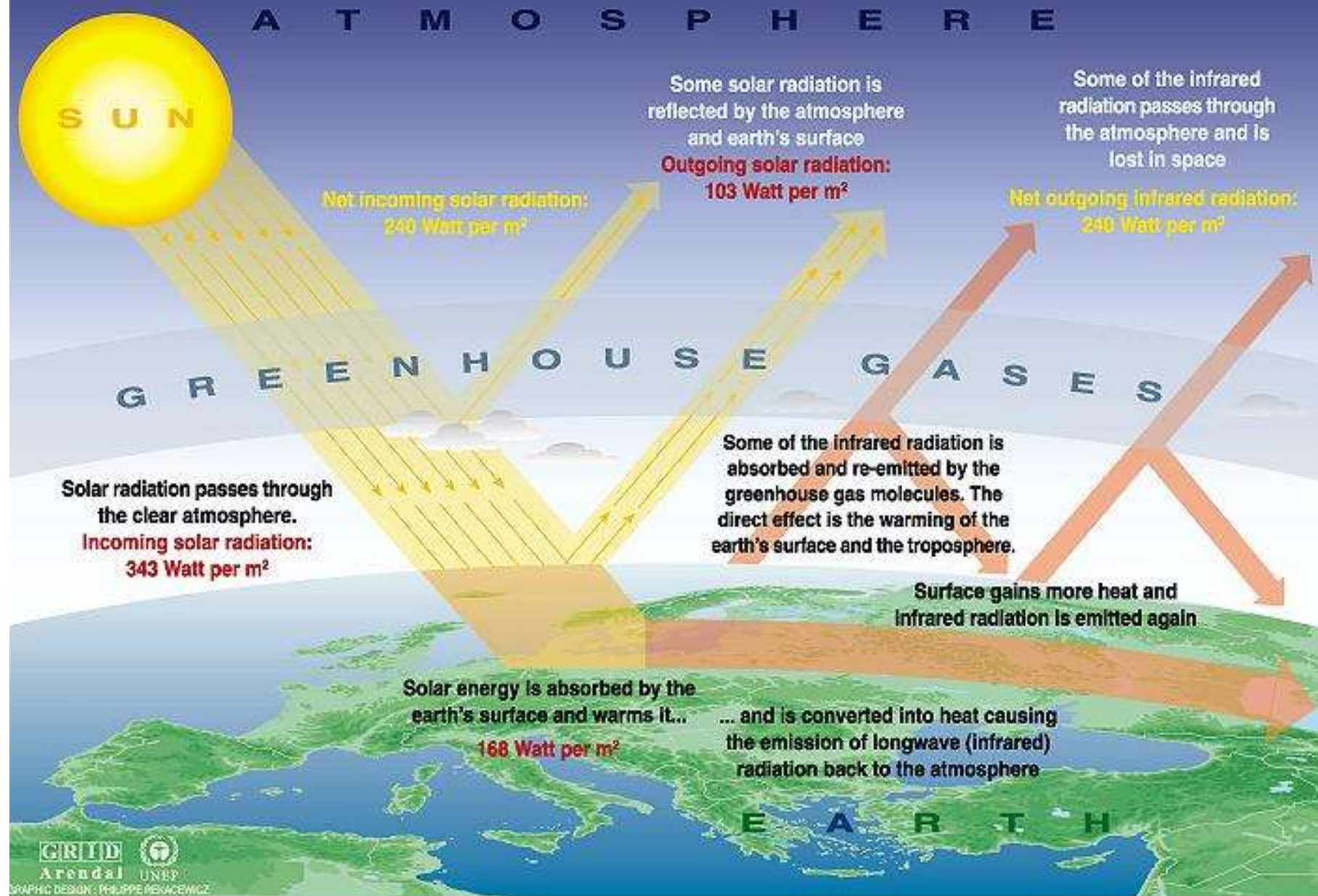


Climate Change Law

Climate Science Background

June 5, 2018

The Greenhouse effect



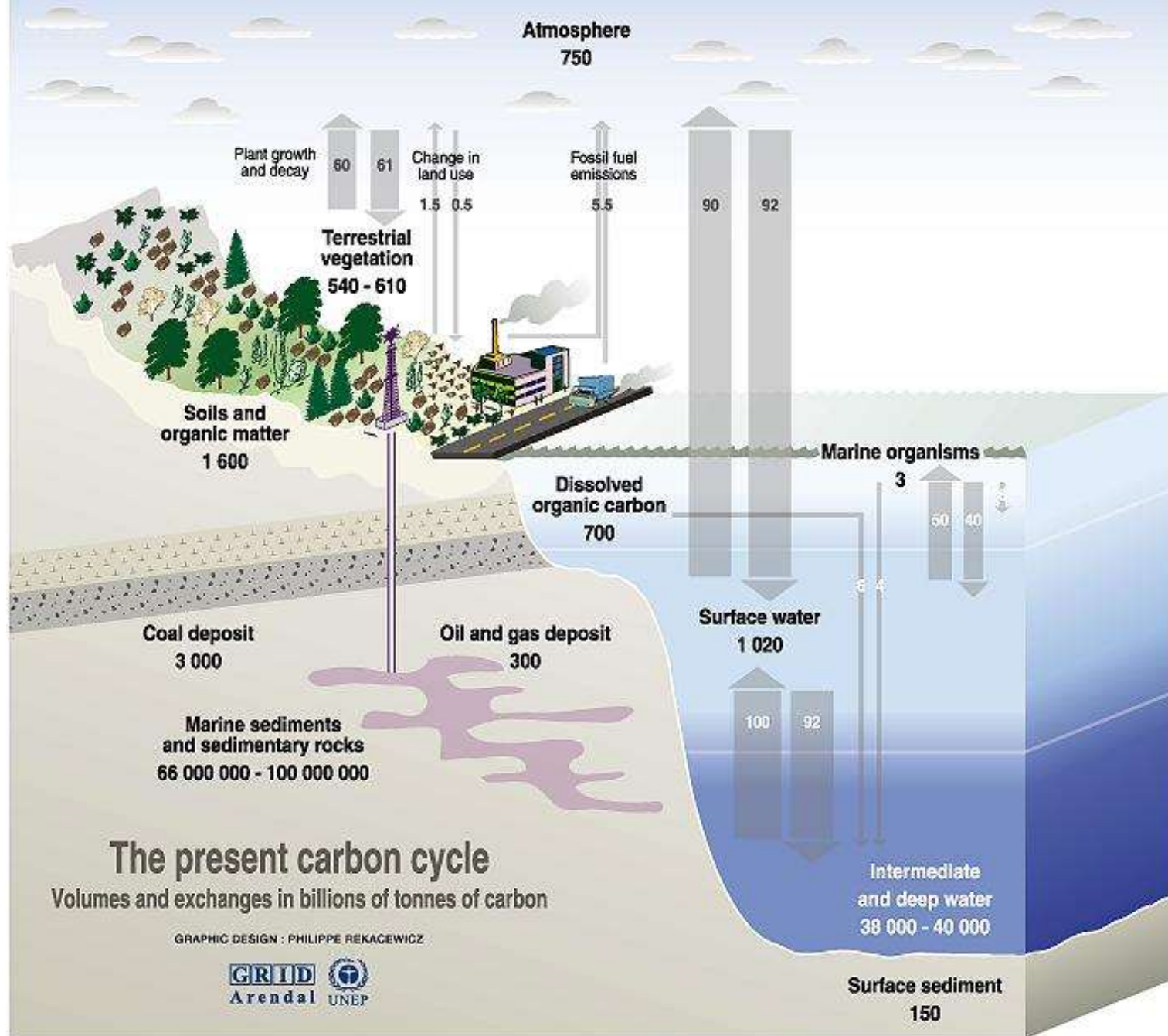
Sources: Okanagan university college in Canada, Department of geography, University of Oxford, school of geography; United States Environmental Protection Agency (EPA), Washington; Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge university press, 1996.

