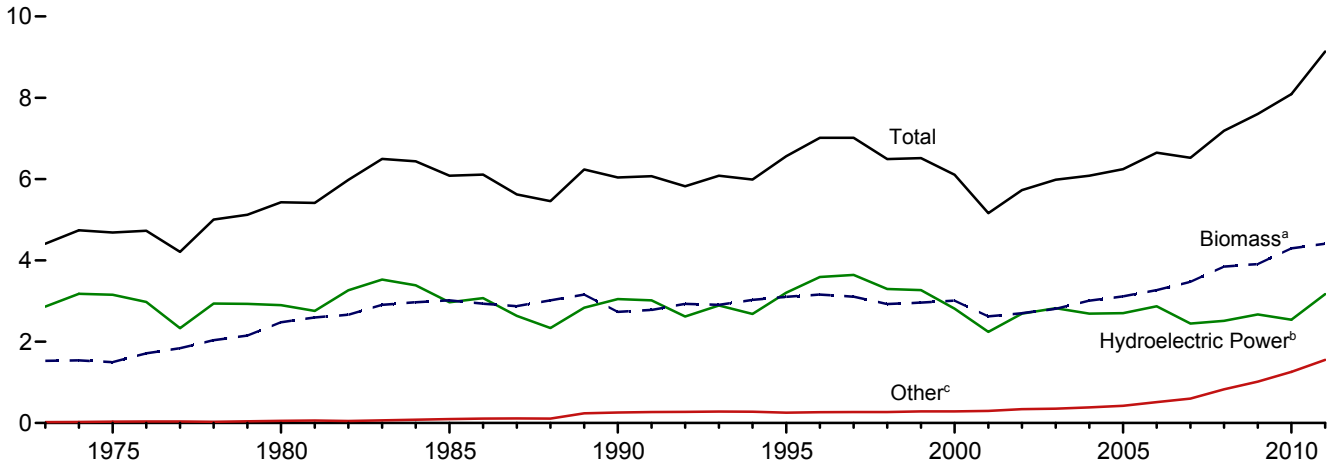
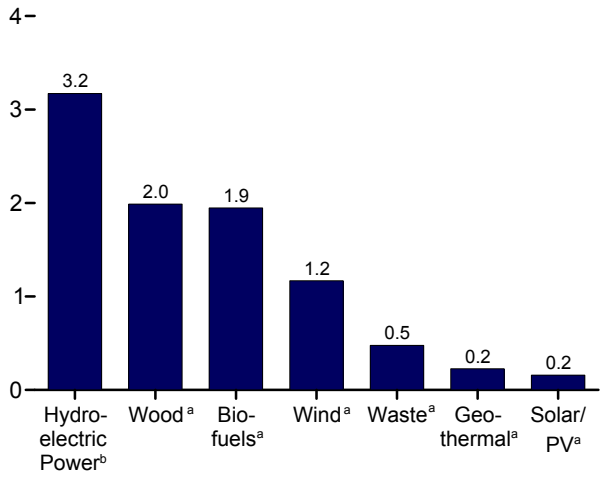
10. Renewable Energy

Figure 10.1 Renewable Energy Consumption
(Quadrillion Btu)

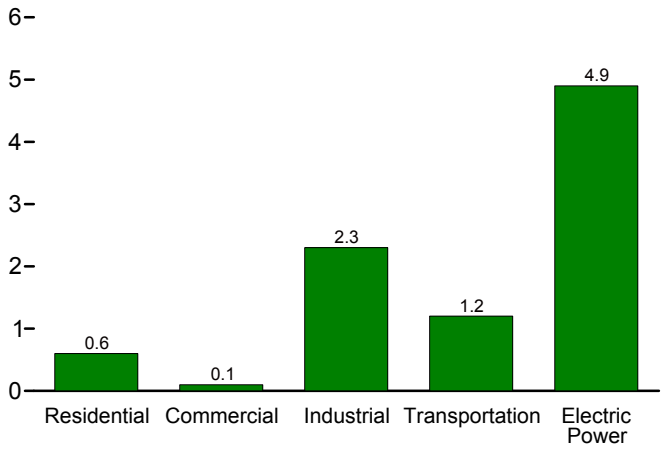
Total and Major Sources, 1973-2011



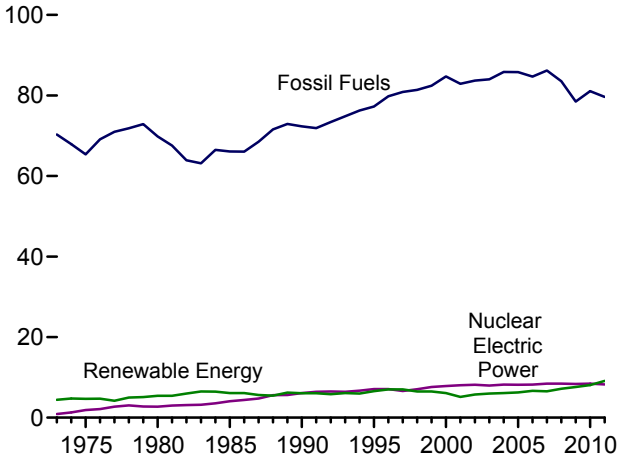
By Source, 2011



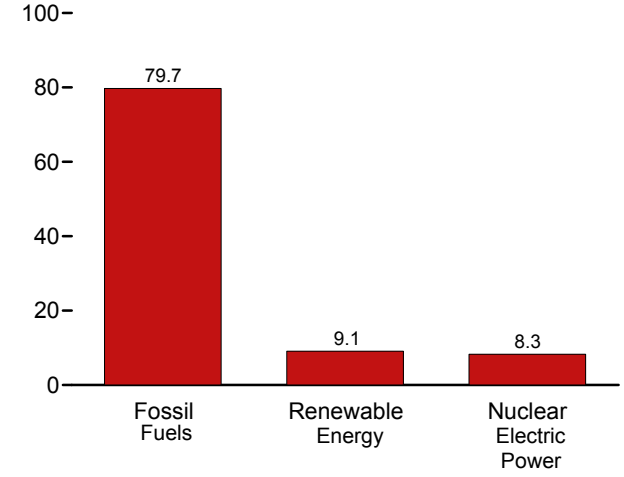
By Sector, 2011



Compared With Other Resources, 1973-2011



Compared With Other Resources, 2011



[a] See Table 10.1 for definition.
[b] Conventional hydroelectric power.
[c] Geothermal, solar/PV, and wind.

