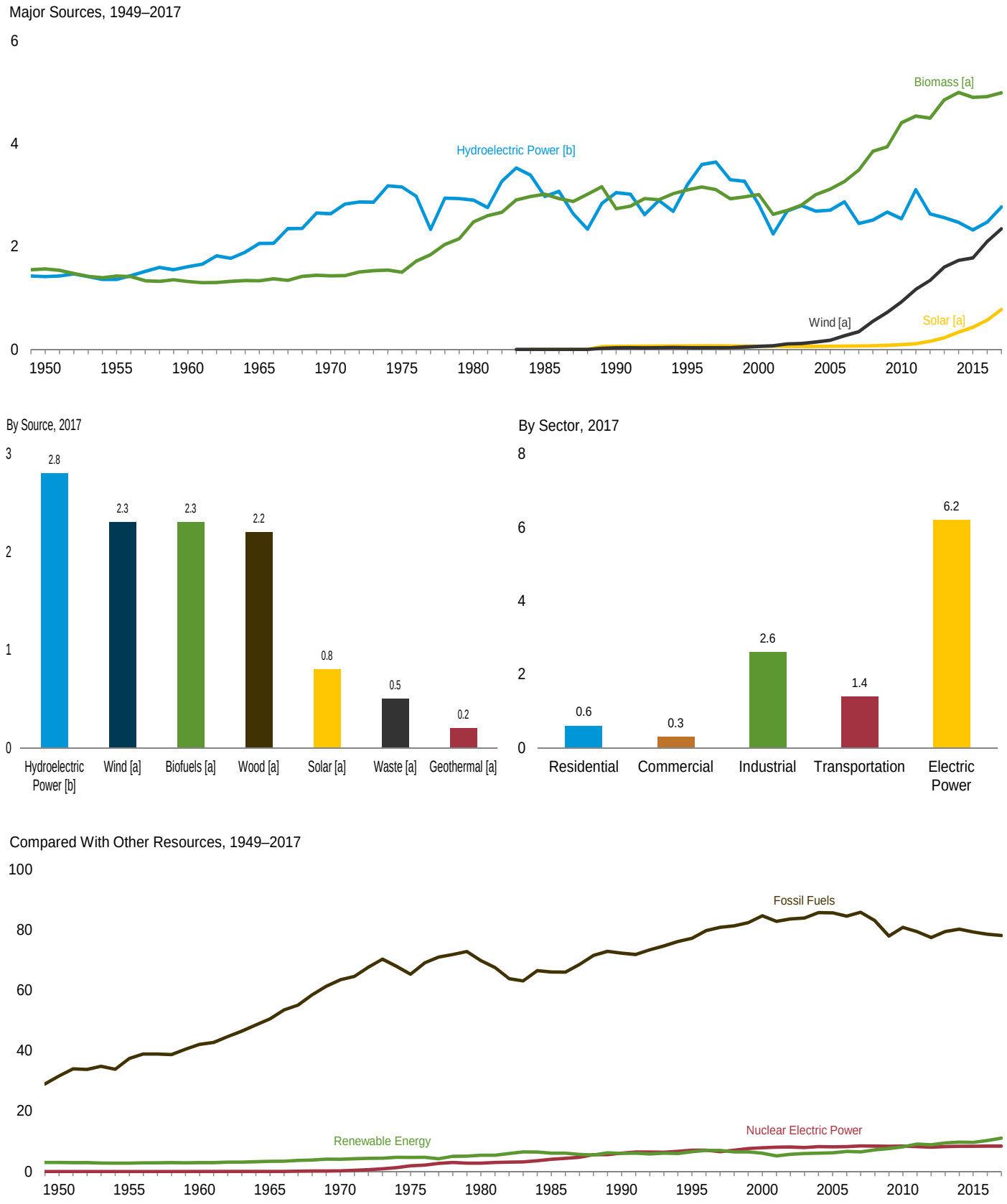
10. Renewable Energy

Figure 10.1 Renewable Energy Consumption

(Quadrillion Btu)



[a] See Table 10.1 for definition.
[b] Conventional hydroelectric power.

Web Page: http://www.eia.gov/totalenergy/data/monthly/#renewable.
Sources: Tables 1.3 and 10.1–10.2c.

Table 10.1 Renewable Energy Production and Consumption by Source

(Trillion Btu)

	Production[a]			Consumption								
	Biomass		Total Renewable Energy[d]	Hydroelectric Power[e]	Geothermal[f]	Solar[g]	Wind[h]	Biomass				Total Renewable Energy
	Biofuels[b]	Total[c]						Wood[i]	Waste[j]	Biofuels[k]	Total	
1950 Total	**NA**	**1,562**	**2,978**	**1,415**	**NA**	**NA**	**NA**	**1,562**	**NA**	**NA**	**1,562**	**2,978**
1955 Total	**NA**	**1,424**	**2,784**	**1,360**	**NA**	**NA**	**NA**	**1,424**	**NA**	**NA**	**1,424**	**2,784**
1960 Total	**NA**	**1,320**	**2,928**	**1,608**	**(s)**	**NA**	**NA**	**1,320**	**NA**	**NA**	**1,320**	**2,928**
1965 Total	**NA**	**1,335**	**3,396**	**2,059**	**2**	**NA**	**NA**	**1,335**	**NA**	**NA**	**1,335**	**3,396**
1970 Total	**NA**	**1,431**	**4,070**	**2,634**	**6**	**NA**	**NA**	**1,429**	**2**	**NA**	**1,431**	**4,070**
1975 Total	**NA**	**1,499**	**4,687**	**3,155**	**34**	**NA**	**NA**	**1,497**	**2**	**NA**	**1,499**	**4,687**
1980 Total	**NA**	**2,475**	**5,428**	**2,900**	**53**	**NA**	**NA**	**2,474**	**2**	**NA**	**2,475**	**5,428**
1985 Total	**93**	**3,016**	**6,084**	**2,970**	**97**	**(s)**	**(s)**	**2,687**	**236**	**93**	**3,016**	**6,084**
1990 Total	**111**	**2,735**	**6,040**	**3,046**	**171**	**59**	**29**	**2,216**	**408**	**111**	**2,735**	**6,040**
1995 Total	**198**	**3,099**	**6,557**	**3,205**	**152**	**68**	**33**	**2,370**	**531**	**200**	**3,101**	**6,559**
2000 Total	**233**	**3,006**	**6,102**	**2,811**	**164**	**63**	**57**	**2,262**	**511**	**236**	**3,008**	**6,104**
2001 Total	**254**	**2,624**	**5,162**	**2,242**	**164**	**62**	**70**	**2,006**	**364**	**253**	**2,622**	**5,160**
2002 Total	**308**	**2,705**	**5,731**	**2,689**	**171**	**60**	**105**	**1,995**	**402**	**303**	**2,701**	**5,726**
2003 Total	**401**	**2,805**	**5,942**	**2,793**	**173**	**58**	**113**	**2,002**	**401**	**403**	**2,806**	**5,944**
2004 Total	**486**	**2,996**	**6,063**	**2,688**	**178**	**58**	**142**	**2,121**	**389**	**498**	**3,008**	**6,075**
2005 Total	**561**	**3,101**	**6,221**	**2,703**	**181**	**58**	**178**	**2,137**	**403**	**574**	**3,114**	**6,233**
2006 Total	**716**	**3,212**	**6,586**	**2,869**	**181**	**61**	**264**	**2,099**	**397**	**766**	**3,262**	**6,637**
2007 Total	**970**	**3,472**	**6,510**	**2,446**	**186**	**65**	**341**	**2,089**	**413**	**983**	**3,485**	**6,523**
2008 Total	**1,374**	**3,868**	**7,191**	**2,511**	**192**	**74**	**546**	**2,059**	**435**	**1,357**	**3,851**	**7,174**
2009 Total	**1,570**	**3,953**	**7,620**	**2,669**	**200**	**78**	**721**	**1,931**	**452**	**1,553**	**3,936**	**7,604**
2010 Total	**1,868**	**4,452**	**8,212**	**2,539**	**208**	**90**	**923**	**2,116**	**468**	**1,821**	**4,405**	**8,166**
2011 Total	**2,029**	**4,630**	**9,224**	**3,103**	**212**	**111**	**1,168**	**2,139**	**462**	**1,933**	**4,534**	**9,128**
2012 Total	**1,929**	**4,529**	**8,866**	**2,629**	**212**	**157**	**1,340**	**2,133**	**467**	**1,892**	**4,492**	**8,829**
2013 Total	**1,981**	**4,824**	**9,426**	**2,562**	**214**	**225**	**1,601**	**2,347**	**496**	**2,007**	**4,850**	**9,452**
2014 Total	**2,103**	**5,029**	**9,774**	**2,467**	**214**	**337**	**1,728**	**2,410**	**516**	**2,067**	**4,992**	**9,738**
2015 Total	**2,161**	**4,914**	**9,650**	**2,321**	**212**	**426**	**1,777**	**2,235**	**518**	**2,145**	**4,898**	**9,634**
2016 January	185	417	867	236	18	26	170	184	42	171	398	848
February	176	396	857	223	17	35	186	173	40	173	387	848
March	190	417	933	253	18	43	203	177	44	187	408	924
April	175	388	883	239	16	48	192	166	43	173	382	877
May	189	411	894	235	18	55	174	173	43	192	408	891
June	189	412	850	215	17	56	151	175	40	192	407	845
July	196	422	862	198	17	61	163	181	41	201	423	863
August	198	429	814	181	18	61	125	183	42	204	429	813
September	187	405	780	151	17	55	151	172	39	194	404	780
October	194	412	827	160	18	49	188	172	41	195	407	822
November	192	415	827	174	18	41	179	175	43	195	413	825
December	203	456	933	208	19	37	214	200	45	202	447	924
Total	**2,275**	**4,982**	**10,328**	**2,472**	**210**	**569**	**2,096**	**2,131**	**503**	**2,279**	**4,913**	**10,260**
2017 January	197	437	918	247	18	33	183	188	45	181	414	895
February	177	390	860	218	16	40	195	168	40	166	374	843
March	197	434	1,014	270	18	62	230	186	43	191	421	1,001
April	183	404	989	271	18	69	227	175	41	184	400	984
May	197	423	1,026	298	17	81	207	179	41	201	422	1,025
June	192	419	982	278	16	86	183	180	40	199	419	983
July	196	431	923	244	18	83	147	189	41	197	426	918
August	203	441	865	201	18	79	125	191	41	205	437	861
September	192	413	843	176	17	73	164	175	38	190	403	834
October	201	429	916	168	17	68	233	182	40	197	419	905
November	203	434	913	189	17	50	222	183	42	194	418	896
December	205	449	950	206	20	49	226	192	43	196	431	932
Total	**2,344**	**5,105**	**11,200**	**2,767**	**210**	**774**	**2,343**	**2,187**	**495**	**2,302**	**4,984**	**11,078**
2018 January	198	440	991	236	18	50	248	192	44	190	426	977
February	182	408	940	235	17	58	222	176	41	164	381	913
March	200	437	1,021	239	18	76	251	187	44	190	421	1,006
April	190	418	1,024	253	17	89	247	180	41	178	399	1,005
May	201	433	1,049	280	19	99	217	187	41	200	427	1,042
June	200	432	1,038	258	18	107	224	185	40	194	419	1,025
July	210	448	935	221	19	100	148	192	40	201	432	919
August	212	451	945	197	19	99	180	192	40	205	438	932
September	193	416	862	172	18	90	166	179	36	183	399	845
9-Month Total	**1,787**	**3,883**	**8,805**	**2,092**	**162**	**766**	**1,902**	**1,669**	**367**	**1,705**	**3,742**	**8,664**
2017 9-Month Total	**1,735**	**3,792**	**8,421**	**2,203**	**157**	**608**	**1,661**	**1,630**	**370**	**1,715**	**3,716**	**8,345**
2016 9-Month Total	**1,686**	**3,699**	**7,741**	**1,931**	**155**	**441**	**1,515**	**1,584**	**375**	**1,687**	**3,646**	**7,688**

[a] For hydroelectric power, geothermal, solar, wind, and biomass waste, production equals consumption. For biofuels, production equals total biomass inputs to the production of fuel ethanol and biodiesel. For wood, through 2015, production equals consumption; beginning in 2016, production equals consumption plus densified biomass exports.

[b] Total biomass inputs to the production of fuel ethanol and biodiesel.

[c] Wood and wood-derived fuels, biomass waste, and total biomass inputs to the production of fuel ethanol and biodiesel.

[d] Hydroelectric power, geothermal, solar, wind, and biomass.

[e] Conventional hydroelectricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6).

[f] Geothermal electricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6), and geothermal heat pump and direct use energy.

[g] Solar photovoltaic (PV) and solar thermal electricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6), and solar thermal direct use energy.

[h] Wind electricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6).

[i] Wood and wood-derived fuels.

[j] Municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural byproducts, and other biomass. Through 2000, also includes non-renewable waste (municipal solid waste from non-biogenic sources, and tire-derived fuels).

