Air Quality Strategy for Fife 2025 - 2030

Foreword

The quality of the air that we breathe has an impact on all of us. Some people are more exposed to poor air quality than others, and some people are more vulnerable to its impacts than others, but improving air quality is an important issue for us all and continues to be the biggest environmental risk to human health.

Although air quality is generally good in Fife, it is in everyone's interests to make it even better.

It is my pleasure to present this new Air Quality Strategy. The strategy includes key actions that we will be taking over the next few years to achieve better air quality across Fife, with benefits for everyone's health both now and in the future.

The strategy outlines how we will improve the way we monitor air quality and how we provide information to the public, making sure that robust air quality data is available to view online.

It also details how we will work with a range of partners to tackle air pollution from transport, housing and other areas as well as how we support Schools & Businesses to reduce their levels of air pollution.

We all have a role to play in improving the air we breathe; this is not something that the council can do alone.

Collaboration is very much at the heart of this strategy, working with and supporting residents, local partners, and businesses, to bring about meaningful improvements in air quality.

I hope you will support us in delivering this Air Quality Strategy. By working together, we can make a real difference and create a cleaner and healthier environment for us all.

Councillor Jan Wincott
Spokesperson for Environment & Climate Change

Executive Summary

Good air quality is fundamental to the quality of our environment. Although air quality has improved over recent years, action is still required to address current and emerging challenges.

Minimising air pollution levels will bring lasting benefits, with positive effects on public health, climate change, economic development, and population wellbeing. This Air Quality Strategy seeks to contribute to Fife becoming a healthier, more sustainable, prosperous and desirable place to live, work and visit.

The Council has had an Air Quality Strategy in place since 2015[1], outlining the steps taken to achieve significant improvements to air quality in the Fife area. The Strategy is updated every five years, as a minimum, with an update published in 2020[2]. This Strategy builds on previous actions and sets out how we will tackle emerging issues.

Our work in reducing road traffic pollution has resulted in achieving compliance with the air quality objectives, enabling us to revoke both Air Quality Management Areas (AQMAs).

Our vision for clean air aligns with the Scottish Government's national Cleaner Air for Scotland 2 (CAFS 2)[3] as we understand that a cohesive comprehensive approach to tackling air pollution at a regional, national and international level is required.

For over 20 years Fife Council have been successfully tackling the issue of air pollution in the region through its proactive commitment to the Local Air Quality Management (LAQM) regime. This Strategy is a commitment to seeking further improvements through a holistic approach. We will continue to review and develop the strategy to ensure alignment with the latest national strategy and understanding of air quality issues.

Fife Council will focus on the education of primary school-aged children on the importance of good air quality so that the resulting good behavioural changes are second nature in later life.

Our approach:

- Maintain pollutant concentrations below Scottish Air Quality Standard (AQS) objective levels;
- Integrate air quality into our strategies and policies, particularly in areas such as transport, planning, climate change and public health;
- Focus on behaviour changing initiatives; and
- Improve collaboration with neighbouring authorities to address the management of regional air pollution sources.

Our vision for Fife is to have the best air quality that can be achieved, to protect and enhance the health of our residents and visitors and to let the environment around us thrive.

[1] Fife Council (2015), *An Air Quality Strategy for Fife 2015-2020*, accessible at: https://www.fife.gov.uk/__data/assets/pdf_file/0018/160164/Fifes-Air-Quality-Strategy-2015-2020.pdf
[2] Fife Council (2020), *Air Quality Strategy for Fife 2021-2025*, accessible at: https://www.fife.gov.uk/__data/assets/pdf_file/0033/252996/Fife-AQS_200721-Final-Issue-Alt-Text-2.pdf
[3] Scottish Government (2021), *Cleaner Air For Scotland 2: Towards a Better Place for Everyone*, accessible at: https://www.gov.scot/publications/cleaner-air-scotland-2-towards-better-place-everyone/

Our Commitments

Health

Implement abatement measures to ensure that the Scottish Air Quality Objectives continue to be achieved, and public health continues to be protected; and

Work collaboratively with NHS Fife, Health and Social Care Partnership (HSCP) and within communities to raise awareness of the health impacts of air pollution, especially on the most vulnerable; and of the health benefits of sustainable travel options such as walking or cycling.