The main greenhouse gases

Greenhouse gases	Chemical formula	Pre-industrial concentration	Concentration in 1994	Atmospheric lifetime (years)**	Anthropogenic sources	Global warming potential (GWP)*
Carbon-dioxide	CO ₂	278 000 ppbv	358 000 ppbv	Variable	Fossil fuel combustion Land use conversion Cement production	1
Methane	CH ₄	700 ppbv	1721 ppbv	12,2 +/- 3	Fossil fuels Rice paddies Waste dumps Livestock	21 **
Nitrous oxide	N ₂ O	275 ppbv	311 ppbv	120	Fertilizer industrial processes combustion	310
CFC-12	CCl ₂ F ₂	0	0,503 ppbv	102	Liquid coolants Foams	6200-7100 ****
HCFC-22	CHClF ₂	0	0,105 ppbv	12,1	Liquid coolants	1300-1400 ****
Perfluoromethane	CF ₄	0	0,070 ppbv	50 000	Production of aluminium	6 500
Sulphur hexa-fluoride	SF ₆	0	0,032 ppbv	3 200	Dielectric fluid	23 900

Note : pptv= 1 part per trillion by volume; ppbv= 1 part per billion by volume, ppm v= 1 part per million by volume

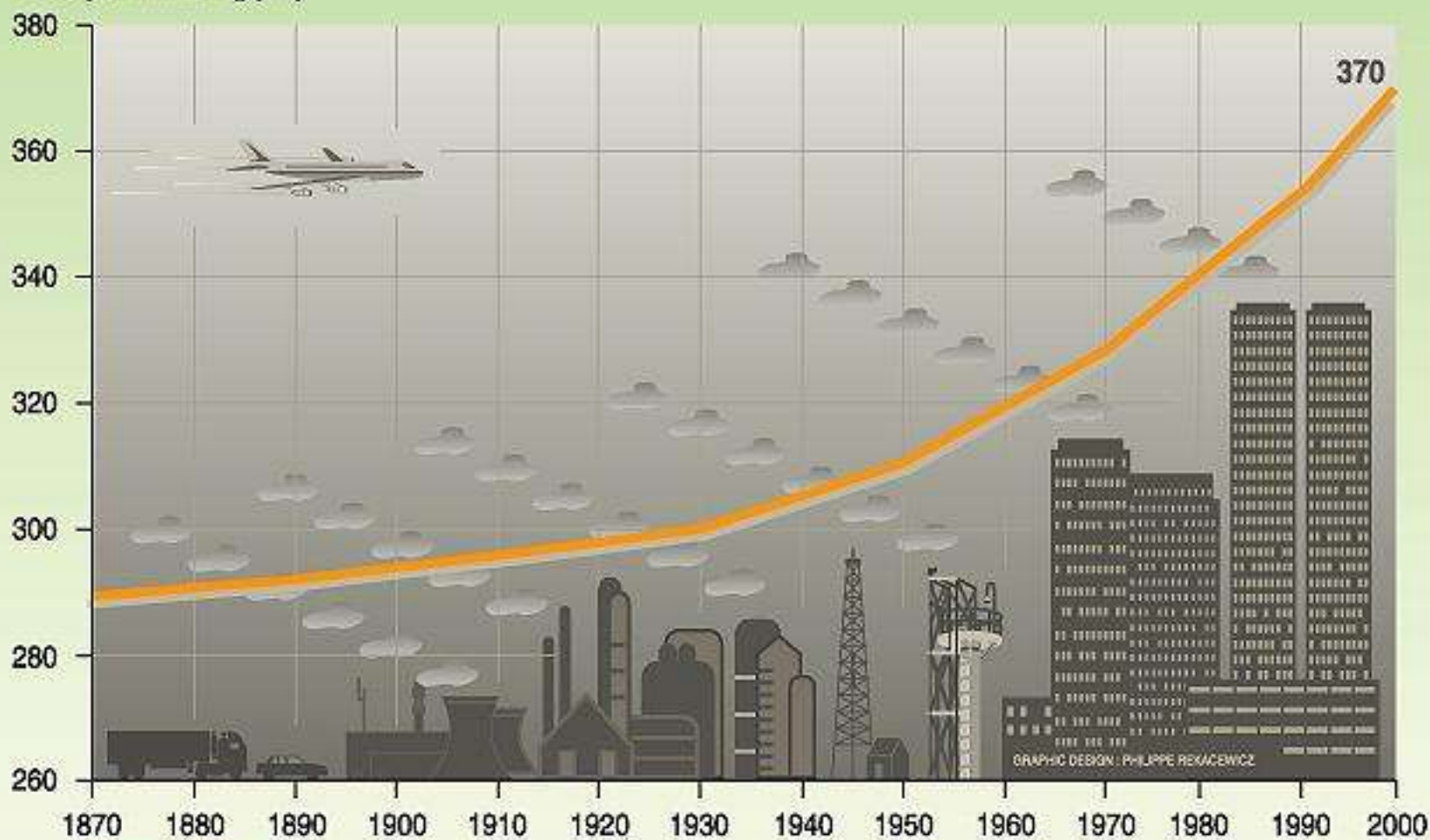
* GWP for 100 year time horizon. ** Includes indirect effects of tropospheric ozone production and stratospheric water vapour production. *** On page 15 of the IPCC SAR. No single lifetime for CO₂ can be defined because of the different rates of uptake by different sink processes. **** Net global warming potential (i.e., including the indirect effect due to ozone depletion).



Sources: Center for climatic research, Institute for environmental studies, university of Wisconsin at Madison; Okanagan university college in Canada, Department of geography; World Watch, November-December 1998; Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge press university, 1996.

