



EPA Headquarters

PO Box 3000
Johnstown Castle Estate
County Wexford, Ireland

T +353 53 9160600
LoCall 1890 33 55 99
www.epa.ie

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IRELAND'S TRANSBOUNDARY GAS EMISSIONS IN 2010

Introduction

The pollutants sulphur dioxide (SO₂), nitrogen oxides (NO_x), volatile organic compounds (VOC) and ammonia (NH₃) are responsible for long-range transboundary air pollution such as acidification, eutrophication and ground-level ozone pollution.

Under Article 4.1 of the National Emissions Ceiling Directive [2001/81/EC], Member States are required to limit their annual national emissions of SO₂, NO_x, VOC and NH₃ to amounts not greater than the emissions ceilings laid down in Annex 1 of the Directive, by the year 2010 at the latest. Ireland's limits are as follows:

- SO₂ 42 kilotonnes
- NO_x 65 kilotonnes
- VOC 55 kilotonnes
- NH₃ 116 kilotonnes

This inventory submission shows Ireland below 3 of the 4 Annex 1 ceilings for 2010. The submission shows Ireland exceeding its 2010 NO_x ceiling by 7.6 kilotonnes. Emissions of each of the four pollutants in 2010 are shown below:

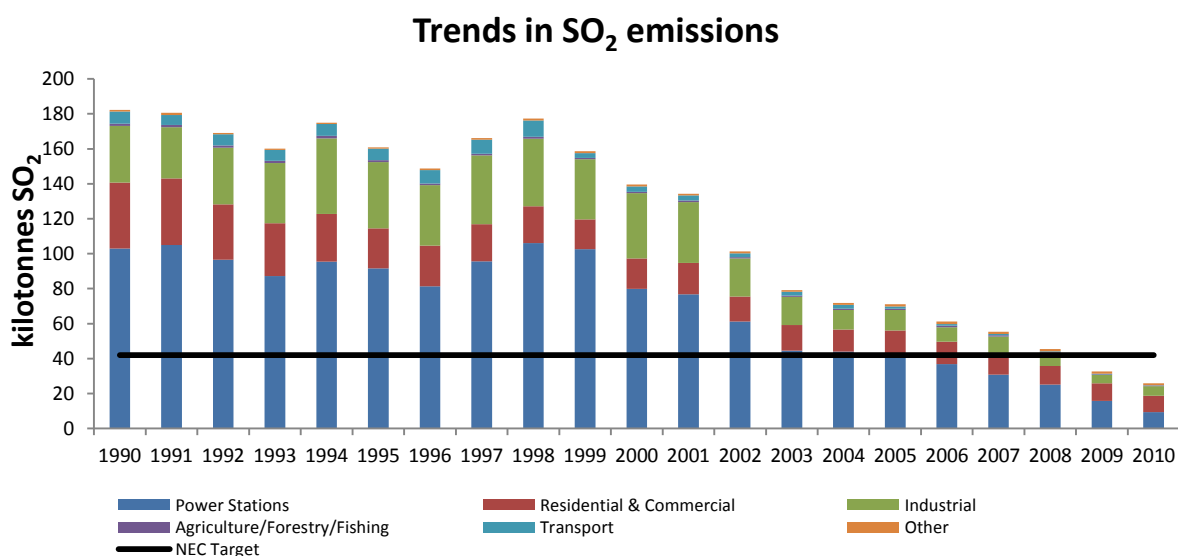
- SO₂ 25.9 kilotonnes
- **NO_x 72.6 kilotonnes**
- VOC 44.9 kilotonnes
- NH₃ 106.2 kilotonnes

Sulphur Dioxide

Sulphur dioxide (SO₂) is the major precursor to acid deposition, which is associated with the acidification of soils and surface waters and the accelerated corrosion of buildings and monuments. Emissions of SO₂ are derived from the sulphur in fossil fuels such as coal and oil used in combustion activities.

National Emissions Ceiling

Ireland's national emission ceiling for SO₂ under the NEC Directive is 42 kilotonnes (kt) to be achieved by 2010. This is equivalent to a 77 per cent reduction from the 1990 baseline level of 182.3 kt SO₂.



