

GHG Global Warming Potentials

IN THIS SECTION

Each greenhouse gas (GHG) has a global warming potential value, which reflects the climate forcing of a kilogram of emissions relative to the same mass of carbon dioxide (CO₂). This number is calculated by the Intergovernmental Panel on Climate Change (IPCC), based on the intensity of infrared absorption by each GHG and how long emissions remain in the atmosphere. GWPs are calculated using a set time horizon. All GWPs used for GHG inventory purposes are considered over a 100-yr timeframe. GWPs are updated periodically with improvements to the underlying science.

100-yr GWPs from the IPCC second assessment report (SAR) and fourth assessment report (AR4)

AR4 GWPs are used for the 2000-2017 emission inventory

Gas Name	Formula	Lifetime (years)	SAR GWP	AR4 GWP	Percent Change
Carbon Dioxide	CO ₂		1	1	
Methane	CH ₄	12	21	25	+19%
Nitrous Oxide	N ₂ O	114	310	298	-3.9%
Sulphur Hexafluoride	SF ₆	3200	23,900	22,800	-4.6%
Nitrogen Trifluoride	NF ₃	740	n/a	17,200	
Hexafluoroethane (PFC-116)	C ₂ F ₆	10,000	9,200	12,200	+33%
Octafluoropropane (PFC-218)	C ₃ F ₈	2,600	7,000	8,830	+26%



Gas Name	Formula	Lifetime (years)	SAR GWP	AR4 GWP	Percent Change
Octafluorocyclobutane (PFC-318)	C ₄ F ₈	3,200	8,700	10,300	+18%
Tetrafluoromethane (PFC-14)	CF ₄	50,000	6,500	7,390	+14%
Hydrofluorocarbon 125	HFC-125	29	2,800	3,500	+25%
Hydrofluorocarbon 134a	HFC-134a	14	1,300	1,430	+10%
Hydrofluorocarbon 143a	HFC-143a	52	3,800	4,470	+18%
Hydrofluorocarbon 152a	HFC-152a	1	140	124	-11%
Hydrofluorocarbon 227ea	HFC-227ea	34	2,900	3,220	+11%
Hydrofluorocarbon 23	HFC-23	270	11,700	14,800	+26%
Hydrofluorocarbon 236fa	HFC-236fa	240	6,300	9,810	+56%
Hydrofluorocarbon 245fa	HFC-245fa	8	n/a	1,030	
Hydrofluorocarbon 32	HFC-32	5	650	675	+3.8%
Hydrofluorocarbon 365mfc	HFC-365mfc	9	n/a	794	
Hydrofluorocarbon 43-10mee	HFC-43-10mee	16	1,300	1,640	+26%



AR4 GWPs for 2019 Edition GHG Inventory

CARB uses 2007 IPCC AR4 GWPs for the 2000–2017 emission inventory. Some previous

versions of the inventory used GWPs from the SAR; the GWP version is documented in all archive datasets. A summary of the SAR versus AR4 GWPs are included in the table above.

Implications of Updated GWPs

GWPs are used to convert GHG emission values to "carbon dioxide equivalent" (CO₂e) units. The percent change in GWP (above) will be mirrored in all CO₂e emissions.

(800) 242-4450 | helpline@arb.ca.gov
1001 I Street, Sacramento, CA 95814
P.O. Box 2815, Sacramento, CA 95812



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