Fast Facts

Fast Facts: U.S. Greenhouse Gas Emissions and Sinks

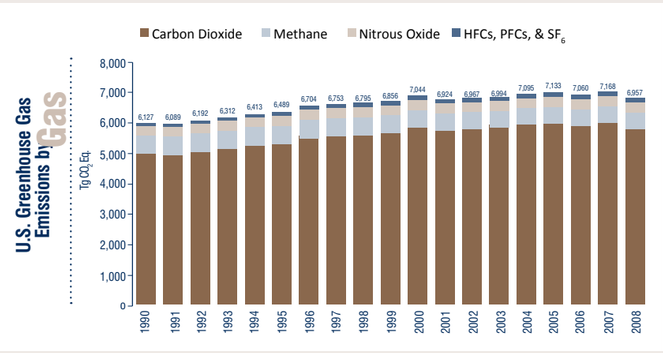
Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2008

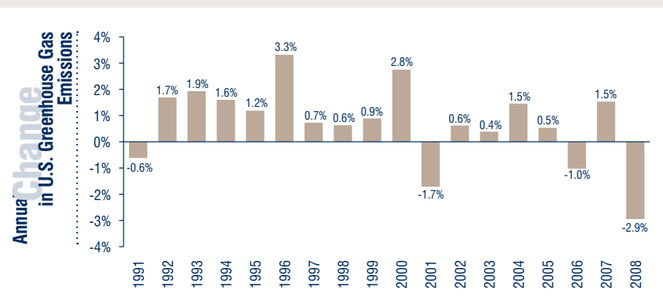
U.S. Greenhouse Gas Emissions and Sinks ($Tg\ CO_2$ Equivalents)

