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Air quality: policies, proposals and concerns

Summary

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Summary

Poor air quality is considered by the Government to be "the largest environmental risk to public health in the UK". As well as human health, air pollution also has implications for the natural environment and for the economy. Due to the transboundary nature of air pollution, action to manage and improve air quality in the UK has been driven by both international agreements and EU legislation, as well as national and devolved legislation.

This paper gives an overview of the current air quality legal framework, the changing governance and enforcement mechanisms following Brexit, forthcoming legislative changes and ongoing issues and concerns.

Current law and policy

Following the UK's departure from the EU and the end of the transition period, those air quality laws (as set out below) originating from EU legislation have been retained in domestic legislation in accordance with the *EU (Withdrawal) Act 2018* (as amended) and subsequent regulations.

At international level, the Gothenburg Protocol and amendments to it set emissions ceilings levels for various pollutants. Its aim is to control long-range transboundary pollution. It is implemented at EU level through several directives, including the National Emission Ceilings Directives of 2001 and 2016. The 2001 Directive is implemented in the UK through the by the *National Emission Ceilings Regulations 2002*. The 2016 Directive sets emission ceilings which apply from 2020 and has been implemented by the National Emission Ceilings Regulations 2018.

There is also legislation relating to ambient air quality (the air that more immediately surrounds us) at EU level through Directive 2008/50/EC (the "Air Quality Directive"). Instead of setting a ceiling for pollutants, it sets "limit values" (parameters that must not be exceeded) for concentrations of different pollutants.

The Air Quality Directive is implemented in the UK through:

- Air Quality Standards Regulations 2010 (as amended);
- Air Quality Standards (Wales) Regulations 2010 (as amended);
- Air Quality Standards (Scotland) Regulations 2010 (as amended); and
- Air Quality Standards Regulations (Northern Ireland) 2010 (as amended)

WHO guidelines

The World Health Organization (WHO) published updated Global Air Quality Guidelines in September 2021 covering Particulate matter ($PM_{2.5}$ and PM_{10}), ozone, nitrogen dioxide, sulphur dioxide and carbon monoxide. They provide guidance on thresholds and limits for key air pollutants that pose health risks. They are guidelines only and are not binding on any country unless that country chooses to adopt them into its own legislation. These guidelines are an update on the previous 2005 version, Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (PDF), which have been frequently referenced in debates about air quality targets.

UK air quality plans and policies

In the UK, responsibility for meeting air quality limit values is devolved to the devolved administrations in Scotland, Wales and Northern Ireland. The Secretary of State for Environment, Food and Rural Affairs has responsibility for meeting the limit values in England and the Department for Environment, Food and Rural Affairs (Defra) co-ordinates assessment and air quality plans for the UK as a whole.

At a national level, the UK Government and the devolved administrations (except Northern Ireland) are required under the Environment Act 1995 to produce a national air quality strategy. The requirement for Northern Ireland stems from the Environment (Northern Ireland) Order 2002. The purpose is to have a document with common aims covering all parts of the UK. This was last reviewed and published in 2007, as the UK Air Quality Strategy for England, Scotland, Wales and Northern Ireland.

The UK Government, alongside the Scottish Government, Welsh Government and the Northern Ireland Department for Agriculture, Environment and Rural Affairs (DAERA), also published a National Air Pollution Control Programme (NAPCP) in April 2019 to meet requirements set by the revised 2016 National Emission Ceilings Directive (2016/2284). A consultation on a revised draft NAPCP was published in July 2022, which includes updated emissions projections, policies and proposed measures.

Each government within the UK can also choose to publish its own air quality strategy. See in particular:

- UK Government: Clean Air Strategy 2019, January 2019
- Scottish Government: Cleaner Air for Scotland 2, July 2021
- Welsh Government: Clean Air Plan for Wales: Healthy Air, Healthy Wales, August 2020
- DAERA: Clean Air Strategy for Northern Ireland: A Public Discussion Document, November 2020

EU infringement proceedings

Enforcement mechanisms for failure to meet air quality limit values were previously enforced by EU institutions.

In February 2014 the EU Commission began infringement proceedings against the UK (as well as other countries) for its failure to meet air quality targets for nitrogen dioxide set by the EU Air Quality Directive in certain parts of the UK. In May 2018 the European Commission referred the UK to the Court of Justice of the EU (CJEU) for "for failure to respect limit values for nitrogen dioxide (NO_2), and for failing to take appropriate measures to keep exceedance periods as short as possible."

On 4 March 2021, the CJEU issued its decision on this case. The CJEU court had continued to oversee the case because proceedings started before the UK's EU exit. The CJEU found that the UK had failed to fulfil its obligations under the provisions of EU Directive 2008/50/EC and that it had failed to ensure that the period of exceedance of limit values was kept as short as possible. Media reports on the case suggested that there was some uncertainty about what would happen if the UK still failed to comply within a "reasonable" period, questioning whether the UK could be forced to pay a fine.

Judicial review and air quality plan compatibility with EU legislation

Separate to the Commission proceedings, but arising from the same EU Air Quality Directive, private judicial reviews have also been brought against the UK Government stemming from the admitted and continuing failure of the United Kingdom, since 2010, to comply (in certain zones), with the limits for nitrogen dioxide levels. These proceedings have resulted in the Government being required to produce a number of different air quality plans aimed at reducing nitrogen dioxide levels.

Future enforcement bodies

As a result of leaving the EU, environmental law and policy (including on air quality), which was derived from the EU, is no longer subject to the oversight of EU institutions, including the Court of Justice of the European Union (CJEU). Environmental campaigners raised concerns following the Brexit referendum that this would leave a "governance gap". As environmental matters are generally devolved, each Government within the UK has now put forward proposals to establish new environmental governance bodies to fill the role played by the EU institutions:

- In England and Northern Ireland the Office for Environmental Protection (the OEP), has been established;
- In Scotland a public sector body called Environmental Standards Scotland (ESS) has been established;

- The Welsh Government plans to establish a permanent environmental governance oversight body, and in the interim has appointed an environmental protection assessor for Wales for a two-year period.

Recent and forthcoming legislative changes

The UK Government's Environment Act 2021 requires the Government to set legally binding environmental targets for England in four priority areas including air quality, as well as an additional target on fine particulate matter ($PM_{2.5}$), as this is considered to be the air pollutant of greatest harm to human health. In March 2022 the Government published a consultation on what the targets should look like. Both of the proposed air quality targets relate to $PM_{2.5}$ and are:

- An annual mean concentration target – a target of 10 micrograms per cubic metre (μg m^3) to be met across England by 2040.

- A population exposure reduction target – a 35% reduction in population exposure by 2040 (compared to a base year of 2018).

Provisions in Part 4 of the Environment Act 2021 deal with air quality and, from 1 May 2022, have amended the Local Air Quality Management Frameworks requirements. It also provides local authorities with greater powers in smoke control areas and includes provision to require the recall of motor vehicles on environmental grounds.

The Welsh Government has published a White Paper on a Clean Air (Wales) Bill, presenting proposals before drafting legislation. Key proposals for this legislation include a requirement for a Clean Air Plan or Strategy to be reviewed at least every 5 years; and powers to set air quality targets, including for $PM_{2.5}$. It would also make amendments to the Local Air Quality Management Regime.

Future EU air quality changes

In November 2019, the EU Commission published a Fitness Check of the Ambient Air Quality Directives. It concluded that these Directives have been only partially effective in improving air quality and not all their objectives have been met. It therefore intends to revise the Directive, to align air quality standards more closely with the recommendations of the World Health Organization, subject to future consultation. An Inception Impact Assessment outlines the approach towards Commission adoption, planned for the second half of 2022. Further information is available on the European Commission webpage, Revision of the Ambient Air Quality Directives.

Health concerns

Air quality has long been a high-profile issue, with specific concerns around human health. Academic research has found big differences in air pollution across communities, with deprived areas often the worst affected. Children, the elderly and individuals with pre-existing cardio and respiratory conditions

are particularly vulnerable to the effects of poor air quality. In 2020 a coroner found that air pollution was a significant contributory factor to the death of 9-year-old child.

The Covid-19 pandemic has raised questions about whether there is a link between poor air quality and Covid-19 outcomes. Researchers are also beginning to examine the effect of lockdown measures on air quality and work out what any findings mean for future policy.

1 Sources of air pollution

Poor air quality can be caused by different pollutants from a variety of sources. The pollutants set out below are those commonly identified in UK Government air quality strategies and as being of concern and those which have legal limits places upon them.[1] They will be referred to throughout this paper and are:

- **Sulphur dioxide (SO_2)**: An acid gas formed when fuels containing sulphur impurities are burned. The main man-made sources include fossil fuel combustion and incineration of waste.[2]

- **Nitrogen oxides:** Compounds formed when nitrogen and oxygen combine. NO_x, which comprises nitric oxide (NO) and nitrogen dioxide (NO_2), is emitted from combustion processes. NO is subsequently oxidised to form NO_2, although some NO_2 is emitted directly. Main sources include road transport, power generation and industrial combustion.

- **Particulate matter (PM):** Small breathable particles classified according to size. PM is not a single compound. It is made up of a mixture of solid and liquid particles of organic and inorganic chemicals; and includes some naturally occurring substances, such as salt and dust.[3] Within this category, PM is split further into **PM_{10}** and **$PM_{2.5}$**, which reflects the size of the particles ($PM_{2.5}$ is smaller). The smaller the particle, the further it can penetrate into the lungs through inhalation.[4] Sources of PM are classified as either primary, such as particles from engine combustion or break and tyre wear; or secondary, when other substances react to form PM in the atmosphere.

- **Ozone (O_3):** A pollutant gas which is not emitted directly from any source in significant quantities, but is produced by reactions between other pollutants in the presence of sunlight.[5] Ozone acts as an irritant to the eyes, nose and lungs. It can also affect vegetation, impacting crop yields and ecosystems. [6]

1 See for example, UK Government, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2007; UK Government, Clean Air Strategy 2019, January 2019 and the Air Quality Standards Regulations 2010 (SI 2010/1001)
2 WHO Fact Sheet, Ambient (outdoor) air quality and health, May 2018
3 WHO Fact Sheet, Ambient (outdoor) air quality and health, May 2018
4 Defra, Air Pollution in the UK 2019, September 2020, p22
5 Defra, Air Pollution in the UK 2019, September 2020, glossary
6 Air Quality Expert Group, Ozone in the United Kingdom, 2009

- **Non-methane volatile organic compounds (NMVOCs)** are organic compounds which are emitted to air as combustion products, as vapour arising from things like petrol, solvents, air fresheners, cleaning products and perfumes. NMVOCs react with other air pollutants in the presence of sunlight to produce ground level ozone. NMVOCs are released through both industrial processes and domestic use.[7]

- **Lead (Pb) and heavy metals**, for example, **arsenic, cadmium, mercury and nickel**. Anthropogenic emissions of toxic metals mainly come from fossil fuel combustion and industrial processes.[8]

- **Polycyclic Aromatic Hydrocarbons (PAHs)**. PAHs are a large group of chemical compounds that are toxic and carcinogenic. This group includes Benzo[a]pyrene (BaP). The main sources of BaP are domestic heating (in particular wood and coal burning), waste burning, coke production and steel production.[9]

- **Benzene:** is a chemical used as a starting material for a wide range of chemicals which feed into industrial manufacturing processes. Benzene will quickly evaporate when it is released into the environment. Major sources of benzene include vehicle exhaust, evaporation of petrol, petrol manufacturing and other industries.[10]

- **1,3-Butadiene:** is an organic compound emitted into the atmosphere mainly from fuel combustion e.g. petrol and diesel vehicles.[11]

- **Carbon Monoxide (CO): is** a gas formed from incomplete combustion of carbon-containing fuels. The largest source is road transport, with residential and industrial combustion making significant contributions.[12]

- **Ammonia (NH_3):** is a gas that is emitted into the atmosphere and then either deposited back onto land or converted to secondary PM through reactions in the atmosphere. Agriculture is the dominant source of NH_3 emissions (88% in 2016). It is emitted during storage and spreading of manures, slurries and fertilisers. Other sources of NH_3 include the waste sector and industry.[13]

The sources of these pollutants are a range of natural and anthropogenic sources, including the combustion of fossil fuels for industrial and domestic processes, incineration of waste, emissions from traffic, chemical and photo-chemical reactions. For further information see the Defra publication What are the causes of Air Pollution.

7 UK Government, Clean Air Strategy 2019, January 2019, p20
8 Defra, Air Pollution in the UK 2019, September 2020, p24
9 European Environment Agency, Air quality in Europe 2017, October 2017, p16
10 Public Health England, Guidance: Benzene: general information,14 August 2019
11 Defra, Air Pollution in the UK 2019, September 2020
12 Defra, What are the causes of Air Pollution? [downloaded 20 October 2021]
13 UK Government, Clean Air Strategy 2019, January 2019, p17

1.1 Reasons for concern

Air pollution is cause of concern for human health, the natural environmental and on the economy.

It is widely acknowledged that air pollution has a significant public health impact.[14]

Public Health England guidance, Guidance Health matters: air pollution, November 2018, summarises the effects on health as follows:

> Air pollution has a significant effect on public health, and poor air quality is the largest environmental risk to public health in the UK. In 2010, the Environment Audit Committee considered that the cost of health impacts of air pollution was likely to exceed estimates of £8 to 20 billion.
>
> Epidemiological studies have shown that long-term exposure to air pollution (over years or lifetimes) reduces life expectancy, mainly due to cardiovascular and respiratory diseases and lung cancer. Short-term exposure (over hours or days) to elevated levels of air pollution can also cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality.[15]

The guidance goes on to set out different health risks associated with different air pollutants.

The UK Government's Clean Air Strategy 2019 raised concerns about those living in deprived communities being most likely to suffer adverse health effects from poor air quality. It noted however that this was not always the case and that more affluent communities can be affected too:

> Deprived communities are more likely to experience adverse health effects from poor air quality because they are more exposed to air pollution, for example, by being close to major roads. They are less likely to live close to well maintained green spaces associated with lower levels of air pollution, increased physical activity, and improved mental wellbeing. However, air quality can also be poor in areas that are generally considered affluent, such as central London. This is reflected by the overall national distribution of air pollution with highest average levels in South East England and lowest in the North of England, Scotland, Wales, and Northern Ireland.[16]

The Government's July 2017 UK plan for tackling roadside nitrogen dioxide concentrations provides a summary of some of the implications of poor air quality on public health, the natural environment and the economy:

> 11. Poor air quality is the largest environmental risk to public health in the UK. It is known to have more severe effects on vulnerable groups, for example the elderly, children and people already suffering from pre-existing health conditions such as respiratory and cardiovascular conditions. Studies have

14 WHO Fact Sheet, Ambient (outdoor) air quality and health, May 2018
15 Public Health England guidance, Guidance Health matters: air pollution, November 2018
16 HM Government, Clean Air Strategy, 2019, p24

suggested that the most deprived areas of Britain bear a disproportionate share of poor air quality.

12. Air pollution also results in damage to the natural environment. NO_2 contributes to acidification and eutrophication of soil and watercourses, which impacts on animal and plant life and biodiversity. It also contributes to local ozone production which has public health impacts and damages agricultural crops, forests and plants.

13. Air pollution has social costs and risks the potential for economic growth. It also impacts upon people of working age which can have economic effects, for instance if they have to take days off work due to air pollution-related health problems. Poor air quality is estimated to have had a total cost of up to £2.7 billion through its impact on productivity in 2012.[17]

For a selection of further views and studies about the impacts of air pollution see:

- Reports and statements from the Committee on the Medical Effects of Air Pollutants (COMEAP);
- Section 1.3 of the European Environment Agency report, Air quality in Europe 2020, September 2020;
- Environment Agency, The state of the environment: air quality, July 2018; and
- Chief Medical Officer annual report 2017: health impacts of all pollution – what do we know? 2 March 2018.

Specific key concerns about air quality are explored further in section 8 of this paper.

[17] HM Government, UK plan for tackling roadside nitrogen dioxide concentrations, July 2017, p3

2 Air quality legislation and standards

Due to the transboundary nature of air pollution, action to manage and improve air quality in the UK has been driven by both international agreements and EU legislation, as well as domestic legislation.

Following the UK's departure from the EU and the end of the transition period, those air quality laws (as set out below) originating from EU legislation have been retained in domestic legislation in accordance with the *EU (Withdrawal) Act 2018* (as amended) and subsequent regulations.

As a former EU Member, the UK's air quality standards that set ceilings and limits have been shaped into three different strands:

- Those covering **ambient air quality** (the air that surrounds us). These standards cover ground level ozone, particulate matter, nitrogen oxides, dangerous heavy metals and a number of other pollutants. These air quality standards were to be attained by all Member States from 2005 or 2010 onwards, depending on the pollutant. If the set limit values were exceeded, Member States were required to adopt air quality plans detailing measures to keep the exceedance period as short as possible.

- Those covering **transboundary air pollutants**: sulphur oxides, nitrogen oxides, ammonia, volatile organic compounds and particulate matter. National emission reduction targets were set that need to be met in 2020 and 2030. Member States had to develop National Air Pollution Control Programmes by 2019 to demonstrate compliance with their emission reduction commitments.

- **Standards for key sources of pollution**. These standards are set out at EU level in legislation targeting industrial emissions, emissions from power plants, vehicles and transport fuels, as well as the energy performance of products.[18]

The following sections provide more detailed information about some of the key pieces of legislation in these three different strands.

There is also a section on legislation which gives local authorities various powers and responsibilities to control air quality in their areas. This includes the *Clean Air Act 1993*, which provides prohibitions on emitting dark smoke from the chimneys of any building or industrial or trade premises and provides local authorities with powers to designate smoke control areas, and

[18] European Commission Communication, A Europe that protects: Clean air for all, COM(2018) 330 final, 17 May 2018

the *Environment Act 1995*, which (among other things), establishes the local air quality management (LAQM) regime.

2.1 Ambient air standards

The key legislation covering ambient air quality includes stems from the EU. This includes EU Directive 2008/50/EC (the "Air Quality Directive") which covers particulate matter, NO_2 and ozone and Directive 2004/107/EC, which covers cadmium, arsenic, nickel and mercury, and polycyclic aromatic hydrocarbons (PAHs). This legislation sets limit values which have been implemented in the UK through regulations.

The Air Quality Directive

EU Directive 2008/50/EC (the "Air Quality Directive") on ambient air quality and cleaner air for Europe set legally binding standards for ambient air quality (the more immediate air that surrounds us). It did this by setting limit values for concentrations of them.

Limit values are legally binding and must not be exceeded. They are set at the same level for all EU countries for individual pollutants and comprise a concentration value, an averaging period for the concentration value, a number of exceedances allowed (per year) and a date by which it must be achieved.

The Air Quality Directive sets limit values for a number of pollutants, as follows:

Box 1: Air Quality Directive emission limits and targets for NOx, PM and Ozone for the protection of human health

- **By January 2005 for PM_{10}:** a maximum annual mean concentration of no more than 40µg/m^3 ; and a 24 hour mean concentration of 50µg/m^3 not to be exceeded more than 35 times a year.
- **By January 2010 for NO_2:** a maximum annual mean concentration of no more than 40µg/m^3; and an hourly mean concentration of 200µg/m^3 not to be exceeded more than 18 times in a year.
- **By January 2015 for $PM_{2.5}$:** a maximum annual mean concentration of 25µg/m^3.
- **By January 2020 for $PM_{2.5}$:** a maximum annual mean concentration of 20µg/m^3.

- **By January 2010 for ozone**: a target of a daily 8 hour ozone mean of 120 µg/m^3 not to be exceeded more than 25 days year (averaged over 3 years). A long-term objective of a daily 8 hour ozone mean of 120 µg/m^3, with no exceedances from January 2020.

µg = microgram

The Directive allowed for Member States to apply to the European Commission to postpone the deadline for meeting the limit values for certain pollutants in a particular area. For example, this was by three years for PM_{10} and up to five years for NO_2. Approval from the EU Commission was required to extend the deadline.

