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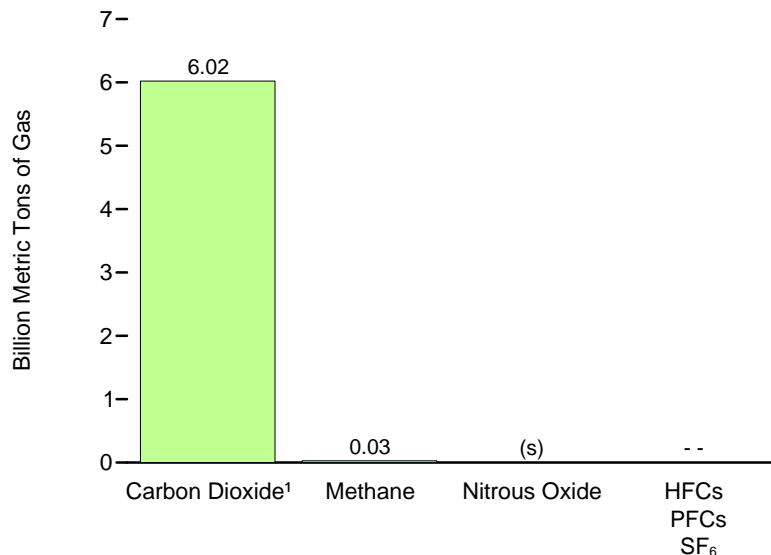
Environmental Indicators



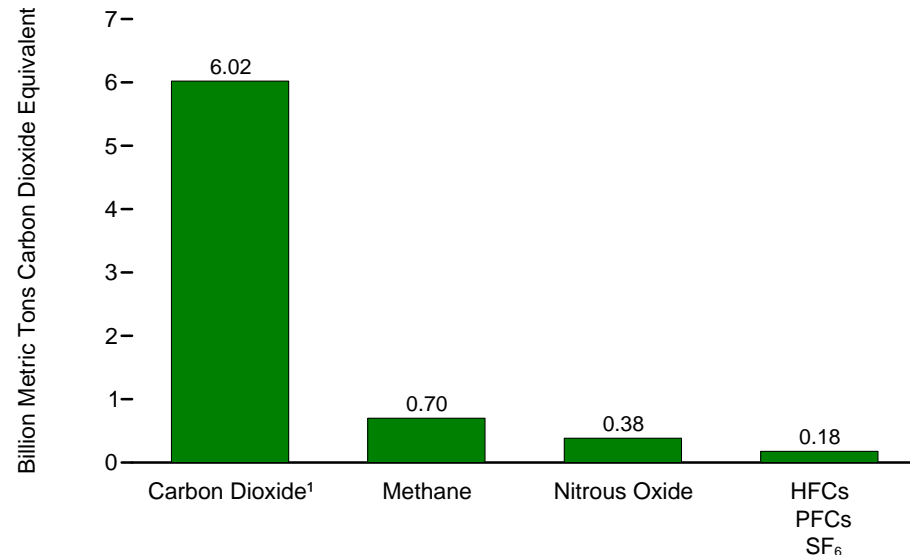
"Harpers Ferry, Junction of the Rivers Shenandoah and Potomac." Engraving by W. Goodacre and James Archer, published in *The History and Topography of the United States of North America*, by John Howard Hinton, 1852. From the collection of the National Park Service, Harpers Ferry National Historical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

Figure 12.1 Emissions of Greenhouse Gases

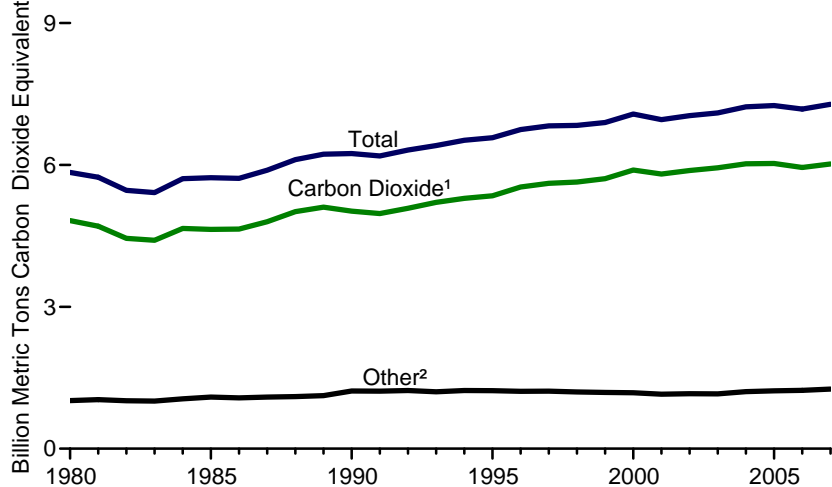
By Type of Gas, 2007



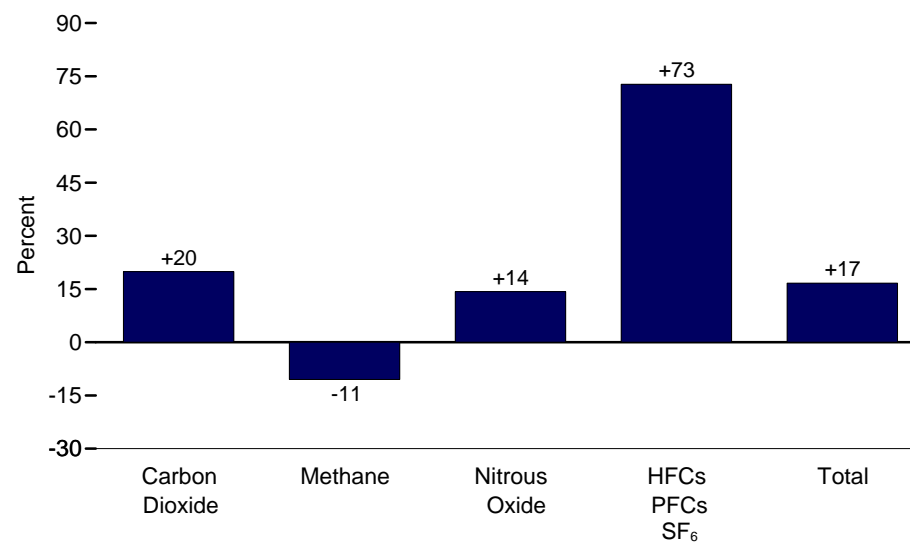
Based on Global Warming Potential, by Type of Gas, 2007



Based on Global Warming Potential, 1980-2007



Change 1990-2007, 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, HFCs, PFCs, and 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.

Source: Table 12.1.

Table 12.1 Emissions of Greenhouse Gases, 1980-2007

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	R5,021.4	R31.3	1.1	--	R5,021.4	R782.1	R336.0	R102.4	R6,241.8
1991	R4,973.5	R31.1	1.2	--	R4,973.5	R778.4	R345.2	R93.2	R6,190.4
1992	R5,084.1	R31.2	1.2	--	R5,084.1	R781.0	R352.4	R98.1	R6,315.6
1993	R5,207.4	R30.1	1.2	--	R5,207.4	R753.3	R351.8	R96.5	R6,409.1
1994	R5,293.6	R30.2	1.3	--	R5,293.6	R754.7	R377.5	R97.2	R6,522.9
1995	R5,348.4	R30.1	1.2	--	R5,348.4	R752.6	R359.7	R114.6	R6,575.2
1996	R5,534.2	R29.2	1.2	--	R5,534.2	R729.1	R360.2	R124.8	R6,748.2
1997	R5,610.9	R29.2	1.2	--	R5,610.9	R730.0	R353.1	R132.1	R6,826.0
1998	R5,637.9	R27.9	1.2	--	R5,637.9	R696.5	R351.0	R150.6	R6,836.0
1999	R5,708.1	R27.6	1.2	--	R5,708.1	R690.6	R348.9	R149.0	R6,896.6
2000	R5,892.6	R27.4	1.2	--	R5,892.6	R685.7	R344.6	R152.1	R7,075.0
2001	R5,806.9	R26.8	1.1	--	R5,806.9	R670.1	R339.3	R141.4	R6,957.7
2002	R5,880.5	R27.0	1.1	--	R5,880.5	R674.2	R335.4	R153.6	R7,043.7
2003	R5,938.7	R27.1	1.1	--	R5,938.7	R676.5	R334.6	R149.0	R7,098.8
2004	R6,023.9	R27.2	1.2	--	R6,023.9	R679.7	R361.5	R165.0	R7,230.1
2005	R6,032.3	R27.2	1.2	--	R6,032.3	R679.4	R370.8	R174.5	R7,256.9
2006	R5,945.8	R27.5	1.3	--	R5,945.8	R686.9	R375.7	R171.3	R7,179.7
2007 ^P	6,021.8	28.0	1.3	--	6,021.8	699.9	383.9	176.9	7,282.4

¹ Emissions of greenhouse gases are weighted based upon their relative global warming potential (GWP), with carbon dioxide equal to a weight of one. See "Global Warming Potential" in Glossary.

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.