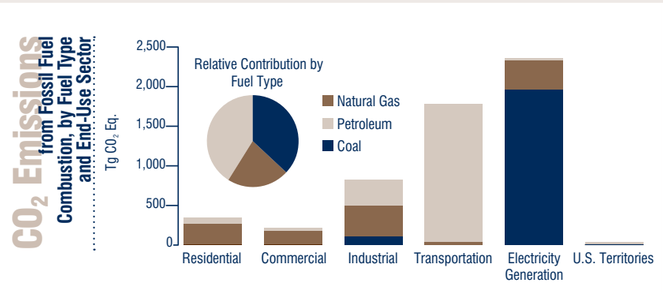
Gas/Source	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Change from 1990 to 2008: Absolute	Change from 1990 to 2008: Percent
CO_2	**5,100.8**	**5,059.3**	**5,164.8**	**5,274.7**	**5,361.3**	**5,427.3**	**5,603.4**	**5,689.8**	**5,721.7**	**5,799.5**	**5,977.2**	**5,876.5**	**5,917.6**	**5,970.9**	**6,076.9**	**6,108.4**	**6,017.2**	**6,120.2**	**5,921.2**	**820.4**	**16%**
Fossil Fuel Combustion	4,735.7	4,698.1	4,797.9	4,908.2	4,975.2	5,029.5	5,213.8	5,284.5	5,313.9	5,388.6	5,593.4	5,521.0	5,555.2	5,623.8	5,708.8	5,753.3	5,652.8	5,757.0	5,572.8	837.1	18%
Non-Energy Use of Fuels	119.6	126.5	129.2	128.5	140.6	142.9	137.1	150.0	166.1	170.8	146.1	135.8	141.4	132.2	149.3	136.5	141.4	135.3	134.2	14.6	12%
Iron and Steel & Metallurgical Coke Production	102.6	93.3	93.4	89.3	92.1	95.7	93.6	94.9	88.7	86.4	88.1	77.5	73.8	71.4	69.8	67.7	70.5	72.8	69.0	(33.6)	(33%)
Cement Production	33.3	32.5	32.8	34.6	36.1	36.8	37.1	38.3	39.2	40.0	41.2	41.4	42.9	43.1	45.6	45.9	46.6	45.2	41.1	7.9	24%
Natural Gas Systems	37.3	37.5	37.3	40.6	40.7	42.2	39.8	39.3	29.3	30.3	29.4	28.8	29.6	28.4	28.1	29.5	29.5	30.8	30.0	(7.3)	(20%)
Lime Production	11.5	11.4	11.8	12.1	12.6	13.3	14.1	14.3	14.6	14.3	14.1	13.6	13.1	13.8	14.5	14.4	15.1	14.6	14.3	2.8	24%
Incineration of Waste	8.0	8.0	9.6	9.8	10.9	11.5	12.1	12.0	11.0	11.2	11.3	11.6	12.0	12.3	12.6	12.6	12.7	13.3	13.1	5.1	63%
Ammonia Production and Urea Consumption	16.8	16.8	17.5	17.8	18.4	17.8	17.7	18.0	19.0	17.6	16.4	13.3	14.2	12.4	13.2	12.8	12.3	14.0	11.8	(5.1)	(30%)
Cropland Remaining Cropland	7.1	7.3	6.9	6.4	6.8	7.0	7.0	7.0	7.7	7.5	7.5	7.8	8.5	8.3	7.6	7.9	7.9	8.3	7.6	0.6	8%
Limestone and Dolomite Use	5.1	4.5	4.6	4.3	4.8	6.7	7.2	6.7	6.9	7.6	5.1	4.8	5.6	4.1	5.9	6.8	8.0	7.7	6.6	1.5	29%
Aluminum Production	6.8	6.9	6.8	6.2	5.5	5.7	6.0	6.0	6.2	6.3	6.1	4.4	4.5	4.5	4.2	4.1	3.8	4.3	4.5	(2.4)	(34%)
Soda Ash Production and Consumption	4.1	4.0	4.1	4.0	4.0	4.3	4.2	4.4	4.3	4.2	4.2	4.1	4.1	4.1	4.2	4.2	4.2	4.1	4.1	(+)	(1%)
Petrochemical Production	3.3	3.4	3.6	3.8	4.0	4.1	4.1	4.4	4.5	4.6	4.5	4.2	4.3	4.1	4.3	4.2	3.8	3.9	3.4	0.1	4%
Titanium Dioxide Production	1.2	1.2	1.4	1.4	1.5	1.5	1.5	1.7	1.7	1.7	1.8	1.7	1.8	1.8	2.1	1.8	1.8	1.9	1.8	0.6	51%
Carbon Dioxide Consumption	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.8	1.0	1.3	1.2	1.3	1.7	1.9	1.8	0.4	26%
Ferroalloy Production	2.2	1.9	2.0	1.9	2.0	2.0	2.1	2.2	2.2	2.2	1.9	1.5	1.3	1.3	1.4	1.4	1.5	1.6	1.6	(0.6)	(26%)
