Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

# Ireland's Air Pollutant Emissions

1990-2030

June 2020

# Environmental Protection Agency

The Environmental Protection Agency (EPA) is responsible for protecting and improving the environment as a valuable asset for the people of Ireland. We are committed to protecting people and the environment from the harmful effects of radiation and pollution.

The work of the EPA can be divided into three main areas:

- **Regulation:** We implement effective regulation and environmental compliance systems to deliver good environmental outcomes and target those who don't comply.
- **Knowledge:** We provide high quality, targeted and timely environmental data, information and assessment to inform decision making at all levels.
- **Advocacy:** We work with others to advocate for a clean, productive and well protected environment and for sustainable environmental behaviour.

## Our Responsibilities

### LICENSING

We regulate the following activities so that they do not endanger human health or harm the environment:

- waste facilities (e.g. landfills, incinerators, waste transfer stations);
- large scale industrial activities (e.g. pharmaceutical, cement manufacturing, power plants);
- intensive agriculture (e.g. pigs, poultry);
- the contained use and controlled release of Genetically Modified Organisms (GMOs);
- sources of ionising radiation (e.g. x-ray and radiotherapy equipment, industrial sources);
- large petrol storage facilities;
- waste water discharges;
- dumping at sea activities.

### NATIONAL ENVIRONMENTAL ENFORCEMENT

- Conducting an annual programme of audits and inspections of EPA licensed facilities.
- Overseeing local authorities' environmental protection responsibilities.
- Supervising the supply of drinking water by public water suppliers.
- Working with local authorities and other agencies to tackle environmental crime by coordinating a national enforcement network, targeting offenders and overseeing remediation.
- Enforcing Regulations such as Waste Electrical and Electronic Equipment (WEEE), Restriction of Hazardous Substances (RoHS) and substances that deplete the ozone layer.
- Prosecuting those who flout environmental law and damage the environment.

### WATER MANAGEMENT

- Monitoring and reporting on the quality of rivers, lakes, transitional and coastal waters of Ireland and groundwaters; measuring water levels and river flows.
- National coordination and oversight of the Water Framework Directive.
- Monitoring and reporting on Bathing Water Quality.

### MONITORING, ANALYSING AND REPORTING ON THE ENVIRONMENT

- Monitoring air quality and implementing the EU Clean Air for Europe (CAFÉ) Directive.
- Independent reporting to inform decision making by national and local government (e.g. periodic reporting on the State of Ireland's Environment and Indicator Reports).

### REGULATING IRELAND'S GREENHOUSE GAS EMISSIONS

- Preparing Ireland's greenhouse gas inventories and projections.
- Implementing the Emissions Trading Directive, for over 100 of the largest producers of carbon dioxide in Ireland.

### ENVIRONMENTAL RESEARCH AND DEVELOPMENT

- Funding environmental research to identify pressures, inform policy and provide solutions in the areas of climate, water and sustainability.

### STRATEGIC ENVIRONMENTAL ASSESSMENT

- Assessing the impact of proposed plans and programmes on the Irish environment (e.g. major development plans).

### RADIOLOGICAL PROTECTION

- Monitoring radiation levels, assessing exposure of people in Ireland to ionising radiation.
- Assisting in developing national plans for emergencies arising from nuclear accidents.
- Monitoring developments abroad relating to nuclear installations and radiological safety.
- Providing, or overseeing the provision of, specialist radiation protection services.

### GUIDANCE, ACCESSIBLE INFORMATION AND EDUCATION

- Providing advice and guidance to industry and the public on environmental and radiological protection topics.
- Providing timely and easily accessible environmental information to encourage public participation in environmental decision-making (e.g. My Local Environment, Radon Maps).
- Advising Government on matters relating to radiological safety and emergency response.
- Developing a National Hazardous Waste Management Plan to prevent and manage hazardous waste.

### AWARENESS RAISING AND BEHAVIOURAL CHANGE

- Generating greater environmental awareness and influencing positive behavioural change by supporting businesses, communities and householders to become more resource efficient.
- Promoting radon testing in homes and workplaces and encouraging remediation where necessary.

### MANAGEMENT AND STRUCTURE OF THE EPA

The EPA is managed by a full time Board, consisting of a Director General and five Directors. The work is carried out across five Offices:

- Office of Environmental Sustainability
- Office of Environmental Enforcement
- Office of Evidence and Assessment
- Office of Radiation Protection and Environmental Monitoring
- Office of Communications and Corporate Services

The EPA is assisted by an Advisory Committee of twelve members who meet regularly to discuss issues of concern and provide advice to the Board.

# Contents

# Key Findings

| | |
|---|---|
| **Assessment of targets** | Ireland exceeded its emission ceiling for ammonia ($NH_3$), nitrogen oxides ($NO_x$) and non-methane volatile organic compounds (NMVOC) in 2018. |
| | For $NH_3$, Ireland has now exceeded its ceiling for three years in a row - 2016, 2017 and 2018, as a result of continued increases in the national herd and fertiliser nitrogen use. |
| | Ireland is availing of the flexibilities allowed in National Emission Ceilings Directive to achieve compliance with the targets for $NO_x$ and NMVOC as the emission of these pollutants exceed the ceilings due to the use of better scientific data, which was unavailable when the limits were set. |
| | Emissions of sulphur dioxide ($SO_2$) are currently well below emission ceilings and continue to decrease. This is largely due to the switch to lower sulphur content in fuels in electricity generation and transport. |
| **Main drivers** | For $NO_x$, the main driver is transport, in particular diesel fuelled vehicles despite improvements in engine technology. Agriculture is also a significant source as a result of nitrogen in manure, fertilisers and dung and urine deposition on soil. |
| | For NMVOC, the main drivers are agriculture, and the food and beverage industry, in particular distillation for spirit production. |
| | Agriculture accounts for over 99% of national $NH_3$ emissions. |
| | Particulate matter ($PM_{2.5}$) emissions increased marginally in 2018, mainly due to increased heating requirements in homes and buildings. |
| **Future outlook** | For 2030, NMVOC and $NH_3$ are projected to be in non compliance with emission ceilings and will require additional measures over and above those outlined in the Climate Action Plan. |
| | The EU may take infringement proceedings against Ireland for non compliance with agreed emission ceilings. |
| | Complying with the $NO_x$ ceiling will require full implementation of Climate Action Plan, including meeting electric vehicle targets. |
| | For 2030 emissions of $PM_{2.5}$ are projected to be in compliance with the emission ceiling. |
| | Emissions of $SO_2$ will continue to remain below the emission ceilings for future years. |

# 1. Introduction

This report provides details of emissions of air pollutants in Ireland in the period 1990 to 2018 and projected emissions of these pollutants for 2020 and 2030. The information used to compile this report is sourced from many Agencies and Government Departments, as well as from Annual Environmental Reports submitted to the EPA by licensed industry and waste management activities. The EPA has calculated emissions using the methodologies described in EU[1] and UN[2] reporting guidelines, to comply with the annual reporting requirements of the Convention on Long Range Transboundary Air Pollution (CLRTAP), and the National Emissions Ceiling Directive (NEC).

This report focuses on the five key pollutants with emission ceilings (limits) for which Ireland has compliance commitments under the National Emissions Ceiling Directive (Directive (EU) 2016/2284[3].These pollutants are Sulphur Dioxide ($SO_2$), Nitrogen Oxides ($NO_x$), Ammonia ($NH_3$), Non-Methane Volatile Organic Compounds (NMVOCs) and Fine Particulate Matter ($PM_{2.5}$). The EPA has produced emissions projections for these five pollutants, to indicate the likelihood of future compliance with emissions ceilings. A summary of trends in air pollutants for which there are no emission ceilings under Directive (EU) 2016/2284 is also presented in Section 4.


1 https://www.eea.europa.eu/publications/emep-eea-guidebook-2019

2 https://www.ceip.at//2014_Guidelines/ece.eb.air.125_ADVANCE_VERSION_reporting_guidelines_2013.pdf

3 transposed into Irish law via S.I. No. 232/2018.

# 2. National Emissions Ceilings

The five air pollutants for which ceilings are set affect the environment and human health in different ways. Sulphur dioxide, $NO_x$ and $NH_3$ are primarily associated with acid deposition leading to toxicity of soils and waters. Ammonia however is also responsible for secondary particulate matter formation and $NO_x$ are precursors to tropospheric (ground level) ozone formation. Fine particulate matter, tropospheric ozone, $NO_x$ and NMVOCs impact directly on human health, especially in higher concentrations in urban areas. In its 2019 air quality in Europe report[4], the EEA estimated that approximately 1,180 premature deaths a year occur in Ireland due to poor air quality.

The latest National Emissions Ceilings Directive (Directive (EU) 2016/2284) on the reduction of national emissions of certain atmospheric pollutants, harmonises the reporting obligations to the European Union under the Convention on Long Range Transboundary Air Pollution (CLRTAP) and details emission ceilings for the above-mentioned air pollutants for 2020 and 2030. The commitments under the previous National Emissions Ceilings Directive (2001/81/EC) continue to apply to emissions produced up to the 31st of December 2019. A full outline of the reporting obligations and submission deadlines are outlined in Article 8 and Annex I of Directive (EU) 2016/2284.

The emission ceilings for Ireland up to 31st December 2019 are as follows and are set as absolute emission values:

- Sulphur dioxide ($SO_2$) — 42 kilotonnes
- Nitrogen oxides ($NO_x$) — 65 kilotonnes
- Ammonia ($NH_3$) — 116 kilotonnes
- Non-methane volatile organic compounds (NMVOCs) — 55 kilotonnes

There is no emission ceiling for $PM_{2.5}$ under Directive 2001/81/EC but emission ceilings for this air pollutant are set for 2020 and 2030 under Directive (EU) 2016/2284.

## 2.1 Compliance with National Emissions Ceilings

The current emission ceilings to which Ireland must comply under Directive 2001/81/EC, are set out in Table 1 along with the latest emission estimates. Directive 2016/2284 has set emission ceilings for 2020-2029 and for 2030 based on percentage reductions using 2005 as the base year from which reductions are set. This differs from Directive 2001/81/EC which sets absolute emission value limits or ceilings. As the reductions are relative to a base year (2005) under the latest Directive, reduction commitments will continue to vary as emission estimates are revised and updated.

The data in Table 1 shows that Ireland is in compliance with the $SO_2$ emission ceilings for all years from 2010 to 2018, inclusive. It also shows Ireland exceeding its emission ceilings for $NO_x$ and NMVOC for all years since 2010 and the emission ceiling for $NH_3$ in 2016, 2017 and 2018.

