24.5	25.7	26.7	26.7	0.4
Coal	9.6	10.2	9.4	9.4	9.6	9.8	9.6	-0.2
Nuclear	3.0	3.1	3.9	4.3	4.3	4.3	4.3	1.2
Other	3.0	3.0	3.4	3.8	4.0	4.3	4.4	1.4
Total	49.9	50.7	51.8	54.8	56.4	57.9	57.6	0.5
Non-OECD Asia								
Liquids	42.1	44.3	55.8	61.4	67.2	73.8	81.2	2.2
Natural gas	15.0	15.5	21.5	28.1	35.2	44.0	52.5	4.4
Coal	93.3	95.5	109.2	112.9	114.4	116.6	119.5	0.8
Nuclear	1.6	1.7	4.8	6.9	10.9	13.5	16.2	8.3
Other	16.1	18.8	31.5	37.1	42.1	47.2	52.6	3.7
Total	168.2	175.9	222.7	246.4	269.9	295.1	322.1	2.2

See notes at end of table.

Table A2. World total energy consumption by region and fuel, Reference case, 2011–40 (continued)
(quadrillion Btu)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
Non-OECD (continued)								
Middle East								
Liquids	15.1	16.0	20.9	21.7	23.3	25.3	27.1	1.9
Natural gas	14.5	15.4	18.6	21.5	24.7	27.4	30.3	2.5
Coal	0.1	0.1	0.1	0.1	0.2	0.2	0.2	3.2
Nuclear	0.0	0.0	0.4	0.6	1.0	1.3	1.6	18.4
Other	0.2	0.2	0.8	1.4	1.6	2.3	2.6	9.0
Total	29.9	31.7	40.8	45.4	50.7	56.6	61.8	2.4
Africa								
Liquids	7.0	7.4	9.5	10.6	11.6	12.8	14.6	2.5
Natural gas	4.1	4.7	5.8	6.6	8.1	9.9	11.7	3.3
Coal	4.6	4.8	5.4	5.8	6.0	6.4	7.0	1.4
Nuclear	0.1	0.1	0.1	0.2	0.3	0.3	0.4	4.4
Other	4.3	4.5	5.4	6.8	7.8	9.0	10.3	3.0
Total	20.1	21.5	26.1	30.0	33.8	38.4	44.0	2.6
Non-OECD Americas								
Liquids	13.6	14.2	15.6	16.6	17.5	18.5	19.8	1.2
Natural gas	5.4	5.4	6.2	7.0	7.8	8.6	9.6	2.0
Coal	0.9	0.9	0.9	0.9	1.0	1.1	1.1	1.0
Nuclear	0.2	0.2	0.4	0.4	0.8	0.8	0.9	5.1
Other	10.4	10.3	10.5	11.9	12.8	14.3	15.9	1.6
Total	30.5	31.0	33.5	36.7	39.7	43.3	47.3	1.5
Total Non-OECD								
Liquids	88.6	92.6	113.8	123.0	132.3	143.3	155.3	1.9
Natural gas	62.4	64.8	75.2	87.8	101.4	116.6	130.9	2.5
Coal	108.4	111.5	124.9	129.2	131.2	134.0	137.5	0.8
Nuclear	5.0	5.2	9.6	12.4	17.2	20.3	23.4	5.5
Other	34.1	36.8	51.5	60.9	68.3	77.0	85.8	3.1
Total	298.6	310.8	375.0	413.3	450.5	491.2	532.8	1.9
Total World								
Liquids	180.3	183.6	204.2	212.5	221.8	233.2	246.0	1.1
Natural gas	121.6	124.2	138.3	154.8	173.1	192.5	211.4	1.9
Coal	152.0	153.3	168.6	173.2	174.4	176.9	180.2	0.6
Nuclear	26.2	24.5	30.9	34.6	40.2	43.4	46.0	2.3
Other	60.4	63.8	87.0	98.8	108.1	119.5	131.4	2.6
Total	540.5	549.3	628.9	673.9	717.7	765.6	815.0	1.4

Notes: Energy totals include net imports of coal coke and electricity generated from biomass in the United States. Totals may not equal sum of components due to independent rounding. The electricity portion of the national fuel consumption values consists of generation for domestic use plus an adjustment for electricity trade based on a fuel's share of total generation in the exporting country.