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/PV[g]	Wind[h]	Biomass				Total Renewable Energy
	Biofuels[b]	Total[c]						Wood[i]	Waste[j]	Biofuels[k]	Total	
1973 Total	**NA**	**1,529**	**4,411**	**2,861**	**20**	**NA**	**NA**	**1,527**	**2**	**NA**	**1,529**	**4,411**
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**	**6,041**	**3,046**	**171**	**59**	**29**	**2,216**	**408**	**111**	**2,735**	**6,041**
1995 Total	**198**	**3,099**	**6,558**	**3,205**	**152**	**69**	**33**	**2,370**	**531**	**200**	**3,101**	**6,560**
1996 Total	**141**	**3,155**	**7,012**	**3,590**	**163**	**70**	**33**	**2,437**	**577**	**143**	**3,157**	**7,014**
1997 Total	**186**	**3,108**	**7,018**	**3,640**	**167**	**70**	**34**	**2,371**	**551**	**184**	**3,105**	**7,016**
1998 Total	**202**	**2,929**	**6,494**	**3,297**	**168**	**69**	**31**	**2,184**	**542**	**201**	**2,927**	**6,493**
1999 Total	**211**	**2,965**	**6,517**	**3,268**	**171**	**68**	**46**	**2,214**	**540**	**209**	**2,963**	**6,516**
2000 Total	**233**	**3,006**	**6,104**	**2,811**	**164**	**66**	**57**	**2,262**	**511**	**236**	**3,008**	**6,106**
2001 Total	**254**	**2,624**	**5,164**	**2,242**	**164**	**64**	**70**	**2,006**	**364**	**253**	**2,622**	**5,163**
2002 Total	**308**	**2,705**	**5,734**	**2,689**	**171**	**63**	**105**	**1,995**	**402**	**303**	**2,701**	**5,729**
2003 Total	**402**	**2,805**	**5,982**	**2,825**	**175**	**62**	**115**	**2,002**	**401**	**404**	**2,807**	**5,983**
2004 Total	**487**	**2,998**	**6,070**	**2,690**	**178**	**63**	**142**	**2,121**	**389**	**499**	**3,010**	**6,082**
2005 Total	**564**	**3,104**	**6,229**	**2,703**	**181**	**63**	**178**	**2,137**	**403**	**577**	**3,117**	**6,242**
2006 Total	**720**	**3,216**	**6,599**	**2,869**	**181**	**68**	**264**	**2,099**	**397**	**771**	**3,267**	**6,649**
2007 Total	**978**	**3,461**	**6,509**	**2,446**	**186**	**76**	**341**	**2,070**	**413**	**991**	**3,474**	**6,523**
2008 Total	**1,387**	**3,864**	**7,202**	**2,511**	**192**	**89**	**546**	**2,040**	**436**	**1,372**	**3,849**	**7,186**
2009 Total	**1,584**	**3,928**	**7,616**	**2,669**	**200**	**98**	**721**	**1,891**	**453**	**1,568**	**3,912**	**7,600**
2010 January	152	359	672	218	18	10	67	168	39	142	349	662
February	142	332	610	201	16	9	53	154	35	136	326	605
March	158	366	682	204	18	10	84	168	40	149	357	673
April	152	351	661	186	17	10	95	160	39	149	348	657
May	157	358	717	245	18	11	85	162	39	155	356	715
June	152	355	753	291	17	11	79	164	39	155	357	755
July	158	367	701	239	17	11	66	170	40	158	368	701
August	160	371	662	196	18	11	65	171	40	159	370	660
September	156	360	626	168	17	11	69	166	38	153	357	622
October	163	369	646	173	17	10	77	166	39	160	366	643
November	164	369	682	191	17	10	95	165	40	157	363	676
December	168	383	726	226	18	10	88	174	41	163	377	720
Total	**1,884**	**4,341**	**8,136**	**2,539**	**208**	**126**	**923**	**1,988**	**469**	**1,837**	**4,294**	**8,090**
2011 January	170	383	754	255	20	12	84	174	40	154	367	739
February	152	344	717	241	18	12	103	156	36	146	337	710
March	171	377	822	310	20	13	103	166	40	160	366	811
April	163	359	821	309	18	13	121	158	38	154	351	812
May	171	371	840	323	19	14	114	160	40	165	365	835
June	167	375	828	315	19	14	106	168	40	166	374	827
July	172	384	797	308	19	14	72	171	41	162	374	787
August	175	384	746	257	19	14	72	169	41	173	382	744
September	167	371	680	210	18	13	67	165	40	160	365	673
October	176	379	711	195	19	14	104	163	40	167	370	702
November	177	382	742	209	19	12	121	164	41	165	370	730
December	186	403	779	241	19	13	102	175	42	173	390	766
Total	**2,047**	**4,511**	**9,236**	**3,171**	**226**	**158**	**1,168**	**1,987**	**477**	**1,947**	**4,411**	**9,135**
2012 January	177	389	792	233	19	15	135	173	40	R 154	R 367	R 769
February	164	362	705	203	18	15	108	161	37	R 152	R 350	R 694
March	172	372	797	256	19	16	132	161	40	R 163	364	R 788
April	164	357	776	261	18	17	123	153	40	R 160	R 353	773
May	173	377	819	283	19	19	121	164	40	172	376	819
5-Month Total	**849**	**1,857**	**3,890**	**1,237**	**95**	**82**	**619**	**811**	**197**	**802**	**1,810**	**3,843**
2011 5-Month Total	**826**	**1,833**	**3,954**	**1,437**	**95**	**64**	**525**	**814**	**193**	**779**	**1,786**	**3,907**
2010 5-Month Total	**761**	**1,766**	**3,341**	**1,054**	**86**	**51**	**384**	**812**	**193**	**731**	**1,737**	**3,312**

[a] Production equals consumption for all renewable energy sources except biofuels.

[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 thermal/photovoltaic, wind, and biomass.

[e] Conventional hydroelectricity net generation (converted to Btu using the fossil-fuels heat rate—see Table A6).

[f] Geothermal electricity net generation (converted to Btu using the fossil-fuels heat rate—see Table A6), and geothermal heat pump and direct use energy.

[g] Solar thermal and photovoltaic (PV) electricity net generation (converted to Btu using the fossil-fuels heat rate—see Table A6), and solar thermal direct use energy.

[h] Wind electricity net generation (converted to Btu using the fossil-fuels heat rate—see 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) and biodiesel consumption, plus losses and co-products from the production of fuel ethanol and biodiesel.

R=Revised. 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 for all available data beginning in 1973.

Sources: Tables 10.2a–10.4.