Phosphoric Acid Production	1.5	1.4	1.5	1.3	1.5	1.5	1.6	1.5	1.6	1.5	1.4	1.3	1.3	1.4	1.4	1.4	1.2	1.2	1.2	(0.3)	(22%)
Wetlands Remaining Wetlands	1.0	1.0	0.9	1.0	0.9	1.0	0.9	1.0	1.1	1.2	1.2	1.1	1.0	1.0	1.1	1.1	0.9	1.0	0.9	(0.1)	(9%)
Petroleum Systems	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	(0.1)	(19%)
Zinc Production	0.9	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.0	0.9	0.5	0.5	0.5	0.5	0.4	0.4	(0.5)	(57%)
Lead Production	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	(+)	(8%)
Silicon Carbide Production and Consumption	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	(0.2)	(53%)
Land Use, Land-Use Change, and Forestry (Sink)[a]	*(909.4)*	*(883.3)*	*(862.8)*	*(801.7)*	*(903.1)*	*(842.9)*	*(740.1)*	*(769.6)*	*(649.4)*	*(614.1)*	*(664.2)*	*(746.8)*	*(908.7)*	*(930.3)*	*(947.1)*	*(950.4)*	*(959.2)*	*(955.4)*	*(940.3)*	*(30.9)*	*3%*
Wood Biomass and Ethanol Consumption[b]	*219.3*	*220.1*	*230.5*	*225.7*	*232.2*	*236.8*	*241.2*	*235.5*	*218.1*	*221.4*	*227.3*	*203.2*	*204.4*	*209.5*	*224.8*	*229.4*	*238.3*	*245.7*	*251.8*	*32.4*	*15%*
International Bunker Fuels[b]	*111.8*	*120.7*	*113.3*	*102.2*	*104.7*	*99.8*	*107.5*	*110.2*	*119.5*	*101.8*	*98.5*	*96.6*	*104.2*	*99.8*	*114.1*	*110.5*	*129.1*	*127.1*	*135.2*	*23.4*	*21%*
CH_4	**613.4**	**614.5**	**619.6**	**609.0**	**621.6**	**613.2**	**617.6**	**596.5**	**589.2**	**586.1**	**586.0**	**574.4**	**576.6**	**569.5**	**557.2**	**553.2**	**568.2**	**569.2**	**567.6**	**(45.8)**	**(7%)**
Enteric Fermentation	132.4	132.5	136.7	138.2	140.6	143.7	142.7	139.9	138.4	138.3	136.8	136.0	136.3	134.5	134.6	136.7	139.0	141.2	140.8	8.5	6%
Landfills	149.3	150.6	151.8	151.6	150.4	144.1	140.7	133.7	127.3	124.4	120.7	117.7	120.4	126.0	123.7	125.6	127.1	126.5	126.3	(23.0)	(15%)
Natural Gas Systems	129.5	130.7	131.0	132.3	133.4	132.6	134.5	132.7	129.9	125.8	130.7	129.1	128.6	125.8	115.8	103.6	103.1	99.5	96.4	(33.1)	(26%)
Coal Mining	84.1	81.1	79.0	67.7	68.1	67.1	66.8	66.4	66.8	62.9	60.4	60.4	56.8	56.8	58.1	56.9	58.3	58.1	67.6	(16.4)	(20%)
Manure Management	29.3	30.6	29.5	30.8	32.9	33.9	33.2	34.8	38.0	38.2	38.6	40.1	41.2	38.4	40.2	42.2	42.3	45.9	45.0	15.7	54%
Petroleum Systems	33.9	34.1	33.2	32.4	32.3	32.0	31.9	31.8	31.5	30.7	30.2	30.1	29.8	29.1	28.7	28.2	28.2	28.8	29.1	(4.8)	(14%)
Wastewater Treatment	23.5	23.9	24.3	24.4	24.7	24.8	24.9	25.2	25.2	25.3	25.2	24.7	24.7	24.5	24.5	24.3	24.5	24.4	24.3	0.8	3%