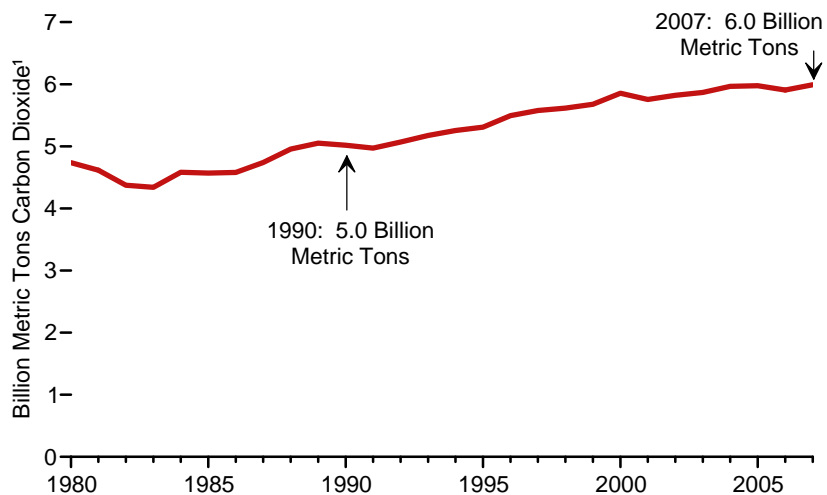
• Emissions are from anthropogenic sources. "Anthropogenic" means produced as the result of human activities, including emissions from agricultural activity and domestic livestock. Emissions from natural sources, such as wetlands and wild animals, are not included. • Because of the continuing goal to 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. Revisions reflect updates to GWP estimates, as well as to energy consumption data. • For information on units for measuring greenhouse gases, see [http://www.eia.doe.gov/oiaf/1605/ggrpt/pdf/0573\(2007\).pdf](http://www.eia.doe.gov/oiaf/1605/ggrpt/pdf/0573(2007).pdf), page 10, 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>.

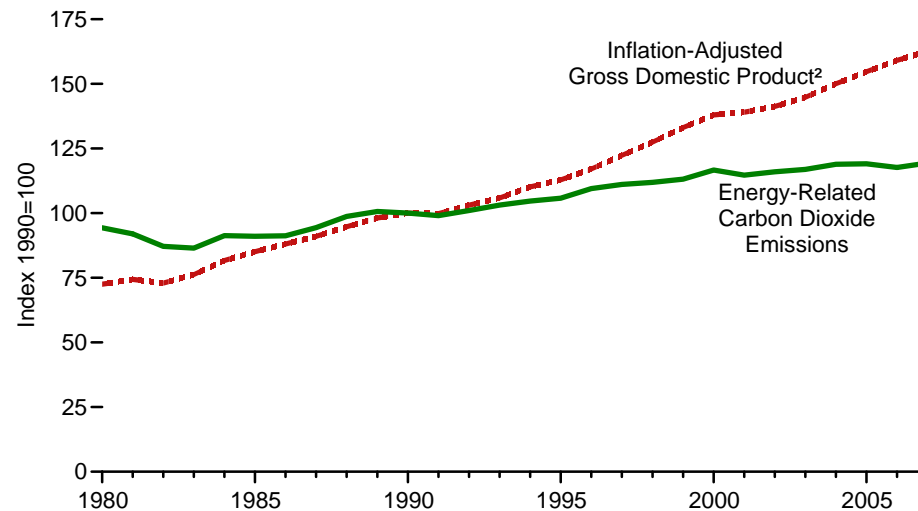
Sources: Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 2007* (December 2008), Table 1; and EIA, Office of Integrated Analysis and Forecasting, estimates.

Figure 12.2 Carbon Dioxide Emissions From Energy Consumption by Sector

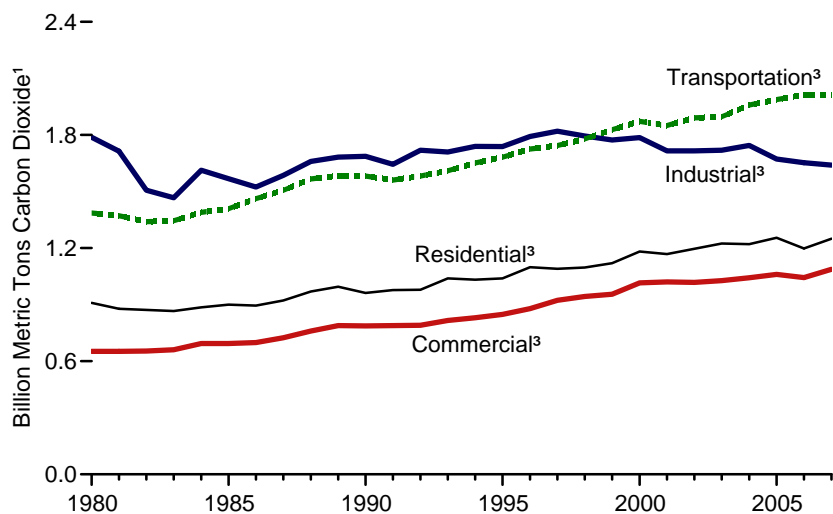
Total, 1980-2007



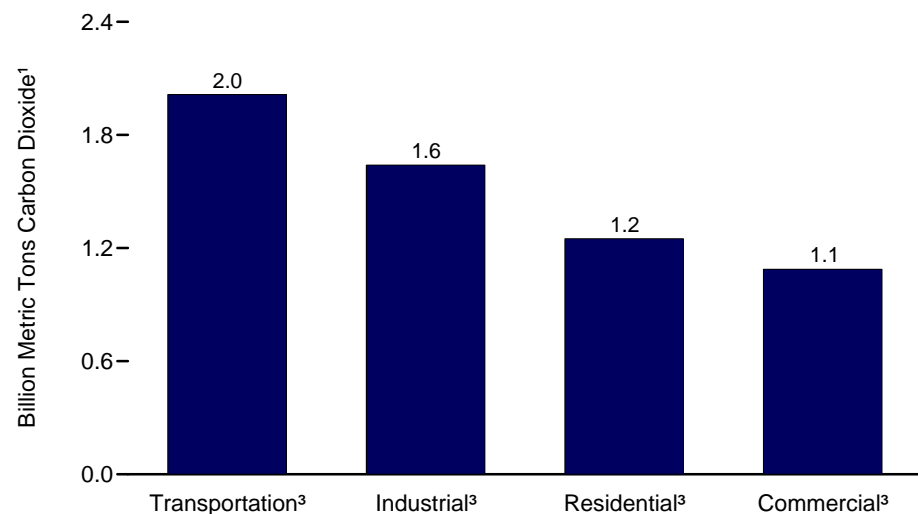
Economic Growth and Carbon Dioxide Emissions, 1980-2007



By End-Use Sector, 1980-2007



By End-Use Sector, 2007



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).

Sources: Tables 1.5 and 12.2.

Table 12.2 Carbon Dioxide Emissions From Energy Consumption by Sector, 1980-2007

(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	341.6	R961.7	R224.9	787.5	R1,052.4	R1,686.9	1,579.4	1,582.6	R1,820.4	R5,018.7
1991	348.5	R977.2	225.7	R788.5	R1,021.3	R1,644.1	1,558.1	1,561.3	R1,817.5	R4,971.0
1992	358.4	978.6	226.8	R790.1	R1,074.6	R1,719.2	1,579.0	1,582.1	R1,831.4	R5,070.1
1993	374.4	R1,039.3	224.5	R815.9	R1,056.4	R1,709.5	1,607.4	1,610.6	R1,912.5	R5,175.3
1994	365.8	R1,032.3	226.9	R830.4	R1,073.5	R1,739.6	1,648.5	1,651.8	R1,939.3	R5,254.0
1995	362.8	1,039.2	230.0	848.4	R1,081.5	R1,738.6	1,679.0	1,682.2	R1,955.1	R5,308.5
1996	391.2	R1,098.5	238.6	879.0	R1,116.5	R1,791.9	1,722.2	1,725.4	R2,026.3	R5,494.9
1997	372.8	1,089.7	238.8	R923.0	R1,128.5	R1,820.3	1,740.9	1,744.2	R2,096.1	R5,577.2
1998	340.3	R1,097.0	221.8	R943.6	R1,091.1	R1,794.9	1,776.2	1,779.5	R2,185.5	R5,615.0
1999	360.9	R1,120.1	223.6	955.5	R1,071.6	R1,773.4	1,824.9	1,828.3	R2,196.5	R5,677.3
2000	379.7	R1,181.6	235.5	R1,015.2	R1,070.7	R1,786.4	1,868.9	1,872.6	R2,300.9	R5,855.8
2001	R367.8	R1,168.3	R226.9	R1,020.1	R1,051.9	R1,715.8	R1,847.2	R1,850.9	R2,261.3	R5,755.1
2002	367.2	R1,196.3	228.5	R1,017.9	R1,066.5	R1,715.5	1,887.2	1,890.9	R2,271.1	R5,820.6
2003	385.1	R1,224.6	R238.3	1,027.1	R1,053.0	R1,719.1	R1,892.6	R1,897.2	R2,299.0	R5,868.1
2004	371.7	R1,220.7	R233.7	R1,042.3	R1,075.4	R1,744.2	R1,954.2	R1,958.9	R2,331.2	R5,966.2
2005	R364.8	R1,254.9	R225.2	R1,060.2	R1,005.0	R1,672.3	R1,983.1	R1,988.0	R2,397.4	R5,975.3
2006	R327.3	R1,197.9	R205.7	R1,043.0	R1,001.0	R1,652.4	R2,008.7	R2,013.4	R2,364.1	R5,906.7
2007 ^P	345.8	1,249.5	215.6	1,087.4	986.7	1,639.7	2,009.4	2,014.4	2,433.4	5,990.9

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.