Trends in SO₂ Emissions

SO₂ emissions in Ireland reduced considerably between 1990 and 2010. The latest estimates indicate a decrease of 86 per cent from 182.3 kt in 1990 to 25.9 kt in 2010. Power stations remain the principal source of SO₂ emissions, contributing 36 per cent of the total in 2010, even though emissions in this sector decreased by 91 per cent from 1990. Combustion sources in the industrial and residential/commercial sectors account for a significant proportion of emissions, with contributions of 21 and 36 per cent, respectively in 2010. The remainder of emissions are from combustion in oil refining, agriculture, forestry and transport.

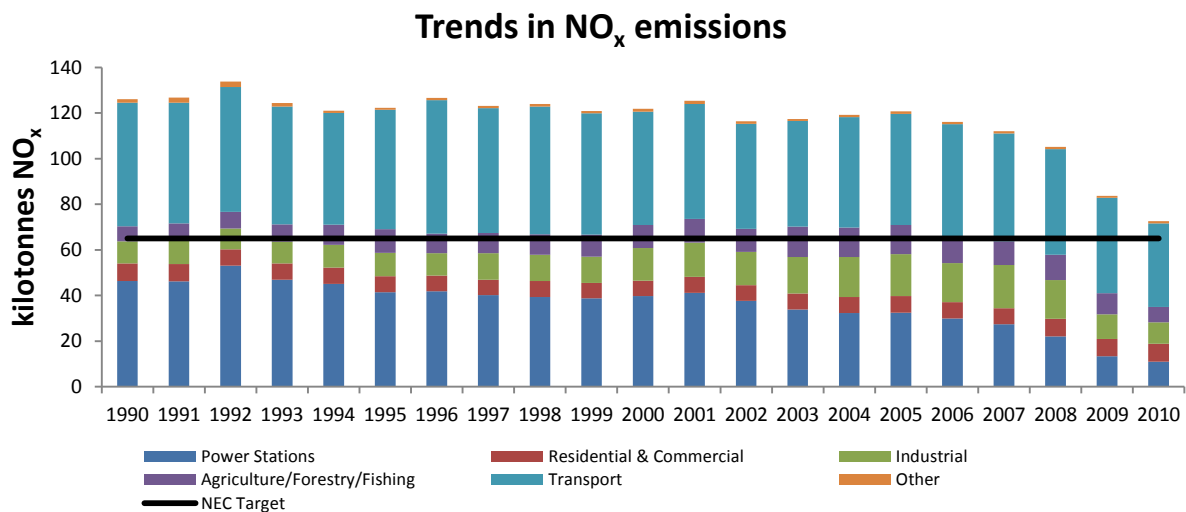
The emissions from industrial sources decreased by 83 per cent from 1990 while the emissions in the residential and commercial sectors decreased by approximately 75 per cent. Total SO₂ emissions in 2010, 25.9 kt, are below the 2010 ceiling. This reflects significant switching from the use of oil and solid fuels to natural gas, reduced sulphur content in coal and oil and implemented abatement in the power generation sector.

Nitrogen Oxides

Emissions of nitrogen oxides (NO_x) contribute to acidification of soils and surface waters, tropospheric ozone formation and nitrogen saturation in terrestrial ecosystems. Power generation plants and motor vehicles are the principal sources of nitrogen oxides, through high-temperature combustion.

National Emissions Ceiling

Ireland's national emission ceiling for NO_x under the NEC Directive is 65 kilotonnes (kt), to be achieved by 2010. This is equivalent to a 48.4 per cent reduction from the 1990 baseline level of 125.9 kt NO_x.



Trend in NO_x Emissions

NO_x emissions in Ireland have decreased by 42.0 per cent between 1990 and 2010 and emissions have decreased by over 32.5 kt, or 31 per cent since 2008. This reduction was achieved due to improved abatement in Moneypoint power plant, reduced demand for clinker/cement and a reduction in fuel used in road transportation. The latest estimates are 72.6 kt in 2010. The transport sector, which mainly consists of road transport, is the principal source of NO_x emissions, contributing approximately 51 per cent of the total in 2010. The power generation sector is the other main source of NO_x emissions, accounting for 15 per cent of emissions in 2010. The remainder of NO_x emissions emanate from the industrial, agriculture and residential/commercial sectors, which together produced over 33 per cent of the total in 2010.

The application of low-NO_x burner technology in several major power stations and the increased use of natural gas have reduced NO_x emissions from electricity generation by 76 per cent on 1990 levels, even though electricity total final consumption has increased by 112 per cent over the same period. Emissions of NO_x from the coal-fired power plant at Moneypoint have decreased by almost 75 per cent between 2007 and 2010.