Table 10.2a Renewable Energy Consumption: Residential and Commercial Sectors

(Trillion Btu)

	Residential Sector				Commercial Sector[a]								
			Biomass						Biomass				
	Geo-thermal[b]	Solar/ PV[c]	Wood[d]	Total	Hydro-electric Power[e]	Geo-thermal[b]	Solar/ PV[f]	Wind[g]	Wood[d]	Waste[h]	Fuel Ethanol[i]	Total	Total
1973 Total	**NA**	**NA**	**354**	**354**	**NA**	**NA**	**NA**	**NA**	**7**	**NA**	**NA**	**7**	**7**
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**	**56**	**580**	**641**	**1**	**3**	**–**	**–**	**66**	**28**	**(s)**	**94**	**98**
1995 Total	**7**	**64**	**520**	**591**	**1**	**5**	**–**	**–**	**72**	**40**	**(s)**	**113**	**118**
1996 Total	**7**	**65**	**540**	**612**	**1**	**5**	**–**	**–**	**76**	**53**	**(s)**	**129**	**135**
1997 Total	**8**	**64**	**430**	**502**	**1**	**6**	**–**	**–**	**73**	**58**	**(s)**	**131**	**138**
1998 Total	**8**	**64**	**380**	**452**	**1**	**7**	**–**	**–**	**64**	**54**	**(s)**	**118**	**127**
1999 Total	**9**	**63**	**390**	**461**	**1**	**7**	**–**	**–**	**67**	**54**	**(s)**	**121**	**129**
2000 Total	**9**	**61**	**420**	**489**	**1**	**8**	**–**	**–**	**71**	**47**	**(s)**	**119**	**128**
2001 Total	**9**	**59**	**370**	**438**	**1**	**8**	**–**	**–**	**67**	**25**	**(s)**	**92**	**101**
2002 Total	**10**	**57**	**380**	**448**	**(s)**	**9**	**–**	**–**	**69**	**26**	**(s)**	**95**	**104**
2003 Total	**13**	**57**	**400**	**470**	**1**	**11**	**–**	**–**	**71**	**29**	**1**	**101**	**113**
2004 Total	**14**	**57**	**410**	**481**	**1**	**12**	**–**	**–**	**70**	**34**	**1**	**105**	**118**
2005 Total	**16**	**58**	**430**	**504**	**1**	**14**	**–**	**–**	**70**	**34**	**1**	**105**	**120**
2006 Total	**18**	**63**	**380**	**462**	**1**	**14**	**–**	**–**	**65**	**36**	**1**	**103**	**118**
2007 Total	**22**	**70**	**410**	**502**	**1**	**14**	**–**	**–**	**70**	**31**	**2**	**103**	**118**
2008 Total	**26**	**80**	**450**	**557**	**1**	**15**	**(s)**	**–**	**73**	**34**	**2**	**109**	**125**
2009 Total	**33**	**89**	**430**	**552**	**1**	**17**	**(s)**	**(s)**	**72**	**36**	**3**	**112**	**129**
2010 January	3	10	36	48	(s)	2	(s)	(s)	6	3	(s)	9	11
February	3	9	32	44	(s)	1	(s)	(s)	5	3	(s)	8	10
March	3	10	36	48	(s)	2	(s)	(s)	6	3	(s)	9	11
April	3	9	35	47	(s)	2	(s)	(s)	6	3	(s)	9	11
May	3	10	36	48	(s)	2	(s)	(s)	6	4	(s)	10	12
June	3	9	35	47	(s)	2	(s)	(s)	6	3	(s)	9	11
July	3	10	36	48	(s)	2	(s)	(s)	6	3	(s)	9	11
August	3	10	36	48	(s)	2	(s)	(s)	6	3	(s)	10	11
September	3	9	35	47	(s)	2	(s)	(s)	6	3	(s)	9	11
October	3	10	36	48	(s)	2	(s)	(s)	6	3	(s)	9	11
November	3	9	35	47	(s)	2	(s)	(s)	6	3	(s)	9	10
December	3	10	36	48	(s)	2	(s)	(s)	6	3	(s)	9	11
Total	**37**	**114**	**420**	**571**	**1**	**19**	**(s)**	**(s)**	**72**	**36**	**3**	**111**	**130**
2011 January	3	12	37	52	(s)	2	(s)	(s)	6	3	(s)	9	11
February	3	11	33	47	(s)	2	(s)	(s)	5	3	(s)	9	10
March	3	12	37	52	(s)	2	(s)	(s)	6	3	(s)	9	11
April	3	12	35	50	(s)	2	(s)	(s)	6	3	(s)	9	10
May	3	12	37	52	(s)	2	(s)	(s)	6	3	(s)	9	11
June	3	12	35	50	(s)	2	(s)	(s)	6	3	(s)	9	11
July	3	12	37	52	(s)	2	(s)	(s)	6	3	(s)	9	11
August	3	12	37	52	(s)	2	(s)	(s)	6	3	(s)	9	11
September	3	12	35	50	(s)	2	(s)	(s)	6	3	(s)	9	11
October	3	12	37	52	(s)	2	(s)	(s)	6	3	(s)	9	11
November	3	12	35	50	(s)	2	(s)	(s)	6	3	(s)	9	11
December	3	12	37	52	(s)	2	(s)	(s)	6	3	(s)	10	11
Total	**40**	**140**	**430**	**610**	**1**	**20**	**(s)**	**(s)**	**71**	**36**	**3**	**110**	**131**
2012 January	3	14	36	54	(s)	2	(s)	(s)	6	3	(s)	9	11
February	3	13	34	51	(s)	2	(s)	(s)	6	3	(s)	9	10
March	3	14	36	54	(s)	2	(s)	(s)	6	3	(s)	9	11
April	3	14	35	52	(s)	2	(s)	(s)	6	3	(s)	9	11
May	3	14	36	54	(s)	2	(s)	(s)	6	3	(s)	9	11
5-Month Total	**16**	**70**	**179**	**265**	**(s)**	**8**	**(s)**	**(s)**	**29**	**14**	**1**	**45**	**54**
2011 5-Month Total	**16**	**58**	**178**	**252**	**1**	**8**	**(s)**	**(s)**	**29**	**14**	**1**	**45**	**54**
2010 5-Month Total	**15**	**47**	**174**	**236**	**(s)**	**8**	**(s)**	**(s)**	**30**	**15**	**1**	**46**	**54**

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

[b] Geothermal heat pump and direct use energy.

[c] Solar thermal direct use energy, and photovoltaic (PV) electricity net generation (converted to Btu using the fossil-fuels heat rate—see Table A6). Includes distributed solar thermal and PV energy used in the commercial, industrial, and electric power sectors.

[d] Wood and wood-derived fuels.

[e] Conventional hydroelectricity net generation (converted to Btu using the fossil-fuels heat rate—see Table A6).