4 https://www.eea.europa.eu/publications/air-quality-in-europe-2019

**Table 1: Ceilings and emission estimates for NEC relevant pollutants***

| | Emissions (kilotonnes) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** |
| National Total $SO_2$ | 26.624 | 25.077 | 23.542 | 23.650 | 17.015 | 15.145 | 13.782 | 13.540 | 12.258 |
| NEC ceiling 2010-2019 | 42.000 | 42.000 | 42.000 | 42.000 | 42.000 | 42.000 | 42.000 | 42.000 | 42.000 |
| National Total $NO_x$ | 114.317 | 102.464 | 105.796 | 107.257 | 106.305 | 106.187 | 108.828 | 107.963 | 107.755 |
| NEC ceiling 2010-2019 | 65.000 | 65.000 | 65.000 | 65.000 | 65.000 | 65.000 | 65.000 | 65.000 | 65.000 |
| National Total NMVOC | 106.288 | 103.559 | 105.049 | 107.555 | 103.467 | 103.577 | 105.269 | 109.942 | 109.784 |
| NEC ceiling 2010-2019 | 55.000 | 55.000 | 55.000 | 55.000 | 55.000 | 55.000 | 55.000 | 55.000 | 55.000 |
| National Total $NH_3$ | 108.072 | 104.295 | 106.190 | 107.766 | 108.266 | 110.695 | 116.160 | 118.441 | 119.339 |
| NEC ceiling 2010-2019 | 116.000 | 116.000 | 116.000 | 116.000 | 116.000 | 116.000 | 116.000 | 116.000 | 116.000 |
| National Total $PM_{2.5}$ | 16.255 | 14.577 | 14.204 | 14.570 | 13.419 | 13.298 | 12.663 | 11.979 | 12.043 |
| NEC ceiling 2010-2019 | NA | NA | NA | NA | NA | NA | NA | NA | NA |

* Data in red highlights where emission ceilings have not been met

Directive (EU) 2016/2284 has a flexibility mechanism that allows Member States to make an adjustment to their Inventory for compliance purposes, where non-compliance with their national emission reduction commitments would result from applying improved emission inventory methods, updated in accordance with scientific knowledge. This flexibility applies to the five key pollutants and is available to all Member States, ensuring that countries are not penalised for updating estimates with information that could not have been foreseen when the ceilings and commitments were agreed.

Ireland is non-compliant with national emission reduction commitments for $NO_x$ and NMVOCs in the period 2010 to 2018 as a result of applying improved emission inventory methods, by using more up-to-date emission factors and recognising new sources. As a result, and in accordance with Directive 2016/2284, Ireland is able to utilise the prescribed flexibility mechanism.

As the non-compliance for $NH_3$ has not been attributed to improved inventory methods and is as a direct result of increased agricultural activity, the criteria for use of the flexibility mechanism does not apply in this case.

Adjusted total emissions for $NO_x$ and NMVOC are presented in Table 2. When the adjustment is considered, Ireland is in exceedance of the emissions ceiling for $NO_x$ and NMVOC for 2010 only. Detailed information relating to the use of the flexibility mechanism is outlined in Ireland's Informative Inventory Report 2020[5].

**Table 2: Adjusted emission estimates for $NO_x$ and NMVOCs***

| kilotonnes | Emissions (kilotonnes) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| National Total $NO_x$ | 114.317 | 102.464 | 105.796 | 107.257 | 106.305 | 106.187 | 108.828 | 107.963 | 107.755 |
| Adjusted $NO_x$ under Article 5(1) | 68.433 | 59.584 | 61.499 | 60.540 | 59.292 | 60.138 | 60.720 | 58.353 | 56.832 |
| NEC ceiling 2010-2019 | 65.000 | 65.000 | 65.000 | 65.000 | 65.000 | 65.000 | 65.000 | 65.000 | 65.000 |
| National Total NMVOC | 106.288 | 103.559 | 105.049 | 107.555 | 103.467 | 103.577 | 105.269 | 109.942 | 109.784 |
| Adjusted NMVOC under Article 5(1) | 55.671 | 52.127 | 50.836 | 50.850 | 49.438 | 48.376 | 47.231 | 46.273 | 47.254 |
| NEC ceiling 2010-2019 | 55.000 | 55.000 | 55.000 | 55.000 | 55.000 | 55.000 | 55.000 | 55.000 | 55.000 |

* Data in red highlights where emission ceilings have not been met

## 2.2 Projected Compliance with future Ceilings

Table 3 sets out the latest estimated values for the reduction commitments in 2020 and 2030 along with projected emissions under two scenarions, *With Existing Measures* (WEM) and *With Additional Measures* (WAM). The WEM scenario assumes that no future policy actions are taken beyond those already in place by the end of 2018, the latest inventory year. This scenario includes the effect of policies and measures that have been established by this date. The WAM scenario provides an alternative outlook including additional planned policies and measures beyond 2018, such as the effect of Ireland's 2019 Climate Action Plan[6] which sets out a major programme of policies and measures aimed to help Ireland achieve its decarbonisation goals.

As can be seen from the table, additional measures, principally those relating to electrification in the transport sector, are projected to bring $NO_x$ emissions into compliance with the 2030 ceiling. NMVOC and ammonia emissions however remain non-compliant across the projected period. Further measures will be required to bring emissions of these pollutants into compliance, with usage of the flexibility mechanism also likely to be sought in the case of NMVOC emissions, if non-compliance results from applying improved emission inventory methods updated in accordance with scientific knowledge.

5 Informative Inventory Report: http://www.epa.ie/pubs/reports/air/airemissions/airpollutantemissions/iir2020/

6 https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/Climate-Action-Plan.aspx

**Table 3: Projected emissions and reduction commitments for NEC relevant pollutants**

| Pollutant | Emissions (kilotonnes) | | | 2020-2029 and 2030 Reduction Commitments (% reduction compared with 2005 levels) | |
|---|---|---|---|---|---|
| | 2020 | 2025 | 2030 | 2020-2029 | 2030 |
| Total $SO_2$ *With Existing Measures* | 13.61 | 11.13 | 9.04 | **25.574** | **10.960** |
| Total $SO_2$ *With Additional Measures* | 13.41 | 8.25 | 5.74 | -65% | -85% |
| Total $NO_x$ *With Existing Measures** | 76.24 | 59.90 | 49.08 | **66.836** | **40.626** |
| Total $NO_x$ *With Additional Measures** | 74.41 | 52.65 | 39.64 | -49% | -69% |
| Total NMVOC *With Existing Measures** | 69.21 | 70.28 | 70.28 | **56.335** | **51.077** |
| Total NMVOC *With Additional Measures** | 68.83 | 68.54 | 66.57 | -25% | -32% |
| Total $NH_3$ *With Existing Measures* | 118.45 | 122.25 | 123.22 | **112.066** | **107.539** |
| Total $NH_3$ *With Additional Measures* | 118.43 | 114.73 | 111.85 | -1% | -5% |
| Total $PM_{2.5}$ *With Existing Measures* | 13.14 | 12.20 | 10.85 | **15.606** | **11.229** |
| Total $PM_{2.5}$ *With Additional Measures* | 12.90 | 10.85 | 8.27 | -18% | -41% |

* Article 4 (3) of the National Emission Ceiling Directive provides that emissions of $NO_x$ and NMVOC from categories 3B (manure management) and 3D (agricultural soils) are not accounted for the purpose of complying with 2020 and 2030 ceilings. The scenarios in this table exclude emissions from these categories (3B and 3D) for the period 2020 to 2030.

Section 3 of this report provides some insight into current and historic trends of the five pollutants for which emission ceilings currently exist and for 2020-2029 and 2030. It also provides an assessment of projected future emissions in 2020 and 2030 of these pollutants, focusing on the *With Additional Measures* scenario.

## 2.3 Additional Air Pollutants reported for Ireland

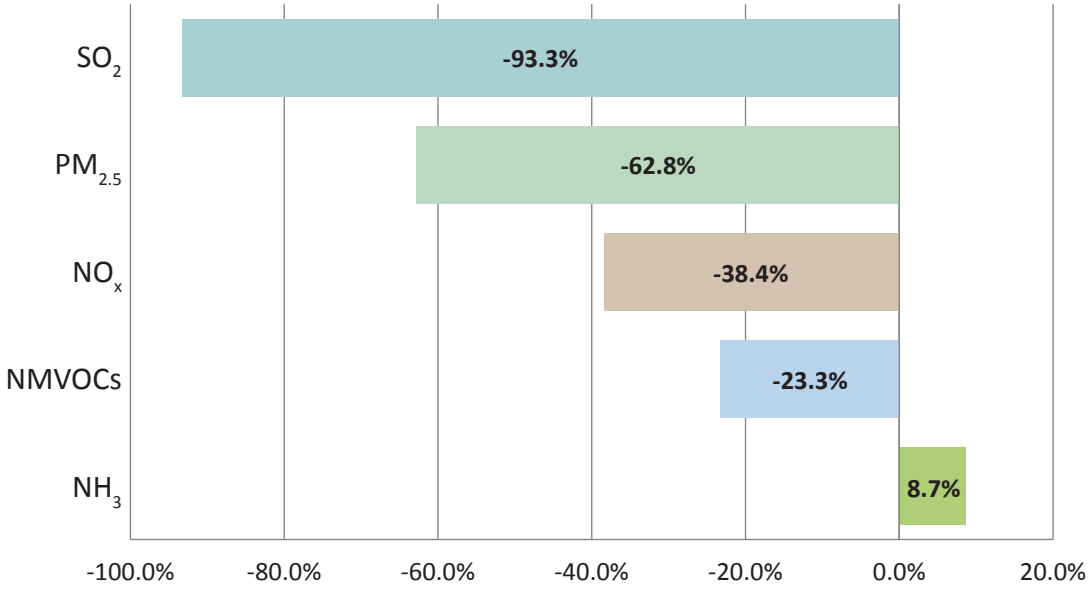
A large number of other pollutants for which no ceilings exist under Directive 2016/2284 are also reported on annually by the EPA. The general trend with these pollutants is downward, largely as a result of fuel switching from coal and peat to natural gas and kerosene in the residential sector, penetration of renewables for electricity generation and reductions in the quantities of coal and peat combusted for electricity generation. Changes in the age structure of the national vehicle fleet have also had an impact. Further detail on these pollutants is presented in Section 4. Detailed information on these pollutants is also provided in Ireland's Informative Inventory Report 2020.

