

Nitrous Oxide

GHG Inventory summary Factsheet

Territorial coverage: UK including Crown Dependencies and Overseas Territories

Total emissions: Quoted with respect to emissions including net LULUCF

Sector Definition: National Communication

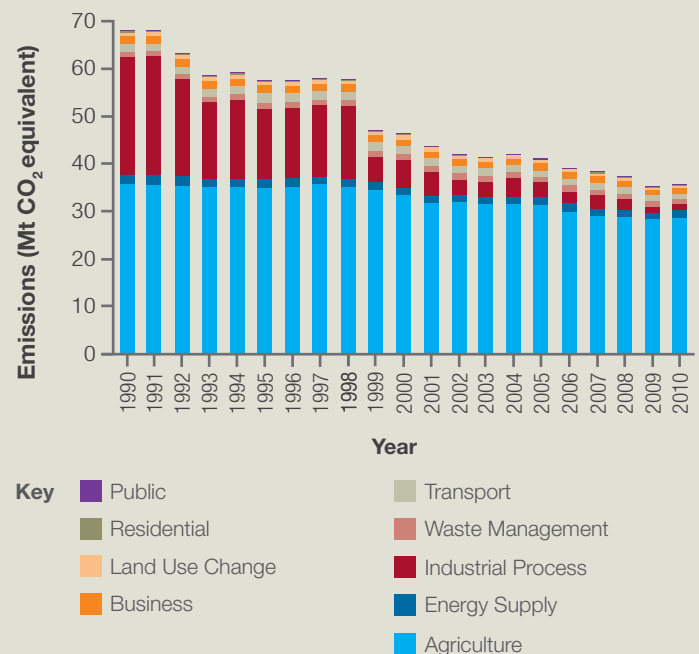
GHG summary - historic emissions

- Nitrous oxide emissions have decreased by 47.5% from 1990 to 2010 and are currently 35.6 MtCO₂e (6.0% of UK total GHGs).
- The main sources of nitrous oxide emissions are currently agricultural soils (74% in 2010), fuel combustion (12% in 2010) and nitric acid production (3.7% in 2010). Historically the chemical industry was a significant source in the 1990s.
- Emissions from agricultural soils decreased by 19.6% over the time series and contributed 20.0% to the total decrease in nitrous oxide emissions.
- Emissions from fuel combustion have decreased by 31%, contributing 6% to the total decrease.
- Emissions from chemical industry processes (nitric and adipic acid production) decreased by 94.7% with a significant decrease seen between 1998 and 1999. The decrease in these emissions equates to 72.3% of the total decrease in nitrous oxide emissions over the period.

Sources of emissions and data sets

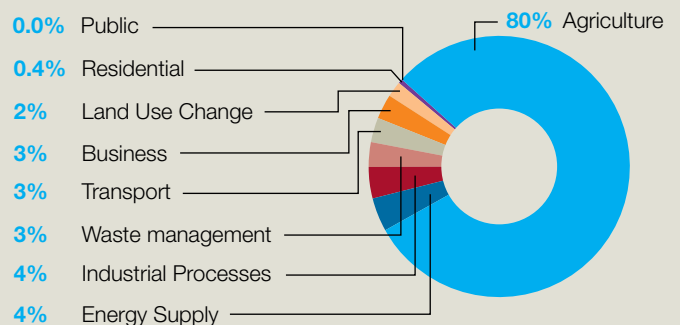
- Agricultural soils, fuel combustion and nitric acid production accounted for almost 90% of total N₂O emissions in 2010.
- The main datasets used in estimation are the June Survey of Agriculture and Horticulture and the British Survey of Fertiliser Practice published by Defra.
- For fuel combustion, the key datasets are the Digest of UK Energy Statistics (DUKES) and emission factors from IPCC and UNECE guidance.
- For industrial processes, the key dataset is the Environment Agency Pollution Inventory and site specific information directly from plant operators.

UK Nitrous oxide emissions by source (1990 - 2010)



Note: Categories used as based on source emissions not end-user.

Total Emissions by Sector (2010)



Methodology

- Nitrous oxide emissions from manure management are estimated by combining livestock numbers with livestock specific and animal waste system specific emission factors. The emission factors used are from UK specific research.
- Emissions from agricultural soils are modelled using various statistical inputs, such as crop areas and fertiliser use to estimate the nitrogen cycle processes such as biological fixation and leaching in order to calculate soil nitrous oxide emissions.
- Emissions from fuel combustion are estimated by combining activity data (from DUKES) with emission factors that are taken from a variety of sources, mostly literature based sources.
- Emissions from nitric acid production are now estimated based information supplied directly from the plant operators. For the early part of the time series, emissions were based on total nitric acid produced and an appropriate emission factor.

Uncertainties

- The GHG Inventory quantifies uncertainties on emission factors and activity data, which in turn allow for the production of uncertainty estimates on the: emissions; overall uncertainty by gas; and indicative-only estimates of sector level uncertainties.
- Uncertainty in UK nitrous oxide emissions in is heavily skewed, with the 97.5th percentile 100 times greater than the 2.5th percentile.
- The central estimate of total nitrous oxide emissions in 2010 was estimated as 36.1 MtCO₂e with Monte Carlo uncertainty analysis suggested that 95% of the values were between 9.1-108.4 MtCO₂e
- Uncertainty in the trend: 95% probability that nitrous oxide emissions in 2010 were between 29% and 76% below the level in 1990.

Improvements

- A programme of agricultural research projects is ongoing, which includes research into the availability of more detailed emission factors and activity data from across the UK.

Projections

- Projected emissions of nitrous oxide are expected to decrease by 9% from 2010 levels by 2025.
- Emissions continue to be dominated by emissions from agriculture.
- The overall decrease in nitrous oxide emissions between 1990 and 2025 is estimated to be 52%.
- The projections presented here exclude the impact of emissions trading.
- The projections are taken from Updated Energy and Emissions Projections: October 2011 (DECC); historic data taken from the 2012 inventory.

Historic and Projected Emissions of Nitrous Oxide



Source: Updated Energy and Emissions Projections: October 2011 (DECC).

Links

- NAEI website: <http://naei.defra.gov.uk/>
- DECC GHG statistics: http://www.decc.gov.uk/en/content/cms/statistics/climate_stats/gg_emissions/gg_emissions.aspx
- DECC projections: http://www.decc.gov.uk/en/content/cms/about/ec_social_res/analytic_projs/en_emis_projs/en_emis_projs.aspx