[f] Photovoltaic (PV) electricity net generation (converted to Btu using the fossil-fuels heat rate—see Table A6) at commercial plants with capacity of 1 megawatt or greater.

[g] Wind electricity net generation (converted to Btu using the fossil-fuels heat rate—see 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.

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

Notes: • Data are estimates, except for commercial sector solar/PV, 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 for all available 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		
	Hydro-electric Power[b]	Geo-thermal[c]	Solar/ PV[d]	Wind[e]	Wood[f]	Waste[g]	Fuel Ethanol[h]	Losses and Co-products[i]	Total	Total	Fuel Ethanol[j]	Bio-diesel	Total
1973 Total	**35**	**NA**	**NA**	**NA**	**1,165**	**NA**	**NA**	**NA**	**1,165**	**1,200**	**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**	**–**	**–**	**1,442**	**192**	**1**	**49**	**1,684**	**1,717**	**60**	**NA**	**60**
1995 Total	**55**	**3**	**–**	**–**	**1,652**	**195**	**2**	**86**	**1,934**	**1,992**	**112**	**NA**	**112**
1996 Total	**61**	**3**	**–**	**–**	**1,683**	**224**	**1**	**61**	**1,969**	**2,033**	**81**	**NA**	**81**
1997 Total	**58**	**3**	**–**	**–**	**1,731**	**184**	**1**	**80**	**1,996**	**2,057**	**102**	**NA**	**102**
1998 Total	**55**	**3**	**–**	**–**	**1,603**	**180**	**1**	**86**	**1,872**	**1,929**	**113**	**NA**	**113**
1999 Total	**49**	**4**	**–**	**–**	**1,620**	**171**	**1**	**90**	**1,882**	**1,934**	**118**	**NA**	**118**
2000 Total	**42**	**4**	**–**	**–**	**1,636**	**145**	**1**	**99**	**1,881**	**1,928**	**135**	**NA**	**135**
2001 Total	**33**	**5**	**–**	**–**	**1,443**	**129**	**3**	**108**	**1,681**	**1,719**	**141**	**1**	**142**
2002 Total	**39**	**5**	**–**	**–**	**1,396**	**146**	**3**	**130**	**1,676**	**1,720**	**168**	**2**	**170**
2003 Total	**43**	**3**	**–**	**–**	**1,363**	**142**	**4**	**169**	**1,679**	**1,726**	**228**	**2**	**230**
2004 Total	**33**	**4**	**–**	**–**	**1,476**	**132**	**6**	**203**	**1,817**	**1,853**	**286**	**3**	**290**
2005 Total	**32**	**4**	**–**	**–**	**1,452**	**148**	**7**	**230**	**1,837**	**1,873**	**327**	**12**	**339**
2006 Total	**29**	**4**	**–**	**–**	**1,472**	**130**	**10**	**285**	**1,897**	**1,930**	**442**	**33**	**475**
2007 Total	**16**	**5**	**–**	**–**	**1,405**	**144**	**10**	**377**	**1,936**	**1,956**	**557**	**46**	**602**
2008 Total	**17**	**5**	**–**	**–**	**1,340**	**144**	**12**	**532**	**2,028**	**2,049**	**786**	**40**	**826**
2009 Total	**18**	**4**	**–**	**–**	**1,208**	**155**	**13**	**617**	**1,994**	**2,016**	**894**	**42**	**935**
2010 January	2	(s)	(s)	–	109	15	1	60	185	187	81	(s)	81
February	2	(s)	(s)	–	100	13	1	56	170	172	76	3	79
March	2	(s)	(s)	–	110	15	1	62	188	190	83	2	85
April	2	(s)	(s)	–	105	15	1	60	181	183	84	4	87
May	2	(s)	(s)	–	106	14	1	62	183	185	89	3	92
June	1	(s)	(s)	–	107	13	2	60	182	183	90	2	93
July	1	(s)	(s)	–	111	14	2	62	188	190	91	3	94
August	1	(s)	(s)	–	111	14	2	63	190	191	91	3	94
September	1	(s)	(s)	–	110	13	1	61	185	187	86	4	90
October	1	(s)	(s)	–	110	15	2	64	190	192	91	3	94
November	1	(s)	(s)	–	108	15	1	65	190	191	88	3	91
December	1	(s)	(s)	–	114	15	2	67	198	199	92	3	94
Total	**16**	**4**	**(s)**	**–**	**1,301**	**169**	**17**	**742**	**2,230**	**2,250**	**1,040**	**34**	**1,074**
2011 January	1	(s)	(s)	(s)	115	15	1	66	197	199	83	3	86
February	2	(s)	(s)	(s)	102	14	1	59	176	178	81	4	85
March	2	(s)	(s)	(s)	109	14	1	66	190	192	87	6	93
April	2	(s)	(s)	(s)	105	14	1	62	182	185	83	8	91
May	2	(s)	(s)	(s)	105	14	2	65	185	187	90	9	99
June	1	(s)	(s)	(s)	112	14	2	63	190	192	92	9	102
July	1	(s)	(s)	(s)	112	14	1	64	192	194	85	11	96
August	1	(s)	(s)	(s)	110	14	2	65	191	192	96	10	106
September	1	(s)	(s)	(s)	109	14	1	62	187	188	83	14	97
October	1	(s)	(s)	(s)	107	15	1	65	189	190	89	12	100
November	1	(s)	(s)	(s)	110	15	1	66	192	194	84	13	98
December	2	(s)	(s)	(s)	116	15	2	69	202	204	90	13	102
Total	**18**	**4**	**(s)**	**(s)**	**1,311**	**172**	**17**	**772**	**2,273**	**2,295**	**1,042**	**112**	**1,154**
2012 January	2	(s)	(s)	(s)	114	15	1	67	197	199	81	[R] 5	[R] 86
February	2	(s)	(s)	(s)	106	14	1	61	183	185	82	[R] 8	[R] 89
March	2	(s)	(s)	(s)	104	14	1	64	184	186	87	[R] 10	98
April	2	(s)	(s)	(s)	101	14	1	61	178	180	86	[R] 11	[R] 98
May	2	(s)	(s)	(s)	108	14	2	64	188	190	93	14	107
5-Month Total	**9**	**2**	**(s)**	**(s)**	**535**	**71**	**7**	**316**	**930**	**940**	**429**	**48**	**477**
2011 5-Month Total	**9**	**2**	**(s)**	**(s)**	**535**	**71**	**7**	**317**	**930**	**941**	**424**	**30**	**454**
2010 5-Month Total	**8**	**2**	**(s)**	**–**	**530**	**71**	**7**	**299**	**907**	**917**	**412**	**12**	**424**

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

[b] Conventional hydroelectricity net generation (converted to Btu using the fossil-fuels heat rate—see Table A6).