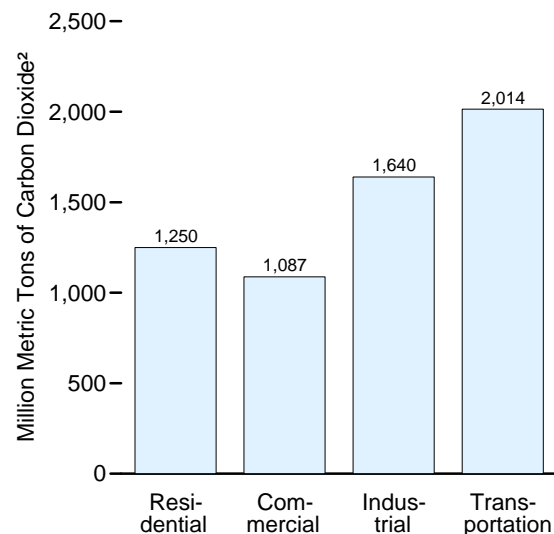
- Because of the continuing goal to improve estimation methods for greenhouse gases, data are frequently revised on an annual basis in keeping with the latest findings of the international scientific community.
- Totals may not equal sum of components due to independent rounding.

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

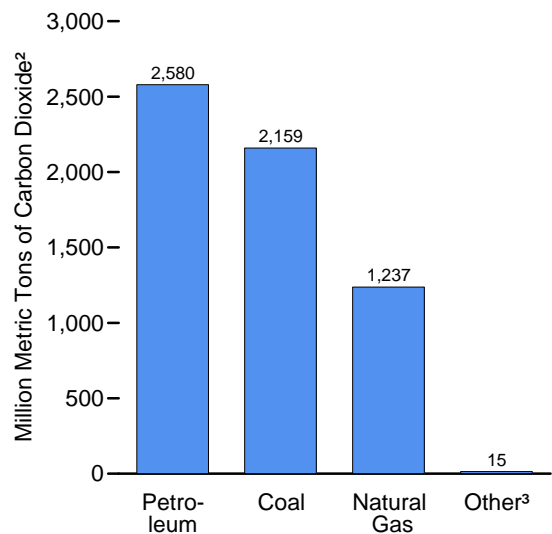
Sources: Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 2007* (December 2008), Tables 6-11; and EIA, Office of Integrated Analysis and Forecasting, estimates.

Figure 12.3 Carbon Dioxide Emissions From Energy Consumption by Sector by Energy Source, 2007

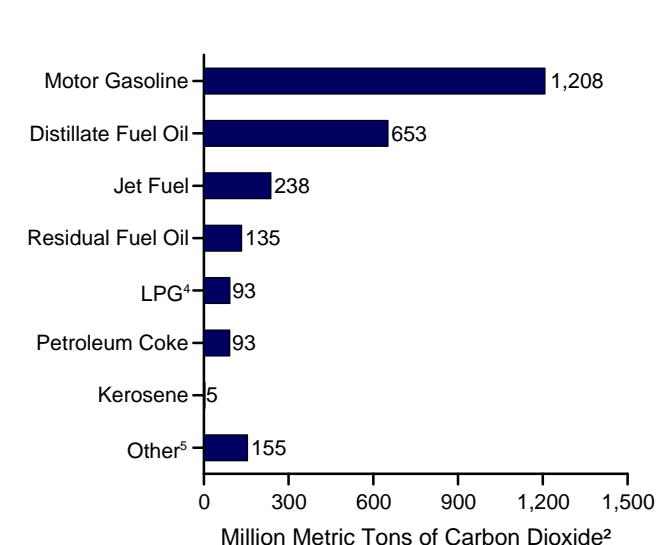
By End-Use Sector¹



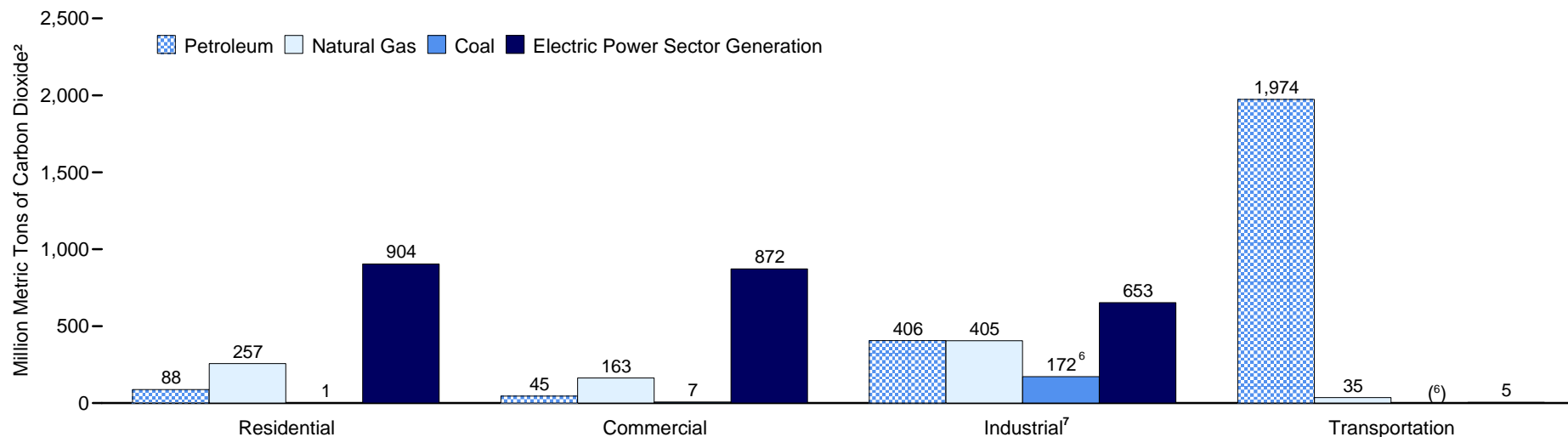
Total by Fuel



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, 2007

(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	88.3	45.4	406.4	1,974.0	2,514.2	65.7	2,579.9
Aviation Gasoline	--	--	--	2.2	2.2	--	2.2
Distillate Fuel Oil	52.6	29.6	90.6	472.5	645.3	7.4	652.7
Jet Fuel	--	--	--	238.0	238.0	--	238.0
Kerosene	2.9	0.7	1.3	--	4.8	--	4.8
Liquefied Petroleum Gases	32.8	5.8	52.8	1.7	93.1	--	93.1
Lubricants	--	--	6.0	⁵ 5.6	11.6	--	11.6
Motor Gasoline	--	3.1	24.7	1,180.5	1,208.3	--	1,208.3
Petroleum Coke	--	--	71.5	--	71.5	21.2	92.7
Residual Fuel Oil	--	6.2	17.8	73.5	97.5	37.1	134.7
Other	--	--	141.6	--	141.6	--	141.6
Natural Gas	256.9	163.4	404.9	35.4	860.6	376.4	1,237.0
Coal	0.6	6.8	⁶ 172.2	(⁶)	179.6	1,979.7	2,159.3
Coal Coke Net Imports	--	--	3.1	--	3.1	--	3.1
Municipal Solid Waste ⁷	--	--	--	--	--	11.2	11.2
Geothermal	--	--	--	--	--	0.4	0.4
Primary	345.8	215.6	986.7	2,009.4	3,557.5	2,433.4	5,990.9
Electric Power Sector Generation ⁸	903.7	871.7	653.0	5.0	2,433.4	--	--
Total	1,249.5	1,087.4	1,639.7	2,014.4	5,990.9	--	5,990.9

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.

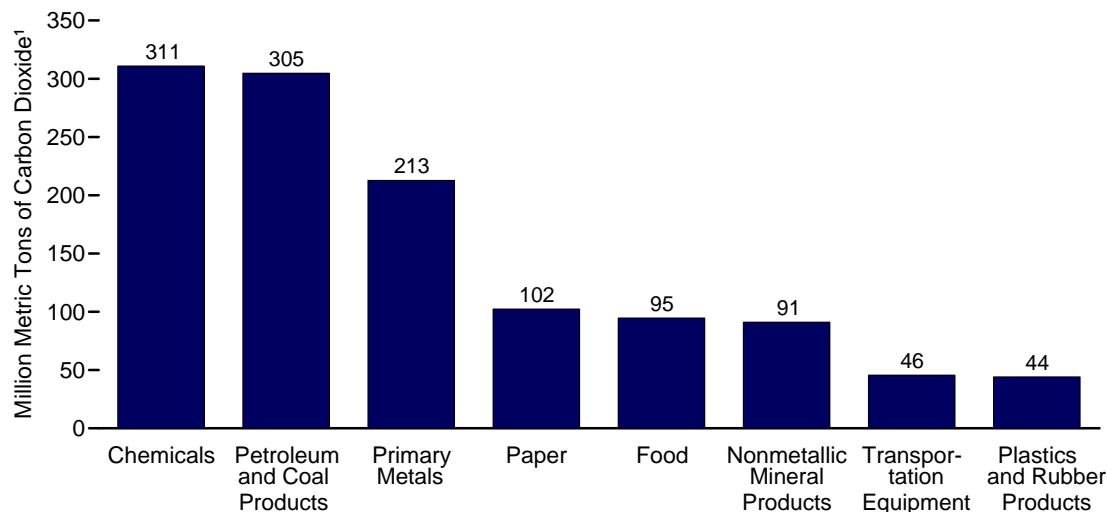
Notes: • Data are preliminary estimates. • Emissions from blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels are counted under their primary energy source—i.e., petroleum, natural gas, or coal. • See Note 2, "Classification of Power Plants Into Energy-Use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

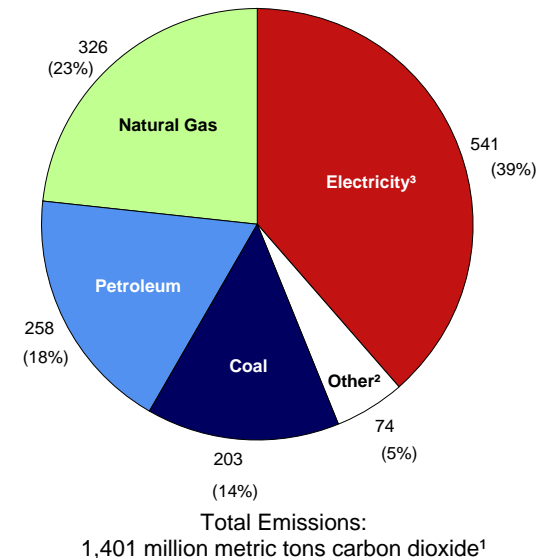
Source: Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2007* (December 2008), Tables 7-11.

