



Emission Factors for Greenhouse Gas Inventories

Last Modified: 9 March 2018

Red text indicates an update from the 2015 version of this document.

Typically, greenhouse gas emissions are reported in units of carbon dioxide equivalent (CO₂e). Gases are converted to CO₂e by multiplying by their global warming potential (GWP). The emission factors listed in this document

Gas	100-Year GWP
CH ₄	25
N ₂ O	298

Source: Intergovernmental Panel on Climate Change (IPCC), Fourth Assessment

Table 1	Stationary Combustion						
Fuel Type	Heat Content (HHV)	CO ₂ Factor	CH ₄ Factor	N ₂ O Factor	CO ₂ Factor	CH ₄ Factor	N ₂ O Factor
	mmBtu per short ton	kg CO ₂ per mmBtu	g CH ₄ per mmBtu	g N ₂ O per mmBtu	kg CO ₂ per short ton	g CH ₄ per short ton	g N ₂ O per short ton
Coal and Coke							
Anthracite Coal	25.09	103.69	11	1.6	2,602	276	40
Bituminous Coal	24.93	93.28	11	1.6	2,325	274	40
Sub-bituminous Coal	17.25	97.17	11	1.6	1,676	190	28
Lignite Coal	14.21	97.72	11	1.6	1,389	156	23
Mixed (Commercial Sector)	21.39	94.27	11	1.6	2,016	235	34
Mixed (Electric Power Sector)	19.73	95.52	11	1.6	1,885	217	32
Mixed (Industrial Coking)	26.28	93.90	11	1.6	2,468	289	42
Mixed (Industrial Sector)	22.35	94.67	11	1.6	2,116	246	36
Coal Coke	24.80	113.67	11	1.6	2,819	273	40
Other Fuels - Solid							
Municipal Solid Waste	9.95	90.70	32	4.2	902	318	42
Petroleum Coke (Solid)	30.00	102.41	32	4.2	3,072	960	126
Plastics	38.00	75.00	32	4.2	2,850	1,216	160
Tires	28.00	85.97	32	4.2	2,407	896	118
Biomass Fuels - Solid							
Agricultural Byproducts	8.25	118.17	32	4.2	975	264	35
Peat	8.00	111.84	32	4.2	895	256	34
Solid Byproducts	10.39	105.51	32	4.2	1,096	332	44
Wood and Wood Residuals	17.48	93.80	7.2	3.6	1,640	126	63
	mmBtu per scf	kg CO ₂ per mmBtu	g CH ₄ per mmBtu	g N ₂ O per mmBtu	kg CO ₂ per scf	g CH ₄ per scf	g N ₂ O per scf
Natural Gas							
Natural Gas	0.001026	53.06	1.0	0.10	0.05444	0.00103	0.00010
Other Fuels - Gaseous							
Blast Furnace Gas	0.000092	274.32	0.022	0.10	0.02524	0.000002	0.000009
Coke Oven Gas	0.000599	46.85	0.48	0.10	0.02806	0.000288	0.000060
Fuel Gas	0.001388	59.00	3.0	0.60	0.08189	0.004164	0.000833
Propane Gas	0.002516	61.46	3.0	0.60	0.15463	0.007548	0.001510
Biomass Fuels - Gaseous							
Landfill Gas	0.000485	52.07	3.2	0.63	0.025254	0.001552	0.000306
Other Biomass Gases	0.000655	52.07	3.2	0.63	0.034106	0.002096	0.000413
	mmBtu per gallon	kg CO ₂ per mmBtu	g CH ₄ per mmBtu	g N ₂ O per mmBtu	kg CO ₂ per gallon	g CH ₄ per gallon	g N ₂ O per gallon
Petroleum Products							
Asphalt and Road Oil	0.158	75.36	3.0	0.60	11.91	0.47	0.09
Aviation Gasoline	0.120	69.25	3.0	0.60	8.31	0.36	0.07
Butane	0.103	64.77	3.0	0.60	6.67	0.31	0.06
Butylene	0.105	68.72	3.0	0.60	7.22	0.32	0.06
Crude Oil	0.138	74.54	3.0	0.60	10.29	0.41	0.08
Distillate Fuel Oil No. 1	0.139	73.25	3.0	0.60	10.18	0.42	0.08
Distillate Fuel Oil No. 2	0.138	73.96	3.0	0.60	10.21	0.41	0.08
Distillate Fuel Oil No. 4	0.146	75.04	3.0	0.60	10.96	0.44	0.09
Ethane	0.068	59.60	3.0	0.60	4.05	0.20	0.04
Ethylene	0.058	65.96	3.0	0.60	3.83	0.17	0.03
Heavy Gas Oils	0.148	74.92	3.0	0.60	11.09	0.44	0.09
Isobutane	0.099	64.94	3.0	0.60	6.43	0.30	0.06
Isobutylene	0.103	68.86	3.0	0.60	7.09	0.31	0.06
Kerosene	0.135	75.20	3.0	0.60	10.15	0.41	0.08
Kerosene-Type Jet Fuel	0.135	72.22	3.0	0.60	9.75	0.41	0.08
Liquefied Petroleum Gases (LPG)	0.092	61.71	3.0	0.60	5.68	0.28	0.06
Lubricants	0.144	74.27	3.0	0.60	10.69	0.43	0.09
Motor Gasoline	0.125	70.22	3.0	0.60	8.78	0.38	0.08
Naphtha (<401 deg F)	0.125	68.02	3.0	0.60	8.50	0.38	0.08
Natural Gasoline	0.110	66.88	3.0	0.60	7.36	0.33	0.07
Other Oil (>401 deg F)	0.139	76.22	3.0	0.60	10.59	0.42	0.08
Pentanes Plus	0.110	70.02	3.0	0.60	7.70	0.33	0.07
Petrochemical Feedstocks	0.125	71.02	3.0	0.60	8.88	0.38	0.08
Petroleum Coke	0.143	102.41	3.0	0.60	14.64	0.43	0.09
Propane	0.091	62.87	3.0	0.60	5.72	0.27	0.05
Propylene	0.091	67.77	3.0	0.60	6.17	0.27	0.05
Residual Fuel Oil No. 5	0.140	72.93	3.0	0.60	10.21	0.42	0.08
Residual Fuel Oil No. 6	0.150	75.10	3.0	0.60	11.27	0.45	0.09
Special Naphtha	0.125	72.34	3.0	0.60	9.04	0.38	0.08
Unfinished Oils	0.139	74.54	3.0	0.60	10.36	0.42	0.08
Used Oil	0.138	74.00	3.0	0.60	10.21	0.41	0.08
Biomass Fuels - Liquid							
Biodiesel (100%)	0.128	73.84	1.1	0.11	9.45	0.14	0.01
Ethanol (100%)	0.084	68.44	1.1	0.11	5.75	0.09	0.01
Rendered Animal Fat	0.125	71.06	1.1	0.11	8.88	0.14	0.01
Vegetable Oil	0.120	81.55	1.1	0.11	9.79	0.13	0.01
Biomass Fuels - Kraft Pulping Liquor, by Wood Furnish							
North American Softwood		94.4	1.9	0.42			
North American Hardwood		93.7	1.9	0.42			
Bagasse		95.5	1.9	0.42			
Bamboo		93.7	1.9	0.42			
Straw		95.1	1.9	0.42			