Global atmospheric concentration of CO₂

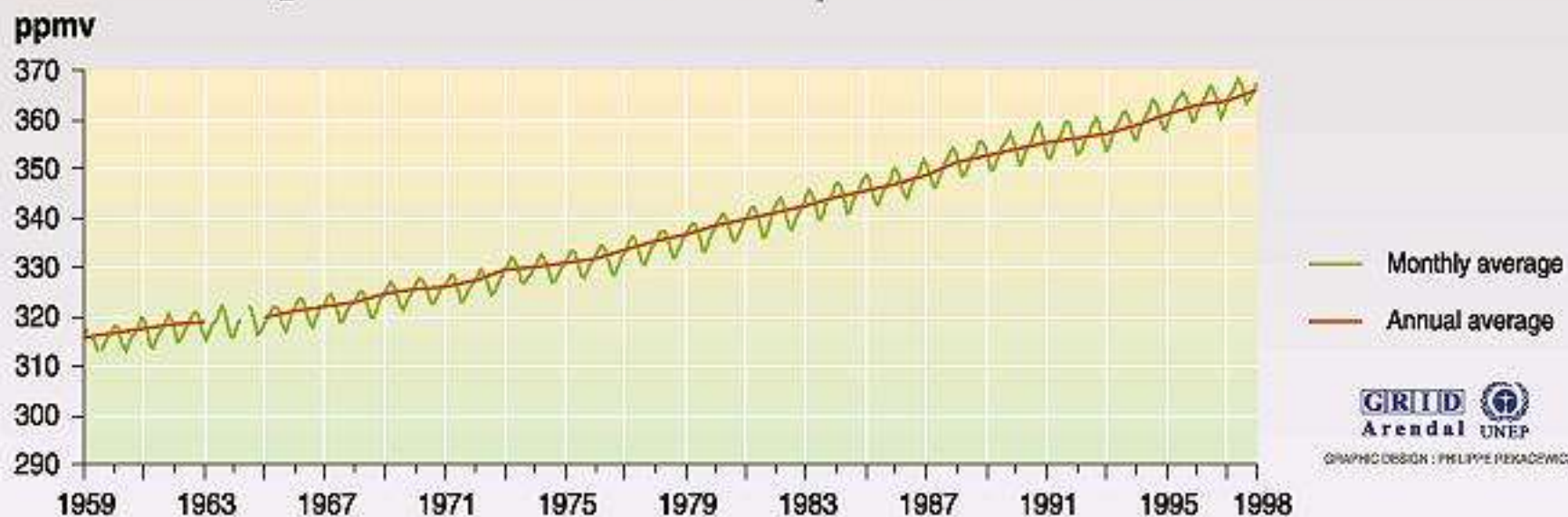
Parts per million (ppm)



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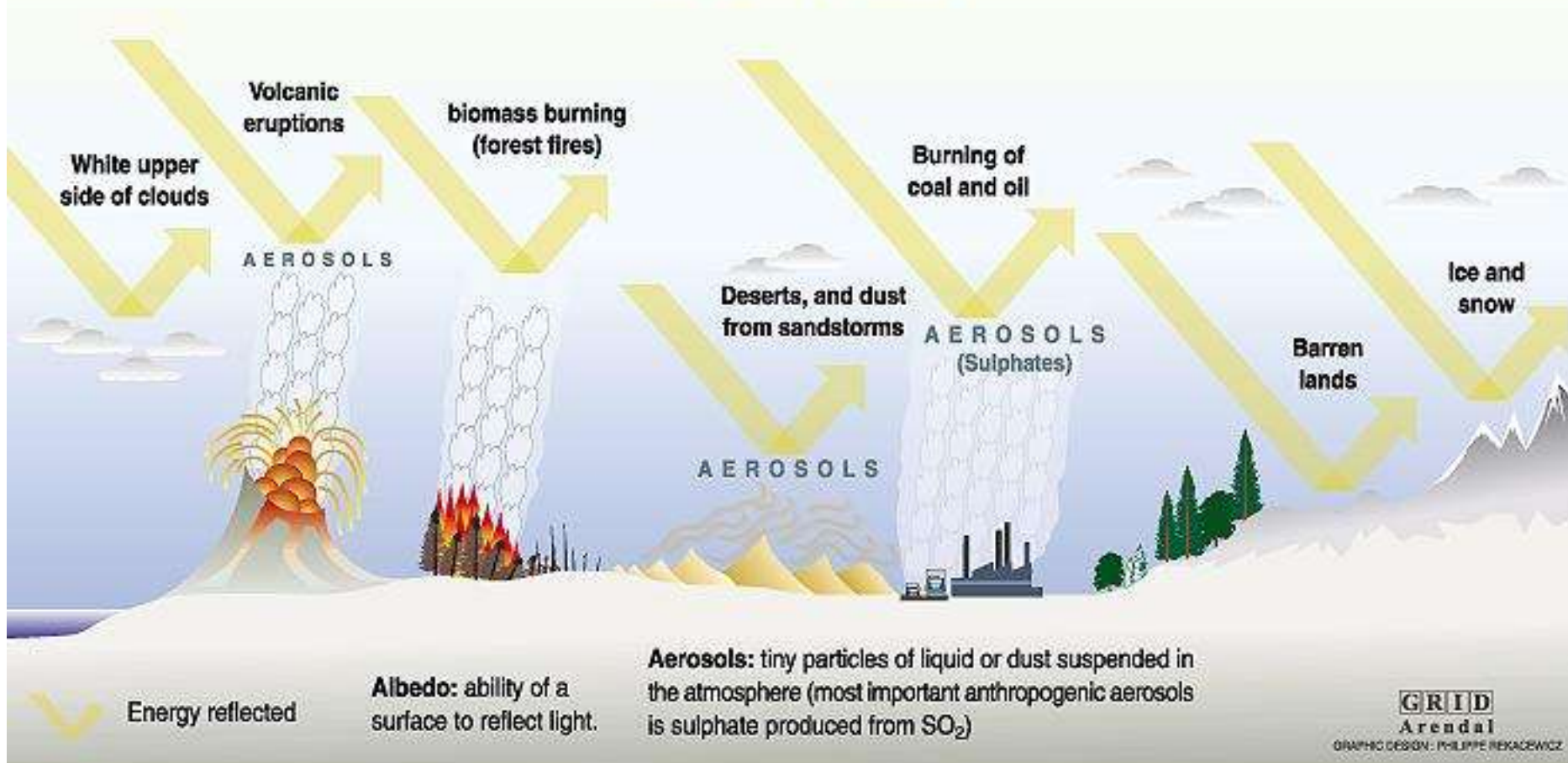
GRAPHIC DESIGN: PHILIPPE REKAWICZ