Sources: History: U.S. Energy Information Administration (EIA), International Energy Statistics database (as of May 2015), www.eia.gov/ies. Projections: EIA, *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo; and World Energy Projection System Plus (2016), run IEO2016-reference_final_2016.02.19_115008.

Table A3. World gross domestic product (GDP) by region expressed in purchasing power parity, Reference case, 2011–40
(billion 2010 dollars)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	18,616	19,080	23,390	26,577	29,942	33,569	37,770	2.5
United States ^a	15,021	15,369	18,801	21,295	23,894	26,659	29,898	2.4
Canada	1,396	1,422	1,700	1,881	2,074	2,293	2,529	2.1
Mexico and Chile	2,200	2,288	2,890	3,400	3,974	4,618	5,343	3.1
OECD Europe	18,670	18,638	21,496	23,621	25,697	27,809	30,074	1.7
OECD Asia	6,904	7,051	8,034	8,575	9,091	9,647	10,198	1.3
Japan	4,299	4,373	4,695	4,886	5,025	5,141	5,173	0.6
South Korea	1,528	1,563	1,960	2,135	2,327	2,535	2,764	2.1
Australia and New Zealand	1,077	1,115	1,379	1,554	1,739	1,971	2,262	2.6
Total OECD	44,189	44,769	52,921	58,772	64,731	71,026	78,042	2.0
Non-OECD								
Non-OECD Europe and Eurasia	5,380	5,535	6,614	7,764	9,009	10,437	11,870	2.8
Russia	3,165	3,273	3,645	4,109	4,604	5,171	5,623	2.0
Other	2,215	2,262	2,969	3,655	4,405	5,266	6,247	3.7
Non-OECD Asia	26,261	27,914	44,139	56,222	69,542	84,680	102,015	4.7
China	13,286	14,309	23,154	29,515	36,303	43,694	51,749	4.7
India	5,706	5,957	10,165	13,423	17,126	21,541	26,863	5.5
Other	7,268	7,648	10,819	13,284	16,112	19,445	23,403	4.1
Middle East	4,986	5,072	6,951	8,578	10,309	12,164	14,144	3.7
Africa	4,355	4,561	6,539	8,295	10,559	13,467	17,144	4.8
Non-OECD Americas	6,427	6,604	7,952	9,259	10,561	11,985	13,615	2.6
Brazil	2,916	2,968	3,410	3,949	4,494	5,077	5,728	2.4
Other	3,510	3,636	4,542	5,310	6,067	6,908	7,887	2.8
Total Non-OECD	47,408	49,686	72,195	90,118	109,979	132,734	158,789	4.2
Total World	91,598	94,455	125,115	148,891	174,711	203,760	236,831	3.3

^aIncludes the 50 States and the District of Columbia.

Note: Totals may not equal sum of components due to independent rounding.

Sources: Derived from Oxford Economic Model (June 2015), www.oxfordeconomics.com (subscription site); and EIA, *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo.

Table A4. World gross domestic product (GDP) by region expressed in market exchange rates, Reference case, 2011–40
(billion 2010 dollars)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	18,006	18,440	22,566	25,585	28,757	32,166	36,120	2.4
United States ^a	15,021	15,369	18,801	21,295	23,894	26,659	29,898	2.4
Canada	1,662	1,694	2,024	2,240	2,470	2,730	3,012	2.1
Mexico and Chile	1,324	1,377	1,741	2,049	2,392	2,777	3,210	3.1
OECD Europe	18,874	18,833	21,535	23,540	25,466	27,401	29,488	1.6
OECD Asia	8,038	8,209	9,263	9,868	10,434	11,044	11,642	1.3
Japan	5,479	5,574	5,984	6,227	6,404	6,552	6,593	0.6
South Korea	1,134	1,160	1,455	1,585	1,728	1,882	2,052	2.1
Australia and New Zealand	1,425	1,475	1,824	2,056	2,302	2,610	2,957	2.6
Total OECD	44,918	45,483	53,365	58,993	64,657	70,611	77,249	1.9
Non-OECD								
Non-OECD Europe and Eurasia	2,581	2,654	3,138	3,669	4,239	4,891	5,533	2.7
Russia	1,590	1,645	1,832	2,065	2,313	2,599	2,826	2.0
Other	990	1,010	1,307	1,604	1,925	2,292	2,707	3.6
Non-OECD Asia	11,517	12,271	19,246	24,402	30,021	36,334	43,472	4.6
China	6,615	7,124	11,528	14,695	18,075	21,755	25,765	4.7
India	1,728	1,804	3,077	4,063	5,184	6,520	8,131	5.5
Other	3,174	3,343	4,641	5,645	6,762	8,060	9,576	3.8
Middle East	2,353	2,454	3,271	3,993	4,765	5,591	6,454	3.5
Africa	1,909	2,004	2,840	3,576	4,514	5,706	7,203	4.7
Non-OECD Americas	4,079	4,160	4,935	5,729	6,523	7,389	8,368	2.5
Brazil	2,295	2,335	2,683	3,108	3,536	3,995	4,507	2.4
Other	1,784	1,825	2,252	2,622	2,987	3,393	3,861	2.7
Total Non-OECD	22,438	23,544	33,431	41,370	50,061	59,911	71,031	4.0
Total World	67,356	69,027	86,796	100,362	114,718	130,522	148,280	2.8

