working draft

EEA Core Set of Indicators - CSI 013

Atmospheric greenhouse gas concentrations

May 2005 assessment

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If you would like to see further background information about this indicator, you can see the published specification at:
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European Environment Agency

Key policy question: Will GHG concentration remain below 550 ppm CO_2 -equivalents in the long term ? (This is the level needed to limit global temperature rise to 2 degrees Celsius or less)

Key message: Current IPCC baseline projections show that greenhouse gas concentrations will exceed the level of 550 ppm CO_2-equivalents in the next few decades (before 2050).

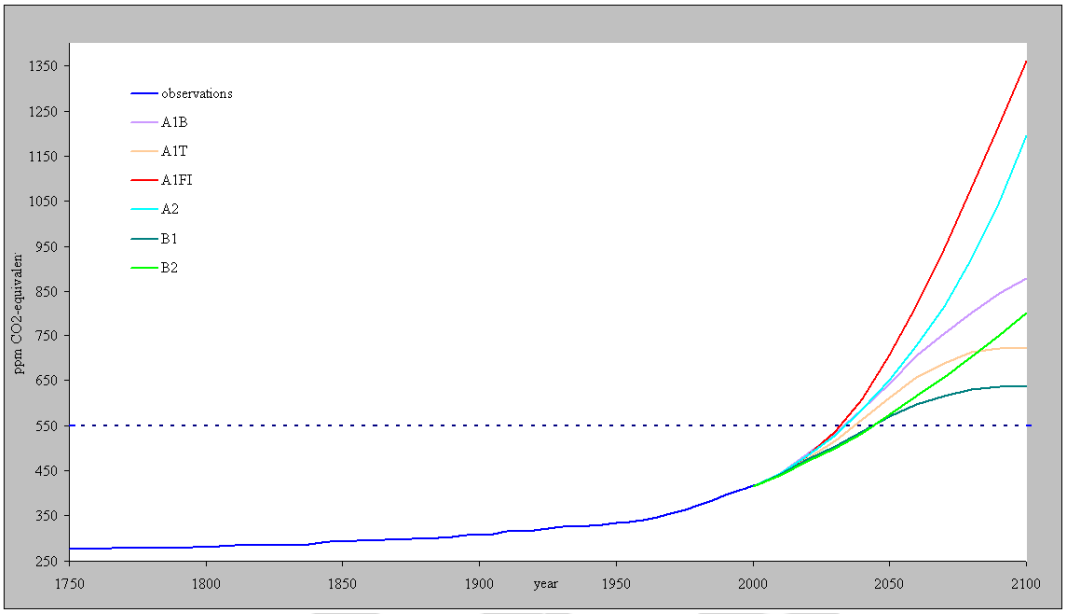
* The concentration of carbon dioxide (CO_2), the main greenhouse, has increased by human activities by 34% compared to pre-industrial levels with an accelerated rise since 1950. Other greenhouse gas concentrations have also risen as a result of human activities. The present concentrations of $CO_2$and CH_4have not been exceeded during the past 420 000 years; the present N_2O concentration has not been exceeded during at least the past 1000 years.

- Current IPCC baseline projections (IPCC, 2001) show that global atmospheric greenhouse gas concentrations will exceed the level of 550 ppm CO2-equivalents in the next few decades (before 2050). If this level of 550 ppm CO2-equivalents is exceeded, there is only little chance that global temperature rise will stay below the 2 degrees Celcius (the EU target). Clearly, global emission reductions are necessary to meet this target.

- The concentration of greenhouse gases in the atmosphere has increased in the 20th Century due to human activities, mostly related to the use of fossil fuels (e.g. for electric power generation), agricultural activities and land-use change (mainly deforestation). The increase has been particularly rapid since 1950. Compared to the pre-industrial era (before 1750), concentrations of the greenhouse gases carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) have increased by 34%, 153%, and 17%, respectively. The present concentrations of CO_2(372 parts per million, ppm) and CH_4(1772 part per billion, ppb) have not been exceeded during the past 420 000 years (for CO_2 likely not even during the past 20 million years); the present N_2O concentration (317 ppb) has not been exceeded during at least the past 1000 years.

- The IPCC projected different future greenhouse gas concentrations for the 21st Century, varying in socio-economic, technological and demographic developments. The scenarios assume no implementation of specific climate-driven policy measures. Under these scenarios, greenhouse gas concentrations are estimated to increase to 650 to 1350 ppm CO_2-equivalent by 2100. It is very likely that fossil fuel burning will be the major cause of this increase in the 21st Century.

Fig. 1: Measured and projected concentrations of 'Kyoto' greenhouse gases



Data source: SIO; ALE/GAGE/AGAGE; NOAA/CMDL; IPCC, 2001