CO₂ concentration in the atmosphere: Mauna Loa curve



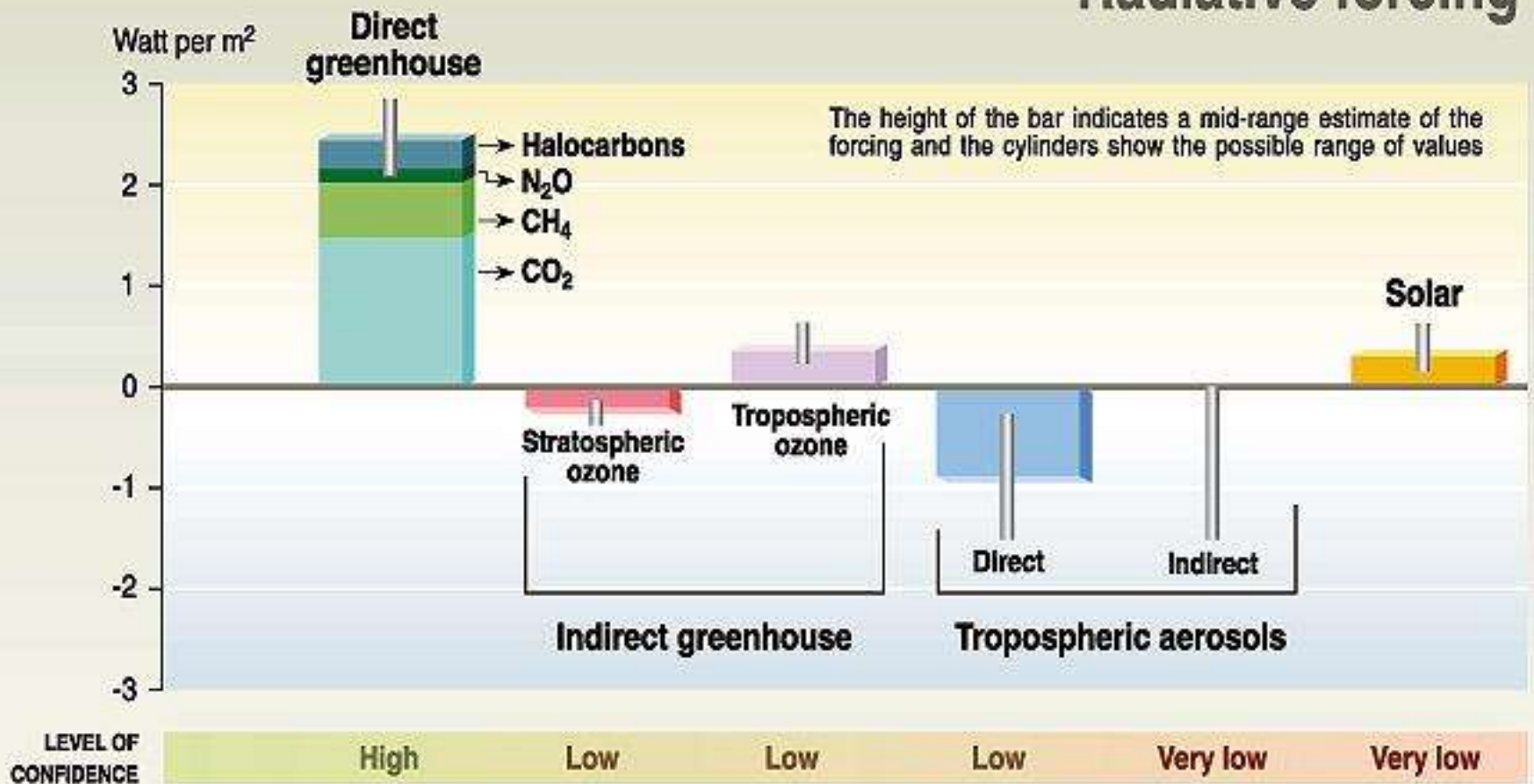
Source : Scripps Institution of oceanography (SIO), University of California, 1998.

The cooling factors



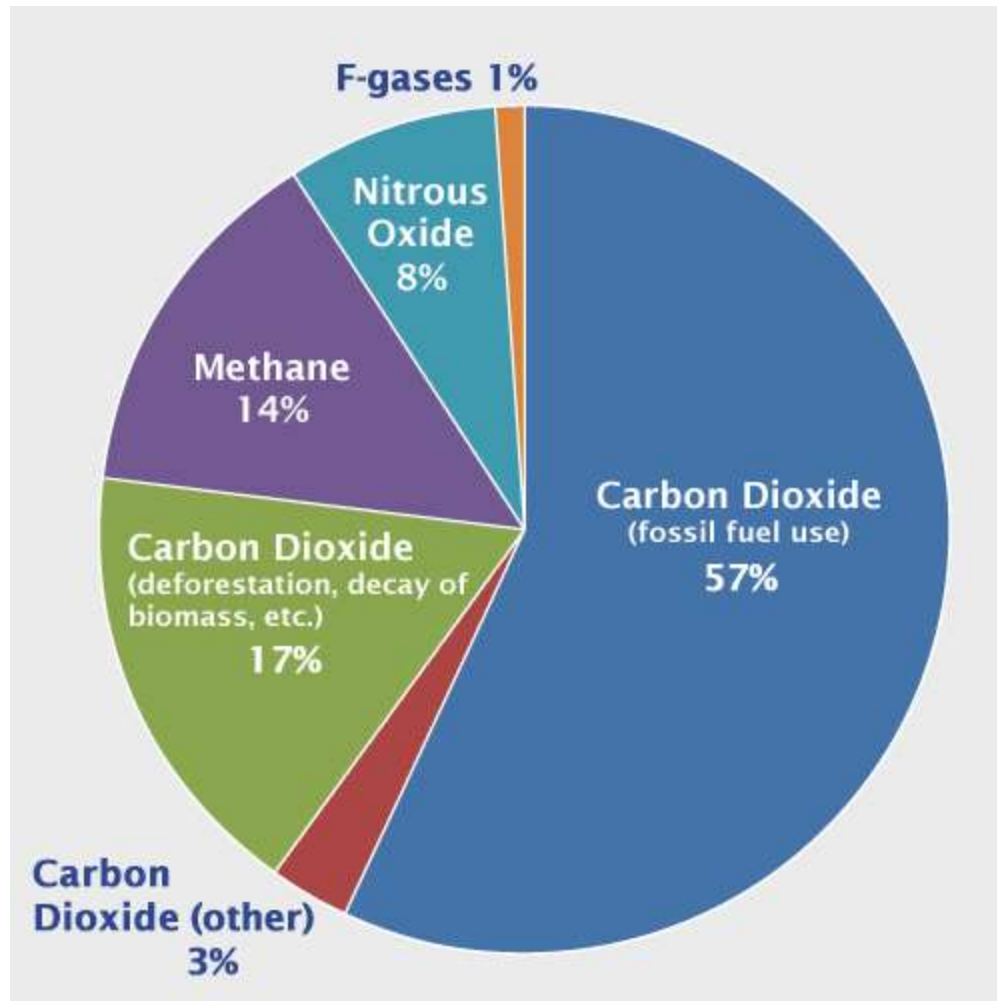
Sources: Radiative forcing of climate change, the 1994 report of the scientific assessment working group of IPCC, summary for policymakers, WMO, UNEP; L.D. Danny Harvey, Climate and global environmental change, Prentice Hall, Pearson Education, Harlow, United Kingdom, 2000.