Under article 24 of the Directive, where there is a risk that the levels of pollutants will exceed one or more of the alert thresholds specified in the Directive, Member States "shall draw up action plans indicating the measures to be taken in the short term in order to reduce the risk or duration of such an exceedance".[19] **The UK has produced a number of these plans. See section 4 of this paper for further information about these plans.**

In the UK, the Air Quality Directive was implemented through:

- Air Quality Standards Regulations 2010 (as amended);
- Air Quality Standards (Wales) Regulations 2010 (as amended);
- Air Quality Standards Regulations (Northern Ireland) 2010 (as amended); and
- Air Quality Standards (Scotland) Regulations 2010 (as amended). Scotland has set stricter levels for PM_{10} and $PM_{2.5}$ than the EU requirements. In April 2016, the Scottish Government became the first country in Europe to adopt the 2005 World Health Organisation's recommended guideline value for $PM_{2.5}$ of 10µg/m^3 as an annual mean threshold.[20]

Fourth Daughter Directive (arsenic, cadmium, mercury, nickel and PAHs)

Directive 2004/107/EC of 15 December 2004, (referred to as "the Fourth Daughter Directive"), covers cadmium, arsenic, nickel and mercury, and polycyclic aromatic hydrocarbons (PAHs). As well as setting limit values for these elements (apart from mercury), the Directive sets monitoring and reporting requirements for Member States. [21]

19 Article 24, Directive 2008/50/EC on ambient air quality and cleaner air for Europe
20 The Air Quality (Scotland) Amendment Regulations 2016 (SI 2016/162)
21 Defra, Air Pollution in the UK 2016, September 2017

It is implemented in the UK through the same regulations as made in relation to the Air Quality Directive (opens PDF), as set out above.

2.2 Transboundary air quality standards

Transboundary air pollution is a particular problem for pollutants that are not easily destroyed or react in the atmosphere to form secondary pollutants. These are cross boundary pollutants that can be generated in one country and felt in others.[22] In the UK transboundary air quality standards stem from a mesh of international agreements, to which the UK is a contracting party, EU legislation and domestic regulations.

International agreement: the Gothenburg Protocol 1999

The United Nations Economic Commission for Europe (UNECE) Convention on Long-Range Transboundary Air Pollution was extended in 1999 by the Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, with the aim of reducing emissions of transboundary air pollution. It set national emissions ceilings for sulphur, nitrogen oxides, volatile organic compounds (VOCs) and ammonia for 2010. The EU and the UK are both contracting parties to the Protocol.

In 2012, decisions amending the Protocol, known as the "2012 Amendment" set new emissions ceilings for sulphur dioxide, nitrogen oxides, ammonium and VOCs to be achieved by 2020 and beyond.[23] The emissions reductions targets were also extended to include $PM_{2.5}$. The acceptance of the 2012 Amendment on behalf of the European Union was published by the Commission in the Official Journal Council Decision (EU) 2017/1757 of 17 July 2017.

EU Legislation

National Emissions Ceilings Directives 2001 and 2016

The Gothenburg Protocol was implemented in the EU through a number of Directives. One of the main ones was the 2001 National Emission Ceilings Directive (the "NECD 2001"). The NECD 2001 set national "ceilings" for air pollutants. The ceilings covered four pollutants: nitrogen oxides (NO_x); sulphur dioxide (SO_2); non-methane volatile organic chemicals (NMVOCs); and ammonia, to be met from 2010 and which continued to apply until 2020.[24]

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22 National Atmospheric Emissions Inventory website, Transboundary Air Pollution [accessed 5 July 2022]

23 UNECE, Parties to UNECE Air Pollution Convention approve new emission reduction commitments for main air pollutants by 2020, 4 May 2012

24 National Atmospheric Emissions Inventory website, National Emissions Ceilings Directive (NECD) [on 18 March 2019]

The NECD 2001 was transposed into UK legislation by the National Emission Ceilings Regulations 2002. Member States had to report their emission inventories annually to the European Environment Agency (EEA) and the European Commission in order to monitor progress and verify compliance.

A revised NECD (2016/2284/EU) (the "2016 Directive"), was agreed in 2016. It set new emission reduction commitments for each Member State for the NECD 2001 pollutants and additionally for fine particulate matter ($PM_{2.5}$) to be met by 2020 and 2030. The 2016 Directive replaced the NECD 2001 from 1 July 2018.[25] It was transposed in UK legislation by the National Emission Ceilings Regulations 2018 (SI No.129), which came into force on 1 July 2018.

Member States were required by Article 6 of the 2016 Directive to establish, by 1 April 2019 at the latest, a National Air Pollution Control Programme which must be regularly updated, at least every four years. This is a governance mechanism designed to ensure that the reduction commitments for 2020 and 2030 are met.[26]

On 1 April 2019 the UK Government, the Scottish Government, the Welsh Government and the Northern Ireland Department for Agriculture, Environment and Rural Affairs, published a National Air Pollution Control Programme (NAPCP). The NAPCP is a UK wide document and sets out the proposed measures and technical analysis, which demonstrate how the legally binding 2020 and 2030 emission reduction commitments for nitrogen oxides, ammonia, non-methane volatile organic compounds, particulate matter and sulphur dioxide could be met across the UK.

In July 2022 the above governments published a consultation on a revised NAPCP. This provides updated emissions projections, policies and proposed measures to be taken. The consultation closes on 4 September 2022 and the reviewed NAPCP is due to be published later in September 2022.[27]

Domestic regulation restricting sale of fuels for domestic burning

The UK Government has also introduced specific domestic regulations in order to help meet its international obligations on transboundary pollutants.

An example of this is the Air Quality (Domestic Solid Fuels Standards) (England) Regulations 2020 (SI 2020/1095), which apply in England. The regulations place restrictions on the sale of wet wood for domestic burning, limits on the emission of sulphur and smoke from manufactured solid fuels and phase out the sale of bituminous coal (traditional house coal). The requirements are backed by criminal sanctions, enforced by local authorities. The explanatory memorandum to the regulations states that such action is necessary since domestic burning through wood burning stoves and open

25 National Atmospheric Emissions Inventory website, National Emissions Ceilings Directive (NECD) [on 18 March 2019]

26 EU Commission, Draft Guidance on National Air Pollution Control Programmes, 10 March 2017

27 Defra, Consultation on the draft National Air Pollution Control Programme, 25 July 2022

fires is a major contributor to national emissions of fine particulate matter ($PM_{2.5}$).[28]

2.3 Combustion plants and industrial emissions

Controls on emissions from combustion plants and industrial emissions have been shaped by EU legislation, which in turn has been implemented by UK domestic regulations.

Medium Combustion Plant Directive

Medium combustion plants those that are generally used to generate heat for large buildings (e.g., offices, hotels, hospitals, prisons), industrial processes, as well as for power generation.[29] They are sources of emissions of sulphur dioxide, nitrogen oxides and dust.[30]

The EU Medium Combustion Plant Directive (MCPD) entered into force on 18 December 2015 and had to be transposed by Member States by 19 December 2017. [31] It regulates pollutant emissions from the combustion of fuels in plants with a rated thermal input equal to or greater than 1 megawatt (MWth) and less than 50 MWth.[32] The MCPD was based on a European Commission proposal, which was part of the Clean Air Policy Package adopted on 18 December 2013.

The Directive requires all plants in scope to be registered or permitted and sets limits on the levels of pollutants that these plants can emit according to their type, size, age, fuel type and annual operating hours. It also requires operators to test emissions from their plants to demonstrate compliance with emission limits.[33]

The UK and Welsh Governments published a consultation, Improving air quality: reducing emissions from Medium Combustion Plants and Generators, in November 2016 seeking views on draft plans to implement the MCPD and emission controls on generators in order to improve air quality. The Environmental Permitting (England and Wales) (Amendment) Regulations 2018 then brought these requirements into force in England and Wales. The

28 Explanatory Memorandum to the *Air Quality (Domestic Solid Fuels Standards) (England) Regulations 2020,* p1

29 Defra and Welsh Government, Consultation on reducing emissions from Medium Combustion Plants and Generators to improve air quality, November 2016, p1

30 EU Commission website, The Medium Combustion Plant Directive [accessed on 8 September 2021]

31 Directive (EU) 2015/2193 of the European Parliament and the Council of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants

32 European Commission website, The Medium Combustion Plant (MCP) Directive [downloaded on 5 December 2017]

33 Department for Environment, Food and Rural Affairs and Welsh Government, Improving air quality: reducing emissions from Medium Combustion Plants and Generators, November 2016, p1

explanatory memorandum to this SI sets out the long implementation period to meet the requirements of the directive:

> In accordance with the Directive operators of new Medium Combustion Plants will require a permit to operate plants from 20 December 2018, at which point those plants will have to comply with the emission limit values for certain pollutants (which depends on the fuel used). Operators will also need to keep a record of operations to demonstrate compliance with their permit conditions for at least 6 years. A long implementation period is provided for existing Medium Combustion Plants, in order to provide operators with sufficient time to adapt technically to the requirements. This means operators of existing medium combustion plants only come within the permitting regime from 2024 or 2029, depending upon the plant's rated thermal input.[34]

In December 2016 the Scottish Government published its consultation, Consultation on Implementation of the Medium Combustion Plant Directive in Scotland. The Pollution Prevention and Control (Designation of Medium Combustion Plant Directive) (Scotland) Order 2017 is now in force.

The Northern Ireland Consultation on the transposition of the Medium Combustion Plant Directive (1-50 megawatts) including the regulation of thermal electricity generators, was published on 21 June 2017. The Pollution Prevention and Control (Industrial Emissions) Regulations (Northern Ireland) 2013 were amended to transpose the requirements of the Medium Combustion Plant Directive, from March 2018.[35]

Industrial Emissions Directive

The regulation of emissions from industrial installations and mobile plant is regulated primarily by the Industrial Emissions Directive 2010 (Directive 2010/75/EU), (the IED). Mobile plant may include operations such soil and groundwater remediation and landspreading of waste.[36]

The IED aims to protect human health and the environment through the use of "Best Available Techniques" (BAT). BAT sets out the available techniques which are the best for preventing or minimising emissions and impacts on the environment. "Techniques" includes both the technology used and the way the installation is designed, built, maintained, operated and decommissioned. The European Commission produces best available technique reference documents which contain the BAT for installations. Around 50,000 installations undertaking the industrial activities listed in Annex I of the IED are required to operate in accordance with a permit (granted by the authorities in the Member States).[37]

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34 HM Government, Explanatory memorandum to the Environmental Permitting (England and Wales) (Amendment) Regulations 2018, p3

35 Amendment made by the Pollution Prevention and Control (Industrial Emissions) (Amendment) Regulations (Northern Ireland) 2018

36 Environment Agency, Regulatory Guidance Series, No RGN 2 Understanding the meaning of regulated facility, Appendix 4 – Understanding the scope of mobile plant, May 2015

37 European Commission website, The Industrial Emissions Directive [downloaded on 6 March 2018]

The Industrial Emissions Directive 2010 was implemented through the Environmental Permitting (EP) regime in England and Wales, the Pollution Prevention and Control (PPC) regime in Scotland, and in Northern Ireland through Integrated Pollution Prevention and Control. These regimes remain in operation following Brexit.

In January 2021 a joint consultation of the UK Government, the Scottish Government, the Welsh Government and the Department of Agriculture, Environment and Rural Affairs in Northern Ireland was published to seek stakeholder views on establishing a new UK BAT regime, following the UK's EU exit.[38] The consultation document summarised the approach to be taken and highlighted that there may be different aspects of BAT standards between the different UK countries:

> We are proposing to develop and set future 'Best Available Techniques', based on the same principles we have followed since the concept was devised; a transparent, collaborative, data and evidence led process that safeguards and builds on the high levels of environmental protection already in place across the UK.
>
> Air quality is a devolved policy area and, following the UK's exit from the European Union, the power for defining "Best Available Techniques" conclusions is transferred to each government independently. Different countries in the UK may set different 'Best Available Techniques'. For instance, Scottish Government has committed to maintaining alignment with EU standards where possible. However, whilst some aspects of 'Best Available Techniques' may be different, a common approach to the development of 'Best Available Techniques' within the UK will be taken.[39]

The Government responded to the consultation on 30 August 2022,[40] and published a new policy paper, Establishing the Best Available Techniques for the UK (UK BAT). This outlines the Government's intention to move towards a more "collaborative" approach.[41] The UK government and Devolved Administrations will work with industry and local councils to determine Best Available Techniques from across the UK's largest industries. This process will include agreeing and setting emissions limits within environmental permits and determining the types of technologies and methods operators should use to reduce their environmental impact.[42] A new governance structure and a new air quality governance group was also outlined:

> A new governance structure will also be established, with new independent bodies - called the Standards Council and the Regulators Group - consisting of government officials and expert regulators from all four nations of the UK. A UK Air Quality Governance Group will also be established to oversee the work of

38 Defra, Best Available Techniques'– A future regime within the UK, January 2021

39 Defra, Best Available Techniques'– A future regime within the UK, January 2021, p4-5

40 HM Government, Summary of responses to the consultation, 'Best Available Techniques': a future regime within the UK, 30 August 2022 and HM Government, Policy paper: Establishing the Best Available Techniques for the UK (UK BAT), 30 August 2022

41 HM Government, New framework announced to tackle industrial emissions across the UK, 30 August 2022

42 HM Government, New framework announced to tackle industrial emissions across the UK, 30 August 2022

the Standards Council as also outlined: and the delivery of the requirements under this new framework. Interested parties from industry, academia and civil society will be able to engage in the running of the BAT system through an advisory group being set up by the UK BAT Team.[43]

2.4 Air quality domestic legislative controls

Clean Air Act 1993

The Clean Air Act 1993 (which contains provisions which apply to England Wales and Scotland), provides powers for local authorities to designate smoke control areas. These are areas where someone cannot emit smoke from a chimney unless they are burning an authorised fuel or using 'exempt appliances', for example burners or stoves.[44] It also contains prohibitions on emitting dark smoke from the chimneys of any building or industrial or trade premises (including from the chimney of a vessel).

Environment Act 1995

The Environment Act 1995 (as amended) requires the Secretary of State to produce a national air quality strategy (covering the whole of Great Britain). The strategy must contain standards, objectives and measures for improving ambient (outdoor) air quality in Great Britain. The 1995 Act requires the Secretary of State to keep the Strategy under review but does not specify a time frame by which this must happen. The latest national air quality strategy was produced in 2007: the Air Quality Strategy for England, Scotland, Wales and Northern Ireland.

The Environment Act 1995 also establishes a local air quality management (LAQM) regime. Section 82 of the Act requires local authorities to review air quality in their respective areas and assess whether the air quality standards specified in the national air quality strategy are being achieved. For areas where specified standards and objectives are not being met, authorities are expected to declare Air Quality Management Areas (AQMAs) and then prepare action plans. The action plan must provide a timeframe for when measures will be implemented.

For further information on LAQM and powers available to local authorities to tackle air quality see Library briefing, Local Government air quality responsibilities.

43 HM Government, New framework announced to tackle industrial emissions across the UK, 30 August 2022

44 For further information see GOV.UK guidance, Smoke control areas: the rules [accessed 18 May 2021]

2.5 World Health Organization guidelines

The World Health Organization (WHO) published Global Air Quality Guidelines in September 2021 covering Particulate matter ($PM_{2.5}$ and PM_{10}), ozone, nitrogen dioxide, sulphur dioxide and carbon monoxide. They provide guidance on thresholds and limits for key air pollutants that pose health risks. They are guidelines only and are not binding on any country unless that country chooses to adopt them into its own legislation.

These guidelines are an update on the previous 2005 version, WHO Air quality guidelines 2005 (opens PDF). In particular, the annual guideline level for fine particulate matter ($PM_{2.5}$) was lowered from 10 $\mu g/m^3$ to 5 $\mu g/m^3$ and the guideline level for nitrogen dioxide was reduced from 40 $\mu g/m^3$ to 10 $\mu g/m^3$.

$\mu g/m^3$ is a microgram (one-millionth of a gram) per cubic metre of air.

The revised 2021 guidelines set the following limit values:[45]

Table 1 WHO recommended 2021 air quality guidance levels compared to 2005 air quality guideline

Pollutant	Averaging time	2005 Air Quality Guidelines	2021 Air Quality Guidelines
$PM_{2.5}$ $\mu g/m^3$	Annual 24-hour	10 25	5 15
PM_{10} $\mu g/m^3$	Annual 24-hour	20 50	15 45
O_3 $\mu g/m^3$	Peak season 8-hour	- 100	60 100
NO_2 $\mu g/m^3$	Annual 24-hour	40 -	10 25
SO_2 $\mu g/m^3$	24-hour	20	40
CO mg/m^3	24-hour	-	4

Source: World Health Organization, What are the WHO Air quality guidelines? 22 September 2021

[45] World Health Organization, What are the WHO Air quality guidelines? 22 September 2021

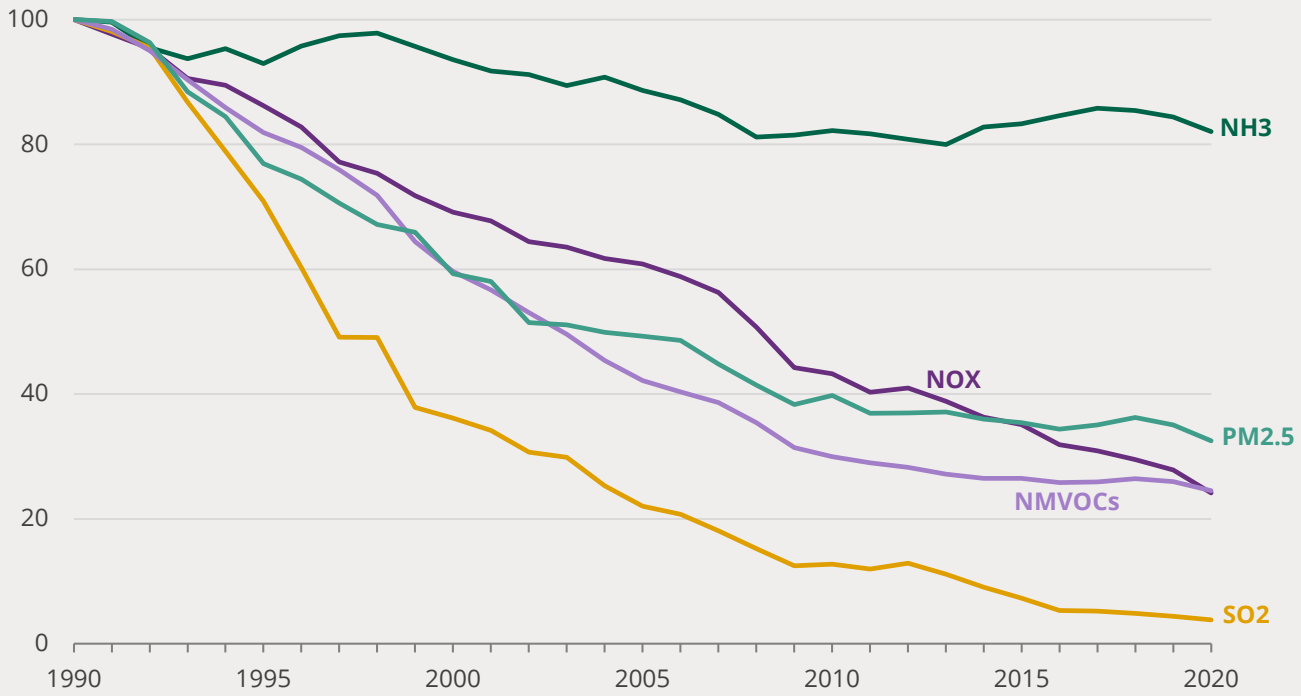
3 Trends in air pollutants

3.1 Summary

Longer term trends in estimates emissions of sulphur dioxide (SO2), fine particulate matter (PM2.5), nitrogen oxides (NOX), non-methane volatile organic compounds (NMVOC) and ammonia (NH3) are summarised in the chart below. All apart from ammonia fell by more than 66% over this time. The fall in emissions of NMVOCs and PM2.5 slowed down noticeable or stopped in the last decade. The largest reduction was in sulphur dioxide which fell by 96% between 1990 and 2020.

