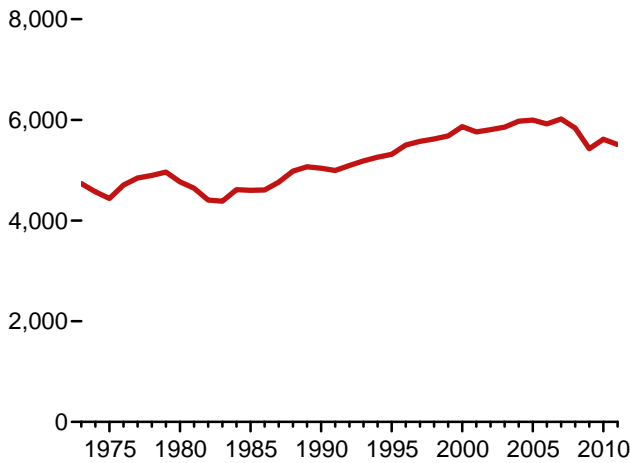


## **12. Environment**

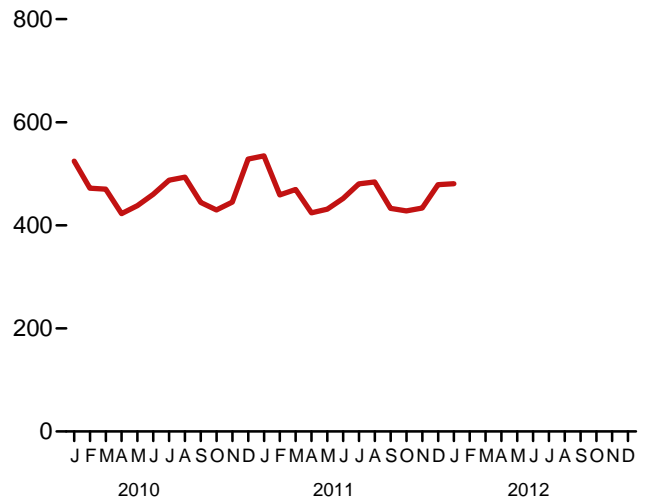
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**Figure 12.1 Carbon Dioxide Emissions From Energy Consumption by Source**  
(Million Metric Tons of Carbon Dioxide)

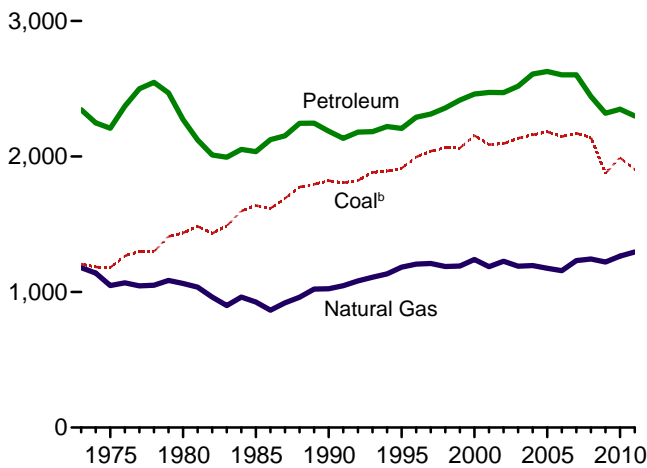
Total,<sup>a</sup> 1973-2011



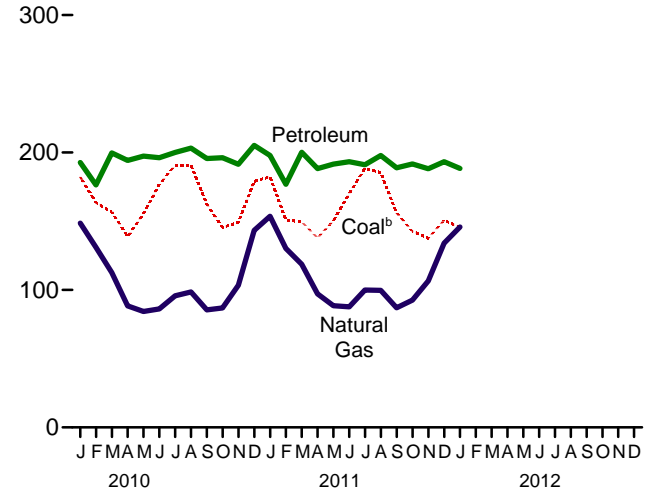
Total,<sup>a</sup> Monthly



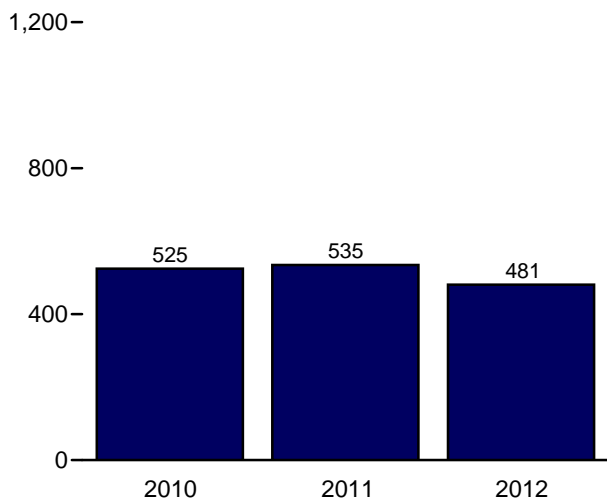
By Major Source, 1973-2011



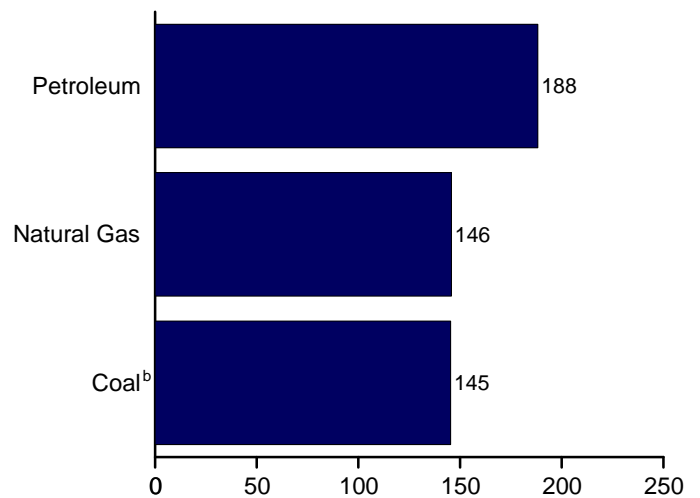
By Major Source, Monthly



Total,<sup>a</sup> January



By Major Source, January 2012



<sup>a</sup>Excludes emissions from biomass energy consumption.  
<sup>b</sup>Includes coal coke net imports.

Web Page: <http://www.eia.gov/totalenergy/data/monthly/#environment>.  
Source: Table 12.1.

**Table 12.1 Carbon Dioxide Emissions From Energy Consumption by Source**  
(Million Metric Tons of Carbon Dioxide<sup>a</sup>)