^aIncludes the 50 States and the District of Columbia.

Note: Totals may not equal sum of components due to independent rounding.

Sources: Derived from Oxford Economic Model (June 2015), www.oxfordeconomics.com (subscription site); and EIA, *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo.

Table A5. World liquids consumption by region, Reference case, 2011–40
(million barrels per day)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	23.6	23.2	24.4	24.4	24.3	24.4	24.6	0.2
United States ^a	18.9	18.5	19.6	19.6	19.4	19.3	19.3	0.2
Canada	2.3	2.4	2.4	2.4	2.4	2.4	2.5	0.2
Mexico and Chile	2.4	2.4	2.4	2.4	2.5	2.7	2.9	0.6
OECD Europe	14.5	14.1	13.7	13.6	13.7	13.8	14.0	0.0
OECD Asia	7.9	8.2	7.7	7.5	7.5	7.5	7.5	-0.3
Japan	4.4	4.7	3.9	3.7	3.7	3.6	3.4	-1.2
South Korea	2.3	2.3	2.4	2.4	2.4	2.5	2.5	0.3
Australia and New Zealand	1.2	1.2	1.4	1.4	1.4	1.5	1.5	0.8
Total OECD	46.0	45.5	45.8	45.5	45.5	45.7	46.1	0.0
Non-OECD								
Non-OECD Europe and Eurasia	5.3	5.3	5.8	6.1	6.2	6.2	6.1	0.5
Russia	3.4	3.4	3.7	3.8	3.8	3.7	3.6	0.1
Other	1.9	1.8	2.2	2.3	2.4	2.5	2.5	1.2
Non-OECD Asia	20.5	21.5	26.7	29.4	32.2	35.4	38.9	2.1
China	9.5	10.2	12.7	13.8	14.8	15.7	16.4	1.7
India	3.5	3.6	4.5	5.2	5.9	7.0	8.3	3.0
Other	7.5	7.7	9.4	10.4	11.4	12.7	14.3	2.2
Middle East	7.4	7.7	10.0	10.4	11.3	12.3	13.2	2.0
Africa	3.4	3.6	4.5	5.1	5.5	6.1	6.9	2.4
Non-OECD Americas	6.4	6.7	7.5	8.0	8.5	9.0	9.6	1.3
Brazil	2.8	2.9	3.4	3.7	4.1	4.4	4.7	1.7
Other	3.6	3.8	4.1	4.3	4.4	4.6	4.9	0.9
Total Non-OECD	43.1	44.8	54.5	59.0	63.6	68.9	74.8	1.9
Total World	89.1	90.3	100.3	104.5	109.1	114.6	120.9	1.0

^aIncludes the 50 States and the District of Columbia.

Notes: Energy totals include net imports of coal coke and electricity generated from biomass in the United States. Totals may not equal sum of components due to independent rounding. The electricity portion of the national fuel consumption values consists of generation for domestic use plus an adjustment for electricity trade based on a fuel's share of total generation in the exporting country.

Sources: **History:** U.S. Energy Information Administration (EIA), International Energy Statistics database (as of May 2015), www.eia.gov/ies; and International Energy Agency, "Balances of OECD and Non-OECD Statistics" (2014), www.iea.org (subscription site). **Projections:** EIA, *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo; and World Energy Projection System Plus (2016), run IEO2016-reference_final_2016.02.19_115008.