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

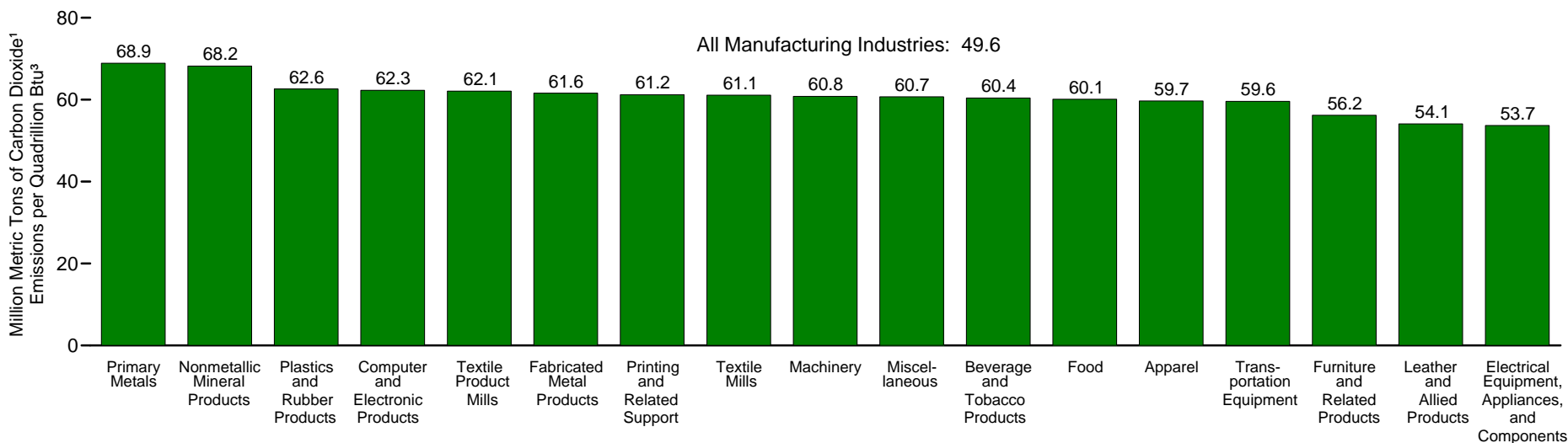
Carbon Dioxide Emissions by Top Industry Groups



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.

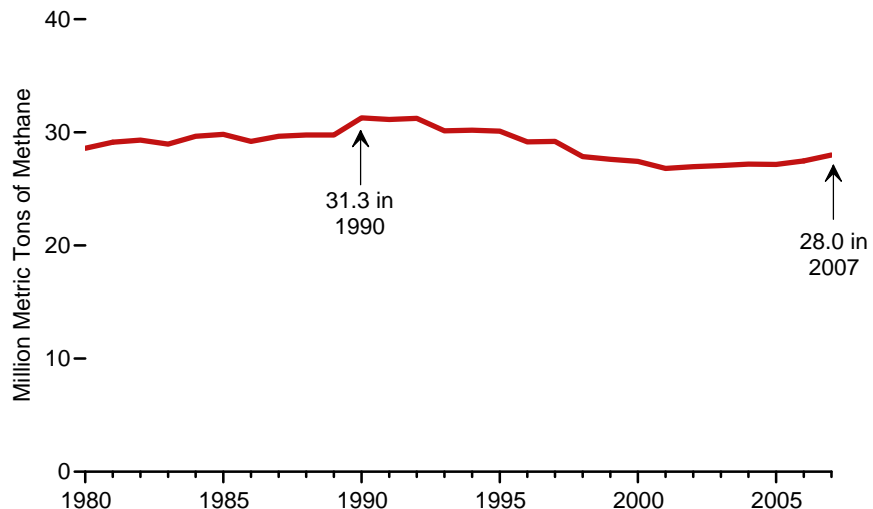
Notes: • Data are estimates for the first use of energy for heat and power and as feedstocks or raw material inputs. "First use" is the consumption of energy that was originally produced offsite or was produced onsite from input materials not classified as energy. Minor revisions to the 2002 Manufacturing 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>.

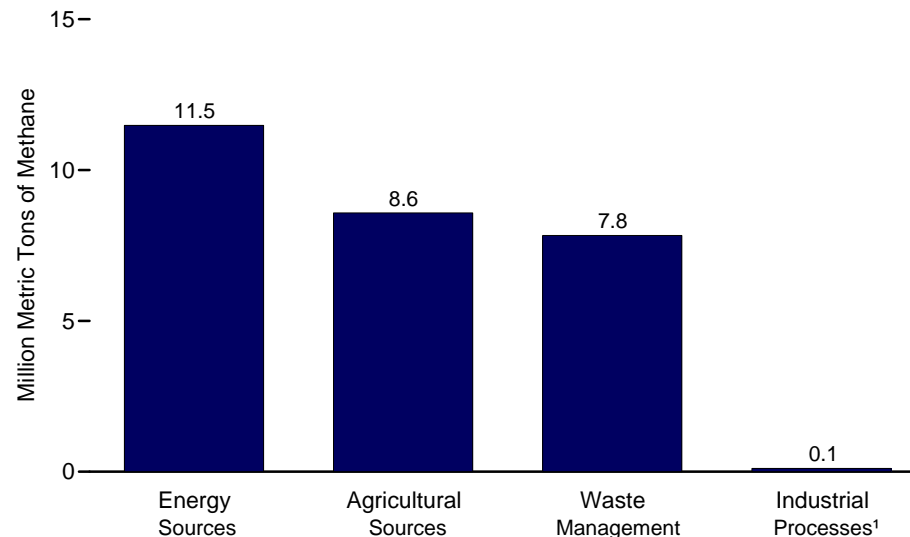
Sources: Energy Information Administration, Form EIA-846, "2002 Manufacturing Energy Consumption Survey," Form EIA-810, "Monthly Refinery Report" (for 2002), and *Documentation for Emissions of Greenhouse Gases in the United States 2003* (May 2005).

Figure 12.5 Methane Emissions

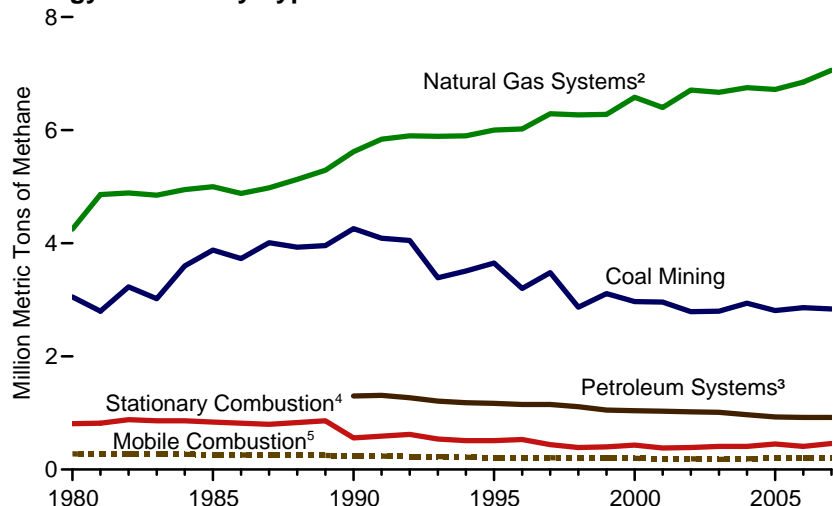
Total, 1980-2007



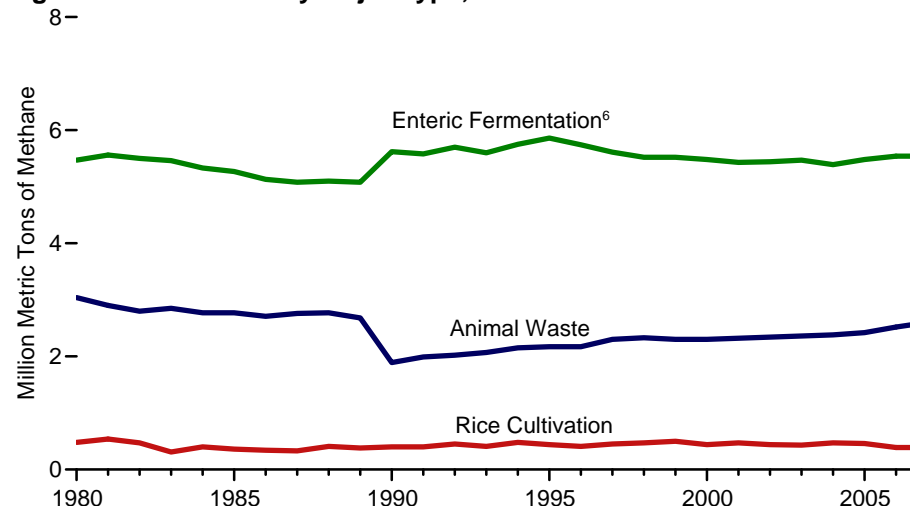
By Source, 2007



Energy Sources by Type 1980-2007



Agricultural Sources by Major Type, 1980-2007



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.