	Coal <sup>b</sup>	Natural Gas <sup>c</sup>	Petroleum										Total <sup>h,i</sup>	
			Aviation Gasoline	Distillate Fuel Oil <sup>d</sup>	Jet Fuel	Kero-sene	LPG <sup>e</sup>	Lubri-cants	Motor Gasoline <sup>f</sup>	Petroleum Coke	Residual Fuel Oil	Other <sup>g</sup>		Total
1973 Total	1,207	1,181	6	480	155	32	91	13	911	51	508	100	2,346	4,733
1975 Total	1,181	1,047	5	443	146	24	82	11	911	48	443	97	2,209	4,437
1980 Total	1,436	1,063	4	446	156	24	87	13	900	46	453	142	2,272	4,770
1985 Total	1,638	926	3	445	178	17	86	12	930	55	216	93	2,035	4,600
1990 Total	1,821	1,025	3	470	223	6	69	13	988	67	220	127	2,187	5,039
1995 Total	1,913	1,184	3	498	222	8	78	13	1,044	75	152	114	2,207	5,314
1996 Total	1,995	1,205	3	524	232	9	84	12	1,063	78	152	132	2,290	5,501
1997 Total	2,040	1,211	3	534	234	10	85	13	1,075	79	142	138	2,313	5,575
1998 Total	2,064	1,189	2	538	238	12	75	14	1,107	89	158	125	2,358	5,622
1999 Total	2,062	1,192	3	555	245	11	91	14	1,127	93	148	130	2,417	5,682
2000 Total	2,155	1,241	3	580	254	10	102	14	1,135	84	163	117	2,468	5,867
2001 Total	2,088	1,187	2	598	243	11	92	13	1,151	88	145	132	2,473	5,759
2002 Total	2,095	1,227	2	587	237	6	98	12	1,183	94	125	127	2,472	5,806
2003 Total	2,136	1,191	2	610	231	8	95	11	1,188	94	138	140	2,518	5,857
2004 Total	2,160	1,195	2	632	240	10	98	12	1,214	105	155	142	2,609	5,975
2005 Total	2,182	1,175	2	640	246	10	94	12	1,214	105	164	141	2,628	5,997
2006 Total	2,147	1,158	2	648	240	8	93	11	1,224	104	122	150	2,603	5,919
2007 Total	2,172	1,233	2	652	238	5	94	12	1,227	98	129	148	2,603	6,020
2008 Total	2,139	1,243	2	615	226	2	89	11	1,166	92	111	130	2,444	5,838
2009 Total	1,876	1,222	2	564	204	3	91	10	1,157	87	91	111	2,320	5,429
2010 January	182	149	(s)	49	17	(s)	10	1	92	5	9	9	193	525
February	164	131	(s)	46	15	(s)	9	1	84	5	7	9	176	472
March	157	113	(s)	51	18	(s)	8	1	95	7	8	11	200	470
April	139	88	(s)	48	17	(s)	7	1	96	6	9	11	194	423
May	155	84	(s)	48	18	(s)	7	1	99	6	8	10	197	438
June	177	86	(s)	48	19	(s)	7	1	97	7	7	10	196	460
July	191	96	(s)	47	19	(s)	7	1	101	7	9	10	200	488
August	191	99	(s)	50	19	(s)	7	1	100	8	7	11	203	493
September	162	86	(s)	50	18	(s)	7	1	96	7	8	10	196	444
October	146	87	(s)	50	18	(s)	8	1	97	6	7	9	196	430
November	149	103	(s)	49	17	1	8	1	92	7	8	9	191	445
December	179	143	(s)	55	17	1	11	1	96	6	8	10	205	528
Total	1,991	1,265	2	590	210	3	94	11	1,146	77	96	120	2,349	5,616
2011 January	182	154	(s)	52	17	(s)	10	1	91	6	9	10	198	535
February	151	130	(s)	46	15	1	8	1	84	4	9	9	177	459
March	R 150	119	(s)	53	17	(s)	8	1	95	6	8	12	200	469
April	138	97	(s)	47	17	(s)	6	1	92	6	9	10	188	R 424
May	R 150	R 88	(s)	48	18	(s)	7	1	95	7	7	9	192	R 431
June	R 170	88	(s)	50	19	(s)	6	1	94	7	7	10	193	R 452
July	188	100	(s)	45	18	(s)	7	1	97	6	5	11	191	480
August	185	100	(s)	52	19	(s)	7	1	96	8	5	10	198	484
September	156	87	(s)	50	17	(s)	7	1	92	6	7	9	189	433
October	R 143	93	(s)	52	17	(s)	8	1	93	7	6	8	192	R 428
November	138	107	(s)	52	17	(s)	8	1	89	6	6	10	188	433
December	R 151	134	(s)	50	17	(s)	9	1	93	5	8	10	193	R 479
Total	R 1,902	1,296	2	596	209	2	92	10	1,111	75	86	116	2,299	R 5,509
2012 January	145	146	(s)	50	16	(s)	9	1	89	6	6	10	188	481

<sup>a</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

<sup>b</sup> Includes coal coke net imports.

<sup>c</sup> Natural gas, excluding supplemental gaseous fuels.

<sup>d</sup> Distillate fuel oil, excluding biodiesel.

<sup>e</sup> Liquefied petroleum gases.

<sup>f</sup> Finished motor gasoline, excluding fuel ethanol.

<sup>g</sup> Aviation gasoline blending components, crude oil, motor gasoline blending components, pentanes plus, petrochemical feedstocks, special naphthas, still gas, unfinished oils, waxes, and miscellaneous petroleum products.

<sup>h</sup> Includes electric power sector use of geothermal energy and non-biomass waste. See Table 12.6.

<sup>i</sup> Excludes emissions from biomass energy consumption. See Table 12.7.

R=Revised. (s)=Less than 0.5 million metric tons.

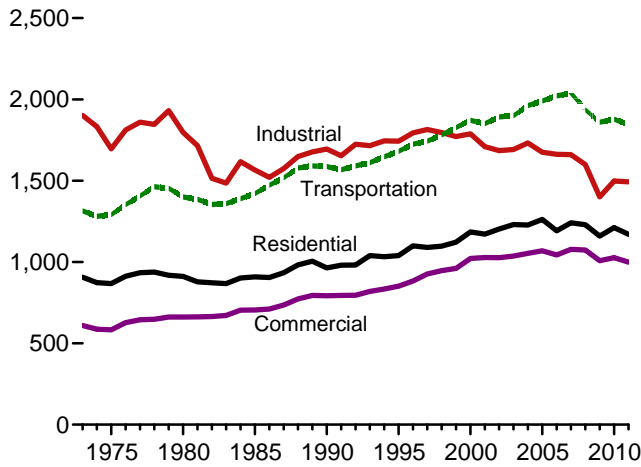
Notes: • Data are estimates for carbon dioxide emissions from energy consumption, including the nonfuel use of fossil fuels. See "Section 12 Methodology and Sources" at end of section. • See "Carbon Dioxide" in Glossary. • See Note 1, "Emissions of Carbon Dioxide and Other Greenhouse Gases," at end of section. • Data exclude emissions from biomass energy consumption. See Table 12.7 and Note 2, "Accounting for Carbon Dioxide Emissions From Biomass Energy Combustion," 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/#environment> for all available data beginning in 1973.

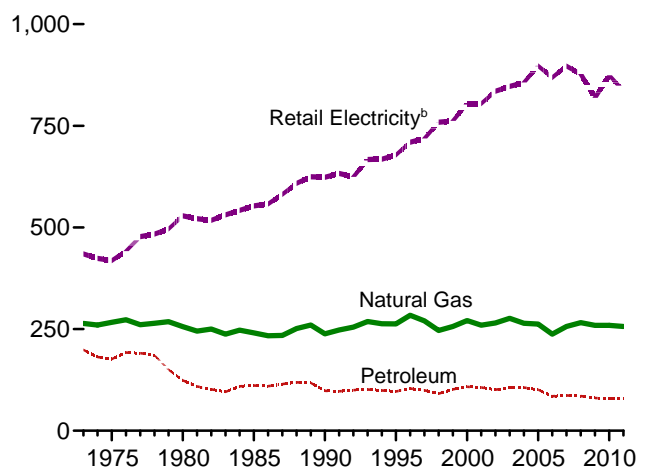
Sources: See end of section.

**Figure 12.2 Carbon Dioxide Emissions From Energy Consumption by Sector**  
(Million Metric Tons of Carbon Dioxide)

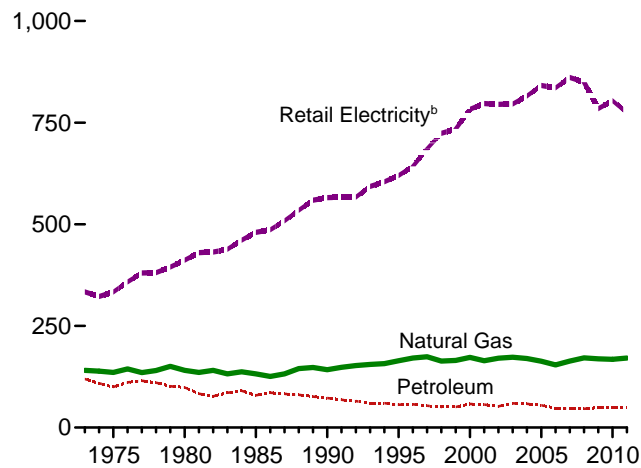
Total<sup>a</sup> by End-Use Sector,<sup>b</sup> 1973-2011



