

Greenhouse gases and Global Warming

Green House Gases	CO ₂	CH ₄	N ₂ O	CFC	O ₃	SF ₆	SF ₅ CF ₃	
Concentration 2008	379 ppm	1.8 ppm	320 ppb	900 ppt (CF ₂ Cl ₂ -500ppt)	34 ppb	5.6 ppt	0.12 ppt	
Concentration 1750	280 ppm	0.7 ppm	270 ppb	0	25 ppb	0	0	
Current Annual Growth Rate	0.4% or 1.8 ppm	1%	0.2%	1%	Varies with region & altitude	7%	6%	
Radiative Forcing (W/m ²)	1.66	0.48	0.16	0.27	0.30 (+0.35-0.05)	2.9×10 ⁻³	7.2×10 ⁻⁵	
Life time or Residence time, years	50-200	12	120	45-1700	Days-Weeks	3,200	800	
Global Warming Potential	1	25	298	11,000 (6,130-14,400)	-	22,800	17,700	
Greenhouse Effect Contribution %	Without Ozone	63	18	6	10	-	0.1	0.003
	With Ozone	57	16	5	9	10	0.1	0.003
Sources	Fossil fuels, deforestation, organic decay, volcanoes, forest fires	Wet lands, rice, livestock, fossil fuels, anaerobic bacteria, fermites	Natural: Nitrification, denitrification Anthropogenic: Fossil fuels, fertilizers, deforestation	Aerosols, Air Conditioning, Refrigeration, Aerosols, Foam Blowing, Solvents, Cleaning agents	Troposphere: Fossil fuels Stratosphere: Ultraviolet Radiation	Dielectric Insulator		

Source: Tuckett, Richard P. in Letcher, Trevor M. (Editor) (2009), p. 10-11

Software and Data Tables

The data tables used in the development of the framework are available as an Excel file in the CD attached to this dissertation. The apportionment software is also available in the CD which can be run by typing 'Control r' after opening the Excel File.

The program attempts to find the values of the mitigation coefficients with non-negativity constraints by an iteration procedure. For the iteration to converge, the target parameters given should be realistic, as otherwise a message is displayed accordingly. Moreover, for quick convergence of the cumulative gamma mitigation option, the following procedure may be adopted: (i) First run the program with parabolic mitigation option. Note the cumulative emission reduction achieved during the mitigation period in Giga tons of carbon. (ii) Now run the program for cumulative gamma mitigation and for the query, viz., 'Enter the value of Minimum cumulative reduction target', give a value equal to the value obtained in parabolic mitigation -10.