Table A6. World natural gas consumption by region, Reference case, 2011–40
(trillion cubic feet)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	30.8	31.8	32.8	34.3	36.5	38.2	40.1	0.8
United States ^a	24.5	25.5	26.1	26.9	28.1	28.8	29.7	0.5
Canada	3.7	3.7	3.9	4.2	4.7	5.2	5.6	1.5
Mexico and Chile	2.6	2.6	2.8	3.2	3.6	4.2	4.8	2.2
OECD Europe	18.6	17.8	19.2	20.6	22.3	23.7	25.3	1.3
OECD Asia	7.6	7.9	8.9	9.8	10.4	11.3	12.2	1.6
Japan	4.5	4.7	5.1	5.6	5.7	5.9	6.0	0.9
South Korea	1.6	1.8	2.1	2.2	2.4	2.7	3.0	1.9
Australia and New Zealand	1.4	1.5	1.7	2.0	2.3	2.7	3.2	2.9
Total OECD	56.9	57.5	60.9	64.7	69.2	73.2	77.6	1.1
Non-OECD								
Non-OECD Europe and Eurasia	22.8	23.0	22.5	23.9	25.0	26.0	26.0	0.4
Russia	15.3	15.7	15.3	15.8	16.2	16.5	16.0	0.1
Other	7.5	7.3	7.2	8.1	8.9	9.5	10.0	1.1
Non-OECD Asia	14.6	15.1	20.8	27.2	34.0	42.5	50.8	4.4
China	4.6	5.1	9.1	13.5	17.6	22.7	27.5	6.2
India	2.3	2.1	2.3	2.9	3.8	4.9	6.0	3.9
Other	7.7	7.9	9.4	10.8	12.7	14.9	17.2	2.8
Middle East	13.9	14.7	17.7	20.5	23.5	26.1	28.9	2.5
Africa	3.9	4.5	5.5	6.2	7.7	9.4	11.1	3.3
Non-OECD Americas	5.0	5.1	5.8	6.5	7.2	8.0	8.9	2.0
Brazil	0.9	1.1	1.4	1.5	1.7	1.9	2.2	2.6
Other	4.1	4.0	4.4	5.0	5.5	6.2	6.8	1.9
Total Non-OECD	60.3	62.3	72.3	84.4	97.5	112.0	125.7	2.5
Total World	117.1	119.8	133.2	149.1	166.6	185.2	203.3	1.9

^aIncludes the 50 States and the District of Columbia.

Note: Totals may not equal sum of components due to independent rounding.

Sources: History: U.S. Energy Information Administration (EIA), International Energy Statistics database (as of May 2015), www.eia.gov/ies.

Projections: EIA, *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo; and World Energy Projection System Plus (2016), run IEO2016-reference_final_2016.02.19_115008.

Table A7. World coal consumption by region, Reference case, 2011–40
(quadrillion Btu)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	21.0	18.7	20.3	20.5	20.1	20.0	20.0	0.2
United States ^a	19.6	17.3	19.2	19.3	19.2	19.0	19.0	0.3
Canada	0.7	0.7	0.6	0.6	0.4	0.4	0.4	-2.5
Mexico and Chile	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.3
OECD Europe	12.9	13.4	13.2	13.3	13.1	12.8	12.6	-0.2
OECD Asia	9.7	9.7	10.2	10.1	10.1	10.1	10.1	0.1
Japan	4.3	4.6	4.5	4.4	4.3	4.2	4.0	-0.5
South Korea	3.2	3.0	3.7	3.8	3.8	4.0	4.3	1.2
Australia and New Zealand	2.1	2.1	2.0	1.9	1.9	1.9	1.9	-0.4
Total OECD	43.6	41.8	43.7	44.0	43.3	42.9	42.7	0.1
Non-OECD								
Non-OECD Europe and Eurasia	9.6	10.2	9.4	9.4	9.6	9.8	9.6	-0.2
Russia	4.7	5.4	5.3	5.3	5.5	5.7	5.5	0.1
Other	5.0	4.8	4.1	4.1	4.1	4.1	4.1	-0.6
Non-OECD Asia	93.3	95.5	109.2	112.9	114.4	116.6	119.5	0.8
China	75.4	76.5	86.6	88.0	87.0	85.4	83.3	0.3
India	11.9	13.0	15.3	16.7	18.3	21.1	24.8	2.3
Other	5.9	6.1	7.4	8.3	9.1	10.1	11.5	2.3
Middle East	0.1	0.1	0.1	0.1	0.2	0.2	0.2	3.2
Africa	4.6	4.8	5.4	5.8	6.0	6.4	7.0	1.4
Non-OECD Americas	0.9	0.9	0.9	0.9	1.0	1.1	1.1	1.0
Brazil	0.5	0.6	0.5	0.6	0.6	0.7	0.7	0.8
Other	0.3	0.3	0.3	0.3	0.4	0.4	0.4	1.3
Total Non-OECD	108.4	111.5	124.9	129.2	131.2	134.0	137.5	0.8
Total World	152.0	153.3	168.6	173.2	174.4	176.9	180.2	0.6

^aIncludes the 50 States and the District of Columbia.