Integrated Policy

Integrate air quality considerations within related Council plans and strategies and across different departments; and

Work in collaboration with departments such as Education to increase awareness of local air quality within the community.

Placemaking

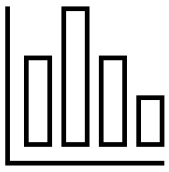
Support Council proposals for infrastructure changes that will facilitate improvements in vehicle movements; and

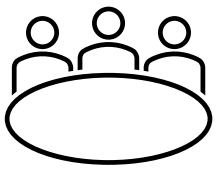
Ensure that development proposals are assessed for air quality impacts and any appropriate mitigation measures implemented including addressing the potential for cumulative negative air quality impacts.

Data

Provide high-quality air pollution data for; continuous compliance with objectives; accurate informing of mitigation decision making and identifying trends or gaps in the information gathered; and

Stay up to date with advances in monitoring technology and analysis tools, including Sensor technology.





Public Engagement & Behaviour Change

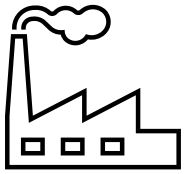
Raise public awareness and understanding of local air quality issues within Fife and inform communities about ways that they can contribute to air quality improvements and take part in initiatives; and

Promote sustainable travel options such as walking, cycling and public transport over the use of cars, and promote our electric vehicle infrastructure.

Industrial

Support the control and reduction of air pollution from industrial sources in collaboration with SEPA; and

Communicate with local residents the work carried out by the Council and SEPA with regards industrial emissions and complaints.



Non-Transport

Control and reduce air pollution from non-transport sources;

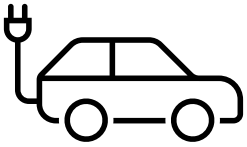
Raise awareness of air quality impacts associated with household wood-burning; and

Raise awareness of ammonia emissions within the Agricultural sector in collaboration with the Scottish Government.

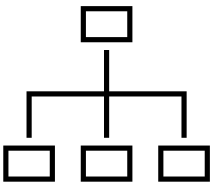
Transport

Maintain the reductions achieved in pollutant concentrations from road traffic by continuing to ensure that air quality is considered in all transport planning decisions and promoting active and sustainable travel; and

Continue to decarbonise the Council's own fleet and encourage the uptake of ultra-low emission vehicles such as hybrid-electric, full-electric and hydrogen fuel vehicles.



Governance



Continue to employ a dedicated air quality team to provide the public with an informative, easily accessible and transparent resource for dealing with air quality issues; and

Deliver improvements to air quality in collaboration with key stakeholders and work closely across Council departments.

Layout of this Air Quality Strategy

This document communicates the reasoning and ideas behind the strategic outcomes it is intended to achieve, focussing on nine key areas in alignment with Cleaner Air for Scotland 2 as follows:

- **Policy Context** – International, national and local legislation and how Fife Council fulfil statutory obligations for local air quality management and assist the Scottish Government in achieving the Air Quality Limit Values;
- **Air Quality** – An introduction to air quality, it's importance and what our air quality monitoring tells us;
- **Local Success Stories** – How the Council lead by example and how collaboration leads to successful initiatives within Fife;
- **Health** – How we address local issues and encourage initiatives to reduce the impact of poor air quality on the health and wellbeing of residents, workers and visitors to Fife and on Fife's natural heritage;
- **Integrated Policy** – How we encourage a collaborative approach with key partners and stakeholders being asked to outline their commitment to supporting Fife Council's intentions of adopting a holistic approach to improving air quality within the Kingdom of Fife;
- **Placemaking** – Management of the development and use of land across Fife in a way that tackles air pollution and improves quality of life for all;
- **Data** – Air Quality data collected by Fife, how it is used and how it can be improved;
- **Public Engagement & Behaviour Change** – How Fife Council leads by example and where possible reduces emissions (including greenhouse gases) from Fife Council's own buildings and vehicle fleets. Emphasise public awareness and understanding of local air quality issues within Fife, and how the public can help contribute to improving the situation;
- **Industrial** – How Fife Council continue to work with SEPA to manage industrial emissions;
- **Non-Transport** – Work with business and industry to raise awareness of non-transport emissions and support households to make less polluting choices;
- **Transport** – How Fife Council promotes sustainable travel to reduce the need to travel, and encourages a modal shift to minimise transport emissions;
- **Governance** – How co-ordinated working is facilitated between Council Services and external stakeholders to improve local air quality.