Source:

Federal Register EPA; 40 CFR Part 98; e-CFR, June 13, 2017 (see link below). Table C-1, Table C-2, Table AA-1.

https://www.ecfr.gov/cgi-bin/text-idx?SID=ae265d7d6f98ec86fcd8640b9793a3f6&mc=true&node=pt40.23.98&rgn=div5#ap40.23.98_19.1

Note: Emission factors are per unit of heat content using higher heating values (HHV). If heat content is available from the fuel supplier, it is preferable to use that value. If not, default heat contents are provided.

Table 2 Mobile Combustion CO₂

Fuel Type	kg CO ₂ per unit	Unit
Aviation Gasoline	8.31	gallon
Biodiesel (100%)	9.45	gallon
Compressed Natural Gas (CNG)	0.05444	scf
Diesel Fuel	10.21	gallon
Ethanol (100%)	5.75	gallon
Kerosene-Type Jet Fuel	9.75	gallon
Liquefied Natural Gas (LNG)	4.50	gallon
Liquefied Petroleum Gases (LPG)	5.68	gallon
Motor Gasoline	8.78	gallon
Residual Fuel Oil	11.27	gallon

Source:

Federal Register EPA; 40 CFR Part 98; e-CFR, June 13, 2017 (see link below). Table C-1, Table C-2, Table AA-1.

https://www.ecfr.gov/cgi-bin/text-idx?SID=ae265d7d6f98ec86fcd8640b9793a3f6&mc=true&node=pt40.23.98&rgn=div5#ap40.23.98_19.1

LNG: The factor was developed based on the CO₂ factor for Natural Gas factor and LNG fuel density from GREET1_2017.xlsx Model, Argonne National Laboratory. This represents a methodology change from previous versions.