# 3. Key Air Pollutants under the NEC Directive

The Gothenburg Protocol to abate acidification, eutrophication and ground-level ozone was adopted on 30 November 1999. The Protocol set national emission ceilings for 2010 up to 2020 for four pollutants; sulphur dioxide ($SO_2$), nitrogen oxides ($NO_x$), volatile organic compounds (VOCs) and ammonia ($NH_3$) and was agreed based on an awareness of the adverse effects on human health and the environment of emissions of these air pollutants. Although Ireland has not officially ratified the Protocol, the EU has implemented its provisions via the National Emissions Ceiling Directive, setting out emissions ceilings for the five air pollutants described in this section.

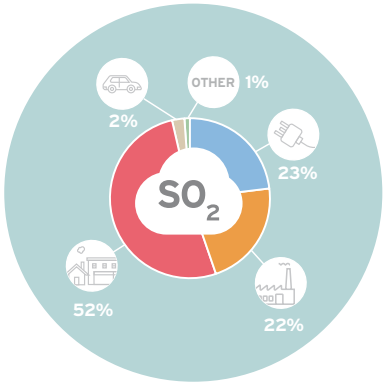
Ireland has seen reductions in the emissions of most of these pollutants over the last thirty years as can be seen in Figure 1 below. Despite this progress, challenges still remain to maintain a decreasing trend in the face of increasing economic activity, particularly in relation to emissions from Transport and Agriculture. Unlike emissions of the other four key NEC air pollutants, emissions of $NH_3$ have increased since 1990, linked to animal numbers, the emissions per animal and fertiliser use.

**Figure 1: Percentage change in key NEC Air Pollutants 1990-2018**



## 3.1 Sulphur Dioxide

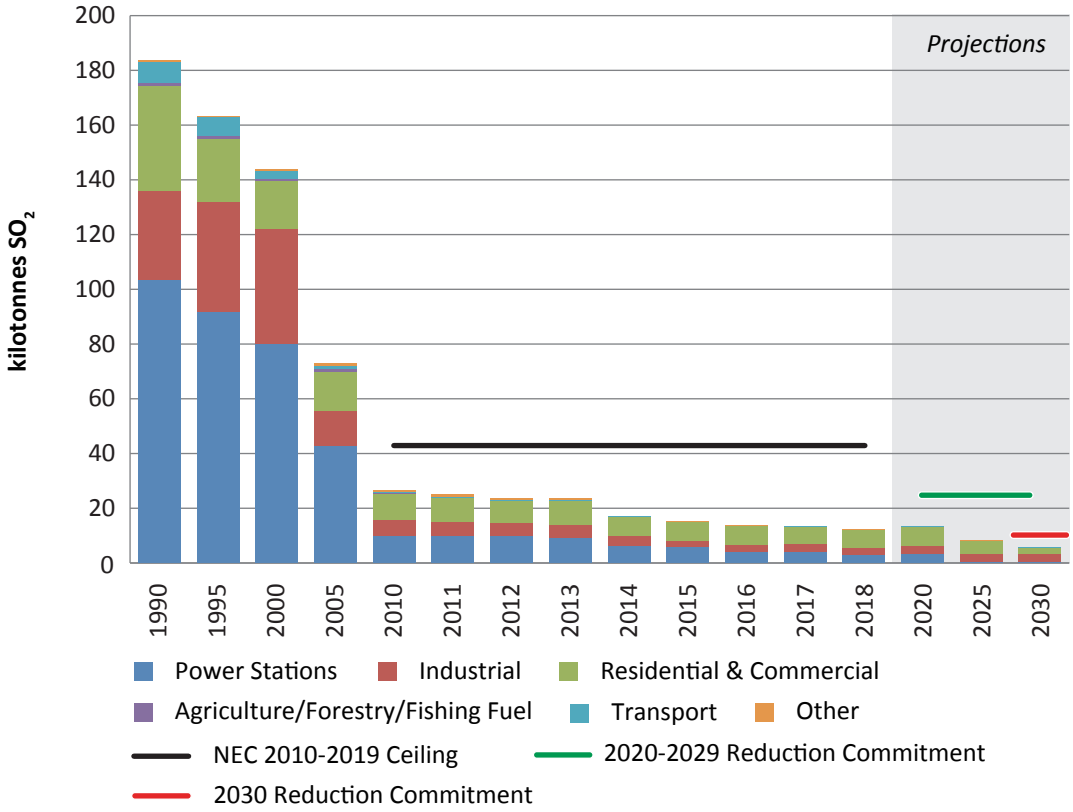
**Sulphur dioxide ($SO_2$)** is the major precursor to acid deposition, which is associated with the acidification of soils and surface waters and the accelerated corrosion of buildings and monuments. Emissions of $SO_2$ are derived from the sulphur in fossil fuels such as coal and oil used in combustion activities.




### National Emissions Ceiling

Ireland's national emission ceiling for $SO_2$ under the NEC Directive is 42 kilotonnes (kt) to be achieved by 2010 and in each year after up to and including 2019. This is equivalent to a 77 per cent reduction from the 1990 baseline level of 183.6 kt $SO_2$ (Figure 2).

**Figure 2: Trend in $SO_2$ emissions 1990-2030, current and future emission ceilings**



## Current and future trends in $SO_2$ emissions

Power stations and combustion in residential and commercial sectors are the two principal sources of $SO_2$ emissions, contributing 23.2 and 51.7 per cent respectively to the total in 2018. Combustion sources in the industrial sector are the next largest accounting for 21.8 per cent in 2018. Total $SO_2$ emissions in 2010, and all subsequent years, are compliant with the 2010 ceiling.

In terms of the outlook for 2020, $SO_2$ emissions under the With Additional Measures scenario are projected to be 13.4 kt in 2020. The emission projections predict compliance with the 2020 emission reduction ceiling by 12.17 kt. In terms of 2030 total $SO_2$ emissions are projected to be 5.7 kt which is below the emission reduction ceiling for that year by 5.2 kt. Key sources of projected $SO_2$ emissions, similar to current trends, include fossil fuel combustion for electricity generation in power stations and emissions from fuel combustion within the residential, commercial and industry sectors. Projected emission levels are provided in Table 4.

## Historic $SO_2$ Emissions

$SO_2$ emissions in Ireland reduced considerably between 1990 and 2018. The latest estimates indicate a decrease of 93.3 per cent from 183.6 kt in 1990 to 12.3 kt in 2018. Emissions from Power stations and combustion in residential and commercial sectors decreased by 97.2 and 83.5 per cent respectively since 1990. The emissions from industrial sources decreased by 91.9 per cent from 1990 while the emissions in the transport sector decreased by 98.2 per cent. These large reductions reflect significant switching from the use of oil and solid fuels to natural gas, reduced sulphur content in coal and oil and implementation of abatement measures in electricity generation. Increased use of renewables rather than combustion of fossil fuels to meet increased electricity demand also contributes to this trend.

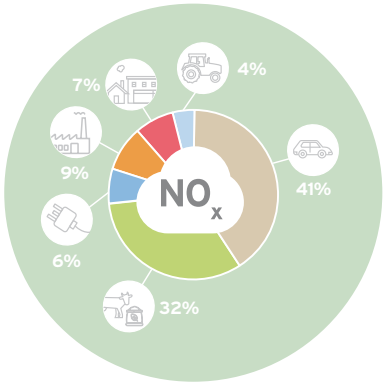
The remainder of $SO_2$ emissions are from combustion in oil refining and in agriculture, forestry and fishing. Emissions in these sectors decreased by 83.5 and 96.6 per cent respectively since 1990.

**Table 4: Projected $SO_2$ emissions in 2020 and 2030**

| Projected $SO_2$ emissions | 2020 | 2030 |
|---|---|---|
| With Additional Measures Scenario (kt) | 13.41 | 5.74 |
| Projected Ceiling (kt) | 25.57 | 10.96 |

## 3.2 Nitrogen Oxides

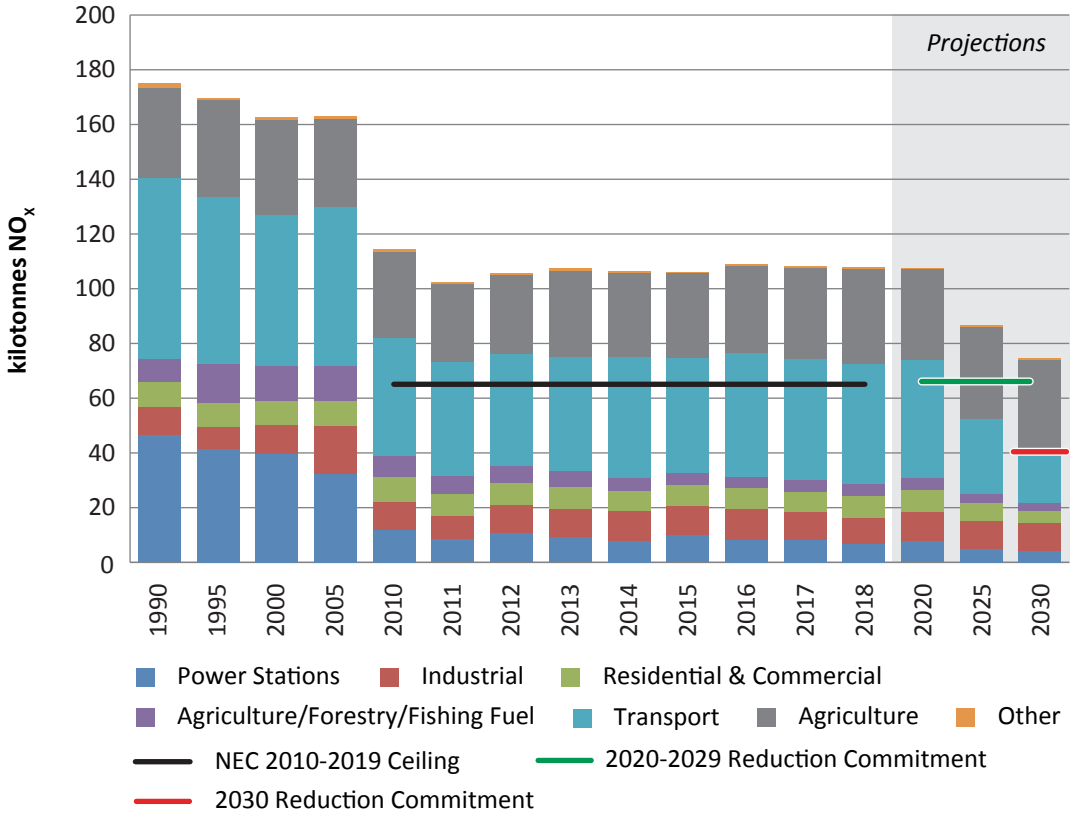
Emissions of **nitrogen oxides ($NO_x$)** contribute to acidification of soils and surface waters, tropospheric ozone formation and nitrogen saturation in terrestrial ecosystems. Power generation plants and motor vehicles are the principal sources of nitrogen oxides, through high-temperature combustion.