1. POLICY CONTEXT

Extensive improvements in air quality have been achieved through regulation to bring about stricter controls on emissions of pollutants from major sources, such as transport, industry and commercial and domestic combustion.

Legislation has been introduced which sets health-based standards for key pollutants in ambient air and defines processes to bring about continuous improvements in air quality.

1.1 National Legislation

Legally binding limits (air quality objectives or AQOs)[4] have been set for pollutants that have been associated with having a detrimental effect on human health and the wider environment. These health-based standards were transposed into Scottish Law through the Air Quality Standards (Scotland) Regulations 2010 (as amended).

Local authorities are required to assess and manage air quality within their respective geographical areas through the Local Air Quality Management (LAQM) Review and Assessment Process.

1.2 Local Air Quality Management (LAQM)

All local authorities are required to compile **Annual Progress Reports (APRs)** on air quality within their geographical areas (in accordance with the Local Air Quality Management regime established by Part IV of The Environment Act 1995).

APRs include a review of recent air quality monitoring data, and of any new developments or significant changes in the area, in order to identify any areas of poor air quality.

If the local authority identifies a likely breach of one or more of the air quality standards, and if there is sufficient evidence to confirm a breach of one or more of the air quality objectives, an '**Air Quality Management Area' (AQMA)**[5] must be declared.

[4] https://uk-air.defra.gov.uk/air-pollution/uk-eu-limits
[5] http://www.scottishairquality.scot/laqm/

2. AIR QUALITY

2.1 Why It Matters

Tackling air pollution has many benefits and improves our quality of life

- Reducing the exposure of residents to higher levels of air pollution brings significant health benefits, including fewer cases of asthma, coronary heart disease, chronic obstructive pulmonary disease, diabetes, and lung cancer and related improvements in quality of life.

Improving air quality also enhances the environment around us

- For example, supporting more physical activity through active travel helps to reduce local congestion. Improved traffic management, infrastructure and placemaking bring improvements in overall environmental quality such as noise reduction, greater road safety and climate change mitigation.

The local economy can also benefit from improved air quality

- People prefer to live and build businesses in places with a good environment.

The natural environment thrives when air quality is good

- Good air quality is crucial to allowing our habitats and ecosystems to remain healthy and support biodiversity

2.2 What Causes Air Pollution

Air pollution results from the introduction of a range of substances into the atmosphere from a wide variety of sources. It can cause short and long-term effects on health and the environment.

Air pollutants are produced by natural and man-made sources (The contribution of each source to local pollution levels can vary depending on several factors including:

- the type/number of local industries;
- the density and age of road transport;
- the chemical and physical properties of different pollutants; and
- the local weather conditions.

Figure 1). Typical sources of local air quality problems include transport, industry, power generation, construction and demolition, combustion processes including biomass combustion, and wind-blown dust.