Table 3 Mobile Combustion CH₄ and N₂O for On-Road Gasoline Vehicles

Vehicle Type	Year	CH ₄ Factor (g / mile)	N ₂ O Factor (g / mile)
Gasoline Passenger Cars	1973-74	0.1696	0.0197
	1975	0.1423	0.0443
	1976-77	0.1406	0.0458
	1978-79	0.1389	0.0473
	1980	0.1326	0.0499
	1981	0.0802	0.0626
	1982	0.0795	0.0627
	1983	0.0782	0.0630
	1984-93	0.0704	0.0647
	1994	0.0531	0.0560
	1995	0.0358	0.0473
	1996	0.0272	0.0426
	1997	0.0268	0.0422
	1998	0.0241	0.0379
	1999	0.0216	0.0337
	2000	0.0178	0.0273
	2001	0.0110	0.0158
	2002	0.0107	0.0153
	2003	0.0115	0.0133
	2004	0.0157	0.0063
	2005	0.0164	0.0051
Gasoline Light-Duty Trucks (Vans, Pickup Trucks, SUVs)	1973-74	0.1908	0.0218
	1975	0.1634	0.0513
	1976	0.1594	0.0555
	1977-78	0.1614	0.0534
	1979-80	0.1594	0.0555
	1981	0.1479	0.0660
	1982	0.1442	0.0681
	1983	0.1368	0.0722
	1984	0.1294	0.0764
	1985	0.1220	0.0806
	1986	0.1146	0.0848
	1987-93	0.0813	0.1035
	1994	0.0646	0.0982
	1995	0.0517	0.0908
	1996	0.0452	0.0871
	1997	0.0452	0.0871
	1998	0.0412	0.0778
	1999	0.0333	0.0593
	2000	0.0340	0.0607
	2001	0.0221	0.0328
	2002	0.0242	0.0378
Gasoline Heavy-Duty Vehicles	1973-74	0.1908	0.0218
	1975	0.1634	0.0513
	1976	0.1594	0.0555
	1977-78	0.1614	0.0534
	1979-80	0.1594	0.0555
	1981	0.1479	0.0660
	1982	0.1442	0.0681
	1983	0.1368	0.0722
	1984	0.1294	0.0764
	1985	0.1220	0.0806
	1986	0.1146	0.0848
	1987-93	0.0813	0.1035
	1994	0.0646	0.0982
	1995	0.0517	0.0908
	1996	0.0452	0.0871
	1997	0.0452	0.0871
	1998	0.0412	0.0778
	1999	0.0333	0.0593
	2000	0.0340	0.0607
	2001	0.0221	0.0328
	2002	0.0242	0.0378
Gasoline Motorcycles	1973-74	0.1908	0.0218
	1975	0.1634	0.0513
	1976	0.1594	0.0555
	1977-78	0.1614	0.0534
	1979-80	0.1594	0.0555
	1981	0.1479	0.0660
	1982	0.1442	0.0681
	1983	0.1368	0.0722
	1984	0.1294	0.0764
	1985	0.1220	0.0806
	1986	0.1146	0.0848
	1987-93	0.0813	0.1035
	1994	0.0646	0.0982
	1995	0.0517	0.0908
	1996	0.0452	0.0871
	1997	0.0452	0.0871
	1998	0.0412	0.0778
	1999	0.0333	0.0593
	2000	0.0340	0.0607
	2001	0.0221	0.0328
	2002	0.0242	0.0378
	2003	0.0225	0.0330
	2004	0.0162	0.0098
	2005	0.0160	0.0081
	2006	0.0159	0.0088
	2007	0.0161	0.0079
	2008-present	0.0163	0.0066
Gasoline Heavy-Duty Vehicles	<1981	0.4604	0.0497
	1982-84	0.4492	0.0538
	1985-86	0.4090	0.0515
	1987	0.3675	0.0849
	1988-1989	0.3492	0.0933
	1990-1995	0.3246	0.1142
	1996	0.1278	0.1680
	1997	0.0924	0.1726
	1998	0.0655	0.1750
	1999	0.0648	0.1721
	2000	0.0630	0.1650
	2001	0.0578	0.1435
	2002	0.0634	0.1664
	2003	0.0603	0.1534
	2004	0.0323	0.0195
	2005	0.0329	0.0162
	2006	0.0318	0.0227
	2007	0.0333	0.0134
	2008-present	0.0333	0.0134
Gasoline Motorcycles	1960-1995	0.0899	0.0087
	1996-present	0.0672	0.0069

Source: EPA (2017) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015. All values are calculated from Tables A-104 through A-110.