Forest Land Remaining Forest Land	3.2	2.8	4.2	2.6	7.7	4.3	12.1	2.4	3.2	11.2	14.3	8.3	12.6	8.0	4.6	9.8	21.6	20.0	11.9	8.7	275%
Rice Cultivation	7.1	7.0	7.9	7.0	8.2	7.6	7.0	7.5	7.9	8.3	7.5	7.6	6.8	6.9	7.6	6.8	5.9	6.2	7.2	0.1	1%
Stationary Combustion	7.4	7.6	7.8	7.3	7.2	7.1	7.4	6.7	6.2	6.3	6.6	6.2	6.2	6.4	6.5	6.6	6.2	6.5	6.7	(0.7)	(10%)
Abandoned Underground Coal Mines	6.0	6.2	6.7	6.9	8.1	8.2	8.5	7.6	6.9	7.0	7.4	6.7	6.2	6.0	5.8	5.6	5.5	5.7	5.9	(0.1)	(2%)
Mobile Combustion	4.7	4.6	4.5	4.5	4.4	4.3	4.1	4.0	3.8	3.5	3.4	3.3	2.9	2.7	2.6	2.5	2.3	2.2	2.0	(2.6)	(56%)
Composting	0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.3	1.3	1.3	1.5	1.6	1.6	1.6	1.7	1.7	1.4	422%
Field Burning of Agricultural Residues	0.8	0.7	0.8	0.7	0.9	0.7	0.8	0.9	0.9	0.9	0.9	0.9	0.8	0.9	1.0	0.9	0.9	1.0	1.0	0.2	27%
Petrochemical Production	0.9	0.9	0.9	1.0	1.1	1.1	1.1	1.2	1.2	1.3	1.2	1.1	1.2	1.1	1.2	1.1	1.0	1.0	0.9	+	6%
Iron and Steel & Metallurgical Coke Production	1.0	0.8	0.9	0.9	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.6	(0.3)	(32%)
Ferroalloy Production	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	(+)	(32%)
Silicon Carbide Production and Consumption	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	(+)	(67%)
Incineration of Waste	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	(+)	(16%)
International Bunker Fuels[b]	*0.2*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.2*	*0.2*	*(+)*	*(0%)*
N_2O	**322.3**	**332.6**	**321.2**	**341.6**	**340.8**	**342.5**	**367.5**	**344.1**	**349.5**	**336.3**	**345.5**	**347.1**	**338.3**	**323.4**	**321.9**	**328.3**	**329.5**	**327.7**	**318.2**	**(4.1)**	**(1%)**
Agricultural Soil Management	203.5	212.6	198.1	215.3	206.6	205.9	222.3	212.6	222.3	203.9	210.1	224.3	214.6	207.2	212.7	215.8	211.2	211.0	215.9	12.4	6%
Mobile Combustion	43.9	46.0	49.0	51.1	52.8	54.0	54.7	55.3	55.2	54.1	53.2	50.3	46.3	42.8	40.1	36.9	33.6	30.3	26.1	(17.8)	(40%)
Nitric Acid Production	18.9	18.9	19.4	19.6	20.7	21.0	21.9	22.5	22.1	21.3	20.7	16.8	18.2	17.1	17.0	17.6	17.2	20.5	19.0	0.1	1%
Manure Management	14.4	14.4	14.4	14.4	15.1	15.5	15.4	15.6	15.7	16.3	16.7	16.5	16.8	16.3	16.4	16.6	17.3	17.3	17.1	2.7	19%
Stationary Combustion	12.8	12.8	13.0	13.2	13.3	13.3	13.9	14.1	13.9	14.0	14.5	14.1	14.0	14.3	14.5	14.7	14.5	14.6	14.2	1.4	11%
Forest Land Remaining Forest Land	2.7	2.3	3.5	2.2	6.4	3.7	10.2	2.2	2.9	9.7	12.1	7.2	10.7	7.0	4.1	8.4	18.0	16.7	10.1	7.4	279%
Wastewater Treatment	3.7	3.8	3.9	3.9	4.0	4.0	4.1	4.1	4.2	4.4	4.5	4.6	4.5	4.5	4.6	4.7	4.8	4.9	4.9	1.3	34%