Source: Table 12.5.

Table 12.5 Methane Emissions, 1980-2007
(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	10.50	0.52	11.02	5.47	3.04	0.48	0.04	9.04	0.13	28.59
1981	2.80	4.86	NA	.27	.82	8.75	10.67	.53	11.20	5.56	2.90	.54	.05	9.05	.14	29.13
1982	3.23	4.89	NA	.27	.88	9.26	10.61	.54	11.15	5.50	2.80	.47	.05	8.81	.10	29.32
1983	3.02	4.85	NA	.27	.86	9.00	10.65	.54	11.19	5.46	2.85	.31	.03	8.66	.11	28.96
1984	3.60	4.95	NA	.27	.86	9.68	10.66	.66	11.32	5.33	2.77	.40	.04	8.55	.11	29.66
1985	3.88	5.00	NA	.26	.84	9.98	10.63	.67	11.30	5.27	2.77	.36	.05	8.45	.11	29.83
1986	3.73	4.88	NA	.26	.82	9.69	10.51	.68	11.18	5.13	2.71	.34	.04	8.22	.10	29.20
1987	4.01	4.98	NA	.25	.80	10.04	10.61	.68	11.29	5.08	2.76	.33	.04	8.21	.11	29.65
1988	3.93	5.13	NA	.25	.83	10.14	10.49	.69	11.18	5.10	2.77	.41	.03	8.31	.12	29.76
1989	3.96	5.29	NA	.25	.86	10.36	10.41	.70	11.11	5.08	2.68	.38	.04	8.18	.12	29.77
1990	R4.26	R5.62	1.30	.24	.56	R11.98	R10.34	.89	R11.22	R5.62	1.89	.40	.04	R7.96	.12	R31.28
1991	R4.09	R5.84	1.31	.24	.59	R12.07	R10.04	.90	R10.94	R5.58	1.99	.40	.04	R8.01	.11	R31.14
1992	4.05	R5.90	1.27	.23	.62	R12.07	R9.91	.92	R10.84	R5.70	R2.02	.45	.05	R8.21	.12	R31.24
1993	R3.39	R5.89	1.21	.23	.54	R11.26	R9.69	.93	R10.63	R5.60	2.07	.41	.04	R8.12	.12	R30.13
1994	3.51	R5.90	1.18	.22	.51	R11.33	R9.34	.95	R10.30	R5.75	2.15	.48	.05	R8.43	.13	R30.19
1995	R3.65	R6.00	1.17	.21	.51	R11.54	R8.95	.97	R9.91	R5.86	2.17	.44	.04	R8.51	.13	R30.10
1996	R3.20	R6.02	1.15	.21	.53	R11.11	R8.58	.98	R9.55	R5.74	R2.17	.41	.05	R8.37	.13	R29.16
1997	R3.48	R6.29	R1.15	.21	.44	11.56	R8.11	.99	R9.10	R5.61	R2.30	.45	.05	R8.40	.13	R29.20
1998	R2.87	R6.27	1.11	R.20	.39	R10.84	R7.51	1.00	R8.51	R5.52	2.33	.47	.05	R8.37	.13	R27.86
1999	3.11	R6.28	R1.05	.20	.40	R11.04	R7.07	1.02	R8.08	R5.52	R2.30	.50	.05	R8.37	.13	R27.62
2000	R2.97	R6.58	R1.04	R.20	.43	R11.21	R6.80	1.02	R7.82	R5.48	R2.30	.44	.05	R8.27	.13	R27.43
2001	2.96	R6.40	1.03	.19	.38	R10.97	R6.44	1.02	R7.46	R5.43	2.32	.47	.05	R8.27	.11	R26.81
2002	2.79	R6.71	1.02	.19	.39	R11.10	R6.45	1.03	R7.48	R5.44	R2.34	R.44	.05	R8.27	.12	R26.97
2003	R2.80	R6.67	1.01	.18	.41	R11.07	R6.54	1.03	R7.57	R5.47	2.36	.43	.05	R8.31	.12	R27.06
2004	R2.94	R6.75	.97	R.19	.41	R11.25	R6.48	1.04	R7.52	R5.39	2.38	.47	.06	R8.30	.12	R27.19
2005	R2.81	R6.72	.93	.20	R.45	R11.11	R6.50	1.04	R7.54	R5.48	R2.42	R.46	.05	R8.41	.11	R27.17
2006	R2.86	R6.85	.92	R.20	R.41	R11.23	R6.57	1.06	R7.63	R5.54	R2.52	R.39	.05	R8.51	R.11	R27.48
2007 ^P	2.84	7.06	.92	.20	.46	11.48	6.76	1.07	7.83	5.54	2.60	.39	.06	8.58	.11	28.00

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.

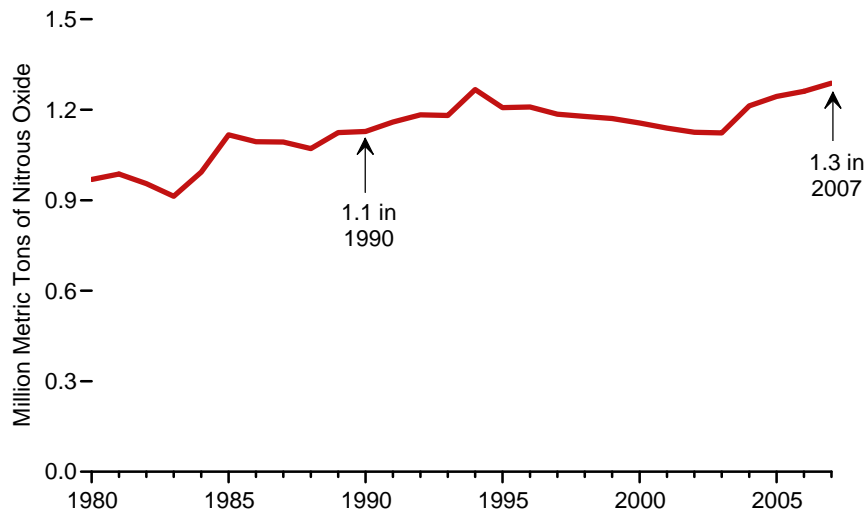
Notes: • Emissions are from anthropogenic sources. "Anthropogenic" means produced as the result of human activities, including emissions from agricultural activity and domestic livestock. Emissions from natural sources, such as wetlands and wild animals, are not included. • Under certain conditions, 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/ggrpt/pdf/0573\(2007\).pdf](http://www.eia.doe.gov/oiaf/1605/ggrpt/pdf/0573(2007).pdf), page 10, 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>.

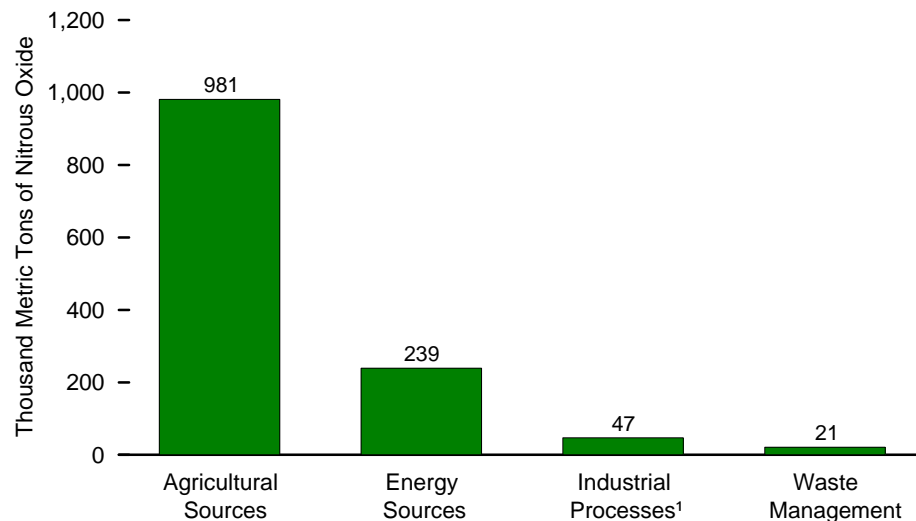
Sources: Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 2007* (December 2008), Tables 16-20; and EIA, Office of Integrated Analysis and Forecasting, estimates.