[k] Fuel ethanol (minus denaturant), biodiesel, and other renewable fuels consumption; plus losses and co-products from the production of fuel ethanol and biodiesel.

NA=Not available. (s)=Less than 0.5 trillion Btu.

Notes: • Most data for the residential, commercial, industrial, and transportation sectors are estimates. See notes and sources for Tables 10.2a and 10.2b. • See Note, "Renewable Energy Production and Consumption," at end of section. • Totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 states and the District of Columbia.

Web Page: See http://www.eia.gov/totalenergy/data/monthly/#renewable (Excel and CSV files) for all available annual data beginning in 1949 and monthly data beginning in 1973.

Sources: • **Production:** Tables 10.2a–10.4 and U.S. Energy Information Administration, Form EIA-63C, "Densified Biomass Fuel Report." • **Consumption:** Tables 10.2a–10.2c.

Table 10.2a Renewable Energy Consumption: Residential and Commercial Sectors

(Trillion Btu)

	Residential Sector				Commercial Sector[a]								
			Biomass						Biomass				
	Geo-thermal[b]	Solar[c]	Wood[d]	Total	Hydro-electric Power[e]	Geo-thermal[b]	Solar[f]	Wind[g]	Wood[d]	Waste[h]	Fuel Ethanol[i,j]	Total	Total
1950 Total	**NA**	**NA**	**1,006**	**1,006**	**NA**	**NA**	**NA**	**NA**	**19**	**NA**	**NA**	**19**	**19**
1955 Total	**NA**	**NA**	**775**	**775**	**NA**	**NA**	**NA**	**NA**	**15**	**NA**	**NA**	**15**	**15**
1960 Total	**NA**	**NA**	**627**	**627**	**NA**	**NA**	**NA**	**NA**	**12**	**NA**	**NA**	**12**	**12**
1965 Total	**NA**	**NA**	**468**	**468**	**NA**	**NA**	**NA**	**NA**	**9**	**NA**	**NA**	**9**	**9**
1970 Total	**NA**	**NA**	**401**	**401**	**NA**	**NA**	**NA**	**NA**	**8**	**NA**	**NA**	**8**	**8**
1975 Total	**NA**	**NA**	**425**	**425**	**NA**	**NA**	**NA**	**NA**	**8**	**NA**	**NA**	**8**	**8**
1980 Total	**NA**	**NA**	**850**	**850**	**NA**	**NA**	**NA**	**NA**	**21**	**NA**	**NA**	**21**	**21**
1985 Total	**NA**	**NA**	**1,010**	**1,010**	**NA**	**NA**	**NA**	**NA**	**24**	**NA**	**(s)**	**24**	**24**
1990 Total	**6**	**55**	**580**	**640**	**1**	**3**	**(s)**	**–**	**66**	**28**	**(s)**	**94**	**98**
1995 Total	**7**	**63**	**520**	**589**	**1**	**5**	**(s)**	**–**	**72**	**40**	**(s)**	**113**	**119**
2000 Total	**9**	**58**	**420**	**486**	**1**	**8**	**1**	**–**	**71**	**47**	**(s)**	**119**	**128**
2001 Total	**9**	**55**	**370**	**435**	**1**	**8**	**1**	**–**	**67**	**25**	**(s)**	**92**	**101**
2002 Total	**10**	**53**	**380**	**443**	**(s)**	**9**	**1**	**–**	**69**	**26**	**(s)**	**95**	**105**
2003 Total	**13**	**52**	**400**	**465**	**1**	**11**	**1**	**–**	**71**	**29**	**1**	**101**	**114**
2004 Total	**14**	**51**	**410**	**475**	**1**	**12**	**1**	**–**	**70**	**34**	**1**	**105**	**120**
2005 Total	**16**	**50**	**430**	**496**	**1**	**14**	**2**	**–**	**70**	**34**	**1**	**105**	**121**
2006 Total	**18**	**53**	**380**	**451**	**1**	**14**	**2**	**–**	**65**	**36**	**1**	**103**	**120**
2007 Total	**22**	**55**	**420**	**497**	**1**	**14**	**4**	**–**	**70**	**31**	**2**	**103**	**121**
2008 Total	**26**	**58**	**470**	**555**	**1**	**15**	**6**	**–**	**73**	**34**	**2**	**109**	**130**
2009 Total	**33**	**60**	**500**	**593**	**1**	**17**	**7**	**(s)**	**73**	**36**	**3**	**112**	**137**
2010 Total	**37**	**65**	**440**	**542**	**1**	**19**	**11**	**(s)**	**72**	**36**	**3**	**111**	**142**
2011 Total	**40**	**71**	**450**	**560**	**(s)**	**20**	**19**	**(s)**	**69**	**43**	**3**	**115**	**154**
2012 Total	**40**	**79**	**420**	**538**	**(s)**	**20**	**32**	**1**	**61**	**45**	**3**	**108**	**161**
2013 Total	**40**	**91**	**580**	**711**	**(s)**	**20**	**41**	**1**	**70**	**47**	**3**	**120**	**182**
2014 Total	**40**	**109**	**587**	**735**	**(s)**	**20**	**52**	**1**	**76**	**47**	**4**	**127**	**200**
2015 Total	**40**	**127**	**436**	**602**	**(s)**	**20**	**57**	**1**	**79**	**47**	**[j] 26**	**152**	**230**
2016 January	3	8	30	41	(s)	2	3	(s)	7	4	2	13	19
February	3	10	28	40	(s)	2	4	(s)	7	4	2	12	18
March	3	13	30	46	(s)	2	5	(s)	7	4	2	13	20
April	3	14	29	46	(s)	2	6	(s)	7	4	2	13	20
May	3	16	30	49	(s)	2	6	(s)	7	4	2	13	21
June	3	17	29	48	(s)	2	6	(s)	7	4	2	13	21
July	3	17	30	50	(s)	2	6	(s)	7	4	2	14	22
August	3	17	30	50	(s)	2	6	(s)	7	4	2	14	22
September	3	15	29	47	(s)	2	6	(s)	7	4	2	13	20
October	3	13	30	46	(s)	2	5	(s)	7	4	2	13	20
November	3	11	29	43	(s)	2	4	(s)	7	4	2	13	19
December	3	10	30	43	(s)	2	4	(s)	7	4	2	13	19
Total	**40**	**160**	**349**	**549**	**2**	**20**	**62**	**1**	**84**	**48**	**26**	**158**	**242**
2017 January	3	10	28	41	(s)	2	4	(s)	7	4	2	14	20
February	3	11	26	40	(s)	2	4	(s)	7	4	2	12	18
March	3	16	28	47	(s)	2	6	(s)	7	4	2	13	21
April	3	18	27	48	(s)	2	7	(s)	7	4	2	13	22
May	3	19	28	51	(s)	2	8	(s)	7	4	2	13	23
June	3	20	27	51	(s)	2	8	(s)	7	4	2	13	23
July	3	20	28	52	(s)	2	8	(s)	7	4	2	13	23
August	3	20	28	52	(s)	2	8	(s)	7	4	2	13	23
September	3	18	27	48	(s)	2	7	(s)	7	4	2	13	21
October	3	16	28	48	(s)	2	6	(s)	7	4	2	13	21
November	3	12	27	43	(s)	2	5	(s)	7	4	2	13	20
December	3	12	28	43	(s)	2	5	(s)	7	4	2	14	20
Total	**40**	**191**	**334**	**565**	**2**	**20**	**76**	**1**	**84**	**48**	**26**	**157**	**256**
2018 January	3	12	33	48	(s)	2	5	(s)	7	4	2	13	21
February	3	13	30	45	(s)	2	6	(s)	7	4	2	12	20
March	3	18	33	54	(s)	2	8	(s)	7	4	2	13	23
April	3	20	32	55	(s)	2	9	(s)	7	4	2	12	23
May	3	23	33	59	(s)	2	10	(s)	7	4	2	13	25
June	3	23	32	58	(s)	2	10	(s)	7	4	2	13	25
July	3	24	33	60	(s)	2	10	(s)	7	4	2	13	25
August	3	23	33	59	(s)	2	10	(s)	7	4	2	13	25
September	3	20	32	55	(s)	2	9	(s)	7	3	2	12	23
9-Month Total	**30**	**175**	**288**	**493**	**2**	**15**	**76**	**1**	**63**	**33**	**19**	**115**	**209**
2017 9-Month Total	**30**	**151**	**250**	**431**	**2**	**15**	**60**	**1**	**62**	**36**	**19**	**118**	**194**
2016 9-Month Total	**30**	**126**	**261**	**417**	**1**	**15**	**49**	**1**	**63**	**36**	**19**	**118**	**184**

[a] Commercial sector, including commercial combined-heat-and-power (CHP) and commercial electricity-only plants. See Note 2, "Classification of Power Plants Into Energy-Use Sectors," at end of Section 7.

[b] Geothermal heat pump and direct use energy.

[c] Distributed (small-scale) solar photovoltaic (PV) electricity generation in the residential sector (converted to Btu by multiplying by the fossil fuels heat rate factors in Table A6) and distributed solar thermal energy in the residential, commercial, and industrial sectors. See Table 10.5.

[d] Wood and wood-derived fuels.

[e] Conventional hydroelectricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6).

[f] Solar photovoltaic (PV) electricity net generation in the commercial sector (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6), both utility-scale and distributed (small-scale). See Table 10.5.

[g] Wind electricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6).

[h] Municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural byproducts, and other biomass. Through 2000, also includes non-renewable waste (municipal solid waste from non-biogenic sources, and tire-derived fuels).

[i] The fuel ethanol (minus denaturant) portion of motor fuels, such as E10, consumed by the commercial sector.

[j] There is a discontinuity in this time series between 2014 and 2015 due to a change in the method for allocating motor gasoline consumption to the end-use sectors. Beginning in 2015, the commercial and industrial sector shares of fuel ethanol consumption are larger than in 2014, while the transportation sector share is smaller.

NA=Not available. – =No data reported. (s)=Less than 0.5 trillion Btu.

Notes: • Data are estimates, except for commercial sector hydroelectric power, wind, and waste. • Totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 states and the District of Columbia.

Web Page: See http://www.eia.gov/totalenergy/data/monthly/#renewable (Excel and CSV files) for all available annual data beginning in 1949 and monthly data beginning in 1973.

Sources: See end of section.

Table 10.2b Renewable Energy Consumption: Industrial and Transportation Sectors

(Trillion Btu)