[c] Geothermal heat pump and direct use energy.

[d] Photovoltaic (PV) electricity net generation (converted to Btu using the fossil-fuels heat rate—see Table A6) at industrial plants with capacity of 1 megawatt or greater.

[e] Wind electricity net generation (converted to Btu using the fossil-fuels heat rate—see 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] 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.

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

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

Notes: • Data are estimates, except for industrial sector hydroelectric power in 1973-1978 and 1989 forward, solar/PV, 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 for all available 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/PV[c]	Wind[d]	Biomass			Total
					Wood[e]	Waste[f]	Total	
1973 Total	**2,827**	**20**	**NA**	**NA**	**1**	**2**	**3**	**2,851**
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**
1996 Total	**3,528**	**148**	**5**	**33**	**138**	**300**	**438**	**4,153**
1997 Total	**3,581**	**150**	**5**	**34**	**137**	**309**	**446**	**4,216**
1998 Total	**3,241**	**151**	**5**	**31**	**137**	**308**	**444**	**3,872**
1999 Total	**3,218**	**152**	**5**	**46**	**138**	**315**	**453**	**3,874**
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	**2,781**	**148**	**5**	**115**	**167**	**230**	**397**	**3,445**
2004 Total	**2,656**	**148**	**6**	**142**	**165**	**223**	**388**	**3,340**
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 January	217	13	(s)	67	17	21	39	335
February	199	11	(s)	53	16	20	36	300
March	202	13	1	84	16	22	39	338
April	184	12	1	95	15	21	36	329
May	243	13	1	85	14	22	36	378
June	290	12	2	79	16	23	39	421
July	238	12	2	66	17	23	40	358
August	195	13	2	65	18	23	41	315
September	168	12	1	69	16	22	38	288
October	171	12	1	77	15	22	37	298
November	190	12	1	95	16	23	39	337
December	225	13	(s)	88	17	23	41	367
Total	**2,521**	**148**	**12**	**923**	**196**	**264**	**459**	**4,064**
2011 January	254	14	(s)	84	16	21	38	391
February	239	13	1	103	15	20	35	390
March	308	14	1	103	15	23	38	463
April	307	13	2	121	12	22	33	476
May	321	14	2	113	13	22	35	486
June	313	13	2	106	15	23	38	473
July	307	13	2	72	16	24	40	434
August	256	13	2	72	16	23	39	383
September	209	13	2	67	15	22	37	327
October	194	14	2	104	13	23	36	349
November	207	13	1	120	13	23	36	377
December	239	14	1	102	16	23	39	396
Total	**3,153**	**163**	**18**	**1,168**	**175**	**269**	**444**	**4,945**
2012 January	232	14	1	135	16	22	38	420
February	201	13	1	108	15	21	35	359
March	255	14	2	132	14	23	37	440
April	259	13	3	123	11	22	33	432
May	281	14	4	121	13	23	36	457
5-Month Total	**1,228**	**69**	**11**	**619**	**69**	**111**	**180**	**2,106**
2011 5-Month Total	**1,428**	**69**	**6**	**525**	**71**	**108**	**179**	**2,206**
2010 5-Month Total	**1,045**	**62**	**4**	**384**	**79**	**107**	**186**	**1,680**

[a] Conventional hydroelectricity net generation (converted to Btu using the fossil-fuels heat rate—see Table A6).

[b] Geothermal electricity net generation (converted to Btu using the fossil-fuels heat rate—see Table A6).

[c] Solar thermal and photovoltaic (PV) electricity net generation (converted to Btu using the fossil-fuels heat rate—see Table A6).

[d] Wind electricity net generation (converted to Btu using the fossil-fuels heat rate—see 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 for all available data beginning in 1973.