N_2O from Product Uses	4.4	4.3	4.0	4.6	4.6	4.6	4.6	4.9	4.9	4.9	4.9	4.9	4.4	4.4	4.4	4.4	4.4	4.4	4.4	(+)	(0%)
Adipic Acid Production	15.8	15.4	13.5	14.6	14.2	17.6	17.4	9.8	5.4	4.9	5.5	4.7	5.2	5.8	3.8	5.0	4.3	3.7	2.0	(13.7)	(87%)
Composting	0.4	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.4	1.4	1.4	1.6	1.7	1.7	1.8	1.8	1.8	1.5	422%
Settlements Remaining Settlements	1.0	1.0	1.1	1.2	1.3	1.2	1.1	1.1	0.9	0.8	1.1	1.4	1.4	1.4	1.5	1.5	1.5	1.6	1.6	0.6	61%
Field Burning of Agricultural Residues	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.1	35%
Incineration of Waste	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	(0.1)	(16%)
Wetlands Remaining Wetlands	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	(+)	(5%)
International Bunker Fuels[b]	*1.1*	*1.1*	*1.1*	*1.0*	*1.0*	*0.9*	*1.0*	*1.0*	*1.1*	*1.0*	*0.9*	*0.9*	*1.0*	*0.9*	*1.1*	*1.0*	*1.2*	*1.2*	*1.2*	*0.2*	*18%*
HFCs, PFCs, and SF_6	**90.3**	**82.5**	**86.2**	**86.2**	**88.9**	**105.8**	**115.5**	**122.4**	**135.0**	**134.1**	**135.8**	**125.9**	**134.4**	**129.9**	**139.4**	**143.3**	**144.9**	**151.0**	**149.7**	**59.4**	**66%**
Substitution of Ozone Depleting Substances	0.3	0.6	1.7	5.5	12.5	29.0	40.3	51.3	58.7	66.5	74.3	80.3	86.4	92.2	98.2	103.2	107.7	110.1	113.0	112.7	34,030%
HCFC-22 Production	36.4	32.7	36.4	33.1	31.5	33.0	31.2	30.1	39.5	30.4	28.6	19.7	21.1	12.3	17.2	15.8	13.8	17.0	13.6	(22.8)	(63%)
Electrical Transmission and Distribution	26.6	25.5	25.4	24.6	23.2	21.4	19.6	17.9	15.3	15.6	15.0	15.1	14.5	14.0	13.9	14.0	13.2	12.7	13.1	(13.6)	(51%)
Semiconductor Manufacture	2.9	2.9	2.9	3.6	4.0	4.9	5.5	5.8	7.1	7.2	6.2	4.4	4.3	4.3	4.3	4.4	4.7	4.7	5.4	2.4	84%
Aluminum Production	18.5	15.6	14.3	13.7	12.1	11.8	12.4	10.8	8.6	8.5	8.6	3.5	5.2	3.8	2.8	3.0	2.5	3.8	2.7	(15.8)	(85%)
Magnesium Production and Processing	5.4	5.2	5.5	5.6	5.4	5.6	6.6	6.4	5.9	5.9	3.0	2.9	2.9	3.4	2.9	2.9	2.9	2.6	2.0	(3.4)	(63%)
Total	**6,126.8**	**6,089.0**	**6,191.9**	**6,311.6**	**6,412.6**	**6,488.8**	**6,704.1**	**6,752.8**	**6,795.4**	**6,855.9**	**7,044.5**	**6,923.9**	**6,966.9**	**6,993.7**	**7,095.5**	**7,133.2**	**7,059.9**	**7,168.1**	**6,956.8**	**830.0**	**14%**
Net Emissions (Sources and Sinks)	**5,217.3**	**5,205.7**	**5,329.0**	**5,509.9**	**5,509.5**	**5,646.0**	**5,963.9**	**5,983.2**	**6,146.1**	**6,241.8**	**6,380.2**	**6,177.1**	**6,058.2**	**6,063.3**	**6,148.4**	**6,182.8**	**6,100.7**	**6,212.7**	**6,016.4**	**799.1**	**15%**

