# **Environmental Indicators**

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"Harpers Ferry, Junction of the Rivers Shenandoah and Potomac." Engraving by W. Goodacre and James Archer, published in *The History and Topography of the United States of North America*, by John Howard Hinton, 1852. From the collection of the National Park Service, Harpers Ferry National Historical Park, Accession #1297.

# Figure 12.1 Emissions of Greenhouse Gases





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Change 1990-2002 in Emissions Based on Global Warming Potential



<sup>1</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

<sup>2</sup> -0.2 percent.

(s)=Less than 0.005 billion metric tons of gas.

= Not applicable because these gases cannot be summed in native units.

Notes: • HFCs=hydrofluorocarbons; PFCs=perfluorocarbons; and SF<sub>6</sub>=sulfur hexafluoride. • Emissions by type of gas should not be compared; for comparison, see emissions based on global warming potential by type of gas. • Because vertical scales differ, graphs should not be compared.

Source: Table 12.1.

Table 12.1	Emissions	of Greenhouse	Gases, 1980-20	)02
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		Greenhou (million metric	se Gases c tons of gas)		Greenhouse Gases, Based on Global Warming Potential <sup>1</sup> (million metric tons carbon dioxide equivalent <sup>2</sup> )							
Year	Carbon Dioxide <sup>2,3</sup>	Methane	Nitrous Oxide	HFCs PFCs SF6	Carbon Dioxide <sup>2</sup>	Methane	Nitrous Oxide	HFCs PFCs SF6	Total			
1980	<sup>R</sup> 4 775 4	17 4	0.9	_	<sup>R</sup> 4 775 4	400.0	<sup>R</sup> 268.9	70.4	<sup>R</sup> 5 514 6			
1981	<sup>R</sup> 4 654 1	18.0	0.9	_	<sup>R</sup> 4 654 1	413.2	<sup>R</sup> 273 1	74.0	<sup>R</sup> 5 414 4			
1982	<sup>R</sup> 4.406.7	17.7	0.9	_	<sup>R</sup> 4.406.7	408.1	<sup>R</sup> 262.6	55.4	<sup>R</sup> 5.132.8			
1983	<sup>R</sup> 4.370.0	18.4	0.8	-	<sup>R</sup> 4.370.0	423.4	R248.9	67.1	<sup>R</sup> 5.109.4			
1984	<sup>R</sup> 4.615.3	18.9	0.9	_	<sup>R</sup> 4.615.3	433.7	<sup>R</sup> 268.1	75.5	<sup>R</sup> 5.392.7			
1985	<sup>R</sup> 4,599.7	23.8	1.0	_	<sup>R</sup> 4,599.7	547.1	<sup>R</sup> 301.5	70.5	<sup>R</sup> 5,518.8			
1986	<sup>R</sup> 4,608.0	23.9	1.0	-	<sup>R</sup> 4,608.0	548.7	<sup>R</sup> 291.7	75.0	<sup>R</sup> 5,523.4			
1987	<sup>R</sup> 4,767.6	24.1	1.0	_	<sup>R</sup> 4,767.6	555.2	<sup>R</sup> 287.5	77.8	<sup>R</sup> 5,688.2			
1988	<sup>R</sup> 4,983.7	24.5	0.9	_	<sup>R</sup> 4,983.7	563.5	<sup>R</sup> 275.9	91.3	<sup>R</sup> 5,914.4			
1989	<sup>R</sup> 5,063.7	24.9	1.0	-	<sup>R</sup> 5,063.7	573.6	<sup>R</sup> 289.3	94.5	<sup>R</sup> 6,021.2			
1990	<sup>R</sup> 5,006.1	<sup>R</sup> 31.3	<sup>R</sup> 1.1	_	<sup>R</sup> 5,006.1	<sup>R</sup> 719.1	<sup>R</sup> 333.8	<sup>R</sup> 96.8	<sup>R</sup> 6,155.8			
1991	<sup>R</sup> 4,959.0	<sup>R</sup> 31.4	<sup>R</sup> 1.1	_	<sup>R</sup> 4,959.0	<sup>R</sup> 722.9	<sup>R</sup> 339.3	<sup>R</sup> 88.0	<sup>R</sup> 6,109.2			
1992	<sup>R</sup> 5,072.6	<sup>R</sup> 31.6	1.2	—	<sup>R</sup> 5,072.6	<sup>R</sup> 725.7	<sup>R</sup> 346.7	<sup>R</sup> 87.9	<sup>R</sup> 6,232.9			
1993	<sup>R</sup> 5,180.0	<sup>R</sup> 30.6	1.2	_	<sup>R</sup> 5,180.0	<sup>R</sup> 702.7	<sup>R</sup> 347.6	<sup>R</sup> 93.6	<sup>R</sup> 6,324.0			
1994	<sup>R</sup> 5,262.5	<sup>R</sup> 30.6	1.3	—	<sup>R</sup> 5,262.5	<sup>R</sup> 703.1	<sup>R</sup> 371.0	<sup>R</sup> 90.9	<sup>R</sup> 6,427.5			
1995	<sup>R</sup> 5,318.5	<sup>R</sup> 30.5	<sup>R</sup> 1.2	-	<sup>R</sup> 5,318.5	<sup>R</sup> 701.8	<sup>R</sup> 355.3	<sup>R</sup> 94.6	<sup>R</sup> 6,470.2			
1996	<sup>R</sup> 5,508.9	<sup>R</sup> 29.4	1.2	_	<sup>R</sup> 5,508.9	<sup>R</sup> 675.9	<sup>R</sup> 352.3	113.3	<sup>R</sup> 6,650.4			
1997	<sup>R</sup> 5,572.5	<sup>R</sup> 29.1	1.2	—	<sup>R</sup> 5,572.5	<sup>R</sup> 668.2	<sup>R</sup> 344.4	<sup>R</sup> 116.0	<sup>R</sup> 6,701.2			
1998	<sup>R</sup> 5,602.4	<sup>R</sup> 28.2	1.2	_	<sup>R</sup> 5,602.4	<sup>R</sup> 648.4	<sup>R</sup> 342.6	<sup>R</sup> 126.2	<sup>R</sup> 6,719.6			
1999	<sup>R</sup> 5,686.1	<sup>R</sup> 27.8	1.2	—	<sup>R</sup> 5,686.1	<sup>R</sup> 639.7	<sup>R</sup> 347.2	<sup>R</sup> 122.1	<sup>R</sup> 6,795.1			
2000	<sup>R</sup> 5,854.0	<sup>R</sup> 27.8	1.2	—	<sup>R</sup> 5,854.0	<sup>R</sup> 638.8	<sup>R</sup> 341.2	<sup>R</sup> 123.2	<sup>R</sup> 6,957.2			
2001	<sup>R</sup> 5,748.3	<sup>R</sup> 27.4	<sup>R</sup> 1.1	_	<sup>R</sup> 5,748.3	<sup>R</sup> 630.2	<sup>R</sup> 336.8	<sup>R</sup> 113.6	<sup>R</sup> 6,828.9			
2002 <sup>P</sup>	5,795.6	26.6	1.1	—	5,795.6	612.8	333.1	120.6	6,862.0			

<sup>1</sup> Emissions of greenhouse gases were weighted based upon their relative global warming potential (gwp), with carbon dioxide equal to a weight of one. The use of updated estimates of gwp resulted in a number of revisions to previously published data. It is also important to note that revisions in estimated emissions result from revisions in energy consumption as well.

