

Emissions of Greenhouse Gases in the United States 2005: Executive Summary

Table ES1. Summary of Estimated U.S. Emissions of Greenhouse Gases, 1990, 1995, and 1998-2005
 (Million Metric Tons of Gas)

Gas	1990	1995	1998	1999	2000	2001	2002	2003	2004	P2005
Carbon Dioxide.....	4,990.6	5,308.5	5,594.0	5,673.9	5,853.4	5,767.0	5,814.7	5,875.3	5,988.7	6,008.6
Methane.....	30.5	29.2	27.4	26.8	26.6	26.0	26.1	26.2	26.4	26.6
Nitrous Oxide.....	1.1	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.2	1.2
HFCs, PFCs, and SF ₆ ...	M	M	M	M	M	M	M	M	M	M

P = preliminary data.

M = mixture of gases. These gases cannot be summed in native units. See Table ES2 for estimated totals in carbon dioxide equivalent.

Note: Data in this table are revised from the data contained in the previous EIA report, *Emissions of Greenhouse Gases in the United States 2004*, DOE/EIA-0573(2004) (Washington, DC, December 2005).

Source: EIA estimates presented in *Emissions of Greenhouse Gases in the United States 2005*, DOE/EIA-0573(2005) (Washington, DC, November 2006).

Table ES2. U.S. Emissions of Greenhouse Gases, Based on Global Warming Potential, 1990, 1995, and 1998-2005
 (Million Metric Tons Carbon Dioxide Equivalent)

Gas	1990	1995	1998	1999	2000	2001	2002	2003	2004	P2005
Carbon Dioxide.....	4,990.6	5,308.5	5,594.0	5,673.9	5,853.4	5,767.0	5,814.7	5,875.3	5,988.7	6,008.6
Methane.....	701.7	672.5	629.8	616.5	611.2	597.7	600.2	602.2	606.5	611.9
Nitrous Oxide.....	333.5	357.7	348.8	346.8	342.8	337.9	333.6	332.9	359.9	366.6
HFCs, PFCs, and SF ₆ ...	87.1	94.9	134.3	133.9	138.0	128.5	137.8	136.6	149.5	160.2
Total.....	6,112.8	6,433.5	6,707.0	6,771.1	6,945.4	6,831.0	6,886.3	6,946.9	7,104.6	7,147.2

P = preliminary data.

Note: Data in this table are revised from the data contained in the previous EIA report, *Emissions of Greenhouse Gases in the United States 2004*, DOE/EIA-0573(2004) (Washington, DC, December 2005).

Sources: **Emissions:** Estimates presented in *Emissions of Greenhouse Gases in the United States 2005*, DOE/EIA-0573(2005) (Washington, DC, November 2006). **Global Warming Potentials:** Intergovernmental Panel on Climate Change, *Climate Change 2001: The Scientific Basis* (Cambridge, UK: Cambridge University Press, 2001), pp. 38 and 388-389.

Table ES3. U.S. Carbon Dioxide Emissions from Energy and Industry, 1990, 1995, and 1998-2005
(Million Metric Tons Carbon Dioxide)