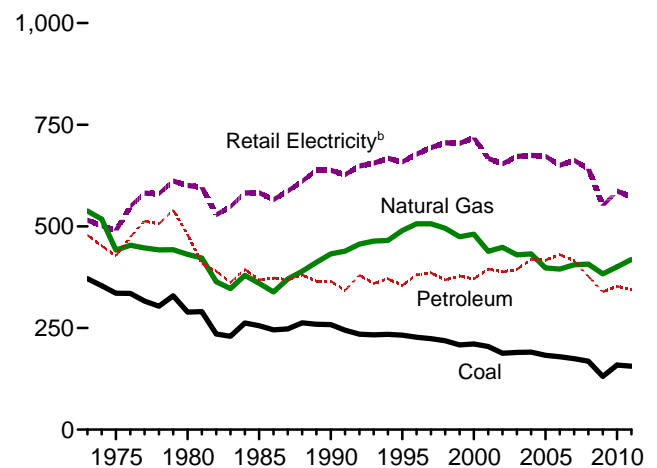
Residential Sector by Major Source, 1973-2011



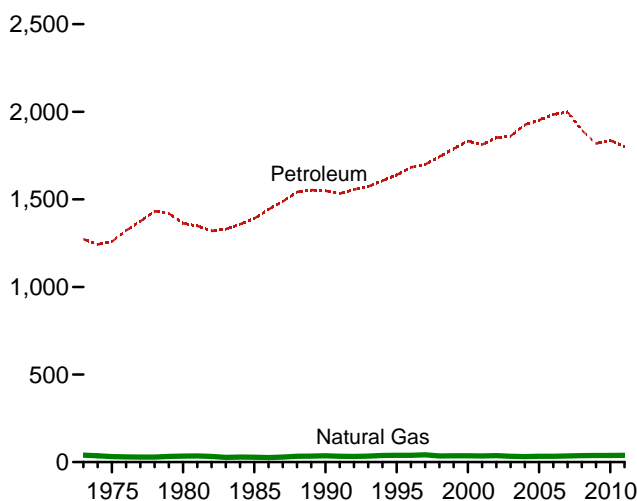
Commercial Sector by Major Source, 1973-2011



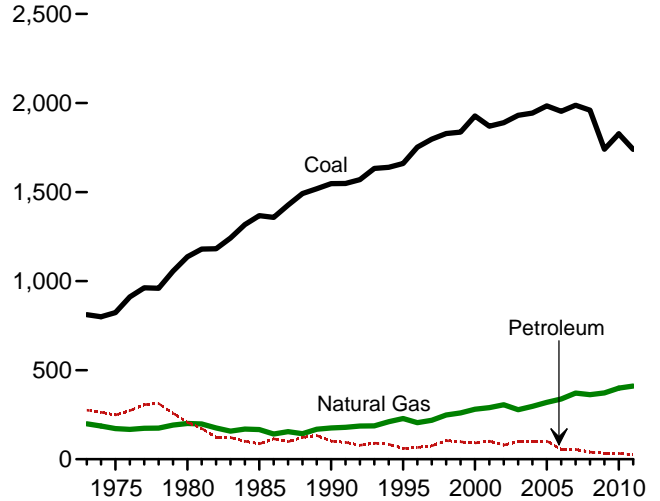
Industrial Sector by Major Source, 1973-2011



Transportation Sector by Major Source, 1973-2011



Electric Power Sector by Major Source, 1973-2011



<sup>a</sup> Excludes emissions from biomass energy consumption.

<sup>b</sup> Emissions from energy consumption in the electric power sector are allocated to the end-use sectors in proportion to each sector's share of

total electricity retail sales.

Web Page: <http://www.eia.gov/totalenergy/data/monthly/#environment>.  
Sources: Tables 12.2-12.6.

**Table 12.2 Carbon Dioxide Emissions From Energy Consumption: Residential Sector**  
(Million Metric Tons of Carbon Dioxide<sup>a</sup>)

	Coal	Natural Gas <sup>b</sup>	Petroleum				Retail Elec- tricity <sup>e</sup>	Total <sup>f</sup>
			Distillate Fuel Oil <sup>c</sup>	Kerosene	LPG <sup>d</sup>	Total		
<b>1973 Total</b> .....	<b>9</b>	<b>264</b>	<b>147</b>	<b>16</b>	<b>36</b>	<b>199</b>	<b>435</b>	<b>907</b>
<b>1975 Total</b> .....	<b>6</b>	<b>266</b>	<b>132</b>	<b>12</b>	<b>32</b>	<b>176</b>	<b>419</b>	<b>867</b>
<b>1980 Total</b> .....	<b>3</b>	<b>256</b>	<b>96</b>	<b>8</b>	<b>20</b>	<b>124</b>	<b>529</b>	<b>911</b>
<b>1985 Total</b> .....	<b>4</b>	<b>241</b>	<b>80</b>	<b>11</b>	<b>20</b>	<b>111</b>	<b>553</b>	<b>909</b>
<b>1990 Total</b> .....	<b>3</b>	<b>238</b>	<b>72</b>	<b>5</b>	<b>22</b>	<b>98</b>	<b>624</b>	<b>963</b>
<b>1995 Total</b> .....	<b>2</b>	<b>263</b>	<b>66</b>	<b>5</b>	<b>25</b>	<b>96</b>	<b>678</b>	<b>1,039</b>
<b>1996 Total</b> .....	<b>2</b>	<b>284</b>	<b>68</b>	<b>6</b>	<b>30</b>	<b>104</b>	<b>710</b>	<b>1,099</b>
<b>1997 Total</b> .....	<b>2</b>	<b>270</b>	<b>64</b>	<b>7</b>	<b>29</b>	<b>99</b>	<b>719</b>	<b>1,090</b>
<b>1998 Total</b> .....	<b>1</b>	<b>247</b>	<b>56</b>	<b>8</b>	<b>27</b>	<b>91</b>	<b>759</b>	<b>1,097</b>
<b>1999 Total</b> .....	<b>1</b>	<b>257</b>	<b>61</b>	<b>8</b>	<b>33</b>	<b>102</b>	<b>762</b>	<b>1,122</b>
<b>2000 Total</b> .....	<b>1</b>	<b>271</b>	<b>66</b>	<b>7</b>	<b>35</b>	<b>108</b>	<b>805</b>	<b>1,185</b>
<b>2001 Total</b> .....	<b>1</b>	<b>259</b>	<b>66</b>	<b>7</b>	<b>33</b>	<b>106</b>	<b>805</b>	<b>1,172</b>
<b>2002 Total</b> .....	<b>1</b>	<b>265</b>	<b>63</b>	<b>4</b>	<b>34</b>	<b>101</b>	<b>835</b>	<b>1,203</b>
<b>2003 Total</b> .....	<b>1</b>	<b>276</b>	<b>66</b>	<b>5</b>	<b>34</b>	<b>106</b>	<b>847</b>	<b>1,230</b>
<b>2004 Total</b> .....	<b>1</b>	<b>264</b>	<b>68</b>	<b>6</b>	<b>32</b>	<b>106</b>	<b>856</b>	<b>1,228</b>
<b>2005 Total</b> .....	<b>1</b>	<b>262</b>	<b>62</b>	<b>6</b>	<b>32</b>	<b>101</b>	<b>897</b>	<b>1,261</b>
<b>2006 Total</b> .....	<b>1</b>	<b>237</b>	<b>52</b>	<b>5</b>	<b>28</b>	<b>85</b>	<b>869</b>	<b>1,192</b>
<b>2007 Total</b> .....	<b>1</b>	<b>257</b>	<b>53</b>	<b>3</b>	<b>31</b>	<b>87</b>	<b>897</b>	<b>1,241</b>
<b>2008 Total</b> .....	<b>1</b>	<b>266</b>	<b>49</b>	<b>2</b>	<b>35</b>	<b>85</b>	<b>878</b>	<b>1,229</b>
<b>2009 Total</b> .....	<b>1</b>	<b>259</b>	<b>44</b>	<b>2</b>	<b>35</b>	<b>81</b>	<b>819</b>	<b>1,159</b>
<b>2010 January</b> .....	(s)	51	6	(s)	3	10	91	151
February .....	(s)	43	6	(s)	3	9	<sup>R</sup> 73	126
March .....	(s)	31	4	(s)	3	7	65	103
April .....	(s)	17	2	(s)	2	5	51	73
May .....	(s)	11	3	(s)	2	5	59	75
June .....	(s)	7	3	(s)	2	6	79	92
July .....	(s)	6	2	(s)	3	5	97	108
August .....	(s)	6	2	(s)	3	5	96	107
September .....	(s)	6	2	(s)	3	5	72	83
October .....	(s)	11	3	(s)	3	6	56	73
November .....	(s)	24	3	(s)	3	7	56	87
December .....	(s)	46	6	(s)	3	10	81	137
<b>Total</b> .....	<b>1</b>	<b>259</b>	<b>43</b>	<b>2</b>	<b>33</b>	<b>78</b>	<b>874</b>	<b>1,212</b>
<b>2011 January</b> .....	(s)	53	5	(s)	3	9	88	149
February .....	(s)	42	5	(s)	3	8	68	118
March .....	(s)	33	4	(s)	3	7	<sup>R</sup> 59	99
April .....	(s)	19	2	(s)	2	5	54	78
May .....	(s)	11	2	(s)	3	4	<sup>R</sup> 58	74
June .....	(s)	7	3	(s)	2	5	76	89
July .....	(s)	6	2	(s)	3	5	97	108
August .....	(s)	6	3	(s)	3	6	93	105
September .....	(s)	7	3	(s)	3	6	69	82
October .....	(s)	12	4	(s)	3	7	54	73
November .....	(s)	23	4	(s)	3	7	53	84
December .....	(s)	37	6	(s)	3	9	67	113
<b>Total</b> .....	<b>1</b>	<b>256</b>	<b>43</b>	<b>1</b>	<b>33</b>	<b>78</b>	<b>836</b>	<sup>R</sup> <b>1,170</b>
<b>2012 January</b> .....	(s)	43	6	(s)	3	9	69	122

<sup>a</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

<sup>b</sup> Natural gas, excluding supplemental gaseous fuels.