Note: Totals may not equal sum of components due to independent rounding.

Sources: History: U.S. Energy Information Administration (EIA), International Energy Statistics database (as of May 2015), www.eia.gov/ies.

Projections: EIA, *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo; and World Energy Projection System Plus (2016), run IEO2016-reference_final_2016.02.19_115008.

Table A8. World nuclear energy consumption by region, Reference case, 2011–40
(billion kilowatthours)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	888	867	902	891	901	900	924	0.2
United States ^a	790	769	804	808	808	812	833	0.3
Canada	88	89	86	72	72	67	62	-1.3
Mexico and Chile	9	8	12	12	20	20	29	4.5
OECD Europe	861	837	845	879	930	948	896	0.2
OECD Asia	304	161	381	437	457	450	427	3.5
Japan	156	17	167	180	175	169	146	7.9
South Korea	148	144	214	258	281	281	281	2.4
Australia and New Zealand	0	0	0	0	0	0	0	—
Total OECD	2,053	1,865	2,128	2,208	2,287	2,298	2,246	0.7
Non-OECD								
Non-OECD Europe and Eurasia	275	279	376	415	411	412	413	1.4
Russia	162	166	234	267	239	228	223	1.0
Other	113	112	141	148	171	183	190	1.9
Non-OECD Asia	156	166	459	662	1,051	1,297	1,559	8.3
China	83	93	329	452	754	983	1,212	9.6
India	29	30	67	117	206	222	248	7.9
Other	44	44	63	93	92	92	98	2.9
Middle East	0	1	40	63	95	128	152	18.4
Africa	13	12	14	21	28	35	42	4.5
Non-OECD Americas	21	21	35	35	74	81	89	5.3
Brazil	15	15	23	23	54	54	54	4.7
Other	6	6	12	12	20	27	34	6.5
Total Non-OECD	465	480	924	1,196	1,659	1,953	2,255	5.7
Total World	2,518	2,345	3,051	3,404	3,946	4,251	4,501	2.4

^aIncludes the 50 States and the District of Columbia.

Note: Totals may not equal sum of components due to independent rounding.

Sources: History: U.S. Energy Information Administration (EIA), International Energy Statistics database (as of May 2015), www.eia.gov/ies.

Projections: EIA, *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo; and World Energy Projection System Plus (2016), run IEO2016-reference_final_2016.02.19_115008.

Table A9. World consumption of hydroelectricity and other renewable energy by region, Reference case, 2011–40 (quadrillion Btu)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	13.1	12.9	15.6	16.6	17.5	18.6	20.3	1.6
United States ^a	7.9	7.7	9.3	9.7	9.9	10.4	11.3	1.4
Canada	4.3	4.2	4.8	5.1	5.5	5.8	6.3	1.4
Mexico and Chile	0.9	1.0	1.5	1.8	2.1	2.4	2.7	3.7
OECD Europe	10.7	11.5	15.7	16.7	17.3	18.5	19.6	1.9
OECD Asia	2.5	2.5	4.1	4.6	5.1	5.4	5.7	3.0
Japan	1.6	1.6	2.3	2.5	2.7	2.8	2.7	2.0
South Korea	0.2	0.2	0.7	0.8	1.0	1.1	1.2	7.1
Australia and New Zealand	0.7	0.7	1.2	1.2	1.4	1.5	1.8	3.2
Total OECD	26.3	27.0	35.5	37.9	39.8	42.5	45.5	1.9
Non-OECD								
Non-OECD Europe and Eurasia	3.0	3.0	3.4	3.8	4.0	4.3	4.4	1.4
Russia	1.7	1.7	1.8	2.2	2.4	2.5	2.5	1.3
Other	1.3	1.3	1.6	1.6	1.6	1.8	1.9	1.5
Non-OECD Asia	16.1	18.8	31.5	37.1	42.1	47.2	52.6	3.7
China	8.9	11.4	21.0	23.7	26.2	28.8	31.3	3.7
India	3.3	3.3	4.7	6.4	7.7	9.1	10.8	4.3
Other	3.9	4.1	5.8	7.1	8.2	9.3	10.5	3.4
Middle East	0.2	0.2	0.8	1.4	1.6	2.3	2.6	9.0
Africa	4.3	4.5	5.4	6.8	7.8	9.0	10.3	3.0
Non-OECD Americas	10.4	10.3	10.5	11.9	12.8	14.3	15.9	1.6
Brazil	7.0	6.8	7.0	8.0	8.6	9.8	11.1	1.7
Other	3.5	3.4	3.5	3.9	4.2	4.5	4.9	1.2
Total Non-OECD	34.1	36.8	51.5	60.9	68.3	77.0	85.8	3.1
Total World	60.4	63.8	87.0	98.8	108.1	119.5	131.4	2.6