Table 4 Mobile Combustion CH₄ and N₂O for On-Road Diesel and Alternative Fuel Vehicles

Vehicle Type	Vehicle Year	CH ₄ Factor (g / mile)	N ₂ O Factor (g / mile)
Diesel Passenger Cars	1960-1982	0.0006	0.0012
	1983-1995	0.0005	0.0010
	1996-present	0.0005	0.0010
Diesel Light-Duty Trucks	1960-1982	0.0011	0.0017
	1983-1995	0.0009	0.0014
	1996-present	0.0010	0.0015
Diesel Medium- and Heavy-Duty Vehicles	1960-present	0.0051	0.0048
CNG Light-Duty Vehicles		0.737	0.050
CNG Medium- and Heavy-Duty Vehicles		1.966	0.175
CNG Buses		1.966	0.175
LPG Light-Duty Vehicles		0.037	0.067
LPG Medium- and Heavy-Duty Vehicles		0.066	0.175
LNG Medium- and Heavy-Duty Vehicles		1.966	0.175
Ethanol Light-Duty Vehicles		0.055	0.067
Ethanol Medium- and Heavy-Duty Vehicles		0.197	0.175
Ethanol Buses		0.197	0.175
Biodiesel Light-Duty Vehicles		0.0005	0.001
Biodiesel Medium- and Heavy-Duty Vehicles		0.005	0.005
Biodiesel Buses		0.005	0.005

Source: EPA (2017) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015. All values are calculated from Tables A-104 through A-110.

Table 5 Mobile Combustion CH₄ and N₂O for Non-Road Vehicles

Vehicle Type	CH ₄ Factor (g / gallon)	N ₂ O Factor (g / gallon)
Residual Fuel Oil Ships and Boats	0.11	0.57
Gasoline Ships and Boats	0.64	0.22
Diesel Ships and Boats	0.06	0.45
Diesel Locomotives	0.80	0.26
Gasoline Agricultural Equip.	1.26	0.22
Diesel Agricultural Equip.	1.44	0.26
Gasoline Construction Equip.	0.50	0.22
Diesel Construction Equip.	0.57	0.26
Jet Fuel Aircraft	0.00	0.30
Aviation Gasoline Aircraft	7.06	0.11
Other Gasoline Non-Road Vehicles	0.50	0.22
Other Diesel Non-Road Vehicles	0.57	0.26
LPG Non-Road Vehicles	0.50	0.22
Biodiesel Non-Road Vehicles	0.57	0.26

Source: EPA (2017) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015. All values are calculated from Table A-110.

Note: LPG non-road vehicles assumed equal to other gasoline sources. Biodiesel vehicles assumed equal to other diesel sources.