<sup>c</sup> Distillate fuel oil, excluding biodiesel.

<sup>d</sup> Liquefied petroleum gases.

<sup>e</sup> Emissions from energy consumption (for electricity and a small amount of useful thermal output) in the electric power sector are allocated to the end-use sectors in proportion to each sector's share of total electricity retail sales. See Tables 7.6 and 12.6.

<sup>f</sup> Excludes emissions from biomass energy consumption. See Table 12.7.

<sup>R</sup>=Revised. (s)=Less than 0.5 million metric tons.

Notes: • Data are estimates for carbon dioxide emissions from energy consumption. See "Section 12 Methodology and Sources" at end of section. • See "Carbon Dioxide" in Glossary. • See Note 1, "Emissions of Carbon Dioxide and Other Greenhouse Gases," at end of section. • Data exclude emissions from biomass energy consumption. See Table 12.7 and Note 2, "Accounting for Carbon Dioxide Emissions From Biomass Energy Combustion," 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/#environment> for all available data beginning in 1973.

Sources: See end of section.

**Table 12.3 Carbon Dioxide Emissions From Energy Consumption: Commercial Sector**  
(Million Metric Tons of Carbon Dioxide<sup>a</sup>)

	Coal	Natural Gas <sup>b</sup>	Petroleum						Retail Electricity <sup>f</sup>	Total <sup>g</sup>	
			Distillate Fuel Oil <sup>c</sup>	Kerosene	LPG <sup>d</sup>	Motor Gasoline <sup>e</sup>	Petroleum Coke	Residual Fuel Oil			Total
1973 Total	15	141	47	5	9	6	NA	52	120	334	609
1975 Total	14	136	43	4	8	6	NA	39	100	333	583
1980 Total	11	141	38	3	6	8	NA	44	98	412	662
1985 Total	13	132	46	2	6	7	NA	18	79	480	704
1990 Total	12	142	39	1	6	8	0	18	73	566	793
1995 Total	11	164	35	2	7	1	(s)	11	56	620	851
1996 Total	12	171	35	2	8	2	(s)	11	57	643	883
1997 Total	12	174	32	2	8	3	(s)	9	54	686	926
1998 Total	9	164	31	2	7	3	(s)	7	51	724	947
1999 Total	10	165	32	2	9	2	(s)	6	51	735	960
2000 Total	9	173	36	2	9	3	(s)	7	58	783	1,022
2001 Total	9	164	37	2	9	3	(s)	6	57	797	1,027
2002 Total	9	170	32	1	9	3	(s)	6	52	795	1,026
2003 Total	8	173	35	1	10	4	(s)	9	59	796	1,036
2004 Total	10	170	34	1	10	3	(s)	10	58	816	1,054
2005 Total	9	163	33	2	8	3	(s)	9	55	842	1,069
2006 Total	6	154	29	1	8	3	(s)	6	48	836	1,043
2007 Total	7	164	28	1	8	4	(s)	6	47	861	1,078
2008 Total	7	171	27	(s)	10	3	(s)	6	46	850	1,074
2009 Total	6	169	30	(s)	9	4	(s)	6	49	785	1,008
2010 January	1	27	4	(s)	1	(s)	(s)	1	6	66	100
February	1	24	4	(s)	1	(s)	(s)	1	6	60	91
March	1	18	3	(s)	1	(s)	(s)	1	4	59	82
April	(s)	12	2	(s)	1	(s)	(s)	(s)	3	57	72
May	(s)	9	2	(s)	1	(s)	0	(s)	3	66	78
June	(s)	7	2	(s)	1	(s)	0	(s)	4	74	85
July	(s)	6	2	(s)	1	(s)	0	(s)	3	80	90
August	(s)	7	2	(s)	1	(s)	(s)	(s)	3	80	91
September	(s)	7	1	(s)	1	(s)	(s)	(s)	3	69	79
October	(s)	10	2	(s)	1	(s)	(s)	(s)	4	62	77
November	(s)	16	2	(s)	1	(s)	(s)	(s)	4	61	81
December	1	25	4	(s)	1	(s)	(s)	1	6	68	100
Total	5	168	30	(s)	9	4	(s)	6	49	804	1,027
2011 January	1	29	4	(s)	1	(s)	(s)	1	6	65	100
February	1	24	3	(s)	1	(s)	(s)	1	5	56	85
March	1	20	3	(s)	1	(s)	(s)	(s)	4	59	83
April	(s)	13	2	(s)	1	(s)	0	(s)	3	57	73
May	(s)	9	1	(s)	1	(s)	0	(s)	2	64	76
June	(s)	7	2	(s)	1	(s)	0	(s)	3	71	82
July	(s)	7	2	(s)	1	(s)	0	(s)	3	79	90
August	(s)	7	2	(s)	1	(s)	0	(s)	4	78	89
September	(s)	8	2	(s)	1	(s)	0	(s)	4	66	78
October	(s)	12	3	(s)	1	(s)	0	1	4	62	78
November	(s)	15	3	(s)	1	(s)	(s)	1	5	57	77
December	(s)	22	4	(s)	1	(s)	(s)	1	6	60	88
Total	5	171	30	(s)	9	4	(s)	6	49	R 774	R 999
2012 January	(s)	24	4	(s)	1	(s)	(s)	1	6	57	88

<sup>a</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

<sup>b</sup> Natural gas, excluding supplemental gaseous fuels.

<sup>c</sup> Distillate fuel oil, excluding biodiesel.

<sup>d</sup> Liquefied petroleum gases.

<sup>e</sup> Finished motor gasoline, excluding fuel ethanol.

<sup>f</sup> Emissions from energy consumption (for electricity and a small amount of useful thermal output) in the electric power sector are allocated to the end-use sectors in proportion to each sector's share of total electricity retail sales. See Tables 7.6 and 12.6.

<sup>g</sup> Excludes emissions from biomass energy consumption. See Table 12.7.

R=Revised. NA=Not available. (s)=Less than 0.5 million metric tons.

Notes: • Data are estimates for carbon dioxide emissions from energy consumption. See "Section 12 Methodology and Sources" at end of section. • See "Carbon Dioxide" in Glossary. • See Note 1, "Emissions of Carbon Dioxide and Other Greenhouse Gases," at end of section. • Data exclude emissions from biomass energy consumption. See Table 12.7 and Note 2, "Accounting for Carbon Dioxide Emissions From Biomass Energy Combustion," 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/#environment> for all available data beginning in 1973.

Sources: See end of section.