### National Emissions Ceiling

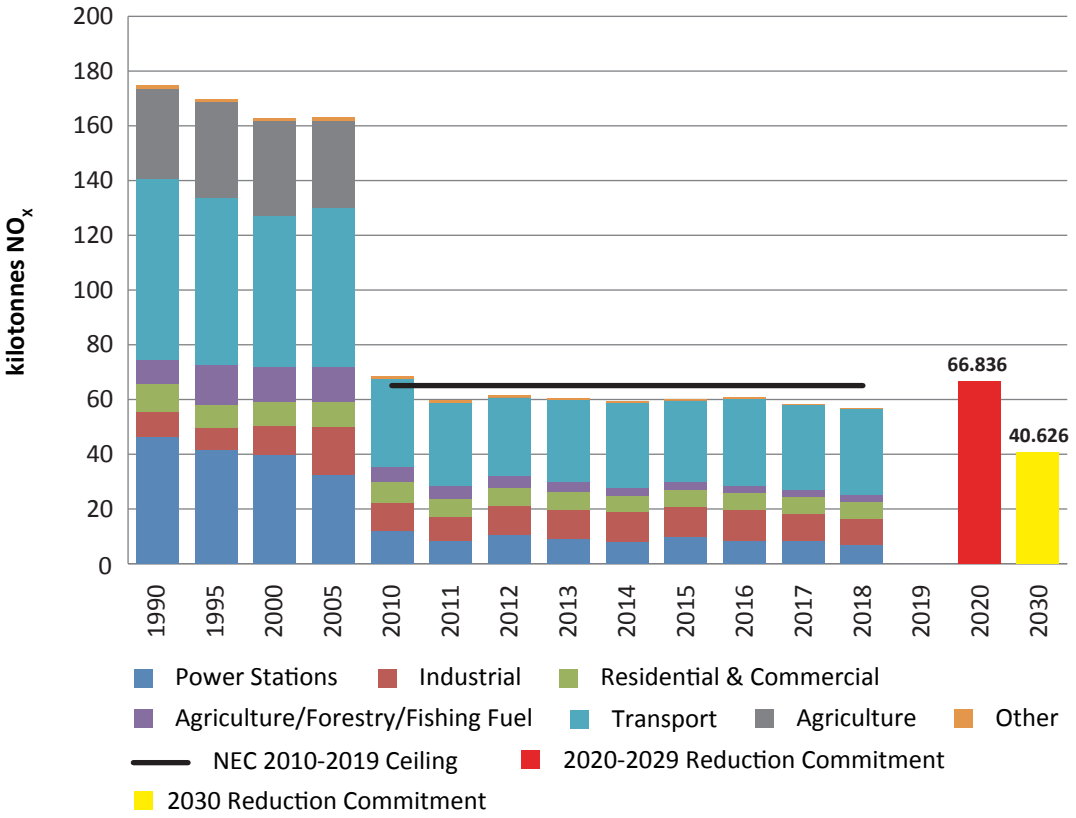
Ireland's national emission ceiling for $NO_x$ under the NEC Directive is 65 kilotonnes (kt), to be achieved by 2010 and in each year after up to and including 2019. This is equivalent to a 62.8 per cent reduction from the 1990 baseline level of 174.9 kt $NO_x$. (Figure 3).

**Figure 3: Trend in $NO_x$ emissions 1990-2030, current and future emission ceilings**



Ireland has applied an adjustment to $NO_x$ emission estimates, as allowed under Article 5(1) of Directive 2016/2284 in accordance with Part 4 of Annex IV, as Ireland is non-compliant with national emission reduction commitments as a result of applying improved emission inventory methods updated in accordance with scientific knowledge. Adjusted $NO_x$ emissions are shown in Figure 4. Ireland exceeds the emission ceiling in 2010 and is compliant with the $NO_x$ emission ceiling from 2011 onwards.

**Figure 4: $NO_x$ emissions 1990-2018 after use of flexibility mechanism, current and future emission ceilings**




Article 4 (3) of the National Emission Ceiling Directive provides that emissions of NOx and NMVOCs from categories 3B (manure management) and 3D (agricultural soils) are not accounted for the purpose of complying with 2020 and 2030 ceilings.

## Current and future trends in $NO_x$ emissions

The latest estimate is that 107.8 kt of $NO_x$ was emitted by Ireland in 2018. The transport sector, which mainly consists of road transport, is the principal source of $NO_x$ emissions, contributing approximately 40.6 per cent of the total in 2018. Agriculture is the second biggest source of $NO_x$ emissions, mainly from synthetic fertiliser application and emissions from urine and dung deposited by grazing animals, contributing approximately 32.4 per cent of the 2018 total. The industrial, power generation and residential/commercial sectors are the other main source of $NO_x$ emissions, with contributions of 8.7 per cent, 6.3 per cent and 7.4 per cent respectively in 2018. The remainder of $NO_x$ emissions emanate from combustion in the agriculture and other (refining and storage, solid fuel manufacture, fugitive emissions and waste) sectors, which together produced around 4.7 per cent of the total in 2018.

Overall $NO_x$ emissions are projected to be in non-compliance with the 2020 emission reduction ceiling by 7.5 kt under the With Additional measures scenario. Under the same scenario the projections estimate compliance with the 2030 emission reduction ceiling by just under 1 kt (Table 5)[7]. Transport accounts for the largest share of projected emissions in 2020 and 2030 (58 and 44 per cent respectively).

## Historic $NO_x$ Emissions

$NO_x$ emissions in Ireland have decreased by 38.4 per cent between 1990 and 2018 and emissions have decreased by 35.9 kt, or 25.0 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 emissions from road transportation. 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 85.5 per cent on 1990 levels, even though electricity total final consumption has increased by 128.7 per cent over the same period. Emissions of $NO_x$ from the coal-fired power plant at Moneypoint have decreased by 95.5 per cent between 1990 and 2018.

Road transport has seen a decline in emissions of 10.9 kt, or 20.0 per cent, between 2008 and 2018 due to the economic recession initially and in later years improvements in vehicle technologies. Progress towards limiting emissions to below the ceiling of 65 kt for $NO_x$ in 2010 to 2018 has however proved difficult, even with large reductions in emissions from power stations and road transport in recent years. Ireland is 42.8 kt above the 2010 emission ceiling in 2018. The $NO_x$ figures for transport throughout this report are based on fuel used rather than fuel sold, and therefore take into account fuel tourism. This means that 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 Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution*[8], paragraph 23. It is estimated that fuel tourism accounted for 2.2 kt of $NO_x$ in 2018.

The increase in vehicle numbers and in road transport in general sustained emissions of $NO_x$ through the period 2000 to 2018, even though improved technologies are reducing the emissions from individual vehicles.

**Table 5: Projected $NO_x$ emissions in 2020 and 2030**

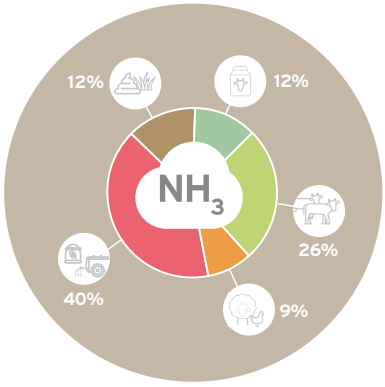
| Projected $NO_x$ emissions | 2020 | 2030 |
|---|---|---|
| With Additional Measures Scenario (kt) | 74.41 | 39.64 |
| Ceiling (kt) | 66.84 | 40.63 |

7 Article 4 (3) of the National Emission Ceiling Directive provides that emissions of $NO_x$ and NMVOCs from categories 3B (manure management) and 3D (agricultural soils) are not accounted for the purpose of complying with 2020 and 2030 ceilings. The scenarios exclude emissions from these categories (3B and 3D) for the period 2020 to 2030 in this table.

8 Paragraph 23, ECE/EB.AIR/125

## 3.3 Ammonia

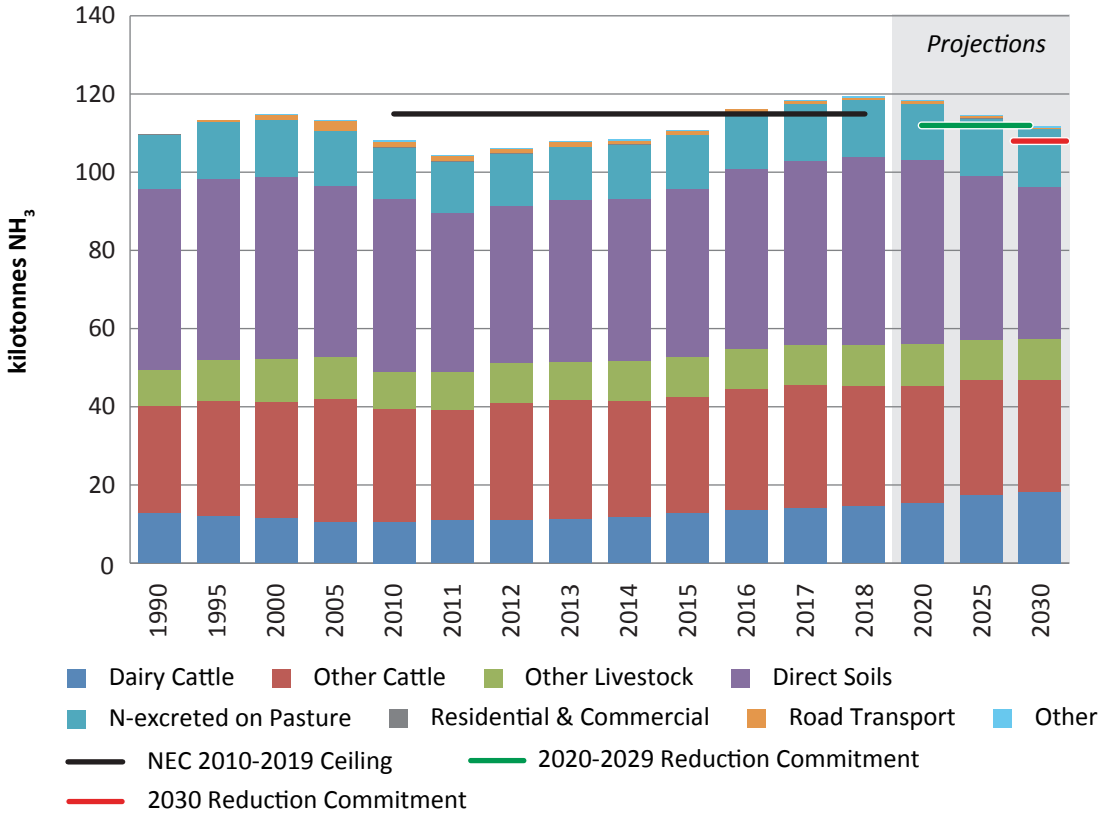
**Ammonia ($NH_3$)** emissions are associated with acid deposition and the formation of secondary particulate matter. The agriculture sector accounts for virtually all (99.1 per cent) of ammonia emissions in Ireland. Grasslands ultimately receive the bulk of the 45 million tonnes (Mt) of animal manures (equivalent to 502,303 tonnes of nitrogen) produced annually in Ireland along with nitrogen fertilisers which amounted to 408,500 tonnes (as nutrient nitrogen) in 2018. A proportion of the nitrogen in these inputs is volatilised into the air as ammonia.