Figure 12.6 Nitrous Oxide Emissions

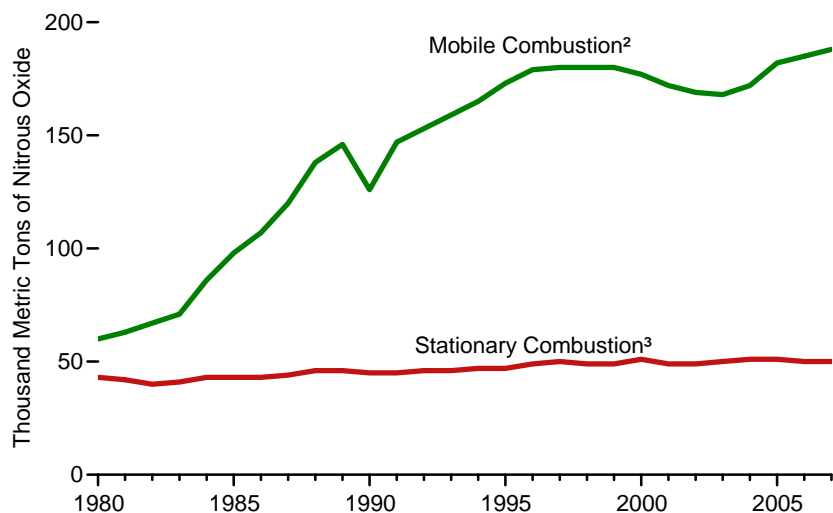
Total, 1980-2007



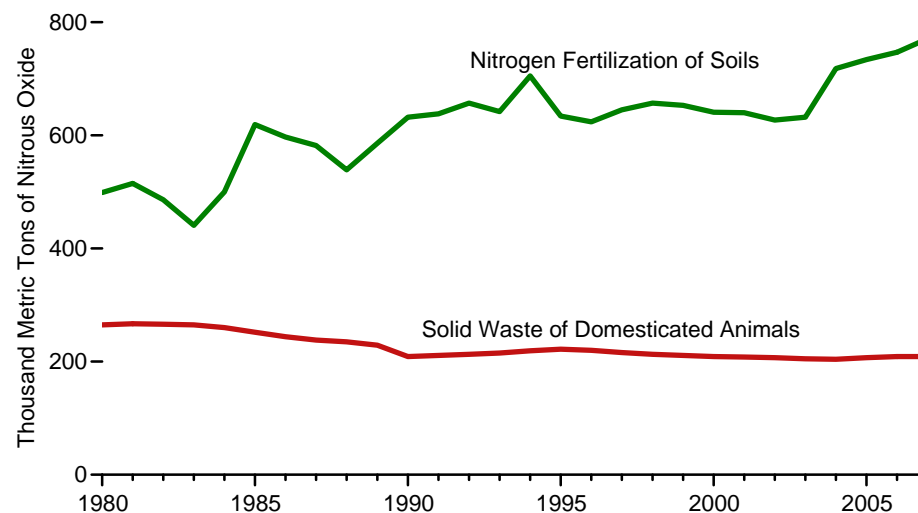
By Source, 2007



Energy Sources by Type, 1980-2007



Agricultural Sources by Major Type, 1980-2007



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.
Source: Table 12.6.

Table 12.6 Nitrous Oxide Emissions, 1980-2007
(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	632	2	209	843	96	R1,128
1991	147	45	192	1	16	17	638	2	211	850	99	R1,159
1992	153	46	198	1	16	17	657	2	213	872	95	R1,183
1993	159	46	205	1	17	17	642	1	215	858	100	1,181
1994	165	47	212	1	17	18	705	2	219	926	110	1,267
1995	173	47	220	1	17	18	634	2	222	R858	111	1,207
1996	179	49	228	1	17	18	624	2	220	R846	116	R1,209
1997	180	50	230	1	18	19	645	2	216	R863	74	R1,185
1998	R180	49	R230	1	18	19	657	2	R213	871	58	R1,178
1999	R180	49	229	1	19	20	653	2	211	865	57	R1,171
2000	R177	51	R228	1	19	20	641	2	209	R853	56	R1,156
2001	R172	49	R221	1	19	20	640	2	R208	850	47	R1,139
2002	R169	R49	R218	1	19	20	627	2	207	R836	51	R1,125
2003	R168	R50	R217	1	19	20	632	2	205	839	46	R1,123
2004	R172	R51	R223	1	R19	21	718	2	204	924	46	R1,213
2005	182	R51	R233	1	20	21	734	2	207	R944	47	R1,244
2006	185	50	235	1	20	21	R747	2	209	R958	47	R1,261
2007 ^P	188	50	239	1	20	21	771	2	209	981	47	1,288

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

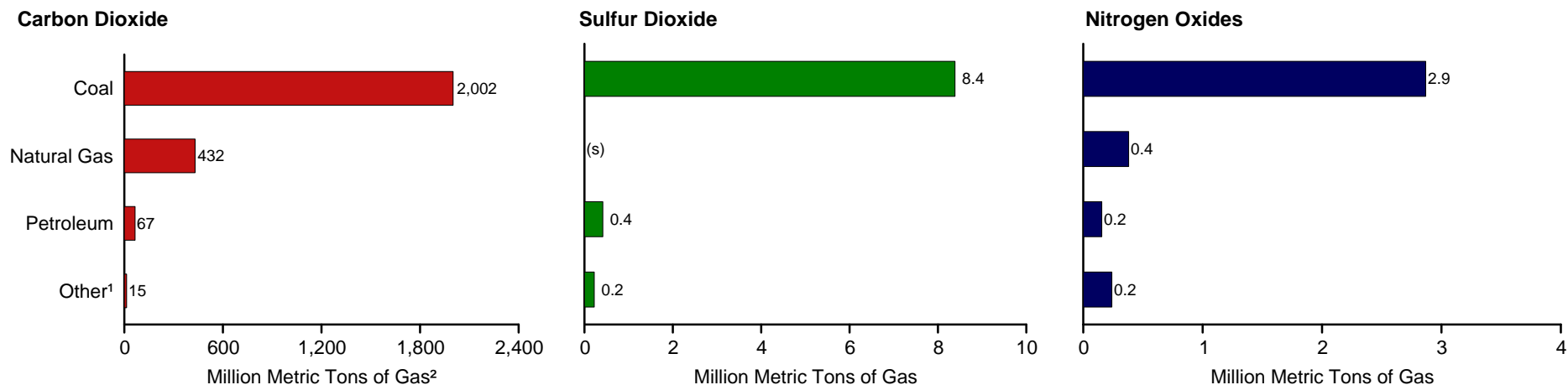
may be produced via anaerobic decomposition of organic materials in landfills, animal wastes, and rice paddies. • Because of the continuing goal to improve estimation methods for greenhouse gases, data are frequently revised on an annual basis in keeping with the latest findings of the international scientific community. • For information on units for measuring greenhouse gases, see [http://www.eia.doe.gov/oiaf/1605/ggprt/pdf/0573\(2007\).pdf](http://www.eia.doe.gov/oiaf/1605/ggprt/pdf/0573(2007).pdf), page 10, 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>.

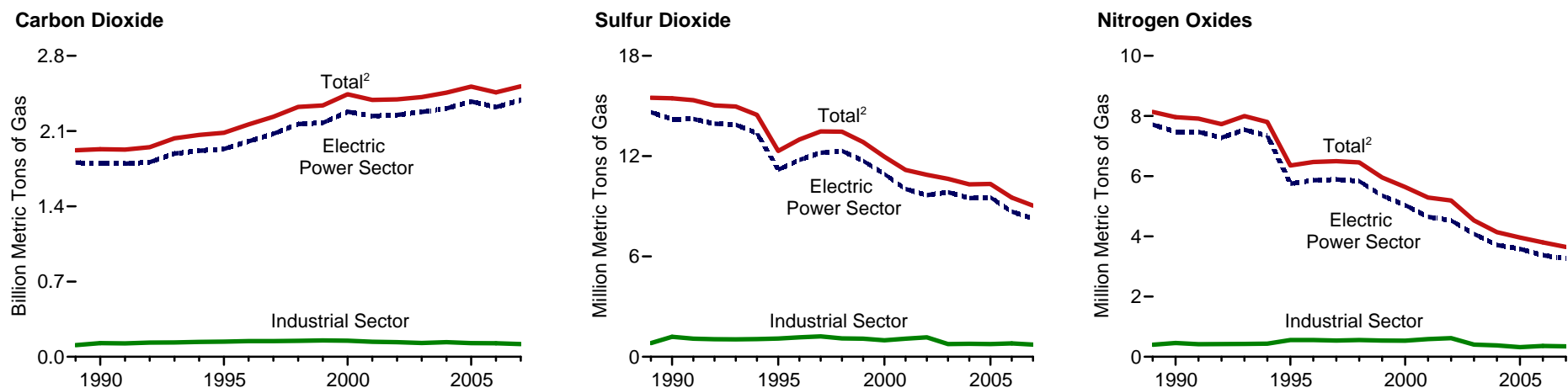
Sources: Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 2007* (December 2008), Tables 21-25; and EIA, Office of Integrated Analysis and Forecasting, estimates.

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

Emissions by Type of Generating Unit, 2007



Emissions by Sector, 1989-2007



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 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.

² Includes Commercial Sector.

(s)=Less than 0.05 million metric tons.

Sources: Tables 12.7a-12.7c.