**Table 12.4 Carbon Dioxide Emissions From Energy Consumption: Industrial Sector**  
(Million Metric Tons of Carbon Dioxide<sup>a</sup>)

	Coal	Coal Coke Net Imports	Natural Gas <sup>b</sup>	Petroleum								Retail Elec- tricity <sup>g</sup>	Total <sup>h</sup>	
				Distillate Fuel Oil <sup>c</sup>	Kero- sene	LPG <sup>d</sup>	Lubri- cants	Motor Gasoline <sup>e</sup>	Petroleum Coke	Residual Fuel Oil	Other <sup>f</sup>			Total
1973 Total .....	371	-1	538	106	11	43	7	18	49	144	100	478	515	1,902
1975 Total .....	336	2	442	97	9	39	6	16	48	117	97	427	490	1,696
1980 Total .....	289	-4	431	96	13	61	7	11	45	105	142	480	601	1,797
1985 Total .....	256	-2	360	81	3	58	6	15	54	57	93	369	583	1,566
1990 Total .....	258	1	432	84	1	39	7	13	64	31	127	366	638	1,695
1995 Total .....	233	7	490	82	1	45	7	14	67	24	114	355	659	1,743
1996 Total .....	227	3	506	86	1	46	6	14	70	24	132	381	678	1,795
1997 Total .....	224	5	506	88	1	48	7	15	68	21	138	386	694	1,815
1998 Total .....	219	8	495	88	2	39	7	14	77	16	125	368	706	1,796
1999 Total .....	208	7	474	86	1	48	7	11	81	14	130	378	704	1,772
2000 Total .....	211	7	481	87	1	56	7	11	74	17	117	370	719	1,788
2001 Total .....	204	3	439	95	2	49	6	21	77	14	132	395	667	1,709
2002 Total .....	188	7	448	88	1	54	6	22	76	13	127	388	654	1,685
2003 Total .....	190	6	430	83	2	50	6	23	76	15	140	394	672	1,692
2004 Total .....	191	16	432	88	2	55	6	26	82	17	142	419	675	1,732
2005 Total .....	183	5	398	92	3	51	6	25	80	20	141	417	673	1,675
2006 Total .....	179	7	395	92	2	56	6	26	82	16	150	430	650	1,662
2007 Total .....	175	3	405	92	1	54	6	21	80	13	148	415	662	1,661
2008 Total .....	168	5	407	93	(s)	42	6	17	76	14	130	377	642	1,599
2009 Total .....	131	-3	383	80	(s)	46	5	17	73	7	111	339	551	1,401
2010 January .....	12	(s)	37	6	(s)	6	(s)	2	3	1	9	28	46	123
February .....	13	(s)	34	6	(s)	5	(s)	1	4	1	9	27	44	119
March .....	13	(s)	35	9	(s)	4	(s)	2	6	1	11	33	46	127
April .....	13	(s)	32	8	(s)	3	(s)	2	5	1	11	30	45	121
May .....	13	(s)	32	6	(s)	3	(s)	2	5	1	10	28	51	124
June .....	13	(s)	31	5	(s)	3	1	2	5	1	10	27	52	123
July .....	13	(s)	32	4	(s)	3	1	2	5	1	10	26	54	124
August .....	13	(s)	32	7	(s)	4	(s)	2	6	1	11	31	55	131
September .....	14	(s)	32	9	(s)	4	(s)	2	6	1	10	31	48	125
October .....	13	(s)	33	7	(s)	4	(s)	2	5	1	9	28	47	121
November .....	13	-1	34	8	(s)	4	(s)	2	6	1	9	30	48	125
December .....	14	-1	37	9	(s)	6	(s)	2	5	1	10	33	50	134
Total .....	159	-1	401	86	1	50	6	19	62	8	120	352	587	1,498
2011 January .....	R 14	(s)	39	10	(s)	6	(s)	1	5	1	10	33	48	R 134
February .....	13	(s)	35	7	(s)	5	(s)	1	3	1	9	26	42	116
March .....	14	(s)	36	10	(s)	4	1	2	5	1	12	33	46	129
April .....	R 12	(s)	34	7	(s)	3	(s)	2	5	1	10	28	45	120
May .....	13	(s)	34	7	(s)	3	(s)	2	6	1	9	28	48	124
June .....	13	(s)	33	7	(s)	3	(s)	2	5	1	10	28	50	124
July .....	12	(s)	33	3	(s)	3	(s)	2	5	(s)	11	25	54	125
August .....	13	(s)	34	7	(s)	4	(s)	2	7	(s)	10	29	53	130
September .....	13	(s)	33	7	(s)	4	(s)	2	5	1	9	27	47	120
October .....	R 13	(s)	34	8	(s)	4	(s)	2	6	1	8	28	47	R 123
November .....	13	(s)	35	9	(s)	4	(s)	1	5	1	10	30	46	124
December .....	R 13	(s)	38	6	(s)	5	(s)	2	4	1	10	28	45	R 125
Total .....	156	1	419	88	(s)	48	5	18	62	8	116	345	573	1,494
2012 January .....	13	(s)	39	7	(s)	5	(s)	1	5	1	10	31	43	126

<sup>a</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

<sup>b</sup> Natural gas, excluding supplemental gaseous fuels.

<sup>c</sup> Distillate fuel oil, excluding biodiesel.

<sup>d</sup> Liquefied petroleum gases.

<sup>e</sup> Finished motor gasoline, excluding fuel ethanol.

<sup>f</sup> Aviation gasoline blending components, crude oil, motor gasoline blending components, pentanes plus, petrochemical feedstocks, special naphthas, still gas, unfinished oils, waxes, and miscellaneous petroleum products.

<sup>g</sup> Emissions from energy consumption (for electricity and a small amount of useful thermal output) in the electric power sector are allocated to the end-use sectors in proportion to each sector's share of total electricity retail sales. See Tables 7.6 and 12.6.

<sup>h</sup> Excludes emissions from biomass energy consumption. See Table 12.7.

R=Revised. (s)=Less than 0.5 million metric tons and greater than -0.5 million metric tons.

Notes: • Data are estimates for carbon dioxide emissions from energy consumption, including the nonfuel use of fossil fuels. See "Section 12 Methodology and Sources" at end of section. • See "Carbon Dioxide" in Glossary. • See Note 1, "Emissions of Carbon Dioxide and Other Greenhouse Gases," at end of section. • Data exclude emissions from biomass energy consumption. See Table 12.7 and Note 2, "Accounting for Carbon Dioxide Emissions From Biomass Energy Combustion," 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/#environment> for all available data beginning in 1973.

Sources: See end of section.

**Table 12.5 Carbon Dioxide Emissions From Energy Consumption: Transportation Sector**  
(Million Metric Tons of Carbon Dioxide<sup>a</sup>)

	Coal	Natural Gas <sup>b</sup>	Petroleum							Retail Electricity <sup>f</sup>	Total <sup>g</sup>	
			Aviation Gasoline	Distillate Fuel Oil <sup>c</sup>	Jet Fuel	LPG <sup>d</sup>	Lubricants	Motor Gasoline <sup>e</sup>	Residual Fuel Oil			Total
1973 Total	(s)	39	6	163	152	3	6	886	57	1,273	2	1,315
1975 Total	(s)	32	5	155	145	3	6	889	56	1,258	2	1,292
1980 Total	(h)	34	4	204	155	1	6	881	110	1,363	2	1,400
1985 Total	(h)	28	3	232	178	2	6	908	62	1,391	3	1,421
1990 Total	(h)	36	3	268	223	1	7	967	80	1,548	3	1,588
1995 Total	(h)	38	3	307	222	1	6	1,029	72	1,639	3	1,681
1996 Total	(h)	39	3	327	232	1	6	1,047	67	1,683	3	1,725
1997 Total	(h)	41	3	342	234	1	6	1,057	56	1,699	3	1,744
1998 Total	(h)	35	2	352	238	1	7	1,090	53	1,743	3	1,782
1999 Total	(h)	36	3	366	245	1	7	1,115	52	1,789	3	1,828
2000 Total	(h)	36	3	378	254	1	7	1,121	70	1,833	4	1,872
2001 Total	(h)	35	2	387	243	1	6	1,127	46	1,813	4	1,852
2002 Total	(h)	37	2	394	237	1	6	1,158	53	1,851	4	1,892
2003 Total	(h)	33	2	414	231	1	6	1,161	45	1,861	5	1,899
2004 Total	(h)	32	2	434	240	1	6	1,185	58	1,926	5	1,962
2005 Total	(h)	33	2	444	246	2	6	1,186	66	1,953	5	1,991
2006 Total	(h)	33	2	469	240	2	5	1,194	71	1,984	5	2,022
2007 Total	(h)	35	2	472	238	1	6	1,201	78	1,999	5	2,040
2008 Total	(h)	37	2	440	226	3	5	1,146	72	1,895	5	1,937
2009 Total	(h)	38	2	404	204	2	5	1,137	64	1,818	5	1,860
2010 January	(h)	4	(s)	31	17	(s)	(s)	91	6	145	(s)	150
February	(h)	4	(s)	30	15	(s)	(s)	82	5	133	(s)	137
March	(h)	3	(s)	35	18	(s)	(s)	94	6	154	(s)	157
April	(h)	3	(s)	35	17	(s)	(s)	94	7	154	(s)	157
May	(h)	3	(s)	37	18	(s)	(s)	97	6	159	(s)	161
June	(h)	3	(s)	36	19	(s)	1	95	5	156	(s)	159
July	(h)	3	(s)	38	19	(s)	(s)	99	6	162	(s)	165
August	(h)	3	(s)	39	19	(s)	(s)	98	5	161	(s)	165
September	(h)	3	(s)	37	18	(s)	(s)	94	6	155	(s)	157
October	(h)	3	(s)	37	18	(s)	(s)	95	6	157	(s)	160
November	(h)	3	(s)	35	17	(s)	(s)	90	6	149	(s)	152
December	(h)	4	(s)	35	17	(s)	(s)	94	5	153	(s)	158
Total	(h)	38	2	425	210	2	5	1,124	69	1,836	5	1,879
2011 January	(h)	5	(s)	33	17	(s)	(s)	89	7	147	(s)	152
February	(h)	4	(s)	30	15	(s)	(s)	83	7	135	(s)	140
March	(h)	4	(s)	36	17	(s)	1	93	6	153	(s)	157
April	(h)	3	(s)	35	17	(s)	(s)	90	7	151	(s)	154
May	(h)	3	(s)	38	18	(s)	(s)	93	6	155	(s)	158
June	(h)	3	(s)	38	19	(s)	(s)	92	5	155	(s)	158
July	(h)	3	(s)	37	18	(s)	(s)	95	3	155	(s)	158
August	(h)	3	(s)	39	19	(s)	(s)	94	3	157	(s)	160
September	(h)	3	(s)	36	17	(s)	(s)	90	5	150	(s)	153
October	(h)	3	(s)	37	17	(s)	(s)	91	5	151	(s)	154
November	(h)	3	(s)	35	17	(s)	(s)	87	4	145	(s)	148
December	(h)	4	(s)	34	17	(s)	(s)	92	6	149	(s)	153
Total	(h)	39	2	430	209	2	5	1,089	65	1,802	4	1,845
2012 January	(h)	4	(s)	32	16	(s)	(s)	87	5	140	(s)	145