Radiative forcing



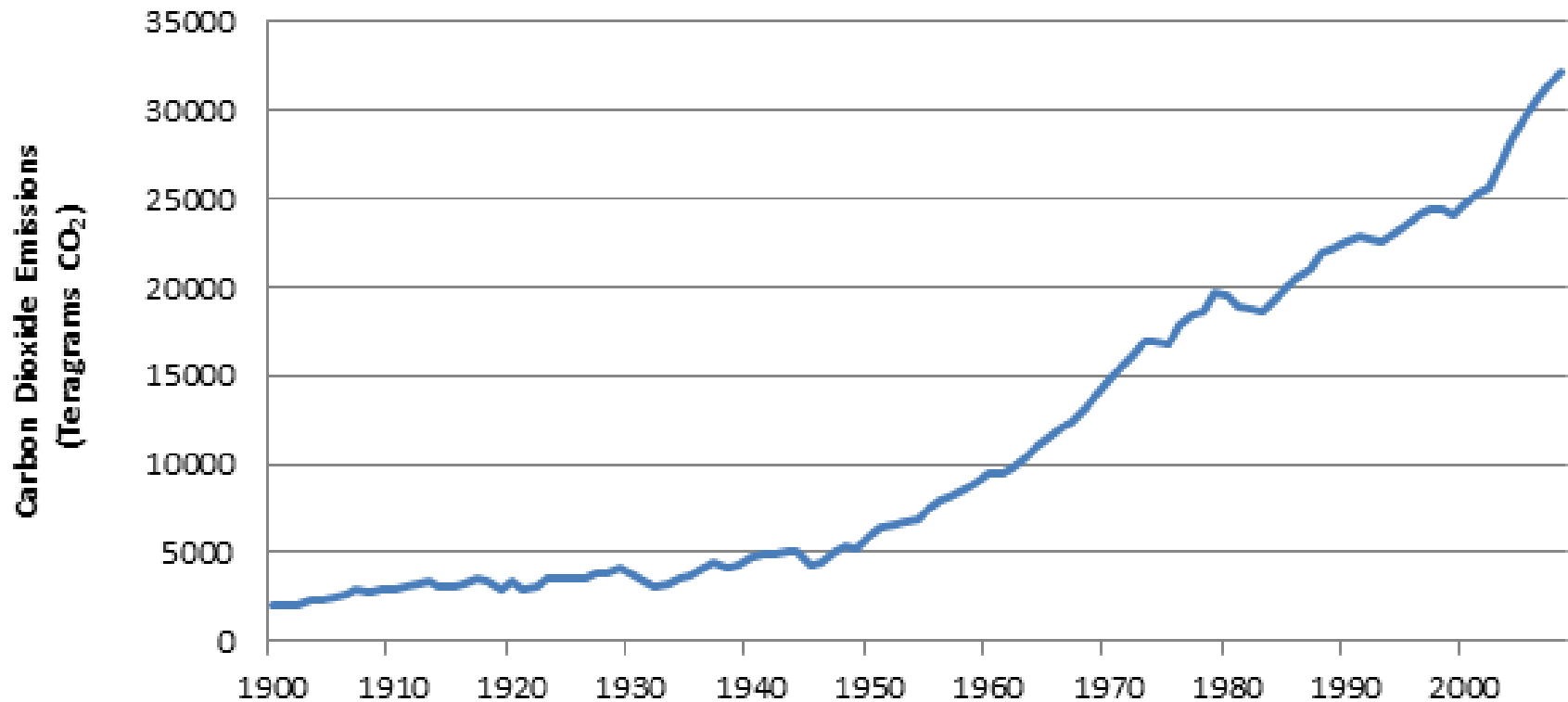
GRAPHIC DESIGN : PHILIPPE REKACEWICZ

Global Greenhouse Gas Emissions by Gas



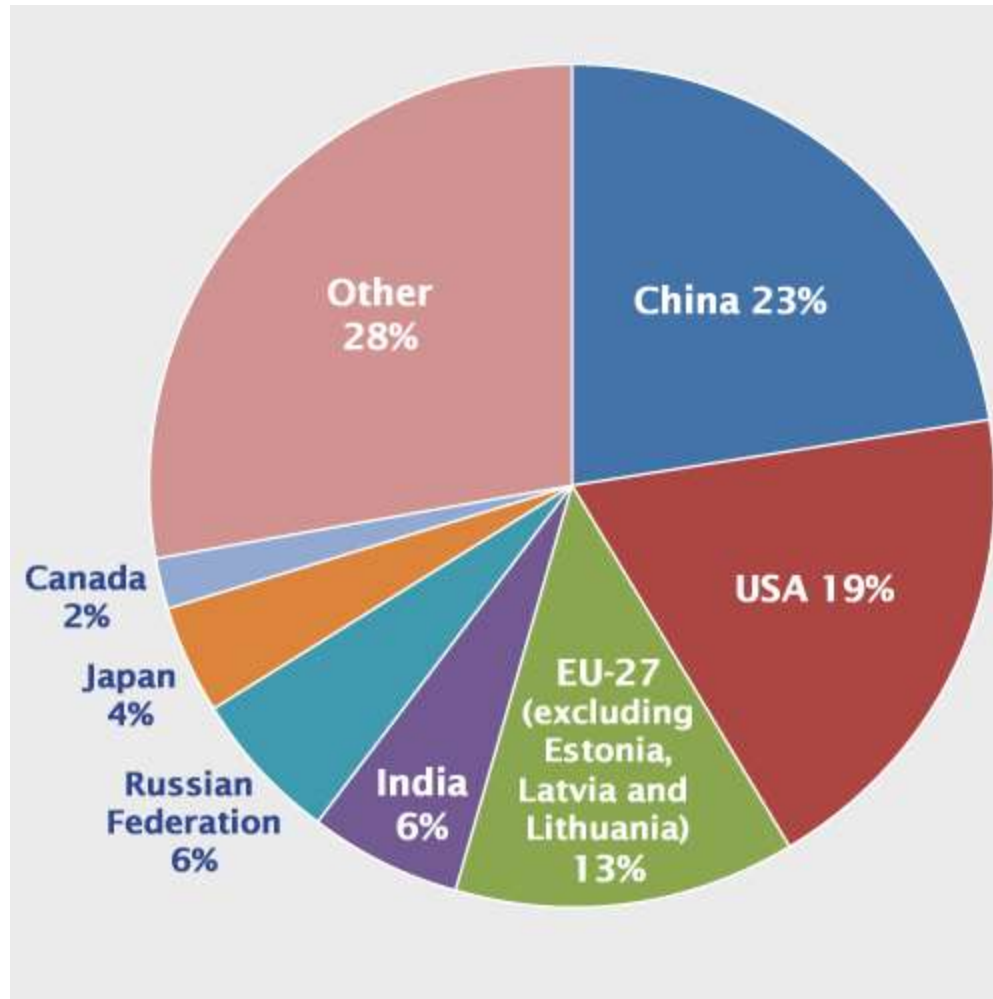
Source: EPA

Global Carbon Dioxide (CO₂) emissions from fossil-fuels 1990-2008



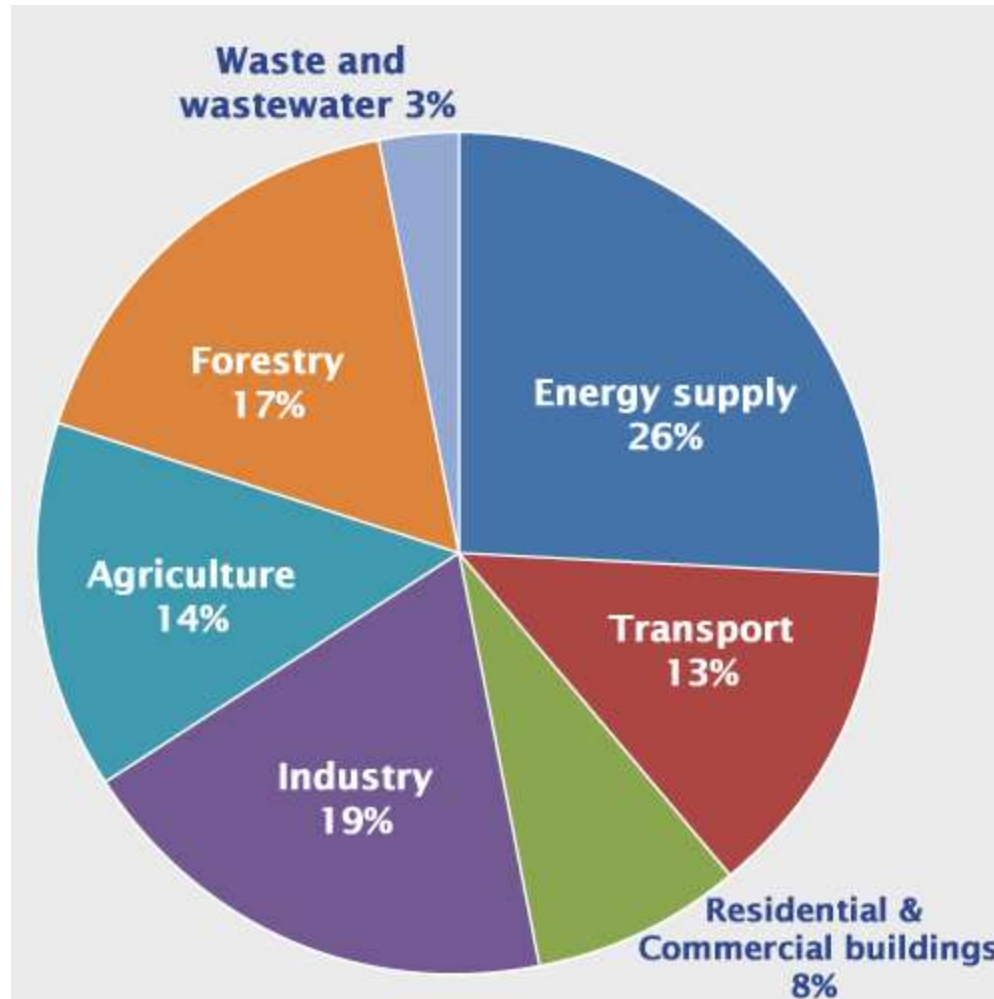