The increase in vehicle numbers and in road transport in general sustained emissions of NO_x through the period 2000 to 2007 even though improved technologies reduced the emissions

from individual vehicles. In recent years, however, road transport has seen a decline in emissions of 8.4 kt, or 20 per cent, between 2007 and 2010 due to the economic recession and the changes made in 2008 to vehicle registration tax (VRT) and road tax to incentivise the buying of more fuel efficient passenger cars. Progress toward the ceiling of 65 kt for NO_x in 2010 has improved largely as a result of declining road transport emissions in the last three years. However, these provisional figures for 2010 show that Ireland is still 7.6 kt above the 2010 emission ceiling.

The NO_x figures are adjusted for fuel tourism i.e. the impact on emissions of fuel sold in the Republic of Ireland for consumption across the border in Northern Ireland is removed as allowed for under the Guidelines for Reporting Emission Data under the Convention on Long-Range Transboundary Air Pollution¹. Fuel tourism accounted for 3.0 kt of NO_x in 2010. The adjusted NO_x inventory (i.e. with the impact of fuel tourism removed as presented here) will be assessed for compliance under the NEC Directive.

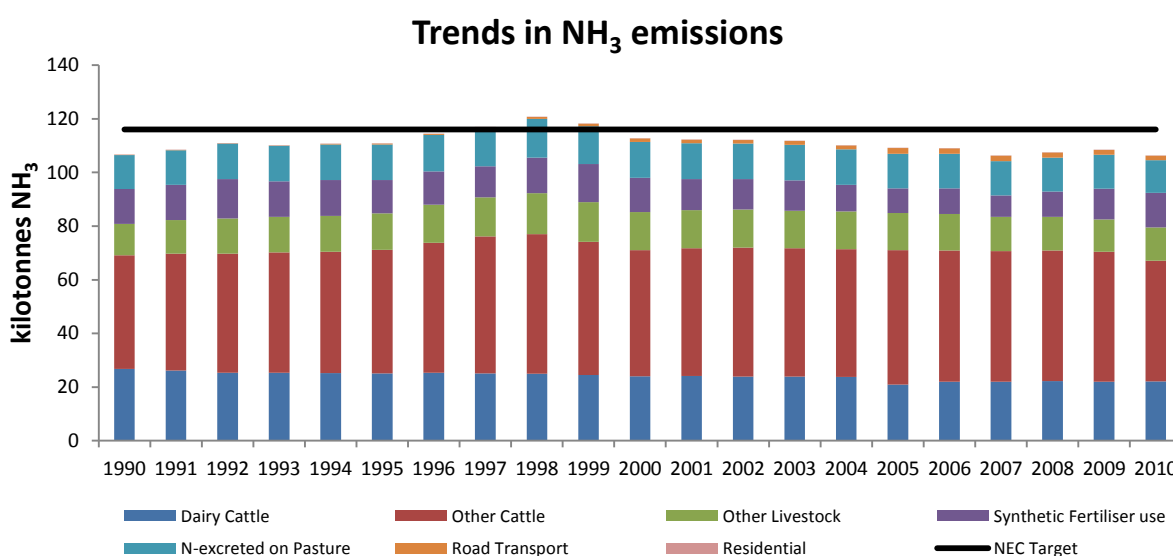
¹ [paragraph 16 of ECE/EB.AIR/97](#)

Ammonia

Ammonia (NH₃) emissions are associated with acid deposition and the formation of secondary particulate matter. The agriculture sector accounts for virtually all (over 98 percent) ammonia emissions in Ireland. Grasslands ultimately receive the bulk of the 40 million tonnes (Mt) of animal manures produced annually in Ireland along with over 300,000 tonnes of nitrogen in fertilisers. A proportion of the nitrogen in these inputs is volatilised into the air as ammonia.

National Emissions Ceiling

Ireland's national emission ceiling for NH₃ under the NEC Directive is 116 kilotonnes (kt), to be achieved by 2010. This is equivalent to an 8.8 per cent permitted increase in emissions from the 106.6 kt 1990 baseline figure.



