

Report #: DOE/EIA-0573(2004/es)

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Table ES1. Summary of Estimated U.S. Emissions of Greenhouse Gases, 1990 and 1996-2004
(Million Metric Tons of Gas)

Gas	1990	1996	1997	1998	1999	2000	2001	2002	2003	P2004
Carbon Dioxide.....	5,002.3	5,499.7	5,563.0	5,598.1	5,677.9	5,845.5	5,785.5	5,808.5	5,871.8	5,973.0
Methane	31.4	29.4	29.4	28.4	27.9	27.8	27.2	27.2	27.6	27.8
Nitrous Oxide	1.1	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.2
HFCs, PFCs, and SF ₆ ..	M	M	M	M	M	M	M	M	M	M

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

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 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004).

Sources: EIA estimates presented in *Emissions of Greenhouse Gases in the United States 2004*.

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Table ES2. U.S. Emissions of Greenhouse Gases, Based on Global Warming Potential, 1990 and 1996-2004
(Million Metric Tons Carbon Dioxide Equivalent)

Gas	1990	1996	1997	1998	1999	2000	2001	2002	2003	P2004
Carbon Dioxide	5,002.3	5,499.7	5,563.0	5,598.1	5,677.9	5,845.5	5,785.5	5,808.5	5,871.8	5,973.0
Methane	721.4	675.8	675.2	654.2	642.2	639.8	625.8	626.2	633.9	639.5
Nitrous Oxide.....	337.0	358.0	349.1	348.8	347.1	343.5	338.8	335.1	335.2	353.7
HFCs, PFCs, and SF ₆ ..	88.1	114.3	122.0	137.7	137.4	142.1	133.9	143.1	142.4	155.9
Total	6,148.8	6,647.7	6,709.3	6,738.8	6,804.7	6,970.8	6,884.1	6,912.9	6,983.2	7,122.1

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 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004).

Sources: **Emissions:** Estimates presented in this report. **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.

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Table ES3. U.S. Carbon Dioxide Emissions from Energy and Industry, 1990 and 1996-2004
 (Million Metric Tons Carbon Dioxide)

Fuel Type or Process	1990	1996	1997	1998	1999	2000	2001	2002	2003	P2004
Energy Use by Sector										
Residential	953.7	1,090.2	1,082.0	1,088.5	1,110.9	1,171.8	1,168.3	1,190.4	1,213.2	1,212.0
Commercial	780.7	872.1	916.1	934.1	947.3	1,005.9	1,026.2	1,019.8	1,021.1	1,024.2
Industrial.....	1,692.2	1,788.8	1,804.4	1,791.2	1,779.1	1,780.3	1,698.4	1,671.0	1,685.6	1,730.2
Transportation	1,569.9	1,705.3	1,722.7	1,757.9	1,806.0	1,844.2	1,835.5	1,864.9	1,875.7	1,933.7
Energy Subtotal	4,996.6	5,456.5	5,525.2	5,571.6	5,643.2	5,802.3	5,728.4	5,746.0	5,795.5	5,899.9
Nonfuel Use Emissions^a	98.1	105.6	110.5	118.6	124.1	110.0	104.9	107.0	105.2	114.3
Nonfuel Use Sequestration....	251.2	291.2	303.4	314.7	325.8	308.1	293.9	298.3	294.0	316.6
Adjustments to Energy										
U.S. Territories (+)	31.1	37.7	39.0	41.3	40.7	42.2	53.6	52.2	58.4	61.7
Military Bunker Fuels (-).....	13.6	8.9	9.6	10.0	9.8	7.8	8.2	8.1	9.2	9.2
International Bunker Fuels (-)....	100.1	93.3	100.1	104.9	97.4	93.5	89.6	81.2	75.0	84.4
<i>Bunker Fuels Subtotal (-)....</i>	<i>113.7</i>	<i>102.2</i>	<i>109.7</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>93.6</i>
Total Energy Adjustments....	-82.6	-64.5	-70.7	-73.6	-66.5	-59.1	-44.2	-37.1	-25.9	-31.9
Adjusted Energy Subtotal	4,914.0	5,392.0	5,454.6	5,498.0	5,576.8	5,743.1	5,684.2	5,709.0	5,769.6	5,868.0
Other Sources										
Natural Gas Flaring	9.1	16.5	15.5	6.2	6.7	5.5	5.9	6.0	5.9	5.9
Carbon Dioxide in Natural Gas..	14.0	17.8	18.0	18.0	17.8	18.2	18.6	17.9	18.0	17.8
Cement Production.....	33.3	37.2	38.4	39.3	40.1	41.3	41.5	43.0	43.2	44.8
Other Industrial.....	26.8	29.0	29.2	29.7	29.3	29.4	27.4	26.4	27.6	28.7
Waste Combustion.....	5.1	7.3	7.3	6.9	7.2	7.9	8.0	6.2	7.5	7.8
Total Other Sources.....	88.3	107.7	108.5	100.1	101.2	102.3	101.3	99.5	102.2	105.0
Total.....	5,002.3	5,499.7	5,563.0	5,598.1	5,677.9	5,845.5	5,785.5	5,808.5	5,871.8	5,973.0