Source: EPA

2008 Global CO2 Emissions from Fossil Fuel Combustion and some Industrial Processes (million metric tons of CO2)



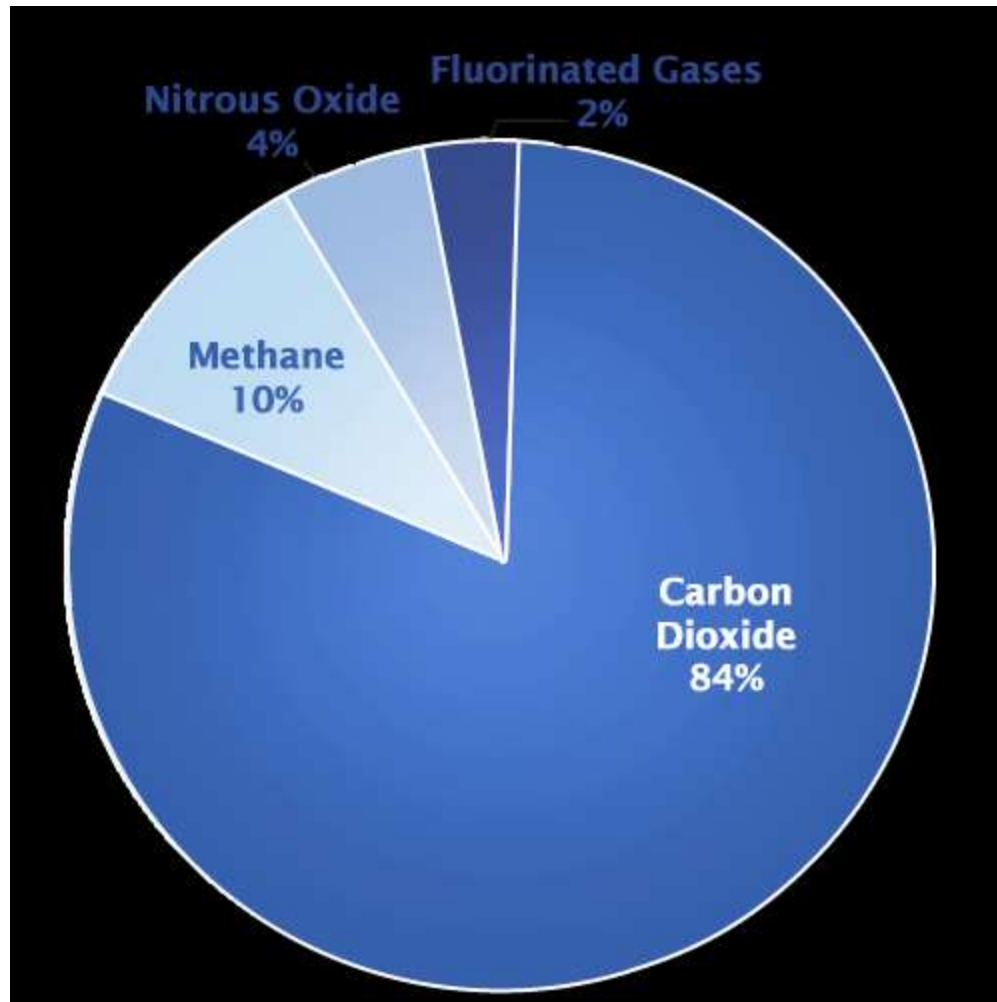
Source: EPA

Global Greenhouse Gas Emissions by Source

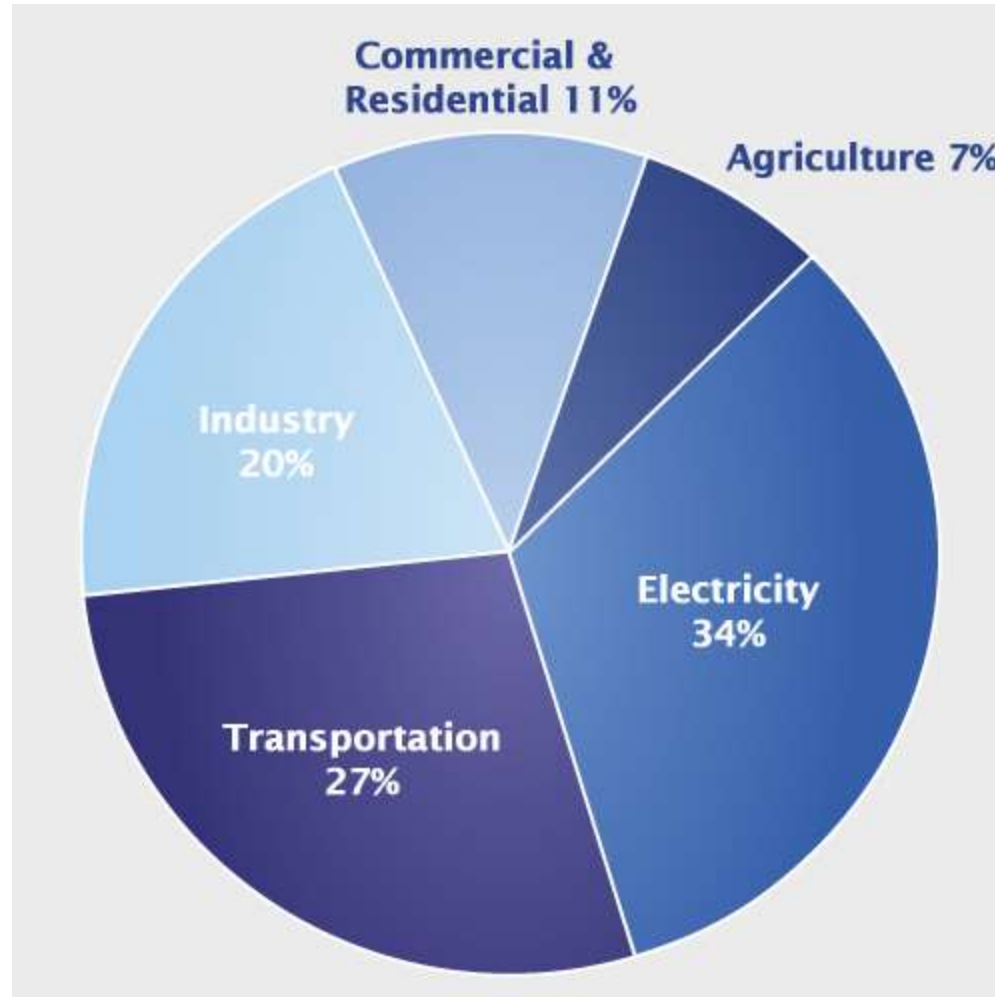


Source: EPA

U.S. Greenhouse Gas Emissions in 2010