^aIncludes the 50 States and the District of Columbia.

Notes: Totals may not equal sum of components due to independent rounding. U.S. totals include net electricity imports, methanol, and liquid hydrogen. Other renewable energy includes wind, geothermal, solar, biomass, waste, and tide/wave/ocean.

Sources: History: U.S. Energy Information Administration (EIA), International Energy Statistics database (as of May 2015), www.eia.gov/ies; and International Energy Agency, "Balances of OECD and Non-OECD Statistics" (2014), www.iea.org (subscription site). Projections: EIA, *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo; and World Energy Projection System Plus (2016), run IEO2016-reference_final_2016.02.19_115008.

Table A10. World carbon dioxide emissions by region, Reference case, 2011–40
(million metric tons carbon dioxide)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	6,558	6,343	6,569	6,620	6,675	6,769	6,887	0.3
United States ^a	5,483	5,272	5,499	5,511	5,514	5,521	5,549	0.2
Canada	562	563	557	577	587	621	647	0.5
Mexico and Chile	513	508	513	533	573	628	690	1.1
OECD Europe	4,193	4,124	4,096	4,170	4,252	4,317	4,415	0.2
OECD Asia	2,270	2,322	2,361	2,388	2,407	2,460	2,513	0.3
Japan	1,185	1,247	1,176	1,175	1,159	1,144	1,111	-0.4
South Korea	642	639	734	742	761	803	850	1.0
Australia and New Zealand	442	436	451	470	487	513	552	0.8
Total OECD	13,021	12,790	13,026	13,178	13,334	13,547	13,815	0.3
Non-OECD								
Non-OECD Europe and Eurasia	2,845	2,938	2,914	3,038	3,128	3,198	3,170	0.3
Russia	1,695	1,795	1,814	1,862	1,897	1,924	1,864	0.1
Other	1,150	1,143	1,100	1,176	1,231	1,275	1,306	0.5
Non-OECD Asia	11,785	12,195	14,456	15,505	16,386	17,482	18,682	1.5
China	8,119	8,378	9,861	10,371	10,636	10,878	11,051	1.0
India	1,663	1,778	2,143	2,394	2,693	3,161	3,732	2.7
Other	2,003	2,038	2,452	2,740	3,057	3,443	3,898	2.3
Middle East	1,828	1,894	2,399	2,608	2,887	3,171	3,446	2.2
Africa	1,120	1,184	1,438	1,594	1,760	1,973	2,239	2.3
Non-OECD Americas	1,242	1,271	1,398	1,509	1,608	1,725	1,865	1.4
Brazil	475	501	549	599	650	704	764	1.5
Other	767	769	849	910	958	1,021	1,101	1.3
Total Non-OECD	18,818	19,481	22,605	24,254	25,769	27,549	29,402	1.5
Total World	31,839	32,271	35,631	37,432	39,103	41,096	43,217	1.0

^aIncludes the 50 States and the District of Columbia.

Notes: Totals may not equal sum of components due to independent rounding. The U.S. numbers include carbon dioxide emissions from electricity generation using nonbiogenic municipal solid waste and geothermal energy.

Sources: History: U.S. Energy Information Administration (EIA), International Energy Statistics database (as of May 2015), www.eia.gov/ies.

Projections: EIA, *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo; and World Energy Projection System Plus (2016), run IEO2016-reference_final_2016.02.19_115008.