Table 6 Electricity

eGRID Subregion	Total Output Emission Factors			Non-Baseload Emission Factors		
	CO ₂ Factor (lb / MWh)	CH ₄ Factor (lb / MWh)	N ₂ O Factor (lb / MWh)	CO ₂ Factor (lb / MWh)	CH ₄ Factor (lb / MWh)	N ₂ O Factor (lb / MWh)
AKGD (ASCC Alaska Grid)	1,072.3	0.077	0.011	1,367.8	0.110	0.016
AKMS (ASCC Miscellaneous)	503.1	0.023	0.004	1,533.8	0.068	0.012
AZNM (WECC Southwest)	1,043.6	0.079	0.012	1,384.8	0.097	0.014
CAMX (WECC California)	527.9	0.033	0.004	942.9	0.045	0.006
ERCT (ERCOT All)	1,009.2	0.076	0.011	1,402.8	0.108	0.015
FRCC (FRCC All)	1,011.7	0.075	0.010	1,188.5	0.078	0.011
HIMS (HICC Miscellaneous)	1,152.0	0.095	0.015	1,530.0	0.147	0.023
HIOA (HICC Oahu)	1,662.9	0.181	0.028	1,637.5	0.153	0.024
MROE (MRO East)	1,668.2	0.156	0.026	1,740.1	0.156	0.025
MROW (MRO West)	1,238.8	0.115	0.020	1,822.0	0.154	0.029
NEWE (NPCC New England)	558.2	0.090	0.012	975.1	0.086	0.011
NWPP (WECC Northwest)	651.2	0.061	0.009	1,524.9	0.124	0.020
NYCW (NPCC NYC/Westchester)	635.8	0.022	0.003	1,061.7	0.022	0.002
NYLI (NPCC Long Island)	1,178.3	0.126	0.016	1,338.8	0.036	0.004
NYUP (NPCC Upstate NY)	294.7	0.021	0.003	1,018.2	0.061	0.008
RFCE (RFC East)	758.2	0.050	0.009	1,434.4	0.079	0.017
RFCM (RFC Michigan)	1,272.0	0.067	0.018	1,806.1	0.101	0.025
RFCW (RFC West)	1,243.4	0.108	0.019	1,934.4	0.172	0.029
RMPA (WECC Rockies)	1,367.8	0.137	0.020	1,688.3	0.147	0.021
SPNO (SPP North)	1,412.4	0.149	0.022	1,990.8	0.202	0.029
SPSO (SPP South)	1,248.3	0.095	0.015	1,662.5	0.121	0.019
SRMV (SERC Mississippi Valley)	838.9	0.050	0.007	1,186.0	0.071	0.010
SRMW (SERC Midwest)	1,612.6	0.082	0.026	1,955.2	0.084	0.031
SRSO (SERC South)	1,089.4	0.087	0.013	1,453.5	0.115	0.017
SRTV (SERC Tennessee Valley)	1,185.4	0.093	0.017	1,757.4	0.135	0.025
SRVC (SERC Virginia/Carolina)	805.3	0.067	0.011	1,422.2	0.111	0.019
US Average	998.4	0.080	0.013	1,501.0	0.111	0.018

Source: EPA eGRID2016, February 2018

Note: Total output emission factors can be used as default factors for estimating GHG emissions from electricity use when developing a carbon footprint or emissions inventory. Annual non-baseload output emission factors should not be used for those purposes, but can be used to estimate GHG emissions reductions from reductions in electricity use.

Table 7 Steam and Heat

	CO ₂ Factor (kg / mmBtu)	CH ₄ Factor (g / mmBtu)	N ₂ O Factor (g / mmBtu)
Steam and Heat	66.33	1.250	0.125

Note: Emission factors are per mmBtu of steam or heat purchased. These factors assume natural gas fuel is used to generate steam or heat at 80 percent thermal efficiency.

Table 8 Business Travel and Employee Commuting

Vehicle Type	CO ₂ Factor (kg / unit)	CH ₄ Factor (g / unit)	N ₂ O Factor (g / unit)	Units
Passenger Car ^A	0.343	0.019	0.011	vehicle-mile
Light-Duty Truck ^B	0.472	0.019	0.018	vehicle-mile
Motorcycle	0.189	0.070	0.007	vehicle-mile
Intercity Rail (i.e. Amtrak) ^C	0.140	0.0087	0.0031	passenger-mile
Commuter Rail ^D	0.161	0.0081	0.0032	passenger-mile
Transit Rail (i.e. Subway, Tram) ^E	0.119	0.0025	0.0017	passenger-mile
Bus	0.056	0.0013	0.0009	passenger-mile
Air Travel - Short Haul (< 300 miles)	0.225	0.0039	0.0072	passenger-mile
Air Travel - Medium Haul (>= 300 miles, < 2300 miles)	0.136	0.0006	0.0043	passenger-mile
Air Travel - Long Haul (>= 2300 miles)	0.166	0.0006	0.0053	passenger-mile

Source:

CO₂, CH₄, and N₂O emissions data for highway vehicles are from Table 2-13 of the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2015. Vehicle-miles and passenger-miles data for highway vehicles are from Table VM-1 of the Federal Highway Administration Highway Statistics 2015.

Fuel consumption data and passenger-miles data for rail are from Tables A.14 to A.16 and 9.10 to 9.12 of the Transportation Energy Data Book: Edition 35. Fuel consumption was converted to emissions by using fuel and electricity emission factors presented in the tables above.

Air Travel factors from 2017 Guidelines to Defra / DECC's GHG Conversion Factors for Company Reporting. Version 1.0 August 2017.