^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 EIA report, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004). Totals may not equal sum of components due to independent rounding. Adjusted energy total includes U.S. Territories.

Sources: EIA estimates presented in *Emissions of Greenhouse Gases in the United States 2004*.

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Table ES4. U.S. Methane Emissions from Anthropogenic Sources, 1990 and 1996-2004
 (Million Metric Tons Carbon Dioxide Equivalent)

Source	1990	1996	1997	1998	1999	2000	2001	2002	2003	P2004
Energy Sources										
Coal Mining	97.7	73.4	80.4	75.6	71.7	68.5	68.0	64.7	67.2	68.2
Natural Gas Systems	128.9	138.1	144.3	143.9	144.2	151.0	147.0	154.0	153.1	152.6
Petroleum Systems	29.9	26.4	26.3	25.5	24.0	23.8	23.7	23.5	23.3	23.2
Stationary Combustion	13.0	13.3	10.1	9.1	9.6	10.1	8.7	7.6	8.5	8.0
Mobile Sources	5.6	5.1	5.1	4.8	4.8	4.7	4.6	4.6	4.3	4.4
Total Energy Sources	275.0	256.3	266.2	258.9	254.4	258.1	252.0	254.3	256.4	256.3
Waste Management										
Landfills	257.0	219.8	208.1	195.0	187.4	183.3	175.8	173.4	178.1	182.6
Wastewater Treatment	13.2	14.3	14.5	14.7	14.8	15.0	15.2	15.3	15.5	15.6
Total Waste Management...	270.2	234.2	222.6	209.7	202.2	198.3	191.0	188.7	193.6	198.2
Agricultural Sources										
Enteric Fermentation	119.6	122.0	119.1	117.2	117.3	116.3	115.1	115.7	116.2	115.2
Animal Waste	43.5	49.7	52.7	53.6	52.7	52.8	53.3	53.7	54.2	54.7
Rice Cultivation	9.3	9.4	10.3	10.7	11.5	10.2	10.7	10.2	9.8	11.0
Crop Residue Burning	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.2	1.3
Total Agricultural Sources ..	173.4	182.2	183.3	182.6	182.5	180.5	180.3	180.6	181.3	182.3
Industrial Processes	2.7	3.1	3.1	3.1	3.1	2.9	2.5	2.6	2.6	2.7
Total	721.4	675.8	675.2	654.2	642.2	639.8	625.8	626.2	633.9	639.5

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 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004). Totals may not equal sum of components due to independent rounding.

Sources: EIA estimates presented in this report. 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. U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2003*, EPA-430-R-05-003 (Washington, DC, April 2005), web site <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUSEmissionsInventory2005.html>.