### National Emissions Ceiling

Ireland's national emission ceiling for $NH_3$ under the NEC Directive is 116 kilotonnes (kt), to be achieved by 2010 and in each year up to and including 2019. This is equivalent to a 5.6 per cent permitted increase in emissions from the 109.8 kt 1990 baseline figure (Figure 5).

**Figure 5: Trend in $NH_3$ emissions 1990-2030, current and future emission ceilings**



## Current and future trends in $NH_3$ emissions

Increases in cattle numbers and fertiliser use have seen $NH_3$ emissions increase for the last six years. $NH_3$ emissions increased in 2018 by 0.9 kt, primarily as a result of a 2.7 per cent increase in the dairy herd and a 10.7 per cent (39,400 tonnes) increase in synthetic fertiliser nitrogen use. Road transport produces a small proportion of emissions of ammonia (< 1 per cent) mainly from petrol passenger cars with three-way catalysts.

The emissions of $NH_3$ are compliant with the 2010 ceiling for years 2010 to 2015, however Ireland exceeds the emission ceiling in 2016, 2017 and 2018. Limiting and reducing $NH_3$ emissions into the future will be a challenge given the strong performance of the agriculture sector in line with the ambitious targets of Food Wise 2025. There is now a requirement for focused implementation of abatement measures, such as protected urea fertilisers and low emissions slurry spreading, at farm level including verification of their use.

Total $NH_3$ emissions under the With Additional Measures scenario are projected to be 118.4 kt in 2020 which is an exceedance of the 2020 emission reduction ceiling by 6.3 kt (Table 6). Post 2020, emissions reduce to 111.8 kt in 2030. Ireland's 2030 emission ceiling of a 5 per cent reduction on 2005 levels results in a distance to the ceiling of 4.3 kt in 2030 under the With Additional Measures scenario. Under this scenario, measures as identified under the Climate Action Plan 2019, such as protected urea fertilisers and low emission slurry spreading, are assumed to be implemented.

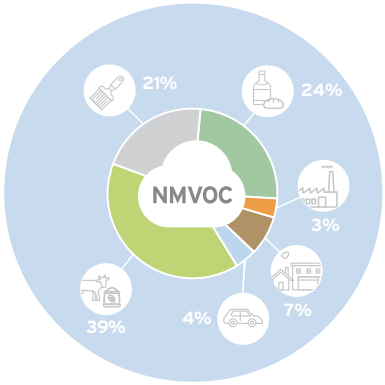
## Historic $NH_3$ Emissions

The emissions in 2018 were 9.5 kt or 8.7 per cent higher than emissions in 1990. Of the 99.1 per cent of total ammonia emissions attributable to agriculture, animal manures are responsible for 90 per cent of those agriculture emissions. Chemical fertilisers and road transport account for the remainder. It is estimated that approximately 16 per cent of the nitrogen in animal manures and 3 per cent of nitrogen contained in chemical fertilisers is lost to the atmosphere as $NH_3$ on average. The $NH_3$ emissions trend is consequently largely determined by the cattle population and showed a steady increase up to 123.4 kt in 1998. There was some decline in the populations of cattle and sheep after 1998, as well as a decrease in fertiliser use, which contributed to a decrease in $NH_3$ emissions in the period 2000 to 2011.

**Table 6: Projected $NH_3$ emissions in 2020 and 2030**

| Projected $NH_3$ emissions | 2020 | 2030 |
|---|---|---|
| With Additional Measures scenario (kt) | 118.43 | 111.85 |
| Ceiling (kt) | 112.07 | 107.54 |

## 3.4 Non-Methane Volatile Organic Compound (NMVOC) emissions

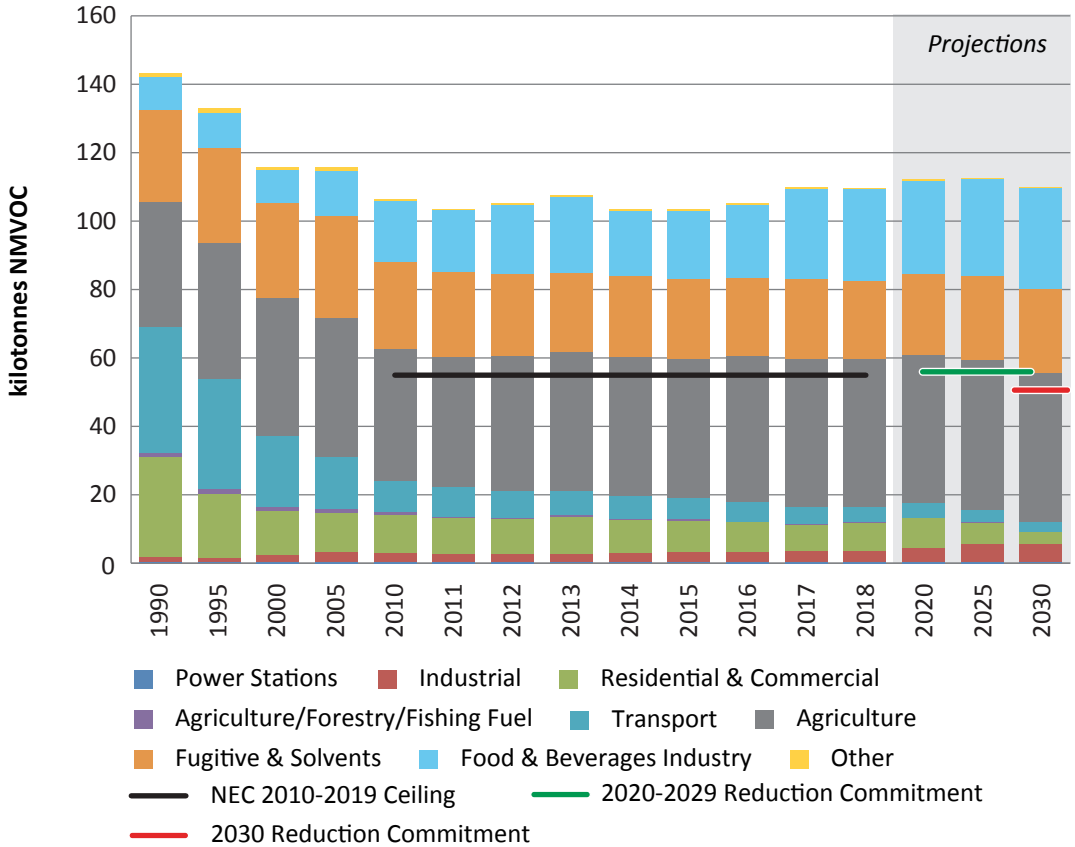



**Non-methane volatile organic compounds (NMVOC)** are emitted as gases by a wide array of products including paints, paint strippers, glues, cleaning agents and adhesives. They also arise as a product of incomplete combustion of fuels, from the storage and handling of animal manure and fertilisers in agriculture and from the food and beverages industry.

### National Emissions Ceiling

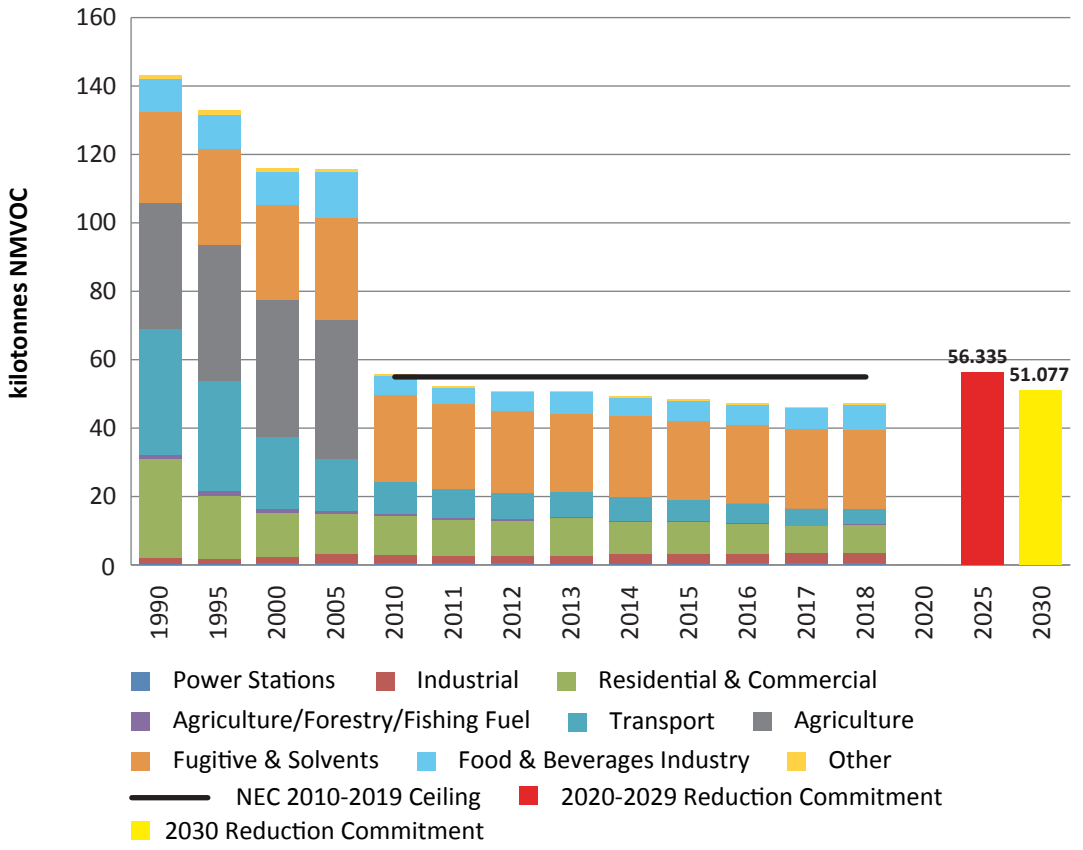
The EU National Emissions Ceilings (NEC) Directive has set a ceiling of 55 kilotonnes (kt) of NMVOC emissions in Ireland by 2010 and in each year up to and including 2019. This is equivalent to a 61.6 per cent reduction in emissions from the 143.1 kt 1990 baseline figure (Figure 6).