Fuel Type or Process	1990	1995	1998	1999	2000	2001	2002	2003	2004	P2005
Energy Use by Sector										
Residential	953.7	1,030.7	1,088.1	1,111.3	1,171.9	1,161.1	1,186.4	1,214.0	1,213.9	1,253.8
Commercial	780.7	841.1	935.7	947.7	1,006.4	1,014.2	1,009.4	1,020.3	1,034.1	1,050.6
Industrial	1,683.6	1,728.6	1,782.3	1,770.5	1,778.0	1,702.8	1,684.8	1,688.0	1,736.0	1,682.3
Transportation	1,566.8	1,665.3	1,761.8	1,810.0	1,854.0	1,831.7	1,871.7	1,878.2	1,939.2	1,958.6
Energy Subtotal	4,984.8	5,265.8	5,567.8	5,639.5	5,810.2	5,709.8	5,752.2	5,800.5	5,923.2	5,945.3
Nonfuel Use Emissions^a	98.1	104.7	118.6	124.1	110.0	104.9	105.4	103.5	111.7	106.4
Nonfuel Use Sequestration	251.2	286.4	314.7	325.8	308.1	293.7	293.8	289.5	311.1	300.9
Adjustments to Energy										
U.S. Territories (+)	31.1	38.2	41.0	40.4	42.2	53.6	52.3	56.8	60.0	58.6
Military Bunker Fuels (-)	13.6	8.9	10.0	9.8	7.8	8.2	8.1	9.2	10.1	10.1
International Bunker Fuels (-)	100.1	91.9	104.9	97.4	93.5	89.6	81.2	75.0	90.1	90.6
<i>Bunker Fuels Subtotal (-)</i>	<i>113.7</i>	<i>100.8</i>	<i>114.9</i>	<i>107.2</i>	<i>101.3</i>	<i>97.8</i>	<i>89.3</i>	<i>84.2</i>	<i>100.2</i>	<i>100.7</i>
Total Energy Adjustments	-82.6	-62.6	-73.9	-66.8	-59.1	-44.1	-37.0	-27.5	-40.2	-42.1
Adjusted Energy Subtotal	4,902.3	5,203.2	5,494.0	5,572.7	5,751.1	5,665.7	5,715.2	5,773.0	5,883.0	5,903.2
Other Sources										
Natural Gas Flaring	9.1	17.2	6.2	6.7	5.5	5.9	6.0	5.9	5.9	5.9
Carbon Dioxide in Natural Gas	14.0	16.7	18.0	17.8	18.2	18.6	17.9	18.1	17.8	17.3
Cement Production	33.3	36.9	39.3	40.1	41.3	41.5	43.0	43.2	45.7	45.9
Other Industrial	26.8	28.4	29.7	29.3	29.4	27.4	26.4	27.6	28.5	28.1
Waste Combustion	5.1	6.2	6.9	7.2	7.9	8.0	6.2	7.5	7.7	8.3
Total Other Sources	88.3	105.3	100.1	101.2	102.3	101.3	99.5	102.3	105.7	105.4
Total	4,990.6	5,308.5	5,594.0	5,673.9	5,853.4	5,767.0	5,814.7	5,875.3	5,988.7	6,008.6

^aEmissions from nonfuel use are included in the sectoral totals above.

P = preliminary data.

Notes: Data in this table are revised from the data contained in the previous EIA report, *Emissions of Greenhouse Gases in the United States 2004*, DOE/EIA-0573(2004) (Washington, DC, December 2005). Totals may not equal sum of components due to independent rounding. Adjusted energy total includes U.S. Territories.

Source: EIA estimates presented in *Emissions of Greenhouse Gases in the United States 2005*, DOE/EIA-0573(2005) (Washington, DC, November 2006).

Table ES4. U.S. Methane Emissions from Anthropogenic Sources, 1990, 1995, and 1998-2005
(Million Metric Tons Carbon Dioxide Equivalent)

Source	1990	1995	1998	1999	2000	2001	2002	2003	2004	P2005
Energy Sources										
Coal Mining	97.7	83.8	75.6	71.5	68.1	68.0	64.1	64.2	67.3	65.5
Natural Gas Systems	128.9	137.6	143.9	144.2	151.0	147.0	154.0	153.2	154.7	154.0
Petroleum Systems	29.9	26.9	25.5	24.0	23.8	23.7	23.5	23.3	22.3	21.1
Stationary Combustion	12.9	11.8	8.9	9.3	10.0	8.7	8.9	9.3	9.5	9.7
Mobile Sources	5.6	4.8	4.7	4.6	4.6	4.5	4.4	4.2	4.4	4.5
Total Energy Sources	275.0	264.9	258.6	253.7	257.5	251.9	255.0	254.1	258.3	254.9
Waste Management										
Landfills	237.3	204.9	170.9	162.4	155.4	147.8	146.7	148.7	148.8	155.7
Wastewater Treatment	13.2	14.2	14.7	14.8	15.0	15.2	15.3	15.5	15.6	15.8
Total Waste Management ...	250.6	219.1	185.6	177.2	170.3	162.9	162.0	164.2	164.5	171.5
Agricultural Sources										
Enteric Fermentation	119.6	124.4	117.2	117.3	116.3	115.1	115.8	116.1	114.2	115.6
Animal Waste	43.5	49.9	53.6	52.7	52.8	53.3	53.7	54.2	54.7	55.3
Rice Cultivation	9.3	10.2	10.7	11.5	10.2	10.7	10.2	9.8	10.9	10.9
Crop Residue Burning	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.2	1.3	1.2
Total Agricultural Sources ...	173.4	185.4	182.6	182.5	180.4	180.3	180.7	181.3	181.1	183.0
Industrial Processes	2.7	3.0	3.1	3.1	2.9	2.5	2.6	2.6	2.7	2.5
Total	701.7	672.5	629.8	616.5	611.2	597.7	600.2	602.2	606.5	611.9

