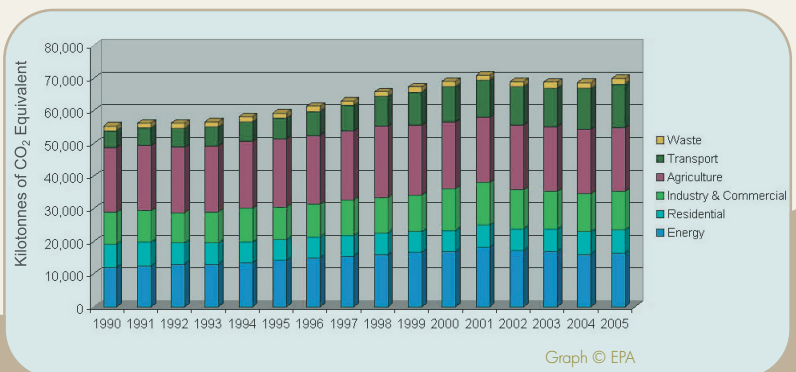


Emissions of GREENHOUSE GASES as a result of human activity have increased significantly since the industrial revolution. Greenhouse gases have a central role in climate change and are largely responsible for the global warming observed in recent decades. The objective of the United National Framework Convention on Climate Change (UNFCCC) is to stabilise atmospheric greenhouse gas concentrations at a level that would prevent the dangerous impacts of climate change. The EU interprets such change as a rise of 2°C in global temperature compared with pre-industrial times.

Under the Kyoto Protocol to the UNFCCC, Ireland must limit its emissions to a 13% increase above the 1990 level during the period 2008–2012. In 2005 Irish emissions of greenhouse gases were 25.4% above 1990 levels.

The top three sectors that contribute to Irish greenhouse gas emissions are agriculture, energy and transport. There is particular concern over emissions from the transport sector, which have increased by 160% between 1990 and 2005.



The Main Greenhouse Gases

Greenhouse gases only form a very small fraction of the total composition of the atmosphere. The greenhouse effect arising from these natural levels of greenhouse gases acts as a blanket and maintains the global average surface temperature at about 15°C. However, increasing atmospheric concentrations of greenhouse gases with long atmospheric lifetimes, i.e. decades to centuries, are the main cause for concern in addressing climate change as they result in an enhanced greenhouse effect, with consequent increases in global temperature.

CARBON DIOXIDE is the most important greenhouse gas. It has a long atmospheric lifetime, of the order of a century. The dominant source of human origin is fossil fuel burning. The second main source is land use and land use changes, including deforestation. Globally, the atmospheric concentration of carbon dioxide has increased by 20% from 1959 to 2005.

The average carbon dioxide emission per unit of energy used varies significantly with the fuel involved, being highest for peat and coal and lowest for natural gas, with oil in between. Thus the mix of fuels used is important, as is the fraction of power generated from fossil fuels.

Greenhouse Gases: An Irish Perspective

Water vapour also acts as a greenhouse gas. The amount of water vapour in the atmosphere is largely determined by temperature. Thus the increased warming due to long lived greenhouse gases also leads to higher atmospheric concentrations of water vapour. This is an important positive feedback that increases the warming impacts of long lived greenhouse gases.

METHANE is the second most important greenhouse gas. The main global sources are wetlands, ruminants, the energy industry, landfills, rice cultivation and biomass burning. It is estimated that about 60% of the emissions are due to human activity.

NITROUS OXIDE is the third most important long lifetime greenhouse gas. The main human-related sources are fertiliser use and livestock management in agriculture, biomass burning and industrial activities.

Lower atmosphere or ground level **OZONE** is an important greenhouse gas. It has a short lifetime of about 7 to 10 days. It is damaging to human health, ecosystems and crops and is being addressed through international actions on air quality. The concentration of ozone depends, in a complicated way, on the concentrations of pollutant gases such as carbon monoxide and oxides of nitrogen.

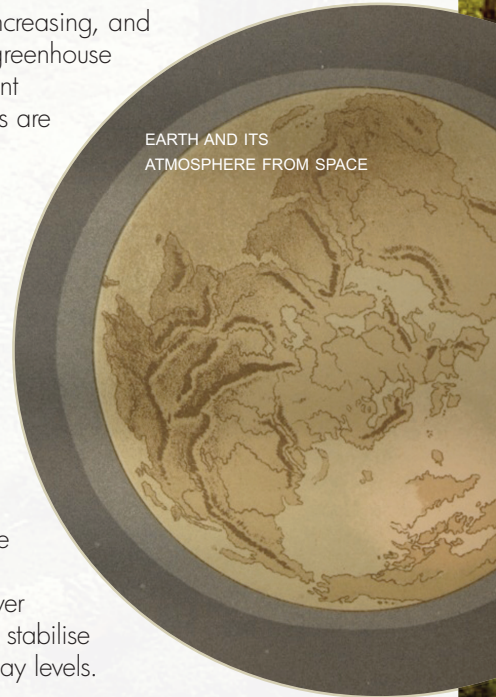
Atmospheric concentrations of **CHLOROFLUOROCARBONS (CFCs)** and some other compounds that are involved both in stratospheric ozone depletion and the greenhouse effect are either increasing more slowly or decreasing, thanks to the Montreal Protocol to the Vienna Convention on ozone depleting substances and subsequent amendments. At the same time, concentrations of a number of other

gases, including some that are used as substitutes for CFCs, are increasing, and some of these are strong greenhouse gases, although their current atmospheric concentrations are very low.

The UNFCCC and Kyoto Protocol have focused on greenhouse gases that are not addressed under other international forums such as the Montreal Protocol.

The Intergovernmental Panel on Climate Change estimates that because of the longevity of greenhouse gases in the atmosphere, immediate reductions of over 60% would be required to stabilise concentrations at present-day levels.

EARTH AND ITS ATMOSPHERE FROM SPACE



THE SITUATION IN IRELAND: With regard to their likely role in climate change, carbon dioxide emissions contribute nearly two thirds of Ireland's greenhouse gas emissions, while methane and nitrous oxide contribute just over a third. The share of methane and nitrous oxide emissions in Ireland is high, because of the important role of agriculture and, in particular, livestock production.

On a per capita basis, Irish annual emissions of greenhouse gases amount to about 17 tonnes (carbon dioxide equivalent). The figures for the USA, EU-15 average and India are about 23 tonnes, 11 tonnes and 1 tonne, respectively.



**Irish Committee
on Climate Change**

4th Scientific Statement Greenhouse Gases: An Irish Perspective

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This is the fourth in a series of scientific statements by the ICC. Previously published statements:
• A General Statement on Climate Change and Ireland • Climate Change and Irish Agriculture • Climate and Sea level Change.

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