	Industrial Sector[a]										Transportation Sector		
					Biomass						Biomass		
	Hydroelectric Power[b]	Geothermal[c]	Solar[d]	Wind[e]	Wood[f]	Waste[g]	Fuel Ethanol[h,i]	Losses and Co-products[j]	Total	Total	Fuel Ethanol[i,k]	Biodiesel[l]	Total[m]
1950 Total	**69**	**NA**	**NA**	**NA**	**532**	**NA**	**NA**	**NA**	**532**	**602**	**NA**	**NA**	**NA**
1955 Total	**38**	**NA**	**NA**	**NA**	**631**	**NA**	**NA**	**NA**	**631**	**669**	**NA**	**NA**	**NA**
1960 Total	**39**	**NA**	**NA**	**NA**	**680**	**NA**	**NA**	**NA**	**680**	**719**	**NA**	**NA**	**NA**
1965 Total	**33**	**NA**	**NA**	**NA**	**855**	**NA**	**NA**	**NA**	**855**	**888**	**NA**	**NA**	**NA**
1970 Total	**34**	**NA**	**NA**	**NA**	**1,019**	**NA**	**NA**	**NA**	**1,019**	**1,053**	**NA**	**NA**	**NA**
1975 Total	**32**	**NA**	**NA**	**NA**	**1,063**	**NA**	**NA**	**NA**	**1,063**	**1,096**	**NA**	**NA**	**NA**
1980 Total	**33**	**NA**	**NA**	**NA**	**1,600**	**NA**	**NA**	**NA**	**1,600**	**1,633**	**NA**	**NA**	**NA**
1985 Total	**33**	**NA**	**NA**	**NA**	**1,645**	**230**	**1**	**42**	**1,918**	**1,951**	**50**	**NA**	**50**
1990 Total	**31**	**2**	**(s)**	**–**	**1,442**	**192**	**1**	**49**	**1,684**	**1,717**	**60**	**NA**	**60**
1995 Total	**55**	**3**	**(s)**	**–**	**1,652**	**195**	**2**	**86**	**1,934**	**1,992**	**112**	**NA**	**112**
2000 Total	**42**	**4**	**(s)**	**–**	**1,636**	**145**	**1**	**99**	**1,881**	**1,928**	**135**	**NA**	**135**
2001 Total	**33**	**5**	**(s)**	**–**	**1,443**	**129**	**3**	**108**	**1,681**	**1,719**	**141**	**1**	**142**
2002 Total	**39**	**5**	**(s)**	**–**	**1,396**	**146**	**3**	**130**	**1,676**	**1,720**	**168**	**2**	**170**
2003 Total	**43**	**3**	**(s)**	**–**	**1,363**	**142**	**4**	**168**	**1,678**	**1,725**	**228**	**2**	**230**
2004 Total	**33**	**4**	**(s)**	**–**	**1,476**	**132**	**6**	**201**	**1,815**	**1,852**	**286**	**3**	**290**
2005 Total	**32**	**4**	**(s)**	**–**	**1,452**	**148**	**7**	**227**	**1,834**	**1,871**	**327**	**12**	**339**
2006 Total	**29**	**4**	**1**	**–**	**1,472**	**130**	**10**	**280**	**1,892**	**1,926**	**442**	**33**	**475**
2007 Total	**16**	**5**	**1**	**–**	**1,413**	**145**	**10**	**369**	**1,937**	**1,958**	**557**	**45**	**602**
2008 Total	**17**	**5**	**1**	**–**	**1,339**	**143**	**12**	**519**	**2,012**	**2,035**	**786**	**39**	**825**
2009 Total	**18**	**4**	**2**	**–**	**1,178**	**154**	**13**	**603**	**1,948**	**1,972**	**894**	**41**	**935**
2010 Total	**16**	**4**	**3**	**–**	**1,409**	**168**	**17**	**727**	**2,320**	**2,343**	**1,041**	**33**	**1,075**
2011 Total	**17**	**4**	**4**	**(s)**	**1,438**	**165**	**17**	**756**	**2,375**	**2,401**	**1,045**	**113**	**1,158**
2012 Total	**22**	**4**	**7**	**(s)**	**1,462**	**159**	**17**	**711**	**2,349**	**2,382**	**1,045**	**115**	**1,162**
2013 Total	**33**	**4**	**9**	**(s)**	**1,489**	**187**	**18**	**709**	**2,403**	**2,449**	**1,072**	**182**	**1,278**
2014 Total	**12**	**4**	**11**	**1**	**1,495**	**190**	**14**	**757**	**2,456**	**2,484**	**1,093**	**181**	**1,292**
2015 Total	**13**	**4**	**14**	**(s)**	**1,476**	**190**	**[i] 18**	**776**	**2,460**	**2,491**	**[i] 1,110**	**191**	**1,326**
2016 January	1	(s)	1	(s)	127	15	1	66	209	212	88	13	102
February	1	(s)	1	(s)	119	15	1	63	197	200	90	15	107
March	1	(s)	2	(s)	121	16	2	67	206	210	96	17	116
April	1	(s)	2	(s)	115	15	1	61	193	196	89	18	108
May	1	(s)	2	(s)	121	15	2	66	204	207	97	23	122
June	1	(s)	2	(s)	121	13	2	66	202	205	97	21	122
July	1	(s)	2	(s)	124	14	2	69	208	211	99	27	128
August	1	(s)	2	(s)	124	14	2	70	209	213	101	28	131
September	1	(s)	2	(s)	117	13	1	66	197	200	94	26	124
October	1	(s)	2	(s)	120	15	2	68	204	207	96	25	123
November	1	(s)	1	(s)	122	15	1	67	206	208	95	26	124
December	1	(s)	1	(s)	143	16	2	71	231	234	100	26	127
Total	**12**	**4**	**19**	**1**	**1,474**	**174**	**18**	**801**	**2,467**	**2,503**	**1,143**	**266**	**1,434**
2017 January	1	(s)	1	(s)	132	15	1	71	220	222	91	13	107
February	1	(s)	1	(s)	118	14	1	63	196	199	84	14	100
March	1	(s)	2	(s)	129	15	2	70	216	220	96	19	118
April	1	(s)	2	(s)	123	14	1	64	203	207	94	21	117
May	1	(s)	2	(s)	127	14	2	69	211	215	100	25	128
June	1	(s)	2	(s)	128	12	2	67	208	212	100	25	128
July	1	(s)	2	(s)	133	13	2	68	216	219	99	24	125
August	1	(s)	2	(s)	134	13	2	71	220	223	103	26	130
September	1	(s)	2	(s)	123	13	2	67	203	207	96	22	120
October	1	(s)	2	(s)	128	14	2	70	214	217	99	22	123
November	1	(s)	1	(s)	129	15	2	71	216	219	97	21	120
December	1	(s)	1	(s)	135	15	2	71	223	226	97	21	121
Total	**13**	**4**	**22**	**1**	**1,539**	**168**	**18**	**821**	**2,547**	**2,587**	**1,155**	**253**	**1,436**
2018 January	1	(s)	1	(s)	131	15	2	70	218	221	98	18	117
February	1	(s)	1	(s)	122	14	1	63	200	203	81	14	98
March	1	(s)	2	(s)	128	15	2	69	214	218	96	20	117
April	1	(s)	2	(s)	126	14	1	66	208	211	88	20	109
May	1	(s)	3	(s)	128	14	2	69	213	217	103	21	126
June	1	(s)	3	(s)	127	12	2	69	210	214	98	22	121
July	1	(s)	3	(s)	132	13	2	72	219	223	101	22	125
August	1	(s)	3	(s)	133	13	2	73	221	225	104	23	129
September	1	(s)	2	(s)	123	13	1	66	203	207	91	21	114
9-Month Total	**9**	**3**	**20**	**1**	**1,152**	**123**	**14**	**617**	**1,906**	**1,939**	**859**	**180**	**1,055**
2017 9-Month Total	**10**	**3**	**18**	**1**	**1,147**	**124**	**14**	**609**	**1,894**	**1,925**	**861**	**189**	**1,073**
2016 9-Month Total	**9**	**3**	**15**	**(s)**	**1,089**	**129**	**13**	**595**	**1,826**	**1,854**	**853**	**189**	**1,060**

[a] Industrial sector, including industrial combined-heat-and-power (CHP) and industrial electricity-only plants. See Note 2, "Classification of Power Plants Into Energy-Use Sectors," at end of Section 7.

[b] Conventional hydroelectricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6).

[c] Geothermal heat pump and direct use energy.

[d] Solar photovoltaic (PV) electricity net generation in the industrial sector (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6), both utility-scale and distributed (small-scale). See Table 10.5.

[e] Wind electricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6).

[f] Wood and wood-derived fuels.

[g] Municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural byproducts, and other biomass. Through 2000, also includes non-renewable waste (municipal solid waste from non-biogenic sources, and tire-derived fuels).

[h] The fuel ethanol (minus denaturant) portion of motor fuels, such as E10, consumed by the industrial sector.

[i] There is a discontinuity in this time series between 2014 and 2015 due to a change in the method for allocating motor gasoline consumption to the end-use sectors. Beginning in 2015, the commercial and industrial sector shares of fuel ethanol consumption are larger than in 2014, while the transportation sector share is smaller.

[j] Losses and co-products from the production of fuel ethanol and biodiesel. Does not include natural gas, electricity, and other non-biomass energy used in the production of fuel ethanol and biodiesel—these are included in the industrial sector consumption statistics for the appropriate energy source.

[k] The fuel ethanol (minus denaturant) portion of motor fuels, such as E10 and E85, consumed by the transportation sector.

[l] Although there is biodiesel use in other sectors, all biodiesel consumption is assigned to the transportation sector.

[m] Beginning in 2009, includes other renewable fuels consumption, which includes other renewable diesel fuel imports minus stock change, and other renewable fuels imports. See "Renewable Diesel Fuel (Other)" and "Renewable Fuels (Other)" in Glossary.

NA=Not available. – =No data reported. (s)=Less than 0.5 trillion Btu.

Notes: • Data are estimates, except for industrial sector hydroelectric power in 1949–1978 and 1989 forward, and wind. • Totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 states and the District of Columbia.

Web Page: See http://www.eia.gov/totalenergy/data/monthly/#renewable (Excel and CSV files) for all available annual data beginning in 1949 and monthly data beginning in 1973.

Sources: See end of section.

Table 10.2c Renewable Energy Consumption: Electric Power Sector

(Trillion Btu)

	Hydro-electric Power[a]	Geo-thermal[b]	Solar[c]	Wind[d]	Biomass			Total
					Wood[e]	Waste[f]	Total	
1950 Total	**1,346**	**NA**	**NA**	**NA**	**5**	**NA**	**5**	**1,351**
1955 Total	**1,322**	**NA**	**NA**	**NA**	**3**	**NA**	**3**	**1,325**
1960 Total	**1,569**	**(s)**	**NA**	**NA**	**2**	**NA**	**2**	**1,571**
1965 Total	**2,026**	**2**	**NA**	**NA**	**3**	**NA**	**3**	**2,031**
1970 Total	**2,600**	**6**	**NA**	**NA**	**1**	**2**	**4**	**2,609**
1975 Total	**3,122**	**34**	**NA**	**NA**	**(s)**	**2**	**2**	**3,158**
1980 Total	**2,867**	**53**	**NA**	**NA**	**3**	**2**	**4**	**2,925**
1985 Total	**2,937**	**97**	**(s)**	**(s)**	**8**	**7**	**14**	**3,049**
1990 Total[g]	**3,014**	**161**	**4**	**29**	**129**	**188**	**317**	**3,524**
1995 Total	**3,149**	**138**	**5**	**33**	**125**	**296**	**422**	**3,747**
2000 Total	**2,768**	**144**	**5**	**57**	**134**	**318**	**453**	**3,427**
2001 Total	**2,209**	**142**	**6**	**70**	**126**	**211**	**337**	**2,763**
2002 Total	**2,650**	**147**	**6**	**105**	**150**	**230**	**380**	**3,288**
2003 Total	**2,749**	**146**	**5**	**113**	**167**	**230**	**397**	**3,411**
2004 Total	**2,655**	**148**	**6**	**142**	**165**	**223**	**388**	**3,339**
2005 Total	**2,670**	**147**	**6**	**178**	**185**	**221**	**406**	**3,406**
2006 Total	**2,839**	**145**	**5**	**264**	**182**	**231**	**412**	**3,665**
2007 Total	**2,430**	**145**	**6**	**341**	**186**	**237**	**423**	**3,345**
2008 Total	**2,494**	**146**	**9**	**546**	**177**	**258**	**435**	**3,630**
2009 Total	**2,650**	**146**	**9**	**721**	**180**	**261**	**441**	**3,967**
2010 Total	**2,521**	**148**	**12**	**923**	**196**	**264**	**459**	**4,064**
2011 Total	**3,085**	**149**	**17**	**1,167**	**182**	**255**	**437**	**4,855**
2012 Total	**2,606**	**148**	**40**	**1,339**	**190**	**262**	**453**	**4,586**
2013 Total	**2,529**	**151**	**83**	**1,600**	**207**	**262**	**470**	**4,833**
2014 Total	**2,454**	**151**	**165**	**1,726**	**251**	**279**	**530**	**5,026**
2015 Total	**2,308**	**148**	**228**	**1,776**	**244**	**281**	**525**	**4,985**
2016 January	235	12	13	170	21	23	44	475
February	222	11	20	186	20	22	43	482
March	251	12	24	202	19	24	43	533
April	238	11	26	192	15	24	39	506
May	234	12	31	174	16	24	40	491
June	213	12	32	150	18	23	41	448
July	197	12	36	163	20	24	44	451
August	180	12	36	125	21	24	45	399
September	150	12	33	151	19	22	41	388
October	159	12	29	188	16	22	37	426
November	173	13	25	179	18	24	42	432
December	207	13	22	213	21	25	46	501
Total	**2,459**	**146**	**328**	**2,094**	**224**	**281**	**505**	**5,531**
2017 January	245	13	19	183	20	26	46	505
February	217	11	23	195	18	22	41	487
March	268	13	39	230	21	24	45	595
April	269	12	43	227	17	22	39	590
May	297	12	52	207	17	24	40	607
June	277	11	56	182	18	24	42	569
July	243	12	52	147	20	24	44	498
August	200	12	50	125	21	23	45	432
September	175	12	47	164	18	22	40	438
October	167	11	44	233	18	22	40	496
November	188	12	31	222	19	23	42	495
December	205	14	31	226	21	24	45	522
Total	**2,752**	**147**	**486**	**2,341**	**229**	**280**	**510**	**6,235**
2018 January	235	13	31	247	20	25	45	571
February	234	12	38	222	18	23	42	547
March	238	13	48	251	19	25	44	593
April	252	12	57	247	15	23	38	605
May	279	13	65	217	19	23	42	615
June	256	13	71	224	20	24	43	607
July	220	13	63	147	20	23	43	487
August	196	13	64	180	19	24	42	495
September	171	13	59	166	17	21	38	446
9-Month Total	**2,080**	**115**	**495**	**1,900**	**166**	**211**	**377**	**4,968**
2017 9-Month Total	**2,191**	**109**	**380**	**1,660**	**171**	**211**	**382**	**4,722**
2016 9-Month Total	**1,920**	**108**	**251**	**1,514**	**170**	**210**	**380**	**4,173**

[a] Conventional hydroelectricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6).

[b] Geothermal electricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6).

[c] Solar photovoltaic (PV) and solar thermal electricity net generation in the electric power sector (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6). See Table 10.5.

[d] Wind electricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6).

[e] Wood and wood-derived fuels.

[f] Municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural byproducts, and other biomass. Through 2000, also includes non-renewable waste (municipal solid waste from non-biogenic sources, and tire-derived fuels).