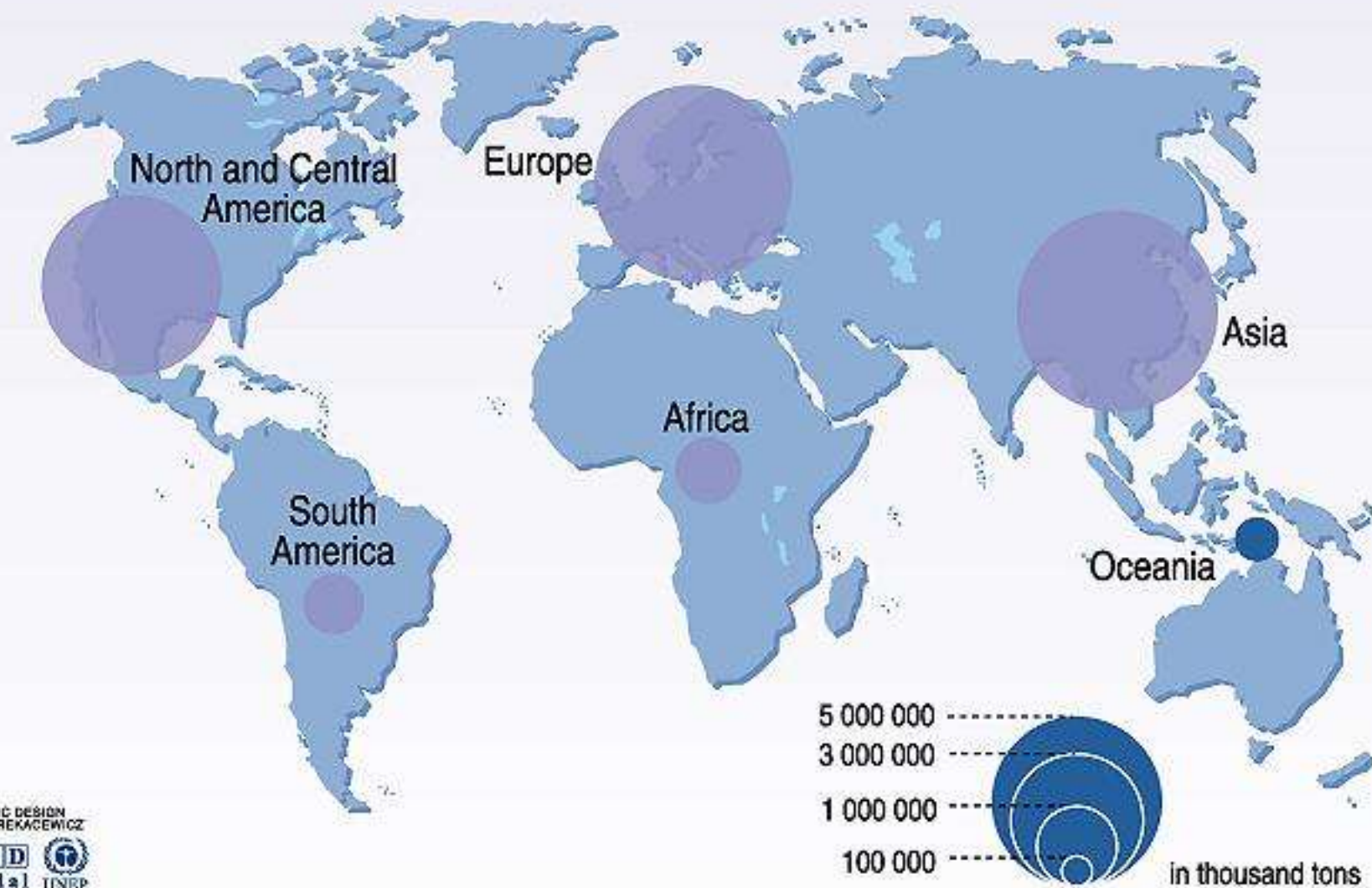


Total U.S. Greenhouse Gas Emissions by Economic Sector in 2010



Source: EPA

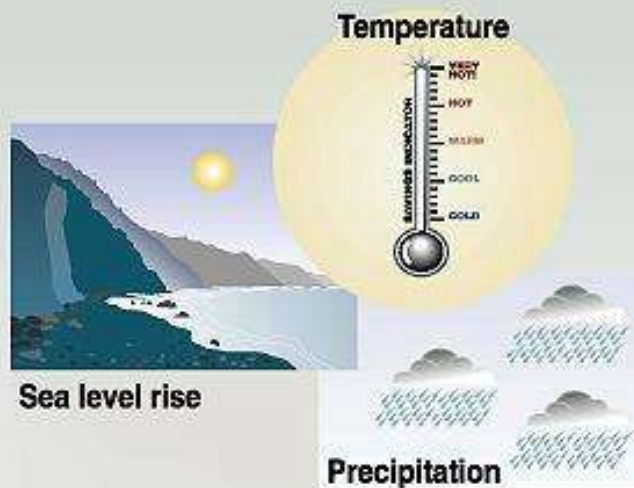
CO₂ emissions from industrial processes



CO₂ emissions from land use change



Potential climate changes impact



Impacts on...