<sup>a</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

<sup>b</sup> Natural gas, excluding supplemental gaseous fuels.

<sup>c</sup> Distillate fuel oil, excluding biodiesel.

<sup>d</sup> Liquefied petroleum gases.

<sup>e</sup> Finished motor gasoline, excluding fuel ethanol.

<sup>f</sup> Emissions from energy consumption (for electricity and a small amount of useful thermal output) in the electric power sector are allocated to the end-use sectors in proportion to each sector's share of total electricity retail sales. See Tables 7.6 and 12.6.

<sup>g</sup> Excludes emissions from biomass energy consumption. See Table 12.7.

<sup>h</sup> Beginning in 1978, the small amounts of coal consumed for transportation are reported as industrial sector consumption.

(s)=Less than 0.5 million metric tons.

Notes: • Data are estimates for carbon dioxide emissions from energy consumption, including the nonfuel use of fossil fuels. See "Section 12 Methodology and Sources" at end of section. • See "Carbon Dioxide" in Glossary. • See Note 1, "Emissions of Carbon Dioxide and Other Greenhouse Gases," at end of section. • Data exclude emissions from biomass energy consumption. See Table 12.7 and Note 2, "Accounting for Carbon Dioxide Emissions From Biomass Energy Combustion," 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/#environment> for all available data beginning in 1973.

Sources: See end of section.

**Table 12.6 Carbon Dioxide Emissions From Energy Consumption: Electric Power Sector**  
(Million Metric Tons of Carbon Dioxide<sup>a</sup>)

	Coal	Natural Gas <sup>b</sup>	Petroleum				Geo-thermal	Non-Biomass Waste <sup>d</sup>	Total <sup>e</sup>
			Distillate Fuel Oil <sup>c</sup>	Petroleum Coke	Residual Fuel Oil	Total			
<b>1973 Total</b> .....	812	199	20	2	254	276	NA	NA	1,286
<b>1975 Total</b> .....	824	172	17	(s)	231	248	NA	NA	1,244
<b>1980 Total</b> .....	1,137	200	12	1	194	207	NA	NA	1,544
<b>1985 Total</b> .....	1,367	166	6	1	79	86	NA	NA	1,619
<b>1990 Total</b> .....	1,548	176	7	3	92	102	(s)	6	1,831
<b>1995 Total</b> .....	1,661	228	8	8	45	61	(s)	10	1,960
<b>1996 Total</b> .....	1,752	205	8	8	50	66	(s)	10	2,033
<b>1997 Total</b> .....	1,797	219	8	10	56	75	(s)	10	2,101
<b>1998 Total</b> .....	1,828	248	10	13	82	105	(s)	10	2,192
<b>1999 Total</b> .....	1,836	260	10	11	76	97	(s)	10	2,204
<b>2000 Total</b> .....	1,927	281	13	10	69	91	(s)	10	2,310
<b>2001 Total</b> .....	1,870	290	12	11	79	102	(s)	11	2,273
<b>2002 Total</b> .....	1,890	306	9	18	52	79	(s)	13	2,288
<b>2003 Total</b> .....	1,931	278	12	18	69	98	(s)	11	2,319
<b>2004 Total</b> .....	1,943	297	8	23	69	100	(s)	11	2,352
<b>2005 Total</b> .....	1,984	319	8	25	69	102	(s)	11	2,417
<b>2006 Total</b> .....	1,954	338	5	22	28	56	(s)	12	2,359
<b>2007 Total</b> .....	1,987	372	7	17	31	55	(s)	11	2,426
<b>2008 Total</b> .....	1,959	362	5	16	19	40	(s)	12	2,374
<b>2009 Total</b> .....	1,741	373	5	14	14	34	(s)	11	2,159
<b>2010</b> January .....	169	30	1	1	1	4	(s)	1	204
February .....	150	26	(s)	1	1	2	(s)	1	179
March .....	143	25	(s)	1	1	2	(s)	1	171
April .....	125	25	(s)	1	1	2	(s)	1	154
May .....	142	30	(s)	1	1	3	(s)	1	176
June .....	163	38	1	1	2	4	(s)	1	206
July .....	177	48	1	2	2	4	(s)	1	230
August .....	177	51	(s)	1	2	3	(s)	1	232
September .....	148	38	(s)	1	1	2	(s)	1	189
October .....	132	31	(s)	1	1	2	(s)	1	166
November .....	136	27	(s)	1	1	2	(s)	1	165
December .....	165	31	1	1	1	3	(s)	1	200
<b>Total</b> .....	<b>1,827</b>	<b>399</b>	<b>6</b>	<b>15</b>	<b>12</b>	<b>33</b>	<b>(s)</b>	<b>11</b>	<b>2,270</b>
<b>2011</b> January .....	168	29	1	2	1	3	(s)	1	201
February .....	137	26	(s)	1	1	2	(s)	1	166
March .....	135	26	(s)	1	1	2	(s)	1	164
April .....	125	28	(s)	1	1	2	(s)	1	156
May .....	137	31	(s)	1	1	2	(s)	1	171
June .....	157	38	(s)	1	1	2	(s)	1	198
July .....	176	51	(s)	1	1	3	(s)	1	230
August .....	172	50	(s)	1	1	2	(s)	1	225
September .....	143	37	(s)	1	1	2	(s)	1	183
October .....	129	31	(s)	1	(s)	2	(s)	1	163
November .....	125	29	(s)	1	(s)	2	(s)	1	<sup>R</sup> 156
December .....	137	33	(s)	1	(s)	2	(s)	1	173
<b>Total</b> .....	<b>1,739</b>	<b>411</b>	<b>5</b>	<b>14</b>	<b>7</b>	<b>25</b>	<b>(s)</b>	<b>11</b>	<sup>R</sup> <b>2,187</b>
<b>2012</b> January .....	132	35	(s)	1	1	2	(s)	1	170

<sup>a</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

<sup>b</sup> Natural gas, excluding supplemental gaseous fuels.

<sup>c</sup> Distillate fuel oil, excluding biodiesel.

<sup>d</sup> Municipal solid waste from non-biogenic sources, and tire-derived fuels.

<sup>e</sup> Excludes emissions from biomass energy consumption. See Table 12.7.

R=Revised. NA=Not available. (s)=Less than 0.5 million metric tons.

Notes: • Data are estimates for carbon dioxide emissions from energy consumption. See "Section 12 Methodology and Sources" at end of section.

• See "Carbon Dioxide" in Glossary. • See Note 1, "Emissions of Carbon Dioxide and Other Greenhouse Gases," at end of section. • Data exclude emissions from biomass energy consumption. See Table 12.7 and Note 2, "Accounting for Carbon Dioxide Emissions From Biomass Energy Combustion," 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/#environment> for all available data beginning in 1973.