1990–2008 Trends

- Total GHG emissions rose 13.5 percent since 1990
- Dominant gas emitted was CO_2, mostly from fossil fuel combustion
- Methane emissions decreased by 7.5 percent
- Nitrous oxide emissions decreased by 1.3 percent
- HFC, PFC, and SF_6 emissions have grown by 65.9 percent







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Office of Atmospheric Programs (6207J)
April 2010

+ Does not exceed 0.05 Tg CO_2 Eq.
[a] Sinks are only included in net emissions totals.
[b] Emissions from International Bunker Fuels and Wood Biomass and Ethanol Consumption are not included in totals.
Note: Totals may not sum due to independent rounding. Emissions weighted using GWP values from IPCC Second Assessment Report (1996) in keeping with UNFCCC reporting guidelines.

Reference Tables
Inventory of U.S. Greenhouse Gas Emissions and Sinks
Economic Sectors

Conversions and Units

Global Warming Potentials
(100 Year Time Horizon)

Gas	GWP	
	SAR[a]	AR4[b]
Carbon dioxide (CO_2)	1	1
Methane (CH_4)*	21	25
Nitrous oxide (N_2O)	310	298
HFC-23	11,700	14,800
HFC-125	2,800	3,500
HFC-134a	1,300	1,430
HFC-143a	3,800	4,470
HFC-152a	140	124
HFC-227ea	2,900	3,220
HFC-236fa	6,300	9,810
HFC-4310mee	1,300	1,640
CF_4	6,500	7,390
C_2F_6	9,200	12,200
C_4F_{10}	7,000	8,860
C_6F_{14}	7,400	9,300
SF_6	23,900	22,800

[a] *IPCC Second Assessment Report* (1996)
[b] *IPPC Fourth Assessment Report* (2007)
* The methane GWP includes the direct effects and those indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO_2 is not included.

Note: GWP values from the *IPCC Second Assessment Report* are used in accordance with UNFCCC guidelines.

Global Warming Potential (GWP) is defined as the cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas. The GWP-weighted emissions of direct greenhouse gases in the U.S. Inventory are presented in terms of equivalent emissions of carbon dioxide (CO_2), using units of teragrams of carbon dioxide equivalents (Tg CO_2 Eq.).

Conversion:

$$\text{Tg} = 10^9 \text{ kg} = 10^6 \text{ metric tons}$$
$$= 1 \text{ million metric tons}$$

The molecular weight of carbon is 12, and the molecular weight of oxygen is 16; therefore, the molecular weight of CO_2 is 44 (i.e., 12+[16×2]), as compared to 12 for carbon alone. Thus, the weight ratio of carbon to carbon dioxide is 12/44.

Conversion from gigagrams of gas to teragrams of carbon dioxide equivalents:

$$\text{Tg CO}_2\text{ Eq.} = \left(\frac{\text{Gg}}{\text{of gas}}\right) \times (\text{GWP}) \times \left(\frac{\text{Tg}}{\text{1,000 Gg}}\right)$$

Energy Conversions

The common energy unit used in international reports of greenhouse gas emissions is the joule. A joule is the energy required to move an object one meter with the force of one Newton. A terajoule (TJ) is one trillion (10^{12}) joules. A British thermal unit (Btu, the customary U.S. energy unit) is the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit at or near 39.2 Fahrenheit.

1 TJ = 2.388×10^{11} calories
23.88 metric tons of crude oil equivalent
9.478×10^8 Btu
277,800 kilowatt-hours

Energy Units

Btu	British thermal unit	1 Btu
MBtu	Thousand Btu	1×10^3 Btu
MMBtu	Million Btu	1×10^6 Btu
BBtu	Billion Btu	1×10^9 Btu
TBtu	Trillion Btu	1×10^{12} Btu
QBtu	Quadrillion Btu	1×10^{15} Btu