Health



Weather-related mortality
Infectious diseases
Air-quality respiratory illnesses

Agriculture



Crop yields
Irrigation demands

Forest



Forest composition
Geographic range of forest
Forest health and productivity

Water resources



Water supply
Water quality
Competition for water

coastal areas



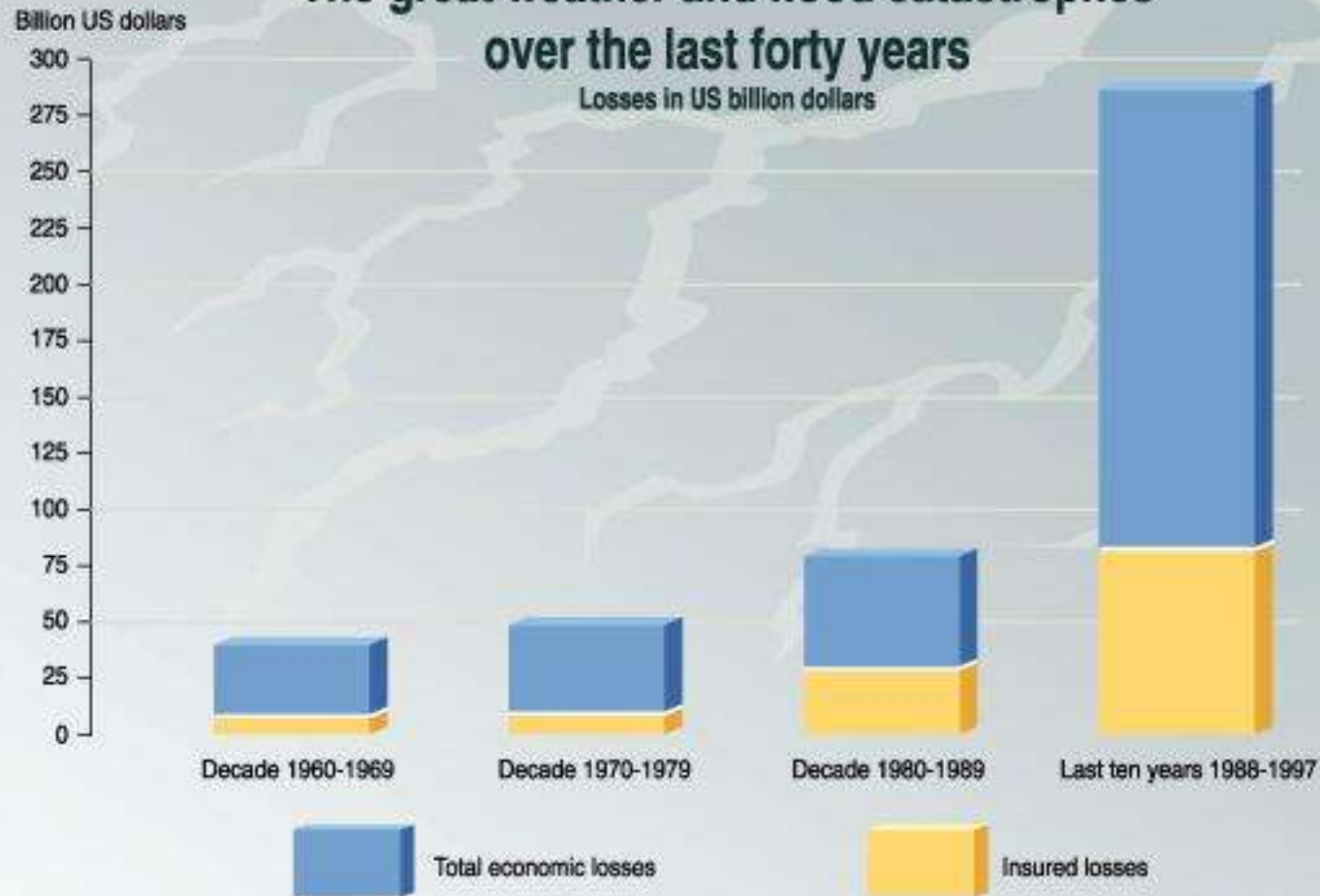
Erosion of beaches
Inundation of coastal lands
additional costs to protect coastal communities

Species and natural areas

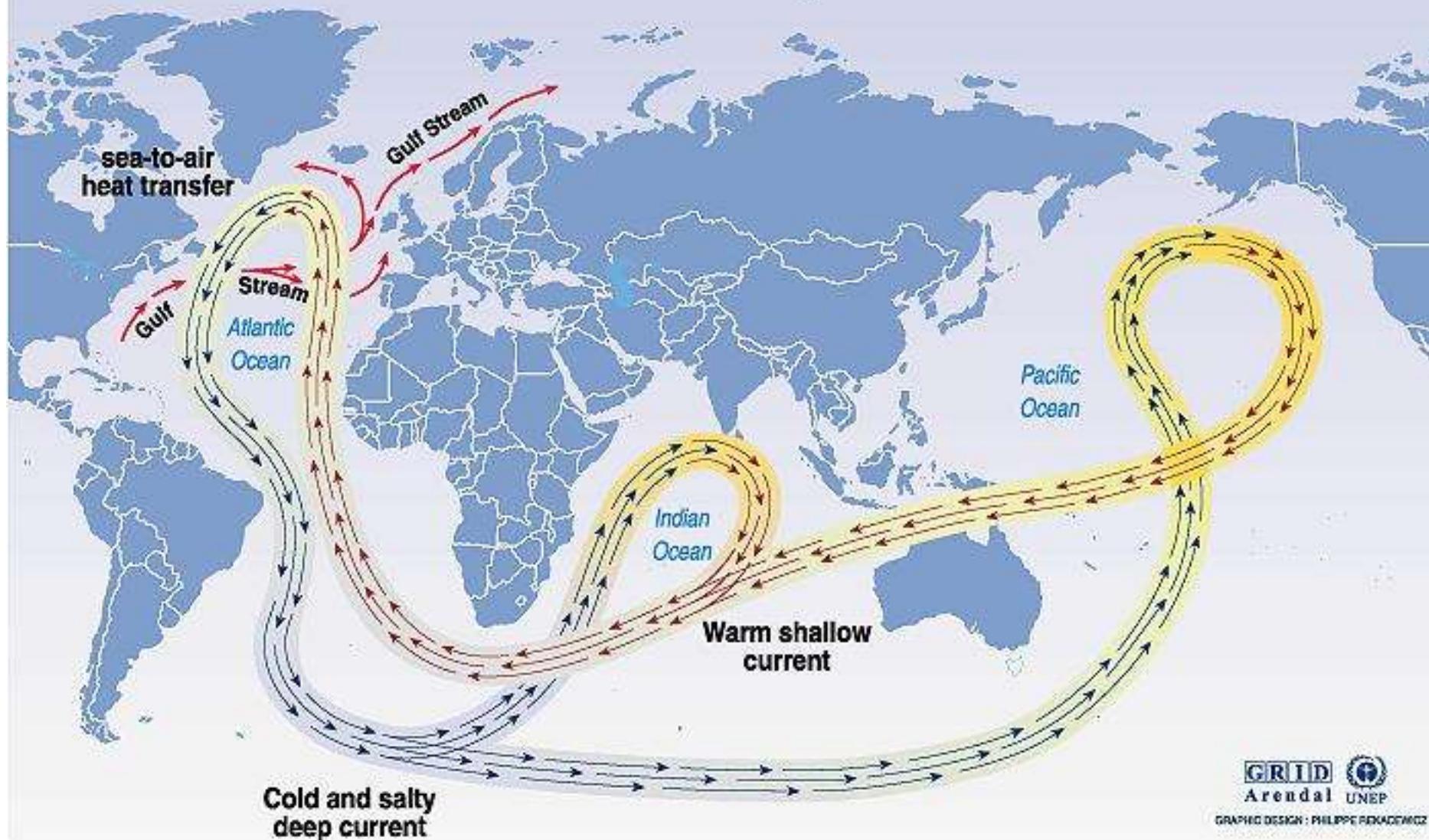


Loss of habitat and species
Cryosphere: diminishing glaciers

The great weather and flood catastrophes over the last forty years



Great ocean conveyor belt



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GRAPHIC DESIGN: PHILIPPE ROKACOWICZ

Source: Broecker, 1991, in Climate change 1995, impacts, adaptations and mitigation of climate change: scientific-technical analyses, contribution of working group 2 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge press university, 1996.

Potential impact of sea-level rise on Bangladesh



Today

Total population: 112 Million

Total land area: 134,000 km²



1.5 m - Impact

Total population affected: 17 Million (15%)

Total land area affected: 22,000 km² (16%)