UK Emissions of four key pollutants down by more than two thirds since 1990

Index values 1990=100



Source: Emissions of air pollutants, Defra (February 2022)

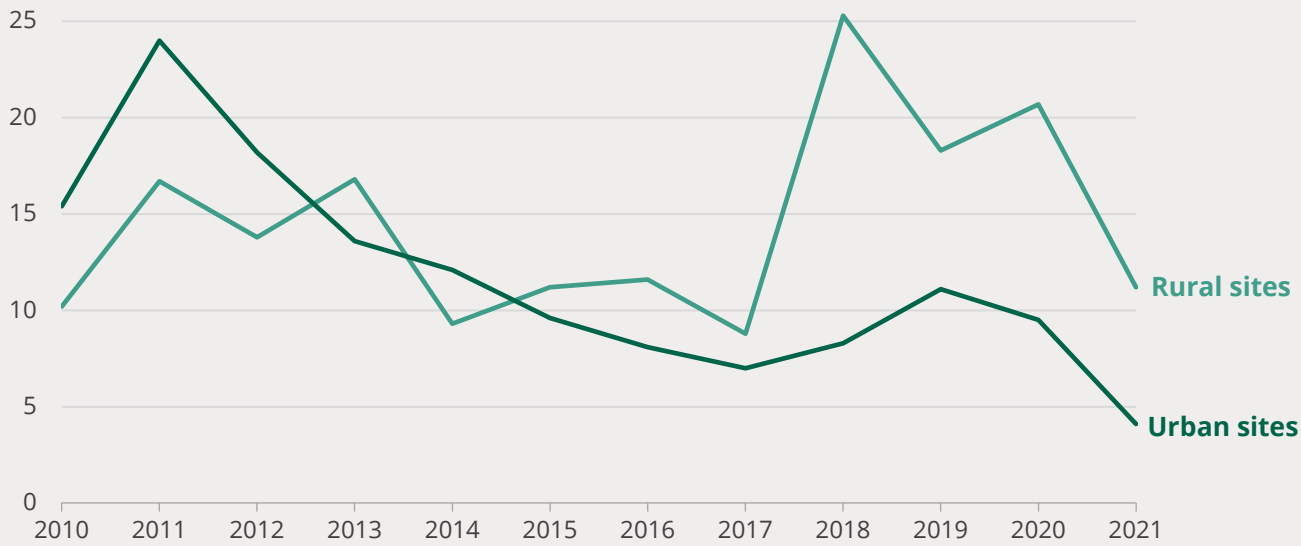
The next chart looks at the average number of days where pollution was categorised as 'moderate' or higher[46] since 2010. The number at urban monitoring stations fell from 24 per site in 2011 to 7 in 2017. It increased in the follow two years before falling again in 2020 and 2021 to a new low of 4.1. This

[46] Bands 'low', 'moderate', 'high', or 'very high' for a range of different pollutants.

recent fall will have been due, at least in part, to the pandemic and associated lockdowns. In contrast the average number at rural sites has increased from around 10 in the middle of the last decade to a peak of just over 25 in 2018. It was around 20 in 2019 and 2020 before falling to around 11 in 2021. Pollution can be affected by weather conditions, particularly ozone which makes up most of the days of moderate of higher pollution. These trends are therefore not solely due to changes in underlying UK emissions.

More days with moderate or higher pollution at rural sites in recent years

Mean average number of days per monitoring site when air pollution was moderate or higher



Source: Air quality statistics, Defra (April 2022)

3.2 Individual pollutants

This section looks at national level data on emissions of the five pollutants listed above and concentrations of fine particulate matter ($PM_{2.5}$) and nitrogen dioxide (NO_2). The emissions data show estimates for 2000 to 2019 and compare these to internationally-agreed legal ceilings on emissions:

- The National Emission Ceilings Regulations 2018 (NECR)
- The Gothenburg Protocol to the UNECE Convention on Long Range Transboundary Air Pollution (CLRTAP)

Both set limits on pollution based on an agreed percentage reduction compared to a base year. These ceilings cover 10-year periods: 2010-19 and 2020-29. The ceilings for fine particulate matter only cover 2020-29.

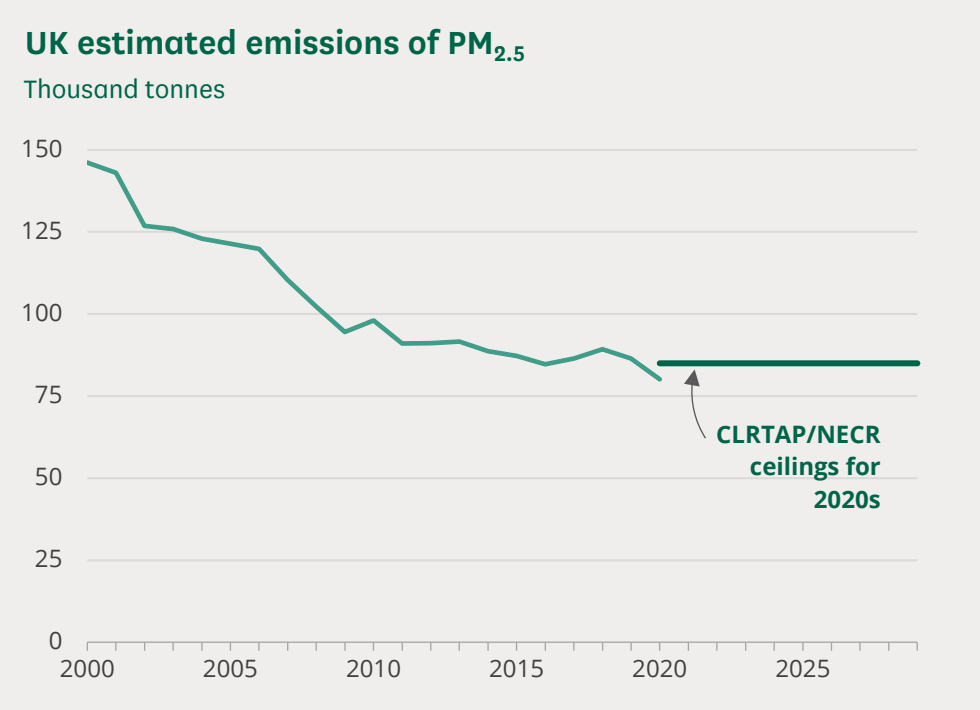
The data on $PM_{2.5}$ and NO_2 concentrations cover 2009 to 2020. The commentary on this data compares estimates to legal limits set out in the Air

Quality Standards Regulations (2010)[47] which are based on EU and UN directives. It also compares this UK data to the recent guidelines on air quality produced by the World Health Organisation (WHO).[48] These air quality guidelines are set out alongside interim targets to meet this level.

Particulates ($PM_{2.5}$)

Emissions

Estimated emissions of $PM_{2.5}$ were just under 150 thousand tonnes in 2000. They fell to 91 thousand tonnes in 2011 and remained around this level up to 2019 before falling to 80 thousand tonnes in 2020. The 2020 level was 6% below the emission ceilings for the 2020s. These are set at 30% below 2005 levels.



Source: Emissions of air pollutants, Defra (February 2022)

The largest single source of $PM_{2.5}$ was combustion in the manufacturing and construction sections which was responsible for 27% of emissions in 2020. Domestic combustion -mainly burning wood for heat in homes- was the next largest at 25%.[49]

Concentrations

Data on $PM_{2.5}$ concentrations are based on figures from roadside and urban background monitoring stations. There are a limited number of stations and in order to reflect the uncertainty in going from this data to national

47 Air Quality Standards Regulations 2010

48 WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide, WHO September 2021

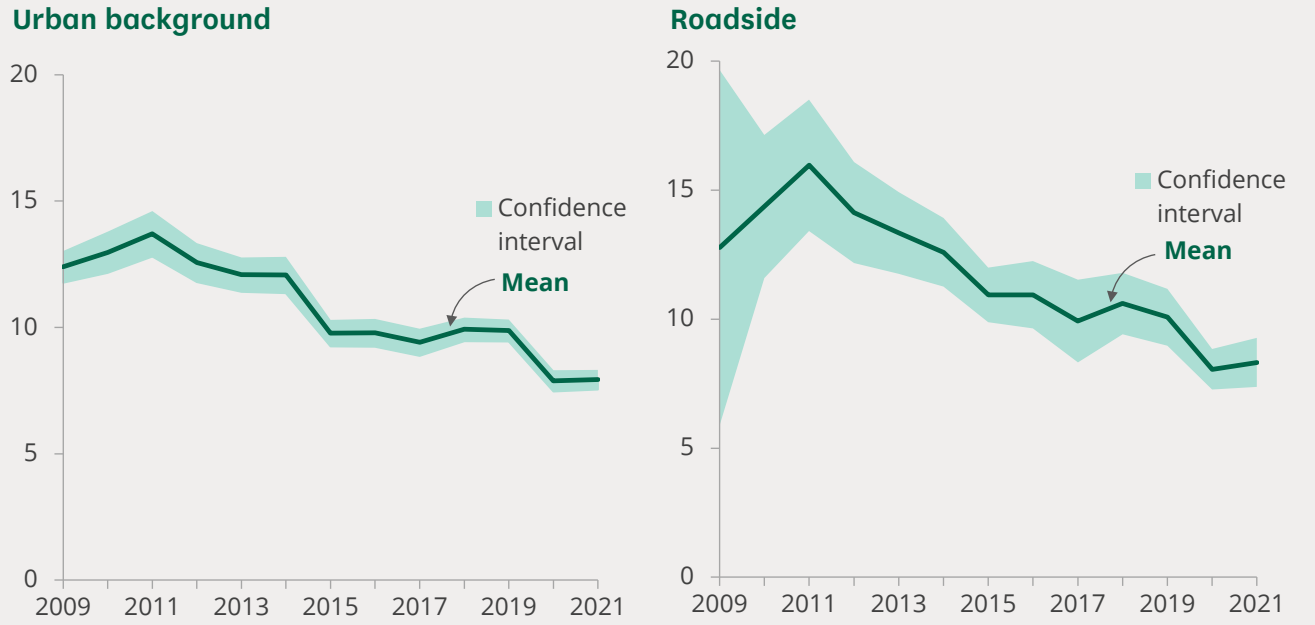
49 Emissions of air pollutants in the UK – Particulate matter (PM10 and PM2.5), Defra

estimates they presented alongside confidence intervals. These intervals narrow over time due to the increased number of monitoring stations and the reduction in variation between sites.

Mean hourly concentrations of $PM_{2.5}$ fell between 2011 and 2015 at roadside and urban background sites by 31% and 21% respectively. There was little change in the following four years. Concentrations fell in 2020 and remained at this level in 2021 as the pandemic and related lockdowns led to a dramatic fall in road traffic.

Annual mean concentrations of PM2.5 in the UK

µg/m³



Source: Air quality statistics, Defra (April 2022)

$PM_{2.5}$ targets

UK limit: **25 µg/m³**

WHO guidelines:

2005: **10 µg/m³**

2021: **5 µg/m³**

The Air Quality Standards Regulations 2010 require that annual average concentrations of $PM_{2.5}$ must not exceed 25 µg/m³. The charts above show that concentrations were well below this level. The UK is divided into 43 zones for the purpose of assessment of compliance with these regulations. In 2020 all met the 25 µg/m³ limit and the (WHO) stage 2 indicative limit of 20 µg/m³.[50]

The WHO has recently recommended an annual guideline concentration level of 5 µg/m³.[51] Its earlier target, published in 2005 was 10 µg/m³.

The Government has said the following on its progress to meeting the earlier guideline level:[52]

50 Air Pollution in the UK 2020, Defra

51 WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide, WHO September 2021

52 Air Quality: National Air Pollution Control Programme, Defra (March 2019)

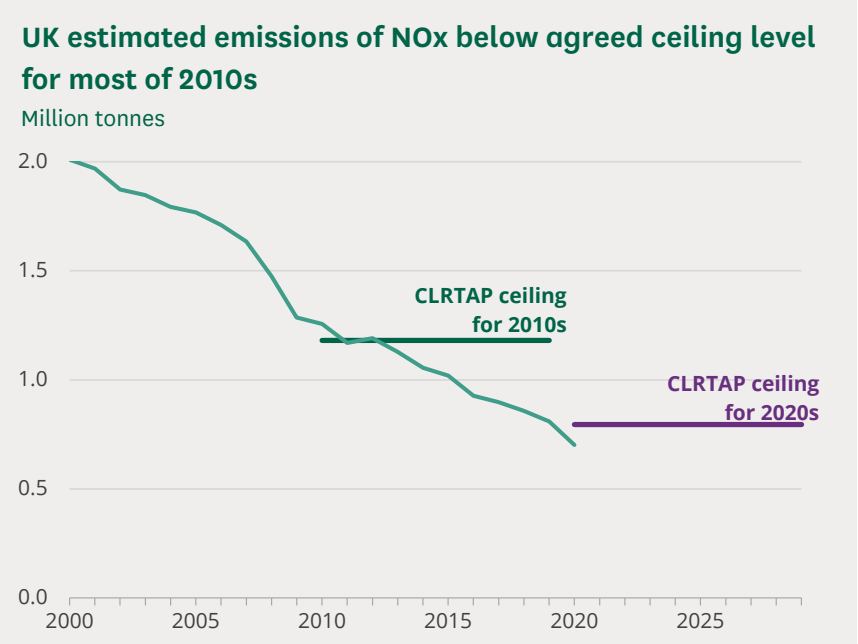
The UK's current objectives on PM2.5 stem from EU legislation. We already meet the EU limit value of 25 µg/m3 and are on track to meet the second stage limit of 20 µg/m3 by 2020.

The WHO guidelines recommend an ultimate goal for concentrations of PM2.5 of 10 µg/m3. This is half of the 2020 EU limit and the WHO recognises that this represents a significant challenge … **We will reduce PM2.5 levels in order to halve the number of people living in locations where concentrations of particulate matter are above 10 µg/m3 by 2025.**

Nitrogen oxides (NOx)

Emissions

Emissions of NOx have fallen consistently from just under 2 million tonnes in 2000 to below 1.5 million tonnes from 2008 and less than 1 million tonnes from 2016. The pandemic and associated lockdowns were likely to be partly responsible for the relatively large drop in 2020 The overall cut between 2000 and 2020 was 65%. The following chart shows that emissions were below the CLRTAP ceiling for the 2010s in all years other than 2010 and 2012. 2020 emissions were below the cap for the 2020s. The NECR ceiling applies to NOx excluding agriculture and emissions on this basis were below this level in all years other than 2010. However, Defra has said that after adjustments/improvements to estimates the revised emissions totals were below the ceilings in all years. [53]



Source: Emissions of air pollutants, Defra (February 2022)

Emissions of NOx from road transport have fallen faster than other sources, but they were still the largest single source in 2020 with 18% of the total.

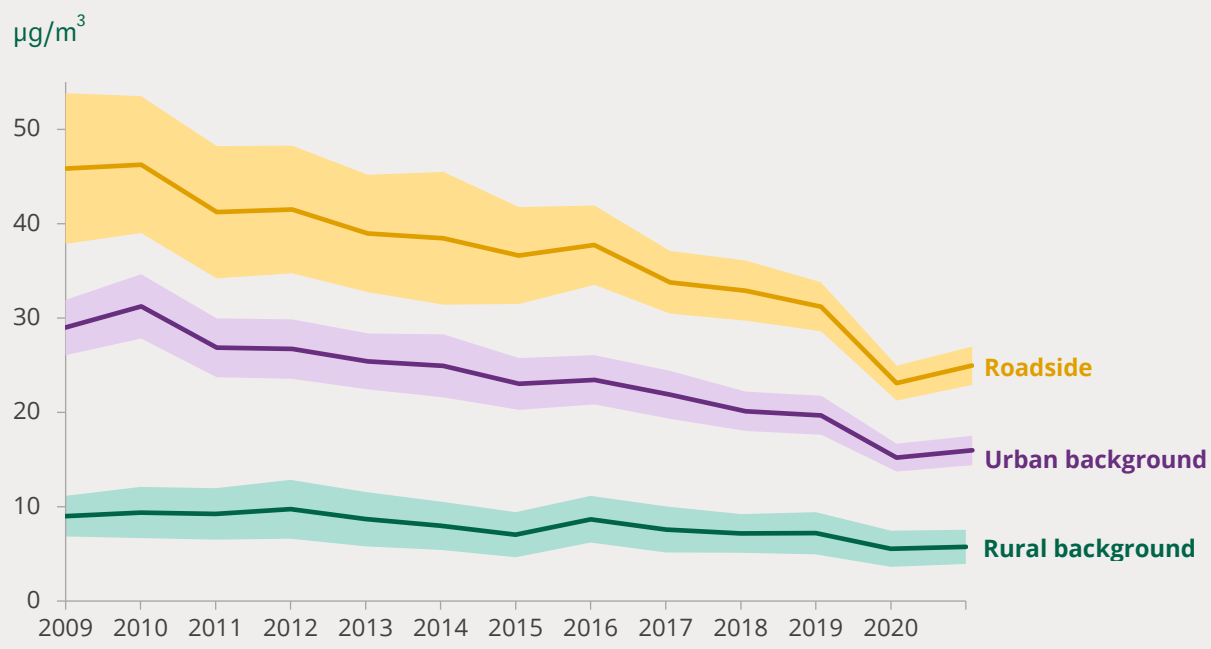
[53] Emissions of air pollutants in the UK – Nitrogen oxides (NOx) Defra

Manufacturing/construction and energy industries were the next most important sectors with 21% and 20% respectively.[54]

Concentrations of Nitrogen Dioxide (NO_2)

Data on concentrations of NO_2, are, as with other pollutants, estimated from monitoring stations of different types. They are presented with confidence intervals to take account of the uncertainty of this method. The following chart shows trends for the three different types of charts since 2009. Average emissions at all types of sites fell over the 2010s, with somewhat larger percentage reductions at roadside and urban background sites. There was a more dramatic fall in 2020 as the lockdowns led to a large cut in road traffic.

Annual mean concentrations of NO_2 in the UK



Source: Air quality statistics, Defra (April 2022)

NO_2 targets
UK limit: **40 µg/m³**
WHO guidelines:
2005: **40 µg/m³**
2021: **10 µg/m³**

The Air Quality Standards Regulations 2010 require that annual concentrations must not exceed 40 µg/m³. The average at all types of site has been below this level for some years. In 2020 38 of the 43 air quality zones in the UK met this annual limit, up from 10 in 2019.[55]

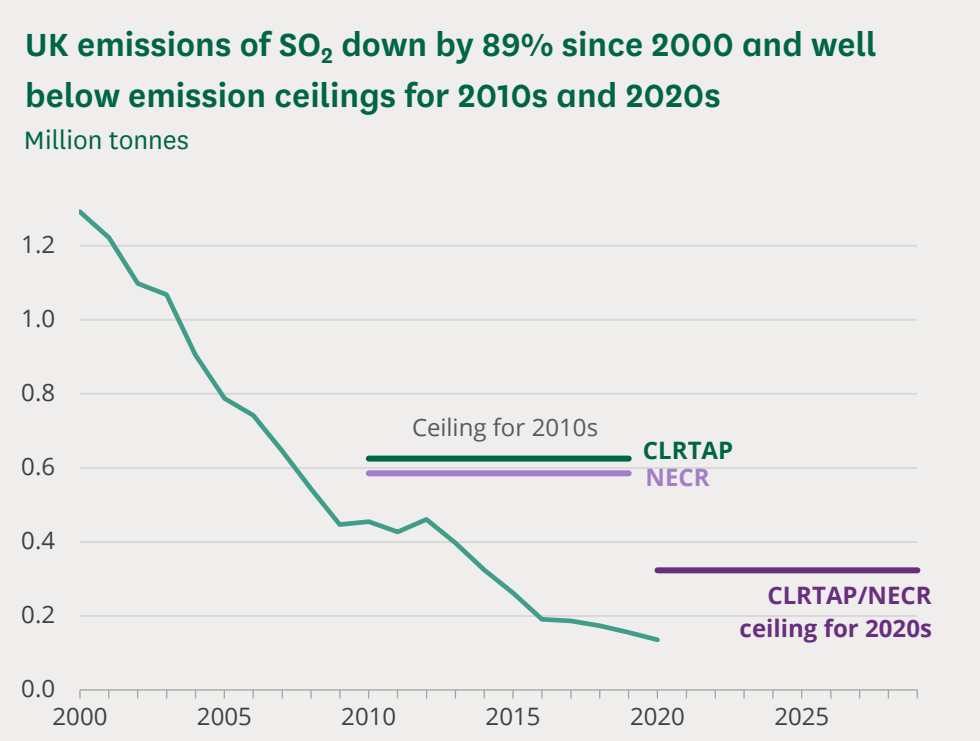
The latest WHO guideline concentration is 10 µg/m³.[56] The chart above shows that even with the reductions in 2020, average concentrations were well above this level at urban background and roadside sites.

54 ibid.
55 Air Pollution in the UK 2020, Defra
56 WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide, WHO September 2021

Sulphur Dioxide (SO_2)

Emissions

Estimated emissions of SO_2 have been falling for many decades. The following chart looks at the period since 2000 during which they fell by 89% from 1.3 million tonnes to just over than 0.1 million tonnes. Levels were below the NECR and CLRTAP ceilings for the 2010s at the start of the decade and well below at the end. Recent levels have also been below the commitments for the 2020s.