P = preliminary data.

Notes: Data in this table are revised from the data contained in the previous EIA report, *Emissions of Greenhouse Gases in the United States 2004*, DOE/EIA-0573(2004) (Washington, DC, December 2005). Totals may not equal sum of components due to independent rounding.

Sources: EIA estimates presented in *Emissions of Greenhouse Gases in the United States 2005*, DOE/EIA-0573 (2005) (Washington, DC, November 2006). Emissions calculations based on Intergovernmental Panel on Climate Change, *Greenhouse Gas Inventory Reference Manual: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, Vol. 3 (Paris, France, 1997), pp. 4.83-4.84, web site www.ipcc.ch/pub/guide.htm; and U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2004*, EPA 430-R-06-002 (Washington, DC, April 2006), web site <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUS EmissionsInventory2006.html>.

Table ES5. Estimated U.S. Emissions of Nitrous Oxide, 1990, 1995, and 1998-2005
(Million Metric Tons Carbon Dioxide Equivalent)

Source	1990	1995	1998	1999	2000	2001	2002	2003	2004	P2005
Agriculture										
Nitrogen Fertilization of Soils	186.9	187.3	194.0	192.7	189.4	189.1	185.1	186.6	211.9	218.1
Solid Waste of Domesticated Animals ..	61.9	65.6	62.8	62.3	61.8	61.4	61.1	60.7	60.3	61.2
Crop Residue Burning	0.5	0.5	0.6	0.5	0.6	0.6	0.5	0.5	0.6	0.6
Subtotal	249.3	253.4	257.4	255.6	251.8	251.1	246.8	247.8	272.9	279.9
Energy Use										
Mobile Combustion	37.4	52.2	54.3	54.0	53.6	52.4	51.2	50.5	52.0	52.6
Stationary Combustion	13.3	13.9	14.4	14.6	15.0	14.5	14.3	14.5	14.8	14.7
Subtotal	50.8	66.1	68.7	68.6	68.6	66.9	65.6	65.0	66.9	67.3
Industrial Sources	28.6	32.9	17.2	16.8	16.6	14.0	15.2	14.0	14.0	13.2
Waste Management										
Human Sewage in Wastewater	4.6	5.1	5.3	5.5	5.6	5.6	5.7	5.7	5.8	5.8
Waste Combustion	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Subtotal	4.9	5.4	5.5	5.8	5.8	6.0	6.0	6.1	6.1	6.2
Total	333.5	357.7	348.8	346.8	342.8	337.9	333.6	332.9	359.9	366.6

P = preliminary data.

Notes: Data in this table are revised from the data contained in the previous EIA report, *Emissions of Greenhouse Gases in the United States 2004*, DOE/EIA-0573(2004) (Washington, DC, December 2005). Totals may not equal sum of components due to independent rounding.

Sources: EIA estimates presented in *Emissions of Greenhouse Gases in the United States 2005*, DOE/EIA-0573 (2005) (Washington, DC, November 2006). Emissions calculations based on Intergovernmental Panel on Climate Change, *Greenhouse Gas Inventory Reference Manual: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, Vol. 3 (Paris, France, 1997), pp. 4.81-4.94, web site www.ipcc.ch/pub/guide.htm; and U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2004*, EPA 430-R-06-002 (Washington, DC, April 2006), web site <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUS EmissionsInventory2006.html>.