**Figure 6: Trend in NMVOC emissions 1990-2030, current and future emission ceilings**



Ireland has applied an adjustment to NMVOC emission inventories, as allowed under Article 5(1) of Directive 2016/2284 in accordance with Part 4 of Annex IV, as Ireland is non-compliant with national emission reduction commitments as a result of applying improved emission inventory methods updated in accordance with better scientific knowledge. Adjusted NMVOC emissions are shown below (Figure 7). Ireland exceeds the emission ceiling in 2010 and is compliant with the NMVOC emission ceiling from 2011 onwards.

**Figure 7: NMVOC emissions 1990-2018 after use of flexibility mechanism, current and future emission ceilings**




Article 4 (3) of the National Emission Ceiling Directive provides that emissions of NOx and NMVOCs from categories 3B (manure management) and 3D (agricultural soils) are not accounted for the purpose of complying with 2020 and 2030 ceilings.

## Current and future trends in NMVOC emissions

The main sources of NMVOC emissions in Ireland are from manure management in agriculture, solvent use and the food and beverages industry. These sources produced 39.4 per cent, 20.8 per cent and 24.4 per cent, respectively of the annual total in 2018. Coal burning in the residential sector is another important but declining source as coal consumption decreases. Emissions from stationary combustion of fossil fuels across all sectors; power stations, industrial, residential, commercial and agriculture account for 10.9 per cent of national total NMVOC emissions in 2018. Transport emissions account for 4.0 per cent of national total emissions of NMVOC, mainly from exhaust and fugitive releases from gasoline vehicles.

Emissions in 2018, at 109.8 kt, are not compliant with the 2010 ceiling, with national total emissions since 2010 on average, 51.1 kt above the 2010 emission ceiling. The inclusion of NMVOC emissions from manure management and fertiliser use in Ireland's three previous submissions, and the inclusion from the food and

beverages industry of increased distillation activity have added over 56.3 kt of NMVOC, on average, to Ireland's national total, effectively doubling the national emissions for this pollutant. The agriculture sector is now the principal source of NMVOC emissions, contributing 39.4 per cent of the total in 2018.

Total NMVOC emissions under the With Additional Measures scenario[9] are projected to be 68.8 kt in 2020 (Table 7). The emission projections predict non-compliance with the 2020 ceiling by approximately 12.49 kt under the WAM scenario. Emissions in 2030 are projected to be 66.5 kt which is 15.5 kt above the emission reduction ceiling for 2030. Key drivers in emissions over the projected period include solvents and other product use, and emissions from food and beverages industry.

Table 7 also presents a scenario where the NMVOC emissions from source category 2.H (spirit production) are excluded, as this source was not included in the national inventory at the time the 2020 and 2030 reduction ceilings were established. Emissions in 2030 are projected to be 45.4 kt in this scenario, which is still 0.08 kt above the emission reduction ceiling for 2030. Thus, even considering a potential exclusion of spirit production from compliance assessment via the flexibility mechanism, additional measures will still be necessary to reduce NMVOC emissions in order to achieve compliance.

## Historic NMVOC Emissions

Reductions corresponding to 23.3 per cent of NMVOC emissions have been achieved from 1990 to 2018. Technological controls for NMVOCs 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 along with reduced use of coal and peat as a source of heating in the residential sector. On the other hand, emissions from the agriculture sector have increased by 17.6 per cent since 1990. Emissions from the food and beverage industry, mainly spirit production have increased by 178.7 per cent over the same period. Indeed, there has been an almost doubling of emissions from this source in the last decade.

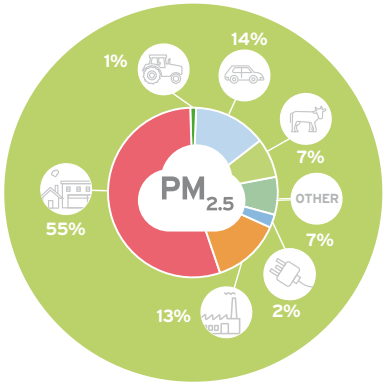
**Table 7: Projected NMVOC emissions in 2020 and 2030**

| Projected NMVOC emissions | 2020 | 2030 |
|---|---|---|
| *(excluding emissions from agricultural categories 3B and 3D)* | | |
| With Additional Measures (kt) | 68.83 | 66.57 |
| Ceiling (kt) | 56.34 | 51.08 |
| *(excluding emissions from agricultural categories 3B and 3D and source category 2.H (spirit production))* | | |
| With Additional Measures (kt) | 49.23 | 45.36 |
| Ceiling (kt) | 49.94 | 45.28 |

9 Article 4 (3) of the National Emission Ceiling Directive provides that emissions of $NO_x$ and NMVOCs from categories 3B (manure management) and 3D (agricultural soils) are not accounted for the purpose of complying with 2020 and 2030 ceilings. The scenarios exclude emissions from these categories (3B and 3D) for the period 2020 to 2030 in this table.

## 3.5 Fine Particulate matter ($PM_{2.5}$) emissions

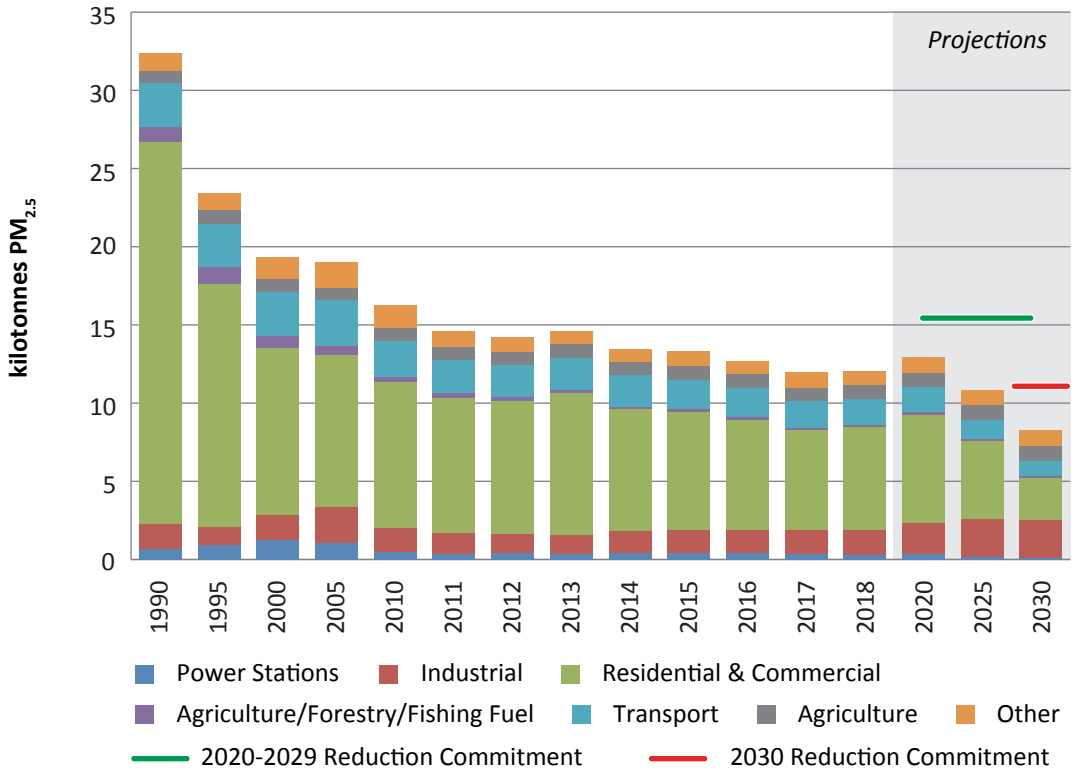
There are many sources of particulate matter (dust) including vehicle exhaust emissions, soil and road surfaces, construction works and industrial emissions. Particulate matter can be formed from reactions between different pollutant gases. Small particles can penetrate the lungs and cause damage. These are known as $PM_{10}$ (diameter less than 10µm) and $PM_{2.5}$ (diameter less than 2.5µm). $PM_{2.5}$ is a better indicator of anthropogenic (man-made) emissions. Fine particulate matter $PM_{2.5}$ is responsible for significant negative impacts on human health.




### National Emissions Ceiling

There is no emission ceiling for $PM_{2.5}$ for 2018 as Directive 2001/81/EC did not set a ceiling for this pollutant. Directive 2016/2284 sets emission ceilings for $PM_{2.5}$ for 2020 and 2030 (Figure 8).

**Figure 8: Trend in $PM_{2.5}$ emissions 1990-2030, and future emission ceilings**



## Current and future trends in $PM_{2.5}$ Emissions

The main sources of $PM_{2.5}$ emissions in Ireland are from combustion of fossil fuels in the residential & commercial sectors which together produced 54.9 per cent of the annual total in 2018. $PM_{2.5}$ emissions in the Other sector account for 7.5 per cent of the total in 2018. These emissions arise from Manufacture of solid fuels, oil refining/storage sectors, coal mining and handling, quarrying and mining of minerals other than coal, construction and demolition, storage, handling and transport of mineral products, road paving with asphalt, fireworks, use of tobacco, storage handling and transport of agricultural products and accidental vehicle and building fires. Emissions from Agriculture arise from Manure Management and Inorganic Nitrogen fertilisers, together accounting for 0.9 kt, 7.4 per cent of the national total in 2018. Transport contributed 1.7 kt (13.8 per cent share) to the national total in 2018.