[g] Through 1988, data are for electric utilities only. Beginning in 1989, data are for electric utilities and independent power producers.

NA=Not available. (s)=Less than 0.5 trillion Btu.

Notes: • The electric power sector comprises electricity-only and combined-heat-and-power (CHP) plants within the NAICS 22 category whose primary business is to sell electricity, or electricity and heat, to the public. • Totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 states and the District of Columbia.

Web Page: See http://www.eia.gov/totalenergy/data/monthly/#renewable (Excel and CSV files) for all available annual data beginning in 1949 and monthly data beginning in 1973.

Sources: Tables 7.2b, 7.4b, and A6.

Table 10.3 Fuel Ethanol Overview

	Feedstock[a]	Losses and Co-products[b]	Denaturant[c]	Production[d]			Trade[d] Net Imports[e]	Stocks[d,f]	Stock Change[d,g]	Consumption[d]			Consumption Minus Denaturant[h]
	TBtu	TBtu	Mbbl	Mbbl	MMgal	TBtu	Mbbl	Mbbl	Mbbl	Mbbl	MMgal	TBtu	*TBtu*
1981 Total	**13**	**6**	**40**	**1,978**	**83**	**7**	**NA**	**NA**	**NA**	**1,978**	**83**	**7**	***7***
1985 Total	**93**	**42**	**294**	**14,693**	**617**	**52**	**NA**	**NA**	**NA**	**14,693**	**617**	**52**	***51***
1990 Total	**111**	**49**	**356**	**17,802**	**748**	**63**	**NA**	**NA**	**NA**	**17,802**	**748**	**63**	***62***
1995 Total	**198**	**86**	**647**	**32,325**	**1,358**	**115**	**387**	**2,186**	**-207**	**32,919**	**1,383**	**117**	***114***
2000 Total	**233**	**99**	**773**	**38,627**	**1,622**	**138**	**116**	**3,400**	**-624**	**39,367**	**1,653**	**140**	***137***
2001 Total	**253**	**108**	**841**	**42,028**	**1,765**	**150**	**315**	**4,298**	**898**	**41,445**	**1,741**	**148**	***144***
2002 Total	**307**	**130**	**1,019**	**50,956**	**2,140**	**182**	**306**	**6,200**	**1,902**	**49,360**	**2,073**	**176**	***171***
2003 Total	**400**	**168**	**1,335**	**66,772**	**2,804**	**238**	**292**	**5,978**	**-222**	**67,286**	**2,826**	**240**	***233***
2004 Total	**482**	**201**	**1,621**	**81,058**	**3,404**	**289**	**3,542**	**6,002**	**24**	**84,576**	**3,552**	**301**	***293***
2005 Total	**550**	**227**	**1,859**	**92,961**	**3,904**	**331**	**3,234**	**5,563**	**-439**	**96,634**	**4,059**	**344**	***335***
2006 Total	**683**	**280**	**2,326**	**116,294**	**4,884**	**414**	**17,408**	**8,760**	**3,197**	**130,505**	**5,481**	**465**	***453***
2007 Total	**907**	**368**	**3,105**	**155,263**	**6,521**	**553**	**10,457**	**10,535**	**1,775**	**163,945**	**6,886**	**584**	***569***
2008 Total	**1,286**	**518**	**4,433**	**221,637**	**9,309**	**790**	**12,610**	**14,226**	**3,691**	**230,556**	**9,683**	**821**	***800***
2009 Total	**1,503**	**602**	**5,688**	**260,424**	**10,938**	**928**	**4,720**	**16,594**	**2,368**	**262,776**	**11,037**	**936**	***910***
2010 Total	**1,823**	**726**	**6,506**	**316,617**	**13,298**	**1,127**	**-9,115**	**17,941**	**1,347**	**306,155**	**12,858**	**1,090**	***1,061***
2011 Total	**1,904**	**754**	**6,649**	**331,646**	**13,929**	**1,181**	**-24,365**	**18,238**	**297**	**306,984**	**12,893**	**1,093**	***1,065***
2012 Total	**1,801**	**709**	**6,264**	**314,714**	**13,218**	**1,120**	**-5,891**	**20,350**	**2,112**	**306,711**	**12,882**	**1,092**	***1,064***
2013 Total	**1,805**	**707**	**6,181**	**316,493**	**13,293**	**1,126**	**-5,761**	**16,424**	**-3,926**	**314,658**	**13,216**	**1,120**	***1,092***
2014 Total	**1,938**	**755**	**6,476**	**340,781**	**14,313**	**1,212**	**-18,371**	**18,739**	**2,315**	**320,095**	**13,444**	**1,139**	***1,111***
2015 Total	**1,998**	**774**	**6,636**	**352,553**	**14,807**	**1,254**	**-17,632**	**21,596**	**2,857**	**332,064**	**13,947**	**1,181**	***1,153***
2016 January	172	66	617	30,452	1,279	108	-2,294	23,347	1,751	26,407	1,109	94	*92*
February	162	63	586	28,810	1,210	103	-2,024	23,171	-176	26,962	1,132	96	*93*
March	175	67	601	30,957	1,300	110	-2,612	22,730	-441	28,786	1,209	102	*100*
April	159	61	557	28,208	1,185	100	-2,919	21,336	-1,394	26,683	1,121	95	*93*
May	171	66	586	30,346	1,275	108	-1,627	20,962	-374	29,093	1,222	104	*101*
June	172	66	567	30,443	1,279	108	-1,045	21,284	322	29,076	1,221	103	*101*
July	178	68	570	31,469	1,322	112	-1,641	21,381	97	29,731	1,249	106	*103*
August	180	69	564	31,856	1,338	113	-1,924	21,198	-183	30,115	1,265	107	*105*
September	170	65	544	30,048	1,262	107	-2,315	20,713	-485	28,218	1,185	100	*98*
October	175	67	563	31,006	1,302	110	-2,946	20,113	-600	28,660	1,204	102	*100*
November	173	67	559	30,706	1,290	109	-3,074	19,463	-650	28,282	1,188	101	*98*
December	185	71	606	32,680	1,373	116	-2,583	19,758	295	29,802	1,252	106	*104*
Total	**2,072**	**798**	**6,920**	**366,981**	**15,413**	**1,306**	**-27,002**	**19,758**	**-1,838**	**341,817**	**14,356**	**1,216**	***1,187***
2017 January	185	71	600	32,887	1,381	117	-2,844	22,679	2,921	27,122	1,139	96	*94*
February	165	63	545	29,307	1,231	104	-3,605	23,195	516	25,186	1,058	90	*87*
March	182	70	603	32,393	1,361	115	-3,023	23,981	786	28,584	1,201	102	*99*
April	167	64	545	29,639	1,245	105	-1,918	23,671	-310	28,031	1,177	100	*97*
May	180	69	562	31,863	1,338	113	-2,831	22,855	-816	29,848	1,254	106	*104*
June	173	66	543	30,794	1,293	110	-2,045	21,770	-1,085	29,834	1,253	106	*104*
July	177	68	559	31,384	1,318	112	-2,553	21,167	-603	29,434	1,236	105	*102*
August	184	70	577	32,672	1,372	116	-2,029	21,186	19	30,624	1,286	109	*106*
September	173	66	535	30,701	1,289	109	-1,757	21,507	321	28,623	1,202	102	*100*
October	182	70	536	32,212	1,353	115	-2,419	21,663	156	29,637	1,245	105	*103*
November	184	71	523	32,631	1,371	116	-2,069	23,203	1,540	29,022	1,219	103	*101*
December	186	71	529	32,952	1,384	117	-4,175	23,043	-160	28,937	1,215	103	*101*
Total	**2,138**	**819**	**6,657**	**379,435**	**15,936**	**1,349**	**-31,268**	**23,043**	**3,285**	**344,882**	**14,485**	**1,226**	***1,199***
2018 January	182	69	504	32,428	1,362	115	-2,104	24,229	[i] 1,181	29,143	1,224	104	*102*
February	166	63	441	29,519	1,240	105	-5,298	24,335	106	24,115	1,013	86	*84*
March	181	69	484	32,216	1,353	115	-5,122	22,883	-1,452	28,546	1,199	102	*100*
April	172	65	462	30,532	1,282	109	-3,866	23,256	373	26,293	1,104	93	*92*
May	181	69	487	32,215	1,353	115	-2,280	22,636	-620	30,555	1,283	109	*106*
June	180	68	473	31,924	1,341	114	-3,609	21,880	-756	29,071	1,221	103	*101*
July	188	72	519	33,496	1,407	119	-2,487	22,802	922	30,087	1,264	107	*105*
August	190	72	527	33,773	1,418	120	-2,638	22,833	31	31,104	1,306	111	*108*
September	173	66	471	30,667	1,288	109	-2,106	24,422	1,589	26,972	1,133	96	*94*
9-Month Total	**1,614**	**615**	**4,368**	**286,770**	**12,044**	**1,020**	**-29,509**	**24,422**	**1,374**	**255,887**	**10,747**	**910**	***892***
2017 9-Month Total	**1,586**	**607**	**5,069**	**281,640**	**11,829**	**1,002**	**-22,604**	**21,507**	**1,749**	**257,287**	**10,806**	**915**	***894***
2016 9-Month Total	**1,539**	**593**	**5,192**	**272,589**	**11,449**	**970**	**-18,398**	**20,713**	**-883**	**255,074**	**10,713**	**908**	***886***

[a] Total corn and other biomass inputs to the production of undenatured ethanol used for fuel ethanol.

[b] Losses and co-products from the production of fuel ethanol. Does not include natural gas, electricity, and other non-biomass energy used in the production of fuel ethanol—these are included in the industrial sector consumption statistics for the appropriate energy source.

[c] The amount of denaturant in fuel ethanol produced.

[d] Includes denaturant.

[e] Through 2009, data are for fuel ethanol imports only; data for fuel ethanol exports are not available. Beginning in 2010, data are for fuel ethanol imports minus fuel ethanol (including industrial alcohol) exports.

[f] Stocks are at end of period.

[g] A negative value indicates a decrease in stocks and a positive value indicates an increase.

[h] Consumption of fuel ethanol minus denaturant. Data for fuel ethanol minus denaturant are used to develop data for "Renewable Energy/Biomass" in Tables 10.1–10.2b, as well as in Sections 1 and 2.

[i] Derived from the preliminary 2017 stocks value (23,048 thousand barrels), not the final 2017 value (23,043 thousand barrels) that is shown under "Stocks."

NA=Not available.

Notes: • Mbbl = thousand barrels. MMgal = million U.S. gallons. TBtu = trillion Btu. • Fuel ethanol data in thousand barrels are converted to million gallons by multiplying by 0.042, and are converted to Btu by multiplying by the approximate heat content of fuel ethanol—see Table A3. • Through 1980, data are not available. For 1981–1992, data are estimates. For 1993–2008, only data for feedstock, losses and co-products, and denaturant are estimates. Beginning in 2009, only data for feedstock, and losses and co-products, are estimates. • See "Denaturant," "Ethanol," "Fuel Ethanol," and "Fuel Ethanol Minus Denaturant" in Glossary. • Totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 states and the District of Columbia.

Web Page: See http://www.eia.gov/totalenergy/data/monthly/#renewable (Excel and CSV files) for all available annual and monthly data beginning in 1981.

Sources: See end of section.