Sources: • **Biomass:** Table 7.4b. • **All Other Data:** Tables 7.2b 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***
1996 Total	**141**	**61**	**464**	**23,178**	**973**	**83**	**313**	**2,065**	**-121**	**23,612**	**992**	**84**	***82***
1997 Total	**186**	**80**	**613**	**30,674**	**1,288**	**109**	**85**	**2,925**	**860**	**29,899**	**1,256**	**107**	***104***
1998 Total	**202**	**86**	**669**	**33,453**	**1,405**	**119**	**66**	**3,406**	**481**	**33,038**	**1,388**	**118**	***115***
1999 Total	**211**	**90**	**698**	**34,881**	**1,465**	**124**	**87**	**4,024**	**618**	**34,350**	**1,443**	**122**	***119***
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**	**169**	**1,335**	**66,772**	**2,804**	**238**	**292**	**5,978**	**-222**	**67,286**	**2,826**	**240**	***233***
2004 Total	**484**	**203**	**1,621**	**81,058**	**3,404**	**289**	**3,542**	**6,002**	**24**	**84,576**	**3,552**	**301**	***293***
2005 Total	**552**	**230**	**1,859**	**92,961**	**3,904**	**331**	**3,234**	**5,563**	**-439**	**96,634**	**4,059**	**344**	***335***
2006 Total	**688**	**285**	**2,326**	**116,294**	**4,884**	**414**	**17,408**	**8,760**	**3,197**	**130,505**	**5,481**	**465**	***453***
2007 Total	**914**	**376**	**3,105**	**155,263**	**6,521**	**553**	**10,457**	**10,535**	**1,775**	**163,945**	**6,886**	**584**	***569***
2008 Total	**1,300**	**531**	**4,433**	**221,637**	**9,309**	**790**	**12,610**	**14,226**	**3,691**	**230,556**	**9,683**	**821**	***800***
2009 Total	**1,517**	**616**	**5,688**	**260,424**	**10,938**	**928**	**4,720**	**16,594**	**2,368**	**262,776**	**11,037**	**936**	***910***
2010 January	149	60	541	25,625	1,076	91	-234	18,251	1,657	23,734	997	85	*82*
February	138	56	496	23,802	1,000	85	-482	19,297	1,046	22,274	936	79	*77*
March	154	62	537	26,486	1,112	94	-1,104	20,222	925	24,457	1,027	87	*85*
April	147	59	522	25,384	1,066	90	-927	20,042	-180	24,637	1,035	88	*85*
May	152	61	534	26,244	1,102	93	-368	19,851	-191	26,067	1,095	93	*90*
June	149	60	522	25,632	1,077	91	-341	18,565	-1,286	26,577	1,116	95	*92*
July	154	62	543	26,584	1,117	95	-578	17,809	-756	26,762	1,124	95	*93*
August	157	63	538	26,964	1,132	96	-695	17,380	-429	26,698	1,121	95	*93*
September	152	61	533	26,221	1,101	93	-924	17,437	57	25,240	1,060	90	*88*
October	160	64	563	27,471	1,154	98	-830	17,278	-159	26,800	1,126	95	*93*
November	161	65	585	27,747	1,165	99	-923	18,150	872	25,952	1,090	92	*90*
December	165	67	592	28,457	1,195	101	-1,711	17,941	-209	26,955	1,132	96	*93*
Total	**1,839**	**742**	**6,506**	**316,617**	**13,298**	**1,127**	**-9,115**	**17,941**	**1,347**	**306,155**	**12,858**	**1,090**	***1,061***
2011 January	165	66	581	28,524	1,198	102	-1,359	20,672	[i] 2,732	24,433	1,026	87	*85*
February	147	59	535	25,400	1,067	90	-1,425	20,809	137	23,838	1,001	85	*83*
March	163	65	548	28,194	1,184	100	-2,003	21,440	631	25,560	1,074	91	*89*
April	154	62	507	26,591	1,117	95	-2,865	20,807	-633	24,359	1,023	87	*85*
May	161	64	545	27,756	1,166	99	-1,743	20,387	-420	26,433	1,110	94	*92*
June	157	63	535	27,064	1,137	96	-1,533	18,833	-1,554	27,085	1,138	96	*94*
July	160	64	555	27,624	1,160	98	-2,731	18,700	-133	25,026	1,051	89	*87*
August	163	65	575	28,110	1,181	100	-790	17,900	-800	28,120	1,181	100	*97*
September	154	62	525	26,645	1,119	95	-1,820	18,437	537	24,288	1,020	86	*84*
October	163	65	557	28,092	1,180	100	-2,388	18,072	-365	26,069	1,095	93	*90*
November	164	66	573	28,335	1,190	101	-3,258	18,343	271	24,806	1,042	88	*86*
December	172	69	600	29,772	1,250	106	-3,407	18,261	-82	26,447	1,111	94	*92*
Total	**1,922**	**770**	**6,636**	**332,107**	**13,948**	**1,182**	**-25,322**	**18,261**	[i] **321**	**306,464**	**12,871**	**1,091**	***1,063***
2012 January	167	67	583	29,063	1,221	103	-1,789	21,753	3,492	23,782	999	85	*82*
February	154	61	528	26,653	1,119	95	-1,785	22,572	819	24,049	1,010	86	*83*
March	160	64	522	27,706	1,164	99	-1,626	22,952	380	25,700	1,079	91	*89*
April	152	61	494	26,368	1,107	94	-1,549	22,370	-582	25,401	1,067	90	*88*
May	160	64	520	27,718	1,164	99	-1,013	21,851	-519	27,224	1,143	97	*95*
5-Month Total	**793**	**316**	**2,647**	**137,508**	**5,775**	**490**	**-7,762**	**21,851**	**3,590**	**126,156**	**5,299**	**449**	***438***
2011 5-Month Total	**790**	**316**	**2,716**	**136,465**	**5,732**	**486**	**-9,394**	**20,387**	**2,447**	**124,624**	**5,234**	**444**	***432***
2010 5-Month Total	**741**	**299**	**2,630**	**127,541**	**5,357**	**454**	**-3,114**	**19,851**	**3,257**	**121,170**	**5,089**	**431**	***420***

[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 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 December 2010 stocks value (17,940 thousand barrels), not the final December 2010 value (17,941 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 for all available data beginning in 1981.

Sources: See end of section.

Table 10.4 Biodiesel Overview

	Feedstock[a]	Losses and Co-products[b]	Production			Trade			Stocks[d]	Stock Change[e]	Balancing Item[f]	Consumption		
						Imports	Exports	Net Imports[c]						
	TBtu	TBtu	Mbbl	MMgal	TBtu	Mbbl	Mbbl	Mbbl	Mbbl	Mbbl	Mbbl	Mbbl	MMgal	TBtu
2001 Total	**1**	**(s)**	**204**	**9**	**1**	**78**	**39**	**39**	**NA**	**NA**	**NA**	**243**	**10**	**1**
2002 Total	**1**	**(s)**	**250**	**10**	**1**	**191**	**56**	**135**	**NA**	**NA**	**NA**	**385**	**16**	**2**
2003 Total	**2**	**(s)**	**338**	**14**	**2**	**94**	**110**	**-16**	**NA**	**NA**	**NA**	**322**	**14**	**2**
2004 Total	**4**	**(s)**	**666**	**28**	**4**	**97**	**124**	**-26**	**NA**	**NA**	**NA**	**640**	**27**	**3**
2005 Total	**12**	**(s)**	**2,162**	**91**	**12**	**207**	**206**	**1**	**NA**	**NA**	**NA**	**2,163**	**91**	**12**
2006 Total	**32**	**(s)**	**5,963**	**250**	**32**	**1,069**	**828**	**242**	**NA**	**NA**	**NA**	**6,204**	**261**	**33**
2007 Total	**63**	**1**	**11,662**	**490**	**62**	**3,342**	**6,477**	**-3,135**	**NA**	**NA**	**NA**	**8,528**	**358**	**46**
2008 Total	**88**	**1**	**16,145**	**678**	**87**	**7,502**	**16,128**	**-8,626**	**NA**	**NA**	**NA**	**7,519**	**316**	**40**
2009 Total	**67**	**1**	**12,281**	**516**	**66**	**1,844**	**6,332**	**-4,489**	**711**	**711**	**669**	**7,750**	**326**	**42**
2010 January	3	(s)	633	27	3	41	296	-256	1,049	338	0	40	2	(s)
February	4	(s)	696	29	4	31	139	-108	1,039	-10	0	599	25	3
March	4	(s)	804	34	4	60	433	-374	1,057	18	0	412	17	2
April	4	(s)	814	34	4	45	227	-182	1,009	-48	0	680	29	4
May	4	(s)	760	32	4	80	251	-171	1,016	7	0	582	24	3
June	4	(s)	644	27	3	54	304	-249	968	-48	0	443	19	2
July	4	(s)	657	28	4	32	199	-167	830	-138	0	628	26	3
August	4	(s)	653	27	3	52	225	-173	771	-59	0	539	23	3
September	4	(s)	723	30	4	69	131	-62	682	-89	0	749	31	4
October	4	(s)	676	28	4	18	132	-114	650	-32	0	594	25	3
November	3	(s)	528	22	3	30	57	-27	676	26	0	475	20	3
December	3	(s)	588	25	3	34	109	-75	672	-4	0	517	22	3
Total	**44**	**1**	**8,177**	**343**	**44**	**546**	**2,503**	**-1,958**	**672**	**-39**	**0**	**6,258**	**263**	**34**
2011 January	5	(s)	842	35	5	49	217	-169	738	[g] 76	0	597	25	3
February	5	(s)	961	40	5	37	88	-51	869	131	0	779	33	4
March	8	(s)	1,419	60	8	53	197	-144	984	115	0	1,160	49	6
April	9	(s)	1,692	71	9	52	222	-169	1,012	28	0	1,494	63	8
May	10	(s)	1,838	77	10	48	192	-144	1,102	90	0	1,604	67	9
June	11	(s)	1,938	81	10	48	117	-69	1,216	114	0	1,755	74	9
July	12	(s)	2,183	92	12	62	142	-80	1,267	51	0	2,052	86	11
August	12	(s)	2,273	95	12	65	71	-7	1,663	396	0	1,871	79	10
September	12	(s)	2,283	96	12	65	193	-127	1,201	-462	0	2,617	110	14
October	14	(s)	2,508	105	13	82	132	-49	1,481	280	0	2,179	92	12
November	14	(s)	2,494	105	13	66	131	-65	1,436	-45	0	2,474	104	13
December	14	(s)	2,604	109	14	234	39	195	1,902	466	0	2,333	98	13
Total	**125**	**2**	**23,034**	**967**	**123**	**861**	**1,740**	**-879**	**1,902**	[g] **1,240**	**0**	**20,915**	**878**	**112**
2012 January	9	(s)	1,700	71	9	44	248	-204	[R] 2,527	[R] 625	0	[R] 872	[R] 37	[R] 5
February	10	(s)	1,837	77	10	58	119	-62	[R] 2,869	[R] 342	0	[R] 1,433	[R] 60	[R] 8
March	12	(s)	2,193	92	12	55	149	-93	[R] 3,053	[R] 184	0	[R] 1,915	[R] 80	[R] 10
April	12	(s)	2,180	92	12	49	221	-171	[R] 2,932	[R] -121	0	[R] 2,130	[R] 89	[R] 11
May	13	(s)	2,373	100	13	94	306	-212	2,514	-418	0	2,579	108	14
5-Month Total	**56**	**1**	**10,283**	**432**	**55**	**301**	**1,042**	**-742**	**2,514**	**612**	**0**	**8,930**	**375**	**48**
2011 5-Month Total	**37**	**(s)**	**6,751**	**284**	**36**	**239**	**916**	**-677**	**1,102**	**440**	**0**	**5,634**	**237**	**30**
2010 5-Month Total	**20**	**(s)**	**3,708**	**156**	**20**	**256**	**1,347**	**-1,090**	**1,016**	**305**	**0**	**2,313**	**97**	**12**