<sup>2</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

<sup>3</sup> Carbon dioxide data in this table differ from those for the United States in Table 11.19 due to: the exclusion of emissions from international bunker fuels consumption; the inclusion of emissions from geothermal power generation, cement production and other industrial processes, and municipal solid waste combustion; and the inclusion of data for the U.S. Territories.

R=Revised. P=Preliminary. — = Not applicable because these gases cannot be summed in native units.

Notes: • HFCs = hydrofluorocarbons; PFCs = perfluorocarbons; and SF<sub>6</sub> = sulfur hexafluoride. • Emissions are from anthropogenic sources. "Anthropogenic" means produced as the result of human activities, including emissions from agricultural activity and domestic livestock. Emissions from natural sources, such as wetlands and wild animals, are not included. • Because of the continuing goal to improve estimation methods for greenhouse gases, data are frequently revised on an annual basis in keeping with the latest findings of the international scientific community.

Web Page: For related information, see http://www.eia.doe.gov/environment.html.

Sources: • 1980-1989—Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States*, annual reports and unpublished revisions. • 1990 forward—EIA, *Emissions of Greenhouse Gases in the United States 2002* (October 2003), Tables ES1 and ES2.



# Figure 12.2 Carbon Dioxide Emissions From Energy Consumption by Sector

<sup>1</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

<sup>2</sup> Based on chained (2000) dollars.

<sup>3</sup> Electric power sector emissions are distributed across the end-use sectors. Note: Because vertical scales differ, graphs should not be compared. Sources: Tables 1.5 and 12.2.

#### Table 12.2 Carbon Dioxide Emissions From Energy Consumption by Sector, 1980-2002

(Million Metric Tons of Carbon Dioxide <sup>1</sup>)

				End-Us	e Sectors					
	Resid	lential	Comm	ercial <sup>2</sup>	Indus	strial <sup>3</sup>	Transp	ortation	Sector <sup>4</sup>	
Year	Primary <sup>5</sup>	Total <sup>6</sup>	Primary <sup>5</sup>	Total 7						
1980	<sup>R</sup> 385.1	<sup>R</sup> 908.9	<sup>R</sup> 244.5	652.5	<sup>R</sup> 1,192.5	<sup>R</sup> 1,787.4	1,383.9	1,386.2	1,529.0	<sup>R</sup> 4,735.0
1981	<sup>R</sup> 360.7	<sup>R</sup> 877.7	225.8	<sup>R</sup> 652.2	<sup>R</sup> 1,123.0	<sup>R</sup> 1,714.0	1,369.4	<sup>R</sup> 1,371.7	1,536.7	<sup>R</sup> 4,615.6
1982	<sup>R</sup> 359.0	<sup>R</sup> 872.1	<sup>R</sup> 226.0	<sup>R</sup> 654.1	<sup>Ŕ</sup> 983.0	<sup>R</sup> 1,506.7	1,338.3	1,340.5	1,467.1	<sup>R</sup> 4,373.4
1983	<sup>R</sup> 340.2	<sup>R</sup> 866.3	225.7	660.5	<sup>R</sup> 923.0	<sup>R</sup> 1,466.4	<sup>R</sup> 1,343.0	1,345.3	1,506.5	<sup>R</sup> 4,338.5
1984	<sup>R</sup> 348.7	<sup>R</sup> 885.7	<sup>R</sup> 236.2	693.6	<sup>R</sup> 1,035.8	<sup>R</sup> 1,612.3	<sup>R</sup> 1,387.1	1,389.6	1,573.5	<sup>R</sup> 4,581.3
1985	<sup>R</sup> 351.3	<sup>R</sup> 899.6	217.9	694.0	<sup>R</sup> 989.8	<sup>R</sup> 1,567.4	1,406.3	<sup>R</sup> 1,408.9	1,604.6	<sup>R</sup> 4,569.9
1986	<sup>R</sup> 342.4	<sup>R</sup> 895.1	<sup>R</sup> 216.1	698.8	<sup>R</sup> 963.0	<sup>R</sup> 1,523.2	<sup>R</sup> 1,460.2	1,462.9	1,598.2	<sup>R</sup> 4,580.0
1987	<sup>R</sup> 345.7	<sup>R</sup> 921.8	<sup>R</sup> 219.9	724.6	<sup>R</sup> 1,004.1	<sup>R</sup> 1,585.4	1,504.4	1,506.9	1,664.5	<sup>R</sup> 4,738.6
1988	<sup>R</sup> 366.6	<sup>R</sup> 969.5	<sup>R</sup> 230.1	760.0	<sup>R</sup> 1,053.9	<sup>R</sup> 1,659.1	1,564.1	1,566.8	1,740.8	<sup>R</sup> 4,955.5
1989	<sup>R</sup> 371.5	<sup>R</sup> 989.6	229.9	<sup>R</sup> 784.0	<sup>R</sup> 1,045.2	<sup>R</sup> 1,677.0	<sup>R</sup> 1,581.5	1,584.3	<sup>R</sup> 1,806.7	<sup>R</sup> 5,034.8
1990	<sup>R</sup> 339.1	<sup>R</sup> 950.8	<sup>R</sup> 224.1	<sup>R</sup> 779.5	<sup>R</sup> 1,063.1	<sup>R</sup> 1,688.8	<sup>R</sup> 1,566.8	<sup>R</sup> 1,569.5	<sup>R</sup> 1,795.5	<sup>R</sup> 4,988.6
1991	<sup>R</sup> 346.7	<sup>R</sup> 966.7	<sup>R</sup> 225.5	<sup>R</sup> 781.0	<sup>R</sup> 1,029.8	<sup>R</sup> 1,643.9	<sup>R</sup> 1,546.8	<sup>R</sup> 1,549.4	<sup>R</sup> 1,792.2	<sup>R</sup> 4,941.0
1992	<sup>R</sup> 356.7	<sup>R</sup> 967.7	<sup>R</sup> 225.8	<sup>R</sup> 781.1	<sup>R</sup> 1,088.7	<sup>R</sup> 1,723.5	<sup>R</sup> 1,567.9	<sup>R</sup> 1,570.5	<sup>R</sup> 1,803.7	<sup>R</sup> 5,042.7
1993	<sup>R</sup> 371.7	<sup>R</sup> 1,026.7	<sup>R</sup> 223.1	<sup>R</sup> 806.2	<sup>R</sup> 1,062.1	<sup>R</sup> 1,705.1	<sup>R</sup> 1,588.1	<sup>R</sup> 1,590.6	<sup>R</sup> 1,883.6	<sup>R</sup> 5,128.6
1994	<sup>R</sup> 363.9	<sup>R</sup> 1,020.0	<sup>R</sup> 225.6	<sup>R</sup> 819.6	<sup>R</sup> 1,078.0	<sup>R</sup> 1,733.5	<sup>R</sup> 1,628.4	<sup>R</sup> 1,631.7	<sup>R</sup> 1,908.9	<sup>R</sup> 5,204.7
1995	<sup>R</sup> 360.3	<sup>R</sup> 1,025.7	<sup>R</sup> 228.4	<sup>R</sup> 836.7	<sup>R</sup> 1,085.9	<sup>R</sup> 1,732.0	<sup>R</sup> 1,658.3	<sup>R</sup> 1,661.4	<sup>R</sup> 1,922.9	<sup>R</sup> 5,255.8
1996	<sup>R</sup> 388.4	<sup>R</sup> 1,085.3	<sup>R</sup> 236.9	<sup>R</sup> 867.9	<sup>R</sup> 1,122.2	<sup>R</sup> 1,785.2	<sup>R</sup> 1,702.1	<sup>R</sup> 1,705.3	<sup>R</sup> 1,994.0	<sup>R</sup> 5,443.7
1997	<sup>R</sup> 370.1	<sup>R</sup> 1,076.6	237.1	<sup>R</sup> 911.2	<sup>R</sup> 1,122.6	<sup>R</sup> 1,800.4	<sup>R</sup> 1,719.5	<sup>R</sup> 1,722.7	<sup>R</sup> 2,061.7	<sup>R</sup> 5,511.0
1998	<sup>R</sup> 338.1	<sup>R</sup> 1,096.2	<sup>R</sup> 219.6	<sup>R</sup> 922.4	<sup>R</sup> 1,090.6	<sup>R</sup> 1,776.0	<sup>R</sup> 1,754.6	<sup>R</sup> 1,757.9	<sup>R</sup> 2,149.6	<sup>R</sup> 5,552.5
1999	<sup>R</sup> 358.6	<sup>R</sup> 1,123.9	<sup>R</sup> 222.2	<sup>R</sup> 933.5	<sup>R</sup> 1,085.1	<sup>R</sup> 1,767.0	<sup>R</sup> 1,802.7	<sup>R</sup> 1,806.0	<sup>R</sup> 2,161.9	<sup>R</sup> 5,630.5
2000	<sup>R</sup> 378.5	<sup>R</sup> 1,169.4	<sup>R</sup> 237.0	<sup>R</sup> 1,005.9	<sup>R</sup> 1,068.3	<sup>R</sup> 1,774.1	<sup>R</sup> 1,845.7	<sup>R</sup> 1,849.2	<sup>R</sup> 2,269.2	<sup>R</sup> 5,798.6
2001	<sup>R</sup> 366.2	<sup>R</sup> 1,160.8	<sup>R</sup> 227.1	<sup>R</sup> 1,018.3	<sup>R</sup> 1,048.2	<sup>R</sup> 1,685.3	<sup>R</sup> 1,823.6	<sup>R</sup> 1,827.3	<sup>R</sup> 2,226.6	<sup>R</sup> 5,691.7
2002 <sup>P</sup>	372.3	1,193.0	231.1	1,012.9	1,030.5	1,673.7	1,846.3	1,849.7	2,249.0	5,729.3