Notes:

^A Passenger car: includes passenger cars, minivans, SUVs, and small pickup trucks (vehicles with wheelbase less than 121 inches).

^B Light-duty truck: includes full-size pickup trucks, full-size vans, and extended-length SUVs (vehicles with wheelbase greater than 121 inches).

^C Intercity rail: long-distance rail between major cities, such as Amtrak

^D Commuter rail: rail service between a central city and adjacent suburbs (also called regional rail or suburban rail)

^E Transit rail: rail typically within an urban center, such as subways, elevated railways, metropolitan railways (metro), streetcars, trolley cars, and tramways.

Table 9 Upstream Transportation and Distribution and Downstream Transportation and Distribution

Vehicle Type	CO ₂ Factor (kg / unit)	CH ₄ Factor (g / unit)	N ₂ O Factor (g / unit)	Units
Medium- and Heavy-Duty Truck	1.467	0.014	0.010	vehicle-mile
Passenger Car ^A	0.343	0.019	0.011	vehicle-mile
Light-Duty Truck ^B	0.472	0.019	0.018	vehicle-mile
Medium- and Heavy-Duty Truck ^C	0.202	0.0020	0.0015	ton-mile
Rail	0.023	0.0018	0.0006	ton-mile
Waterborne Craft	0.059	0.0005	0.0040	ton-mile
Aircraft	1.308	0.0000	0.0402	ton-mile

Source:

CO₂, CH₄, and N₂O emissions data for road vehicles are from Table 2-13 of the U.S. Greenhouse Gas Emissions and Sinks: 1990–2015 (April 15, 2017). Vehicle-miles and passenger-miles data for road vehicles are from Table VM-1 of the Federal Highway Administration Highway Statistics 2015.

CO₂e emissions data for non-road vehicles are based on Table A-117 of the U.S. Greenhouse Gas Emissions and Sinks: 1990–2015, which are distributed into CO₂, CH₄, and N₂O emissions based on fuel/vehicle emission factors. Freight ton-mile data for non-road vehicles are from Table 1-50 of the Bureau of Transportation Statistics, National Transportation Statistics for 2015 (Data based on 2014).

Notes:

Vehicle-mile factors are appropriate to use when the entire vehicle is dedicated to transporting the reporting organization's product. Ton-mile factors are appropriate when the vehicle is shared with products from other organizations.

^A Passenger car: includes passenger cars, minivans, SUVs, and small pickup trucks (vehicles with wheelbase less than 121 inches).

^B Light-duty truck: includes full-size pickup trucks, full-size vans, and extended-length SUVs (vehicles with wheelbase greater than 121 inches).

^C Medium- and Heavy-Duty Truck: updates due to a methodology change.

Table 10a Global Warming Potentials (GWPs)

Gas	100-Year GWP
CO ₂	1
CH ₄	25
N ₂ O	298
HFC-23	14,800
HFC-32	675
HFC-41	92
HFC-125	3,500
HFC-134	1,100
HFC-134a	1,430
HFC-143	353
HFC-143a	4,470
HFC-152	53
HFC-152a	124
HFC-161	12
HFC-227ea	3,220
HFC-236cb	1,340
HFC-236ea	1,370
HFC-236fa	9,810
HFC-245ca	693
HFC-245fa	1,030
HFC-365mfc	794
HFC-43-10mee	1,640
SF ₆	22,800
NF ₃	17,200
CF ₄	7,390
C ₂ F ₆	12,200
C ₃ F ₈	8,830
c-C ₄ F ₈	10,300
C ₄ F ₁₀	8,860
C ₅ F ₁₂	9,160
C ₆ F ₁₄	9,300
C ₁₀ F ₁₈	>7,500

Source:

100-year GWPs from IPCC Fourth Assessment Report (AR4), 2007. IPCC AR4 was published in 2007 and is among the most current and comprehensive peer-reviewed assessments of climate change. AR4 provides revised GWPs of several GHGs relative to the values provided in previous assessment reports, following advances in scientific knowledge on the radiative efficiencies and atmospheric lifetimes of these GHGs and of CO₂. Because the GWPs provided in AR4 reflect an improved scientific understanding of the radiative effects of these gases in the atmosphere, the values provided are more appropriate for supporting the overall goal of organizational GHG reporting than the Second Assessment Report (SAR) GWP values previously used in the Emission Factors Hub.