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Table ES5. Estimated U.S. Emissions of Nitrous Oxide, 1990 and 1996-2004
 (Million Metric Tons Carbon Dioxide Equivalent)

Source	1990	1996	1997	1998	1999	2000	2001	2002	2003	P2004
Agriculture										
Nitrogen Fertilization of Soils	186.9	184.2	190.5	194.0	192.7	189.4	189.1	185.1	186.6	204.3
Solid Waste of Domesticated Animals ..	61.9	65.1	63.8	62.9	62.4	61.8	61.4	61.2	60.7	60.3
Crop Residue Burning	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.5	0.5	0.6
Subtotal	249.3	249.8	254.8	257.4	255.6	251.8	251.1	246.8	247.8	265.2
Energy Use										
Mobile Combustion	41.1	53.9	52.4	54.2	54.3	54.3	53.3	53.0	53.0	53.8
Stationary Combustion.....	13.3	14.5	14.6	14.5	14.7	15.1	14.5	14.2	14.5	14.7
Subtotal	54.4	68.5	67.0	68.7	68.9	69.4	67.9	67.2	67.5	68.4
Industrial Sources	28.6	34.3	21.8	17.2	16.8	16.6	14.0	15.2	14.0	14.0
Waste Management										
Human Sewage in Wastewater	4.6	5.2	5.2	5.3	5.5	5.6	5.6	5.7	5.7	5.8
Waste Combustion	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Subtotal	4.8	5.4	5.4	5.5	5.7	5.8	5.9	5.9	6.0	6.0
Total	337.0	358.0	349.1	348.8	347.1	343.5	338.8	335.1	335.2	353.7

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 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004). Totals may not equal sum of components due to independent rounding.

Sources: Estimates presented in this report. 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: 1990-2003*, EPA 430-R-05-003 (Washington, DC, April 2005), web site <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUSEmissionsInventory2005.html>.

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**Table ES6. U.S. Emissions of Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride,
 1990 and 1996-2004**
 (Million Metric Tons Carbon Dioxide Equivalent)

Gas	1990	1996	1997	1998	1999	2000	2001	2002	2003	P2004
Hydrofluorocarbons										
HFC-23	36.1	32.3	31.2	41.7	31.7	30.9	20.6	20.6	13.0	16.3
HFC-125	0.0	6.3	8.6	10.7	12.1	13.6	14.9	16.2	17.8	19.7
HFC-134a	0.0	24.5	31.4	36.7	42.2	48.0	52.7	56.9	60.5	65.8
HFC-143a	0.0	2.3	4.0	5.9	7.5	9.3	11.4	13.8	16.5	19.5
HFC-236fa	0.0	0.0	0.1	0.6	1.3	2.0	2.6	3.2	3.5	3.5
Total HFCs	36.1	65.5	75.1	95.5	94.9	103.8	102.2	110.7	111.3	124.8
Perfluorocarbons										
CF ₄	14.8	11.0	10.1	8.7	8.6	8.7	4.2	5.0	3.8	3.2
C ₂ F ₆	4.8	5.4	5.6	5.9	6.0	5.0	3.4	3.8	3.4	3.5
Total PFCs	19.6	16.4	15.7	14.6	14.6	13.7	7.6	8.8	7.2	6.7
Other HFCs, PFCs/PFPEs	0.3	3.4	4.5	5.5	6.2	6.5	6.7	7.1	7.6	8.6
Sulfur Hexafluoride	32.1	29.1	26.7	22.1	21.7	18.1	17.4	16.4	16.3	16.0
Total Emissions	88.1	114.3	122.0	137.7	137.4	142.1	133.9	143.1	142.4	155.9

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).

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**Table ES7. Net Carbon Dioxide Sequestration from U.S. Land-Use Change and Forestry,
1990 and 1997-2003**
(Million Metric Tons Carbon Dioxide Equivalent)

Component	1990	1997	1998	1999	2000	2001	2002	2003
Forest Land Remaining Forest Land:								
Changes in Forest Carbon Stocks	949.3	851.0	805.5	751.7	747.9	750.9	751.5	752.7
Cropland Remaining Cropland:								
Changes in Agricultural Soil Carbon Stocks ...	8.1	7.4	4.3	4.3	5.7	7.1	6.2	6.6
Settlements Remaining Settlements	84.7	71.6	71.2	70.0	68.9	68.9	68.8	68.7
Urban Trees	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7
Landfilled Yard Trimmings and Food Scraps ..	26.0	12.9	12.5	11.4	10.2	10.3	10.2	10.1
Total Net Flux	1,042.1	930.0	881.0	826.0	822.5	826.9	826.5	828.0

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: 1990-2003*, EPA 430-R-05-003 (Washington, DC, April 2005), web site <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUSEmissionsInventory2005.html>.