Total $PM_{2.5}$ emissions under the With Additional Measures scenario are projected to be 12.9 kt in 2020 and 8.27 kt in 2030 (Table 8). The emission projections predict compliance with both the 2020 and 2030 emission ceilings by a margin of 2.71 kt and 2.96 kt, respectively. Key contributors to emissions over the projected period include the combustion of fossil fuels in the Residential, Commercial and Manufacturing Industry sectors.

## Historic $PM_{2.5}$ Emissions

Total $PM_{2.5}$ emissions in 2018, at 12.0 kt, show a reduction of 62.8 per cent on the 1990 level.

Reduced use of coal and peat in the residential & commercial sectors, with increased use of gasoil, kerosene and natural gas has resulted in 73.0 per cent lower emissions between 1990 and 2018 in those combined sectors. Agriculture emissions have increased by 7.1 per cent from their 1990 level. Emissions from Transport sector, dominated by Road Transport have been decreasing since 2005, with a 40.6 per cent reduction between 1990 and 2018. This was largely due to technological advances and the age structure of the national fleet, which has in turn been offset somewhat by increases in vehicle numbers over the time series.

**Table 8: Projected $PM_{2.5}$ emissions in 2020 and 2030**

| Projected $PM_{2.5}$ emissions | 2020 | 2030 |
|---|---|---|
| With Additional Measures scenario (kt) | 12.90 | 8.27 |
| Ceiling (kt) | **15.61** | **11.23** |

# 4. Additional Air Pollutants reported for Ireland

The reporting obligations outlined in Article 8 and Annex I of the Directive (EU) 2016/2284 also include the mandatory reporting of emissions of carbon monoxide, cadmium, mercury, lead, polycyclic aromatic hydrocarbons, dioxins and furans, polychlorinated biphenyls (PCB), hexachlorobenzene, coarse particulate matter < 10µm and black carbon. Voluntary reporting of annual emissions of arsenic, chromium, copper, nickel, selenium, Zinc and total suspended particulates (TSP) is also undertaken. Emission ceilings are not set for any of the aforementioned pollutants in the Directive.

A brief overview of the pollutants involved and the trend in emissions of these pollutants over time is presented below. A summary table (Table 9) indicates the relative importance of each sector to emissions of each air pollutant. If a sector is the largest source of a pollutant, this is indicated in the second column, followed in the third column by other air pollutants for which the sector is a significant source.

**Table 9: Sectoral sources of Pollutants**

| Sector | Largest source | Significant source |
|---|---|---|
| **Road Transport** | CO, Cu, Zn, BC | $PM_{10}$, Pb, Hg, Cr, |
| **Power Stations** | Hg | CO, Pb, Cd, As, Cr, Ni, Se, HCB |
| **Combustion in manufacturing industries** | Cd, Ni | CO, $PM_{10}$, PB, Cd, Hg, Cr, NI, Zn, Dioxins & Furans, BC |
| **Industrial Processes** | TSP, PCB | Cd, Cr, Cu, Zn, Dioxins & Furans |
| **Residential Combustion** | Pb, Se, PAH, BC Dioxins & Furans | CO, $PM_{10}$, Cd, Hg, Cr, Zn, PCB |
| **Commercial Combustion** | – | Ni, BC |
| **Agriculture** | HCB, $PM_{10}$ | TSP |
| **Industrial waste incineration** | As, Cr | – |
| **Solid waste disposal (landfills)** | – | Hg |
| **Vehicle and building fires and waste burning** | – | Dioxins/Furans, PCB |

***Carbon monoxide*** (CO) emissions continue to decline, driven by major reductions due to three-way catalysts in gasoline vehicles in Road Transport, the principal source of CO, and a large decrease in the use of solid fuels for space heating in the Residential sector. National total CO emissions have reduced by 79.0 per cent over the period 1990 to 2018.

Emissions of ***coarse particulate matter*** ($PM_{10}$) have reduced by 42.2 per cent since 1990. The main determinant of the trend in $PM_{10}$ emissions is the Agriculture sector with a 31.7 per cent share of the national total, and combustion in the Residential and Commercial/Institutional sectors combined with 24.6 per cent share of the total in 2018. The chief sources of coarse particulate matter in the Agriculture sector are fertiliser application, manure management and the storage, handling and transport of agricultural products. Total suspended particulate emissions have decreased by 26.6 per cent, since 1990. Total suspended particulates emissions are driven by a wide range of minor sources. ***Black Carbon*** (BC) emissions have decreased by 55.5 per cent, between 1990 and 2018. The main driver of the BC trend is emissions from Transport where technological advances and changes to the age structure (towards newer vehicles) are the main drivers.

Over the period 1990-2018, total national ***lead*** (Pb) emissions have decreased by 97.0 per cent with the Pb emissions trend largely determined by the Road Transport sector. There was a marked decrease between 1999 and 2005 when the lead content of petrol was reduced. Combustion of fuels in the Residential and Commercial/Institutional sectors is also an important source of Pb.

Total national emissions of ***cadmium*** (Cd) have decreased by 53.2 per cent. Emissions of Cd are largely determined by combustion of fuels in the Manufacturing Industries and Construction sector, specifically combustion sources in Non-Ferrous Metals.

Total national emissions of ***mercury*** Hg have decreased by 63.6 per cent between 1990 and 2018. Emissions from Public Electricity and Heat Production are the largest source of Hg. Emissions from the Residential and Commercial/Institutional sectors are also an important source of Hg.

Emissions of ***arsenic*** (As) are largely dominated by incineration of hazardous and clinical wastes and crematoria. In the past Public Electricity and Heat Production was the largest however both a reduction in coal and peat power generation and move towards cleaner fuels has reduced its contribution substantially.

Emissions of ***chromium*** (Cr) have decreased by 51.0 per cent between 1990 and 2018. Transport and Waste Incineration are the two main sources.

Total ***copper*** (Cu) emissions in Ireland were steadily increasing over the 1990-2007 period and have been steadily decreasing since. Total emissions in 2018 were 10.2 per cent lower than in their peak in 2007 but they are 79.0 per cent higher than in 1990. Road transport is the main driver of Cu emissions with lubricant and tobacco and firework use also playing significant roles.

National total emission estimates of ***nickel*** (Ni) were steadily increasing over the 1990-1999 period and have been generally decreasing from 1999 onwards. The main contributor to the trend is combustion of fuels in the Manufacturing Industries and Construction sector. Similar to other Heavy Metal emission estimates, the Residential and Commercial/Institutional sectors are important contributors to the total.

The main contributor to national ***selenium*** (Se) emissions has been fuel combustion in the Residential and Commercial/Institutional sectors which combined accounted for 63.5 per cent of selenium emissions in 2018.

National total emissions of ***zinc*** (Zn) have fallen by 63.6 per cent between 1990 and 2018. In the 1990-2001 period, the main determinant of the trend in zinc emissions was Metal Production. Since the closure of Ireland's only steel plant in 2001, fuel combustion in the Transport and Manufacturing Industries and Construction sectors are the largest sources.

***Dioxin*** and ***furan*** emission levels decreased having reduced by 66.9 per cent between 1990 and 2018. The main contributors to national emissions are the combined Residential and Commercial/Institutional sectors, with a 63.8 per cent share of total emissions in 2018.

***Hexachlorobenzene*** (HCB) emissions from secondary aluminium processing were the largest source of HCB emissions in Ireland up to 1996. Since then the use of pesticides in agriculture is the largest source accounting for 84.6 per cent of national emissions in 2018.

Emissions of ***polychlorinated biphenyls*** (PCBs) have decreased by 79.6 per cent between 1990 and 2018. Industrial Processes (incl. cement production) are the largest source of PCB emissions.

***Polycyclic Aromatic Hydrocarbon*** (PAHs) emissions, which include emissions of ***benzo[a]pyrene***, ***benzo[b]fluoranthene***, ***benzo[k]fluoranthene***, and ***indeno[1,2,3-cd]pyrene***, are dominated by combustion in the Residential and Commercial/Institutional sectors. Declines in the use of coal and sod peat have led to reduced emissions from these sectors.

# Conclusion

The National Emissions Ceiling Directive sets national emission reduction commitments for Member States and the EU for five important air pollutants: nitrogen oxides, non-methane volatile organic compounds, sulphur dioxide, ammonia and fine particulate matter. These pollutants impact the environment and human health, contributing to respiratory problems and pollution of soil, surface water and vegetation.

The numbers show that some positive changes have been made since 1990, benefiting air quality and human health. Fuel switching from coal and peat to natural gas and kerosene in the residential sector has reduced particulate matter pollution, particularly important in urban areas. A higher penetration of renewables in electricity generation and changes in the age structure of the national vehicle fleet to newer, lower emission class vehicles, have also resulted in a general downward trend in emissions of many pollutants.

Challenges remain for Ireland however in relation to continued compliance with its obligations under the NEC Directive. Whilst currently in compliance with its international ceilings for most gases, the latest trends and projections indicate that Ireland will have to implement significant mitigation measures to remain in compliance out to 2030. Implementing the measures announced in the Climate Action Plan will be important but not sufficient to meet all future ceilings.

Looking towards the future, non-compliance with emission ceilings for $NO_x$ and NMVOCs is projected in 2020 and $NO_x$ compliance in 2030 will require full implementation of the measures in the Climate Action Plan, including significant electrification of the transport sector. Compliance with the 2030 NMVOC ceiling will require new measures which have yet to be identified.

Ireland exceeded its emission ceiling for $NH_3$ in 2018, having already done so in 2016 and 2017. The exceedance was driven primarily by increased animal numbers and fertiliser nitrogen. Continued non-compliance with the ammonia ceiling over the entire compliance period to 2030 is currently projected. Widespread adoption of on farm measures aimed at reducing emissions, such as the use of protected urea fertilisers and low emissions slurry spreading, are now required to reverse this trend.

It is important that measures are implemented to reduce emissions and decouple them from economic growth. Further measures are needed to meet national ceilings in the period from now to 2030, and these can be complementary, tackling both the Climate and Air Pollution challenge together.