Unit Conversions

1 pound	= 0.454 kilograms	= 16 ounces		
1 kilogram	= 2.205 pounds	= 35.27 ounces		
1 short ton	= 0.9072 metric tons	= 2,000 pounds		
1 metric ton	= 1.1023 short tons	= 1,000 kilograms		
1 cubic foot	= 0.02832 cubic meters	= 28.3168 liters		
1 cubic meter	= 35.315 cubic feet	= 1,000 liters		
1 U.S. gallon	= 3.78541 liters	= 0.03175 barrels	= 0.02381 barrels petroleum	
1 liter	= 0.2642 U.S. gallons	= 0.0084 barrels	= 0.0063 barrels petroleum	
1 barrel	= 31.5 U.S. gallons	= 119 liters	= 0.75 barrels petroleum	
1 barrel petroleum	= 42 U.S. gallons	= 159 liters		
1 foot	= 0.3048 meters	= 12 inches		
1 meter	= 3.28 feet	= 39.37 inches		
1 mile	= 1.609 kilometers	= 5,280 feet		
1 kilometer	= 0.6214 miles	= 3,280.84 feet		
1 square mile	= 2.590 square kilometers	= 640 acres		
1 square kilometer	= 0.386 square miles	= 100 hectares		
1 acre	= 43,560 square feet	= 0.4047 hectares	= 4,047 square meters	

Guide to Metric Unit Prefixes

Prefix/Symbol	Factor	
Tera (T)	10^{12}	1,000,000,000,000
Giga (G)	10^9	1,000,000,000
Mega (M)	10^6	1,000,000
Kilo (k)	10^3	1,000
Hecto (h)	10^2	100
Deca (da)	10^1	10
—	10^0	1
Deci (d)	10^{-1}	.1
Centi (c)	10^{-2}	.01
Milli (m)	10^{-3}	.001
Micro (μ)	10^{-6}	.000001
Nano (n)	10^{-9}	.000000001
Pico (p)	10^{-12}	.000000000001

Carbon Information

Conversion Factors to Energy Units (Heat Equivalents) Heat Contents and Carbon Content Coefficients of Various Fuel Types

Converting Various Physical Units to Energy Units—The values in the following table provide conversion factors from physical units to energy equivalent units and from energy units to carbon contents. These factors can be used as default factors, if local data are not available.

Fuel Type	Heat Content	Carbon (C) Content Coefficients	Carbon Dioxide (CO_2) per Physical Unit
Solid Fuels	**Million Btu/Metric Ton**	**kg C/Million Btu**	**kg CO_2/Metric Ton**
Anthracite Coal	24.88	28.28	2,579.9
Bituminous Coal	26.33	25.44	2,456.6
Sub-bituminous Coal	18.89	26.50	1,835.9
Lignite	14.18	26.65	1,385.6
Coke	27.56	31.00	3,131.9
Unspecified Coal	27.56	25.34	2,560.0
Gas Fuels	**Btu/Cubic Foot**	**kg C/Million Btu**	**kg CO_2/Cubic Foot**
Natural Gas	1,028	14.46	0.0545
Liquid Fuels	**Million Btu/Petroleum Barrel**	**kg C/Million Btu**	**kg CO_2/Petroleum Barrel**
Motor Gasoline	5.22	19.46	372.2
Distillate Fuel Oil	5.83	20.17	430.8
Residual Fuel Oil	6.29	20.48	472.1
Jet Fuel	5.67	19.70	409.5
Aviation Gasoline	5.05	18.86	349.0
LPG	3.70	16.83	228.6
Kerosene	5.67	19.96	415.1
Still Gas	6.00	18.20	400.3
Petroleum Coke	6.02	27.85	615.1
Pentanes Plus	4.62	19.10	323.6
Unfinished Oils	5.83	20.31	433.8

Note: For fuels with variable heat contents and carbon content coefficients, 2008 U.S. average values are presented. All factors are presented in gross calorific values (GCV) (i.e., higher heating values). LPG = Liquefied Petroleum Gas.

CO_2 Emissions from Fossil Fuel Combustion = **Fuel Combusted × Carbon Content Coefficient × Fraction Oxidized × (44/12)**

May include adjustments for carbon stored in fossil fuel-based products, emissions from international bunker fuels, or emissions from territories.