[a] Total vegetable oil and other biomass inputs to the production of biodiesel.

[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.

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

[f] Beginning in 2009, because of incomplete data coverage and different data sources, "Balancing Item" is used to balance biodiesel supply and disposition.

[g] Derived from the preliminary December 2010 stocks value (662 thousand barrels), not the final December 2010 value (672 thousand barrels) that is shown under "Stocks."

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

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 A3). • 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 for all available data beginning in 2001.

Sources: See end of section.

Renewable Energy

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 using the fossil-fuels heat rate—see Table A6); geothermal electricity net generation (converted to Btu using the fossil-fuels heat rate—see Table A6), and geothermal heat pump and geothermal direct use energy; solar thermal and photovoltaic electricity net generation (converted to Btu using the fossil-fuels heat rate —see Table A6), and solar thermal direct use energy; wind electricity net generation (converted to Btu using the fossil-fuels heat rate—see 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) and biodiesel consumption; and losses and co-products from the production of fuel ethanol and biodiesel. In Tables 1.1, 1.2, and 10.1, renewable production is assumed to equal consumption for all renewable energy sources except biofuels (biofuels production comprises biomass inputs to the production of fuel ethanol and biodiesel).

Table 10.2a Sources

Residential Sector, Geothermal

Oregon Institute of Technology, Geo-Heat Center. 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. (The annual estimate for the current year is set equal to that of the previous year.)

Residential Sector, Solar/PV

1989–2009: U.S. Energy Information Administration (EIA) estimates based on Form EIA-63A, "Annual Solar Thermal Collector Manufacturers Survey," and Form EIA-63B, "Annual Photovoltaic Module/Cell Manufacturers Survey." 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.

2010 forward: EIA estimates based on Form EIA-63B, "Annual Photovoltaic Cell/Module Shipments Report"; Form EIA-63A, "Annual Solar Thermal Collector Manufacturers Survey" (pre-2010 data); and SEIA/GTM Research, *U.S. Solar Market Insight: 2010 Year in Review.* 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. (The annual estimate for 2012 is derived using the average annual growth rate for 2009–2011.)

Residential Sector, Wood

1973–1979: EIA, *Estimates of U.S. Wood Energy Consumption from 1949 to 1981*, Table A2.

1980 forward: EIA, Form EIA-457, "Residential Energy Consumption Survey"; and EIA estimates based on Form EIA-457 and regional heating degree-day data. 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. (The annual estimate for the current year is set equal to that of the previous year.)

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 fossil-fuels heat rate—see Table A6.

Commercial Sector, Geothermal

Oregon Institute of Technology, Geo-Heat Center. 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. (The annual estimate for the current year is set equal to that of the previous year.)

Commercial Sector, Solar/PV

2008 forward: Commercial sector solar thermal and photovoltaic (PV) electricity net generation data from EIA, Form EIA-923, "Power Plant Operations Report," are converted to Btu by multiplying by the fossil-fuels heat rate—see Table A6.

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 fossil-fuels heat rate—see Table A6.

Commercial Sector, Wood

1973–1979: EIA, *Estimates of U.S. Wood Energy Consumption from 1949 to 1981*, Table A2.

1980–1983: EIA, *Estimates of U.S. Wood Energy Consumption 1980-1983*, Table ES1.

1984: EIA estimate based on the 1983 value.

1985–1988: Values interpolated.

1989 forward: EIA, *Monthly Energy Review* (*MER*), Tables 7.4a–7.4c; and EIA estimates based on Form EIA-871, "Commercial Buildings Energy Consumption Survey." Data for wood consumption at commercial combined-heat-and-power (CHP) plants are calculated as total wood consumption at electricity-only and CHP plants (MER, Table 7.4a) minus wood consumption in the electric power sector (MER, Table 7.4b) and at industrial CHP plants (MER, Table 7.4c). Annual estimates for wood consumption at other commercial plants are based on Form EIA-871 (the annual estimate for the current year is set equal to that of the previous year); 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, Biomass Waste
EIA, MER, Table 7.4c.