Source: Emissions of air pollutants, Defra (February 2022)

The switch away from coal-fired power has been the main cause of the long-term cut in SO_2 emissions. In 2020 the biggest single source sector was domestic combustion with 32% followed by manufacturing/construction with 26%.[57]

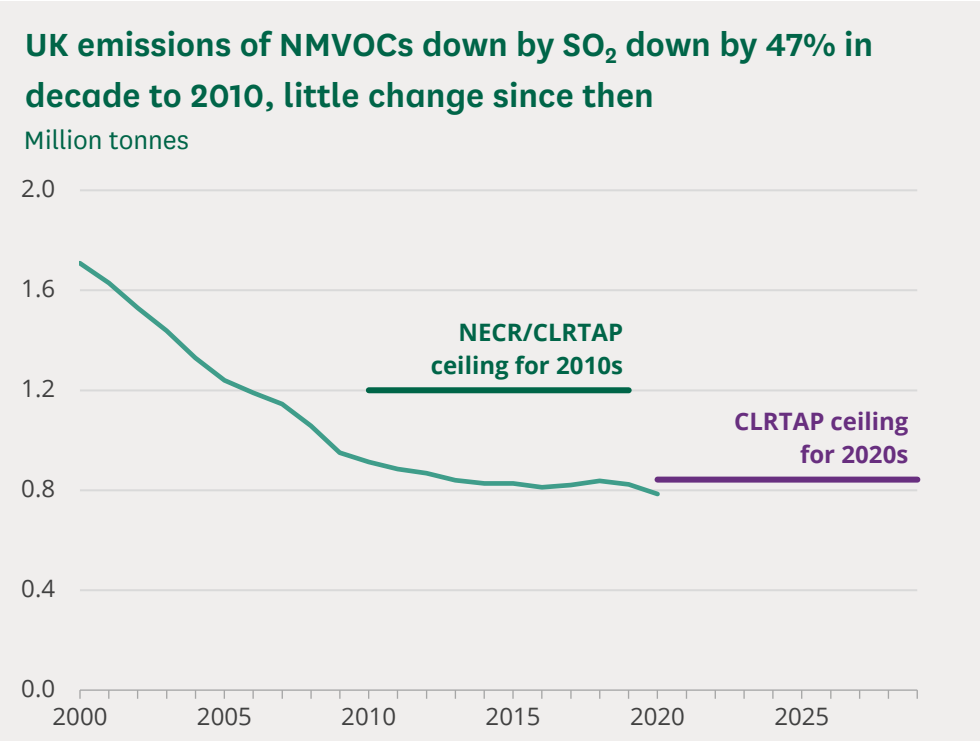
Non-methane volatile organic compounds (NMVOCs)

Emissions

Estimated emissions of NMVOCs fell by 47% between 2000 and 2010 to just over 0.9 million tonnes. They have remained in the 0.8-0.9 million tonnes per year range during the 2010s and were well below the emission ceilings for the decade. The 2020 emission figure was just below the CLRTAP ceiling for the 2020s. The NECR commitment for the 2020s excludes NMVOCs from

[57] Emissions of air pollutants in the UK – Sulphur dioxide (SO2), Defra

agriculture and emissions on this basis (not shown in the following chart) were 14% below this level in 2020.



Source: Emissions of air pollutants, Defra (February 2022)

23% of NMVOC emissions in 2020 were from domestic solvent use. The next largest source was fugitive emissions from the energy sector with 14%.[58]

Ammonia

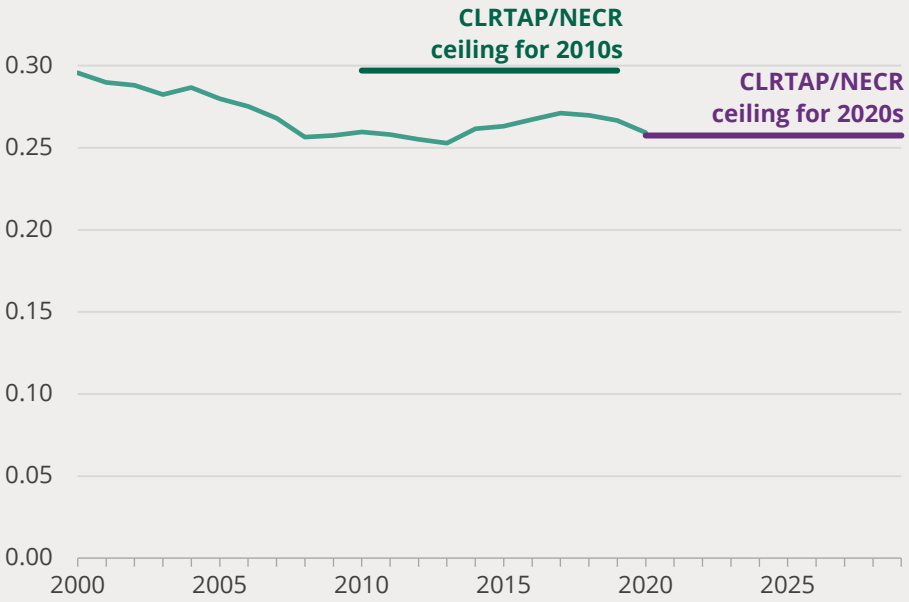
Emissions

Estimated UK emissions of ammonia fell from almost 300 thousand tonnes in 2000 to a low of just over 255,000 in 2008. The following chart shows that emissions remained at this level for six years before increasing during the late 2010s. This level of emissions was below the ceiling levels during the whole of the 2010s. Emissions fell by 3% in 2020 to their lowest level since 22013, but were just above the ceiling level for the 2020s of 257 thousand tonnes.

[58] Emissions of air pollutants in the UK – Non-methane volatile organic compounds (NMVOCs), Defra

UK emissions of ammonia below ceiling for 2010s, but have increased in recent years and are above target for 2020s

Million tonnes



Source: Emissions of air pollutants, Defra (February 2022)

The majority of ammonia emissions come from agriculture; 87% in 2020. Trends in total emissions are closely connected to changings in farming practice, such as fertiliser use and the number of farm animals.[59]

3.3 Local data on air quality

Air quality assessment zones

The annual Air pollution in the UK report gives a high level summary of the UK's compliance with legal limits on air pollution alongside background information on the UK's legal and policy framework and how pollution is measured and modelled. The UK is divided into 43 zones for air quality assessment. 28 are agglomerations zones (large urban areas) and 15 non agglomeration zones (larger regions outside urban areas). The report presents compliance with each pollution limit for all zones. This is based on a mixture of measured concentrations and modelling.

In 2020 all zones were compliant with the limit values for SO_2, $PM_{2.5}$, lead, benzene and CO. The UK has been compliant with these limits for more than a decade. No zones exceeded the NO_2 hourly mean limit (for the first time ever) and five exceeded the annual mean (down from 33 in 2019). No zones exceeded the annual or daily mean limits for PM_{10} and all were compliant with the stage 1 and stage 2 limits on $PM_{2.5}$. All zones were compliant with the

[59] Emissions of air pollutants in the UK – Ammonia (NH3), Defra

8 hour target value on ozone protection of human health, but only three were compliant with the long term objective for human health. The target value on a separate measure of ozone for protection of vegetation was met in all zones, but 16 exceeded the long-term objective on this measure.

Current and forecast levels of pollution

The following websites give current data on air pollution levels (Daily Air Quality Index bands) and forecasts:

- Air Quality in England
- Air Quality in Scotland
- Air Quality in Wales
- Northern Ireland Air

Detailed local level modelling of pollution

The UK Air website from Defra contains forecast and latest pollution summary bands, but also includes data on pollution levels from the monitoring network and exceedances of pollution limits. The ambient air quality map on this site is an interactive tool which allows users to explore modelled annual data on background and roadside pollution concentrations from Defra's national Pollution Climate Mapping modelling. It covers all the pollutants included in the UK's limits for each year from 2001 to 2020. These give detailed local patterns and the roadside figures show modelled pollution levels along the length of specific roads.

Local authority reports and data

Local authorities are required to produce annual reports on their air quality: Annual Status Reports in England and Annual Progress Reports in Wales and Scotland. These include a summary of local pollution in the year, data on pollution levels at their monitoring sites, exceedances of pollution limits and descriptions of actions they have taken to cut pollution.

The Greater London Authority compiles a Borough Air Quality Compendium from the reports for individual London boroughs. The London Air Quality Network website includes current pollution levels, local authority summaries which give pollution data and exceedances for individual sites and annual summary maps of modelled concentrations of NO_2, ozone, PM_{10} and $PM_{2.5}$.

4 UK air quality policies, plans and strategies

In the UK, responsibility for meeting air quality limit values is devolved. The Secretary of State for Environment, Food and Rural Affairs has responsibility for meeting the limit values in England and the Department for Environment, Food and Rural Affairs (Defra) co-ordinates assessment and air quality plans for the UK as a whole.[60]

The UK Government has produced a number of plans for reducing roadside nitrogen dioxide concentrations in the UK. These plans were initially produced in relation to a request to postpone the compliance date for meeting limits on nitrogen dioxide set by European Union law, under the Air Quality Directive (2008/50/EC) and were subsequently revised and updated following a number of legal challenges. More about these plans and the legal challenges is set out in **section 5.2** below.

The UK Government, alongside the Scottish Government, Welsh Government and the Northern Ireland Department for Agriculture, Environment and Rural Affairs, also published a National Air Pollution Control Programme (NAPCP) in April 2019 to meet requirements set by the revised 2016 National Emission Ceilings Directive (2016/2284). An updated, draft National Air Pollution Control Programme, was published for consultation in July 2022.

At a national level, the UK Government and the devolved administrations (except Northern Ireland) are required under the Environment Act 1995 to produce a national air quality strategy. The requirement for Northern Ireland stems from the Environment (Northern Ireland) Order 2002. The purpose is to have a document with common aims covering all parts of the UK. This was last reviewed and published in 2007, as the UK Air Quality Strategy for England, Scotland, Wales and Northern Ireland. While this strategy considers the European and wider international context in which the UK's domestic policies were set at the time, the document is not a requirement stemming from EU legislation. It focuses on nitrogen dioxide (NO_2), ozone (O_3) and particle matter (PM). A revised National Air Quality Strategy is expected to be published in 2023.[61]

Each government within the UK can also choose to publish its own air quality strategy. These strategies are highlighted below.

60 Defra website, UK and EU Air Quality Policy Context [downloaded on 6 March 2018]

61 HM Government, Consultation on environmental targets, 16 March 2022, p36

4.1 A UK-wide air quality common framework

Following EU exit, the four UK nations are no longer bound together by the common framework on air quality provided by the EU. As a result, the UK and devolved governments have agreed that a number of common frameworks will be needed to avoid significant policy divergence between the nations of the UK where that would be undesirable. As part of this work, air quality was identified as a policy area, "where we think that common rules of ways of working will be needed and we expect to implement this through a non-legislative common framework agreement."[62]

An Air quality: provisional common framework was published on 3 February 2022. It sets out how the UK Government and devolved governments propose to work together on policies that aim to reduce harmful emissions and concentrations of air pollutants. For example, it would commit the governments to continue to collaborate on the reporting of data at a UK level and to work collaboratively on emission reductions to meet national and international ceilings. This includes delivering future National Air Pollution Control Programmes, as required under the National Emission Ceilings Regulations 2018. The document states that no primary legislation is deemed necessary for the implementation of this framework.[63]

4.2 England

On 14 January 2019 the UK Government published a Clean Air Strategy 2019 for England. It sets out the Government's plans for dealing with all sources of air pollution and reducing emissions from sectors including transport, farming and industry.[64]

The UK Government's 25 Year Environment Plan, January 2018, also contains ambitions on air quality, and commitments to meet existing targets, which it states are not affected by EU exit.[65]

The 25 Year Environment Plan is accompanied by an indicator framework that is used to check progress against the ambitions and targets in the Plan, Measuring environmental change: outcome indicator framework for the 25 Year Environment Plan (May 2019). A series of update reports on the plan and the indicator framework have since been published.

62 HM Government, Frameworks Analysis 2020 Breakdown of areas of EU law that intersect with devolved competence in Scotland, Wales and Northern Ireland, September 2020
63 HM Government, Air quality: provisional common framework, 3 February 2022, p15
64 HM Government, Clean Air Strategy 2019, January 2019, p63
65 HM Government, A Green Future: Our 25 Year Plan to Improve the Environment, January 2018, p97

4.3 Scotland

In November 2015, the Scottish Government published the now superseded Cleaner Air for Scotland – The Road to a Healthier Future (CAFS). Its purpose was to provide a national framework for air quality improvement in Scotland and to set out how different organisations would work together on this.[66]

Since publication, annual progress reports have been published, up to 2018-19. In November 2018 the Scottish Government commissioned an independently led review of CAFS, led by Professor Campbell Gemmell.[67] A final report following the independent review, Cleaner Air for Scotland strategy: independent review, was published in August 2019. The review concluded CAFS provided for an "overly complex" structure which lacked effective accountability.[68]

In October 2020 the Scottish Government then published Cleaner Air for Scotland 2: consultation. This was a consultation on a draft new air quality strategy for Scotland, taking into account the recommendations arising from the independent review of the Cleaner Air for Scotland strategy. In July 2021 the Scottish Government published the final version of its new strategy: Cleaner Air for Scotland 2 - Towards a Better Place for Everyone (CAFS2).

CAFS2 sets out the Scottish Government's policies on air quality improvements over the next five years. It sets a vision of, "Scotland having the best air quality in Europe – a quality of air that aims to protect and enhance health, wellbeing and the environment." A further review of progress on air quality improvements will commence during 2024, "in order to track progress on delivering the actions in the new strategy."[69]

Alignment with EU law

In Scotland, section 1 of the UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021 (the "Continuity Act"), provides Scottish Ministers with the discretionary power to continue to keep devolved law in line with EU law. It establishes a broad power for the Scottish Government to make regulations that match or implement new EU measures.

In its Cleaner Air for Scotland 2 strategy, the Scottish Government states that it will, "ensure that EU standards and principles relating to emissions of air pollutants continue to apply in Scotland following the UK's exit from the EU, in

66 Scottish Government, Cleaner Air for Scotland – The Road to a Healthier Future, November 2015, executive summary

67 Scottish Government, Tackling Air Pollution, 6 November 2018

68 Cleaner Air for Scotland strategy: independent review, August 2019, para 1.5

69 Scottish Government, Cleaner Air for Scotland 2 - Towards a Better Place for Everyone, July 2021, p9-10

line with the duties introduced by the Continuity Act 2021."[70] The Strategy also set out the Scottish Government's intention to apply EU laws:

> The Scottish Government has made clear its commitment to maintain or exceed EU standards, following the UK's departure from the European Union (EU). The Scottish Government is committed to ensuring that EU environmental principles continue to sit at the heart of environmental policy and law in Scotland. The UK Withdrawal from the European Union (Continuity) (Scotland) Act 20213 will bring the guiding European principles on the environment into force in Scots law, including the precautionary principle, polluter pays principle, prevention principle, rectification at source principle and the integration principle. In relation to current regulation, retained EU law will continue to apply, as will domestic regulations made to transpose EU Directives.[71]

4.4 Wales

In August 2020 the Welsh Government published a Clean Air Plan for Wales: Healthy Air, Healthy Wales. The aim of the plan is set out as being to "improve air quality and reduce the impacts of air pollution on human health, biodiversity, the natural environment and our economy." The content in the plan and its four key themes are summarised as follows:

> The Clean Air Plan:
>
> - Provides context about what we mean by clean air and the challenges we face.
> - Explains how air quality policy aligns with wider Welsh Government policy and the priorities and principles we will apply in delivering the Plan.
> - Considers the impacts of COVID-19 on society and our action to improve air quality.
> - Sets out how we will work collaboratively across sectors and with the public, to put in place new evidence-based policy, legislation, regulations and investment to reduce air pollution in line with highest international air quality standards.
>
> This Plan sets out a 10-year pathway to achieving cleaner air. We have structured the Plan around four core themes, with actions to enable collaborative approaches to reducing air pollution.
>
> - People: Protecting the health and well-being of current and future generations
> - Environment: Taking action to support our natural environment, ecosystems and biodiversity

[70] Scottish Government, Cleaner Air for Scotland 2, July 2021, p52
[71] Scottish Government, Cleaner Air for Scotland 2, July 2021, p9

- Prosperity: Working with industry to reduce emissions, supporting a cleaner and more prosperous Wales

- Place: Creating sustainable places through better planning, infrastructure and transport.

The themes were designed through the lens of the Well-being of Future Generations Act to enable collaborative and integrated approaches to improving air quality, across a range of policy areas and sectors.

The timescales for delivering actions are framed within three Senedd periods, short term: 2020 to 2021, medium term: 2021-26 and longer term: 2026-2031.[72]

The plan also sets out legislative proposals to develop a Clean Air Act for Wales. This is intended to consolidate and improve existing legislative and regulatory frameworks and will include the Local Air Quality Management regime and rules on domestic burning.[73] **For more on proposals for future legislation see section 6 of this paper.**

On leaving the EU, the Plan states that Wales will, "maintain or enhance air quality standards."[74]

In October 2020 Ricardo Energy & Environment (on behalf of the Welsh Government and Welsh Air Quality Forum), published an updated version of its publication, Air Quality in Wales 2019. This provides a summary of information on local air quality monitoring, and pollution levels and their impacts throughout Wales during 2019, along with a 2020 update.

4.5 Northern Ireland

In November 2020 the Northern Ireland Department of Agriculture, Environment and Rural Affairs (DAERA) launched a Discussion Document in advance of developing the first Clean Air Strategy for Northern Ireland. It presented evidence and research on a range of ambient air pollutants, as well as outlining existing policy and legislation. The consultation on the discussion document closed on 15 February 2021 and a synopsis of consultee responses was published in June 2022.

The DAERA website stated that the responses to the discussion document will be considered and used to shape future policies; that these policies will be included within the final Clean Air Strategy, which will "undergo a further public consultation later in 2021."[75] At the time of writing this further public

72 Welsh Government, Clean Air Plan for Wales: Healthy Air, Healthy Wales, August 2020, p5
73 Welsh Government, Clean Air Plan for Wales: Healthy Air, Healthy Wales, August 2020, p22
74 Welsh Government, Clean Air Plan for Wales: Healthy Air, Healthy Wales, August 2020, p9
75 Department of Agriculture, Environment and Rural Affairs website, A Clean Air Strategy for Northern Ireland – Public Discussion Document [downloaded on 19 May 2021]

consultation has not taken place. An update on the work was provided in the in the July 2022 draft UK National Air Pollution Control Programme:

> Preliminary analysis, recommendations and actions have been presented to the Minister. Once they have considered the options and decided on a policy direction, officials will engage with other Departments to develop preferred options and policy positions more fully. Officials will then begin to draft the first Clean Air Strategy for Northern Ireland. This will be a more focused and shorter document than the Discussion Document and will contain proposals relating to policy and other measures which can improve air quality. This draft Clean Air Strategy will be subject to an additional public consultation and due to the cross-cutting nature of the policy area, Executive approval will also be sought at that time.[76]

[76] UK government, Scottish Government, Welsh Government and the Northern Ireland Executive, Draft UK National Air Pollution Control Programme (opens PDF), July 2022

5 Enforcement of air quality legislation

This section provides information about some of the more recent enforcement proceedings against the Government in respect of non-compliance with air quality limit values. This has stemmed both from European Commission infringement proceedings and judicial review proceedings in UK courts. Judicial review is a type of court proceeding in which a judge reviews the lawfulness of a decision or action made by a public body. European Commission infringement proceedings are where a possible infringement of EU law has been identified and is a matter which can ultimately be referred to the Court of Justice. Having now left the EU, the UK Government and the devolved administrations are now putting in place new bodies and procedures which will govern how any future enforcement action against breaches of air quality laws will be taken.

5.1 EU infringement proceedings

As an EU Member State, the UK was required to report air quality data on an annual basis to the European Commission under the Directive on ambient air quality and cleaner air for Europe (2008/50/EC), the "Air Quality Directive".

The Air Quality Directive contained certain flexibility with regard to the deadline for returning air pollution to safe levels. For example, although the original deadline for meeting the NO_2 limit values was 1 January 2010, extensions were agreed by the Commission with some Member States who had notified it of a credible and workable plan for meeting the air quality standards within five years of the original deadline, i.e. to January 2015.[77] Notifications by Member States and Commission decisions on notification are available Commission webpage, Air Quality - Time extensions.

The United Kingdom submitted a notification to the Commission in September 2011 of a postponement (under Article 22(1) of the Air Quality Directive) of the 2010 deadline for attaining the annual limit value and hourly limit value for NO_2 in a number of air quality zones. The Commission accepted the notification for some, but not all of the zones. This was on the grounds that the United Kingdom had not demonstrated that compliance with the limit

[77] European Commission, Press release Brussels, Environment: Commission takes action against UK for persistent air pollution problems, 20 February 2014

value could be achieved by 1 January 2015 or earlier. For further information see "Commission decision of 25 June 2012 (C(2012) 4155 final).[78]

In May 2013 the UK Supreme Court declared that EU Air Quality Directive limits on nitrogen dioxide had been regularly exceeded in 16 zones across the UK.[79] The areas affected were: Greater London, the West Midlands, Greater Manchester, West Yorkshire, Teesside, the Potteries, Hull, Southampton, Glasgow, the East, the South East, the East Midlands, Merseyside, Yorkshire & Humberside, the West Midlands, and the North East.