Table 10.4 Biodiesel and Other Renewable Fuels Overview

	Biodiesel													Other Renewable Fuels[f]
						Trade								
	Feedstock[a]	Losses and Co-products[b]	Production			Imports	Exports	Net Imports[c]	Stocks[d]	Stock Change[e]	Consumption			
	TBtu	TBtu	Mbbl	MMgal	TBtu	Mbbl	Mbbl	Mbbl	Mbbl	Mbbl	Mbbl	MMgal	TBtu	TBtu
2001 Total	**1**	**(s)**	**204**	**9**	**1**	**81**	**41**	**40**	**NA**	**NA**	**244**	**10**	**1**	**NA**
2002 Total	**1**	**(s)**	**250**	**10**	**1**	**197**	**57**	**140**	**NA**	**NA**	**390**	**16**	**2**	**NA**
2003 Total	**2**	**(s)**	**338**	**14**	**2**	**97**	**113**	**-17**	**NA**	**NA**	**322**	**14**	**2**	**NA**
2004 Total	**4**	**(s)**	**666**	**28**	**4**	**101**	**128**	**-27**	**NA**	**NA**	**639**	**27**	**3**	**NA**
2005 Total	**12**	**(s)**	**2,162**	**91**	**12**	**214**	**213**	**1**	**NA**	**NA**	**2,163**	**91**	**12**	**NA**
2006 Total	**32**	**(s)**	**5,963**	**250**	**32**	**1,105**	**856**	**250**	**NA**	**NA**	**6,213**	**261**	**33**	**NA**
2007 Total	**63**	**1**	**11,662**	**490**	**62**	**3,455**	**6,696**	**-3,241**	**NA**	**NA**	**8,422**	**354**	**45**	**NA**
2008 Total	**88**	**1**	**16,145**	**678**	**87**	**7,755**	**16,673**	**-8,918**	**NA**	**NA**	**7,228**	**304**	**39**	**NA**
2009 Total	**67**	**1**	**12,281**	**516**	**66**	**1,906**	**6,546**	**-4,640**	**711**	**711**	[g] **7,663**	**322**	**41**	**(s)**
2010 Total	**44**	**1**	**8,177**	**343**	**44**	**564**	**2,588**	**-2,024**	**672**	**-39**	**6,192**	**260**	**33**	**(s)**
2011 Total	**125**	**2**	**23,035**	**967**	**123**	**890**	**1,799**	**-908**	**2,005**	[h] **1,028**	**21,099**	**886**	**113**	**(s)**
2012 Total	**128**	**2**	**23,588**	**991**	**126**	**853**	**3,056**	**-2,203**	**1,984**	**-20**	**21,406**	**899**	**115**	**3**
2013 Total	**176**	**2**	**32,368**	**1,359**	**173**	**8,152**	**4,675**	**3,477**	**3,810**	**1,825**	**34,020**	**1,429**	**182**	**24**
2014 Total	**165**	**2**	**30,452**	**1,279**	**163**	**4,578**	**1,974**	**2,604**	**3,131**	**-679**	**33,735**	**1,417**	**181**	**18**
2015 Total	**163**	**2**	**30,080**	**1,263**	**161**	**8,399**	**2,091**	**6,308**	**3,943**	**813**	**35,575**	**1,494**	**191**	**25**
2016 January	14	(s)	2,490	105	13	248	42	206	4,222	279	2,416	101	13	1
February	14	(s)	2,504	105	13	287	49	238	4,133	-89	2,831	119	15	2
March	16	(s)	2,861	120	15	565	234	331	4,167	34	3,159	133	17	3
April	16	(s)	2,856	120	15	969	246	723	4,358	192	3,388	142	18	1
May	18	(s)	3,222	135	17	1,117	335	782	4,091	-268	4,272	179	23	2
June	17	(s)	3,205	135	17	1,630	220	1,410	4,726	635	3,980	167	21	3
July	18	(s)	3,331	140	18	1,681	250	1,431	4,443	-283	5,045	212	27	2
August	18	(s)	3,385	142	18	1,873	235	1,638	4,265	-177	5,201	218	28	2
September	17	(s)	3,206	135	17	1,835	150	1,685	4,227	-38	4,929	207	26	4
October	19	(s)	3,433	144	18	1,822	114	1,708	4,690	463	4,678	196	25	2
November	19	(s)	3,408	143	18	2,184	143	2,041	5,314	624	4,825	203	26	3
December	19	(s)	3,425	144	18	2,668	80	2,588	6,398	1,083	4,929	207	26	1
Total	**203**	**3**	**37,327**	**1,568**	**200**	**16,879**	**2,098**	**14,781**	**6,398**	**2,455**	**49,653**	**2,085**	**266**	**25**
2017 January	12	(s)	2,208	93	12	241	42	199	6,397	(s)	2,407	101	13	3
February	12	(s)	2,238	94	12	549	59	490	6,475	78	2,650	111	14	1
March	15	(s)	2,761	116	15	650	136	514	6,189	-286	3,561	150	19	3
April	16	(s)	3,020	127	16	681	283	398	5,706	-484	3,901	164	21	2
May	18	(s)	3,242	136	17	948	239	709	4,909	-797	4,748	199	25	3
June	18	(s)	3,344	140	18	1,736	226	1,510	5,052	144	4,711	198	25	3
July	19	(s)	3,560	150	19	1,670	453	1,217	5,405	353	4,424	186	24	3
August	19	(s)	3,559	149	19	1,582	387	1,195	5,356	-49	4,803	202	26	2
September	19	(s)	3,507	147	19	205	100	105	4,849	-507	4,119	173	22	2
October	19	(s)	3,515	148	19	386	217	169	4,485	-364	4,047	170	22	2
November	19	(s)	3,523	148	19	222	49	173	4,233	-252	3,948	166	21	1
December	19	(s)	3,515	148	19	504	35	469	4,268	35	3,949	166	21	2
Total	**206**	**3**	**37,993**	**1,596**	**204**	**9,374**	**2,228**	**7,146**	**4,268**	**-2,130**	**47,269**	**1,985**	**253**	**28**
2018 January	16	(s)	2,945	124	16	246	102	144	4,557	[i] -193	3,282	138	18	1
February	16	(s)	2,996	126	16	146	103	43	4,924	367	2,672	112	14	2
March	19	(s)	3,493	147	19	457	255	202	4,916	-8	3,702	155	20	2
April	18	(s)	3,344	140	18	308	217	91	4,681	-235	3,670	154	20	1
May	19	(s)	3,538	149	19	325	382	-57	4,257	-424	3,905	164	21	3
June	20	(s)	3,718	156	20	296	275	21	3,845	-412	4,150	174	22	1
July	21	(s)	3,892	163	21	157	259	-102	3,583	-262	4,052	170	22	2
August	22	(s)	4,028	169	22	281	263	18	3,412	-172	4,217	177	23	2
September	21	(s)	3,850	162	21	277	190	87	3,360	-52	3,989	168	21	2
9-Month Total	**173**	**2**	**31,803**	**1,336**	**170**	**2,493**	**2,047**	**446**	**3,360**	**-1,390**	**33,639**	**1,413**	**180**	**16**
2017 9-Month Total	**149**	**2**	**27,440**	**1,152**	**147**	**8,262**	**1,926**	**6,336**	**4,849**	**-1,549**	**35,324**	**1,484**	**189**	**22**
2016 9-Month Total	**147**	**2**	**27,060**	**1,137**	**145**	**10,205**	**1,761**	**8,444**	**4,227**	**284**	**35,221**	**1,479**	**189**	**19**

[a] Total vegetable oil and other biomass inputs to the production of biodiesel—calculated by multiplying biodiesel production by 5.433 million Btu per barrel. See "Biodiesel Feedstock" entry in the "Thermal Conversion Factor Source Documentation" at the end of Appendix A.

[b] Losses and co-products from the production of biodiesel. Does not include natural gas, electricity, and other non-biomass energy used in the production of biodiesel—these are included in the industrial sector consumption statistics for the appropriate energy source.

[c] Net imports equal imports minus exports.

[d] Stocks are at end of period. Includes biodiesel stocks at (or in) refineries, pipelines, and bulk terminals. Beginning in 2011, also includes stocks at biodiesel production plants.

[e] A negative value indicates a decrease in stocks and a positive value indicates an increase.

[f] Other renewable fuels consumption, which includes other renewable diesel fuel imports minus stock change, and other renewable fuels imports. See "Renewable Diesel Fuel (Other)" and "Renewable Fuels (Other)" in Glossary.

[g] In 2009, because of incomplete data coverage and differing data sources, a "Balancing Item" amount of 733 thousand barrels (653 thousand barrels in January 2009; 80 thousand barrels in February 2009) is used to balance biodiesel supply and disposition.

[h] Derived from the final 2010 stocks value for bulk terminals and biodiesel production plants (977 thousand barrels), not the final 2010 value for bulk terminals only (672 thousand barrels) that is shown under “Stocks.”

[i] Derived from the preliminary 2017 stocks value (4,750 thousand barrels), not the final 2017 value (4,268 thousand barrels) that is shown under “Stocks.”

NA=Not available. (s)=Less than 0.5 trillion Btu and greater than -0.5 trillion Btu, or less than 500 barrels and greater than -500 barrels.

Notes: • Mbbl = thousand barrels. MMgal = million U.S. gallons. TBtu = trillion Btu. • Biodiesel data in thousand barrels are converted to million gallons by multiplying by 0.042, and are converted to Btu by multiplying by 5.359 million Btu per barrel (the approximate heat content of biodiesel—see Table A1). • Through 2000, data are not available. Beginning in 2001, data not from U.S. Energy Information Administration (EIA) surveys are estimates. • Totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 states and the District of Columbia.

Web Page: See http://www.eia.gov/totalenergy/data/monthly/#renewable (Excel and CSV files) for all available annual and monthly data beginning in 2001.

Sources: See end of section.

Table 10.5 Solar Energy Consumption

(Trillion Btu)

	Distributed[a] Solar Energy[b]						Utility-Scale[c] Solar Energy[b]				
		Electricity[d]					Electricity[e]				
	Heat[f]	Residential Sector	Commercial Sector	Industrial Sector	Total	Total[g]	Commercial Sector[h]	Industrial Sector[i]	Electric Power Sector[j]	Total	Total[k]
1985 Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**(s)**	**(s)**	**(s)**
1990 Total	**55**	**(s)**	**(s)**	**(s)**	**(s)**	**55**	**–**	**–**	**4**	**4**	**59**
1995 Total	**63**	**(s)**	**(s)**	**(s)**	**1**	**63**	**–**	**–**	**5**	**5**	**68**
2000 Total	**57**	**(s)**	**1**	**(s)**	**1**	**58**	**–**	**–**	**5**	**5**	**63**
2001 Total	**55**	**(s)**	**1**	**(s)**	**1**	**56**	**–**	**–**	**6**	**6**	**62**
2002 Total	**53**	**1**	**1**	**(s)**	**2**	**54**	**–**	**–**	**6**	**6**	**60**
2003 Total	**51**	**1**	**1**	**(s)**	**2**	**53**	**–**	**–**	**5**	**5**	**58**
2004 Total	**50**	**1**	**1**	**(s)**	**2**	**53**	**–**	**–**	**6**	**6**	**58**
2005 Total	**49**	**1**	**2**	**(s)**	**3**	**52**	**–**	**–**	**6**	**6**	**58**
2006 Total	**51**	**2**	**2**	**1**	**5**	**56**	**–**	**–**	**5**	**5**	**61**
2007 Total	**53**	**2**	**4**	**1**	**7**	**59**	**–**	**–**	**6**	**6**	**65**
2008 Total	**54**	**4**	**6**	**1**	**11**	**65**	**(s)**	**–**	**9**	**9**	**74**
2009 Total	**55**	**5**	**7**	**2**	**14**	**69**	**(s)**	**–**	**9**	**9**	**78**
2010 Total	**56**	**9**	**11**	**3**	**23**	**79**	**(s)**	**(s)**	**12**	**12**	**90**
2011 Total	**58**	**13**	**19**	**4**	**36**	**93**	**1**	**(s)**	**17**	**18**	**111**
2012 Total	**59**	**20**	**30**	**7**	**56**	**116**	**1**	**(s)**	**40**	**41**	**157**
2013 Total	**61**	**31**	**38**	**9**	**78**	**138**	**3**	**(s)**	**83**	**86**	**225**
2014 Total	**62**	**47**	**49**	**11**	**107**	**169**	**4**	**(s)**	**165**	**168**	**337**
2015 Total	**62**	**65**	**53**	**14**	**132**	**194**	**4**	**(s)**	**228**	**232**	**426**
2016 January	3	5	3	1	9	12	(s)	(s)	13	14	26
February	4	6	4	1	11	14	(s)	(s)	20	21	35
March	5	8	5	2	14	19	(s)	(s)	24	24	43
April	6	9	5	2	16	21	(s)	(s)	26	27	48
May	6	10	6	2	17	24	(s)	(s)	31	32	55
June	6	10	6	2	18	24	(s)	(s)	32	32	56
July	7	11	6	2	18	25	1	(s)	36	36	61
August	6	10	6	2	18	24	1	(s)	36	37	61
September	6	9	5	2	16	22	(s)	(s)	33	34	55
October	5	8	5	2	14	19	(s)	(s)	29	29	49
November	4	7	4	1	12	16	(s)	(s)	25	26	41
December	4	6	4	1	11	15	(s)	(s)	22	22	37
Total	**62**	**98**	**57**	**19**	**174**	**236**	**5**	**(s)**	**328**	**333**	**569**
2017 January	3	6	4	1	11	15	(s)	(s)	19	19	33
February	4	7	4	1	13	16	(s)	(s)	23	24	40
March	5	11	6	2	18	23	(s)	(s)	39	39	62
April	6	12	6	2	20	26	(s)	(s)	43	43	69
May	6	13	7	2	22	29	(s)	(s)	52	52	81
June	6	14	7	2	23	29	1	(s)	56	57	86
July	7	14	7	2	24	30	1	(s)	52	53	83
August	6	13	7	2	23	29	1	(s)	50	50	79
September	6	12	7	2	21	26	(s)	(s)	47	47	73
October	5	11	6	2	18	24	(s)	(s)	44	44	68
November	4	8	5	1	14	18	(s)	(s)	31	31	50
December	4	8	5	1	14	17	(s)	(s)	31	31	49
Total	**63**	**128**	**71**	**22**	**221**	**284**	**5**	**(s)**	**486**	**491**	**774**
2018 January	3	8	5	1	15	18	(s)	(s)	31	31	50
February	4	9	6	1	16	20	(s)	(s)	38	38	58
March	5	13	7	2	22	28	(s)	(s)	48	48	76
April	6	15	8	2	25	31	1	(s)	57	58	89
May	6	16	9	2	28	34	1	(s)	65	65	99
June	7	17	9	2	28	35	1	(s)	71	72	107
July	7	17	10	3	29	36	1	(s)	63	64	100
August	7	16	9	2	28	34	1	(s)	64	64	99
September	6	14	8	2	25	31	1	(s)	59	60	90
9-Month Total	**50**	**125**	**71**	**19**	**216**	**266**	**5**	**1**	**495**	**500**	**766**
2017 9-Month Total	**49**	**102**	**56**	**17**	**175**	**224**	**4**	**(s)**	**380**	**384**	**608**
2016 9-Month Total	**49**	**77**	**45**	**15**	**137**	**186**	**4**	**(s)**	**251**	**255**	**441**

[a] Data are estimates for distributed (small-scale) facilities (combined generator nameplate capacity less than 1 megawatt).