Table A11. World carbon dioxide emissions from liquids use by region, Reference case, 2011–40
(million metric tons carbon dioxide)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	2,881	2,838	2,861	2,812	2,785	2,794	2,812	0.0
United States ^a	2,291	2,240	2,269	2,227	2,182	2,163	2,147	-0.2
Canada	289	291	291	289	290	295	304	0.2
Mexico and Chile	301	307	301	296	313	335	361	0.6
OECD Europe	1,969	1,903	1,823	1,804	1,815	1,832	1,854	-0.1
OECD Asia	942	980	912	897	892	892	891	-0.3
Japan	537	568	473	452	442	430	411	-1.1
South Korea	248	253	263	264	267	272	280	0.4
Australia and New Zealand	157	160	176	181	184	189	199	0.8
Total OECD	5,792	5,721	5,595	5,513	5,492	5,517	5,557	-0.1
Non-OECD								
Non-OECD Europe and Eurasia	698	723	807	852	860	865	855	0.6
Russia	425	436	485	506	501	498	481	0.3
Other	273	286	322	346	358	366	374	1.0
Non-OECD Asia	2,706	2,786	3,501	3,854	4,219	4,632	5,090	2.2
China	1,257	1,306	1,665	1,806	1,932	2,038	2,124	1.8
India	414	435	573	657	756	889	1,055	3.2
Other	1,035	1,045	1,263	1,391	1,531	1,705	1,910	2.2
Middle East	1,050	1,068	1,401	1,452	1,560	1,696	1,814	1.9
Africa	481	495	639	714	776	858	977	2.5
Non-OECD Americas	878	902	990	1,052	1,106	1,170	1,251	1.2
Brazil	376	390	424	463	500	538	578	1.4
Other	502	512	566	589	606	632	672	1.0
Total Non-OECD	5,812	5,974	7,339	7,925	8,521	9,220	9,987	1.9
Total World	11,604	11,695	12,934	13,439	14,013	14,737	15,543	1.0

^aIncludes the 50 States and the District of Columbia.

Note: Totals may not equal sum of components due to independent rounding.

Sources: History: U.S. Energy Information Administration (EIA), International Energy Statistics database (as of May 2015), www.eia.gov/ies.

Projections: EIA, *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo; and World Energy Projection System Plus (2016), run IEO2016-reference_final_2016.02.19_115008.

Table A12. World carbon dioxide emissions from natural gas use by region, Reference case, 2011–40
(million metric tons carbon dioxide)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	1,666	1,715	1,766	1,849	1,965	2,063	2,167	0.8
United States ^a	1,305	1,363	1,394	1,432	1,497	1,538	1,586	0.5
Canada	205	205	213	234	261	287	310	1.5
Mexico and Chile	156	147	158	184	207	238	271	2.2
OECD Europe	1,016	970	1,046	1,122	1,218	1,291	1,383	1.3
OECD Asia	435	446	506	556	588	641	691	1.6
Japan	251	260	288	316	321	332	337	0.9
South Korea	98	105	126	131	140	160	177	1.9
Australia and New Zealand	86	80	92	109	127	149	177	2.9
Total OECD	3,117	3,131	3,317	3,527	3,771	3,995	4,241	1.1
Non-OECD								
Non-OECD Europe and Eurasia	1,240	1,255	1,227	1,301	1,364	1,416	1,415	0.4
Russia	834	855	835	860	881	897	871	0.1
Other	405	400	392	441	484	519	544	1.1
Non-OECD Asia	797	825	1,139	1,492	1,867	2,333	2,788	4.4
China	257	281	506	750	973	1,256	1,527	6.2
India	125	117	130	162	212	277	339	3.9
Other	415	426	504	580	682	800	923	2.8
Middle East	771	817	987	1,142	1,310	1,456	1,609	2.5
Africa	219	251	306	349	429	524	621	3.3
Non-OECD Americas	285	289	329	372	411	458	509	2.0
Brazil	50	60	76	84	94	106	122	2.6
Other	235	229	254	288	318	352	387	1.9
Total Non-OECD	3,312	3,436	3,989	4,656	5,382	6,188	6,943	2.5
Total World	6,429	6,566	7,306	8,183	9,153	10,183	11,184	1.9

^aIncludes the 50 States and the District of Columbia.

Note: Totals may not equal sum of components due to independent rounding.

Sources: History: U.S. Energy Information Administration (EIA), International Energy Statistics database (as of May 2015), www.eia.gov/ies.