While EPA recognizes that Fifth Assessment Report (AR5) GWPs have been published, in an effort to ensure consistency and comparability of GHG data between EPA's voluntary and non-voluntary GHG reporting programs (e.g. GHG Reporting Program and National Inventory), EPA recommends the use of AR4 GWPs. The United States and other developed countries to the UNFCCC have agreed to submit annual inventories in 2015 and future years to the UNFCCC using GWP values from AR4, which will replace the current use of SAR GWP values. Utilizing AR4 GWPs improves EPA's ability to analyze corporate, national, and sub-national GHG data consistently, enhances communication of GHG information between programs, and gives outside stakeholders a consistent, predictable set of GWPs to avoid confusion and additional burden.

Table 10b Global Warming Potentials (GWPs) for Blended Refrigerants

ASHRAE #	100-year GWP	Blend Composition
R-401A	16	53% HCFC-22 , 34% HCFC-124 , 13% HFC-152a
R-401B	14	61% HCFC-22 , 28% HCFC-124 , 11% HFC-152a
R-401C	19	33% HCFC-22 , 52% HCFC-124 , 15% HFC-152a
R-402A	2,100	38% HCFC-22 , 6% HFC-125 , 2% propane
R-402B	1,330	6% HCFC-22 , 38% HFC-125 , 2% propane
R-403B	3,444	56% HCFC-22 , 39% PFC-218 , 5% propane
R-404A	3,922	44% HFC-125 , 4% HFC-134a , 52% HFC 143a
R-406A	0	55% HCFC-22 , 41% HCFC-142b , 4% isobutane
R-407A	2,107	20% HFC-32 , 40% HFC-125 , 40% HFC-134a
R-407B	2,804	10% HFC-32 , 70% HFC-125 , 20% HFC-134a
R-407C	1,774	23% HFC-32 , 25% HFC-125 , 52% HFC-134a
R-407D	1,627	15% HFC-32 , 15% HFC-125 , 70% HFC-134a
R-407E	1,552	25% HFC-32 , 15% HFC-125 , 60% HFC-134a
R-408A	2,301	47% HCFC-22 , 7% HFC-125 , 46% HFC 143a
R-409A	0	60% HCFC-22 , 25% HCFC-124 , 15% HCFC-142b
R-410A	2,088	50% HFC-32 , 50% HFC-125
R-410B	2,229	45% HFC-32 , 55% HFC-125
R-411A	14	87.5% HCFC-22 , 11 HFC-152a , 1.5% propylene
R-411B	4	94% HCFC-22 , 3% HFC-152a , 3% propylene
R-413A	2,053	88% HFC-134a , 9% PFC-218 , 3% isobutane
R-414A	0	51% HCFC-22 , 28.5% HCFC-124 , 16.5% HCFC-142b
R-414B	0	5% HCFC-22 , 39% HCFC-124 , 9.5% HCFC-142b
R-417A	2,346	46.6% HFC-125 , 5% HFC-134a , 3.4% butane
R-422A	3,143	85.1% HFC-125 , 11.5% HFC-134a , 3.4% isobutane
R-422D	2,729	65.1% HFC-125 , 31.5% HFC-134a , 3.4% isobutane
R-423A	2,280	47.5% HFC-227ea , 52.5% HFC-134a ,
R-424A	2,440	50.5% HFC-125, 47% HFC-134a, 2.5% butane/pentane
R-426A	1,508	5.1% HFC-125, 93% HFC-134a, 1.9% butane/pentane
R-428A	3,607	77.5% HFC-125 , 2% HFC-143a , 1.9% isobutane
R-434A	3,245	63.2% HFC-125, 16% HFC-134a, 18% HFC-143a, 2.8% isobutane
R-500	32	73.8% CFC-12 , 26.2% HFC-152a , 48.8% HCFC-22
R-502	0	48.8% HCFC-22 , 51.2% CFC-115
R-504	325	48.2% HFC-32 , 51.8% CFC-115
R-507	3,985	5% HFC-125 , 5% HFC143a
R-508A	13,214	39% HFC-23 , 61% PFC-116
R-508B	13,396	46% HFC-23 , 54% PFC-116

Source:

100-year GWPs from IPCC Fourth Assessment Report (AR4), 2007. See the source note to Table 13 for further explanation. GWPs of blended refrigerants are based on their HFC and PFC constituents, which are based on data from <http://www.epa.gov/ozone/snap/refrigerants/refblend.html>.