[b] See "Photovoltaic Energy" and "Solar Thermal Energy" in Glossary.

[c] Data are for utility-scale facilities (combined generator nameplate capacity of 1 megawatt or more).

[d] Solar photovoltaic (PV) electricity generation at distributed (small-scale) facilities connected to the electric power grid (converted to Btu by multiplying by the fossil fuels heat rate factors in Table A6).

[e] Solar photovoltaic (PV) and solar thermal electricity net generation at utility-scale facilities (converted to Btu by multiplying by the fossil fuels heat rate factors in Table A6).

[f] Solar thermal direct use energy in the residential, commercial, and industrial sectors for all end uses, such as pool heating, hot water heating, and space heating.

[g] Data are the sum of "Distributed Solar Energy Heat" and "Distributed Solar Energy Electricity."

[h] Commercial combined-heat-and-power (CHP) and commercial electricity-only plants. See Note 2, "Classification of Power Plants Into Energy-Use Sectors," at end of Section 7.

[i] Industrial combined-heat-and-power (CHP) and industrial electricity-only plants. See Note 2, "Classification of Power Plants Into Energy-Use Sectors," at end of Section 7.

[j] Electricity-only and combined-heat-and-power (CHP) plants within the NAICS 22 category whose primary business is to sell electricity, or electricity and heat, to the public. Through 1988, data are for electric utilities only; beginning in 1989, data are for electric utilities and independent power producers.

[k] Data are the sum of "Distributed Solar Energy Total" and "Utility-Scale Solar Energy Total."

NA=Not available. – =No data reported. (s)=Less than 0.5 trillion Btu.

Notes: • Distributed (small-scale) solar energy data for all years, and utility-scale solar energy data for the current two years, are estimates. • Totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 states and the District of Columbia.

Web Page: See http://www.eia.gov/totalenergy/data/monthly/#renewable (Excel and CSV files) for all available annual and monthly data beginning in 1984.

Sources: See end of section.

Table 10.6 Solar Electricity Net Generation

(Million Kilowatthours)

	Distributed[a] Solar Generation[b]				Utility-Scale[c] Solar Generation[b]				
	Residential Sector	Commercial Sector	Industrial Sector	Total	Commercial Sector[d]	Industrial Sector[e]	Electric Power Sector[f]	Total	Total
1985 Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**11**	**11**	**11**
1990 Total	**12**	**17**	**4**	**32**	**–**	**–**	**367**	**367**	**399**
1995 Total	**20**	**29**	**6**	**56**	**–**	**–**	**497**	**497**	**552**
2000 Total	**39**	**55**	**12**	**107**	**–**	**–**	**493**	**493**	**600**
2001 Total	**47**	**67**	**15**	**129**	**–**	**–**	**543**	**543**	**672**
2002 Total	**56**	**79**	**18**	**153**	**–**	**–**	**555**	**555**	**708**
2003 Total	**65**	**93**	**21**	**178**	**–**	**–**	**534**	**534**	**712**
2004 Total	**81**	**115**	**25**	**221**	**–**	**–**	**575**	**575**	**796**
2005 Total	**121**	**172**	**38**	**332**	**–**	**–**	**550**	**550**	**882**
2006 Total	**177**	**251**	**56**	**484**	**–**	**–**	**508**	**508**	**991**
2007 Total	**250**	**355**	**79**	**683**	**–**	**–**	**612**	**612**	**1,295**
2008 Total	**401**	**570**	**126**	**1,097**	**(s)**	**–**	**864**	**864**	**1,962**
2009 Total	**539**	**766**	**170**	**1,475**	**(s)**	**–**	**891**	**891**	**2,366**
2010 Total	**900**	**1,170**	**259**	**2,329**	**5**	**2**	**1,206**	**1,212**	**3,541**
2011 Total	**1,358**	**1,911**	**423**	**3,692**	**84**	**7**	**1,727**	**1,818**	**5,509**
2012 Total	**2,058**	**3,169**	**702**	**5,929**	**148**	**14**	**4,164**	**4,327**	**10,256**
2013 Total	**3,217**	**4,023**	**891**	**8,131**	**294**	**17**	**8,724**	**9,036**	**17,167**
2014 Total	**4,947**	**5,146**	**1,139**	**11,233**	**371**	**16**	**17,304**	**17,691**	**28,924**
2015 Total	**6,999**	**5,689**	**1,451**	**14,139**	**416**	**21**	**24,456**	**24,893**	**39,032**
2016 January	520	346	113	980	26	1	1,458	1,486	2,465
February	622	398	124	1,145	39	2	2,201	2,242	3,386
March	835	520	171	1,525	44	2	2,571	2,617	4,143
April	951	566	186	1,703	46	2	2,831	2,880	4,583
May	1,058	616	206	1,879	48	3	3,375	3,425	5,304
June	1,099	623	206	1,928	53	3	3,418	3,473	5,401
July	1,146	640	214	2,000	55	3	3,886	3,945	5,945
August	1,113	620	209	1,942	58	3	3,908	3,969	5,911
September	989	556	190	1,735	48	2	3,584	3,635	5,370
October	884	493	174	1,552	42	2	3,147	3,191	4,743
November	726	393	139	1,257	36	2	2,729	2,767	4,024
December	653	387	128	1,167	33	1	2,389	2,424	3,591
Total	**10,595**	**6,158**	**2,060**	**18,812**	**529**	**27**	**35,497**	**36,054**	**54,866**
2017 January	703	420	123	1,246	17	1	2,011	2,030	3,276
February	789	458	137	1,384	27	2	2,526	2,555	3,939
March	1,147	629	197	1,972	42	3	4,200	4,245	6,218
April	1,283	699	213	2,195	46	4	4,646	4,696	6,891
May	1,415	770	239	2,423	53	4	5,605	5,663	8,086
June	1,469	777	241	2,487	61	5	6,109	6,175	8,662
July	1,495	808	252	2,555	58	5	5,690	5,753	8,308
August	1,446	788	246	2,480	55	5	5,374	5,434	7,914
September	1,293	709	223	2,225	52	4	5,059	5,115	7,340
October	1,157	632	201	1,990	47	4	4,771	4,821	6,811
November	904	502	156	1,561	34	3	3,372	3,409	4,970
December	841	492	138	1,472	29	3	3,358	3,389	4,861
Total	**13,942**	**7,685**	**2,364**	**23,990**	**521**	**42**	**52,723**	**53,286**	**77,276**
2018 January	922	546	145	1,614	28	4	3,380	3,413	5,027
February	1,008	599	154	1,761	36	5	4,079	4,120	5,880
March	1,394	813	219	2,426	45	7	5,159	5,211	7,636
April	1,596	901	239	2,736	57	8	6,192	6,257	8,993
May	1,757	986	265	3,009	66	9	7,004	7,079	10,088
June	1,793	999	266	3,058	81	11	7,719	7,811	10,869
July	1,838	1,031	275	3,144	68	9	6,865	6,943	10,087
August	1,761	990	267	3,018	71	11	6,900	6,982	10,000
September	1,545	891	246	2,681	66	10	6,395	6,471	9,153
9-Month Total	**13,615**	**7,756**	**2,076**	**23,447**	**519**	**75**	**53,693**	**54,286**	**77,733**
2017 9-Month Total	**11,040**	**6,058**	**1,870**	**18,967**	**411**	**33**	**41,222**	**41,667**	**60,634**
2016 9-Month Total	**8,332**	**4,885**	**1,619**	**14,836**	**418**	**22**	**27,232**	**27,672**	**42,509**

[a] Data are estimates for solar photovoltaic (PV) electricity generation at small-scale facilities (combined generator nameplate capacity less than 1 megawatt) connected to the electric power grid.

[b] See "Photovoltaic Energy" and "Solar Thermal Energy" in Glossary.

[c] Solar photovoltaic (PV) and solar thermal electricity net generation at utility-scale facilities (combined generator nameplate capacity of 1 megawatt or more).

[d] Commercial combined-heat-and-power (CHP) and commercial electricity-only plants. See Note 2, "Classification of Power Plants Into Energy-Use Sectors," at end of Section 7.

[e] Industrial combined-heat-and-power (CHP) and industrial electricity-only plants. See Note 2, "Classification of Power Plants Into Energy-Use Sectors," at end of Section 7.

[f] Electricity-only and combined-heat-and-power (CHP) plants within the NAICS 22 category whose primary business is to sell electricity, or electricity and heat, to the public. Through 1988, data are for electric utilities only; beginning in 1989, data are for electric utilities and independent power producers.

NA=Not available. – =No data reported. (s)=Less than 0.5 million kilowatthours.

Notes: • Distributed (small-scale) solar generation data for all years, and utility-scale solar energy data for the current two years, are estimates. • Totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 states and the District of Columbia.

Web Page: See http://www.eia.gov/totalenergy/data/monthly/#renewable (Excel and CSV files) for all available annual and monthly data beginning in 1984.

Sources: • **Distributed Solar Generation: 1989–2013—**Calculated as distributed solar energy consumption (see Table 10.5) divided by the total fossil fuels heat rate factors (see Table A6). **2014 forward—**U.S. Energy Information Administration (EIA), *Electric Power Monthly,* monthly reports, Tables 1.1, 1.2.C, 1.2.D, and 1.2.E. • **Utility-Scale Solar Generation: 1984–1988—**EIA, Form EIA-759, "Monthly Power Plant Report." **1989–1997:** EIA, Form EIA-759, "Monthly Power Plant Report," and Form EIA-867, "Annual Nonutility Power Producer Report." **1998–2000:** EIA, Form EIA-759, "Monthly Power Plant Report," and Form EIA-860B, "Annual Electric Generator Report—Nonutility." **2001–2003:** EIA, Form EIA-906, "Power Plant Report." **2004–2007:** EIA, Form EIA-906, "Power Plant Report," and Form EIA-920, "Combined Heat and Power Plant Report." **2008 forward:** EIA, Form EIA-923, "Power Plant Operations Report." • **Total:** Calculated as distributed solar generation plus utility-scale solar generation.

Note. Renewable Energy Production and Consumption. In Tables 1.1, 1.3, and 10.1, renewable energy consumption consists of: conventional hydroelectricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6); geothermal electricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6), and geothermal heat pump and geothermal direct use energy; solar thermal and photovoltaic electricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6), and solar thermal direct use energy; wind electricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6); wood and wood-derived fuels consumption; biomass waste (municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural byproducts, and other biomass) consumption; fuel ethanol (minus denaturant), biodiesel, and other renewable fuels consumption; and losses and co-products from the production of fuel ethanol and biodiesel. In Tables 1.1, 1.2, and 10.1, renewable energy production is assumed to equal consumption for all renewable energy sources except biofuels and wood. Biofuels production comprises biomass inputs to the production of fuel ethanol and biodiesel. Wood production is the sum of wood consumption and densified biomass exports.

Table 10.2a Sources

Residential Sector, Geothermal

1989–2011: Annual estimates by the U.S Energy Information Administration (EIA) based on data from Oregon Institute of Technology, Geo-Heat Center.

2012 forward: Annual estimates assumed by EIA to be equal to that of 2011.

(For 1989 forward, monthly estimates are created by dividing the annual estimates by the number of days in the year and then multiplying by the number of days in the month.)

Residential Sector, Solar

1989 forward: Residential sector solar consumption is the sum of the values for "Distributed Solar Energy Consumption: Heat" (which includes solar thermal direct use energy in the residential, commercial, and industrial sectors) from Table 10.5 and "Distributed Solar Energy Consumption: Electricity, Residential Sector" from Table 10.5.

Residential Sector, Wood

1949–1979: Annual estimates are from EIA, *Estimates of U.S. Wood Energy Consumption from 1949 to 1981*, Table A2.

1980–2013: Annual estimates are based on EIA, Form EIA-457, "Residential Energy Consumption Survey"; and National Oceanic and Atmospheric Administration regional heating degree-day data.

2014 forward: Annual estimates based on residential wood consumption growth rates from EIA's *Annual Energy Outlook* data system.

(For 1973 forward, monthly estimates are created by dividing the annual estimates by the number of days in the year and then multiplying by the number of days in the month.)

Residential Sector, Total Renewable Energy

1949–1988: Residential sector total renewable energy consumption is equal to residential sector wood consumption.

1989 forward: Residential sector total renewable energy consumption is the sum of the residential sector consumption values for geothermal, solar, and wood.