Carbon Intensity of Different Fuel Types

The amount of carbon in fossil fuels per unit of energy content varies significantly by fuel type. For example, coal contains the highest amount of carbon per unit of energy, while petroleum has about 25 percent less carbon than coal, and natural gas about 45 percent less.

For more information on calculating CO_2 emissions per kWh, download eGRID at:
http://www.epa.gov/cleanenergy/egrid

For other related information, see:
http://www.epa.gov/climatechange and
http://unfccc.int

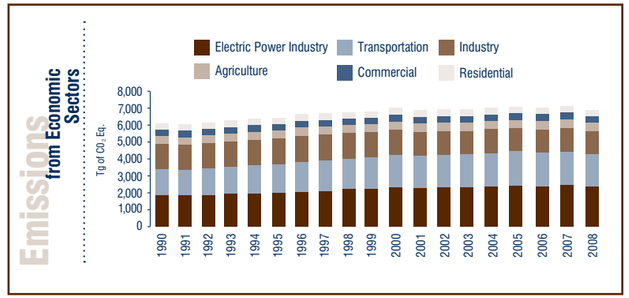
Economic Sectors

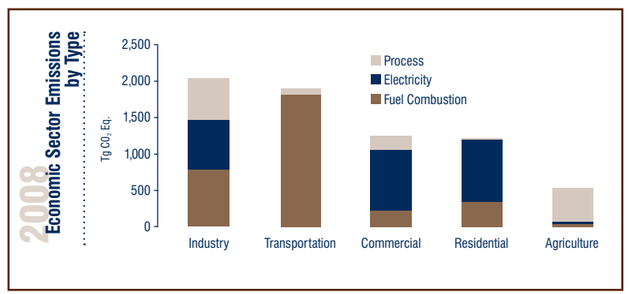
U.S. Greenhouse Gas Emissions Allocated to Economic Sectors (Tg CO_2 Eq.)

Implied Sectors	1990	1995	2000	2005	2006	2007	2008
Electric Power Industry	1,867.2	1,993.7	2,336.8	2,443.5	2,387.5	2,454.0	2,404.2
Transportation	1,545.0	1,695.2	1,932.3	2,016.1	1,993.0	2,003.5	1,886.1
Industry	1,506.6	1,531.3	1,469.1	1,350.9	1,380.2	1,374.2	1,342.4
Agriculture	433.2	460.8	485.3	494.1	515.1	518.0	504.1
Commercial	395.1	399.6	387.3	399.0	389.2	404.4	410.9
Residential	345.9	367.6	386.7	370.7	334.9	356.2	359.3
U.S. Territories	33.7	40.7	46.9	58.9	60.0	57.8	49.9
Total Emissions	**6,126.8**	**6,488.8**	**7,044.5**	**7,133.2**	**7,059.9**	**7,168.1**	**6,956.8**

U.S. Greenhouse Gas Emissions Allocated to Economic Sectors with Electricity Distributed (Tg CO_2 Eq.)

Implied Sectors	1990	1995	2000	2005	2006	2007	2008
Industry	2,179.8	2,228.0	2,239.2	2,071.1	2,077.3	2,084.2	2,018.4
Transportation	1,548.2	1,698.3	1,935.8	2,020.9	1,997.6	2,008.6	1,890.8
Commercial	946.8	1,000.2	1,141.5	1,216.5	1,202.2	1,240.1	1,250.6
Residential	954.0	1,024.5	1,162.4	1,242.2	1,180.3	1,226.9	1,215.6
Agriculture	464.2	497.1	518.7	523.5	542.5	550.5	531.6
U.S. Territories	33.7	40.7	46.9	58.9	60.0	57.8	49.9
Total Emissions	**6,126.8**	**6,488.8**	**7,044.5**	**7,133.2**	**7,059.9**	**7,168.1**	**6,956.8**





Download the Inventory at: **http://www.epa.gov/climatechange/emissions/usinventoryreport.html**

Source for all data: *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990–2008* (EPA 2010)