# Appendix – Emissions of key NEC Directive Air Pollutants, 1990-2018

| | $SO_2$ | $NO_x$ | NMVOC | $NH_3$ | $PM_{2.5}$ |
|---|---|---|---|---|---|
| | | | kilotonnes | | |
| **1990** | 183.643 | 174.922 | 143.094 | 109.798 | 32.395 |
| **1991** | 183.741 | 176.890 | 144.045 | 111.351 | 32.154 |
| **1992** | 171.368 | 184.075 | 140.376 | 113.701 | 28.112 |
| **1993** | 162.263 | 175.043 | 137.716 | 112.574 | 27.506 |
| **1994** | 177.371 | 173.130 | 134.357 | 113.153 | 25.192 |
| **1995** | 163.236 | 169.784 | 132.844 | 113.355 | 23.384 |
| **1996** | 150.091 | 172.641 | 133.974 | 117.107 | 23.785 |
| **1997** | 168.536 | 163.479 | 130.428 | 119.542 | 21.635 |
| **1998** | 178.620 | 167.106 | 131.463 | 123.442 | 22.702 |
| **1999** | 160.873 | 164.873 | 122.672 | 120.754 | 19.290 |
| **2000** | 143.900 | 162.789 | 115.823 | 114.911 | 19.290 |
| **2001** | 141.979 | 163.236 | 116.532 | 114.544 | 19.125 |
| **2002** | 106.402 | 155.204 | 116.761 | 114.409 | 18.311 |
| **2003** | 82.440 | 156.760 | 115.670 | 114.067 | 18.103 |
| **2004** | 73.124 | 159.650 | 115.326 | 113.135 | 18.238 |
| **2005** | 73.069 | 163.099 | 115.635 | 113.198 | 19.032 |
| **2006** | 60.807 | 158.543 | 116.260 | 111.859 | 18.458 |
| **2007** | 54.971 | 152.976 | 115.188 | 108.355 | 17.805 |
| **2008** | 45.674 | 143.647 | 111.823 | 109.573 | 17.857 |
| **2009** | 32.816 | 120.234 | 109.524 | 110.201 | 17.184 |
| **2010** | 26.624 | 114.317 | 106.288 | 108.072 | 16.255 |
| **2011** | 25.077 | 102.464 | 103.559 | 104.295 | 14.577 |
| **2012** | 23.542 | 105.796 | 105.049 | 106.190 | 14.204 |
| **2013** | 23.650 | 107.257 | 107.555 | 107.766 | 14.570 |
| **2014** | 17.015 | 106.305 | 103.467 | 108.266 | 13.419 |
| **2015** | 15.145 | 106.187 | 103.577 | 110.695 | 13.298 |
| **2016** | 13.782 | 108.828 | 105.269 | 116.160 | 12.663 |
| **2017** | 13.540 | 107.963 | 109.942 | 118.441 | 11.979 |
| **2018** | 12.258 | 107.755 | 109.784 | 119.339 | 12.043 |

# An Ghníomhaireacht um Chaomhnú Comhshaoil

Tá an Ghníomhaireacht um Chaomhnú Comhshaoil (GCC) freagrach as an gcomhshaol a chaomhnú agus a fheabhsú mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaol a chosaint ar thionchar díobhálach na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

- **Rialú:** Déanaimid córais éifeachtacha rialaithe agus comhlíonta comhshaoil a chur i bhfeidhm chun torthaí maithe comhshaoil a sholáthar agus chun díriú orthu siúd nach gcloíonn leis na córais sin.
- **Eolas:** Soláthraímid sonraí, faisnéis agus measúnú comhshaoil atá ar ardchaighdeán, spriocdhírithe agus tráthúil chun bonn eolais a chur faoin gcinnteoireacht ar gach leibhéal.
- **Tacaíocht:** Bímid ag saothrú i gcomhar le grúpaí eile chun tacú le comhshaol atá glan, táirgiúil agus cosanta go maith, agus le hiompar a chuirfidh le comhshaol inbhuanaithe.

## Ár bhFreagrachtaí

### CEADÚNÚ

Déanaimid na gníomhaíochtaí seo a leanas a rialú ionas nach ndéanann siad dochar do shláinte an phobail ná don chomhshaol:

- saoráidí dramhaíola (m.sh. láithreáin líonta talún, loisceoirí, stáisiúin aistrithe dramhaíola);
- gníomhaíochtaí tionsclaíocha ar scála mór (m.sh. déantúsaíocht cógaisíochta, déantúsaíocht stroighne, stáisiúin chumhachta);
- an diantalmhaíocht (m.sh. muca, éanlaith);
- úsáid ghlanscartha agus scaoileadh rialaithe Orgánach Géinmhodhnaithe (OGanna);
- foinsí radaíochta ianúcháin (m.sh. trealamh x-gha agus radaiteiripe, foinsí tionsclaíocha);
- áiseanna móra stórála peitril;
- sceitheadh fuíolluisce;
- gníomhaíochtaí dumpála ar farraige.

### FORFHEIDHMIÚ NÁISIÚNTA I LEITH CÚRSAÍ COMHSHAOIL

- Clár náisiúnta iniúchtaí agus cigireachtaí a dhéanamh gach bliain ar shaoráidí a bhfuil ceadúnas ón nGníomhaireacht acu.
- Maoirseacht a dhéanamh ar fhreagrachtaí cosanta comhshaoil na n-údarás áitiúil.
- Caighdeán an uisce óil, arna sholáthar ag soláthraithe uisce phoiblí, a mhaoirsiú.
- Obair le húdaráis áitiúla agus gníomhaireachtaí eile chun dul i ngleic le coireacht chomhshaoil trí chomhordú a dhéanamh ar líonra forfheidhmiúcháin náisiúnta, díriú ar chiontóirí, agus maoirsiú a dhéanamh ar fheabhsúchán.
- Cur i bhfeidhm rialachán ar nós na Rialachán um Dhramhthrealamh Leictreach agus Leictreonach (WEEE), um Shrian ar Shubstaintí Guaiseacha agus na Rialachán um rialú ar shubstaintí a ídíonn an ciseal ózóin.
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaol.

### BAINISTÍOCHT UISCE

- Monatóireacht agus tuairisciú a dhéanamh ar cháilíocht aibhneacha, lochanna, uiscí idirchreasa agus cósta na hÉireann, agus screamhuiscí; leibhéil uisce agus sruthanna aibhneacha a thomhas.
- Comhordú náisiúnta agus maoirsiú a dhéanamh ar an gCreat-Treoir Uisce.
- Monatóireacht agus tuairisciú a dhéanamh ar Cháilíocht an Uisce Snámha.

### MONATÓIREACHT, ANAILÍS AGUS TUAIRISCIÚ AR AN GCOMHSHAOL

- Monatóireacht a dhéanamh ar cháilíocht an aeir agus Treoir an AE maidir le hAer Glan don Eoraip (CAFÉ) a chur chun feidhme.
- Tuairisciú neamhspleách le cabhrú le cinnteoireacht an rialtais náisiúnta agus áitiúil (m.sh. tuairisciú tréimhsiúil ar Staid Chomhshaol na hÉireann agus Tuarascálacha ar Thráscairí).
- Rialú Astaíochtaí na nGás Ceaptha Teasa in Éirinn
- Fardail agus réamh-mheastacháin na hÉireann maidir le gás ceaptha teasa a ullmhú.
- An Treoir maidir le Trádáil Astaíochtaí a chur chun feidhme i gcomhair breis agus 100 de na táirgeoirí dé-ocsaíde carbóin is mó in Éirinn.

### TAIGHDE AGUS FORBAIRT COMHSHAOIL

- Taighde comhshaoil a chistiú chun brúnna a shainaithint, bonn eolais a chur faoi bheartais, agus réitigh a sholáthar i réimsí na haeráide, an uisce agus na hinbhuanaitheachta.

### MEASÚNÚ STRAITÉISEACH COMHSHAOIL

- Measúnacht a dhéanamh ar thionchar pleananna agus clár beartaithe ar an gcomhshaol in Éirinn (m.sh. mórphleananna forbartha).

### COSAINT RAIDEOLAÍOCH

- Monatóireacht a dhéanamh ar leibhéil radaíochta, agus measúnacht a dhéanamh ar a oiread is atá muintir na hÉireann gan chosaint ar an radaíocht ianúcháin.
- Cabhrú le pleananna náisiúnta a fhorbairt le haghaidh éigeandálaí ag eascairt as taismí núicléacha.
- Monatóireacht a dhéanamh ar fhorbairtí thar lear a bhaineann le saoráidí núicléacha agus leis an tsábháilteacht raideolaíochta.
- Sainseirbhísí cosanta ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

### TREOIR, FAISNÉIS INROCHTANA AGUS OIDEACHAS

- Comhairle agus treoir a chur ar fáil d'earnáil na tionsclaíochta agus don phobal maidir le hábhair a bhaineann le caomhnú an chomhshaoil agus leis an gcosaint raideolaíoch.
- Faisnéis thráthúil ar an gcomhshaol ar a bhfuil fáil éasca a chur ar fáil chun rannpháirtíocht an phobail a spreagadh sa chinnteoireacht i ndáil leis an gcomhshaol (m.sh. Timpeall an Tí, Mapaí Radóin).
- Comhairle a chur ar fáil don Rialtas maidir le hábhair a bhaineann leis an tsábháilteacht raideolaíoch agus le cúrsaí práinnfhreagartha.
- Plean Náisiúnta Bainistíochta Dramhaíola Guaisí a fhorbairt chun dramhaíl ghuaiseach a chosc agus a bhainistiú.

### MÚSCAILT FEASACHTA AGUS ATHRÚ IOMPRAÍOCHTA

- Feasacht chomhshaoil níos fearr a ghiniúint agus dul i bhfeidhm ar athrú iompraíochta dearfach trí thacú le gnóthais, le pobail agus le teaghlaigh a bheith níos éifeachtúla ar acmhainní.
- Tástáil le haghaidh radóin a chur chun cinn i dtithe agus in ionaid oibre, agus gníomhartha leasúcháin a spreagadh nuair is gá.

### BAINISTÍOCHT AGUS STRUCHTÚR AN GCC

Tá an ghníomhaíocht á bainistiú ag Bord lánaimseartha, ar a bhfuil Ard-Stiúrthóir agus cúigear Stiúrthóirí. Déantar an obair ar fud cúig cinn d'Oifigí:

- An Oifig um Inbhuanaitheacht Comhshaoil
- An Oifig Forfheidhmithe i leith cúrsaí Comhshaoil
- An Oifig um Fhianaise agus Measúnú
- An Oifig um Chosaint Radaíochta agus Monatóireacht Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag comhaltaí air agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair imní agus le comhairle a chur ar an mBord.