Table ES6. U.S. Emissions of Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride, 1990, 1995, and 1998-2005
(Million Metric Tons Carbon Dioxide Equivalent)

Gas	1990	1995	1998	1999	2000	2001	2002	2003	2004	P2005
Hydrofluorocarbons										
HFC-23	36.1	28.1	41.6	31.7	30.9	20.6	20.6	12.9	16.3	17.3
HFC-32	0.0	0.0	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4
HFC-125	0.0	4.4	10.7	12.1	13.6	14.9	16.3	17.9	19.8	22.1
HFC-134a	0.0	17.7	35.2	40.2	45.4	49.7	53.5	56.8	61.6	66.1
HFC-143a	0.0	0.9	5.9	7.5	9.3	11.4	13.8	16.5	19.5	23.0
HFC-236fa	0.0	0.0	0.6	1.3	2.0	2.6	3.2	3.5	3.5	2.9
Total HFCs	36.1	51.0	94.2	93.1	101.5	99.4	107.6	107.8	121.1	131.8
Perfluorocarbons										
CF ₄	14.6	10.0	8.4	8.3	8.4	3.8	5.0	3.8	3.2	3.2
C ₂ F ₆	5.4	5.4	5.8	5.8	4.9	3.3	3.8	3.3	3.4	3.0
NF ₃	*	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3
C ₃ F ₈	*	*	*	*	0.1	0.1	0.1	0.1	*	*
C ₄ F ₈	*	*	*	*	*	*	0.1	0.1	0.1	0.1
Total PFCs	20.0	15.5	14.2	14.2	13.6	7.3	9.2	7.6	7.0	6.7
Other HFCs, PFCs/PFPEs	0.4	2.1	4.9	5.0	4.9	4.7	4.7	4.7	5.4	6.1
Sulfur Hexafluoride	30.7	26.3	21.0	21.6	18.1	17.1	16.3	16.4	16.0	15.7
Total Emissions	87.1	94.9	134.3	133.9	138.0	128.5	137.8	136.6	149.5	160.2

*Less than 50,000 metric tons carbon dioxide equivalent.
P = preliminary data.
Notes: Other HFCs, PFCs/PFPEs include HFC-152a, HFC-227ea, HFC-245fa, HFC-4310mee, and a variety of PFCs and perfluoropolyethers (PFPEs). They are grouped together to protect confidential data. Totals may not equal sum of components due to independent rounding.
Source: U.S. Environmental Protection Agency, Office of Air and Radiation, web site www.epa.gov/globalwarming/ (preliminary estimates, September 2005).

Table ES7. Net Carbon Dioxide Sequestration from U.S. Land-Use Change and Forestry, 1990 and 1998-2004
(Million Metric Tons Carbon Dioxide Equivalent)

Component	1990	1998	1999	2000	2001	2002	2003	2004
Forest Land Remaining Forest Land:								
Changes in Forest Carbon Stocks	773.4	618.8	637.9	631.0	634.0	634.6	635.8	637.2
Cropland Remaining Cropland:								
Changes in Agricultural Soil Carbon Stocks and Liming Emissions	33.1	24.6	24.6	26.1	27.8	27.5	28.7	28.9
Land Converted to Cropland:								
Changes in Agricultural Soil Carbon Stocks	-1.5	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Grassland Remaining Grassland:								
Changes in Agricultural Soil Carbon Stocks	4.5	-7.5	-7.5	-7.4	-7.4	-7.4	-7.3	-7.3
Land Converted to Grassland:								
Changes in Agricultural Soil Carbon Stocks	17.6	21.1	21.1	21.1	21.1	21.1	21.1	21.1
Settlements Remaining Settlements	83.2	84.2	86.8	85.9	89.7	89.9	93.8	97.3
Urban Trees	58.7	73.3	77.0	77.0	80.7	80.7	84.3	88.0
Landfilled Yard Trimmings and Food Scraps	24.5	10.9	9.8	8.9	9.0	9.3	9.4	9.3
Total Net Flux	910.4	744.0	765.7	759.5	768.0	768.6	774.8	780.1

Note: Totals may not equal sum of components due to independent rounding.
Source: U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2004*, EPA 430-R-06-002 (Washington, DC, April 2006), web site <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUSEmissionsInventory2006.html>.