Sources: See end of section.

**Table 12.7 Carbon Dioxide Emissions From Biomass Energy Consumption**  
(Million Metric Tons of Carbon Dioxide<sup>a</sup>)

	By Source					By Sector					
	Wood <sup>b</sup>	Biomass Waste <sup>c</sup>	Fuel Ethanol <sup>d</sup>	Bio-diesel	Total	Residential	Commercial <sup>e</sup>	Industrial <sup>f</sup>	Transportation	Electric Power <sup>g</sup>	Total
1973 Total .....	143	(s)	NA	NA	143	33	1	109	NA	(s)	143
1975 Total .....	140	(s)	NA	NA	141	40	1	100	NA	(s)	141
1980 Total .....	232	(s)	NA	NA	232	80	2	150	NA	(s)	232
1985 Total .....	252	14	3	NA	270	95	2	168	3	1	270
1990 Total .....	208	24	4	NA	237	54	8	147	4	23	237
1995 Total .....	222	30	8	NA	260	49	9	166	8	28	260
1996 Total .....	229	32	6	NA	266	51	10	170	6	30	266
1997 Total .....	222	30	7	NA	259	40	10	172	7	30	259
1998 Total .....	205	30	8	NA	242	36	9	160	8	30	242
1999 Total .....	208	29	8	NA	245	37	9	161	8	30	245
2000 Total .....	212	27	9	NA	248	39	9	161	9	29	248
2001 Total .....	188	33	10	(s)	231	35	9	147	10	31	231
2002 Total .....	187	36	12	(s)	235	36	9	144	12	35	235
2003 Total .....	188	36	16	(s)	240	38	9	141	16	37	240
2004 Total .....	199	35	20	(s)	255	38	10	151	20	36	255
2005 Total .....	200	37	23	1	261	40	10	150	23	37	261
2006 Total .....	R 197	36	31	2	R 266	R 36	9	151	33	R 266	
2007 Total .....	R 194	37	39	3	R 274	R 38	9	146	41	R 274	
2008 Total .....	R 191	40	55	3	R 289	42	10	140	57	40	R 289
2009 Total .....	R 177	41	62	3	R 284	40	10	R 128	64	41	R 284
<b>2010</b> January .....	16	4	6	(s)	25	3	1	12	6	4	25
February .....	14	3	5	(s)	23	3	1	11	5	3	23
March .....	16	4	6	(s)	25	3	1	12	6	4	25
April .....	15	4	6	(s)	25	3	1	11	6	3	25
May .....	15	4	6	(s)	25	3	1	11	6	3	25
June .....	15	4	6	(s)	25	3	1	11	6	4	25
July .....	16	4	6	(s)	26	3	1	12	6	4	26
August .....	16	4	6	(s)	26	3	1	12	6	4	26
September .....	16	3	6	(s)	25	3	1	12	6	3	25
October .....	16	4	6	(s)	26	3	1	12	6	3	26
November .....	15	4	6	(s)	25	3	1	12	6	4	25
December .....	16	4	6	(s)	27	3	1	12	6	4	27
<b>Total .....</b>	<b>186</b>	<b>43</b>	<b>73</b>	<b>2</b>	<b>304</b>	<b>39</b>	<b>10</b>	<b>139</b>	<b>73</b>	<b>42</b>	<b>304</b>
<b>2011</b> January .....	16	4	6	(s)	26	3	1	12	6	3	26
February .....	R 15	3	6	(s)	24	3	1	11	6	3	24
March .....	R 16	4	6	(s)	26	3	1	12	6	3	26
April .....	15	3	6	(s)	R 25	3	1	11	6	3	R 25
May .....	15	4	6	(s)	25	3	1	11	7	3	25
June .....	16	4	6	1	26	3	1	12	7	3	26
July .....	16	4	6	1	26	3	1	12	7	4	26
August .....	16	4	7	1	27	3	1	12	7	4	27
September .....	15	4	6	1	26	3	1	12	7	3	26
October .....	15	4	6	1	26	3	1	11	7	3	26
November .....	15	4	6	1	26	3	1	12	7	3	26
December .....	16	4	6	1	27	3	1	12	7	4	27
<b>Total .....</b>	<b>R 186</b>	<b>R 43</b>	<b>73</b>	<b>7</b>	<b>R 310</b>	<b>R 40</b>	<b>10</b>	<b>R 140</b>	<b>79</b>	<b>41</b>	<b>R 310</b>
<b>2012</b> January .....	16	4	6	(s)	26	3	1	12	6	4	26

<sup>a</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

<sup>b</sup> Wood and wood-derived fuels.

<sup>c</sup> Municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural byproducts, and other biomass.

<sup>d</sup> Fuel ethanol minus denaturant.

<sup>e</sup> Commercial sector, including commercial combined-heat-and-power (CHP) and commercial electricity-only plants.

<sup>f</sup> Industrial sector, including industrial combined-heat-and-power (CHP) and industrial electricity-only plants.

<sup>g</sup> 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.

R=Revised. NA=Not available. (s)=Less than 0.5 million metric tons.

Notes: • Carbon dioxide emissions from biomass energy consumption are excluded from the energy-related carbon dioxide emissions reported in Tables 12.1–12.6. See Note 2, "Accounting for Carbon Dioxide Emissions From Biomass Energy Combustion," at end of section. • Data are estimates. See "Section 12 Methodology and Sources" at end of section. • See "Carbon Dioxide" in Glossary. • See Note 1, "Emissions of Carbon Dioxide and Other Greenhouse Gases," 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/#environment> for all available data beginning in 1973.

Sources: See end of section.

## Environment

**Note 1. Emissions of Carbon Dioxide and Other Greenhouse Gases.** Greenhouse gases are those gases—such as water vapor, carbon dioxide (CO<sub>2</sub>), methane, nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride—that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.

Energy-related carbon dioxide emissions account for about 98 percent of U.S. CO<sub>2</sub> emissions. The vast majority of CO<sub>2</sub> emissions come from fossil fuel combustion, with smaller amounts from the nonfuel use of fossil fuels, as well as from electricity generation using geothermal energy and non-biomass waste. Other sources of CO<sub>2</sub> emissions include industrial processes, such as cement and limestone production. Data in the U.S. Energy Information Administration's (EIA) *Monthly Energy Review (MER)* Tables 12.1–12.6 are estimates for U.S. CO<sub>2</sub> emissions from energy consumption, including the nonfuel use of fossil fuels (excluded are estimates for CO<sub>2</sub> emissions from biomass energy consumption, which appear in Table 12.7).

For annual U.S. estimates for emissions of CO<sub>2</sub> from all sources, as well as for emissions of other greenhouse gases, see EIA's *Emissions of Greenhouse Gases Report* at [http://www.eia.gov/environment/emissions/ghg\\_report/](http://www.eia.gov/environment/emissions/ghg_report/).

**Note 2. Accounting for Carbon Dioxide Emissions From Biomass Energy Combustion.** Carbon dioxide (CO<sub>2</sub>) emissions from the combustion of biomass to produce energy are excluded from the energy-related CO<sub>2</sub> emissions reported in MER Tables 12.1–12.6, but appear in Table 12.7. According to current international convention (see the Intergovernmental Panel on Climate Change's "2006 IPCC Guidelines for National Greenhouse Gas Inventories"), carbon released through biomass combustion is excluded from reported energy-related emissions. The release of carbon from biomass combustion is assumed to be balanced by the uptake of carbon when the feedstock is grown, resulting in zero net emissions over some period of time. (This is not to say that biomass energy is carbon-neutral. Energy inputs are required in order to grow, fertilize, and harvest the feedstock and to produce and process the biomass into fuels.)

However, analysts have debated whether increased use of biomass energy may result in a decline in terrestrial carbon stocks, leading to a net positive release of carbon rather than the zero net release assumed by its exclusion from reported energy-related emissions. For example, the clearing of forests for biofuel crops could result in an initial release of carbon that is not fully recaptured in subsequent use of the land for agriculture.

To reflect the potential net emissions, the international convention for greenhouse gas inventories is to report

biomass emissions in the category "agriculture, forestry, and other land use," usually based on estimates of net changes in carbon stocks over time.