The Court also noted that air quality improvement plans had estimated that in London compliance with the Directive's standards would only be achieved by 2025 and by 2020 for the other 15 zones.[80] The original deadline in the Directive was for compliance by 2010.

In February 2014 the European Commission began infringement proceedings against the UK for its failure to meet Air Quality Directive targets for NO_2 in the 16 air quality zones (listed above).[81] This action was followed in February 2017 by final warnings to Germany, France, Spain, Italy and the United Kingdom for failing to address repeated breaches of NO_2 limits.[82]

On 17 May 2018 the Commission referred the UK (along with France, Germany, Hungary, Italy and Romania) to the Court of Justice of the EU (CJEU) for "for failure to respect limit values for nitrogen dioxide (NO_2), and for failing to take appropriate measures to keep exceedance periods as short as possible."[83] Further information is available from the Commission press release, "Air quality: Commission takes action to protect citizens from air pollution" 17 May 2018.

On 4 March 2021, the CJEU issued its decision on this case (European Commission v. United Kingdom of Great Britain and Northern Ireland, c-664/18). The CJEU court had continued to oversee the case because proceedings started before the UK's EU exit. The CJEU found that the UK had failed to fulfil its obligations under the provisions of EU Directive 2008/50/EC and that it had failed to ensure that the period of exceedance of limit values was kept as short as possible.

78 Commission decision of 25 June 2012 (C(2012) 4155 final) on the notification by the United Kingdom of Great Britain and Northern Ireland of a postponement of the deadline for attaining the limit values for NO_2 in 24 air quality zones.

79 R (on the application of ClientEarth) (Appellant) v The Secretary of State for the Environment, Food and Rural Affairs (Respondent), [2013] UKSC 25

80 European Commission, Press release Brussels, Environment: Commission takes action against UK for persistent air pollution problems, 20 February 2014

81 European Commission, Press release, Environment: Commission takes action against UK for persistent air pollution problems, Brussels, 20 February 2014

82 European Commission - Press release, Commission warns Germany, France, Spain, Italy and the United Kingdom of continued air pollution breaches, Brussels, 15 February 2017

83 European Commission press release, "Air quality: Commission takes action to protect citizens from air pollution" 17 May 2018

Reporting on the case, the BBC set out what may happen next and highlighted uncertainty about whether fines could be imposed:

> Following today's ruling, if the UK still fails to comply within a "reasonable" period, the European Commission could issue formal notice requiring the UK to remedy the situation.
>
> If the UK fails again, the Commission could bring the matter before the court a second time.
>
> If that happens, fines may be imposed – although it's not clear legally whether the UK could be forced to pay, following Brexit.
>
> In any future cases where the government has breached legal limits, the case would be dealt with by a new UK Office for Environmental Protection.[84]

5.2 Judicial Review

Separate to European Commission infringement proceedings, EU legislation on air quality has also provided the legal framework for the Government's actions to be challenged by private organisations in the UK courts by judicial review.

Proceedings brought by the environmental advocacy charity, ClientEarth, arose out of the admitted and continuing failure of the United Kingdom since 2010 to secure compliance in certain zones with the limits for nitrogen dioxide levels set by European Union law, under the Air Quality Directive (2008/50/EC).[85] Article 13 of this Directive sets limit values "for the protection of human health". In respect of NO_2, certain limits "may not be exceeded" from the relevant date, (1 January 2010).

Following judicial review challenges in 2015, 2016 and 2017 the Government has been directed by the courts to produce and amend a series of plans to reduce nitrogen dioxide (see Box 2 below). For further information about the judicial review challenges see Library briefing paper, Brexit and Air Quality, 21 May 2019.

Box 2: Government plans on NO_2 air quality

A number of different plans to reduce nitrogen dioxide (NO_2) have been published by the UK Government. The plans were formulated following

[84] BBC News, "UK found guilty of dirty air breach by EU court" 4 March 2021

[85] R (on the application of ClientEarth) (Appellant) v The Secretary of State for the Environment, Food and Rural Affairs (Respondent), [2013] UKSC 25

recognition that a number of zones in the UK had not met EU limits on NO_2. The air quality plans were initially submitted to the European Commission with a view to postponement of the 2010 compliance date for meeting the NO_2 limits to 2015. The plans are as follows:

- Air Quality Plans for the achievement of EU air quality limit values for nitrogen dioxide (NO2) in the UK: UK Overview Document, **September 2011**. This was subsequently replaced by:
- Improving air quality in the UK, Tackling nitrogen dioxide in our towns and cities: UK overview document, **December 2015**. This in turn was replaced by:
- UK plan for tackling roadside nitrogen dioxide concentrations: Detailed plan, **July 2017**. This is the Government's current approach to setting out how the UK will be reducing roadside nitrogen dioxide concentrations.

Following judicial review proceedings in relation to the July 2017 Plan, the High Court ruled, on 21 February 2018, that a supplement to the 2017 Plan should be produced by the Government by 5 October 2018. This was published on 5 October 2018: Supplement to the UK plan for tackling roadside nitrogen dioxide concentrations.

Since publication of the October 2018 Supplement to the UK plan for tackling roadside nitrogen dioxide concentrations the Government has issued directions requiring specific local authorities to take specified actions to plan for and take actions aimed at delivering compliance with nitrogen dioxide limit values in the shortest possible time. These are available on the GOV.UK website, Air quality plan for nitrogen dioxide (NO2) in UK (2017): air quality directions.

5.3 Future enforcement bodies and procedures

As a result of leaving the EU, environmental law and policy (including on air quality), which was derived from the EU, will no longer be subject to the oversight of EU institutions and the Court of Justice of the European Union (CJEU). Environmental campaigners had raised concerns following the Brexit referendum that this would leave a "governance gap".[86] As environmental matters are generally devolved policy areas, each government within the UK has now put forward proposals to establish new environmental governance bodies to replace the role played by the EU institutions.

[86] See for example, Greener UK, The governance gap: why Brexit could weaken environmental protections, August 2017

England and Northern Ireland

The Environment Act 2021 provided the legal basis for the establishment of a new environmental enforcement body in England and Northern Ireland called the Office for Environmental Protection (OEP). It has been fully operational in England as a non-departmental public body sponsored by Defra from January 2022. Following the passing of the Environment (2021 Act) (Commencement and Saving Provision) Order (Northern Ireland) 2022 the OEP became functional in Northern Ireland from 28 February 2022.[87]

The OEP has a range of monitoring and governance duties and holds enforcement powers in respect of environmental law. These are similar functions those that were held by European institutions until the end of the EU withdrawal transition period. The OEP's remit also covers the scrutiny of government's progress against Environmental Improvement Plan (the 2018 25 Year Environment Plan) and targets; and monitoring the implementation of environmental law.[88] The OEP is able to investigate and enforce potential breaches of environmental law in England and Northern Ireland, and of reserved areas of environmental law across the United Kingdom.

The OEP has powers in the form of being able to issue "information notices" and "decision notices". An information notice describes the alleged failure of compliance with environmental law and is a means by which the OEP can formally request information from the relevant Minister or authority concerned in relation to a suspected failure. A decision notice describes a failure of a public authority to comply with environmental law, and sets out the steps the OEP considers the authority should take in relation to the failure.

The OEP can also bring legal proceedings in the High Court against a public authority regarding an alleged breach of environmental law in accordance using a procedure called "environmental review". The remedies available to the Court are set out in the (then) Bill's explanatory notes, as follows:

> ...it will have the full suite of remedies, other than damages, available to it as on a judicial review, but only if it is satisfied that granting such a remedy would have neither of the effects described in paragraphs (a) and (b). These remedies include a declaration, quashing, prohibiting and mandatory orders, and injunctions. Damages are not available in environmental reviews because the OEP, as the only applicant, would have no cause to seek compensation for damages personally suffered where the claimant in a traditional judicial review might. As such, this remedy is unnecessary.[89]

Although damages are ruled out as a remedy, if a public authority then failed to comply with one of the above remedies ordered by the High Court, they could be held in contempt of court, which may then result in fines or other sanctions.

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87 DAERA, Assembly approves new environmental provisions for Northern Ireland, 7 March 2022

88 Interim Environmental Governance Secretariat website, OEP and Environment Bill [accessed 19 May 2021]

89 Explanatory Notes to the Environment Bill 2019-21, para 294

Further information about the OEP and how to submit a complaint about a failure of a public authority to comply with environmental law, is available from the Office for Environmental Protection website.

When the then Environment Bill went through its Parliamentary stages concern was expressed about whether the OEP would have comparable powers, to hold the government to account, to those held by the EU institutions it replaces. For further information about these concerns, and the government's response to them, see Library briefing, Commons Library analysis of the Environment Bill 2019-20.

Scotland

In Scotland the UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021 (the "Continuity Act"), made provision for a new independent body called Environmental Standards Scotland (ESS) to be established.[90] It has been established as a non-Ministerial office and is directly accountable to the Scottish Parliament for the delivery of its functions.

The Continuity Act 2021 provides for a range of functions and powers for ESS. It has the power to require information and may issue a written 'information notice' to a public authority requiring it to provide such information as ESS reasonably requires. It also has three specific enforcement powers:

- Power to prepare an "improvement report" if ESS considers that a public authority has failed to comply with environmental law, make effective environmental law or implement or apply environmental law effectively when carrying out its functions. It is a report that sets out the details of the alleged failure and recommends measures that the public authority should take to comply with environmental law, or to improve the effectiveness of environmental law, or how it is applied.[91]

- Power to issue a "compliance notice", if ESS considers that a public authority is failing to comply with environmental law, or has failed to comply with environmental law and it is likely that the failure will be repeated or be continued. Another requirement is that the failure has caused, is causing or is at risk of causing environmental harm. A compliance notice is a notice requiring the public authority to whom it is issued to take the steps set out in the notice in order to address its failure to comply with environmental law.[92]

90 Scottish Government website, Environmental Standards Scotland [downloaded on 19 May 2021]

91 Explanatory Notes to the UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021, section 26

92 Explanatory Notes to the UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021, section 31

- Power to apply for judicial review of a public authority's conduct or intervene in an existing case.[93]

Further information about ESS, its board, chair, mission statement and vision and how to raise a complaint is available from the Environmental Standards Scotland website. Further information is also provided by the Scottish Parliament Information Centre briefing, UK Withdrawal from the European Union (Continuity) (Scotland) Bill - Part 2 -Environmental Principles and Governance, August 2020.

Wales

The Welsh Government has not yet established a new environmental governance body for Wales but has indicated its intention to do so.[94] In a November 2020 letter from Lesley Griffiths AS/MS, Minister for Environment, Energy and Rural Affairs to Professor Robert Lee, Chair of the Environmental Governance Stakeholder Task Group, the Minister identified establishing a new governance body as her preferred option, based on a commission/commissioner model.[95]

The Environmental Governance Stakeholder Task Group[96] reported in March 2020. Its recommendations for an independent environment commission were summarised as follows:

> The preference of the Task Group was for an independent Environment Commission supported by expert panels as needed, discharging a range of functions beginning with complaints-handling and advice and extending into enforcement activity following appropriate scrutiny and investigation. The Commission would review the workings of devolved environmental law in Wales under its 'implementation' function and would undertake wider monitoring and responding to environmental policy in Wales, keying in as necessary to existing structures. In addition to an annual report, it would have the capacity to produce expert reports on systemic issues relating to the implementation and workings of environmental law in Wales. It would have an oversight function in relation to environmental objectives and principles within Wales and would partner as appropriate with other governance bodies in the UK. It was thought that there was room to articulate the Aarhus Convention rights alongside the principles and the new governance framework.[97]

93 Explanatory Notes to the UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021, section 38

94 Letter from Lesley Griffiths AS/MS, Minister for Environment, Energy and Rural Affairs to Professor Robert Lee, Chair Environmental Governance Stakeholder Task Group, 19 November 2020

95 Letter from Lesley Griffiths AS/MS, Minister for Environment, Energy and Rural Affairs to Professor Robert Lee, Chair Environmental Governance Stakeholder Task Group, 19 November 2020

96 Convened by the Welsh Government in July 2019 the Group was tasked to assist with the development of options for environmental governance in Wales following Brexit.

97 Environmental Governance Stakeholder Task Group, Environmental Governance in Wales Post Exit from the European Union, March 2020

The Minister accepted many of the recommendations made by the task group, including those relating to the establishment of a new commission for the environment and for it to have powers to initiate and environmental review.[98]

As temporary measure, for two years from February 2021, the Welsh Government has appointed environmental lawyer, Dr Nerys Llewelyn Jones as an Interim Environmental Protection Assessor for Wales (IEPAW).[99] Concerns about the functioning of environmental laws in Wales can be sent to the IEPAW. The Welsh Government has provided information about what this means in practice:

> **What do we mean by 'functioning'?**
>
> Concerns about the functioning of environmental law fall into three broad categories.
>
> - No longer delivers intended objectives and outcomes. Either because it is outdated or requires updating or it no longer functions in a way which protects the environment or enables us to deliver our ambitious environmental outcomes.
>
> - Guidance or information about the law is not accessible. The quality and availability of information or guidance impedes deliverability or operability by intended users.
>
> - Practical delivery of the law is impeded. Where there are improvements which could be incorporated as a result of advances in science or technology or where barriers exist which frustrate or prevent practical delivery of law.[100]

The guidance from the Welsh Government is that a challenge, in relation to compliance with environmental law, should be made by pursing existing means of redress (for example judicial review) following appropriate independent legal advice. For further information see Welsh Government, Raising a concern about the functioning of environmental law, updated 2 September 2022.

98 Welsh Government, Written Statement: Environmental Governance Stakeholder Task Group Report, 19 November 2020

99 Welsh Government, Welsh Government appoints new environmental protection assessor, 24 February 2021

100 Welsh Government, Raising a concern about the functioning of environmental law, 5 May 2021 update version

6 Recent and forthcoming legislative changes

The UK Government's Environment Act 2021 has made, and will further introduce, changes to air quality legislation. Part 1 will require the Government to set legally binding environmental targets for England in four priority areas including air quality, as well as an additional target on fine particulate matter (PM2.5). The Government plans to set two air quality targets relating to $PM_{2.5}$, as this is considered to be the air pollutant of greatest harm to human health. It is proposed that one target will be based on annual mean concentration of $PM_{2.5}$, and the other would be on population exposure reduction.

Part 4 of the Act deals with air quality and has amended the requirements and management of Local Air Quality Management Frameworks. It also provides local authorities with greater powers in smoke control areas and includes provisions to require the recall of motor vehicles on environmental grounds.

The Welsh Government has published a White Paper on a Clean Air (Wales) Bill, presenting proposals for the Bill before drafting legislation. Key proposals for this legislation include a requirement for a Clean Air Plan or Strategy to be reviewed at least every 5 years and powers to set air quality targets, including for $PM_{2.5}$. It would also make amendments to the Local Air Quality Management Regime.[101]

Further information about these legislative provisions in England and Wales is set out below.

6.1 The Environment Act 2021

Long-term air quality targets

The Environment Act 2021 will establish a new framework for setting long-term, legally binding environmental targets in England. One of these targets must cover air quality. The minimum duration for a long-term target is 15 years. Long-term targets will be supported by interim targets, which will set a five-year trajectory towards meeting the long-term targets. The then Bill's accompanying policy paper states that a new statutory cycle of target setting, monitoring, planning and reporting will "help deliver significant, long

[101] Welsh Government, White Paper on a Clean Air (Wales) Bill, January 2021, p10

term environmental improvement and ensure government can be held to account for its actions."[102]

In addition to the long-term air quality target, the Environment Act 2021 also requires the Secretary of State to set a target specifically for an annual mean concentration level of fine particulate matter ($PM_{2.5}$) in ambient air. The $PM_{2.5}$ air quality target may, but is not required to be, a "long-term target".[103]

The Environment Act itself did not specify what the targets should be. In March 2022 the Government published a consultation on its proposed approach. It proposed two air quality targets, both of which relate to $PM_{2.5}$:

- Annual Mean Concentration Target ('concentration target') – a target of 10 micrograms per cubic metre ($\mu g\ m^{-3}$) to be met across England by 2040.

- Population Exposure Reduction Target ('exposure reduction target') – a 35% reduction in population exposure by 2040 (compared to a base year of 2018).[104]

In the consultation document the Government set out the estimated health benefit of these targets:

> Reducing PM2.5 to meet these ambitious targets will have a significant benefit on health. A reduction in population exposure in England of just 1 μgm^{-3} could prevent an estimated 50,000 cases of coronary heart disease, 16,500 strokes, 9,000 cases of asthma and 4,000 lung cancers over 18 years.[105]

The consultation document noted that an impact assessment, an air quality targets evidence report and a "defining target metrics; assessment method" report will all be published "shortly" and will be available from the consultation landing page.[106] The Government also highlighted that it is exploring the role local authorities will play in helping to meet these targets, as part of its Air Quality Strategy review. This review will be consulted on in "late 2022", and a revised National Air Quality Strategy will be published in 2023.[107] The Government aims to have drafted its target legislation, to be laid before Parliament by 31 October 2022.[108]

These targets sit in the context of other air quality targets and guidelines set by the EU and the WHO. The EU Air Quality Directive sets an annual mean concentration for $PM_{2.5}$ of 25 $\mu g/m^3$ from 2015 and 20 $\mu g/m^3$ from 2020. The WHO annual mean guideline limit set in 2005 was 10 $\mu g/m^3$ and, from September 2021 is reduced to 5 $\mu g/m^3$. The Government has previously done some work examining whether it would be feasible to adopt the previous 2005 World Health Organization (WHO) target for $PM_{2.5}$ of an annual guideline level

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102 HM Government, Environment Bill policy statement, 30 January 2020

103 Clause 2(2), Environment Bill, Bill 3 2019-20

104 HM Government, Consultation on Environmental Targets, 16 March 2022

105 HM Government, Consultation on Environmental Targets, 16 March 2022, p34

106 HM Government, Consultation on Environmental Targets, 16 March 2022

107 HM Government, Consultation on Environmental Targets, 16 March 2022, p36

108 HM Government, Consultation on Environmental Targets, 16 March 2022, p6

of 10 µg/m^3. As a result of this work, in July 2019, the Government concluded that "it would be technically feasible to meet the former WHO guideline level for $PM_{2.5}$ across the UK in the future."[109]

On 19 November 2020 the Air Quality Expert Group[110] published a Call for Evidence - Future PM2.5 concentrations in England. This was to help inform the setting of targets under the then Environment Bill. This call for evidence closed on 17 December 2020. In July 2021 the Government published Call for Evidence on Future PM2.5 Concentrations Summary of responses and government response (PDF). The Government response said that it would, "take into consideration the information and recommendations provided by AQEG, when developing the evidence for the air quality targets."[111]

A Defra in the Media blog piece in March 2022, Environment Act 2021: environmental targets, noted that there had been some criticism in the press that the Government's proposed targets are not as stringent as the September 2021 WHO target. The blog highlighted the Government's view that it would not be possible to achieve the WHO's target in many locations in England, "due to the level of natural PM2.5 and pollution blown in from outside the country."[112]

Local air quality management framework

The Environment Act 1995 (as amended) requires the Secretary of State to produce a national air quality strategy (covering the whole of Great Britain). The 1995 Act requires the Secretary of State to keep the Strategy under review but does not specify a time frame by which this must happen. The latest national air quality strategy was produced in 2007: the Air Quality Strategy for England, Scotland, Wales and Northern Ireland.

The Environment Act 1995 also established the local air quality management (LAQM) regime. Section 82 of the Act requires local authorities to review air quality in their respective areas and assess whether the air quality standards specified in the national air quality strategy are being achieved. For areas where specified standards and objectives are not being met, authorities are expected to declare Air Quality Management Areas (AQMAs) and then prepare action plans. The action plan must set out the time by which the local authority proposes to implement the proposed measures in the plan.

109 HM Government, Assessing progress towards WHO guideline levels of PM2.5 in the UK, 23 July 2019, p9

110 The AQEG is an Expert Committee to Defra that provides independent scientific advice on air quality. It does not advise on health impacts.

111 HM Government, Call for Evidence on Future PM2.5 Concentrations Summary of responses and government response, July 2021, p6

112 Defra in the Media, Environment Act 2021: environmental targets, 17 March 2022

From 1 May 2022, schedule 11 of the Environment Act 2021 has amended the Environment Act 1995 to:[113]

- Require the Secretary of State to report annually to Parliament on an assessment of progress made in meeting air quality targets in England and steps taken to meet those targets.

- Specify factors that local Air Quality Management Areas and corresponding action plans must identify and/or include. For example, action plans must set out how local authorities will exercise functions in order to secure and maintain air quality standards, what measures they will take and the date by which they will be carried out (amongst other things).