Commercial Sector, Hydroelectric Power

1989 forward: Commercial sector conventional hydroelectricity net generation data from EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms, are converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6.

Commercial Sector, Geothermal

1989–2011: Annual estimates by EIA based on data from Oregon Institute of Technology, Geo-Heat Center.

2012 forward: Annual estimates assumed by EIA to be equal to that of 2011.

(For 1989 forward, monthly estimates are created by dividing the annual estimates by the number of days in the year and then multiplying by the number of days in the month.)

Commercial Sector, Solar

1989 forward: Commercial sector solar consumption is the sum of the values for "Distributed Solar Energy Consumption: Electricity, Commercial Sector" from Table 10.5 and "Utility-Scale Solar Energy Consumption: Electricity, Commercial Sector" from Table 10.5.

Commercial Sector, Wind

2009 forward: Commercial sector wind electricity net generation data from EIA, Form EIA-923, "Power Plant Operations Report," are converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6.

Commercial Sector, Wood

1949–1979: Annual estimates are from EIA, *Estimates of U.S. Wood Energy Consumption from 1949 to 1981*, Table A2.

1980–1983: Annual estimates are from EIA, *Estimates of U.S. Wood Energy Consumption 1980 –1983*, Table ES1.

1984: Annual estimate assumed by EIA to be equal to that of 1983.

1985–1988: Annual estimates interpolated by EIA.

(For 1973–1988, monthly estimates are created by dividing the annual estimates by the number of days in the year and then multiplying by the number of days in the month.)

1989 forward: Monthly/annual commercial sector combined-heat-and-power (CHP) wood consumption data are from EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms. Annual estimates for commercial sector non-CHP wood consumption are based on EIA, Form EIA-871, "Commercial Buildings Energy Consumption Survey" (for 2014 forward, the annual estimates are based on commercial sector wood consumption growth rates from EIA's *Annual Energy Outlook* data system). For 1989 forward, monthly estimates for commercial sector non-CHP wood consumption are created by dividing the annual estimates by the number of days in the year and then multiplying by the number of days in the month. Commercial sector total wood consumption is the sum of commercial sector CHP and non-CHP wood consumption.

Commercial Sector, Biomass Waste

1989 forward: Table 7.4c.

Commercial Sector, Fuel Ethanol (Minus Denaturant)

1981 forward: The commercial sector share of motor gasoline consumption is equal to commercial sector motor gasoline consumption from Table 3.7a divided by motor gasoline product supplied from Table 3.5. Commercial sector fuel ethanol (minus denaturant) consumption is equal to fuel ethanol (minus denaturant) consumption from Table 10.3 multiplied by the commercial sector share of motor gasoline consumption. Note that there is a discontinuity in this time series between 2014 and 2015 due to a change in the method for allocating motor gasoline consumption to the end-use sectors; beginning in 2015, the commercial and industrial sector shares of fuel ethanol consumption are larger than in 2014, while the transportation sector share is smaller.

Commercial Sector, Total Biomass

1949–1980: Commercial sector total biomass consumption is equal to commercial sector wood consumption.

1981–1988: Commercial sector total biomass consumption is the sum of the commercial sector consumption values for wood and fuel ethanol (minus denaturant).

1989 forward: Commercial sector total biomass consumption is the sum of the commercial sector consumption values for wood, waste, and fuel ethanol (minus denaturant).

Commercial Sector, Total Renewable Energy

1949–1988: Commercial sector total renewable energy consumption is equal to commercial sector total biomass consumption.

1989–2007: Commercial sector total renewable energy consumption is the sum of the commercial sector consumption values for conventional hydroelectric power, geothermal, and total biomass.

2008: Commercial sector total renewable energy consumption is the sum of the commercial sector consumption values for conventional hydroelectric power, geothermal, solar, and total biomass.

2009 forward: Commercial sector total renewable energy is the sum of the commercial sector consumption values for conventional hydroelectric power, geothermal, solar, wind, and total biomass.

Table 10.2b Sources

Industrial Sector, Hydroelectric Power

1949 forward: Industrial sector conventional hydroelectricity net generation data from Table 7.2c are converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6.

Industrial Sector, Geothermal

1989–2009: Annual estimates by the U.S. Energy Information Administration (EIA) based on data from Oregon Institute of Technology, Geo-Heat Center.

2010 forward: Annual estimates assumed by EIA to be equal to that of 2009.

(For 1989 forward, monthly estimates are created by dividing the annual estimates by the number of days in the year and then multiplying by the number of days in the month.)

Industrial Sector, Solar

1989 forward: Industrial sector solar consumption is the sum of the values for "Distributed Solar Energy Consumption: Electricity, Industrial Sector" from Table 10.5 and "Utility-Scale Solar Energy Consumption: Electricity, Industrial Sector" from Table 10.6.

Industrial Sector, Wind

2011 forward: Industrial sector wind electricity net generation data from EIA, Form EIA-923, "Power Plant Operations Report," are converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6.

Industrial Sector, Wood

1949–1979: Annual estimates are from EIA, *Estimates of U.S. Wood Energy Consumption from 1949 to 1981,* Table A2.

1980–1983: Annual estimates are from EIA, *Estimates of U.S. Wood Energy Consumption 1980 –1983,* Table ES1.

1984: Annual estimate is from EIA, *Estimates of U.S. Biofuels Consumption 1990*, Table 1.

1985 and 1986: Annual estimates interpolated by EIA.

1987: Annual estimate is from EIA, *Estimates of Biofuels Consumption in the United States During 1987*, Table 2.

1988: Annual estimate interpolated by EIA.

(For 1973–1988, monthly estimates are created by dividing the annual estimates by the number of days in the year and then multiplying by the number of days in the month.)

1989 forward: Monthly/annual industrial sector combined-heat-and-power (CHP) wood consumption data are from EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms. Annual estimates for industrial sector non-CHP wood consumption are based on EIA, Form EIA-846, "Manufacturing Energy Consumption Survey" (for 2015 forward, the annual estimates are assumed by EIA to be equal to that of 2014). For 1989 forward, monthly estimates for industrial sector non-CHP wood consumption are created by dividing the annual estimates by the number of days in the year and then multiplying by the number of days in the month. Industrial sector total wood consumption is the sum of industrial sector CHP and non-CHP wood consumption.

Industrial Sector, Biomass Waste

1981: Annual estimate is calculated as total waste consumption (from EIA, *Estimates of U.S. Biofuels Consumption 199*0, Table 8) minus electric power sector waste consumption (from MER Table 10.2c).

1982 and 1983: Annual estimates are calculated as total waste consumption (based on *Estimates of U.S. Biofuels Consumption 1990*, Table 8) minus electric power sector waste consumption (from MER, Table 10.2c).

1984: Annual estimate is calculated as total waste consumption (from EIA*, Estimates of U.S. Biofuels Consumption 1990*, Table 8) minus electric power sector waste consumption (from MER, Table 10.2c).

1985 and 1986: Annual estimates interpolated by EIA.

1987: Annual estimate is calculated as total waste consumption (from EIA, *Estimates of U.S. Biofuels Consumption 1990*, Table 8) minus electric power sector waste consumption (from MER, Table 10.2c).

1988: Annual estimate interpolated by EIA.

(For 1973–1988, monthly estimates are created by dividing the annual estimates by the number of days in the year and then multiplying by the number of days in the month.)

1989 forward: Monthly/annual industrial sector combined-heat-and-power (CHP) consumption data are from Table 7.4c. Annual estimates for industrial sector non-CHP waste consumption are based on information presented in Government Advisory Associates, *Resource Recovery Yearbook* and *Methane Recovery Yearbook,* and information provided by the U.S. Environmental Protection Agency, Landfill Methane Outreach Program (for 2014 forward, the annual estimates are assumed by EIA to be equal to that of 2013). For 1989 forward, monthly estimates for industrial sector non-CHP waste consumption are created by dividing the annual estimates by the number of days in the year and then multiplying by the number of days in the month. Industrial sector total waste consumption is the sum of industrial sector CHP and non-CHP waste consumption.

Industrial Sector, Fuel Ethanol (Minus Denaturant)

1981 forward: The industrial sector share of motor gasoline consumption is equal to industrial sector motor gasoline consumption from Table 3.7b divided by motor gasoline product supplied from Table 3.5. Industrial sector fuel ethanol (minus denaturant) consumption is equal to fuel ethanol (minus denaturant) consumption from Table 10.3 multiplied by the industrial sector share of motor gasoline consumption. Note that there is a discontinuity in this time series between 2014 and 2015 due to a change in the method for allocating motor gasoline consumption to the end-use sectors; beginning in 2015, the commercial and industrial sector shares of fuel ethanol consumption are larger than in 2014, while the transportation sector share is smaller.

Industrial Sector, Biomass Losses and Co-products

1981 forward: Calculated as fuel ethanol losses and co-products from Table 10.3 plus biodiesel losses and co-products from Table 10.4.

Industrial Sector, Total Biomass

1949–1980: Industrial sector total biomass consumption is equal to industrial sector wood consumption.

1981 forward: Industrial sector total biomass consumption is the sum of the industrial sector consumption values for wood, waste, fuel ethanol (minus denaturant), and biomass losses and co-products.

Industrial Sector, Total Renewable Energy

1949–1988: Industrial sector total renewable energy consumption is the sum of the industrial sector consumption values for conventional hydroelectric power and total biomass.

1989–2009: Industrial sector total renewable energy consumption is the sum of the industrial sector consumption values for conventional hydroelectric power, geothermal, and total biomass.

2010: Industrial sector total renewable energy consumption is the sum of the industrial sector consumption values for conventional hydroelectric power, geothermal, solar, and total biomass.

2011 forward: Industrial sector total renewable energy consumption is the sum of the industrial sector consumption values for conventional hydroelectric power, geothermal, solar, wind, and total biomass.

Transportation Sector, Fuel Ethanol (Minus Denaturant)

1981 forward: The transportation sector share of motor gasoline consumption is equal to transportation sector motor gasoline consumption from Table 3.7c divided by motor gasoline product supplied from Table 3.5. Transportation sector fuel ethanol (minus denaturant) consumption is equal to fuel ethanol (minus denaturant) consumption from Table 10.3 multiplied by the transportation sector share of motor gasoline consumption. Note that there is a discontinuity in this time series between 2014 and 2015 due to a change in the method for allocating motor gasoline consumption to the end-use sectors; beginning in 2015, the commercial and industrial sector shares of fuel ethanol consumption are larger than in 2014, while the transportation sector share is smaller.

Transportation Sector, Biodiesel

2001 forward: Table 10.4. Transportation sector biodiesel consumption is assumed to equal total biodiesel consumption.

Transportation Sector, Other Renewable Fuels

2009 forward: Table 10.4.

Transportation Sector, Total Renewable Energy

1981–2000: Transportation sector total renewable energy consumption is equal to transportation sector fuel ethanol (minus denaturant) consumption.

2001–2008: Transportation sector total renewable energy consumption is the sum of the transportation sector consumption values for fuel ethanol (minus denaturant) and biodiesel.

2009 forward: Transportation sector total renewable energy consumption is the sum of the transportation sector consumption values for fuel ethanol (minus denaturant), biodiesel, and other renewable fuels.

Table 10.3 Sources

Feedstock

1981 forward: Calculated as fuel ethanol production (in thousand barrels) minus denaturant, and then multiplied by the fuel ethanol feedstock factor—see Table A3.

Losses and Co-products

1981 forward: Calculated as fuel ethanol feedstock plus denaturant minus fuel ethanol production.

Denaturant

1981–2008: Data in thousand barrels for petroleum denaturant in fuel ethanol produced are estimated as 2% of fuel ethanol production; these data are converted to Btu by multiplying by 4.645 million Btu per barrel (the estimated

quantity-weighted factor of natural gasoline and conventional motor gasoline used as denaturant).

2009–2017: U.S. Energy Information Administration (EIA), *Petroleum Supply Annual (PSA),* annual reports, Table 1. Data in thousand barrels for net production of natural gasoline at renewable fuels and oxygenate plants are multiplied by -1; these data are converted to Btu by multiplying by 4.620 million Btu per barrel (the approximate heat content of natural gasoline). Data in thousand barrels for net production of conventional motor gasoline and motor gasoline blending components at renewable fuels and oxygenate plants are multiplied by -1; these data are converted to Btu by multiplying by 5.222 million Btu per barrel (the approximate heat content of motor gasoline blending components). Total denaturant is the sum of the values for natural gasoline, conventional motor gasoline, and motor gasoline blending components.

2018: EIA, *Petroleum Supply Monthly (PSM)*, monthly reports, Table 1. Data in thousand barrels for net production of natural gasoline at renewable fuels and oxygenate plants are multiplied by -1; these data are converted to Btu by multiplying by 4.620 million Btu per barrel (the approximate heat content of natural gasoline). Data in thousand barrels for net production of conventional motor gasoline and motor gasoline blending components at renewable fuels and oxygenate plants are multiplied by -1; these data are converted to Btu by multiplying by 5.222 million Btu per barrel (the approximate heat content of motor gasoline blending components). Total denaturant is the sum of the values for natural gasoline, conventional motor gasoline, and motor gasoline blending components.

