

Appendix A

Reference case

Table A1. Total energy supply, disposition, and price summary
(quadrillion Btu per year, unless otherwise noted)

Supply, disposition, and prices	Reference case							Annual growth 2013-2040 (percent)
	2012	2013	2020	2025	2030	2035	2040	
Production								
Crude oil and lease condensate	13.7	15.6	22.2	21.5	21.1	19.8	19.9	0.9%
Natural gas plant liquids	3.3	3.6	5.5	5.7	5.7	5.6	5.5	1.7%
Dry natural gas	24.6	25.1	29.6	31.3	33.9	35.1	36.4	1.4%
Coal ¹	20.7	20.0	21.7	22.2	22.5	22.5	22.6	0.5%
Nuclear / uranium ²	8.1	8.3	8.4	8.5	8.5	8.5	8.7	0.2%
Conventional hydroelectric power	2.6	2.5	2.8	2.8	2.8	2.8	2.8	0.4%
Biomass ³	4.0	4.2	4.4	4.6	4.6	4.7	5.0	0.7%
Other renewable energy ⁴	1.9	2.3	3.2	3.4	3.6	4.1	4.6	2.7%
Other ⁵	0.8	1.3	0.9	0.9	0.9	0.9	1.0	-1.0%
Total	79.6	82.7	98.7	100.9	103.7	103.9	106.6	0.9%
Imports								
Crude oil	18.7	17.0	13.6	14.9	15.7	17.7	18.2	0.3%
Petroleum and other liquids ⁶	4.2	4.3	4.6	4.5	4.4	4.3	4.1	-0.2%
Natural gas ⁷	3.2	2.9	1.9	1.7	1.6	1.5	1.7	-1.9%
Other imports ⁸	0.3	0.3	0.1	0.1	0.1	0.1	0.1	-5.2%
Total	26.4	24.5	20.2	21.3	21.7	23.6	24.1	-0.1%
Exports								
Petroleum and other liquids ⁹	6.5	7.3	11.2	12.0	12.6	13.3	13.7	2.4%
Natural gas ¹⁰	1.6	1.6	4.5	5.2	6.4	6.8	7.4	5.9%
Coal	3.1	2.9	2.5	2.9	3.3	3.4	3.5	0.8%
Total	11.2	11.7	18.1	20.1	22.4	23.4	24.6	2.8%
Discrepancy ¹¹	0.4	-1.6	-0.1	0.0	0.2	0.3	0.3	--
Consumption								
Petroleum and other liquids ¹²	35.2	35.9	37.1	36.9	36.5	36.3	36.2	0.0%
Natural gas	26.1	26.9	26.8	27.6	28.8	29.6	30.5	0.5%
Coal ¹³	17.3	18.0	19.2	19.3	19.2	19.0	19.0	0.2%
Nuclear / uranium ²	8.1	8.3	8.4	8.5	8.5	8.5	8.7	0.2%
Conventional hydroelectric power	2.6	2.5	2.8	2.8	2.8	2.8	2.8	0.4%
Biomass ¹⁴	2.8	2.9	3.0	3.2	3.2	3.2	3.5	0.7%
Other renewable energy ⁴	1.9	2.3	3.2	3.4	3.6	4.1	4.6	2.7%
Other ¹⁵	0.4	0.4	0.3	0.3	0.3	0.3	0.3	-0.7%
Total	94.4	97.1	100.8	102.0	102.9	103.8	105.7	0.3%
Prices (2013 dollars per unit)								
Crude oil spot prices (dollars per barrel)								
Brent	113	109	79	91	106	122	141	1.0%
West Texas Intermediate	96	98	73	85	99	116	136	1.2%
Natural gas at Henry Hub (dollars per million Btu) ..	2.79	3.73	4.88	5.46	5.69	6.60	7.85	2.8%
Coal (dollars per ton)								
at the minemouth ¹⁶	40.5	37.2	37.9	40.3	43.7	46.7	49.2	1.0%
Coal (dollars per million Btu)								
at the minemouth ¹⁶	2.01	1.84	1.88	2.02	2.18	2.32	2.44	1.0%
Average end-use ¹⁷	2.63	2.50	2.54	2.71	2.84	2.96	3.09	0.8%
Average electricity (cents per kilowatthour)	10.0	10.1	10.5	11.0	11.1	11.3	11.8	0.6%

Table A1. Total energy supply, disposition, and price summary (continued)
(quadrillion Btu per year, unless otherwise noted)