Commercial Sector, Fuel Ethanol (Minus Denaturant)
EIA, MER, Tables 3.5, 3.7a, and 10.3. Calculated as commercial sector motor gasoline consumption (Table 3.7a) divided by total motor gasoline product supplied (Table 3.5), and then multiplied by fuel ethanol (minus denaturant) consumption (Table 10.3).

Table 10.2b Sources

Industrial Sector, Hydroelectric Power
Industrial sector conventional hydroelectricity net generation data from Table 7.2c are converted to Btu by multiplying by the fossil-fuels heat rate—see Table A6.

Industrial Sector, Geothermal
Oregon Institute of Technology, Geo-Heat Center. 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. (The annual estimate for the current year is set equal to that of the previous year.)

Industrial Sector, Solar/PV
2010 forward: Industrial sector solar thermal and photovoltaic (PV) electricity net generation data from the U.S. Energy Information Administration (EIA), Form EIA-923, "Power Plant Operations Report," are converted to Btu by multiplying by the fossil-fuels heat rate—see Table A6.

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 fossil-fuels heat rate—see Table A6.

Industrial Sector, Wood
1973–1979: EIA, *Estimates of U.S. Wood Energy Consumption from 1949 to 1981*, Table A2.

1980–1983: EIA, *Estimates of U.S. Wood Energy Consumption 1980-1983*, Table ES1.

1984: EIA, *Estimates of U.S. Biofuels Consumption 1990*, Table 1.

1985 and 1986: Values interpolated.

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

1988: Value interpolated.

1989 forward: EIA, *Monthly Energy Review (MER),* Table 7.4c; and EIA estimates based on Form EIA-846, "Manufacturing Energy Consumption Survey." Data for wood consumption at industrial combined-heat-and-power (CHP) plants are from MER, Table 7.4c. Annual estimates for wood consumption at other industrial plants are based on Form EIA-846 (the annual estimate for the current year is set equal to that of the previous year); 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, Biomass Waste
1981: EIA, *Estimates of U.S. Biofuels Consumption 1990*, Table 8; and EIA, MER, Table 10.2c. Estimates are calculated as total waste consumption minus electric power sector waste consumption.

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

1984: EIA, *Estimates of U.S. Biofuels Consumption 1990*, Table 8; and EIA, MER, Table 10.2c. Estimates are calculated as total waste consumption minus electric power sector waste consumption.

1985 and 1986: Values interpolated.

1987: EIA, *Estimates of U.S. Biofuels Consumption 1990*, Table 8; and EIA, MER, Table 10.2c. Estimates are calculated as total waste consumption minus electric power sector waste consumption.

1988: Value interpolated.

1989 forward: EIA, MER, Table 7.4c; and EIA estimates 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. Data for waste consumption at industrial CHP plants are from MER, Table 7.4c. Annual estimates for waste consumption at other industrial plants are based on the non-EIA sources listed above (the annual estimate for the current year is set equal to that of the previous year); 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, Fuel Ethanol (Minus Denaturant)
EIA, MER, Tables 3.5, 3.7b, and 10.3. Calculated as industrial sector motor gasoline consumption (Table 3.7b) divided by total motor gasoline product supplied (Table

3.5), and then multiplied by fuel ethanol (minus denaturant) consumption (Table 10.3).

Industrial Sector, Losses and Co-products
Calculated as fuel ethanol losses and co-products (Table 10.3) plus biodiesel losses and co-products (Table 10.4).

Transportation Sector, Fuel Ethanol (Minus Denaturant)
EIA, MER, Tables 3.5, 3.7c, and 10.3. Calculated as transportation sector motor gasoline consumption (Table 3.7c) divided by total motor gasoline product supplied (Table 3.5), and then multiplied by fuel ethanol (minus denaturant) consumption (Table 10.3).

Transportation Sector, Biodiesel
EIA, MER, Table 10.4. Transportation sector biodiesel consumption is assumed to equal total biodiesel consumption.

Table 10.3 Sources

Feedstock
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
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 percent 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 pentanes plus and conventional motor gasoline used as denaturant).

2009 and 2010: U.S. Energy Information Administration (EIA), *Petroleum Supply Annual (PSA)*, annual reports, Table 1. Data in thousand barrels for net production of pentanes plus 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 pentanes plus). 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 5.253 million Btu per barrel (the approximate heat content of conventional motor gasoline). Total denaturant is the sum of the values for pentanes plus, conventional motor gasoline, and motor gasoline blending components.

2011 and 2012: EIA, *Petroleum Supply Monthly (PSM),* monthly reports, Table 1. Data in thousand barrels for net production of pentanes plus 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 pentanes plus). 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 5.253 million Btu per barrel (the approximate heat content of conventional motor gasoline). Total denaturant is the sum of the values for pentanes plus, 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 and 2010: EIA, PSA, annual reports, Table 1, data for net production of fuel ethanol at renewable fuels and oxygenate plants.

2011 and 2012: EIA, PSM, monthly reports, Table 1, data for net production of fuel ethanol at renewable fuels and oxygenate plants.

Trade, Stocks, and Stock Change
1992–2010: EIA, PSA, annual reports, Table 1.

2011 and 2012: 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 percent 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 and 2010: EIA, PSA, annual reports, Table 1. Calculated as fuel ethanol refinery and blender net inputs minus fuel ethanol adjustments.

2011 and 2012: EIA, PSM, monthly reports, Table 1. Calculated as fuel ethanol refinery and blender net inputs minus fuel ethanol adjustments.

Consumption Minus Denaturant

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

Feedstock

Calculated as biodiesel production in thousand barrels multiplied by 5.433 million Btu per barrel (the biodiesel feedstock factor—see Table A3).

Losses and Co-products

Calculated as biodiesel feedstock minus biodiesel production.

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, Bureau of the Census, "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, Bureau of the Census, "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, Bureau of the Census, M311K data, multiplied by the EIA 2008 annual value's share of the M311K 2008 annual value.

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

Trade

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); 3824.90.40.30, "Biodiesel/Mixes" (data for July 2010–2011); 3826.00.00.00, "Biodiesel B30-99" (data for 2012); and 3826.00.10.00, "Biodiesel B100" (data for 2012). 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); 3824.90.40.30, "Biodiesel <70%" (data for 2011); and 3826.00.00.00, "Biodiesel B=>30" (data for 2012). 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.

Stocks and Stock Change

2009 and 2010: EIA, *Petroleum Supply Annual (PSA),* annual reports, Table 1, data for renewable fuels except fuel ethanol.

2011 and 2012: EIA, *Petroleum Supply Monthly,* monthly reports, Table 1, data for renewable fuels except fuel ethanol.

Balancing Item

Calculated as biodiesel consumption and biodiesel stock change minus biodiesel production and biodiesel net imports.

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.