Trend in NH₃ Emissions

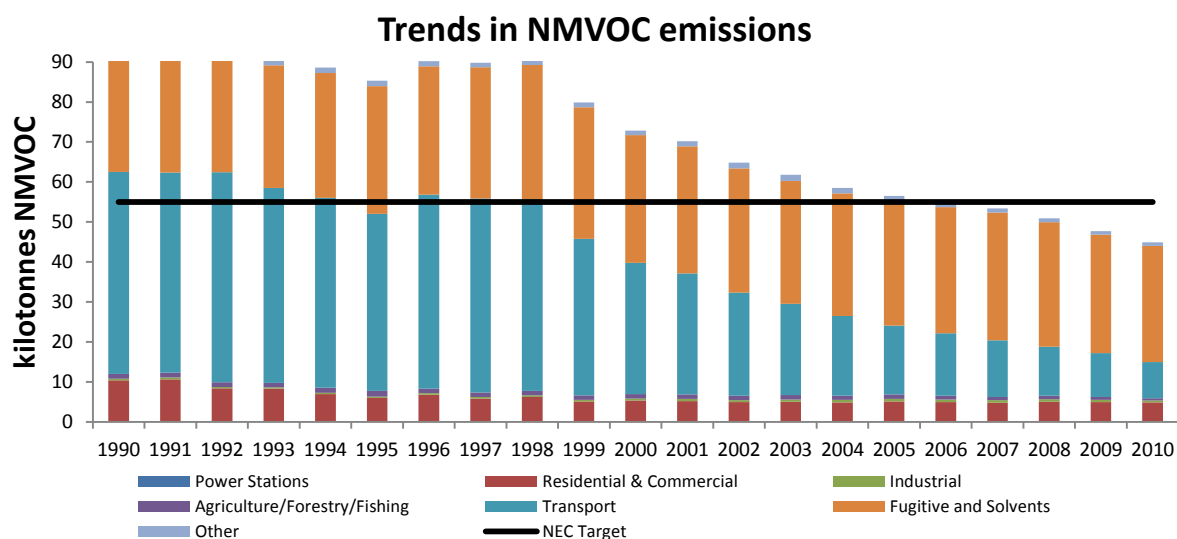
The emissions in 2010 were 106.2 kt or 0.4 per cent less than emissions in 1990. Animal manures produce about 86 per cent of ammonia emissions in agriculture and chemical fertilisers and road transport account for the remainder. It is estimated that approximately 17 per cent of the nitrogen in animal wastes and 3 per cent of nitrogen contained in chemical fertilisers is lost to the atmosphere as NH₃. The NH₃ emissions trend is consequently largely determined by the cattle population and showed a steady increase up to almost 120.7 kt in 1998. There was some decline in the populations of cattle and sheep after 1998, as well as a decrease in fertiliser use until 2009, which contributed to a downturn in NH₃ emissions in the period 2000 to 2010. NH₃ emissions from synthetic fertiliser applied on soils have increased by 1.4 kt or 12.5 per cent from 2009 to 2010 due to an 18 per cent increase in nitrogenous fertiliser use. Road transport produces a small proportion of emissions of ammonia (< 2.0 per cent) mainly from petrol passenger cars with three way catalysts. The emissions of NH₃ are below with the 2010 ceiling.

Volatile Organic Compound (VOC) emissions

Volatile organic compounds (VOC) are emitted as gases by a wide array of products including paints, paint strippers, glues, adhesives and cleaning agents. They also arise as a product of incomplete combustion of fuels and as such are a component of car exhaust and evaporative emissions.

National Emissions Ceiling

The EU National Emissions Ceilings (NEC) Directive has set a target of 55 kilotonnes (kt) of VOC emissions in Ireland by 2010. This is equivalent to a 41 per cent reduction in emissions from the 93.2 kt 1990 baseline figure.



Trend over time

The main sources of VOC emissions in Ireland are solvent use and transport. These sources produce 85 per cent of the annual total. Coal burning in the residential sector is another important but declining source as coal consumption decreases. Emissions in 2010, at 44.9 kt, are below the 2010 ceiling. Reductions corresponding to 51.8 per cent have been achieved from 1990 to 2010. Technological controls for VOCs in motor vehicles, which have led to a significant reduction in emissions from road transport, have largely been responsible for the decrease in overall emissions.

Further reductions in VOC emissions depend largely on the effects of legislative controls on hydrocarbon emissions from road vehicles and on the benefits that result from implementation of EU Directives on solvents and on the solvent content of paints.