- Impose a duty on "air quality partners" (an air quality partner can include bodies exercising public functions where they have been designated in regulations made by the Secretary of State),[114] to cooperate with the local authority, including requiring air quality partners to provide measures they would take to contribute to the action plan being developed by a local authority.

- Make provisions regarding the collaboration between district and county councils in relation to air quality action plans, with similar provisions made for London and combined authorities. District councils have the responsibility to declare LAQMs and prepare action plans.

- Introduce a requirement for local authorities to have regard to any guidance published by the Secretary of State regarding local air quality standards and the local authorities' functions in that regard.

In October 2020 the Government published a consultation, Local air quality management: public authorities call for evidence, (relevant to Part 4 of the Act). It sought views on which public authorities should be considered for designation by the Environment Secretary as 'Relevant Public Authorities'. A relevant public authority may then be required to co-operate with local authorities acting as an 'Air Quality Partner' within the Local Air Quality Management Framework. On 18 August 2022 the Government announced that National Highways would become the first designated "Relevant Public Authority". The Government said that this would, "see a more consistent approach to meeting local air quality objectives on road networks."[115]

Also announced on 18 August 2022, following on from the Government's March 2022, Consultation on the review of the Local Air Quality Management Policy Guidance, it was confirmed that the Local Air Quality Management (LAQM) Technical Guidance, (which is designed to support local authorities in

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113 By virtue of Environment Act 2021 (Commencement No 2 and Saving Provision) Regulations 2022 (SI 2022/48)

114 *Memorandum from the Department for the Environment, Food and Rural Affairs to the Delegated Powers and Regulatory Reform Committee*, 30 Jan 2020, para 281

115 HM Government, Package of measures introduced to improve air quality, 18 August 2022

carrying out their duties under the Environment Act), has also been updated to include:

- A new requirement for local Air Quality Action Plans to include a timeline of clear actions that ensure Air Quality Objectives (pollution concentration limits) are met and air quality standards improve in local areas.
- The requirement for an Air Quality Management Area to be declared within 12 months of identifying an exceedance of the air quality objectives to ensure that local councils develop Air Quality Actions Plans more quickly.
- The requirement for local authorities to produce an Air Quality Action Plan within 18 months of declaring an Air Quality Management Area.
- A new reminder and warning alert system to increase local council compliance with reporting on actions they are taking to improve air quality.[116]

Smoke control areas

The Clean Air Act 1993 (as amended) is the main legislative framework for the control of pollution from domestic solid fuel burning. The Government has said that the domestic burning of house coal, smokeless solid fuels and wood is the single largest source of harmful particulate matter emissions in the UK, at around 40% of the total in 2015.[117]

Part III of this Act allows local authorities to make smoke control areas. In a smoke control area someone can only burn fuel on the list of authorised fuels, or a specified "smokeless" fuels, unless they are using an exempt appliance (as listed on the Defra website). For further information see the Gov.uk website Smoke control areas: the rules. The Act provides for a power for local authorities to designate smoke control areas, but it is not a duty – local authorities are not obliged to designate such areas.

On 30 January 2018 the Government issued a call for evidence seeking views on restricting the use of house coal, smokeless coal, manufactured solid fuels and wet wood used for heating homes,[118] which was followed by a further consultation in October 2018.[119]

Following this consultation process, the Environment Act 2021 included provisions relating to England that, from 1 May 2022, have:[120]

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116 HM Government, Package of measures introduced to improve air quality, 18 August 2022

117 Defra, Call for Evidence - Domestic Burning of House Coal, Smokeless Coal, Manufactured Solid Fuel and Wet Wood, 30 January 2018.

118 Defra, Call for Evidence - Domestic Burning of House Coal, Smokeless Coal, Manufactured Solid Fuel and Wet Wood, 30 January 2018.

119 Defra, Consultation on cleaner domestic burning of solid fuels and wood, 12 October 2018.

120 By virtue of the provisions of regulation 4 of the Environment Act 2021 (Commencement No 2 and Saving Provision) Regulations 2022

- allowed local authorities to issue financial penalties for emitting smoke from a chimney in a smoke control area in England. It means that in England, emitting smoke from a chimney (as defined) is no longer a criminal offence, but rather subject to a civil penalty notice (a fine). The (then) Bill's Explanatory Notes state that this makes enforcement "quicker, simpler and more proportionate".[121]

- Created a new offence of selling a controlled solid fuel by retail without taking reasonable steps to notify potential customers that it is an offence to purchase the fuel for use in circumstances where a smoke control order applies. The Explanatory Notes state that "reasonable steps" could include "putting an informative sign next to the fuels and at the cash register, or including a notification during online checkout."[122]

- Removed the financial limit on penalties for the sale of controlled fuels for delivery to a building to which a smoke control order applies. The penalty is at the discretion of the Magistrates Court.

- Allowed local authorities to extend their Smoke Control Areas to include moored vessels.

Statutory nuisance for smoke emissions from private dwellings

The Environment Act 2021 has also amended the Environmental Protection Act 1990 (EPA) so that smoke emitted from a private dwelling in a smoke control area in England could be defined as a statutory nuisance if it were "prejudicial to health or a nuisance".[123] Previously, smoke emitted from a chimney of a private dwelling within a smoke control area was an exemption from this statutory nuisance provision.

6.2 White Paper on a Clean Air (Wales) Bill

In January 2021 the Welsh Government published a White Paper on a Clean Air (Wales) Bill, presenting proposals for the Bill before drafting legislation. Views on the white paper were sought until 7 April 2021 and a summary of response is awaited.[124] The white paper was accompanied by an Integrated Impact Assessment and a Regulatory Impact Assessment.

The white paper sets out the aim of the Bill as follows:

> The aim of the Bill will be to give effect to a number of actions under the Clean Air Plan for Wales: Healthy Air, Heathy Wales. We are developing proposals for

[121] Environment Bill Explanatory Notes, para 36.

[122] Environment Bill, Explanatory Notes, para 1451.

[123] By virtue of the provisions of regulation 4 of the Environment Act 2021 (Commencement No 2 and Saving Provision) Regulations 2022 (SI 2022/48)

[124] Welsh Government, White Paper on a Clean Air (Wales) Bill, 29 June 2021 update version

> a Bill to enhance existing legislation and bring forward new legislation to deliver air quality improvements.
>
> Poor air quality can adversely affect health by exacerbating underlying health issues or causing new health issues. Vulnerable groups are particularly susceptible to air pollution and we recognise there are unique issues around children's exposure to air pollutants.
>
> Through the Bill we are seeking to deliver a healthier and more resilient Wales. Measures to set legally binding air quality targets and control emissions will drive changes in improvements to the management of air quality and the air we breathe in our communities. The proposals in the Bill have been developed to provide direct benefits for public health, habitats and biodiversity.
>
> This document is set within the context of the sustainable development principle set out within the Well-being of Future Generations (Wales) Act 2015, which places a duty on all Public Bodies in Wales to consider how their actions might impact in the long term, and how they will alleviate problems of poverty, health inequalities and climate change.[125]

The key measures proposed for the Bill are summarised as follows:

> Strategic Air Quality Management Approach
>
> - a requirement for a Clean Air Plan or Strategy to be reviewed at least every 5 years; and
> - Powers to set air quality targets, including for PM2.5.
>
> Legislative and regulatory air quality management systems
>
> - Clarified and enhanced Local Air Quality Management Regime (LAQM);
> - consolidated powers to implement Clean Air Zones or Low Emission Zones;
> - strengthened powers to address vehicle idling;
> - enhancing existing powers for smoke control linked to tackling air pollution from domestic burning (PM2.5); and
> - A duty on inter-sectoral workforces to adhere to guidance to empower them to tackle air pollution.[126]

[125] Welsh Government, White Paper on a Clean Air (Wales) Bill, January 2021, p8
[126] Welsh Government, White Paper on a Clean Air (Wales) Bill, January 2021, p10

7 Future EU air quality policy

7.1 Revision of the Ambient Air Quality Directives

In November 2019, the EU Commission published a Fitness Check of the Ambient Air Quality Directives.[127] It concluded that these Directives have been partially effective in improving air quality, but not fully effective, and not all their objectives have been met. It concluded that the remaining gap to achieve air quality standards is too wide in certain cases.[128] The European Commission therefore intends to revise the Ambient Air Quality Directive, to align air quality standards more closely with the recommendations of the World Health Organization, subject to future consultation. An Inception Impact Assessment outlines the approach towards Commission adoption, planned for the second half of 2022. Further information is available on the European Commission webpage, Revision of the Ambient Air Quality Directives.

7.2 The EU Green Deal

In December 2019 the European Commission published a communication called The European Green Deal.[129] It is described as resetting "the Commission's commitment to tackling climate and environmental-related challenges that is this generation's defining task."[130] It presents an initial roadmap of the key policies and measures needed to achieve a number of goals. Commentators have stated that they expect the European Green Deal to "significantly alter EU environmental law over the next five years".[131]

On air quality the Green Deal specifically noted the plans to revise air quality standards:

> The Commission will draw on the lessons learnt from the evaluation of the current air quality legislation. It will also propose to strengthen provisions on monitoring, modelling and air quality plans to help local authorities achieve cleaner air. The Commission will notably propose to revise air quality

[127] European Commission, Fitness check of the ambient air quality directives, SWD(2019) 427 final, 28 November 2019
[128] European Commission, inception impact assessment - Ares(2020)7689281, 2020, p1
[129] European Commission website, A European Green Deal [downloaded on 30 June 2021]
[130] European Commission, Communication from the Commission, The European Green Deal, COM(2019) 640 final, 11 December 2019
[131] "Q&A: What's at stake for the environment in post-Brexit talks" ENDSReport, 21 February 2020 [subscription required]

> standards to align them more closely with the World Health Organization recommendations.[132]

As part of its Green Deal work, on 12 May 2021, the European Commission adopted an EU Action Plan: "Towards Zero Pollution for Air, Water and Soil". This Action Plan provides more detailed information on proposals for specific policy areas. On outdoor air quality, it again proposed changes to the EU's air quality standards, to align them more closely with 2005 WHO recommendations:

> ...in 2022 the Commission will propose that the EU's air quality standards be aligned more closely with the upcoming WHO recommendations and that provisions on monitoring, modelling and air quality plans be strengthened to help local authorities, while improving the overall enforceability of the regulatory framework. In parallel, the Commission will introduce stricter requirements to tackle air pollution at source, such as from agriculture, industry, transport, buildings and energy, including through a number of European Green Deal measures and strategies (such as sustainable and smart mobility, renovation wave, and farm to fork).[133]

The EU Action Plan also set out plans to assess whether further legislation is needed to cap ammonia emissions and to consider the need to limit $PM_{2.5}$ emissions from road vehicles.[134]

[132] European Commission, Communication from the Commission, The European Green Deal, COM(2019) 640 final, 11 December 2019, section 2.1.8

[133] European Commission, Pathway to a Healthy Planet for All EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil', COM(2021) 400 final, 12 May 2021, section 2.2

[134] European Commission, Pathway to a Healthy Planet for All EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil', COM(2021) 400 final, 12 May 2021, section 2.2

8 Health, inequality and environmental concerns

Academic research has found big differences in air pollution across communities in England, with deprived areas the worst affected. Children, the elderly and individuals with pre-existing cardio and respiratory conditions are particularly vulnerable to the effects of poor air quality.[135] In 2020 a coroner found that air pollution was a significant contributory factor to the death of 9-year-old child.[136]

The COVID-19 pandemic has highlighted this concern further in relation to whether there is a link between poor air quality and COVID-19 outcomes.[137] Researchers are also beginning to examine the effect of lockdown measures on air quality and work out what any findings mean for future policy formation.[138]

The context of Brexit has also led commentators to question what the future for UK air quality standards and enforcement looks like and whether any new domestic legislation will be as robust as that provided for by the EU.[139]

The following sections set the above issues and responses to them out in further detail.

8.1 The COVID-19 pandemic

Investigating the correlation between air quality and COVID-19 mortality

It is widely accepted that children, the elderly and individuals with pre-existing cardio and respiratory conditions are particularly vulnerable to the effects of poor air quality.[140] In turn, the NHS has warned that those people

[135] See for example, HM Government, Clean Air Strategy 2019, p27
[136] London Inner South Coroner's Court, Inquest touching the death of Ella Roberta Adoo-Kissi Debrah, December 2020
[137] COMEAP, COMEAP's on-going work on air pollution and COVID-19, undated
[138] Air Quality Expert Group, Report: Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, July 2020
[139] Greener UK, Final Risk Tracker June 2016-March 2021: air pollution tab, March 2021
[140] See for example, HM Government, Clean Air Strategy 2019, p27

with certain pre-existing conditions, such as respiratory illnesses, may have an increased vulnerability to COVID-19.[141]

To investigate this possible link further, the UK Health Security Agency and other Government departments are undertaking reviews, which includes "assessing whether there is any evidence of an association between exposure to gaseous pollutants or particulates and COVID-19 mortality in the United Kingdom."[142] In January 2021 Defra Minister Rebecca Pow set out further how the Government was examining this issue:

> Defra continues to work with the Department of Health and Social Care (DHSC) regarding the relationship between air quality and health, recently considering the specific relationship between Covid-19 deaths and air quality. I met with Jo Churchill, Parliamentary Under Secretary of State at DHSC, to discuss this important issue on 13 November 2020. We will continue working closely on this issue, as our understanding of the role air quality has to play in the Covid-19 pandemic continues to evolve, taking into account the many other factors influencing health inequalities.[143]

The independent advisory body to Government on how air pollution impacts on health, the Committee on the Medical Effects of Air Pollution (COMEAP), has set out that while further work investigating correlations in this area is needed, that evidence suggests it, "is likely" that that exposure to air pollutants increases the likelihood or severity of COVID-19 infection:

> A number of epidemiological and other studies investigating possible links between air pollution and COVID-19 mortality have been reported. Most of these are currently available as 'pre-prints' and have not yet been subjected to the rigours of scientific peer review. It is difficult to draw causal conclusions from the available studies because many of the risk factors for disease transmission and severity are likely to be correlated with concentrations of air pollutants. The studies which report correlations without appropriate attempts to adjust for confounding are not informative. In addition, studies of the associations of COVID-19 disease with both past and contemporary air pollution exposure are limited by the current incomplete understanding of the factors controlling the transmission and progression of the disease, and especially individual risk factors. Nonetheless although there is, as yet, no clear empirical evidence that exposure to air pollutants increases the likelihood or severity of COVID-19 infection, knowledge of the impacts of air pollution on health suggests that this is likely. In addition, infection may temporarily increase subsequent responses to air pollution in those with pre-existing conditions.[144]

A paper by the Office for National Statistics (ONS) examining the potential relationship between long term air pollution exposure and COVID-19 mortality rates was published in August 2020, based on the available evidence at that time, Air pollution and COVID-19 mortality rates. The paper highlighted the

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[141] NHS, Who is at high risk from coronavirus (clinically extremely vulnerable) [downloaded on 7 July 2021]

[142] PQ Coronavirus: Nitrogen Oxides, UIN HL4694, tabled on 19 May 2020

[143] PQ Air pollution: Coronavirus, UIN 133171, tabled on 30 December 2020

[144] COMEAP, COMEAP's on-going work on air pollution and COVID-19, undated

possibility of a changing correlation between air quality and mortality over the course of the pandemic:

> We have published detailed analysis showing that deaths involving COVID-19 were more common in highly polluted areas, particularly early in the pandemic.
>
> However, the correlation between pollution and mortality fell as deaths rose and lockdown was introduced, before levelling off in early May.
>
> The link between early COVID-19 deaths and exposure to dirty air was partly down to the outbreak in London (where pollution levels are generally higher than the rest of the country).
>
> Up to the week when lockdown began (week ending 27 March 2020), 45% of COVID-19 deaths in England had occurred in the capital. By the week ending 12 June (cut-off date for this analysis), this had fallen to 18%.
>
> As the virus spread across the country and deaths became more evenly distributed, the correlation between air pollution exposure and COVID-19 mortality decreased.[145]

The ONS concluded that ultimately, its analysis was inconclusive, and that further work would need to be done to control for other factors (including ethnicity) that may impact on the correlation:

> To disentangle factors such as pollution and ethnicity, and their contribution to COVID-19 mortality, we would need to identify detailed characteristics of the individuals who have died from COVID-19. While we hope to publish this kind of analysis in future, the data and modelling required take much longer to put together.[146]

In answer to a July 2021 PQ the Government said that Public Health England (now the UK Health Security Agency) had not undertaken any direct modelling on the effect of air pollution on hospitalisations and deaths for COVID-19.[147]

Air pollution during lockdown

Questions have been raised about whether the reduced economic activity and use of road transport during lockdowns over the course of the COVID-19 pandemic has affected concentrations of air pollution. A number of studies and report have since examined the issue. Some of the key ones are set out below.

Air Quality Expert Group

In April 2020 the Air Quality Expert group (an expert committee that provides independent scientific advice to government), acting on a request from Defra, called for evidence from the research and air quality management user communities to examine seven areas of scientific uncertainty related to the

145 ONS, Air pollution and Covid-19 mortality rates, 13 August 2020
146 ONS, Air pollution and Covid-19 mortality rates, 13 August 2020
147 PQ Coronavirus: air pollution, UIN 28366, tabled on 6 July 2021

potential interactions between COVID-19 and UK air pollution. These seven areas were:

> 1. What sectors or areas of socioeconomic activity do you anticipate will show a decrease in air pollution emissions, and by how much? Are there any emissions sources or sectors which might be anticipated to lead to an increase in emissions in the next three months?
>
> 2. Can you provide estimates for how emissions and ambient concentrations of NOx, NO2, PM, O3, VOC, NH3 etc. may have changed since the COVID-19 outbreak? Where possible please provide data sets to support your response.
>
> 3. What changes do you anticipate in indoor air quality as a result of the COVID-19 pandemic?
>
> 4. How might public exposure to air pollution have changed as a consequence of recent restrictions on movement?
>
> 5. How might altered emissions of air pollutants over the next three months affect UK summertime air quality?
>
> 6. Based on what is already known about air pollutants as respiratory irritants or inflammatory agents, can any insights be gained into the impact of air quality on viral infection?
>
> 7. Are there any insights that can be gained from aerosol science on possible viral transmission mechanisms?[148]

The Air Quality Expert Group published its report in July 2020, Report: Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK. These findings, based on non-peer reviewed observational data, showed evidence there was a drop in the emissions and concentrations of some pollutants. The measured drop in emissions varied by pollutant. Nitrogen dioxide levels showed a consistent drop while $PM_{2.5}$ exhibited a more variable pattern:

> The most pronounced changes in UK air quality during lockdown have been in the urban environment, notably for nitrogen oxides (NOx). Once weather effects are accounted for, mean reductions in urban NOx averaged over the lockdown period considered have been typically 30-40%, with mean NO2 reductions of 20- 30%. In general, NOx and NO2 reductions have been greater at roadside than at urban background sites. These reductions would typically correspond to decreases in concentrations of 10-20 μg m-3 if expressed relative to annual averages.
>
> Meteorological conditions have led to higher PM2.5 during lockdown than the average experienced in equivalent calendar periods from previous years. Analysis combining observations and models indicates however that PM2.5 concentrations were of the order 2 - 5 μg m-3 lower in Southern England than would have been expected under a business-as-usual emissions scenario. The

[148] Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, 7 April 2020

> changes to UK PM2.5 in terms of contributing sources and transboundary influences have yet to be determined.[149]

National Centre for Atmospheric Science

Scientists from the National Centre for Atmospheric Science – based at the Wolfson Atmospheric Chemistry Laboratory and supported by the Natural Environment Research Council (NERC) – compared air pollution level in ten UK cities from spring 2020 to previous averages for that time from the past five years. Their analysis found that levels of nitrogen dioxide and fine particulate matter were "significantly lower than the levels normally seen at this time of year in most of the UK's largest cities."[150]

A later article set out their analysis of air pollution during the winter lockdown in early 2021.[151] This research concluded that air pollution levels fell across the UK during the winter lockdown, but they did not fall as far as during the first lockdown in spring 2020:

> Research led by the National Centre for Atmospheric Science and University of York shows that nitrogen dioxide levels dropped by around 28% between January and March this year.
>
> By comparison, nitrogen dioxide fell by around 52% between March and May last year.
>
> Nitrogen dioxide is a pollutant that, in urban areas, is primarily caused by vehicles. It may be surprising then, that despite both lockdowns having a similar impact on transport, levels of nitrogen dioxide remained higher throughout the winter period.
>
> Scientists believe that the disparity is likely caused by increasing household heating emissions in winter as people continue to work from home, and higher exhaust emissions from cars running in colder conditions.
>
> Dr Will Drysdale, part of the research team at the Wolfson Atmospheric Chemistry Laboratory, says the key difference between each lockdown is the change in weather.
>
> "Colder temperatures influence our activities, which in turn lead to higher emissions. This seems to have muted the reduction in air pollution over the winter lockdown."[152]

European Environment Agency

The European Environment Agency (EEA) has also examined air pollution in the context of Covid-19 related lockdowns. An article by the EEA updated in

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149 Air Quality Expert Group, Report: Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, July 2020, p8

150 National Centre for Atmospheric Science, Air pollution falling across UK cities, latest data shows, 31 March 2020

151 National Centre for Atmospheric Science, Winter lockdown had less impact on UK air pollution than first lockdown, 26 April 2021

152 National Centre for Atmospheric Science, Winter lockdown had less impact on UK air pollution than first lockdown, 26 April 2021

May 2021 found that concentrations of nitrogen dioxide had decreased in many European cities with lockdown measures in place, but that a decrease in fine particulate matter was not consistent. It sets out how other factors, such as weather conditions may also affect results:

> Data from EEA member countries show how concentrations of nitrogen dioxide (NO2) — a pollutant mainly emitted by road transport — have decreased in many European cities where lockdown measures have been implemented.
>
> Although a decrease in concentrations of fine particulate matter (PM2.5) may also be expected, a consistent reduction cannot yet be seen across European cities. This is likely due to the fact that the main sources of this pollutant are more varied, including at European level the combustion of fuel for the heating of residential, commercial and institutional buildings, industrial activities and road traffic. A significant fraction of particulate matter is also formed in the atmosphere from reactions of other air pollutants, including ammonia — a pollutant typically emitted from the application of agricultural fertilisers at this time of year.
>
> Other factors, such as weather conditions, may also significantly contribute to the reductions seen in pollutant concentrations. Conversely, changes in meteorology can also lead to increased air pollution, and coupled with the often non-linear relationships between changes in emissions and changes in concentrations, also explain why lower air pollution may not occur at all locations.[153]

Welsh Government

The Welsh Government and Ricardo published a report Provisional Analysis of Welsh Air Quality Monitoring Data – Impacts of Covid-19, July 2020. The report outlines key findings from air quality data during the first lockdown period, including that from 16 March to 31 May 2020. The report estimated that nitrogen oxide and nitrogen dioxide concentrations had decreased on average by 49% and 36% respectively, compared with previous business-as-usual levels at roadside sites.