<sup>1</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

 $^{2}$  Commercial sector, including commercial combined-heat-and-power (CHP) and commercial electricity-only plants.

<sup>3</sup> Industrial sector, including industrial combined-heat-and-power (CHP) and industrial electricity-only plants.

<sup>4</sup> Electricity-only and combined-heat-and-power (CHP) plants within the NAICS (North American Industry Classification System) 22 category whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>5</sup> Carbon dioxide emissions from the combustion of fossil fuels. The electric power sector also has a small amount of emissions from geothermal power generation and the combustion of the plastics component of municipal solid waste.

<sup>6</sup> In addition to "Primary" emissions, also includes emissions from energy consumption (for electricity and a small amount of useful thermal output) in the electric power sector, which are allocated to the end-use sectors in proportion to each sector's share of total electricity retail sales. (Electricity retail sales to "Other," which are primarily for use in government buildings and for street and highway lighting, are added to the commercial sector, except for approximately 5 percent used by railroads and railways and attributed to the transportation sector.)

<sup>7</sup> The sum of "Primary" emissions in the five energy-use sectors equals the sum of "Total" emissions in the four end-use sectors.

#### R=Revised. P=Preliminary.

Notes: • See Note 2, "Classification of Power Plants Into Energy-Use Sectors," at end of Section 8. • Because of the continuing goal to improve estimation methods for greenhouse gases, data are frequently

revised on an annual basis in keeping with the latest findings of the international scientific community. • Totals may not equal sum of components due to independent rounding.

Web Page: For related information, see http://www.eia.doe.gov/environment.html.

Sources: • 1980-1989—Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States*, annual reports and unpublished revisions. • 1990 forward—EIA, *Emissions of Greenhouse Gases in the United States 2002* (October 2003), Tables 6-10.



**Total by Fuel** 







#### By End-Use Sector and Source



<sup>1</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

<sup>2</sup> Emissions in the electric power sector are distributed across the end-use sectors.

<sup>3</sup> Coal coke net imports, municipal solid waste, and geothermal.

<sup>4</sup> Liquefied petroleum gases.

<sup>5</sup> Aviation gasoline, kerosene, petroleum coke, and other products.

<sup>6</sup> Small amounts of coal consumed for transportation are reported as industrial consumption. (s)=Less than 0.5 million metric tons.

Source: Table 12.3.

#### Table 12.3 Carbon Dioxide Emissions From Energy Consumption by Sector by Energy Source, 2002

(Million Metric Tons of Carbon Dioxide <sup>1</sup>)

			End-Use Sectors			Electric		
Energy Source	Residential	Commercial <sup>2</sup>	Industrial <sup>3</sup>	Transportation	Total	Sector <sup>4</sup>	Total	
Petroleum	104.0	52.6	412.8	1.811.2	2.380.5	72.2	2.452.7	
Aviation Gasoline	_	_	_	2.3	2.3		2.3	
Distillate Fuel Oil	65.1	36.4	92.7	379.0	573.2	7.8	581.0	
Jet Fuel	—	—	_	234.4	234.4	—	234.4	
Kerosene	4.1	1.3	1.0	—	6.4	—	6.4	
Liquefied Petroleum Gases	34.9	6.2	50.4	0.8	92.2	—	92.2	
Lubricants	_	—	6.3	6.0	12.3	—	12.3	
Motor Gasoline	—	2.7	21.3	1,138.7	1,162.7	—	1,162.7	
Petroleum Coke	—	—	101.2	—	101.2	12.6	113.8	
Residual Fuel Oil	_	6.0	15.1	49.9	71.0	51.4	122.4	
Other	—	—	124.7	—	124.7	0.4	124.7	
Natural Gas	267.2	169.4	432.7	35.2	904.4	299.1	1,203.4	
Coal	1.1	9.2	179.4	(5)	189.7	1,874.7	2,064.4	
Coal Coke Net Imports	_	_	5.8	—	5.8	_	5.8	
Municipal Solid Waste 6	_	—	—	—	—	2.7	2.7	
Geothermal	—	—	—	—	—	0.4	0.4	
Primary	372.3	231.1	1,030.5	1,846.3	3,480.3	2,249.0	5,729.3	
Electric Power Sector Generation 7	820.7	781.8	643.1	3.4	2,249.0	—	—	
Total	1,193.0	1,012.9	1,673.7	1,849.7	5,729.3	_	5,729.3	

<sup>1</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

<sup>2</sup> Commercial sector, including commercial combined-heat-and-power (CHP) and commercial electricity-only plants.

<sup>3</sup> Industrial sector, including industrial combined-heat-and-power (CHP) and industrial electricity-only plants.

<sup>4</sup> Electricity-only and combined-heat-and-power (CHP) plants within the NAICS (North American Industry Classification System) 22 category whose primary business is to sell electricity, or electricity and heat, to the public.

<sup>5</sup> Small amounts of coal consumed for transportation are reported as industrial sector consumption.

<sup>6</sup> The plastics component of municipal solid waste.

<sup>7</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. (Electricity retail sales to "Other," which are primarily for use in government buildings and for street and highway lighting, are added to the commercial sector, except for approximately 5 percent used by railroads and railways and attributed to the transportation sector.)

--- = Not applicable. (s)=Less than 0.05 million metric tons.

Notes: • Data are preliminary estimates. • Emissions from blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels are counted under their primary energy source—i.e., petroleum, natural gas, or coal. • See Note 2, "Classification of Power Plants Into Energy-Use Sectors," at end of Section 8. • Totals may not equal sum of components due to independent rounding.

Web Page: For related information, see http://www.eia.doe.gov/environment.html.

Source: Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States* 2002 (October 2003), Tables 6-10, and unpublished revisions.

# Figure 12.4 Carbon Dioxide Emissions From Consumption of Energy for All Purposes in the Manufacturing Sector, 1998



#### **Carbon Dioxide Emissions by Energy Source**



# Carbon Dioxide Emissions per Unit of Primary Consumption, Top Industry Groups



<sup>1</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

<sup>3</sup> Including allocated electricity losses. Source: Table 12.4.

<sup>2</sup> All other types of energy that respondents indicated were consumed or allocated.

#### Table 12.4 Carbon Dioxide Emissions From Consumption of Energy for All Purposes in the Manufacturing Sector, 1998

(Million Metric Tons of Carbon Dioxide,<sup>1</sup> Except as Noted)

				Carbon Diox	ide Emissions			Carbon Dioxide	Carbon Dioxide	
NAICS <sup>2</sup> Code	Major Group	Coal	Natural Gas	Petroleum	Electricity <sup>3</sup>	Other <sup>4</sup>	Total	per Unit of Primary Consumption <sup>5</sup>	Emissions per Dollar of Shipments <sup>6</sup>	
311	Food	12.2	30.0	2.8	41 4	0.1	86.5	59.0	202.0	
312	Beverage and Tobacco Products	27	2.4	0.4	47	0.0	10.2	65.0	99.4	
313	Textile Mills	1.9	5.4	1.4	19.8	(s)	28.6	62.4	497.9	
314	Textile Product Mills	0.3	1.3	Q	3.5	0.0	5.3	62.8	171.3	
315	Apparel	0.1	1.2	0.3	3.5	0.0	5.1	61.0	78.5	
316	Leather and Allied Products	0.0	0.2	0.0	0.6	0.0	0.8	60.4	78.0	
321	Wood Products	0.2	3.9	1.2	14.0	0.2	19.4	29.8	213.3	
322	Paper	25.8	30.9	15.2	46.7	0.7	119.3	37.0	769.8	
323	Printing and Related Support	0.0	2.3	0.1	9.9	0.1	12.4	62.1	123.4	
324	Petroleum and Coal Products	0.0	53.2	175.0	24.5	69.8	322.5	42.6	2,337.5	
325	Chemicals	28.7	125.2	56.6	112.2	4.9	327.6	45.4	786.1	
326	Plastics and Rubber Products	0.3	6.7	0.8	35.6	0.0	43.3	62.7	264.5	
327	Nonmetallic Mineral Products	27.7	23.4	6.7	26.1	0.7	84.6	67.9	914.5	
331	Primary Metals	94.6	49.3	3.3	106.0	3.6	256.8	70.5	1,546.2	
332	Fabricated Metal Products	0.6	12.7	1.0	34.2	0.1	48.7	61.2	191.8	
333	Machinery	0.6	5.2	0.4	18.7	0.2	25.1	61.6	89.6	
334	Computer and Electronic Products	0.0	3.4	0.2	26.6	0.0	30.2	63.2	68.0	
335	Electrical Equipment, Appliances, and Components	0.1	2.8	0.4	10.7	0.9	14.9	58.8	128.2	
336	Transportation Equipment	2.8	11.2	1.8	37.9	0.2	53.9	61.3	88.0	
337	Furniture and Related Products	0.2	1.4	0.1	5.8	0.1	7.7	52.2	109.9	
339	Miscellaneous	0.0	2.1	0.3	7.8	0.0	10.2	60.2	96.8	
_	Total Manufacturing	198.6	374.2	268.6	590.4	81.4	1,513.2	50.7	388.0	

<sup>1</sup> Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

<sup>2</sup> The Standard Industrial Classification (SIC) system has been replaced by the North American Industry Classification System (NAICS).

<sup>3</sup> Carbon dioxide emitted from energy inputs used to produce electricity (including associated losses), derived by calculating the manufacturing subsector share of the electric power sector's total carbon dioxide emissions based upon the weighted share of electricity retail sales to (receipts by) the manufacturing subsector. Estimates presented here are based upon the electric power sector and differ from prior estimates that were based upon data for electric utilities only.

<sup>4</sup> Includes all other types of energy that respondents indicated were consumed or allocated, such as asphalt and road oil, lubricants, naphtha < 401° F, other oils >= 401° F, special naphthas, waxes, and miscellaneous nonfuel products, which are nonfuel products assigned to the petroleum refining industry group (NAICS 324110).

<sup>5</sup> Data are in million metric tons of carbon dioxide per quadrillion Btu of energy (including allocated electricity losses).

<sup>6</sup> Data are in metric tons of carbon dioxide per million (nominal) dollars.

(s)=Less than 0.05 million metric tons. Q=Data withheld because the relative standard error was greater than 50 percent.

Notes: • For prior surveys and the current Manufacturing Energy Consumption Survey, emissions are available classified under the 1987 Standard Industrial Classification System. See the Web Page. • The estimates are for the first use of energy for heat and power and as feedstocks or raw material inputs. First use is defined as the consumption of the energy that was originally produced offsite or was produced onstite from input materials not classified as energy. • Electricity was converted from point-of-use to primary electricity using Table A6 of this report. • See Table 2.2 for manufacturing energy use. • Totals may not equal sum of components due to independent rounding.

Web Page: For related information, see http://www.eia.doe.gov/emeu/mecs.

Sources: Energy Information Administration, Form EIA-846, "1998 Manufacturing Energy Consumption Survey," Form EIA-810, "Monthly Refinery Report" for 1998, and *Emissions of Greenhouse Gases in the United States 2002* (October 2003).

# Figure 12.5 Methane Emissions



<sup>1</sup> Methane emitted as a product of digestion in animals such as cattle, buffalo, sheep, goats, and camels.

Note: Because vertical scales differ, graphs should not be compared. Source: Table 12.5.

#### Table 12.5 Methane Emissions, 1980-2002

(Million Metric Tons of Methane)

	Energy Sources							ste Managem	ent		Agı	icultural Sour	ces			
Year	Coal Mining	Natural Gas Systems <sup>1</sup>	Petroleum Systems <sup>2</sup>	Mobile Com- bustion <sup>3</sup>	Stationary Com- bustion <sup>4</sup>	Total	Landfills	Waste- water Treatment	Total	Enteric Fermen- tation <sup>5</sup>	Animal Waste	Rice Cultivation	Crop Residue Burning	Total	Industrial Processes <sup>6</sup>	Total
1980	3.05	4.30	NA	0.28	0.81	8.44	9.85	<sup>R</sup> 0.53	<sup>R</sup> 10.38	5.47	3.03	0.48	0.04	9.02	0.13	<sup>R</sup> 27.98
1981	2.80	4.91	NA	0.27	0.82	8.80	10.07	<sup>R</sup> 0.53	<sup>R</sup> 10.60	5.56	2.88	0.54	<sup>R</sup> 0.05	9.03	0.14	<sup>R</sup> 28.57
1982	3.23	4.94	NA	0.27	0.88	9.31	10.21	<sup>R</sup> 0.54	<sup>R</sup> 10.75	5.50	2.78	0.47	<sup>R</sup> 0.05	<sup>R</sup> 8.80	0.10	<sup>R</sup> 28.95
1983	3.02	4.90	NA	0.27	0.86	9.05	10.41	<sup>R</sup> 0.54	<sup>R</sup> 10.95	5.46	2.84	0.31	0.03	8.64	0.11	<sup>R</sup> 28.75
1984	3.60	5.00	NA	<sup>R</sup> 0.27	0.86	9.73	10.55	<sup>R</sup> 0.55	<sup>R</sup> 11.10	5.33	2.76	0.40	0.04	<sup>R</sup> 8.54	0.11	<sup>R</sup> 29.48
1985	3.88	5.05	NA	0.26	0.84	10.03	10.67	<sup>R</sup> 0.55	<sup>R</sup> 11.22	5.27	2.76	0.36	<sup>R</sup> 0.05	8.43	0.11	<sup>R</sup> 29.79
1986	3.73	4.93	NA	0.26	0.82	9.74	10.69	<sup>R</sup> 0.56	<sup>R</sup> 11.25	5.13	2.70	0.34	0.04	<sup>R</sup> 8.21	0.10	<sup>R</sup> 29.30
1987	4.01	5.03	NA	0.25	0.80	10.09	10.92	<sup>R</sup> 0.56	<sup>R</sup> 11.49	5.08	2.74	0.33	0.04	<sup>R</sup> 8.20	0.11	<sup>R</sup> 29.89
1988	3.93	5.18	NA	0.25	0.83	10.19	10.98	<sup>R</sup> 0.57	<sup>R</sup> 11.55	5.10	2.76	0.41	0.03	8.30	0.12	<sup>R</sup> 30.16
1989	3.96	5.34	NA	0.25	0.86	10.41	_11.08	<sup>R</sup> 0.57	<sup>⊾</sup> 11.65	5.08	2.66	0.38	0.04	_8.16	0.12	<sup>R</sup> 30.35
1990	<sup>ĸ</sup> 4.25	5.60	1.30	0.25	0.56	<sup>k</sup> 11.96	<sup>K</sup> 11.01	<sup>r</sup> 0.58	<sup>k</sup> 11.59	5.22	<sup>k</sup> 1.93	0.40	<sup>K</sup> 0.05	₹7.60	0.12	531.27
1991	<sup>R</sup> 4.10	5.83	1.31	<sup>ĸ</sup> 0.24	0.59	<sup>K</sup> 12.06	<sup>™</sup> 10.86	<sup>K</sup> 0.58	<sup>R</sup> 11.44	<sup>™</sup> 5.19	<sup>R</sup> 2.19	0.40	0.04	₹7.81	0.11	™31.43
1992	<sup>^</sup> 4.05	5.89	1.27	0.24	0.62	<sup>^</sup> 12.07	<sup>►</sup> 10.77	°0.59	<sup>^</sup> 11.36	<sup>5.29</sup>	<sup>∿</sup> 2.21	0.45	<sup>^</sup> 0.05	<sup>^</sup> 8.01	0.12	<sup>^</sup> 31.55
1993	<sup>N</sup> 3.44	5.88	1.21	0.24	0.54	^11.30	<sup>►</sup> 10.58	<sup>N</sup> 0.60	<sup>k</sup> 11.18	~5.24	R2.26	0.41	0.04	►7.95	0.12	^30.55
1994	<sup>N</sup> 3.51	5.89	1.18	0.24	0.53	N11.35	*10.27 Bo o7	N0.60	R10.88	<sup>N</sup> 5.34	<sup>1</sup> 2.34	0.48	0.05	*8.21 Ro. co	0.13	R30.57
1995	N3.66	5.98	1.17	0.25	0.58	111.64 R44.40	*9.87 B0.07	10.61 Ro.04	10.48 <sup>80</sup>	**5.42 85.04	"2.35 Bo 04	0.44	0.04 Bo.05	<sup>11</sup> 8.26	0.13	**30.51 Roo oo
1996	R3.19	6.00	1.15	0.24	0.58	R11.16	<sup>N</sup> 9.37	R0.61	R9.98	N5.31	<sup>11</sup> 2.34	0.41	N0.05	N8.11	0.13	R29.39
1997	<sup></sup> 3.50	6.01	1.14	0.24	0.44	R11.33		<sup>11</sup> 0.62			"2.48 B2.54	0.45	<sup>11</sup> 0.05		0.13	<sup></sup> 29.05
1998	~3.28	6.02	1.11 B1.05	0.24	0.39	11.04		<sup>N</sup> 0.63		"0.11 Rc 11	"2.51 Bo.46	0.47	<sup>11</sup> 0.05 B0.05		0.13	
1999	3.12	0.19 Re 44	1.05	0.26	0.42	R11.02	87.91	B0.65	80.54	85.0C	R2.40	0.50	0.05		0.13	B27.81
2000	2.90 R2.96	R6 38	1.03	R0 24	0.44	R11.03	R7 58	R0.66	Rg 24	85.00	R2 40	R0 47	R0.05	R8 01	0.13	R27.40
2001 <sup>P</sup>	2.86	6.47	1.02	0.24	0.36	10.95	6.94	0.67	7.61	5.00	2.45	0.46	0.05	7.98	0.11	26.65

<sup>1</sup> Natural gas production, processing, and distribution.

<sup>2</sup> Petroleum production, refining, and distribution.

<sup>3</sup> Emissions from passenger cars, trucks, buses, motorcycles, and other transport.

<sup>4</sup> Consumption of coal, petroleum, natural gas, and wood for heat or electricity.

<sup>5</sup> Methane emitted as a product of digestion in animals such as cattle, buffalo, sheep, goats, and camels.

<sup>6</sup> Chemical production, and iron and steel production.

R=Revised. P=Preliminary. NA=Not available.

Notes: • Emissions are from anthropogenic sources. "Anthropogenic" means produced as the result of human activities, including emissions from agricultural activity and domestic livestock. Emissions from

natural sources, such as wetlands and wild animals, are not included. • Under certain conditions, methane may be produced via anaerobic decomposition of organic materials in landfills, animal wastes, and rice paddies. • Because of the continuing goal to improve estimation methods for greenhouse gases, data are frequently revised on an annual basis in keeping with the latest findings of the international scientific community. • Totals may not equal sum of components due to independent rounding.

Web Page: For related information, see http://www.eia.doe.gov/environment.html.

Sources: • 1980-1989—Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States*, annual reports and unpublished revisions. • 1990 forward—EIA, *Emissions of Greenhouse Gases in the United States 2002* (October 2003), Table 13.

# Figure 12.6 Nitrous Oxide Emissions



<sup>1</sup> Emissions from passenger cars and trucks; air, rail, and marine transportation; and farm and construction equipment.

Notes: Because vertical scales differ, graphs should not be compared. Source: Table 12.6.

<sup>2</sup> Consumption of coal, petroleum, natural gas, and wood for heat or electricity.

#### Table 12.6 Nitrous Oxide Emissions, 1980-2002

(Thousand Metric Tons of Nitrous Oxide)

		Energy Sources		w	aste Managemen	t		Agricult	tural Sources			
Year	Mobile Combustion <sup>1</sup>	Stationary Combustion <sup>2</sup>	Total	Waste Combustion	Human Sewage in Wastewater	Total	Nitrogen Fertilization of Soils	Crop Residue Burning	Solid Waste of Domesticated Animals	Total	Industrial Processes <sup>3</sup>	Total
1980	60	43	102	(s)	13	13	499	1	264	764	88	968
1981	63	42	105	(s)	13	13	515	2	266	782	85	985
1982	67	40	107	(s)	13	13	486	2	265	752	81	954
1983	71	41	112	(s)	14	14	441	1	264	706	80	912
1984	86	43	130	(s)	14	14	500	2	259	761	88	992
1985	98	43	141	(s)	15	15	619	2	251	871	89	1.116
1986	107	43	150	(s)	15	15	597	2	242	841	87	1,093
1987	120	44	164	1	15	16	582	1	237	821	91	1,092
1988	138	46	183	1	15	16	539	1	234	774	96	1,069
1989	146	46	192	1	15	16	586	2	228	816	99	1,123
1990	156	45	200	1	16	17	604	2	209	814	96	1,128
1991	165	44	209	1	16	17	609	2	211	821	99	1,146
1992	175	45	220	1	16	17	624	2	214	839	95	1,171
1993	180	46	226	1	16	17	613	1	216	831	100	1,174
1994	190	46	237	1	17	18	667	2	220	888	110	1,253
1995	200	47	247	1	17	18	601	2	222	825	111	1,200
1996	198	49	247	1	17	18	587	2	220	809	116	1,190
1997	201	49	250	1	17	18	604	2	216	822	74	1,164
1998	203	48	251	1	18	18	616	2	213	830	58	1,158
1999	221	49	270	1	18	19	613	2	211	826	58	1,173
2000	214	50	264	1	19	20	601	2	209	812	57	1,153
2001	215	49	263	1	19	20	598	2	208	807	47	1,138
2002 <sup>P</sup>	214	49	263	1	19	20	583	2	207	791	50	1,125

<sup>1</sup> Emissions from passenger cars and trucks; air, rail, and marine transportation; and farm and construction equipment.

<sup>2</sup> Consumption of coal, petroleum, natural gas, and wood for heat or electricity.

<sup>3</sup> Adipic acid production (primarily for the manufacture of nylon fibers and plastics), and nitric acid production (primarily for fertilizers).

P=Preliminary. (s)=Less than 0.5 thousand metric tons.

Notes: • Emissions are from anthropogenic sources. "Anthropogenic" means produced as the result of human activities, including emissions from agricultural activity and domestic livestock. Emissions from natural sources, such as wetlands and wild animals, are not included. • Under certain conditions, methane

may be produced via anaerobic decomposition of organic materials in landfills, animal wastes, and rice paddies. • Because of the continuing goal to improve estimation methods for greenhouse gases, data are frequently revised on an annual basis in keeping with the latest findings of the international scientific community. • Totals may not equal sum of components due to independent rounding.

Web Page: For related information, see http://www.eia.doe.gov/environment.html.

Sources: • 1980-1989—Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States*, annual reports. • 1990 forward—EIA, *Emissions of Greenhouse Gases in the United States 2002* (October 2003), Table 23.

**Emissions by Type of Generating Unit** 



<sup>1</sup> For carbon dioxide: municipal solid waste (only the estimated plastics component of municipal solid waste is included). For sulfur dioxide and nitrogen oxides: wood, black liquor, and other wood waste; municipal solid waste, sludge waste, tire-derived fuels, agricultural byproducts, other solids, other liquids, other gases, and all other.

<sup>2</sup> Carbon dioxide gas can be converted to units of carbon equivalent by multiplying by 12/44.

<sup>3</sup> Includes Commercial Sector.

(s)=Less than 0.05 million short tons.

Note: Because vertical scales differ, graphs should not be compared. Source: Table 12.7.

			Carbon Dioxide			Sulfur Dioxide					Nitrogen Oxides				
	Coal <sup>1</sup>	Petroleum <sup>2</sup>	Natural Gas <sup>3</sup> and Other Gases <sup>4</sup>	MSW 5	Total	Coal <sup>1</sup>	Petroleum <sup>2</sup>	Natural Gas <sup>3</sup> and Other Gases <sup>4</sup>	Other <sup>6</sup>	Total	Coal <sup>1</sup>	Petroleum <sup>2</sup>	Natural Gas <sup>3</sup> and Other Gases <sup>4</sup>	Other <sup>6</sup>	Total
Year		Million Met	ric Tons of Carbon D	ioxide <sup>7</sup>			Thousand	Short Tons of Sulfur	Dioxide			Thousand S	Short Tons of Nitroge	n Oxides	
							E	lectric Power Sector 8							
1989 1990 1991 1992 1993 1994 1995 1996 1997	1,505.6 1,517.0 1,516.6 1,535.6 1,603.1 1,609.6 1,629.2 1,718.5 1,763.8	129.6 98.4 92.1 76.5 87.3 81.9 58.1 63.2 72.0	164.5 171.1 174.4 180.6 204.1 221.8 197.9 211.1	1.1 1.5 1.9 2.2 2.2 2.4 2.5 2.4 2.5 2.4 2.6	1,800.8 1,788.0 1,785.0 1,794.9 1,874.2 1,898.0 1,911.6 1,982.0 2,049.5	15,211 15,080 14,935 14,695 14,426 13,925 11,598 12,238 12,630	846 678 680 615 809 735 560 597 649	2 1 1 1 1 7 2 1	7 10 12 9 10 9 8 8 8	16,066 15,769 15,629 15,320 15,246 14,670 12,173 12,845 13,289	6,788 6,640 6,609 6,526 6,724 6,512 5,525 5,763 5,763	217 167 123 139 124 131 130 140	407 397 390 371 376 406 504 439 417	27 39 44 51 50 51 53 53	7,439 7,243 7,200 7,068 7,290 7,092 6,211 6,385 6,385
1998 1999 2000 2001 <sup>P</sup>	1,792.6 1,799.8 1,891.4 1,833.4	102.2 94.9 89.1 99.6	240.1 251.2 271.5 279.1	2.5 2.5 2.4 2.7	2,137.4 2,148.4 2,254.4 2,214.8	12,452 11,805 10,736 NA	922 826 689 NA	1 16 2 NA	10 8 6 NA	13,385 12,655 11,433 NA	5,541 5,048 4,707 NA	219 198 169 NA	492 484 480 NA	56 56 57 NA	6,308 5,786 5,413 NA
								Industrial Sector 9							
1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 <sup>P</sup>	21.2 21.6 21.2 22.9 23.8 24.2 24.1 24.3 24.2 22.8 22.5 22.8 22.5 22.8 21.3	4.1 6.7 6.2 7.1 6.3 6.1 5.6 6.1 5.2 5.5 5.7 5.1 5.2	29.4 34.7 35.9 37.7 37.6 38.7 39.9 42.2 40.3 40.5 42.0 41.7 40.7	(S) 0.1 (S) (S) (S) (S) (S) (S) (S) (S) (S) (S)	54.7 63.1 63.3 67.7 67.7 69.0 69.6 72.6 69.7 68.8 70.2 69.6 67.2	271 285 274 296 309 299 297 301 274 252 185 198 NA	64 145 105 90 45 52 65 105 89 90 71 54 NA	(S) (S) (S) (S) (S) (S) (S) (S) (S) (S)	12 73 75 84 86 86 85 92 85 72 68 66 NA	347 503 454 470 440 437 447 498 448 448 414 324 318 NA	96 99 94 96 95 95 95 94 87 89 88 NA	8 13 11 12 11 12 11 11 11 10 11 13 9 NA	167 199 178 197 202 185 155 230 177 170 190 178 NA	24 30 24 25 24 26 27 24 23 23 23 22 NA	295 338 302 327 334 317 287 363 305 291 315 297 NA
								Total (All Sectors) <sup>10</sup>							
1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 <sup>P</sup>	$\begin{array}{c} 1,527.7\\ 1,539.4\\ 1,538.6\\ 1,559.3\\ 1,627.7\\ 1,634.6\\ 1,654.4\\ 1,744.1\\ 1,749.2\\ 1,816.3\\ 1,823.4\\ 1,915.4\\ 1,855.9\end{array}$	134.3 105.5 98.6 83.8 93.9 88.3 64.0 69.6 77.5 108.1 101.0 94.6 105.2	194.9 207.3 211.9 220.2 221.3 245.1 264.0 242.4 253.6 282.8 295.4 315.2 321.8	1.3 1.7 2.0 2.4 2.4 2.6 2.7 2.8 2.9 2.8 2.9 2.8 2.8 2.8 2.8 2.8 2.9 2.8 2.9 2.8 2.9 2.8 2.9 2.9	$\begin{array}{c} 1,858.1\\ 1,854.0\\ 1,851.1\\ 1,865.7\\ 1,945.3\\ 1,970.6\\ 1,985.2\\ 2,059.0\\ 2,123.3\\ 2,210.0\\ 2,222.5\\ 2,327.9\\ 2,285.8 \end{array}$	15,499 15,381 15,223 15,004 14,751 14,240 11,915 12,559 12,925 12,719 12,006 10,952 NA	914 825 786 705 855 788 627 703 740 1,014 898 744 NA	2 2 1 2 7 2 2 2 2 16 3 NA	20 83 94 96 95 93 101 95 82 76 72 NA	16,434 16,291 16,098 15,804 15,703 15,124 12,642 13,366 13,761 13,817 12,997 11,770 NA	6,888 6,740 6,623 6,824 6,612 5,625 5,864 5,875 5,632 5,142 4,799 NA	226 180 168 136 150 136 142 142 151 231 212 178 NA	576 601 572 571 583 596 665 675 599 667 678 661 NA	51 71 74 78 76 81 84 84 84 84 84 83 NA	7,741 7,591 7,513 7,405 7,636 7,421 6,513 6,765 6,708 6,613 6,116 5,722 NA

#### Table 12.7 Emissions From Energy Consumption for Electricity Generation, 1989-2001

Anthracite, bituminous coal, subbituminous coal, lignite, waste coal, and synthetic coal.

<sup>2</sup> Distillate fuel oil, residual fuel oil, petroleum coke, jet fuel, kerosene, other petroleum, and waste oil.

3 Natural gas, plus a small amount of supplemental gaseous fuels that cannot be identified separately. Blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels.
 Carbon dioxide data for "Other Gases" are not included in the data in Tables 12.1-12.3.

<sup>5</sup> Municipal solid waste (only the estimated plastics component of municipal solid waste is included). <sup>6</sup> Wood, black liquor, and other wood waste; municipal solid waste, sludge waste, tire-derived fuels, agricultural byproducts, other solids, other liquids, other gases, and all other.

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

<sup>8</sup> Electricity-only and combined-heat-and-power (CHP) plants within the NAICS (North American Industry Classification System) 22 category whose primary business is to sell electricity, or electricity and heat, to the Public. <sup>9</sup> Industrial combined-heat-and-power (CHP) and industrial electricity-only plants.

<sup>10</sup> Includes commercial combined-heat-and-power (CHP) and commercial electricity-only plants.

P=Preliminary. NA=Not available. (s)=Less than 0.05 million metric tons or less than 500 short tons.

Notes: • Data are for emissions from energy consumption for electricity generation; they exclude emissions from energy consumption for useful thermal output. • Data in this table are the same as in *Annual Energy Review 2002*, Table 12.7, "Emissions From Energy Consumption for Electricity and Useful Thermal Output at Electricity-Only and Combined-Heat-and-Power Plants, 1989-2001," which mistakenly excluded the emissions from energy consumption for useful thermal output. • See Note 2, "Classification of Power Plants Into Energy-Use Sectors," at end of Section 8.

Web Page: For related information, see http://www.eia.doe.gov/fuelelectric.html.

Sources: Carbon Dioxide: Data as of July 2, 2003, from Energy Information Administration (EIA), Form EIA-906, "Power Plant Report" and predecessor forms. Sulfur Dioxide and Nitrogen Oxides: Data as of July 2, 2003, from EIA, Form EIA-767, "Steam-Electric Plant Operation and Design Report." Data were adjusted by the Environmental Protection Agency's Continuous Emission Monitoring System.

### Figure 12.8 Installed Nameplate Capacity of Steam-Electric Generators With Environmental Equipment

#### By Fuel and Equipment Type, 2002



(s)=Less than 0.5 thousand megawatts.

<sup>1</sup> Through 2000, data are for electric utility plants with fossil-fueled steam-electric capacity of 100 megawatts or greater. Beginning in 2001, data are for electric utility and non-utility generating plants (independent power producers, commercial plants, and industrial plants) in operating or standby status, with fossil-fueled steam-electric capacity of 100 megawatts or greater. Notes: • Components are not additive because some generators are included in more than one category. • Because vertical scales differ, graphs should not be compared. Source: Table 12.8.

#### Table 12.8 Installed Nameplate Capacity of Steam-Electric Generators With Environmental Equipment, 1985-2002

(Megawatts)

		Co	bal			Petroleum an	d Natural Gas		Total			
Year	Particulate Collectors	Cooling Towers	Scrubbers	Total <sup>1</sup>	Particulate Collectors	Cooling Towers	Scrubbers	Total <sup>1</sup>	Particulate Collectors	Cooling Towers	Scrubbers	Total <sup>1</sup>
1985	302,056	120,591	56,955	304,706	36,054	28,895	65	62,371	338,110	149,486	57,020	367,078
1986	308,566	126,731	63,735	311,217	34,258	27,919	65	59,618	342,825	154,650	63,800	370,835
1987	311,043	127,875	65,688	312,885	33,431	27,912	65	58,783	344,474	155,786	65,753	371,668
1988	311,776	129,366	67,156	313,618	34,063	27,434	65	58,937	345,839	156,800	67,221	372,555
1989	313,680	131,701	67,469	315,521	33,975	28,386	65	59,736	347,655	160,087	67,534	375,257
1990	315,681	134,199	69,057	317,522	33,639	28,359	65	59,372	349,319	162,557	69,122	376,894
1991	319,046	135,565	70,474	319,110	33,864	29,067	260	59,773	352,910	164,632	70,734	378,883
1992	319,856	136,266	71,336	319,918	33,509	28,764	195	59,116	353,365	165,030	71,531	379,034
1993	318,188	135,885	71,106	318,251	32,620	28,922	0	58,580	350,808	164,807	71,106	376,831
1994	319,485	137,266	80,617	319,776	31,695	28,186	0	57,123	351,180	165,452	80,617	376,899
1995	320,685	138,108	84,677	320,749	30,513	27,187	0	54,942	351,198	165,295	84,677	375,691
1996	321,805	139,065	85,842	321,869	30,349	27,685	0	55,275	352,154	166,749	85,842	377,144
1997	320,646	138,120	86,605	320,710	31,422	28,766	0	56,485	352,068	166,886	86,605	377,195
1998	321,082	139,082	87,783	321,353	30,708	27,814	0	55,764	351,790	166,896	87,783	377,117
1999	324,109	146,377	89,666	331,379	29,371	29,142	0	55,812	353,480	175,520	89,666	387,192
2000	321,636	146,093	89,675	328,741	31,090	29,427	0	57,697	352,727	175,520	89,675	386,438
2001	<sup>R</sup> 329,187	<sup>R</sup> 154,747	<sup>R</sup> 97,804	<sup>R</sup> 329,187	<sup>R</sup> 31,575	<sup>R</sup> 34,649	<sup>R</sup> 184	<sup>R</sup> 61,634	<sup>R</sup> 360,762	<sup>R</sup> 189,396	<sup>R</sup> 97,988	<sup>R</sup> 390,821
2002 <sup>P</sup>	329,459	154,750	98,363	329,459	29,879	45,747	310	71,709	359,338	200,497	98,673	401,168

 $^{1}$  Components are not additive because some generators are included in more than one category. R=Revised. P=Preliminary.

with fossil-fueled steam-electric capacity of 100 megawatts or greater.

Web Page: For related information, see http://www.eia.doe.gov/fuelelectric.html.

Note: Through 2000, data are for electric utility plants with fossil-fueled steam-electric capacity of 100 megawatts or greater. Beginning in 2001, data are for electric utility and unregulated generating plants (independent power producers, commercial plants, and industrial plants) in operating or standby status,

Sources: • 1985-1990—Energy Information Administration (EIA), Form EIA-767, "Steam-Electric Plant Operation and Design Report." • 1991 forward—EIA, *Electric Power Annual 2002* (December 2003), Table 5.2, and EIA, Form EIA-767, "Steam-Electric Plant Operation and Design Report."