Production

1981–1992: Fuel ethanol production is assumed to equal fuel ethanol consumption—see sources for "Consumption."

1993–2004: Calculated as fuel ethanol consumption plus fuel ethanol stock change minus fuel ethanol net imports. These data differ slightly from the original production data from EIA, Form EIA-819, "Monthly Oxygenate Report," and predecessor form, which were not reconciled and updated to be consistent with the final balance.

2005–2008: EIA, Form EIA-819, "Monthly Oxygenate Report."

2009–2017: EIA, PSA, annual reports, Table 1, data for net production of fuel ethanol at renewable fuels and oxygenate plants.

2018: EIA, PSM, monthly reports, Table 1, data for net production of fuel ethanol at renewable fuels and oxygenate plants.

Trade, Stocks, and Stock Change

1992–2017: EIA, PSA, annual reports, Table 1.

2018: EIA, PSM, monthly reports, Table 1.

Consumption

1981–1989: EIA, *Estimates of U.S. Biofuels Consumption 1990*, Table 10; and interpolated values for 1982, 1983, 1985, 1986, and 1988.

1990–1992: EIA, *Estimates of U.S. Biomass Energy Consumption 1992*, Table D2; and interpolated value for 1991.

1993–2004: EIA, PSA, annual reports, Tables 2 and 16. Calculated as 10% of oxygenated finished motor gasoline field production (Table 2), plus fuel ethanol refinery input (Table 16).

2005–2008: EIA, PSA, annual reports, Tables 1 and 15. Calculated as motor gasoline blending components adjustments (Table 1), plus finished motor gasoline adjustments (Table 1), plus fuel ethanol refinery and blender net inputs (Table 15).

2009–2017: EIA, PSA, annual reports, Table 1. Calculated as fuel ethanol refinery and blender net inputs minus fuel ethanol adjustments.

2018: EIA, PSM, monthly reports, Table 1. Calculated as fuel ethanol refinery and blender net inputs minus fuel ethanol adjustments.

Consumption Minus Denaturant

1981 forward: Calculated as fuel ethanol consumption minus the amount of denaturant in fuel ethanol consumed. Denaturant in fuel ethanol consumed is estimated by multiplying denaturant in fuel ethanol produced by the fuel ethanol consumption-to-production ratio.

Table 10.4 Sources

Biodiesel Feedstock

2001 forward: Calculated as biodiesel production in thousand barrels multiplied by 5.433 million Btu per barrel (the biodiesel feedstock factor—see "Biodiesel Feedstock" entry in the "Thermal Conversion Factor Source Documentation" at the end of Appendix A).

Biodiesel Losses and Co-products

2001 forward: Calculated as biodiesel feedstock minus biodiesel production.

Biodiesel Production

2001–2005: U.S. Department of Agriculture, Commodity Credit Corporation, Bioenergy Program records. Annual data are derived from quarterly data. Monthly data are estimated by dividing the annual data by the number of days in the year and then multiplying by the number of days in the month.

2006: U.S. Department of Commerce, U.S. Census Bureau, "M311K—Fats and Oils: Production, Consumption, and Stocks," data for soybean oil consumed in methyl esters (biodiesel). In addition, the U.S. Energy Information Administration (EIA) estimates that 14.4 million gallons of yellow grease were consumed in methyl esters (biodiesel).

2007: U.S. Department of Commerce, U.S. Census Bureau, "M311K—Fats and Oils: Production, Consumption, and Stocks," data for all fats and oils consumed in methyl esters (biodiesel).

2008: EIA, *Monthly Biodiesel Production Report*, December 2009 (release date October 2010), Table 11. Monthly data for 2008 are estimated based on U.S. Department of Commerce, U.S. Census Bureau, M311K data, multiplied by the EIA 2008 annual value's share of the M311K 2008 annual value.

2009 and 2010: EIA, *Monthly Biodiesel Production Report*, monthly reports, Table 1.

2011–2017: EIA, *Petroleum Supply Annual (PSA)*, annual reports, Table 1, data for renewable fuels except fuel ethanol.

2018: EIA, *Petroleum Supply Monthly (PSM)*, monthly reports, Table 1, data for renewable fuels except fuel ethanol.

Biodiesel Trade

2001–2011: For imports, U.S. Department of Agriculture, data for the following Harmonized Tariff Schedule codes: 3824.90.40.20, "Fatty Esters Animal/Vegetable Mixture" (data through June 2010); and 3824.90.40.30, "Biodiesel/Mixes" (data for July 2010–2011). For exports, U.S. Department of Agriculture, data for the following Schedule B codes: 3824.90.40.00, "Fatty Substances Animal/Vegetable/Mixture" (data through 2010); and 3824.90.40.30, "Biodiesel <70%" (data for 2011). (The data above are converted from pounds to gallons by dividing by 7.4.) Although these categories include products other than biodiesel (such as biodiesel coprocessed with petroleum feedstocks; and products destined for soaps, cosmetics, and other items), biodiesel is the largest component. In the absence of other reliable data for biodiesel trade, EIA sees these data as good substitutes.

2012–2017: EIA, PSA, annual reports, Tables 25 and 31, data for biomass-based diesel fuel.

2018: EIA, PSM, monthly reports, Tables 37 and 49, data for biomass-based diesel fuel.

Biodiesel Stocks and Stock Change

2009 forward: EIA, biodiesel data from EIA-22M, "Monthly Biodiesel Production Survey"; and biomass-based diesel fuel data from EIA-810, "Monthly Refinery Report," EIA-812, "Monthly Product Pipeline Report," and EIA-815, "Monthly Bulk Terminal and Blender Report."

Biodiesel Consumption

2001–2008: Calculated as biodiesel production plus biodiesel net imports.

January and February 2009: EIA, PSA, Table 1, data for refinery and blender net inputs of renewable fuels except fuel ethanol.

March 2009 forward: Calculated as biodiesel production plus biodiesel net imports minus biodiesel stock change.

Other Renewable Fuels

2009 forward: Imports data for "Other Renewable Diesel Fuel" are from EIA, PSA Table 25 and PSM Table 37 (data are converted to Btu by multiplying by the other renewable diesel fuel heat content factor in Table A1). Imports data for "Other Renewable Fuels" are from EIA, PSA Table 25 and PSM Table 37 (data are converted to Btu by multiplying by the biodiesel heat content factor in Table A1). Stock change data for "Other Renewable Diesel Fuel" are from EIA, EIA-810, "Monthly Refinery Report," EIA-812, "Monthly Product Pipeline Report," and EIA-815, "Monthly Bulk Terminal and Blender Report" (data are converted to Btu by multiplying by the other renewable diesel fuel heat content factor in Table A1). "Other Renewable Fuels" in Table 10.4 is calculated as other renewable diesel fuel imports plus other renewable fuels imports minus other renewable diesel fuel stock change.

Table 10.5 Sources

Distributed Solar Energy Consumption: Heat

Annual Data

1989–2009: Annual estimates by the U.S. Energy Information Administration (EIA) based on EIA, Form EIA-63A, "Annual Solar Thermal Collector/Reflector Shipments Report." Solar energy consumption by solar thermal non-electric applications (mainly in the residential sector, but with some in the commercial and industrial sectors) is based on assumptions about the stock of equipment in place and other factors.

2010 forward: Annual estimates based on commercial sector solar thermal growth rates from EIA's *Annual Energy Outlook (AEO)* data system. (Annual estimates are subject to revision when a new AEO is released.)

Monthly Data

1989–2013: Monthly estimates for each year are obtained by allocating a given year's annual value to the months in that year. Each month's allocator is the average of that month's "Distributed Solar Energy Consumption: Electricity, Total" values in 2014 and 2015. The allocators, when rounded, are as follows: January—5%; February—6%; March—8%; April—9%; May—10%; June—10%; July—10%; August—10%; September—9%; October—9%; November—7%; and December—7%.

2014 forward: Once all 12 months of "Distributed Solar Energy Consumption: Electricity, Total" data are available for a given year, they are used as allocators and applied to the annual estimate in order to derive monthly estimates for that year. Initial monthly estimates for the current year use the previous year's allocators.

Distributed Solar Energy Consumption: Electricity, Residential Sector

Beginning in 2014, monthly and annual data for residential sector distributed (small-scale) solar photovoltaic generation are from EIA, *Electric Power Monthly*, Table 1.2.E. Those data are converted to consumption data in Btu by multiplying by the total fossil fuels heat rate factors in MER Table A6.

Backcasts for earlier periods are developed as follows:

Annual Data

1989–2003: Annual growth rates are calculated based on distributed (small-scale) solar electricity consumption in all sectors. Consumption is estimated using information on shipments of solar panels from EIA, Form EIA-63B, "Annual Photovoltaic Cell/Module Shipments Report," and assumptions about the stock of equipment in place and other factors. The growth rates are applied to more recent data to create historical annual estimates.

2004–2008: Annual growth rates based on commercial sector solar photovoltaic growth rates from EIA's *Annual Energy Outlook (AEO)* data system are applied to more recent data to create historical annual estimates. (Annual estimates are subject to revision when a new AEO is released.)

2009–2013: Annual growth rates based on residential sector solar photovoltaic growth rates from EIA's *Annual Energy Outlook (AEO)* data system are applied to more recent data to create historical annual estimates. (Annual estimates are subject to revision when a new AEO is released.)

Monthly Data

1989–2013: See "Distributed Solar Energy Consumption: Heat, Monthly Data."

Distributed Solar Energy Consumption: Electricity, Commercial Sector

Beginning in 2014, monthly and annual data for commercial sector distributed (small-scale) solar photovoltaic generation are from EIA, *Electric Power Monthly*, Table 1.2.C. Those data are converted to consumption data in Btu by multiplying by the total fossil fuels heat rate factors in MER Table A6.

Backcasts for earlier periods are developed as follows:

Annual Data

1989–2003: Annual growth rates based on EIA, Form EIA-63B, "Annual Photovoltaic Cell/Module Shipments Report," are applied to more recent data to create historical annual estimates. (See "Distributed Solar Energy Consumption: Electricity, Residential Sector" sources above for details.)

2004–2013: Annual growth rates based on commercial sector solar photovoltaic growth rates from EIA's *Annual Energy Outlook (AEO)* data system are applied to more recent data to create historical annual estimates. (Annual estimates are subject to revision when a new AEO is released.)

Monthly Data

1989–2013: See "Distributed Solar Energy Consumption: Heat, Monthly Data."

Distributed Solar Energy Consumption: Electricity, Industrial Sector

Beginning in 2014, monthly and annual data for industrial sector distributed (small-scale) solar photovoltaic generation are from EIA, *Electric Power Monthly*, Table 1.2.D. Those data are converted to consumption data in Btu by multiplying by the total fossil fuels heat rate factors in MER Table A6.

Backcasts for earlier periods are developed as follows:

Annual Data

1989–2003: Annual growth rates based on EIA, Form EIA-63B, "Annual Photovoltaic Cell/Module Shipments Report," are applied to more recent data to create historical annual estimates. (See "Distributed Solar Energy Consumption: Electricity, Residential Sector" sources above for details.)

2004–2013: Annual growth rates based on commercial sector solar photovoltaic growth rates from EIA's *Annual Energy Outlook (AEO)* data system are applied to more recent data to create historical annual estimates. (Annual estimates are subject to revision when a new AEO is released.)

Monthly Data
1989–2013: See "Distributed Solar Energy Consumption: Heat, Monthly Data."

Distributed Solar Energy Consumption: Electricity, Total
1989 forward: Distributed (small-scale) solar energy consumption for total electricity is the sum of the distributed solar energy consumption (for electricity) values for the residential, commercial, and industrial sectors.

Distributed Solar Energy Consumption: Total
1989 forward: Distributed (small-scale) solar energy consumption total is the sum of distributed solar energy consumption values for heat and total electricity.

Utility-Scale Solar Energy Consumption: Electricity, Commercial Sector
2008 forward: Commercial sector solar photovoltaic and solar thermal electricity net generation data from EIA, Form EIA-923, "Power Plant Operations Report," are converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6.

Utility-Scale Solar Energy Consumption: Electricity, Industrial Sector
2010 forward: Industrial sector solar photovoltaic and solar thermal electricity net generation data from EIA, Form EIA-923, "Power Plant Operations Report," are converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6.

Utility-Scale Solar Energy Consumption: Electricity, Electric Power Sector
1984 forward: Electric power sector solar photovoltaic and solar thermal electricity net generation data from Table 7.2b are converted to Btu by multiplying the total fossil fuels heat rate factors in Table A6.

Utility-Scale Solar Energy Consumption: Electricity, Total
1984 forward: Utility-scale solar energy consumption for total electricity is the sum of the utility-scale solar energy consumption (for electricity) values for the commercial, industrial, and electric power sectors.

Solar Energy Consumption: Total
1984 forward: Total solar energy consumption is the sum of the values for total distributed solar energy consumption and total utility-scale solar energy consumption.