Projections: EIA, *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo; and World Energy Projection System Plus (2016), run IEO2016-reference_final_2016.02.19_115008.

Table A13. World carbon dioxide emissions from coal use by region, Reference case, 2011–40
(million metric tons carbon dioxide)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	2,000	1,779	1,931	1,947	1,912	1,901	1,896	0.2
United States ^a	1,876	1,657	1,824	1,840	1,822	1,808	1,804	0.3
Canada	68	68	53	54	36	38	33	-2.5
Mexico and Chile	56	54	53	53	54	55	58	0.3
OECD Europe	1,208	1,251	1,228	1,244	1,219	1,195	1,178	-0.2
OECD Asia	892	896	943	935	927	927	932	0.1
Japan	397	419	415	407	396	382	363	-0.5
South Korea	296	281	345	347	355	371	394	1.2
Australia and New Zealand	199	196	183	180	177	174	176	-0.4
Total OECD	4,100	3,926	4,102	4,126	4,058	4,023	4,005	0.1
Non-OECD								
Non-OECD Europe and Eurasia	907	961	880	885	904	917	900	-0.2
Russia	435	504	494	496	515	528	512	0.1
Other	472	457	386	389	389	389	388	-0.6
Non-OECD Asia	8,282	8,584	9,816	10,159	10,300	10,518	10,804	0.8
China	6,605	6,791	7,690	7,815	7,731	7,585	7,400	0.3
India	1,124	1,226	1,441	1,574	1,726	1,995	2,338	2.3
Other	553	567	685	770	844	938	1,066	2.3
Middle East	7	9	11	14	17	19	22	3.2
Africa	420	438	493	531	555	590	641	1.4
Non-OECD Americas	79	80	78	84	90	97	105	1.0
Brazil	49	51	48	52	56	60	64	0.8
Other	30	29	30	32	34	37	41	1.3
Total Non-OECD	9,695	10,072	11,278	11,673	11,866	12,142	12,472	0.8
Total World	13,795	13,998	15,379	15,799	15,924	16,165	16,478	0.6

^aIncludes the 50 States and the District of Columbia.

Note: Totals may not equal sum of components due to independent rounding.

Sources: History: U.S. Energy Information Administration (EIA), International Energy Statistics database (as of May 2015), www.eia.gov/ies.

Projections: EIA, *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo; and World Energy Projection System Plus (2016), run IEO2016-reference_final_2016.02.19_115008.

Table A14. World population by region, Reference case, 2011–40
(millions)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	484	489	523	544	564	581	597	0.7
United States ^a	312	315	334	347	359	370	380	0.7
Canada	34	35	38	39	41	43	44	0.8
Mexico and Chile	137	139	151	158	164	169	173	0.8
OECD Europe	548	550	565	571	576	579	581	0.2
OECD Asia	203	204	207	208	208	207	206	0.0
Japan	127	127	125	123	120	117	114	-0.4
South Korea	49	49	51	52	52	52	52	0.2
Australia and New Zealand	27	27	31	33	36	38	40	1.3
Total OECD	1,235	1,243	1,295	1,323	1,348	1,368	1,384	0.4
Non-OECD								
Non-OECD Europe and Eurasia	343	343	343	341	337	333	329	-0.1
Russia	143	143	140	137	133	130	127	-0.4
Other	199	200	203	204	204	203	203	0.1
Non-OECD Asia	3,691	3,730	4,013	4,159	4,278	4,373	4,443	0.6
China	1,373	1,381	1,435	1,450	1,453	1,448	1,434	0.1
India	1,229	1,244	1,360	1,425	1,482	1,530	1,569	0.8
Other	1,089	1,104	1,218	1,284	1,343	1,396	1,441	1.0
Middle East	210	214	249	271	293	316	340	1.7
Africa	1,045	1,070	1,284	1,429	1,583	1,745	1,916	2.1
Non-OECD Americas	467	473	515	540	562	583	601	0.9
Brazil	198	200	212	218	223	227	230	0.5
Other	270	273	304	322	339	356	372	1.1
Total Non-OECD	5,756	5,830	6,404	6,739	7,054	7,351	7,630	1.0
Total World	6,991	7,073	7,699	8,063	8,402	8,719	9,014	0.9

^aIncludes the 50 States and the District of Columbia.

Note: Totals may not equal sum of components due to independent rounding.

Sources: Oxford Economic Model (June 2015), www.oxfordeconomics.com (subscription site); and EIA, *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2013 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo.