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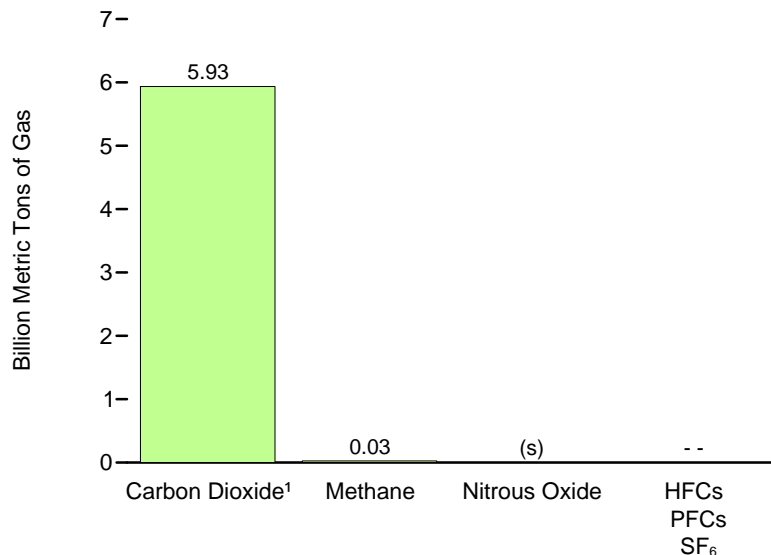
Environmental Indicators



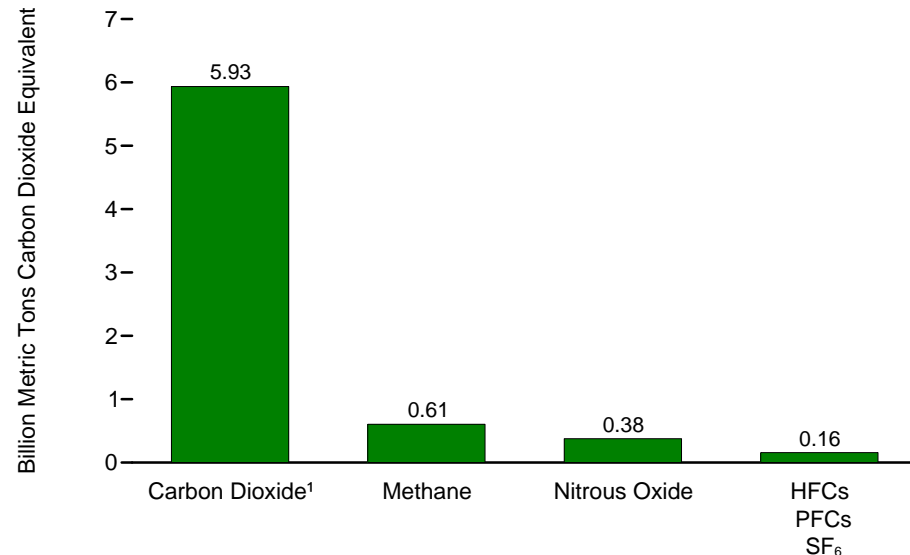
"Harpers Ferry, Junction of the Rivers Shenandoah and Potomac." Engraving by W. Goodacre and James Archer, published in *The History and Topography of the United States of North America*, by John Howard Hinton, 1852. From the collection of the National Park Service, Harpers Ferry National Historical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

Figure 12.1 Emissions of Greenhouse Gases

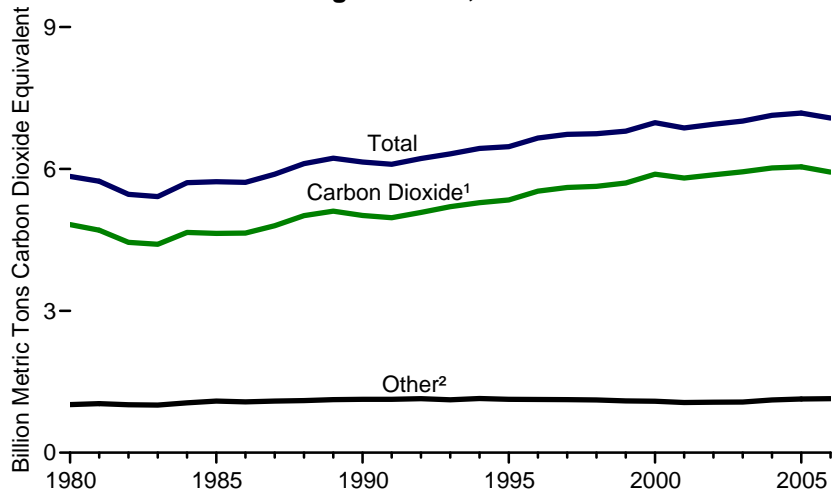
By Type of Gas, 2006



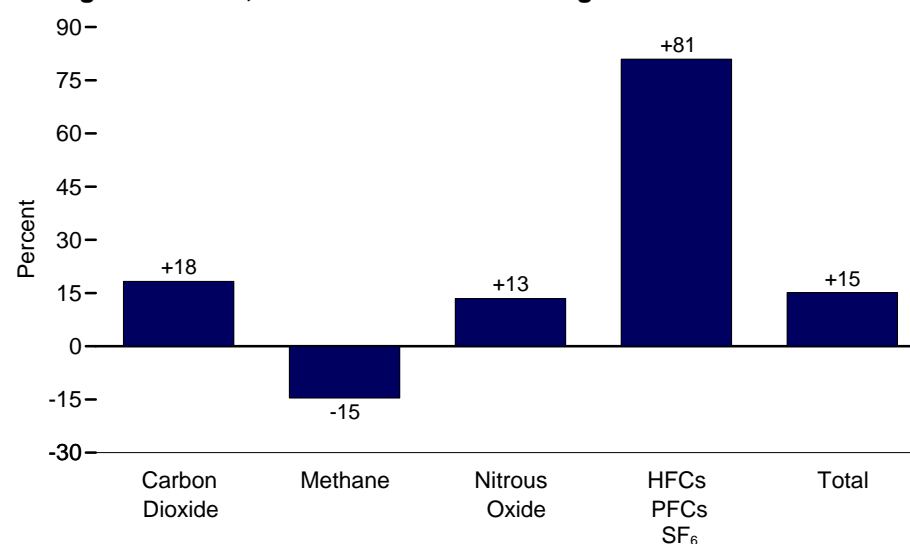
Based on Global Warming Potential, by Type of Gas, 2006



Based on Global Warming Potential, 1980-2006



Change 1990-2006, Based on Global Warming Potential



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

² Methane, nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

(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 SF₆=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, 1980-2006

Year	Greenhouse Gases				Greenhouse Gases, Based on Global Warming Potential ¹				
	Carbon Dioxide ^{2,3}	Methane	Nitrous Oxide	HFCs PFCs SF ₆	Carbon Dioxide ²	Methane	Nitrous Oxide	HFCs PFCs SF ₆	Total
	Million Metric Tons of Gas				Million Metric Tons Carbon Dioxide Equivalent ²				
1980	4,824.7	28.6	1.0	--	4,824.7	658.0	287.0	70.4	5,840.0
1981	4,704.3	29.2	1.0	--	4,704.3	671.1	292.0	74.0	5,741.3
1982	4,448.8	29.4	1.0	--	4,448.8	676.8	282.6	55.4	5,463.7
1983	4,408.0	29.1	.9	--	4,408.0	669.9	270.2	67.1	5,415.3
1984	4,655.8	29.8	1.0	--	4,655.8	684.5	294.0	75.5	5,709.9
1985	4,638.3	30.0	1.1	--	4,638.3	689.7	330.7	70.5	5,729.3
1986	4,642.5	29.4	1.1	--	4,642.5	676.5	323.8	75.0	5,717.8
1987	4,800.2	29.9	1.1	--	4,800.2	688.3	323.4	77.8	5,889.8
1988	5,012.6	30.1	1.1	--	5,012.6	692.0	316.9	91.3	6,112.8
1989	5,105.8	30.2	1.1	--	5,105.8	693.8	332.8	94.5	6,226.9
1990	^R 5,017.5	^R 30.8	1.1	--	^R 5,017.5	^R 708.4	^R 333.7	87.1	^R 6,146.7
1991	^R 4,969.4	^R 30.8	1.2	--	^R 4,969.4	^R 707.7	^R 342.9	79.0	^R 6,098.9
1992	^R 5,078.7	^R 30.9	1.2	--	^R 5,078.7	^R 709.7	^R 350.0	83.7	^R 6,222.1
1993	^R 5,203.0	^R 29.8	1.2	--	^R 5,203.0	^R 684.8	^R 349.5	82.9	^R 6,320.2
1994	^R 5,288.3	^R 29.8	1.3	--	^R 5,288.3	^R 685.6	^R 374.9	^R 85.3	^R 6,434.0
1995	^R 5,343.4	^R 29.4	1.2	--	^R 5,343.4	^R 675.9	^R 357.1	94.9	^R 6,471.2
1996	^R 5,531.0	^R 28.5	1.2	--	^R 5,531.0	^R 656.0	^R 357.6	110.6	^R 6,655.2
1997	^R 5,606.7	^R 28.5	1.2	--	^R 5,606.7	^R 654.6	^R 350.5	^R 118.0	^R 6,729.8
1998	^R 5,632.5	27.4	1.2	--	^R 5,632.5	^R 631.3	^R 347.9	^R 134.4	^R 6,746.1
1999	^R 5,703.1	26.8	1.2	--	^R 5,703.1	^R 615.8	^R 346.3	133.9	^R 6,799.1
2000	^R 5,890.5	^R 26.4	1.2	--	^R 5,890.5	^R 608.0	^R 341.9	138.0	^R 6,978.4
2001	^R 5,806.3	^R 25.8	1.1	--	^R 5,806.3	^R 593.9	^R 336.6	^R 128.6	^R 6,865.4
2002	^R 5,875.9	^R 26.0	1.1	--	^R 5,875.9	^R 598.6	^R 332.5	137.8	^R 6,944.9
2003	^R 5,940.4	26.2	1.1	--	^R 5,940.4	^R 603.7	^R 331.7	136.6	^R 7,012.4
2004	^R 6,019.9	^R 26.3	1.2	--	^R 6,019.9	^R 605.9	^R 358.3	^R 149.4	^R 7,133.5
2005	^R 6,045.0	^R 26.4	1.2	--	^R 6,045.0	^R 607.3	^R 368.0	^R 161.2	^R 7,181.4
2006 ^P	5,934.4	26.3	1.3	--	5,934.4	605.1	378.6	157.6	7,075.6

¹ Emissions of greenhouse gases are 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.

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

³ Carbon dioxide data in this table differ from those for the United States in Table 11.19 because data in this table exclude emissions from international bunker fuels consumption; include emissions from geothermal power generation, cement production and other industrial processes, and municipal solid waste combustion; and include 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 SF₆ = sulfur hexafluoride.

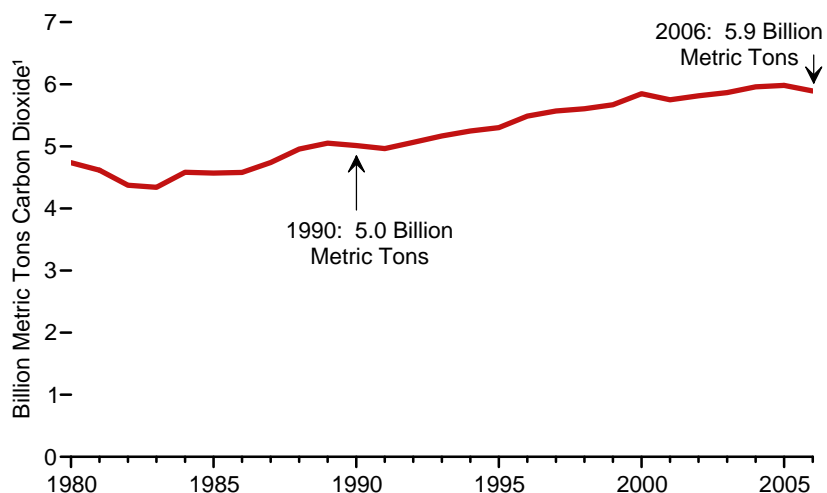
• Emissions are from anthropogenic sources. "Anthropogenic" means produced as the result of human activities, including emissions from agricultural activity and domestic livestock. Emissions from natural sources, such as wetlands and wild animals, are not included. • Because of the continuing goal to 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. • For information on units for measuring greenhouse gases, see http://www.eia.doe.gov/oiarf/1605/archive/gg06rpt/pdf/executive_summary.pdf, page 2, box titled "Units for Measuring Greenhouse Gases." • Totals may not equal sum of components due to independent rounding.

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

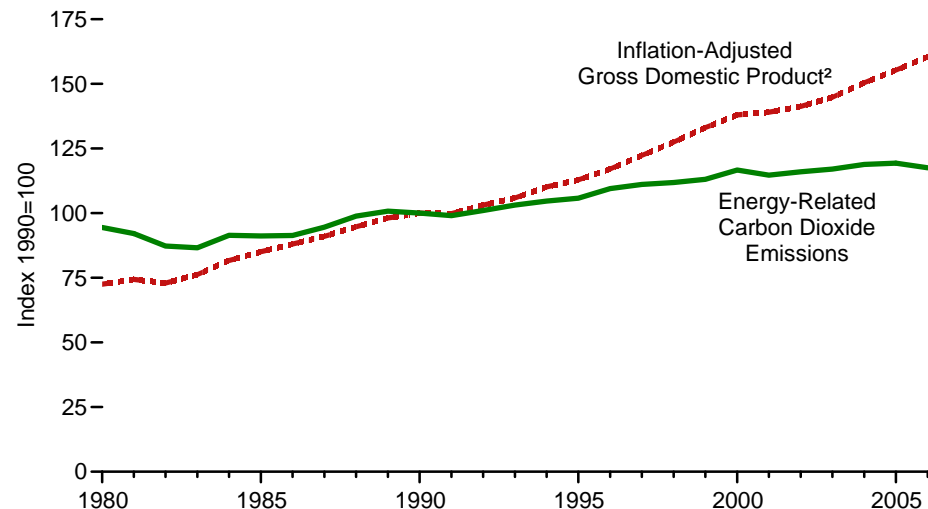
Sources: **1990, 1995, and 1999-2006:** Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 2006* (November 2007), Table 1. **All Other Data:** EIA, *Emissions of Greenhouse Gases in the United States*, annual reports and unpublished revisions.

Figure 12.2 Carbon Dioxide Emissions From Energy Consumption by Sector

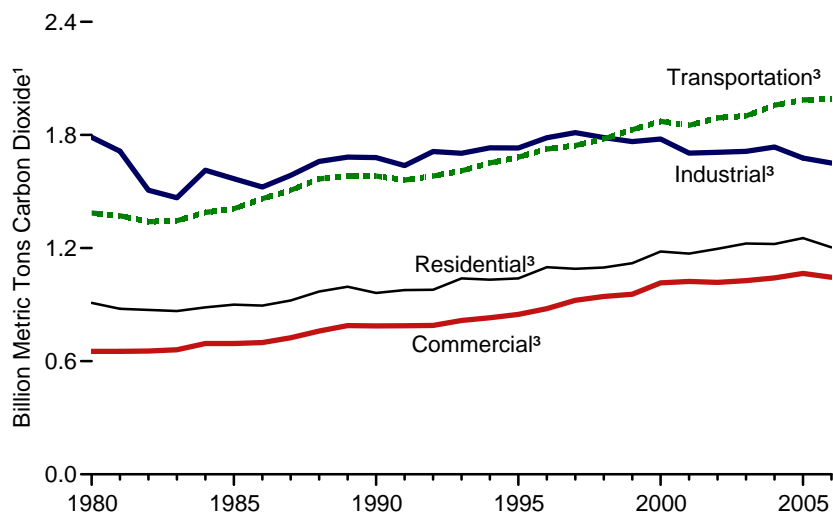
Total, 1980-2006



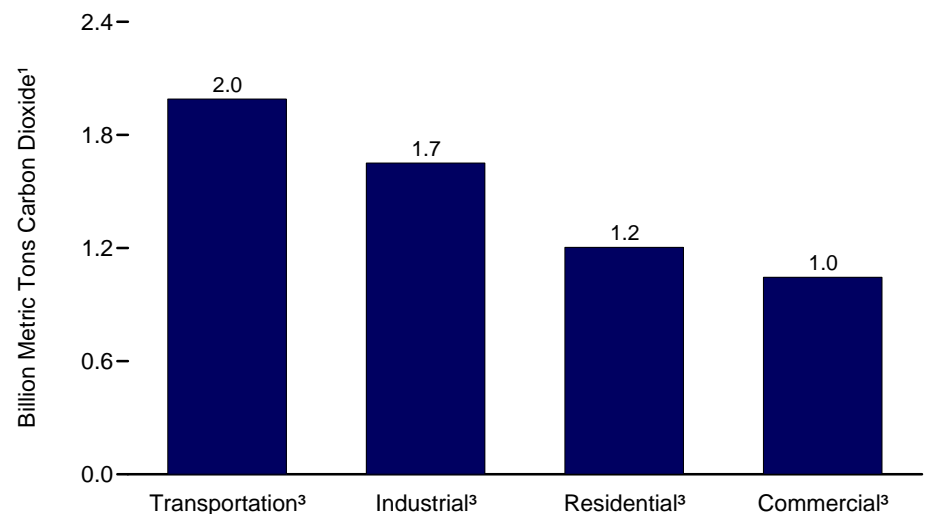
Economic Growth and Carbon Dioxide Emissions, 1980-2006



By End-Use Sector, 1980-2006



By End-Use Sector, 2006



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

² Based on chained (2000) dollars.

³ Electric power sector emissions are allocated to end-use sectors in proportion to each sector's share of total electricity retail sales (see Table 8.9).

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, 1980-2006

(Million Metric Tons of Carbon Dioxide ¹)

Year	End-Use Sectors								Electric Power Sector ⁴	
	Residential		Commercial ²		Industrial ³		Transportation		Primary ⁵	Total ⁷
	Primary ⁵	Total ⁶	Primary ⁵	Total ⁶	Primary ⁵	Total ⁶	Primary ⁵	Total ⁶		
1980	385.2	909.0	244.5	652.5	1,192.8	1,787.7	1,383.9	1,386.2	1,529.0	4,735.4
1981	360.8	877.8	225.8	652.2	1,123.3	1,714.2	1,369.4	1,371.7	1,536.7	4,616.0
1982	359.1	872.2	226.1	654.1	983.2	1,506.9	1,338.3	1,340.5	1,467.1	4,373.8
1983	340.4	866.4	225.7	660.5	923.2	1,466.7	1,343.0	1,345.3	1,506.5	4,338.8
1984	348.8	885.8	236.2	693.7	1,036.0	1,612.6	1,387.2	1,389.6	1,573.5	4,581.7
1985	351.4	899.7	217.9	694.0	990.0	1,567.6	1,406.3	1,408.9	1,604.6	4,570.3
1986	342.5	895.2	216.2	698.8	963.2	1,523.4	1,460.2	1,462.9	1,598.2	4,580.3
1987	345.8	921.9	220.0	724.6	1,004.3	1,585.6	1,504.4	1,506.9	1,664.5	4,738.9
1988	366.7	969.6	230.1	760.0	1,054.1	1,659.3	1,564.1	1,566.8	1,740.7	4,955.7
1989	371.6	994.8	229.9	788.5	1,045.4	1,682.3	1,581.5	1,584.3	1,821.4	5,049.8
1990	R341.6	R961.6	R225.0	R787.5	R1,045.4	R1,679.9	R1,579.4	R1,582.6	R1,820.2	R5,011.6
1991	R348.5	R977.1	R225.7	R788.4	R1,014.9	R1,637.7	R1,558.1	R1,561.3	R1,817.3	R4,964.5
1992	R358.4	R978.6	R226.8	R790.0	R1,067.6	R1,712.2	R1,579.0	R1,582.1	R1,831.2	R5,063.0
1993	R374.4	R1,039.2	R224.5	R815.8	R1,049.5	R1,702.6	R1,607.4	R1,610.6	R1,912.3	R5,168.2
1994	R365.8	R1,032.2	R226.9	R830.3	R1,065.6	R1,731.7	R1,648.5	R1,651.8	R1,939.2	R5,246.0
1995	R362.8	R1,039.2	R230.0	R848.4	R1,073.8	R1,730.9	R1,679.0	R1,682.2	R1,955.0	R5,300.6
1996	R391.2	R1,098.4	R238.6	R879.0	R1,109.5	R1,784.8	R1,722.2	R1,725.4	R2,026.1	R5,487.6
1997	R372.8	R1,089.7	R238.8	R922.9	R1,120.6	R1,812.4	R1,740.9	R1,744.2	R2,096.0	R5,569.1
1998	R340.3	R1,096.9	R221.8	R943.5	R1,082.5	R1,786.2	R1,776.2	R1,779.5	R2,185.3	R5,606.1
1999	R360.9	R1,120.0	R223.6	R955.5	R1,063.1	R1,764.8	R1,824.9	R1,828.3	R2,196.3	R5,668.6
2000	R379.7	R1,181.5	R235.5	R1,015.1	R1,062.4	R1,778.1	R1,868.9	R1,872.6	R2,300.7	R5,847.2
2001	R368.1	R1,171.1	R227.0	R1,023.3	R1,045.6	R1,703.8	R1,847.3	R1,851.0	R2,261.1	R5,749.1
2002	R367.2	R1,196.2	R228.5	R1,018.1	R1,059.1	R1,707.8	R1,887.2	R1,890.9	R2,270.9	R5,813.0
2003	R385.1	R1,224.1	R238.4	R1,027.1	R1,046.4	R1,712.8	R1,896.8	R1,901.4	R2,298.8	R5,865.5
2004	R371.7	R1,221.5	234.2	R1,041.6	R1,066.6	R1,735.7	R1,953.9	R1,958.6	R2,331.0	R5,957.4
2005	R362.9	R1,253.0	R230.5	R1,065.4	R1,009.8	R1,677.1	R1,981.2	R1,986.2	R2,397.1	R5,981.6
2006 ^P	338.2	1,204.2	213.3	1,045.2	1,010.1	1,650.8	1,984.9	1,990.1	2,343.9	5,890.3

¹ 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.

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

⁴ 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.

⁵ 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.

⁶ 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 (see Table 8.9).

⁷ 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.

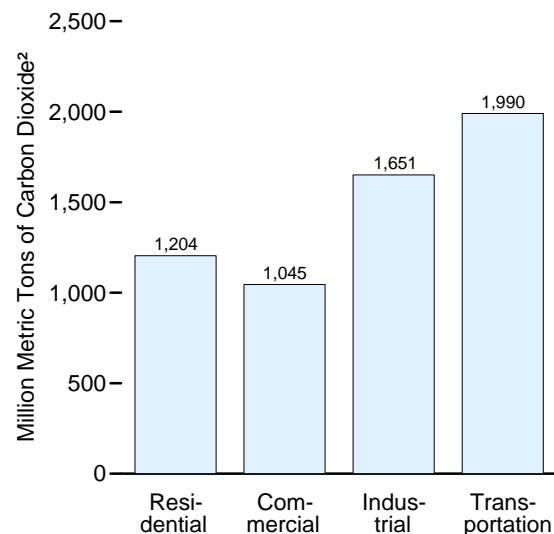
• Totals may not equal sum of components due to independent rounding.

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

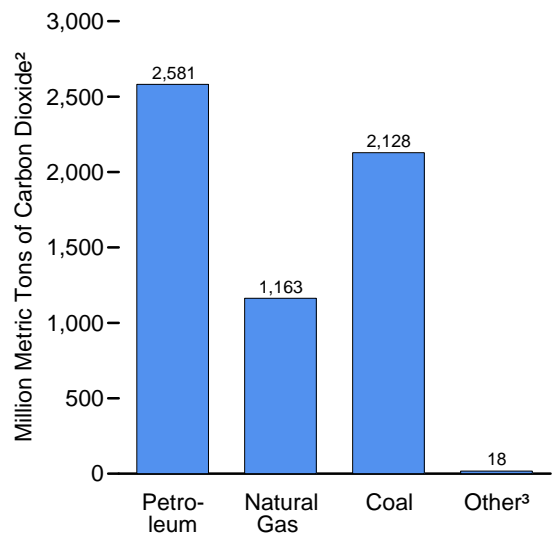
Sources: **1990, 1995, and 1999-2006:** Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 2006* (November 2007), Tables 5-9. **All Other Data:** EIA, *Emissions of Greenhouse Gases in the United States*, annual reports and unpublished revisions.

Figure 12.3 Carbon Dioxide Emissions From Energy Consumption by Sector by Energy Source, 2006

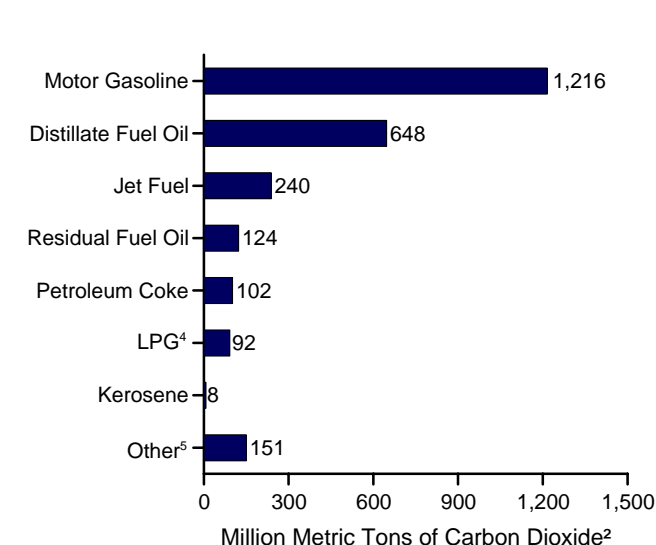
By End-Use Sector¹



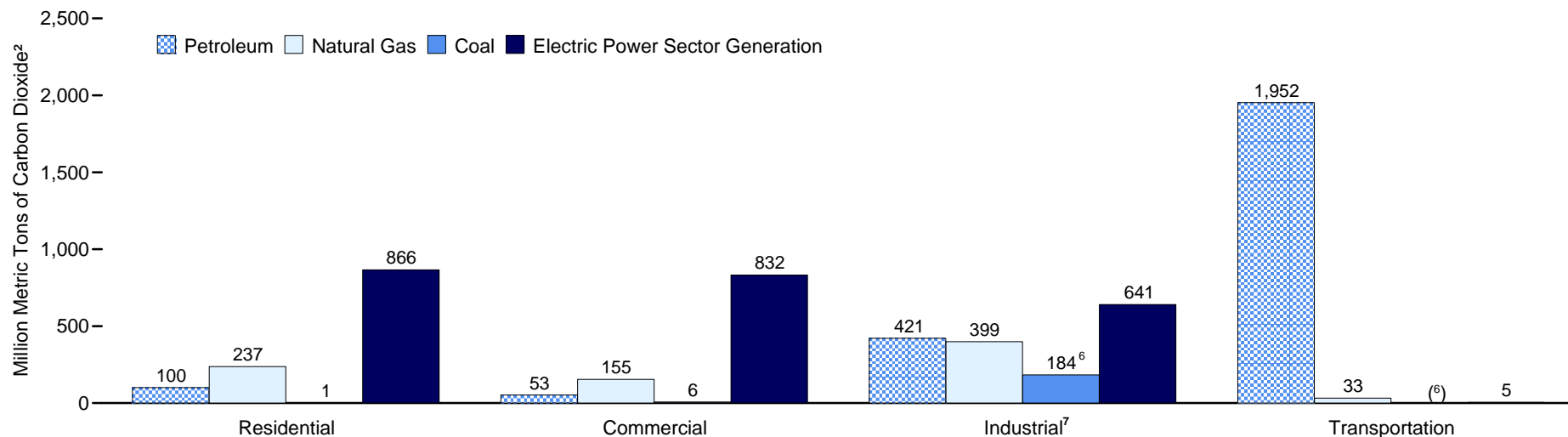
Total by Fuel



By Petroleum Product



By End-Use Sector¹ and Source



¹ 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 (see Table 8.9).

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

³ Coal coke net imports, the plastics component of municipal solid waste, and geothermal.

⁴ Liquefied petroleum gases.

⁵ Aviation gasoline, lubricants, and other products.

⁶ Small amounts of coal consumed for transportation are reported as industrial consumption.

⁷ The industrial sector also includes 4 million metric tons of coal coke net imports.

Note: Because scales differ, graphs should not be compared

Source: Table 12.3.

Table 12.3 Carbon Dioxide Emissions From Energy Consumption by Sector by Energy Source, 2006

(Million Metric Tons of Carbon Dioxide ¹)

Energy Source	End-Use Sectors					Electric Power Sector ⁴	Total
	Residential	Commercial ²	Industrial ³	Transportation	Total		
Petroleum	100.3	52.6	421.4	1,952.4	2,526.6	54.5	2,581.2
Aviation Gasoline	--	--	--	2.3	2.3	--	2.3
Distillate Fuel Oil	63.6	33.3	93.4	452.2	642.5	5.4	647.9
Jet Fuel	--	--	--	239.5	239.5	--	239.5
Kerosene	5.1	1.2	1.7	--	8.0	--	8.0
Liquefied Petroleum Gases	31.6	5.6	54.1	1.1	92.4	--	92.4
Lubricants	--	--	--	⁵ 5.5	5.5	--	5.5
Motor Gasoline	--	3.5	26.7	1,186.2	1,216.4	--	1,216.4
Petroleum Coke	--	--	81.9	--	81.9	20.5	102.4
Residual Fuel Oil	--	8.9	20.3	65.6	94.8	28.7	123.5
Other	--	--	143.3	--	143.3	--	143.3
Natural Gas	237.3	154.6	399.2	32.5	823.6	339.5	1,163.1
Coal	0.6	6.2	⁶ 183.8	(⁶)	190.5	1,937.9	2,128.4
Coal Coke Net Imports	--	--	5.7	--	5.7	--	5.7
Municipal Solid Waste ⁷	--	--	--	--	--	11.5	11.5
Geothermal	--	--	--	--	--	0.4	0.4
Primary	338.2	213.3	1,010.1	1,984.9	3,546.4	2,343.9	5,890.3
Electric Power Sector Generation ⁸	866.0	831.9	640.7	5.2	2,343.9	--	--
Total	1,204.2	1,045.2	1,650.8	1,990.1	5,890.3	--	5,890.3

¹ 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.

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

⁴ 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.

⁵ Includes emissions from nonfuel use of lubricants.

⁶ Small amounts of coal consumed for transportation are reported as industrial sector consumption.

⁷ The plastics component of municipal solid waste.

⁸ 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 Table 8.9).

-- = Not applicable.

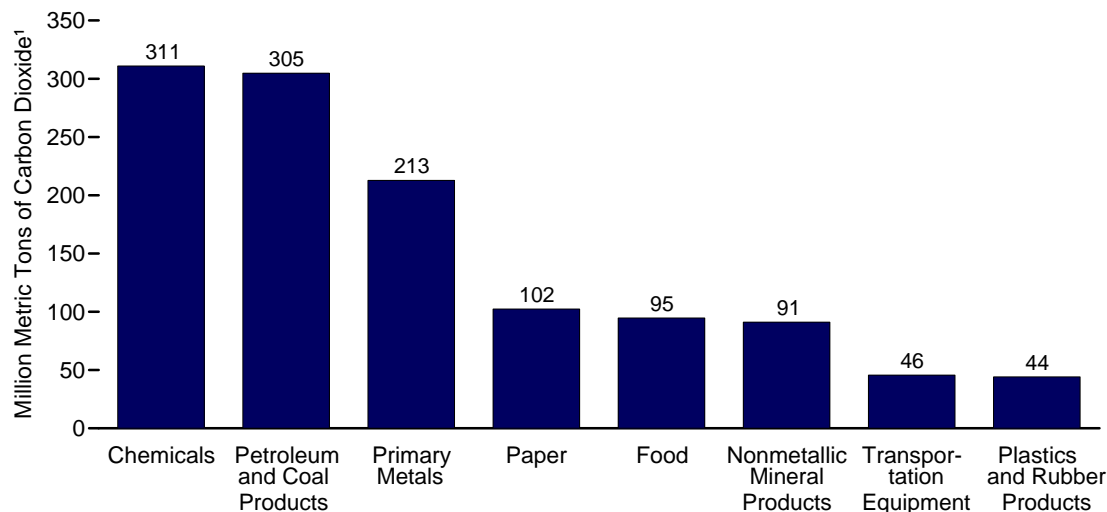
Notes: • Data are preliminary estimates. • Emissions from blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels are counted under their primary energy source—i.e., petroleum, natural gas, or coal. • See Note 2, "Classification of Power Plants Into Energy-Use 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>.

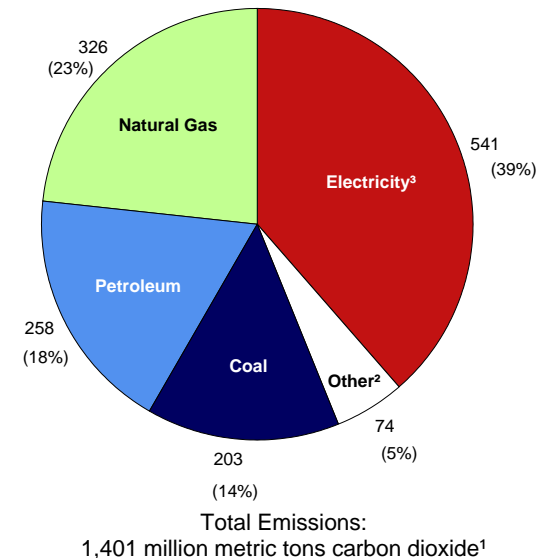
Source: Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2006* (November 2007), Tables 5-9.

Figure 12.4 Carbon Dioxide Emissions From Consumption of Energy for All Purposes in the Manufacturing Sector, 2002

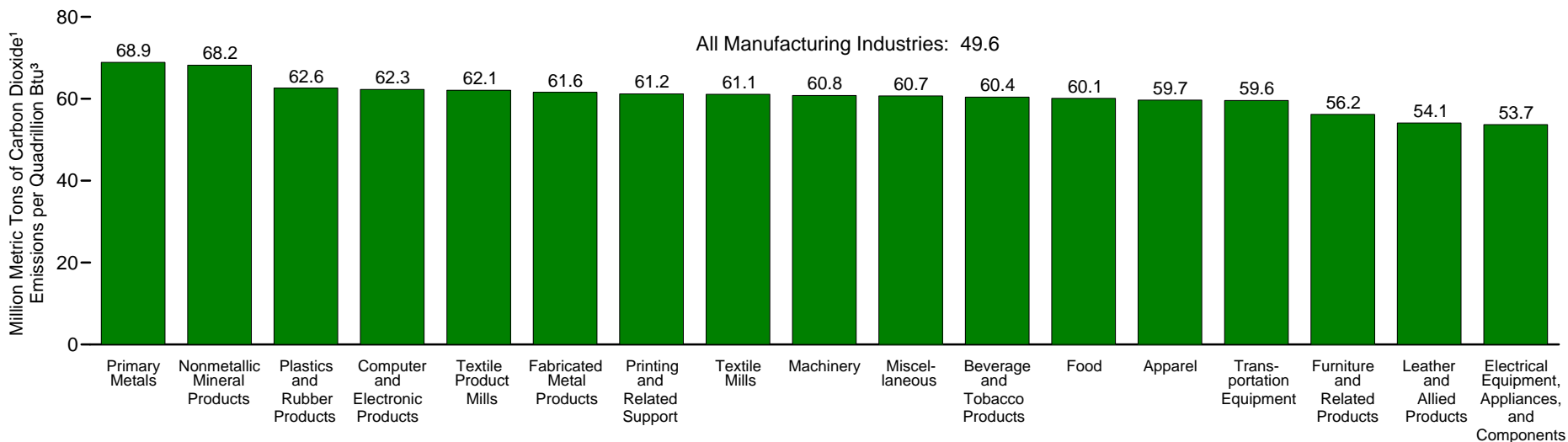
Carbon Dioxide Emissions by Top Industry Groups



Carbon Dioxide Emissions by Energy Source



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



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

² All other types of energy that respondents indicated were consumed or allocated.

³ From energy inputs used to produce electricity, including associated losses. Source: Table 12.4.

Table 12.4 Carbon Dioxide Emissions From Consumption of Energy for All Purposes in the Manufacturing Sector, 2002

(Million Metric Tons of Carbon Dioxide,¹ Except as Noted)

NAICS ² Code	Major Group	Carbon Dioxide Emissions					Carbon Dioxide Emissions per Unit of Primary Consumption ⁵	Carbon Dioxide Emissions per Chained Dollar of Shipments ⁶	
		Coal	Natural Gas	Petroleum	Electricity ³	Other ⁴			Total
311	Food	17.3	30.7	2.9	43.8	0.1	94.7	60.1	215.2
312	Beverage and Tobacco Products	1.6	2.4	0.4	4.9	(s)	9.4	60.4	93.1
313	Textile Mills	2.1	4.0	0.6	16.4	0.0	23.0	61.1	518.3
314	Textile Product Mills	0.7	1.5	0.3	3.2	0.0	5.8	62.1	170.7
315	Apparel	0.0	0.8	0.1	2.3	0.0	3.2	59.7	59.3
316	Leather and Allied Products	0.0	0.2	0.0	0.4	0.0	0.6	54.1	59.1
321	Wood Products	0.1	3.0	1.2	13.7	0.4	18.4	35.6	205.7
322	Paper	22.5	26.6	10.0	42.4	0.8	102.4	36.6	661.3
323	Printing and Related Support	0.0	2.4	0.1	9.5	0.0	12.0	61.2	125.9
324	Petroleum and Coal Products	19.3	46.4	153.9	24.6	60.8	304.8	43.2	1,301.1
325	Chemicals	32.8	106.2	70.2	99.4	2.4	311.0	41.5	738.1
326	Plastics and Rubber Products	2.1	6.8	0.9	34.5	(s)	44.2	62.6	249.4
327	Nonmetallic Mineral Products	30.1	22.3	11.4	26.8	0.4	91.1	68.2	1,046.0
331	Primary Metals	72.4	37.2	2.4	93.8	7.0	212.8	68.9	1,511.1
332	Fabricated Metal Products	0.8	11.1	0.9	30.6	0.0	43.4	61.6	173.4
333	Machinery	0.1	4.3	0.4	16.0	(s)	20.8	60.8	82.3
334	Computer and Electronic Products	0.0	3.4	0.2	24.9	(s)	28.5	62.3	59.9
335	Electrical Equipment, Appliances, and Components	0.0	2.8	0.1	8.9	2.3	14.2	53.7	135.3
336	Transportation Equipment	1.0	10.7	1.2	32.7	0.1	45.7	59.6	74.1
337	Furniture and Related Products	0.1	1.3	0.1	4.6	0.1	6.3	56.2	91.5
339	Miscellaneous	0.0	1.7	0.1	6.7	0.0	8.5	60.7	71.7
—	Total Manufacturing	202.8	325.9	257.6	540.7	74.2	1,401.2	49.6	352.7

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

² North American Industry Classification System (NAICS).

³ 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.

⁴ 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).

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

⁶ Data are in metric tons of carbon dioxide per million chained (2000) dollars.

(s)=Less than 0.05 million metric tons.

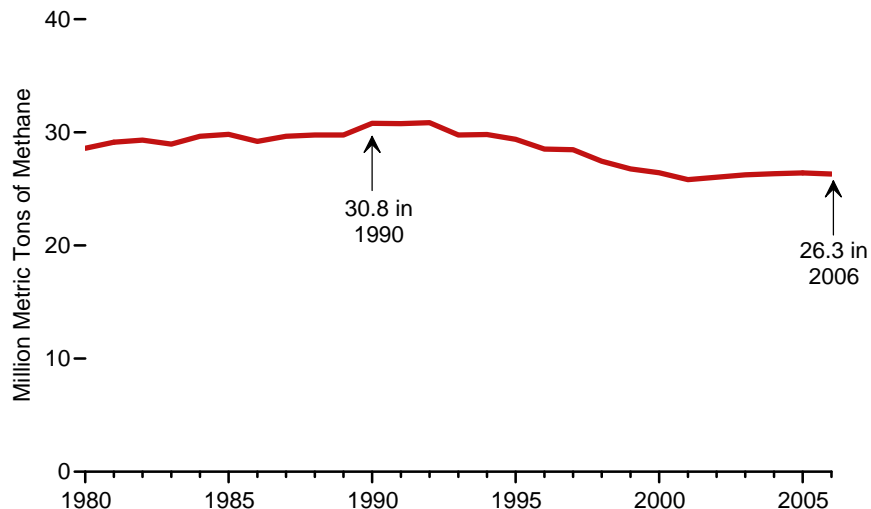
Notes: • Data are estimates for the first use of energy for heat and power and as feedstocks or raw material inputs. "First use" is the consumption of energy that was originally produced offsite or was produced onsite from input materials not classified as energy. Minor revisions to the 2002 Manufacturing Energy Consumption Survey (MECS) consumption data have been made since the estimates in this table have been computed. The revisions would likely not have a discernible effect on the estimates shown. • 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>.

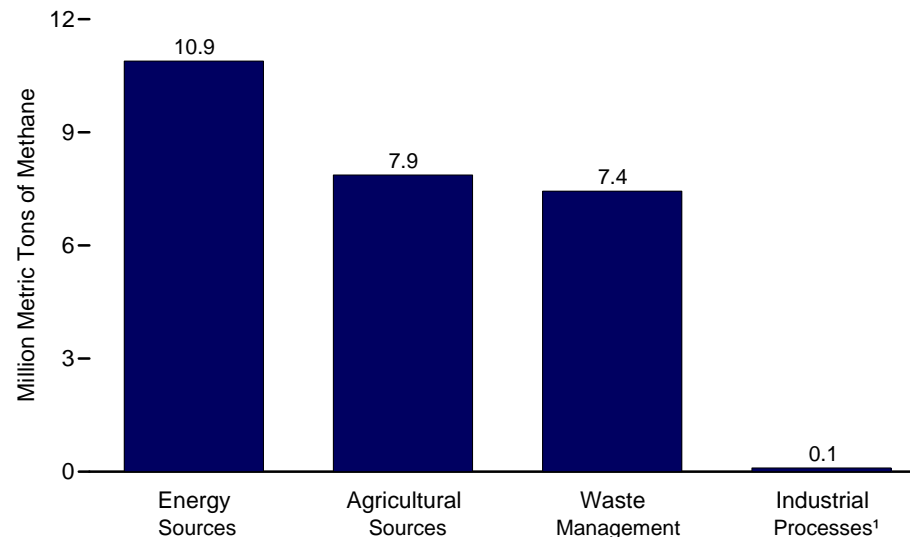
Sources: Energy Information Administration, Form EIA-846, "2002 Manufacturing Energy Consumption Survey," Form EIA-810, "Monthly Refinery Report" (for 2002), and *Documentation for Emissions of Greenhouse Gases in the United States 2003* (May 2005).

Figure 12.5 Methane Emissions

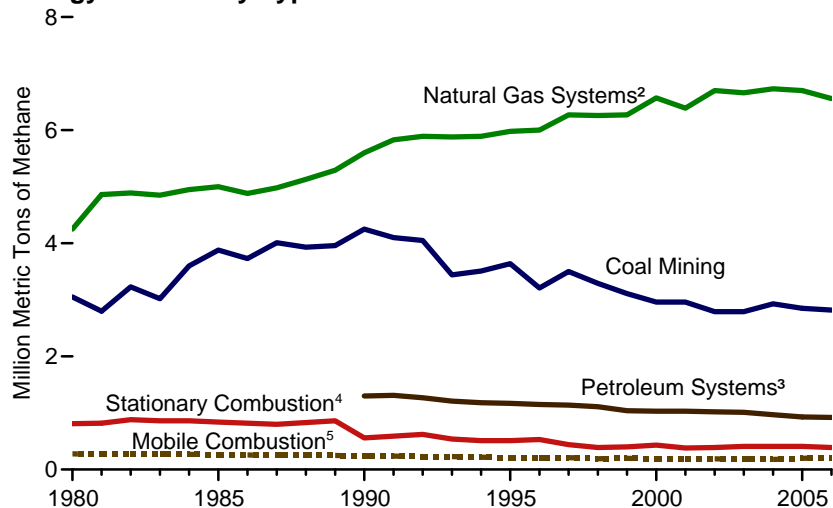
Total, 1980-2006



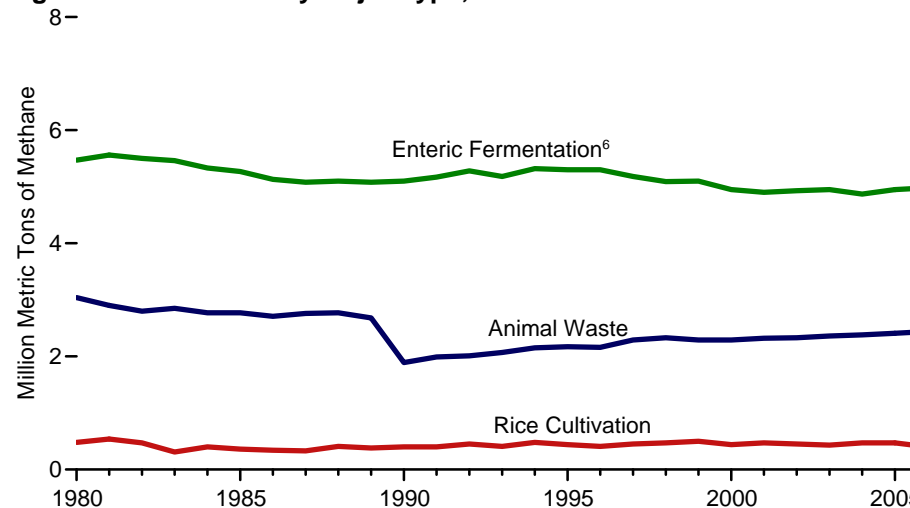
By Source, 2006



Energy Sources by Type 1980-2006



Agricultural Sources by Major Type, 1980-2006



¹ Chemical production, and iron and steel production.

² Natural gas production, processing, and distribution.

³ Petroleum production, refining, and distribution.

⁴ Consumption of coal, petroleum, natural gas, and wood for heat or electricity.

⁵ Emissions from passenger cars, trucks, buses, motorcycles, and other transport.

⁶ 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, 1980-2006
(Million Metric Tons of Methane)

Year	Energy Sources						Waste Management			Agricultural Sources					Industrial Processes ⁹	Total ⁵
	Coal Mining	Natural Gas Systems ¹	Petroleum Systems ²	Mobile Combustion ³	Stationary Combustion ⁴	Total ⁵	Landfills	Waste-water Treatment ⁶	Total ⁵	Enteric Fermentation ⁷	Animal Waste ⁸	Rice Cultivation	Crop Residue Burning	Total ⁵		
1980	3.05	4.25	NA	0.28	0.81	8.39	R10.50	R0.52	R11.02	5.47	3.04	0.48	0.04	9.04	0.13	R28.59
1981	2.80	4.86	NA	.27	.82	8.75	R10.67	.53	R11.20	5.56	2.90	.54	.05	9.05	.14	R29.13
1982	3.23	4.89	NA	.27	.88	9.26	R10.61	.54	R11.15	5.50	2.80	.47	.05	8.81	.10	R29.32
1983	3.02	4.85	NA	.27	.86	9.00	R10.65	.54	R11.19	5.46	2.85	.31	.03	8.66	.11	R28.96
1984	3.60	4.95	NA	.27	.86	9.68	R10.66	R.66	R11.32	5.33	2.77	.40	.04	8.55	.11	R29.66
1985	3.88	5.00	NA	.26	.84	9.98	R10.63	R.67	R11.30	5.27	2.77	.36	.05	8.45	.11	R29.83
1986	3.73	4.88	NA	.26	.82	9.69	R10.51	R.68	R11.18	5.13	2.71	.34	.04	8.22	.10	R29.20
1987	4.01	4.98	NA	.25	.80	10.04	R10.61	R.68	R11.29	5.08	2.76	.33	.04	8.21	.11	R29.65
1988	3.93	5.13	NA	.25	.83	10.14	R10.49	R.69	R11.18	5.10	2.77	.41	.03	8.31	.12	R29.76
1989	3.96	5.29	NA	.25	.86	10.36	R10.41	R.70	R11.11	5.08	2.68	.38	.04	8.18	.12	R29.77
1990	4.25	5.60	1.30	.24	.56	11.96	R10.40	R.89	R11.29	R5.10	1.89	.40	.04	R7.44	.12	R30.80
1991	4.10	5.83	1.31	.24	.59	12.06	R10.11	R.90	R11.01	5.17	1.99	.40	.04	7.59	.11	R30.77
1992	4.05	5.89	1.27	.23	.62	12.05	R9.97	R.92	R10.90	5.28	2.01	.45	.05	7.79	.12	R30.86
1993	3.44	5.88	1.21	.23	.54	11.29	R9.73	R.93	R10.66	5.18	2.07	.41	.04	7.70	.12	R29.77
1994	3.51	5.89	1.18	.22	.51	11.32	R9.41	R.95	R10.36	5.32	2.15	.48	.05	8.00	.13	R29.81
1995	3.64	5.98	1.17	.21	.51	R11.51	R8.82	R.97	R9.79	R5.30	2.17	.44	.04	R7.95	.13	R29.39
1996	3.21	6.00	1.15	.21	.53	11.10	R8.39	R.98	R9.37	5.30	2.16	.41	.05	7.92	.13	R28.52
1997	3.50	6.27	1.14	.21	.44	R11.56	R7.80	R.99	R8.80	5.18	2.29	.45	.05	7.97	.13	R28.46
1998	3.29	6.26	1.11	R.19	.39	11.24	R7.14	R1.00	R8.14	5.09	2.33	.47	.05	7.94	.13	R27.45
1999	3.11	6.27	1.04	.20	R.40	R11.02	R6.67	R1.02	R7.69	5.10	2.29	.50	.05	7.94	.13	R26.77
2000	2.96	6.57	1.03	R.19	.43	R11.18	R6.36	R1.02	R7.38	R4.95	2.29	.44	.05	R7.74	.13	R26.43
2001	2.96	6.39	1.03	R.19	.38	10.95	R6.01	R1.02	R7.03	R4.90	2.32	.47	.05	R7.74	.11	R25.82
2002	2.79	6.70	1.02	.19	.39	R11.08	R6.05	R1.03	R7.08	R4.93	2.33	.45	.05	R7.76	R.12	R26.03
2003	2.79	6.66	1.01	.18	.41	R11.04	R6.28	R1.03	R7.31	R4.95	2.36	.43	.05	R7.78	R.12	R26.25
2004	2.93	6.73	.97	R.18	.41	11.23	R6.18	R1.04	R7.22	R4.87	2.38	.47	.06	R7.78	.12	R26.34
2005	2.85	6.70	R.93	.20	R.41	R11.09	R6.27	R1.04	R7.32	R4.95	2.41	.47	.05	R7.89	.11	R26.41
2006 ^P	2.82	6.56	.92	.21	.39	10.89	6.38	1.06	7.44	4.98	2.44	.40	.05	7.87	.10	26.31

¹ Natural gas production, processing, and distribution; processing is not included in 1980 and is incompletely covered in 1981-1989.

² Petroleum production, refining, and distribution.

³ Emissions from passenger cars, trucks, buses, motorcycles, and other transport.

⁴ Consumption of coal, petroleum, natural gas, and wood for heat or electricity.

⁵ See notes on components for specific coverage, which is inconsistent prior to 1990 in some cases.

⁶ 1980-1984, domestic wastewater only; 1985 forward, industrial and domestic wastewater.

⁷ Methane emitted as a product of digestion in animals such as cattle, buffalo, sheep, goats, and camels.

⁸ Estimation methods for 1990 forward reflect a shift in waste management away from liquid systems to dry-lot systems, thus lowering emissions.

⁹ Chemical production, and iron and steel production.

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

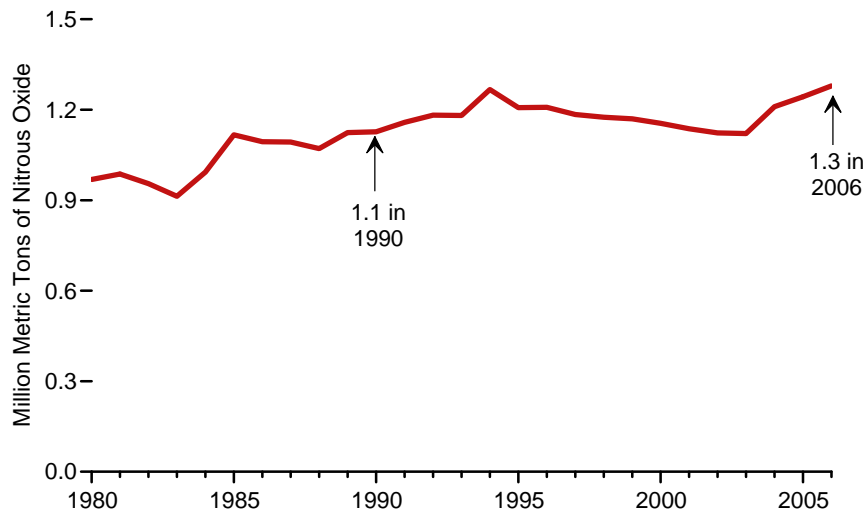
Notes: • Emissions are from anthropogenic sources. "Anthropogenic" means produced as the result of human activities, including emissions from agricultural activity and domestic livestock. Emissions from natural sources, such as wetlands and wild animals, are not included. • Under certain conditions, 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. • For information on units for measuring greenhouse gases, see http://www.eia.doe.gov/oiaf/1605/archive/gg06rpt/pdf/executive_summary.pdf, page 2, box titled "Units for Measuring Greenhouse Gases." • Totals may not equal sum of components due to independent rounding.

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

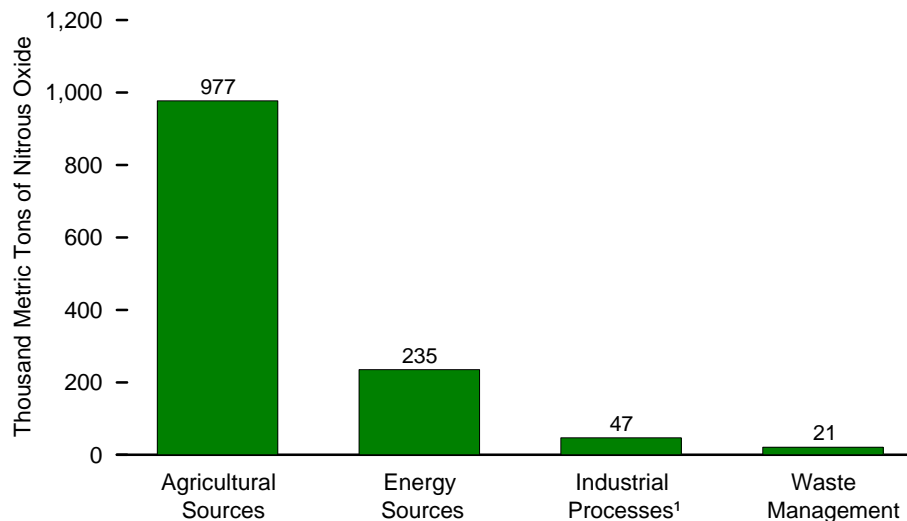
Sources: Energy Information Administration, *Emissions of Greenhouse Gases in the United States*, annual reports and unpublished revisions.

Figure 12.6 Nitrous Oxide Emissions

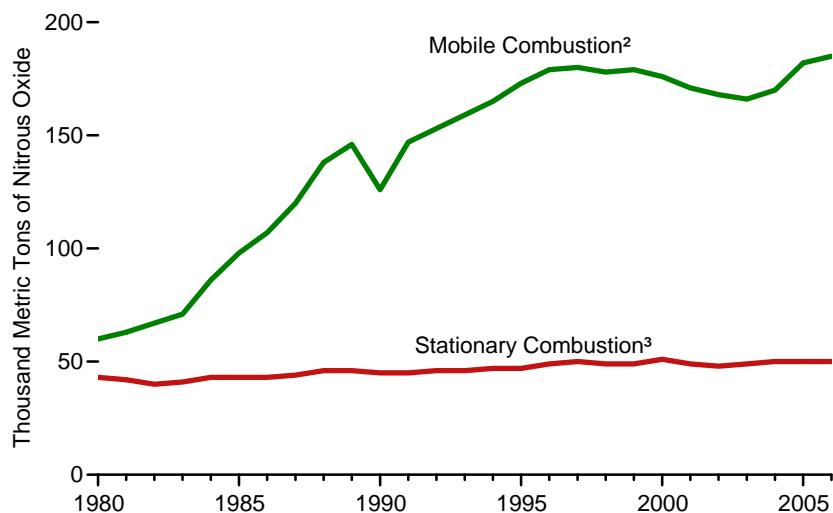
Total, 1980-2006



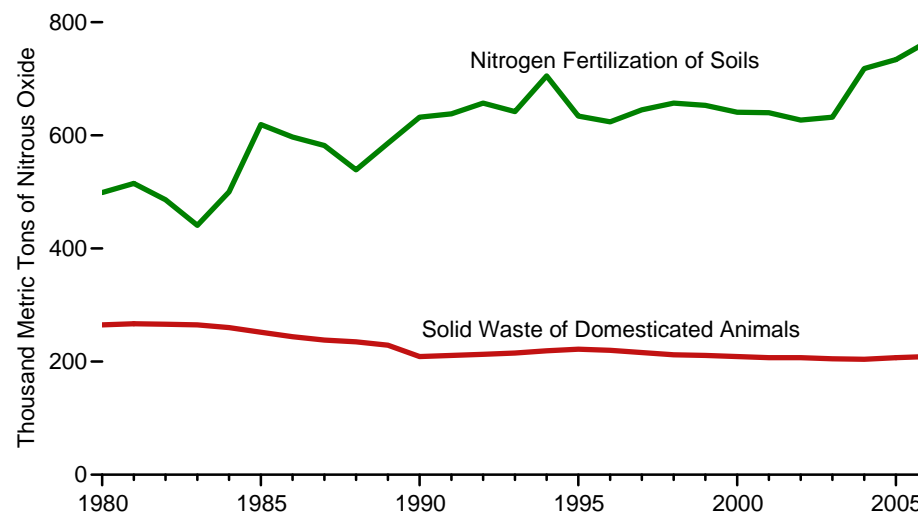
By Source, 2006



Energy Sources by Type, 1980-2006



Agricultural Sources by Major Type, 1980-2006



¹ Adipic acid production (primarily for the manufacture of nylon fibers and plastics) and nitric acid production (primarily for fertilizers).

² Emissions from passenger cars and trucks; air, rail, and marine transportation; and farm and construction equipment.

³ Consumption of coal, petroleum, natural gas, and wood for heat or electricity.

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

Table 12.6 Nitrous Oxide Emissions, 1980-2006
(Thousand Metric Tons of Nitrous Oxide)

Year	Energy Sources			Waste Management			Agricultural Sources				Industrial Processes ³	Total
	Mobile Combustion ¹	Stationary Combustion ²	Total	Waste Combustion	Human Sewage in Wastewater	Total	Nitrogen Fertilization of Soils	Crop Residue Burning	Solid Waste of Domesticated Animals	Total		
1980	60	43	102	(s)	13	13	499	1	265	766	88	969
1981	63	42	105	(s)	13	14	515	2	267	783	85	987
1982	67	40	107	(s)	13	14	486	2	266	754	81	955
1983	71	41	112	(s)	14	14	441	1	265	707	80	913
1984	86	43	130	(s)	14	14	500	2	260	762	88	993
1985	98	43	141	(s)	15	15	619	2	252	872	89	1,117
1986	107	43	150	(s)	15	15	597	2	244	842	87	1,094
1987	120	44	164	1	15	16	582	1	238	822	91	1,093
1988	138	46	183	1	15	16	539	1	235	775	96	1,071
1989	146	46	192	(s)	15	16	586	2	229	817	99	1,124
1990	126	45	172	1	16	17	R632	2	209	R843	96	1,127
1991	147	45	192	1	16	17	R638	2	211	R850	99	1,158
1992	153	46	198	1	16	17	R657	2	213	R872	95	R1,182
1993	159	46	205	1	17	17	R642	1	215	R858	100	R1,181
1994	165	47	212	1	17	18	R705	2	219	R926	110	R1,267
1995	R173	47	R220	1	17	18	R634	2	222	R857	111	R1,207
1996	R179	49	R228	1	17	18	R624	2	220	R845	116	R1,208
1997	180	50	230	1	18	19	R645	2	216	R862	74	R1,184
1998	R178	49	R227	1	18	19	R657	2	212	R871	58	R1,175
1999	R179	49	R229	1	19	20	R653	2	211	R865	57	R1,170
2000	R176	51	R227	1	19	20	R641	2	209	R852	56	R1,155
2001	R171	49	R220	1	19	20	R640	2	207	R850	47	R1,137
2002	R168	48	R216	1	19	20	R627	2	207	R835	51	R1,123
2003	R166	49	R215	1	19	20	R632	2	205	R839	R46	R1,121
2004	R170	50	R220	1	20	21	R718	2	204	R924	R46	R1,210
2005	R182	50	R232	1	20	21	R734	2	207	R943	R47	R1,243
2006 ^P	185	50	235	1	20	21	766	2	209	977	47	1,279

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

² Consumption of coal, petroleum, natural gas, and wood for heat or electricity.

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

R=Revised. 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

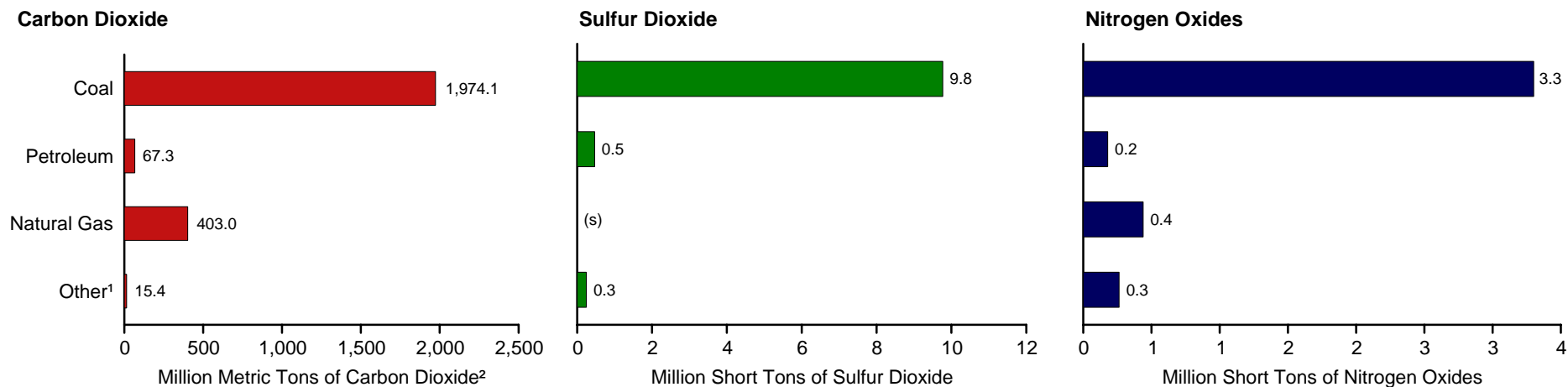
may be produced via anaerobic decomposition of organic materials in landfills, animal wastes, and rice paddies. • Because of the continuing goal to improve estimation methods for greenhouse gases, data are frequently revised on an annual basis in keeping with the latest findings of the international scientific community. • For information on units for measuring greenhouse gases, see http://www.eia.doe.gov/oiaf/1605/archive/gg06rpt/pdf/executive_summary.pdf, page 2, box titled "Units for Measuring Greenhouse Gases." • Totals may not equal sum of components due to independent rounding.

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

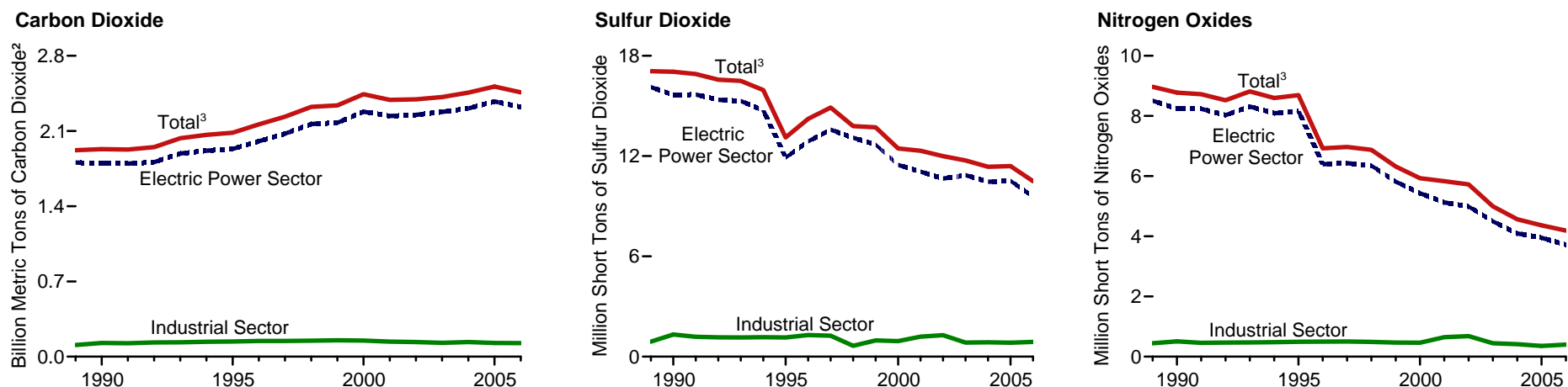
Sources: Energy Information Administration, *Emissions of Greenhouse Gases in the United States*, annual reports and unpublished revisions.

Figure 12.7 Emissions From Energy Consumption for Electricity Generation and Useful Thermal Output

Emissions by Type of Generating Unit, 2006



Emissions by Sector, 1989-2006



¹ For carbon dioxide: municipal solid waste (only the estimated plastics portion of municipal solid waste is included); tire-derived fuel, and geothermal. For sulfur dioxide and nitrogen oxides: blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels; wood, black liquor, and other wood waste; municipal solid waste, landfill gas, sludge waste, tires, agricultural byproducts, and other biomass; and chemicals, hydrogen, pitch, sulfur, and tar coal.

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

³ Includes Commercial Sector.

(s)=Less than 0.05 million short tons.

Sources: Tables 12.7a-12.7c.

**Table 12.7a Emissions From Energy Consumption for Electricity Generation and Useful Thermal Output:
Total (All Sectors), 1989-2006** (Sum of Tables 12.7b and 12.7c)

Year	Carbon Dioxide						Sulfur Dioxide					Nitrogen Oxides				
	Coal ¹	Petroleum ²	Natural Gas ³	MSW ⁴	Geo-thermal ⁵	Total	Coal ¹	Petroleum ²	Natural Gas ³	Other ⁶	Total	Coal ¹	Petroleum ²	Natural Gas ³	Other ⁶	Total
	Million Metric Tons of Carbon Dioxide ⁷						Thousand Short Tons of Sulfur Dioxide					Thousand Short Tons of Nitrogen Oxides				
1989	1,553.9	143.9	217.3	5.5	0.4	1,921.0	15,949	1,085	1	43	17,079	8,026	296	545	102	8,969
1990	1,572.4	118.4	232.7	7.4	.4	1,931.2	15,742	1,033	1	268	17,043	7,847	229	565	134	8,776
1991	1,572.1	110.2	236.9	8.4	.4	1,928.0	15,696	943	1	271	16,912	7,836	213	549	125	8,723
1992	1,596.7	95.7	246.9	9.9	.4	1,949.6	15,499	776	1	291	16,568	7,688	175	525	131	8,519
1993	1,666.2	107.1	249.2	10.3	.4	2,033.1	15,259	938	1	299	16,497	7,964	191	523	137	8,815
1994	1,675.7	101.8	274.9	11.1	.4	2,063.9	14,769	875	1	307	15,953	7,722	176	565	136	8,599
1995	1,698.0	76.3	297.1	11.8	.3	2,083.5	12,133	676	2	303	13,113	7,755	135	660	142	8,692
1996	1,788.7	83.2	276.5	12.6	.4	2,161.3	13,034	878	3	312	14,226	6,036	164	578	146	6,924
1997	1,834.9	92.6	291.7	13.2	.4	2,232.7	13,689	949	2	264	14,904	6,050	177	591	153	6,971
1998	1,862.9	122.4	325.8	12.6	.4	2,324.1	12,569	1,065	2	153	13,789	5,800	253	670	152	6,875
1999	1,869.6	114.7	341.4	12.6	.4	2,338.7	12,408	1,054	7	248	13,717	5,294	232	653	140	6,319
2000	1,960.0	107.5	361.7	12.2	.4	2,441.7	11,338	866	3	246	12,453	4,944	193	657	136	5,930
2001	1,895.2	116.1	365.3	12.8	.3	2,389.7	10,918	1,105	2	293	12,318	4,515	324	696	295	5,831
2002	1,912.7	90.2	377.1	14.8	.4	2,395.0	10,787	852	2	353	11,994	4,472	248	689	317	5,725
2003	1,947.2	111.0	343.4	13.8	.4	2,415.7	10,679	791	2	263	11,735	3,976	265	499	256	4,995
2004	1,962.7	114.7	365.2	14.0	.4	2,456.9	10,402	698	2	261	11,364	3,622	248	458	239	4,567
2005	2,001.2	115.9	381.9	14.1	.4	2,513.6	10,471	648	2	277	11,397	3,456	244	422	244	4,366
2006	1,974.1	67.3	403.0	15.0	.4	2,459.8	9,774	471	2	250	10,498	3,303	180	440	264	4,188

¹ Anthracite, bituminous coal, subbituminous coal, lignite, waste coal, and synthetic coal.

² 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.

⁴ Municipal solid waste (only the estimated plastics portion of municipal solid waste is included) and tire-derived fuel.

⁵ Carbon dioxide in geothermal steam.

⁶ Blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels; wood and wood-derived fuels; municipal solid waste, landfill gas, sludge waste, tires, agricultural

byproducts, and other biomass; and chemicals, hydrogen, pitch, sulfur, and tar coal.

⁷ Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

Notes: • Data are for emissions from energy consumption for electricity generation and useful thermal output. • See "Useful Thermal Output" in Glossary. • Totals may not equal sum of components due to independent rounding.

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

Sources: Tables 12.7b and 12.7c.

**Table 12.7b Emissions From Energy Consumption for Electricity Generation and Useful Thermal Output:
Electric Power Sector, 1989-2006** (Subset of Table 12.7a)

Year	Carbon Dioxide						Sulfur Dioxide					Nitrogen Oxides				
	Coal ¹	Petroleum ²	Natural Gas ³	MSW ⁴	Geo-thermal ⁵	Total	Coal ¹	Petroleum ²	Natural Gas ³	Other ⁶	Total	Coal ¹	Petroleum ²	Natural Gas ³	Other ⁶	Total
	Million Metric Tons of Carbon Dioxide ⁷						Thousand Short Tons of Sulfur Dioxide					Thousand Short Tons of Nitrogen Oxides				
1989	1,501.1	132.2	168.8	4.3	0.4	1,806.8	15,229	893	1	8	16,130	7,777	271	430	28	8,506
1990	1,514.8	100.8	176.3	5.7	.4	1,798.0	14,965	692	1	14	15,672	7,582	193	430	40	8,245
1991	1,515.2	94.2	179.6	7.1	.4	1,796.6	14,981	684	1	16	15,682	7,590	182	423	46	8,241
1992	1,537.1	78.4	186.8	8.4	.4	1,811.0	14,743	616	1	13	15,373	7,440	141	395	51	8,027
1993	1,605.4	89.5	187.3	8.5	.4	1,891.2	14,476	810	1	14	15,302	7,712	157	393	54	8,316
1994	1,613.3	84.2	210.1	9.2	.4	1,917.2	13,994	733	1	12	14,741	7,470	141	430	52	8,094
1995	1,635.4	60.5	227.5	9.9	.3	1,933.6	11,377	527	1	11	11,917	7,501	104	508	54	8,167
1996	1,725.3	65.5	204.2	9.8	.4	2,005.2	12,266	601	2	11	12,881	5,784	131	423	56	6,394
1997	1,771.3	74.4	219.1	10.2	.4	2,075.3	12,874	692	2	14	13,582	5,796	141	429	66	6,432
1998	1,801.3	104.6	248.6	10.1	.4	2,164.9	12,161	926	2	11	13,099	5,561	220	503	68	6,352
1999	1,807.8	97.0	261.1	10.2	.4	2,176.4	11,844	832	7	10	12,692	5,067	198	491	59	5,817
2000	1,897.7	91.3	281.6	10.0	.4	2,281.1	10,770	696	3	7	11,476	4,724	167	483	60	5,434
2001	1,837.8	101.9	289.6	10.8	.3	2,240.4	10,230	831	2	5	11,069	4,274	279	469	106	5,128
2002	1,853.7	78.0	305.9	12.6	.4	2,250.6	10,037	606	2	17	10,661	4,203	206	468	115	4,992
2003	1,891.5	97.2	277.9	11.3	.4	2,278.4	10,202	639	2	15	10,857	3,853	228	311	108	4,500
2004	1,903.7	99.2	296.2	11.1	.4	2,310.6	9,911	544	2	10	10,466	3,508	212	266	111	4,098
2005	1,944.2	101.5	318.9	11.1	.4	2,376.2	9,999	508	2	11	10,520	3,363	208	268	113	3,952
2006	1,918.4	54.8	337.9	11.4	.4	2,322.9	9,277	291	2	9	9,579	3,199	149	253	118	3,719

¹ Anthracite, bituminous coal, subbituminous coal, lignite, waste coal, and synthetic coal.

² 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.

⁴ Municipal solid waste (only the estimated plastics portion of municipal solid waste is included) and tire-derived fuel.

⁵ Carbon dioxide in geothermal steam.

⁶ Blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels; wood and wood-derived fuels; municipal solid waste, landfill gas, sludge waste, tires, agricultural byproducts, and other biomass; and chemicals, hydrogen, pitch, sulfur, and tar coal.

⁷ Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

Notes: • Data are for emissions from energy consumption for electricity generation and useful thermal output. • 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. • See Table 12.7c for commercial and industrial CHP and electricity-only data. • See Note 2, "Classification of Power Plants Into Energy-Use Sectors," at end of Section 8. • See "Useful Thermal Output" in Glossary. • Totals may not equal sum of components due to independent rounding.

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

Sources: **Carbon Dioxide:** • 1989-1997—Energy Information Administration (EIA), Form EIA-759, "Monthly Power Plant Report," and Form EIA-867, "Annual Nonutility Power Producer Report." • 1998-2000—EIA, Form EIA-759, "Monthly Power Plant Report," and Form EIA-860B, "Annual Electric Generator Report—Nonutility." • 2001-2003—EIA, Form EIA-906, "Power Plant Report." • 2004 forward—EIA, Form EIA-906, "Power Plant Report," and Form EIA-920, "Combined Heat and Power Plant Report." **Sulfur Dioxide** and **Nitrogen Oxides:** EIA, Form EIA-767, "Steam-Electric Plant Operation and Design Report." Data were adjusted by the Environmental Protection Agency's Continuous Emission Monitoring System.

Table 12.7c Emissions From Energy Consumption for Electricity Generation and Useful Thermal Output: Commercial and Industrial Sectors, 1989-2006 (Subset of Table 12.7a)

Year	Carbon Dioxide						Sulfur Dioxide					Nitrogen Oxides				
	Coal ¹	Petroleum ²	Natural Gas ³	MSW ⁴	Geo-thermal ⁵	Total	Coal ¹	Petroleum ²	Natural Gas ³	Other ⁶	Total	Coal ¹	Petroleum ²	Natural Gas ³	Other ⁶	Total
	Million Metric Tons of Carbon Dioxide ⁷						Thousand Short Tons of Sulfur Dioxide					Thousand Short Tons of Nitrogen Oxides				
Commercial Sector⁸																
1989	2.3	0.6	1.5	0.8	—	5.3	41	6	(s)	1	48	10	2	4	3	19
1990	2.4	.7	2.3	.9	—	6.3	43	5	(s)	1	49	11	1	6	4	23
1991	2.6	.5	2.3	1.0	—	6.5	35	3	(s)	1	39	11	1	7	4	23
1992	2.5	.5	2.8	1.2	—	7.0	35	3	(s)	1	39	11	1	8	4	24
1993	3.0	.6	3.3	1.3	—	8.1	44	4	(s)	1	48	13	1	8	4	26
1994	2.9	.6	3.7	1.3	—	8.5	43	3	(s)	(s)	47	13	1	8	4	26
1995	3.1	.5	4.0	1.4	—	9.1	43	2	(s)	(s)	46	13	1	10	5	29
1996	3.6	.5	4.3	2.0	—	10.5	48	2	(s)	1	51	16	1	10	7	34
1997	3.8	.7	4.6	2.3	—	11.4	62	4	(s)	3	69	17	1	11	9	37
1998	3.3	.8	4.7	2.1	—	10.9	36	4	(s)	2	42	14	1	11	8	34
1999	3.4	.7	4.5	2.0	—	10.7	51	3	(s)	(s)	54	15	1	10	7	32
2000	3.6	.7	4.6	1.7	—	10.6	47	3	(s)	1	51	14	1	10	6	31
2001	3.3	.8	4.3	1.4	—	9.8	48	4	(s)	2	53	14	3	21	17	55
2002	3.0	.6	4.0	1.5	—	9.1	46	3	(s)	2	50	14	3	22	14	52
2003	3.9	.7	3.2	1.7	—	9.4	35	3	(s)	2	40	10	6	18	16	50
2004	4.0	.9	3.9	1.9	—	10.7	33	4	(s)	2	39	9	8	20	18	54
2005	4.0	.8	4.1	1.9	—	10.7	36	3	(s)	1	40	10	7	26	17	59
2006	3.9	.4	4.4	1.9	—	10.7	36	3	(s)	1	40	10	3	39	18	70
Industrial Sector⁹																
1989	50.4	11.1	47.0	0.4	—	108.9	679	186	(s)	35	901	241	24	110	69	444
1990	55.2	16.9	54.1	.7	—	126.9	734	335	(s)	252	1,322	257	34	128	88	508
1991	54.3	15.5	55.0	.2	—	125.0	681	256	(s)	254	1,191	237	30	119	73	459
1992	57.1	16.8	57.3	.3	—	131.6	722	157	(s)	277	1,156	240	32	122	74	468
1993	57.8	17.0	58.5	.5	—	133.8	739	124	(s)	283	1,147	241	32	122	77	472
1994	59.5	17.0	61.1	.6	—	138.2	732	139	(s)	294	1,165	242	33	126	78	479
1995	59.5	15.3	65.5	.5	—	140.8	713	146	(s)	291	1,150	243	30	142	81	496
1996	59.7	17.2	67.9	.7	—	145.6	720	273	(s)	300	1,294	238	33	144	82	497
1997	59.7	17.5	68.0	.7	—	145.9	753	253	(s)	247	1,253	238	35	150	79	502
1998	58.3	17.0	72.5	.5	—	148.4	372	135	(s)	141	648	225	32	157	75	490
1999	58.4	17.0	75.7	.5	—	151.6	514	219	(s)	237	971	214	32	151	73	470
2000	58.7	15.4	75.5	.5	—	150.1	520	167	(s)	239	927	208	24	164	69	465
2001	54.1	13.4	71.4	.6	—	139.5	640	270	(s)	285	1,196	227	42	206	172	648
2002	56.0	11.6	67.1	.6	—	135.3	704	243	(s)	334	1,282	255	39	199	188	681
2003	51.8	13.0	62.3	.8	—	127.9	443	149	(s)	247	839	112	31	171	131	446
2004	55.1	14.5	65.1	1.0	—	135.6	458	150	(s)	250	859	105	27	173	110	415
2005	53.0	13.7	58.9	1.1	—	126.7	435	137	(s)	265	837	83	29	129	114	355
2006	51.8	12.1	60.7	1.7	—	126.3	461	177	(s)	241	880	94	28	148	129	399

¹ Anthracite, bituminous coal, subbituminous coal, lignite, waste coal, and synthetic coal.

² 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.

⁴ Municipal solid waste (only the estimated plastics portion of municipal solid waste is included) and tire-derived fuel.

⁵ Carbon dioxide in geothermal steam.

⁶ Blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels; wood and wood-derived fuels; municipal solid waste, landfill gas, sludge waste, tires, agricultural byproducts, and other biomass; and chemicals, hydrogen, pitch, sulfur, and tar coal.

⁷ Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.

⁸ Commercial combined-heat-and-power (CHP) and commercial electricity-only plants.

⁹ Industrial combined-heat-and-power (CHP) and industrial electricity-only plants.

— = No data reported. (s)=Less than 0.05 million metric tons or less than 500 short tons.

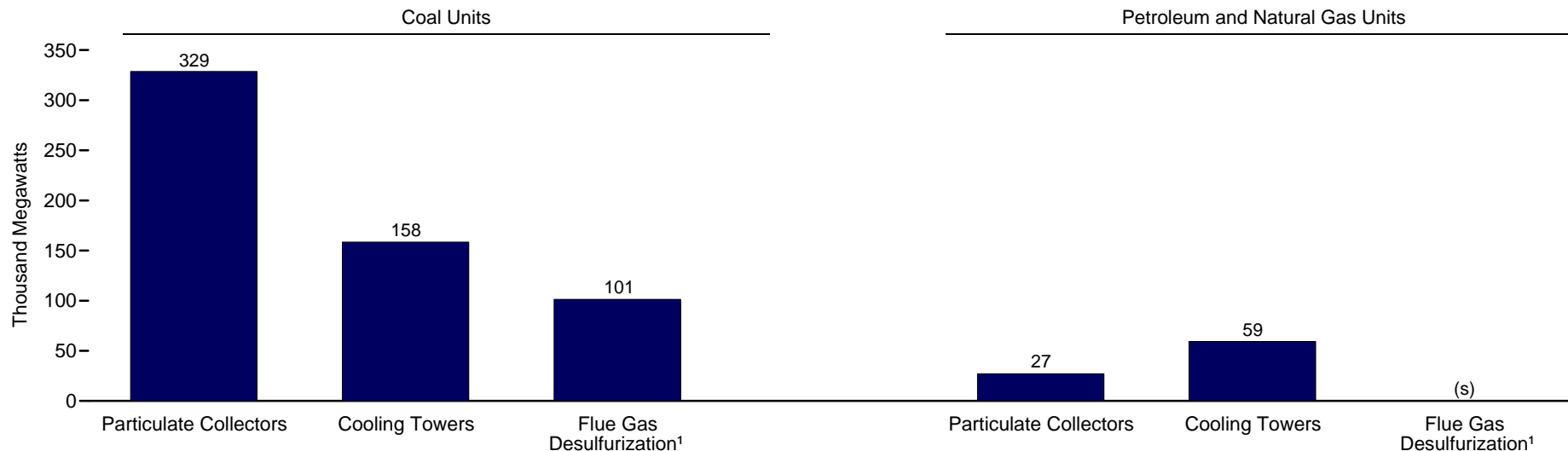
Notes: • Data are for emissions from energy consumption for electricity generation and useful thermal output. • See Table 12.7b for electric power sector data. • See Note 2, "Classification of Power Plants Into Energy-Use Sectors," at end of Section 8. • See "Useful Thermal Output" in Glossary. • Totals may not equal sums of components due to independent rounding.

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

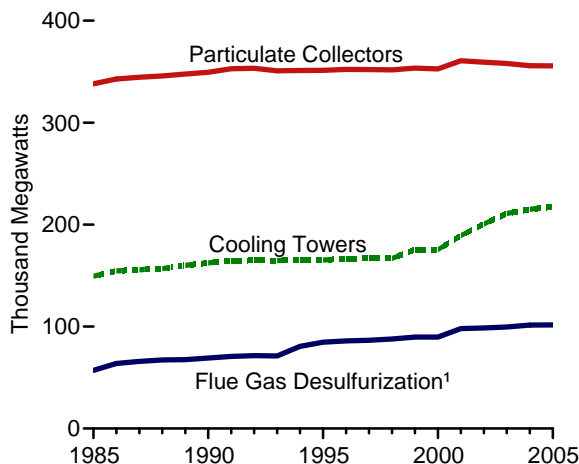
Sources: **Carbon Dioxide:** • 1989-1997—Energy Information Administration (EIA), Form EIA-867, "Annual Nonutility Power Producer Report." • 1998-2000—EIA, Form EIA-860B, "Annual Electric Generator Report—Nonutility." • 2001-2003—EIA, Form EIA-906, "Power Plant Report." • 2004 forward—EIA, Form EIA-906, "Power Plant Report," and Form EIA-920, "Combined Heat and Power Plant Report." **Sulfur Dioxide and Nitrogen Oxides:** 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

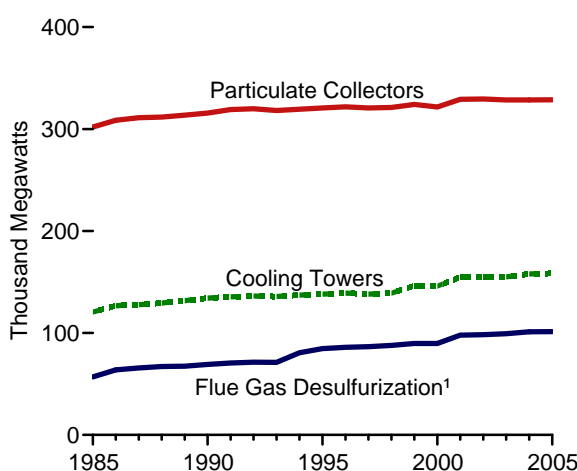
By Fuel and Equipment Type, 2005



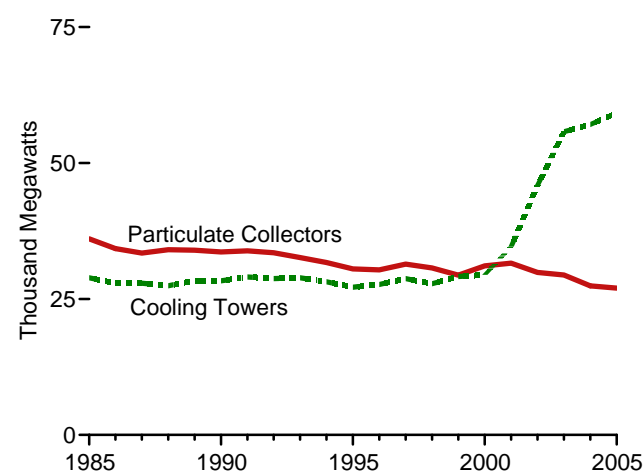
Total Units by Equipment Type, 1985-2005²



Coal Units by Equipment Type, 1985-2005²



Petroleum and Natural Gas Units by Equipment Type, 1985-2005²



(s)=Less than 0.5 thousand megawatts.

¹ Also called "scrubbers."

² 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, with fossil-fueled steam-electric capacity of 100 megawatts or greater, or combustible-renewable steam electric capacity of 10 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, 1985-2005
(Megawatts)

Year	Coal				Petroleum and Natural Gas				Total			
	Particulate Collectors	Cooling Towers	Flue Gas Desulfurization (Scrubbers)	Total ¹	Particulate Collectors	Cooling Towers	Flue Gas Desulfurization (Scrubbers)	Total ¹	Particulate Collectors	Cooling Towers	Flue Gas Desulfurization (Scrubbers)	Total ¹
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	—	58,580	350,808	164,807	71,106	376,831
1994	319,485	137,266	80,617	319,776	31,695	28,186	—	57,123	351,180	165,452	80,617	376,899
1995	320,685	138,108	84,677	320,749	30,513	27,187	—	54,942	351,198	165,295	84,677	375,691
1996	321,805	139,065	85,842	321,869	30,349	27,685	—	55,275	352,154	166,749	85,842	377,144
1997	320,646	138,120	86,605	320,710	31,422	28,766	—	56,485	352,068	166,886	86,605	377,195
1998	321,082	139,082	87,783	321,353	30,708	27,814	—	55,764	351,790	166,896	87,783	377,117
1999	324,109	146,377	89,666	331,379	29,371	29,142	—	55,812	353,480	175,520	89,666	387,192
2000	321,636	146,093	89,675	328,741	31,090	29,427	—	57,697	352,727	175,520	89,675	386,438
2001 ²	329,187	154,747	97,804	329,187	31,575	34,649	184	61,634	360,762	189,396	97,988	390,821
2002	329,459	154,750	98,363	329,459	29,879	45,920	310	72,008	359,338	200,670	98,673	401,341
2003	328,587	155,158	99,257	328,587	29,422	55,770	310	81,493	358,009	210,928	99,567	409,954
2004	328,506	157,968	101,182	328,506	27,402	57,082	310	81,450	355,782	214,989	101,492	409,769
2005	328,720	158,493	101,338	328,720	27,005	59,214	310	83,307	355,599	217,646	101,648	411,840

¹ Components are not additive because some generators are included in more than one category.

² 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, with fossil-fueled steam-electric capacity of 100 megawatts or greater, or combustible-renewable steam-electric capacity of 10 megawatts or greater.

— = No data reported.

Note: Beginning in 2006, data are not available.

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

Sources: • 1985-1993—Energy Information Administration (EIA), Form EIA-767, "Steam-Electric Plant Operation and Design Report." • 1994 forward—EIA, *Electric Power Annual 2005* (November 2006), Table 5.2, and EIA, Form EIA-767, "Steam-Electric Plant Operation and Design Report."