This indirect accounting of CO<sub>2</sub> emissions from biomass can potentially lead to confusion in accounting for and understanding the flow of CO<sub>2</sub> emissions within energy and non-energy systems. In recognition of this issue, reporting of CO<sub>2</sub> emissions from biomass combustion alongside other energy-related CO<sub>2</sub> emissions offers an alternative accounting treatment. It is important, however, to avoid misinterpreting emissions from fossil energy and biomass energy sources as necessarily additive. Instead, the combined total of direct CO<sub>2</sub> emissions from biomass and energy-related CO<sub>2</sub> emissions implicitly assumes that none of the carbon emitted was previously or subsequently reabsorbed in terrestrial sinks or that other emissions sources offset any such sequestration.

## Section 12 Methodology and Sources

To estimate carbon dioxide emissions from energy consumption for the *Monthly Energy Review (MER)*, Tables 12.1–12.7, the U.S. Energy Information Administration (EIA) uses the following methodology and sources:

### Step 1. Determine Fuel Consumption

Coal—Coal sectoral (residential, commercial, coke plants, other industrial, transportation, electric power) consumption data in thousand short tons are from MER Table 6.2. Coal sectoral consumption data are converted to trillion Btu by multiplying by the coal heat content factors in MER Table A5.

Coal Coke Net Imports—Coal coke net imports data in trillion Btu are derived from coal coke imports and exports data in MER Tables 1.4a and 1.4b.

Natural Gas (excluding supplemental gaseous fuels)—Natural gas sectoral consumption data in trillion Btu are from MER Tables 2.2–2.6.

Petroleum—Total and sectoral consumption (product supplied) data in thousand barrels per day for asphalt and road oil, aviation gasoline, distillate fuel oil, jet fuel, kerosene, liquefied petroleum gases (LPG), lubricants, motor gasoline, petroleum coke, and residual fuel oil are from MER Tables 3.5 and 3.7a–3.7c. For the component products of LPG (ethane/ethylene, propane/propylene, normal butane/butylene, and isobutane/isobutylene) and "other petroleum" (aviation gasoline blending components, crude oil, motor gasoline blending components, naphthas for petrochemical feedstock use, other oils for petrochemical feedstock use, pentanes plus, special naphthas, still gas, unfinished oils, waxes, and miscellaneous petroleum products), consumption (product supplied) data in thousand barrels per day are from EIA's *Petroleum Supply Annual (PSA)*, *Petroleum Supply Monthly (PSM)*, and earlier

publications (see sources for MER Table 3.5). Petroleum consumption data by product are converted to trillion Btu by multiplying by the petroleum heat content factors in MER Table A1 (Table A3 for motor gasoline).

Biomass—Sectoral consumption data in trillion Btu for wood, biomass waste, fuel ethanol (minus denaturant), and biodiesel are from MER Tables 10.2a–10.2c.

## Step 2. Remove Biofuels From Petroleum

Distillate Fuel Oil—Beginning in 2009, the distillate fuel oil data (for total and transportation sector) in Step 1 include biodiesel, a non-fossil renewable fuel. To remove the biodiesel portion from distillate fuel oil, data in thousand barrels per day for refinery and blender net inputs of renewable diesel fuel (from the PSA/PSM) are converted to trillion Btu by multiplying by the biodiesel heat content factor in MER Table A3, and then subtracted from the distillate fuel oil consumption values.

Motor Gasoline—Beginning in 1993, the motor gasoline data (for total, commercial sector, industrial sector, and transportation sector) in Step 1 include fuel ethanol, a non-fossil renewable fuel. To remove the fuel ethanol portion from motor gasoline, data in trillion Btu for fuel ethanol consumption (from MER Tables 10.2a, 10.2b, and 10.3) are subtracted from the motor gasoline consumption values. (Note that about 2 percent of fuel ethanol is fossil-based petroleum denaturant, to make the fuel ethanol undrinkable. For 1993–2008, petroleum denaturant is double counted in the PSA product supplied statistics, in both the original product category—e.g., pentanes plus—and also in the finished motor gasoline category; for this time period for MER Section 12, petroleum denaturant is removed along with the fuel ethanol from motor gasoline, but left in the original product. Beginning in 2009, petroleum denaturant is counted only in the PSA/PSM product supplied statistics for motor gasoline; for this time period for MER Section 12, petroleum denaturant is left in motor gasoline.)

## Step 3. Remove Carbon Sequestered by Nonfuel Use

The following fuels have industrial nonfuel uses as chemical feedstocks and other products: coal, natural gas, asphalt and road oil, distillate fuel oil, liquefied petroleum gases (ethane/ethylene, propane/propylene, normal butane/butylene, and isobutane/isobutylene), lubricants (which have industrial and transportation nonfuel uses), naphthas for petrochemical feedstock use, other oils for petrochemical feedstock use, pentanes plus, petroleum coke, residual fuel oil, special naphthas, still gas, waxes, and miscellaneous petroleum products. In the nonfuel use of these fuels, some of the carbon is sequestered, and is thus subtracted from the fuel consumption values in Steps 1 and 2.

Estimates of annual nonfuel use and associated carbon sequestration are developed by EIA using the methodology

detailed in “Documentation for *Emissions of Greenhouse Gases in the United States 2008*” at [http://www.eia.gov/oiaf/1605/ggprt/documentation/pdf/0638\(2008\).pdf](http://www.eia.gov/oiaf/1605/ggprt/documentation/pdf/0638(2008).pdf).

To obtain monthly estimates of nonfuel use and associated carbon sequestration, monthly patterns for industrial consumption and product supplied data series are used. For coal nonfuel use, the monthly pattern for coke plants coal consumption from MER Table 6.2 is used. For natural gas, the monthly pattern for other industrial non-CHP natural gas consumption from MER Table 4.3 is used. For distillate fuel oil, petroleum coke, and residual fuel oil, the monthly patterns for industrial consumption from MER Table 3.7b are used. For the other petroleum products, the monthly patterns for product supplied from the PSA and PSM are used.

## Step 4. Determine Carbon Dioxide Emissions From Energy Consumption

Carbon dioxide (CO<sub>2</sub>) emissions data in million metric tons are calculated by multiplying consumption values in trillion Btu from Steps 1 and 2 (minus the carbon sequestered in nonfuel use in Step 3) by the CO<sub>2</sub> emissions factors at [http://www.eia.gov/oiaf/1605/ggprt/excel/CO2\\_coefs\\_09\\_v2.xls](http://www.eia.gov/oiaf/1605/ggprt/excel/CO2_coefs_09_v2.xls). Beginning in 2010, the 2009 factors are used.

Coal—CO<sub>2</sub> emissions for coal are calculated for each sector (residential, commercial, coke plants, other industrial, transportation, electric power). Total coal emissions are the sum of the sectoral coal emissions.

Coal Coke Net Imports—CO<sub>2</sub> emissions for coal coke net imports are calculated.

Natural Gas—CO<sub>2</sub> emissions for natural gas are calculated for each sector (residential, commercial, industrial, transportation, electric power). Total natural gas emissions are the sum of the sectoral natural gas emissions.

Petroleum—CO<sub>2</sub> emissions are calculated for each petroleum product. Total petroleum emissions are the sum of the product emissions. Total LPG emissions are the sum of the emissions for the component products (ethane/ethylene, propane/propylene, normal butane/butylene, and isobutane/isobutylene); residential, commercial, and transportation sector LPG emissions are estimated by multiplying consumption values in trillion Btu from MER Tables 3.8a and 3.8c by the propane emissions factor; industrial sector LPG emissions are estimated as total LPG emissions minus emissions by the other sectors.

Geothermal and Non-Biomass Waste—Annual CO<sub>2</sub> emissions data for geothermal and non-biomass waste are EIA estimates based on Form EIA-923, “Power Plant Operations Report” (and predecessor forms). Monthly estimates are created by dividing the annual data by the number of days in the year and then multiplying by the number of days in the month. (Annual estimates for the current year are set equal to those of the previous year.)

Biomass—CO<sub>2</sub> emissions for wood, biomass waste, fuel ethanol (minus denaturant), and biodiesel are calculated for each sector. Total emissions for each biomass fuel are the sum of the sectoral emissions. The following factors, in million metric tons CO<sub>2</sub> per quadrillion Btu, are used: wood—93.80; biomass waste—90.70; fuel ethanol—68.44; and biodiesel—73.84. For 1973–1988, the biomass portion

of waste in MER Tables 10.2a–10.2c is estimated as 67 percent; for 1989–2000, the biomass portion of waste is estimated as 67 percent in 1989 to 58 percent in 2000, based on the biogenic shares of total municipal solid waste shown in EIA’s “Methodology for Allocating Municipal Solid Waste to Biogenic and Non-Biogenic Energy,” Table 1 at <http://www.eia.gov/cneaf/solar.renewables/page/mswaste/msw.pdf>.

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