Supply, disposition, and prices	Reference case							Annual growth 2013-2040 (percent)
	2012	2013	2020	2025	2030	2035	2040	
Prices (nominal dollars per unit)								
Crude oil spot prices (dollars per barrel)								
Brent	112	109	90	112	142	180	229	2.8%
West Texas Intermediate	94	98	83	105	133	171	220	3.0%
Natural gas at Henry Hub (dollars per million Btu).	2.75	3.73	5.54	6.72	7.63	9.70	12.73	4.7%
Coal (dollars per ton)								
at the minemouth ¹⁶	40.0	37.2	43.0	49.7	58.6	68.6	79.8	2.9%
Coal (dollars per million Btu)								
at the minemouth ¹⁶	1.98	1.84	2.14	2.48	2.92	3.41	3.96	2.9%
Average end-use ¹⁷	2.59	2.50	2.88	3.33	3.81	4.35	5.00	2.6%
Average electricity (cents per kilowatthour)	9.8	10.1	11.9	13.5	14.8	16.6	19.2	2.4%

¹Includes waste coal.

²These values represent the energy obtained from uranium when it is used in light water reactors. The total energy content of uranium is much larger, but alternative processes are required to take advantage of it.

³Includes grid-connected electricity from wood and wood waste; biomass, such as corn, used for liquid fuels production; and non-electric energy demand from wood. Refer to Table A17 for details.

⁴Includes grid-connected electricity from landfill gas; biogenic municipal waste; wind; photovoltaic and solar thermal sources; and non-electric energy from renewable sources, such as active and passive solar systems. Excludes electricity imports using renewable sources and nonmarketed renewable energy. See Table A17 for selected nonmarketed residential and commercial renewable energy data.

⁵Includes non-biogenic municipal waste, liquid hydrogen, methanol, and some domestic inputs to refineries.

⁶Includes imports of finished petroleum products, unfinished oils, alcohols, ethers, blending components, and renewable fuels such as ethanol.

⁷Includes imports of liquefied natural gas that are later re-exported.

⁸Includes coal, coal coke (net), and electricity (net). Excludes imports of fuel used in nuclear power plants.

⁹Includes crude oil, petroleum products, ethanol, and biodiesel.

¹⁰Includes re-exported liquefied natural gas.

¹¹Balancing item. Includes unaccounted for supply, losses, gains, and net storage withdrawals.

¹²Estimated consumption. Includes petroleum-derived fuels and non-petroleum derived fuels, such as ethanol and biodiesel, and coal-based synthetic liquids. Petroleum coke, which is a solid, is included. Also included are hydrocarbon gas liquids and crude oil consumed as a fuel. Refer to Table A17 for detailed renewable liquid fuels consumption.

¹³Excludes coal converted to coal-based synthetic liquids and natural gas.

¹⁴Includes grid-connected electricity from wood and wood waste, non-electric energy from wood, and biofuels heat and coproducts used in the production of liquid fuels, but excludes the energy content of the liquid fuels.

¹⁵Includes non-biogenic municipal waste, liquid hydrogen, and net electricity imports.

¹⁶Includes reported prices for both open market and captive mines. Prices weighted by production, which differs from average minemouth prices published in EIA data reports where it is weighted by reported sales.

¹⁷Prices weighted by consumption; weighted average excludes export free-alongside-ship (f.a.s.) prices.

Btu = British thermal unit.

-- = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2012 and 2013 are model results and may differ from official EIA data reports.

Sources: 2012 natural gas supply values: U.S. Energy Information Administration (EIA), *Natural Gas Annual 2013*, DOE/EIA-0131(2013) (Washington, DC, October 2014). 2013 natural gas supply values: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2014/07) (Washington, DC, July 2014). 2012 and 2013 coal minemouth and delivered coal prices: EIA, *Annual Coal Report 2013*, DOE/EIA-0584(2013) (Washington, DC, January 2015). 2013 petroleum supply values and 2012 crude oil and lease condensate production: EIA, *Petroleum Supply Annual 2013*, DOE/EIA-0340(2013)/1 (Washington, DC, September 2014). Other 2012 petroleum supply values: EIA, *Petroleum Supply Annual 2012*, DOE/EIA-0340(2012)/1 (Washington, DC, September 2013). 2012 and 2013 crude oil spot prices and natural gas spot price at Henry Hub: Thomson Reuters. Other 2012 and 2013 coal values: *Quarterly Coal Report, October-December 2013*, DOE/EIA-0121(2013/4Q) (Washington, DC, March 2014). Other 2012 and 2013 values: EIA, *Monthly Energy Review*, DOE/EIA-0035(2014/11) (Washington, DC, November 2014). **Projections:** EIA, AEO2015 National Energy Modeling System run REF2015.D021915A.