8.2 Air pollution: coroner's ruling and prevention of future deaths

A Coroner's inquest, which concluded in December 2020, found that air pollution was a significant contributory factor to the death of 9-year-old Ella Roberta Adoo-Kissi Debrah in Lewisham in 2013. This is the first time that a Coroner had found that air pollution was a contributory cause of illness and death.[154] The Coroner's Record of Inquest stated:

> Air Pollution was a significant contributory factor to both the induction and exacerbations of her asthma. During the course of her illness between 2010 and 2013 she was exposed to levels of Nitrogen Dioxide and Particulate Matter

[153] European Environment Agency, Air quality and COVID-19, 11 May 2021 update
[154] Blackstone Chambers, Inquest into the Death of Ella Adoo-Kissi-Debrah, 17 December 2020

> in excess of World Health Organization Guidelines. The principal source of her exposure was traffic emissions. During this period there was a recognized failure to reduce the level of NO2 to within the limits set by the EU and domestic law which possibly contributed to her death.
>
> Ella's mother was not given information about the health risks of air pollution and its potential to exacerbate asthma. If she had been given this information she would have taken steps which might have prevented Ella's death.[155]

In relation to this case, in April 2021, the Coroner also produced a report under paragraph 7, Schedule 5, of the Coroners and Justice Act 2009 and Regulations 28 and 29 of the Coroners (Investigations) Regulations 2013, Report to prevent future deaths. In it he set out three matters of concern for appropriate authorities to respond to, including that:

> (1) The national limits for Particulate Matter are set at a level far higher than the WHO guidelines. The evidence at the inquest was that there is no safe level for Particulate Matter and that the WHO guidelines should be seen as minimum requirements. Legally binding targets based on WHO guidelines would reduce the number of deaths from air pollution in the UK.
>
> (2) There is a low public awareness of the sources of information (such as UK-Air website) about national and local pollution levels. Greater awareness would help individuals reduce their personal exposure to air pollution. It was clear from the evidence at the inquest that publicising this information is an issue that needs to be addressed by national as well as local government. The information must be sufficiently detailed and this is likely to require enlargement of the capacity to monitor air quality, for example by increasing the number of air quality sensors.[156]

The Government responded to the Coroner's Prevention of Future Deaths Report in June 2021.[157] The response set out some of the actions that the Government intends to take to improve air quality in both the short and long term:

- Immediate action will be taken to increase public awareness about air pollution. This will include a comprehensive review of existing sources of information – including UK Air and the Daily Air Quality Index (DAQI) – to include more specific messaging for different population groups. This will help health professionals in advising patients when poor air quality is forecast. The Government will also look at working with relevant health charities on longer-term campaigns aimed specifically at vulnerable groups.

- An additional £6 million will be added to the annual funding pot for local authorities as part of the Air Quality Grant scheme. Part of this fund will be dedicated to improving public awareness in local communities about the risks of air pollution. It will also encourage collaboration with local public health bodies to, for example, provide

[155] London Inner South Coroner's Court, Inquest touching the death of Ella Roberta Adoo-Kissi Debrah, December 2020

[156] Philip Barlow, assistant coroner for the coroner area of Inner South London, Regulation 28: Report to prevent future deaths, April 2021

[157] HM Government, Government responds to Coroner after Ella Kissi-Debrah inquest, 17 June 2021

guidance to vulnerable groups about the health impacts from air pollution and the steps they can take to minimise their exposure. This funding sits alongside the £880 million that has already been pledged for local authorities to develop and implement local air quality plans, including Clean Air Zones.

- Several media organisations already provide air quality information online alongside their weather forecasts to warn people when air pollution levels are likely to be elevated. There are also a number of alert systems – including in Manchester and London – that people can sign up to. The Government will have further discussions with broadcasters, social media companies and app providers to identify ways to spread this information more widely with clear advice that people can act on. It will also consider the scope and effectiveness of establishing a new national SMS alert system.

- NHS England and Improvement (NHSEI) will continue work on a more systematic approach to asthma management. This will include identifying environmental triggers and promoting more personalised care for individual patients. In addition, the NHSEI Children and Young People's (CYP) Transformation Programme will set out evidence-based interventions to help children, young people, families and carers, to control and reduce the risk of asthma attacks.

- On particulate matter limits, a public consultation on new legal targets for PM2.5 and other pollutants will launch early next year, with the aim of setting new targets in legislation by October 2022. The Government has used the World Health Organisation guidelines on PM2.5 to inform its ambitions in shaping these targets. Further to this, the new Office for Health Promotion will consider as a priority how public health benefits can be achieved through reductions in population exposure to PM2.5, taking into account the particular circumstances experienced in London and the South East.

- As well as a simple concentration target on PM2.5, the Government is developing a more sophisticated population exposure reduction target. This aims to drive reductions not just in pollution "hotspots", but in all areas. In setting these new targets, there will also be a commitment to significantly increase the monitoring network to capture more detailed air quality information across the country.[158]

8.3 Air quality and inequality

A Public Health England blog piece, from 2018, set out that while air pollution is an international problem that affects everyone it, "almost always the most socioeconomically disadvantaged suffer most from the health effects of pollution."[159] Other groups disproportionately affected include older people,

[158] HM Government, Government responds to Coroner after Ella Kissi-Debrah inquest, 17 June 2021

[159] UK Health Security Agency, Public Health Matters Blog, Health Matters: Air pollution – sources, impacts and actions, 14 November 2018

children, pregnant women, individuals with existing medical conditions, and communities in areas of higher pollution.[160]

In 2015 a study by Imperial College London and published in the journal Environmental Pollution found big differences in air pollution across communities in England:

> In England, the most deprived 20 per cent of neighbourhoods had higher air pollution levels than the least deprived neighbourhoods - 1.5 µg/m3 higher PM10 and 4.4 µg/m3 NO2 after adjusting for other factors – but this was not the case in the Netherlands. The biggest differences in air pollution levels according to socioeconomic status were in London.
>
> The worst air pollution levels were seen in ethnically diverse neighbourhoods, defined as those where more than 20 per cent of the population are non-white. Even after allowing for the fact that some of these neighbourhoods are more deprived, in England, this difference was 3.0 µg/m3 for PM10 and 10.1 µg/m3 for NO2. In the Netherlands, differences were lower, with 1.1 µg/m3 higher PM10 and 4.5 µg/m3 NO2.[161]

The WHO has also published a WHO Global Urban Ambient Air Pollution Database (update 2016). The summary to it states that globally, over 80% of people living in urban areas where levels are monitored are exposed to air quality levels that exceed WHO limits and that people living in low income cities were the most likely to be affected.[162] The UK Government's Clean Air Strategy, 2019, raised similar concerns about those living in deprived areas being most likely to suffer adverse health effects from poor air quality. It also highlighted however, that more affluent areas can be affected too, specifically referencing central London:

> Deprived communities are more likely to experience adverse health effects from poor air quality because they are more exposed to air pollution, for example, by being close to major roads. They are less likely to live close to well maintained green spaces associated with lower levels of air pollution, increased physical activity, and improved mental wellbeing. However, air quality can also be poor in areas that are generally considered affluent, such as central London. This is reflected by the overall national distribution of air pollution with highest average levels in South East England and lowest in the North of England, Scotland, Wales, and Northern Ireland.[163]

On 16 August 2021 the Mayor of London published research setting out how many schools in the London area were within areas exceeding WHO air quality limits (note that this research was in reference to 2005 WHO limits and not the revised limits):

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[160] UK Health Security Agency, Public Health Matters Blog, Health Matters: Air pollution – sources, impacts and actions, 14 November 2018

[161] Imperial College London, Ethnic minorities and deprived communities hardest hit by air pollution, 26 January 2015

[162] WHO, WHO Global Urban Ambient Air Pollution Database (update 2016)

[163] HM Government, Clean Air Strategy, 2019, p24

- City Hall analysis identifies more than 3.1m children across England going to schools in areas exceeding WHO limits on $PM_{2.5}$
- Children in London are almost four times more likely to go to a school in an area where air pollution exceeds the World Health Organization limit
- 98 per cent of schools in London are in areas exceeding World Health Organization pollution limits, compared to 24 per cent outside of London
- Children growing up in polluted areas in London showed significantly smaller lung volume, with a loss of approximately five per cent in lung capacity - equivalent to two large eggs - compared to their peers in the rest of England.
- The ULEZ [ultra low emissions zone] expansion in combination with the Mayor's other air quality policies will help reduce the exposure gap between the most and least deprived areas by 71 per cent by 2030.
- 28 of the 30 local authorities with the highest school levels of $PM_{2.5}$ are in London boroughs.[164]

In relation to concerns such as these, the UK Government has said that when its Air Quality Strategy is reviewed, it will consider measures focussed on protecting those most vulnerable to air pollution:

> Children and those with health conditions which make them more vulnerable to health impacts from poor air quality, are impacted in multiple locations. While targeted action can be taken, for instance around schools, children will also be exposed at home, while travelling and during other activities.
>
> Any action focused on children and other vulnerable groups needs to be part of a wider programme of action that seeks to take a systematic approach to improving air quality. That is the approach we have taken in the Clean Air Strategy, which will improve air quality for all. In addition, our Air Quality Grant Programme provides funding to local authorities to tackle locally identified air pollution issues, including around schools, and local authorities have discretionary powers to restrict car access to schools and enforce anti-idling laws.
>
> When we review the Air Quality Strategy, we will consider including measures focused on protecting those most vulnerable to air pollution, including children.[165]

In the Government's response to the EFRA Committee report on air quality in April 2021, it set out further work on inequalities, as follows:

> Defra works closely with the Department of Health and Social Care (DHSC), Public Health England (PHE) and a number of other stakeholders on the

[164] Mayor of London press release, 3.1m children in England going to schools in areas with toxic air, 16 August 2021

[165] HM Government, Environment Bill Policy paper 10 March 2020: Air quality factsheet (part 4), Updated 21 October 2020

relationship between air quality and health. Examples of this close working include:

- Defra, PHE and DHSC and clinical experts are currently collaborating to improve the Daily Air Quality Index, with the aim of improving the messaging to children with asthma.

- PHE and Defra are also supporting the coordination of the Joint Air Quality Inequalities Project, led by the Environment Agency. The project aims to understand the relationship between air quality and inequalities, how these impact on people, the barriers that exist and what could help to address these.

Defra and DHSC ministers have agreed that our departments will work together on understanding how exposure to air pollution could be considered as part of wider consideration of health inequalities.

In addition, we are currently reviewing the National Air Quality Strategy (including the Local Air Quality Management Framework). A key objective of this review will be to promote and support greater local action to identify and address air pollution inequalities, targeting action at vulnerable groups and communities. Local Authority action will also be supported by additional funding through the Government's Air Quality Grant which has been increased to £8m per year.[166]

8.4 Divergence from EU standards and enforcement

The European Union (Withdrawal) Act 2018, (the "Withdrawal Act"), and related statutory instruments have retained the EU air quality regulations in UK law after exit day (31 January 2020) and completion of the implementation period (31 December 2020). Now that the UK has left the EU, the UK Government has the discretion to amend air quality standards.

Following the referendum result in June 2016 some environment and health organisations expressed concern that policies on air pollution could be weakened following the UK exit from the EU. ClientEarth challenged the Government to affirm its commitment to environmental laws, including on air pollution.[167]

In 2016 the then Chair of the Environmental Audit Committee, Mary Creagh MP, expressed the view that EU membership had been key for air quality, and had allowed campaigners to hold the Government to account.[168] She also said there were "question marks about what will happen to air pollution

[166] Environment Food and Rural Affairs Committee, Seventh Special Report - Air Quality and Coronavirus: A Glimpse of a Different Future or Business as Usual: Government Response to the Committee's Fifth Report, 24 April 2021, p3

[167] ClientEarth, Brexit "challenge" to politicians over UK environmental laws, 24 June 2016

[168] HC Deb 12 July 2016, c193

standards in the brave new Brexit world."[169] There has also been concern from environmental groups, including the coalition group Greener UK, that new standards on air quality will not be as ambitious as those set and proposed in future by the EU.[170]

The Government under Prime Minister May sought to allay concerns about changes to air quality standards following Brexit by stating that there were no plans to change air quality limit values and targets.[171] The Government's 25 Year Environment Plan, published in January 2018 set a commitment to meet targets:

> The UK's determination to improve air quality is reinforced by our commitment to meeting ambitious, legally-binding targets to cut emissions of five pollutants – ammonia, nitrogen oxides, non-methane volatile organic compounds, fine particulate matter and sulphur dioxide – by 2020 initially, and by 2030 for a deeper cut. Our commitment to meeting these legally binding targets is not affected by the UK's departure from the EU.[172]

In October 2020, in the context of air quality provision in the then Environment Bill, the current Government stated that leaving the EU provided it with "the opportunity to take a more tailored approach to UK action on air quality".[173]

A December 2017 report by the Environmental Industries Commission, an environmental business membership organisation, on Improving Air Quality after Brexit suggested that a change to air quality limit values post Brexit could be desirable on the basis that they could be more refined for the UK's specific circumstances, rather than aligned with a more generic EU approach:

> These are concentration values for pollutants in ambient air, applying to locations where the public is routinely exposed and averaged over a given time period. While they have been a useful tool to help drive air quality improvements, they also imply that concentrations above the limit value are harmful and those below are not. Health evidence has demonstrated that this is not the case for pollutants such as fine particulate matter or ozone, and may not be so for other pollutants.
>
> However, Limit Values are an accepted concept in Europe and are written into, for example, land use planning processes and tend to be strongly supported by both Member States and NGOs. Moreover, the UK's geographic position in Europe, with weather systems dominated by Atlantic south westerly winds, means that annual average concentrations for particulate matter (PM10 and PM2.5) tend to be lower than more central European states. Compliance with the limit values for PM10 is universal across the UK and thus measures to reduce PM, probably the most harmful of the standard suite of air pollutants, are de-prioritised despite evidence that health impacts continue below the Limit Value concentrations.

169 HC Deb 12 July 2016, c193

170 Greener UK, Final Risk Tracker June 2016-March 2021: air pollution tab, March 2021

171 HC Written Question 66372 Air Pollution: EU Law, 8 March 2017

172 HM Government, A Green Future: Our 25 Year Plan to Improve the Environment, February 2018, p97

173 HM Government, Policy paper 10 March 2020: Air quality factsheet (part 4), updated 21 October 2020

> Brexit could offer the opportunity to seek examples of policy making in countries and regions outside the EU and to draw on examples more suited to the UK context. [174]

8.5 Ammonia and emissions from agriculture

Ammonia (NH_3) is a gas that is emitted into the atmosphere and then either deposited back onto land or converted to secondary Particulate Matter (PM) through reactions in the atmosphere. Agriculture is the dominant source of NH_3 emissions (88% in 2016). It is emitted during storage and spreading of manures, slurries and fertilisers.[175]

The Air Quality Expert Group published a report on Air Pollution from Agriculture, 2018. In this it summarises the impacts of ammonia on human health and the environment:

> The main impacts of ammonia arise through its contribution to (1) formation of particulate matter (PM) and the consequent effects on human mortality and morbidity throughout the UK, and (2) the eutrophication of the semi-natural landscape of the UK leading to marked reductions in plant biodiversity. Ammonium in particle form (NH4+) is a transboundary pollutant, exchanged between European countries. Therefore, UK ammonia emissions contribute to human health effects and biodiversity changes in the UK and elsewhere in Europe, while the UK is impacted by emissions from elsewhere in Europe.[176]

The UK Government has published a guidance document in July 2018, Code of Good Agricultural Practice (COGAP) for reducing ammonia emissions produced by Defra in collaboration with the farming industry. It explains the practical steps farmers, growers, land managers, advisors and contractors in England can take to minimise ammonia emissions, including from the storage and application of organic manures, the application of manufactured fertiliser, and through modifications to livestock diet and housing.

In the UK the National Emission Ceilings Regulations 2018 (which implements provisions from the Gothenburg Protocol and the revised EU National Emissions Ceiling Directive (2016/2284/EU)) sets revised targets (among other things) require the UK to reduce ammonia (NH_3) emissions by 8 per cent compared to 2005 emissions by 2020 and by 16% by 2030.[177] The 2005 baseline for ammonia was 288kt (kilotonnes).[178] The 2020 ceiling is therefore 265kt and in 2030 it is 242kt.[179] The UK Government has acknowledged that without further policy intervention, the UK may not meet these targets. To this end the UK Government has set out actions that it intends to take to reduce

174 Environmental Industries Commission, Improving Air Quality after Brexit, 14 December 2017, p18
175 HM Government, Clean Air Strategy, January 2019, p11
176 Air Quality Expert Group, Air Pollution from Agriculture, 2018
177 Defra National Statistics Release: Emissions of air pollutants in the UK, 1970 to 2016, February 2018, p10
178 HM Government, Clean Air Strategy Consultation, May 2018, p87
179 HM Government, Clean Air Strategy Consultation, May 2018, p87

ammonia emissions in its Clean Air Strategy 2019 and the April 2019 National Air Pollution Control Plan.

In November 2020 the Government also published a consultation on Reducing ammonia emissions from urea fertilisers. It sought views on three policy options that give the greatest ammonia emission reductions from regulating the use or sale of sold urea fertilisers. The Government's response was published in March 2022.[180] The response explained that the government had had to change its approach in response to a global fertiliser shortage:

> Global fertiliser shortages and price increases have led to significant concerns over the cost of food and, in turn, on the cost of living. We therefore consider a ban on solid urea fertilisers (Option 1) to be unfeasible. Furthermore, evidence submitted through the consultation indicated that the costs to farmers of banning solid urea would be substantially greater and ammonia emissions reduction less than previously expected. The timelines to implement a ban would be longer than previously estimated due to the changes needed to infrastructure to handle and store greater volumes of ammonium nitrate (AN). An industry consortium including farming unions, research and advice bodies, accreditation/assurance schemes, and the fertiliser supply industry offered to set up and run a non-regulatory approach, which they have termed as "Option 4". This would utilise farm assurance schemes such as Red Tractor, to reduce ammonia emissions from the use of fertilisers containing urea (both solid and liquid), in England from April 2023.
>
> (...)
>
> In view of the results of the revised analysis and taking into account global supply and pricing of fertilisers, Defra is supportive of the industry consortium's proposed approach to be delivered from 2023, a year later than initially proposed. This approach is expected to deliver around 11kt of ammonia emissions reductions by 2024/25. The assurance scheme standard, coupled with advice and guidance on effective use of all fertilisers, have the potential to deliver greater protection for the environment in the longer term if they lead to improved crop nutrient management practices, such as increased nitrogen use efficiency. Defra will monitor the global supply of fertilisers and any impacts on food prices to determine whether any further postponement may be required. Once implemented, Defra will monitor the industry's scheme and its success in reducing ammonia emissions. Should the scheme not achieve sufficient ammonia emissions reductions and the global supply and pricing of fertilisers be more stable, government will consult on draft regulations from 2025/26.[181]

Information about policies in Scotland, Wales and Northern to tackle ammonia emissions is provided in the UK Government, Scottish Government, Welsh Government and Northern Ireland Executive's draft UK National Air Pollution Control Programme, July 2022.