**Table 12.7a Emissions From Energy Consumption for Electricity Generation and Useful Thermal Output:
Total (All Sectors), 1989-2007** (Sum of Tables 12.7b and 12.7c; Thousand Metric Tons of Gas)

Year	Carbon Dioxide ¹						Sulfur Dioxide					Nitrogen Oxides				
	Coal ²	Petroleum ³	Natural Gas ⁴	MSW ⁵	Geo-thermal ⁶	Total	Coal ²	Petroleum ³	Natural Gas ⁴	Other ⁷	Total	Coal ²	Petroleum ³	Natural Gas ⁴	Other ⁷	Total
1989	1,553,863	143,948	217,292	5,531	360	1,920,994	R14,469	R984	1	R39	R15,493	R7,281	R269	R495	R93	R8,136
1990	1,572,389	118,386	232,682	7,411	380	1,931,248	R14,281	R937	1	R243	R15,462	R7,119	R208	R513	R122	R7,961
1991	1,572,149	110,242	236,893	8,358	394	1,928,035	R14,240	R856	1	R246	R15,342	R7,109	R193	R498	R113	R7,913
1992	1,596,666	95,676	246,909	9,948	396	1,949,594	R14,060	R704	1	R264	R15,030	R6,975	R158	R477	R119	R7,728
1993	1,666,152	107,124	249,159	10,293	411	2,033,139	R13,843	R851	1	R271	R14,966	R7,225	R173	R475	R124	R7,997
1994	1,675,705	101,836	274,926	11,054	380	2,063,900	R13,398	R794	1	R279	R14,472	R7,005	R159	R513	R124	R7,801
1995	1,697,952	76,280	297,108	11,844	326	2,083,509	R11,188	R826	2	R298	R12,314	R5,136	R332	R653	R234	R6,355
1996	1,788,663	83,204	276,467	12,568	356	2,161,258	R11,811	R876	R1	R303	R12,991	R5,307	R352	R577	R238	R6,474
1997	1,834,871	92,618	291,673	13,176	370	2,232,709	R12,211	R965	R1	R303	R13,480	R5,322	R326	R619	R233	R6,500
1998	1,862,880	122,422	325,819	12,645	372	2,324,139	R12,012	R1,162	R1	R289	R13,465	R5,123	R395	R700	R241	R6,459
1999	1,869,576	114,722	341,375	12,611	377	2,338,660	R11,453	R1,101	R2	R288	R12,843	R4,687	R391	R632	R245	R5,955
2000	1,960,017	107,464	361,708	12,174	358	2,441,722	R10,729	R933	R2	R300	R11,963	R4,370	R404	R614	R250	R5,638
2001	1,895,181	116,084	365,311	12,821	349	2,389,745	R9,905	R1,002	2	R265	R11,174	R4,096	R294	R631	R268	R5,290
2002	1,912,656	90,208	377,055	14,759	369	2,395,048	R9,786	R773	2	R321	R10,882	R4,057	R225	R625	R287	R5,194
2003	1,947,172	110,955	343,394	13,793	367	2,415,680	R9,688	R717	2	R239	R10,646	R3,607	R240	R453	R232	R4,532
2004	1,962,742	114,653	365,205	13,956	377	2,456,934	R9,437	R633	2	R237	R10,309	R3,286	R225	R416	R217	R4,143
2005	2,001,237	115,944	381,927	14,128	374	2,513,609	R9,499	R588	2	R251	R10,340	R3,135	R221	R383	R222	R3,961
2006	1,974,057	67,326	403,024	15,023	371	2,459,800	R8,867	R427	2	R227	R9,524	R2,996	R164	R399	R240	R3,799
2007	2,002,351	67,112	432,363	14,382	372	2,516,580	8,389	422	4	227	9,042	2,870	157	382	242	3,650

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

² Anthracite, bituminous coal, subbituminous coal, lignite, waste coal, and synthetic coal.

³ Distillate fuel oil, residual fuel oil, petroleum coke, jet fuel, kerosene, other petroleum, and waste oil.

⁴ Natural gas, plus a small amount of supplemental gaseous fuels.

⁵ Municipal solid waste (only the estimated plastics portion of municipal solid waste is included) and tire-derived fuel.

⁶ Carbon dioxide in geothermal steam.

⁷ 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.

R=Revised.

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, 1989-2007 (Subset of Table 12.7a; Thousand Metric Tons of Gas)

Year	Carbon Dioxide ¹						Sulfur Dioxide					Nitrogen Oxides				
	Coal ²	Petroleum ³	Natural Gas ⁴	MSW ⁵	Geo-thermal ⁶	Total	Coal ²	Petroleum ³	Natural Gas ⁴	Other ⁷	Total	Coal ²	Petroleum ³	Natural Gas ⁴	Other ⁷	Total
1989	1,501,138	132,213	168,805	4,319	360	1,806,835	R13,815	R810	1	R7	R14,633	R7,055	R246	R390	R25	R7,717
1990	1,514,803	100,783	176,345	5,734	380	1,798,046	R13,576	R628	1	R13	R14,218	R6,878	R175	R390	R36	R7,480
1991	1,515,187	94,201	179,639	7,131	394	1,796,551	R13,590	R621	1	R15	R14,227	R6,886	R165	R384	R42	R7,476
1992	1,537,071	78,366	186,792	8,387	396	1,811,012	R13,375	R559	1	R12	R13,946	R6,749	R128	R359	R46	R7,282
1993	1,605,411	89,512	187,350	8,490	411	1,891,173	R13,133	R735	1	R13	R13,882	R6,996	R143	R357	R49	R7,544
1994	1,613,316	84,167	210,098	9,217	380	1,917,178	R12,695	R665	1	R11	R13,373	R6,777	R128	R390	R47	R7,343
1995	1,635,373	60,453	227,531	9,908	326	1,933,591	R10,573	R581	1	R34	R11,189	R4,974	R282	R402	R95	R5,754
1996	1,725,336	65,456	204,224	9,827	356	2,005,198	R11,129	R617	R1	R32	R11,779	R5,144	R301	R326	R96	R5,866
1997	1,771,312	74,368	219,073	10,227	370	2,075,350	R11,515	R653	R1	R36	R12,205	R5,157	R269	R370	R98	R5,894
1998	1,801,302	104,582	248,587	10,062	372	2,164,904	R11,372	R911	R1	R37	R12,321	R4,965	R337	R431	R103	R5,836
1999	1,807,766	96,956	261,143	10,165	377	2,176,407	R10,843	R836	R1	R42	R11,722	R4,535	R332	R381	R109	R5,357
2000	1,897,723	91,338	281,618	10,043	358	2,281,080	R10,140	R746	R1	R45	R10,932	R4,225	R367	R338	R111	R5,040
2001	1,837,763	101,874	289,646	10,787	349	2,240,419	R9,281	R754	2	5	R10,041	R3,878	R253	R425	R96	R4,652
2002	1,853,683	78,040	305,917	12,622	369	2,250,631	R9,106	R550	2	R16	R9,672	R3,813	R187	R425	R104	R4,528
2003	1,891,549	97,236	277,903	11,329	367	2,278,385	R9,255	R579	2	R13	R9,849	R3,496	R207	R282	R98	R4,082
2004	1,903,702	99,246	296,216	11,053	377	2,310,594	R8,991	R493	2	R9	R9,495	R3,183	R193	R241	R101	R3,717
2005	1,944,227	101,521	318,942	11,135	374	2,376,199	R9,071	R461	2	R10	R9,543	R3,051	R189	R243	R103	R3,585
2006	1,918,413	54,820	337,859	11,414	371	2,322,876	R8,416	R264	2	R8	R8,690	R2,902	R135	R230	R107	R3,374
2007	1,950,722	55,001	371,402	11,180	372	2,388,677	8,002	265	3	9	8,279	2,781	130	236	112	3,259

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

² Anthracite, bituminous coal, subbituminous coal, lignite, waste coal, and synthetic coal.

³ Distillate fuel oil, residual fuel oil, petroleum coke, jet fuel, kerosene, other petroleum, and waste oil.

⁴ Natural gas, plus a small amount of supplemental gaseous fuels.

⁵ Municipal solid waste (only the estimated plastics portion of municipal solid waste is included) and tire-derived fuel.

⁶ Carbon dioxide in geothermal steam.

⁷ 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.

R=Revised.

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, 1989-2007 (Subset of Table 12.7a; Thousand Metric Tons of Gas)