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[180] HM Government, Consultation on reducing ammonia emissions from solid urea fertilisers: Government response, March 2022

[181] HM Government, Consultation on reducing ammonia emissions from solid urea fertilisers: Government response, March 2022, p4-5

8.6 Decarbonisation and net zero

In June 2019, the Climate Change Act 2008 (2050 Target Amendment) Order 2019, set a new target requiring the government to reduce the UK's net emissions of greenhouse gases by 100% relative to 1990 levels by 2050. This is widely known as the "net zero target".

In November 2020 the Prime Minister published a "Ten Point Plan for a Green Industrial Revolution for 250,000 jobs" which Boris Johnson said "marks the beginning of the UK's path to net zero."[182] This plan covered investment and creation of jobs in a number of different sectors, including lean energy, transport, nature and innovative technologies.

In October 2021 the Government then published a Net Zero Strategy: Build Back Greener which sets out, in more detail, the Government's policies and proposals for a decarbonised economy in 2050. It covers a range of sectors including transport, international shipping and aviation, heat and buildings, industry, waste, agriculture and land use, fuel supply, power and greenhouse gas removal. On air quality, it highlights that further work will be done to assess the impacts of some of the proposed policy measures which may affect air quality:

> 76. Air Quality: As climate change and air pollution have many of the same contributing emission sources, the decarbonisation of the UK economy offers major opportunities to significantly reduce air pollution and therefore improve human health and reduce the impact of some air pollutants on ecosystems. This is primarily driven through the reduction of petrol and diesel cars towards green alternatives, as well as the continual shift away from fossil fuels in heat and power generation. However, some policies and proposals could result in significant negative air quality impacts at both regional and local scales, for example emissions of fine particulate matter from biomass combustion, ammonia from the use of anaerobic digestion, and NOx emissions from hydrogen combustion in domestic or industrial settings. These are likely to impact our ability to reach statutory national emissions ceilings, increase exposure to harmful pollutants and cause some uneven health burdens. Furthermore, the impacts of air pollution can also impact the delivery of net zero. For example, all of England's forests and peatlands continue to be damaged by harmful emissions – particularly ammonia – which impact their ability to provide the ecosystem services required to meet net zero, including carbon sequestration and flood mitigation. Historic pollution loading across all habitats may also need to be ameliorated to maximise the potential of restoring them to meet the biodiversity targets in the Environment Bill. Further work will be undertaken to assess this and provide advice on tailoring our pathway to minimise these impacts. Continuous improvements in emission requirements and innovation in abatement technologies will also be necessary to deliver a pathway to net zero that maximises environmental benefits.[183]

[182] HM Government, PM outlines his Ten Point Plan for a Green Industrial Revolution for 250,000 jobs, 18 November 2020

[183] HM Government, Net Zero Strategy: Build Back Greener, October 2021, p334-335

For air quality, the potential for low carbon policies to contribute to better air quality, depends on the technology chosen to achieve it and the pollutant being considered. This was set out in a 2020 report to Government by the Air Quality Expert Group (AQEG):

> Since air pollution is a complex mixture of different chemical entities, the potential for low carbon strategies to generate cleaner air depends on which pollutant is being considered and the low carbon pathway and/or technology chosen. For some regulated air pollutants that are co-emitted with carbon dioxide (CO2) during fossil fuel combustion, such as nitrogen oxides NOx (defined as the sum of NO and NO2), black carbon, polycyclic aromatic compounds and carbon monoxide, significant reductions in ambient concentrations might be anticipated as fossil fuel use decreases. Other pollutants such as secondary particulate matter (PM), ammonia (NH3), non-methane Volatile Organic Compounds (VOCs), persistent organic pollutants and airborne metals have complex non-combustion sources and have less direct connections to national carbon budgets. For example, fine particles are generated by vehicles through the friction and abrasion of surfaces, irrespective of the propulsion system. In some cases, the future air quality effects of Net Zero will depend critically on how a replacement technology is used; hydrogen consumed in a fuel cell releases no air pollution, whereas hydrogen combusted in a boiler or engine potentially does.
>
> For air pollutants, in contrast to greenhouse gas emissions, it matters if air pollutant emissions shift closer to areas of population (even if total national emissions decrease). For example, air pollutants from district heating biomass boilers can have disproportionate impacts on people close by compared with large power-generation facilities remotely located and with tall chimneys. The effects of poor air quality are felt immediately and are costly, so transitory pollution generated on the pathway to 2050 requires consideration and careful management, for example the localised impacts of major infrastructure projects or the use of intermediate fuels.[184]

The AQEG examined the proposed policies Climate Change Committee's (CCC) 2019 report Net Zero – The UK's contribution to stopping global warming. The CCC is an independent, statutory body, established to advise the UK and devolved governments on emissions. AQEG's report stated that, "encouragingly, for virtually all of the changes proposed on the CCC Net Zero pathway, positive, improved and better air quality outcomes can be envisaged."[185] Among its key conclusions, AQEG cautioned that care needed to be taken to assess local air quality impacts of any development work undertaken to transition to net zero:

> Air pollution has immediate adverse health effects on the communities where it is experienced, and care is needed to ensure that during the transition to 2050, air quality impacts are considered and minimised. For example, major low-carbon infrastructure projects have the potential to create localised air quality problems during their development, whilst the use of transitionary fuels may cause pollution to rise temporarily in some locations.[186]

[184] Air Quality Expert Group, Impacts of Net Zero pathways on future air quality in the UK, 2020
[185] Air Quality Expert Group, Impacts of Net Zero pathways on future air quality in the UK, 2020
[186] Air Quality Expert Group, Impacts of Net Zero pathways on future air quality in the UK, 2020

9 Funding

Funding for air quality improvements can be both direct and indirect and have more than one purpose. For example, funding aimed at encouraging a switch to cycling and walking might have the aim of reducing congestion on the roads, but may also bring improvements for air quality. The following sections set out the sources of funding that have been explicitly linked to air quality improvements.

9.1 UK Government funding

UK plan for tackling roadside nitrogen dioxide concentrations

In July 2017, the then government published its plan for tackling nitrogen dioxide emissions from road traffic. The plan was supported by Government investment in clean air policies. In a PQ response in January 2019, the then Environment Minister Dr Thérèse Coffey set out the components of this investment and how much of it had been disbursed at the time:

> The UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations (NO2), setting out how we will achieve compliance in the shortest possible time, is supported by a £3.5 billion investment into air quality and cleaner transport over 2010 to 2021. This investment includes:
>
> - £1.5 billion to support the uptake of ultra low emission vehicles to 2021 (including elements funded from the National Productivity Investment Fund). As of December 2017 £862.8m had been disbursed.
> - £1.2 billion – for the Cycling and Walking Investment Strategy. As of December 2017 £555m had been disbursed.
> - £495 million Implementation Fund and Clean Air Fund to support councils in the 2017 Plan of which £40m was disbursed as of March 2018 (including the Air Quality Grant for 16/17 and 17/18).
> - £100 million disbursed to Highways England for air quality as part of the Road Investment Strategy.
> - £89 million disbursed for the Green Bus Fund from 2010 to 2013 for low emission buses.
> - £40 million allocated through the Clean Bus Technology Fund 2017-19.

- £27 million allocated through the Clean Bus Technology Fund 2013 & 2015 and Clean Vehicle Fund 2014 and other bus retrofitting.

- An additional £7 million disbursed through the Air Quality Grant to local authorities to support air quality from 2011 to 2015.[187]

Clean Air Fund

In 2018 the Government launched a Clean Air Fund, as follows:

> Fulfilling a commitment to support local authorities to deliver these plans, the government has today launched a £220 million Clean Air Fund to minimise the impact of local plans on individuals and businesses. A range of options local authorities could consider to utilise this money such as new park and ride services, freight consolidation centres, concessionary travel schemes and improvements to bus fleets have been set out.
>
> At the same time, more than £40 million from the £255 million Implementation Fund has been awarded to support local authorities take action as soon as possible to improve air quality.
>
> This includes:
>
> - £11.7 million to the 28 local authorities with the biggest air quality challenges to help carry out the work needed to develop air quality plans, including securing resource and expertise
>
> - £24.5 million to the same 28 local areas to support a range of measures to take action locally. Examples include installing electric charge point hubs in car parks; junction improvements; bus priority measures; building cycle routes; incentivising ultra-low emission taxis through licensing schemes and leasing electric vehicles; and traffic management and monitoring systems
>
> - £2.4 million from the 2017/18 Air Quality Grant for local community projects to tackle air quality at a grass roots level. This comes in addition to £3.7 million already awarded in last year's Air Quality Grant, which included an award winning project taken forward by Westminster City Council to provide advice and toolkits for small and medium businesses to reduce transport emissions from deliveries associated with their operations
>
> - £1.65 million to support the 33 local authorities that have been asked to conduct targeted feasibility studies to identify measures that could bring forward compliance dates within the shortest possible time[188]

Air Quality Grant Scheme

Defra runs the Air Quality Grant Scheme, which local authorities in England can apply to in order to help improve air quality. In April 2021 the Government

[187] Air Pollution, UIN 206817, tabled on 9 January 2019

[188] HM Government, £260 million of clean air funding launched by government, 23 March 2018

said that it had "awarded nearly £70 million in funding since the air quality grant started in 1997."[189]

Further additional funding for the Air Quality Grant Scheme was announced by the Government in its June 2021 to the Coroner's Prevention of Future Deaths Report in June 2021:

> An additional £6 million will be added to the annual funding pot for local authorities as part of the Air Quality Grant scheme. Part of this fund will be dedicated to improving public awareness in local communities about the risks of air pollution. It will also encourage collaboration with local public health bodies to, for example, provide guidance to vulnerable groups about the health impacts from air pollution and the steps they can take to minimise their exposure. This funding sits alongside the £880 million that has already been pledged for local authorities to develop and implement local air quality plans, including Clean Air Zones. [190]

In March 2022 Defra announced that local authorities across England had been granted more than £11 million in government funding to deliver projects to improve air quality, in the latest funding round.[191]

For further information see the GOV.UK Air Quality Grant Programme webpage.

Clean Air Strategy 2019

The government's Clean Air Strategy 2019 included some additional funding:

- UK Research Innovation (UKRI) has recently launched a new £19.6 million research programme to predict future air quality challenges, identify the most vulnerable groups in society, and improve new technologies and policies for reducing air pollution. The programme will be led by the Natural Environment Research Council (NERC) with the Met Office.

- We are investing £10 million in improving our modelling, data and analytical tools to give a more precise picture of current and future air quality and the impact of policies to improve it. We will continue to collaborate closely with UKRI and the wider science and engineering community to deliver cost-effective and innovative solutions to reducing air pollution.[192]

Active travel

In an April 2021 PQ response the then Environment Minister, Rebecca Pow, set out funding for an "active travel" scheme that would bring air quality improvements:

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189 Air Pollution, UIN 188162, tabled on 27 April 2021

190 HM Government, Government responds to Coroner after Ella Kissi-Debrah inquest, 17 June 2021

191 HM Government, £11.6m boost for local authorities to tackle air pollution, 9 March 2022

192 HM Government, Clean Air Strategy 2019, January 2019, p22-23

> A £2 billion package of funding for active travel, which is the largest amount of funding ever committed to increasing cycling and walking in this country, was announced by the Secretary of State for Transport on 9 May 2020. The first £250 million of the £2 billion was allocated in 2020/21 to "quick wins" including the Active Travel Fund and the Fix your Bike voucher scheme.[193]

9.2 Scottish Government

In the Cleaner Air for Scotland 2 Strategy the Scottish Government set out that it provided funding for walking and cycling infrastructure:

> The Scottish Government has invested significant resources in improving walking and cycling infrastructure. In 2018, it doubled the funding for active travel from £39.2 million to £80 million, and increased this to over £100 million in 2020-21, as part of an overall £500 million commitment over the next five years. The figure for 2021-22 is £115.5 million. This funding supports various active travel schemes such as Places for Everyone and Smarter Places, Smarter Choices. In 2020, we delivered the 'Spaces for People' fund in response to the COVID-19 emergency, providing £39 million of funding and guidance to local authorities to quickly design and deliver the temporary walking and cycling infrastructure that was needed to enable people to physically distance.[194]

It also set out funding to improve emissions from busses:

> The Scottish Government also provides substantial financial support via the Bus Service Operators Grant (BSOG) and concessionary fares, and established the Bus Decarbonisation Taskforce to co-design a pathway to a fully zero emission bus fleet. The Taskforce is comprised of leaders from the bus, energy and finance sectors and will set out the pathway to zero emissions by November 2021. The Scottish Government provided over £50 million to support the shift to zero emission buses in 2020-21 and has committed a further £120 million for the next five years. The Scottish Bus Emissions Abatement Retrofit programme also provides funding to licensed bus and coach operators, local authorities and community transport operators to retrofit existing mid-life buses to the Euro VI diesel standard (and thus make them LEZ-compliant).[195]

The document also highlighted Scottish Government funding to support adaptation to new low emissions zones (LEZ):

> The Scottish Government introduced the LEZ Support Fund in 2019 as a form of vehicle disposal scheme to help those who will have the most difficulty in making the transition to the introduction of a LEZ. Rather than a conventional scrappage scheme, it provides targeted mobility grant funding for households (who currently use an LEZ-non-compliant private car) and micro-businesses using non-compliant light commercial vehicles. This approach seeks to encourage lower emission mobility options such as, but not limited to, e-bikes,

193 Air Pollution UIN 188162, tabled on 27 April 2021
194 Scottish Government, Cleaner Air for Scotland 2, July 2021, p70
195 Scottish Government, Cleaner Air for Scotland 2, July 2021, p71

> bikes, public transport season ticket contributions and other incentives which reduce car ownership.[196]

9.3 Welsh Government

In 2018 the Welsh Government announced the establishment of a new £20m fund to reduce emissions and improve the environment in Wales. The Air Quality Fund, which runs until 2021, supports local authorities to comply with nitrogen dioxide limits and improve air quality in their areas.[197]

In the Welsh Government's Clean Air Plan for Wales, 2020, it said that it had allocated over £69 million to Local Authorities to develop new walking and cycling routes and facilities, and make improvements to their existing infrastructure.[198] In Air Quality in Wales 2019, October 2020 update version, the Government summarised further funding for active travel:

> In July 2020, the Welsh Government announced the allocation of £38m in grants to local authorities across Wales for active travel and road safety schemes. During the lockdown period, many more people walked and cycled to make everyday journeys. This investment will create routes and connections in towns and cities across Wales to give people the confidence to continue walking and cycling.[199]

9.4 Northern Ireland

An overview of specific schemes funded by the Northern Ireland Department for Agriculture, Environment and Rural Affairs (DAERA) is provided in the November 2020, A Clean Air Strategy for Northern Ireland – Public Discussion Document. The document sets out that DAERA has a Local Air Quality Management (LAQM) grants scheme which draws down from its Environment Fund. Councils apply annually for funding from the Department to carry out air quality monitoring and assessment, and to prepare and implement action plans.[200]

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[196] Scottish Government, Cleaner Air for Scotland 2, July 2021, p79

[197] Welsh Government press release, £20m Air Quality Fund among new measures to improve air quality in Wales, 24 April 2018

[198] Welsh Government, The Clean Air Plan for Wales, 2020, p61

[199] Welsh Government Air Quality in Wales 2019, October 2020 update version, p5

[200] Northern Ireland Department for Agriculture, Environment and Rural Affairs, A Clean Air Strategy for Northern Ireland – Public Discussion Document, November 2020, p118

10 Debate and scrutiny

The National Audit Office (NAO) conducted a study into local air quality breaches in the UK and a report was published in June 2022.[201] The study considered:

- The extent to which government has a set of policies and programmes that it expects will achieve its objectives for clean air;
- Whether government's programme to tackle breaches of local air quality limits is well set up;
- The progress government has made in delivering this programme and what has been spent, and
- How government is managing ongoing risks to tackling local breaches of air quality.[202]

The NAO recognised that some progress on improving local air quality had been made, but said that the government had been slow to consider the case for national action:

> The Programme, established to tackle illegal and dangerous levels of pollution, has become government's largest dedicated air quality initiative. Government has made progress, with measures fully implemented in 14 local authorities and four sections of the Strategic Road Network. However, the Programme has not moved as fast as expected. While this is undoubtedly due in part to the COVID-19 pandemic, other factors including the effectiveness of public engagement have likely played a role, and government has not had a good overview of the relative impact of different issues. It has also been slow to consider the case for national action to tackle the challenges on major roads and motorways that mean overall compliance cannot be achieved until after 2030. This is more than four years later than government expected when it published its plan for tackling NO_2 in 2017. For these reasons we cannot yet be confident that the Programme is on track to deliver value for money.[203]

The NAO also raised concerns about action on ammonia and particulate matter:

> NO_2 is only one source of air pollution, and there is particular concern about the health risks from particulate matter and ammonia. Government is not yet clear how it will meet existing 2030 ceiling limits, and expects to set new long-term targets for particulate matter by October 2022. It will need to move

[201] National Audit Office, Tackling local breaches of air quality, 17 June 2022
[202] National Audit Office, Tackling local air quality breaches [downloaded 4 May 2022]
[203] National Audit Office, Tackling local breaches of air quality, 17 June 2022

quickly with robust plans to meet these targets if it is to put itself in a good position to meet them and secure value for money from its work on air quality.

Air quality issues are also raised frequently in Parliament, in debates, parliamentary questions and in the work of select committees. Recent references to this work are set out in the sections below.

10.1 Select Committee work

- Public Accounts Committee, Tackling local air quality breaches, oral and written evidence published.
- Environment, Food and Rural Affairs Committee, Oral evidence: Air quality: follow-up, 6 July 2021
- Environment, Food and Rural Affairs Committee, Fifth report: Air Quality and coronavirus: a glimpse of a different future or business as usual, 11 February 2021; and associated Government response, Seventh Special Report - Air Quality and Coronavirus: A Glimpse of a Different Future or Business as Usual: Government Response to the Committee's Fifth Report, 24 April 2021.
- First Joint Report from the Environment, Food and Rural Affairs, Environmental Audit, Health and Social Care and Transport Committees, Improving air quality, 15 March 2018 and associated Government response, Improving air quality: Government Response, 20 June 2018. See also background National Audit Office Report prepared for the Committees, Air Quality, 16 November 2017.
- Environment, Food and Rural Affairs Committee, Air Quality, 27 April 2016 and associated Government response, Air quality: Government response to the Committee's Fourth Report of Session 2015–16, 13 September 2016.

10.2 Parliamentary debates and oral questions

- Clean Air (Human Rights) Bill, HL Bill 5 2022-23, with second reading debate on 8 July 2022. A date for committee stage has not yet be scheduled.
- Environment Bill 2021-22 and 2019-21. Debates at various stages in the proceedings have touched on air quality issues. See for example, Commons public bill committee debates: sixth sitting, 17 March 2020 , fifteenth sitting, 12 November 2020, and twenty-second sitting, 26 November 2020; Commons Report Stage, 26 January 2021; and Lords committee stage (second day) 23 June 2021.

- Air Quality (Legislative Functions) (Amendment) Regulations 2021, House of Lords Grand Committee, 19 May 2021 and Draft Air Quality (Legislative Functions) (Amendment) Regulations 2021, House of Commons delegated legislation committee, 27 April 2021.
- Air Pollution: London, Westminster Hall debate, 27 April 2021.
- Air Quality, House of Commons ten-minute rule motion, 3 February 2021.
- Local Clean Air Targets, Westminster Hall debate, 20 October 2020.
- Air Quality (Domestic Solid Fuels Standards) (England) Regulations 2020, House of Lords, 29 September 2020 and Draft Air Quality (Domestic Solid Fuels Standards) (England) Regulations 2020, House of Commons delegated legislation committee, 16 September 2020
- Air Quality, House of Commons oral questions, 10 September 2020.
- Air Quality and Emissions, House of Lords oral questions, 19 May 2020.
- Air Quality, House of Commons oral questions, 31 October 2019.
- Clean Air, House of Commons ten-minute rule motion, 3 September 2019.

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