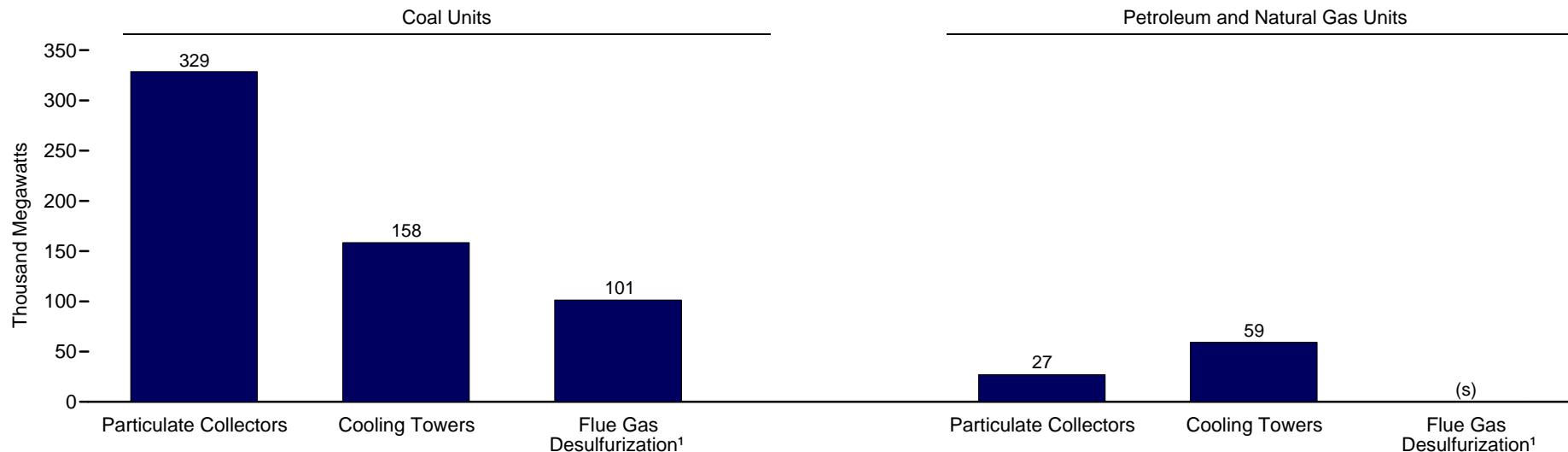
Year	Carbon Dioxide ¹						Sulfur Dioxide					Nitrogen Oxides				
	Coal ²	Petroleum ³	Natural Gas ⁴	MSW ⁵	Geo-thermal ⁶	Total	Coal ²	Petroleum ³	Natural Gas ⁴	Other ⁷	Total	Coal ²	Petroleum ³	Natural Gas ⁴	Other ⁷	Total
Commercial Sector ⁸																
1989	2,292	631	1,534	796	—	5,253	R37	R5	(s)	1	R43	R9	2	R3	3	R17
1990	2,388	699	2,282	949	—	6,319	R39	R4	(s)	1	R45	R10	1	6	4	R21
1991	2,648	538	2,276	1,004	—	6,466	R32	3	(s)	1	R35	R10	1	R6	4	R21
1992	2,521	469	2,773	1,245	—	7,008	R32	3	(s)	1	R35	R10	1	R7	4	R21
1993	2,953	610	3,298	1,273	—	8,134	R40	R3	(s)	1	R44	R12	1	R7	4	R24
1994	2,897	647	3,704	1,279	—	8,527	R39	3	(s)	(s)	R42	R11	1	8	4	R24
1995	3,069	504	4,049	1,447	—	9,070	R30	R3	(s)	R3	R35	R8	R6	R20	R11	R45
1996	3,596	529	4,347	2,003	—	10,475	R40	R3	(s)	R4	R47	R9	R4	R23	R14	R50
1997	3,825	712	4,630	2,252	—	11,419	R43	R3	(s)	R6	R51	R10	R7	R34	R14	R65
1998	3,303	826	4,683	2,054	—	10,867	R37	R5	(s)	R4	R45	R10	R5	R35	R16	R66
1999	3,428	734	4,512	1,988	—	10,662	R34	R4	(s)	R4	R42	R9	R4	R28	R17	R57
2000	3,590	733	4,582	1,667	—	10,573	R33	R4	(s)	R7	R43	R8	R4	R38	R16	R65
2001	3,328	831	4,258	1,404	—	9,820	R43	4	(s)	2	R48	R13	R2	R19	R16	R50
2002	2,988	566	4,015	1,505	—	9,074	R41	R2	(s)	2	R46	R13	R2	R20	R13	R48
2003	3,855	677	3,205	1,689	—	9,426	R32	3	(s)	R1	R36	R9	R5	R16	R15	R45
2004	3,969	910	3,896	1,943	—	10,718	R30	R3	(s)	2	R35	R8	8	R18	R16	R49
2005	3,982	751	4,066	1,878	—	10,676	R33	3	(s)	1	R36	R9	R6	R24	R15	R54
2006	3,860	440	4,435	1,926	—	10,662	R33	3	(s)	1	R36	R9	3	R35	R17	R64
2007	3,944	359	3,781	1,619	—	9,704	33	3	(s)	1	37	10	2	16	16	44
Industrial Sector ⁹																
1989	50,433	11,104	46,952	416	—	108,905	R616	R169	(s)	R32	R817	R218	R21	R100	R63	R403
1990	55,198	16,903	54,055	727	—	126,883	R666	R304	(s)	R229	R1,199	R233	R31	R116	R80	R461
1991	54,313	15,502	54,979	223	—	125,017	R618	R232	(s)	R230	R1,080	R215	R27	R108	R66	R416
1992	57,073	16,841	57,344	316	—	131,574	R655	R143	(s)	R251	R1,049	R218	R29	R110	R67	R425
1993	57,789	17,002	58,511	531	—	133,832	R671	R113	(s)	R257	R1,041	R219	R29	R110	R70	R429
1994	59,492	17,022	61,124	558	—	138,195	R664	R126	(s)	R267	R1,057	R219	R30	R114	R71	R435
1995	59,510	15,323	65,527	488	—	140,849	R585	R243	(s)	R262	R1,090	R154	R43	R231	R128	R556
1996	59,731	17,220	67,896	738	—	145,585	R642	R256	(s)	R268	R1,166	R154	R48	R228	R128	R558
1997	59,734	17,539	67,970	697	—	145,940	R653	R309	(s)	R261	R1,223	R155	R50	R215	R121	R541
1998	58,276	17,014	72,549	529	—	148,368	R603	R247	(s)	R248	R1,099	R148	R53	R234	R121	R557
1999	58,382	17,032	75,719	459	—	151,591	R576	R260	(s)	R243	R1,080	R144	R55	R223	R120	R541
2000	58,704	15,393	75,508	464	—	150,069	R556	R184	(s)	R248	R988	R138	R34	R238	R123	R533
2001	54,091	13,379	71,406	629	—	139,506	R581	R245	(s)	R259	R1,085	R206	R39	R187	R156	R587
2002	55,986	11,603	67,123	633	—	135,344	R639	R221	(s)	R303	R1,163	R231	R36	R181	R170	R618
2003	51,767	13,042	62,285	775	—	127,869	R401	R135	(s)	R224	R761	R102	R28	R155	R119	R404
2004	55,072	14,497	65,093	961	—	135,622	R415	R136	(s)	R227	R779	R95	R25	R157	R100	R376
2005	53,028	13,672	58,920	1,114	—	126,734	R395	R124	(s)	R241	R760	R75	R27	R117	R104	R322
2006	51,783	12,066	60,730	1,683	—	126,262	R419	R161	(s)	R218	R798	R86	R26	R134	R117	R362
2007	47,685	11,751	57,180	1,583	—	118,199	353	154	1	217	726	79	26	129	113	346

¹ Metric tons of carbon dioxide can be converted to metric tons of carbon equivalent by multiplying by 12/44.
² Anthracite, bituminous coal, subbituminous coal, lignite, waste coal, and synthetic coal.
³ Distillate fuel oil, residual fuel oil, petroleum coke, jet fuel, kerosene, other petroleum, and waste oil.
⁴ Natural gas, plus a small amount of supplemental gaseous fuels.
⁵ Municipal solid waste (only the estimated plastics portion of municipal solid waste is included) and tire-derived fuel.
⁶ Carbon dioxide in geothermal steam.
⁷ 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.
⁸ Commercial combined-heat-and-power (CHP) and commercial electricity-only plants.
⁹ Industrial combined-heat-and-power (CHP) and industrial electricity-only plants.

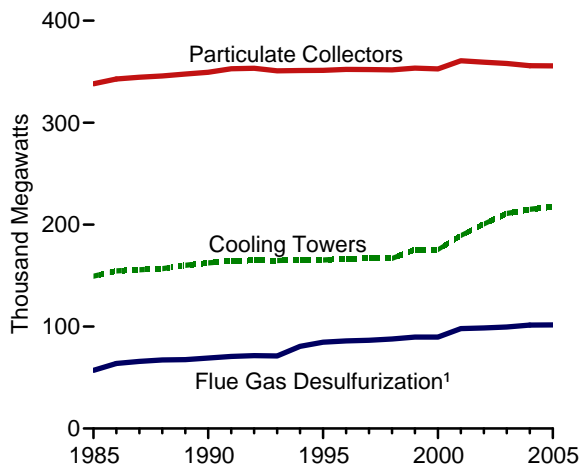
R=Revised. — = No data reported. (s)=Less than 0.5 thousand metric tons.
 Notes: • Data are for emissions from energy consumption for electricity generation and useful thermal output. • See Table 12.7b for electric power sector data. • See Note 2, "Classification of Power Plants Into Energy-Use Sectors," 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

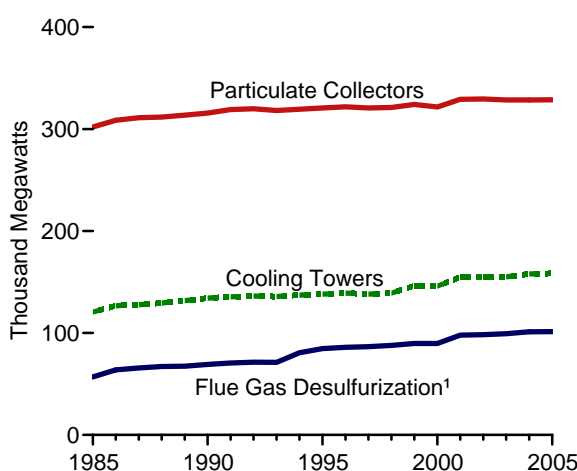
By Fuel and Equipment Type, 2005



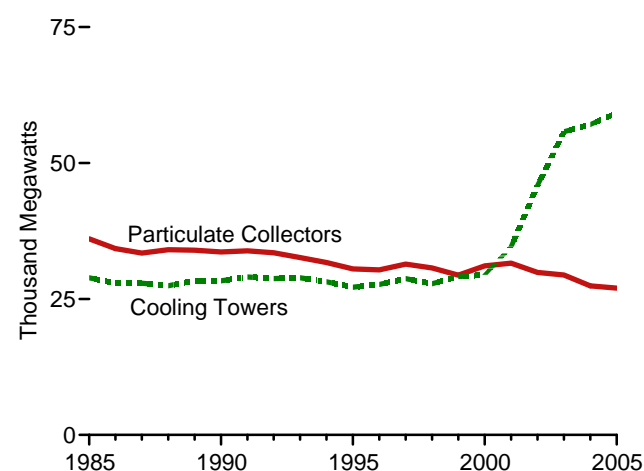
Total Units by Equipment Type, 1985-2005²



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.

Note: • Components are not additive because some generators are included in more than one category.

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."