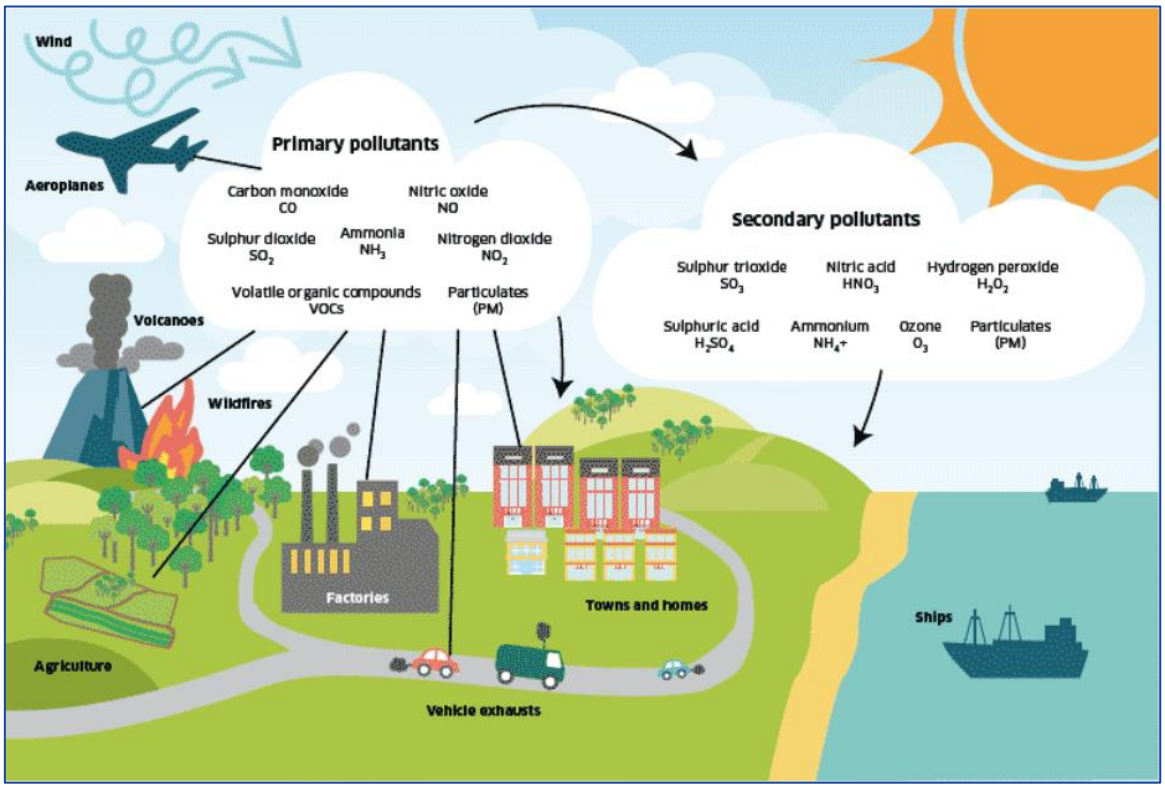
In addition to local sources, emissions generated from up to hundreds of miles

away can also add to local pollution due to the long-range transport of some types of air pollution.

The contribution of each source to local pollution levels can vary depending on several factors including:

- the type/number of local industries;
- the density and age of road transport;
- the chemical and physical properties of different pollutants; and
- the local weather conditions.

Figure 1: Sources of air pollution



2.3 Key terms

Natural sources – e.g. wind-blown dust

Mobile sources – e.g. road vehicles

Stationary sources – e.g. power generation

Concentrations of pollutants – the levels found in ambient air once background concentrations and emissions from various sources have been mixed and transported by atmospheric processes

Primary pollutants – emitted directly from the source,

nitrogen dioxide (NO_2), major contributor to local air pollution, emitted as exhaust fumes from transport

carbon dioxide (CO_2), produced by the combustion of fossil fuels for energy, contributes to climate change

carbon monoxide (CO), poisonous gas produced by incomplete, or inefficient, combustion of fuel

sulphur dioxide (SO_2), main source is industrial burning of fossil fuels

Ammonia (NH_3), a compound of nitrogen and hydrogen which is a by-product of agriculture and industry. It reacts with other pollutants to form particles of ammonium

Secondary pollutants – formed when primary pollutants undergo changes in the atmosphere,

ozone (O_3), transboundary secondary pollutant formed in the atmosphere when primary pollutants react with sunlight. Harmful to humans and the environment at ground level

sulphuric acid (H_2SO_4) and other acids and salts, harmful in their own right as well as contributing to the formation of particulate matter and acid rain

Suspended particles (Particulate matter) – primary and secondary pollutant. Made up of components such as acids, metals, and dust particles; sourced from natural and man-made activity.

2.4 Air Quality in Scotland

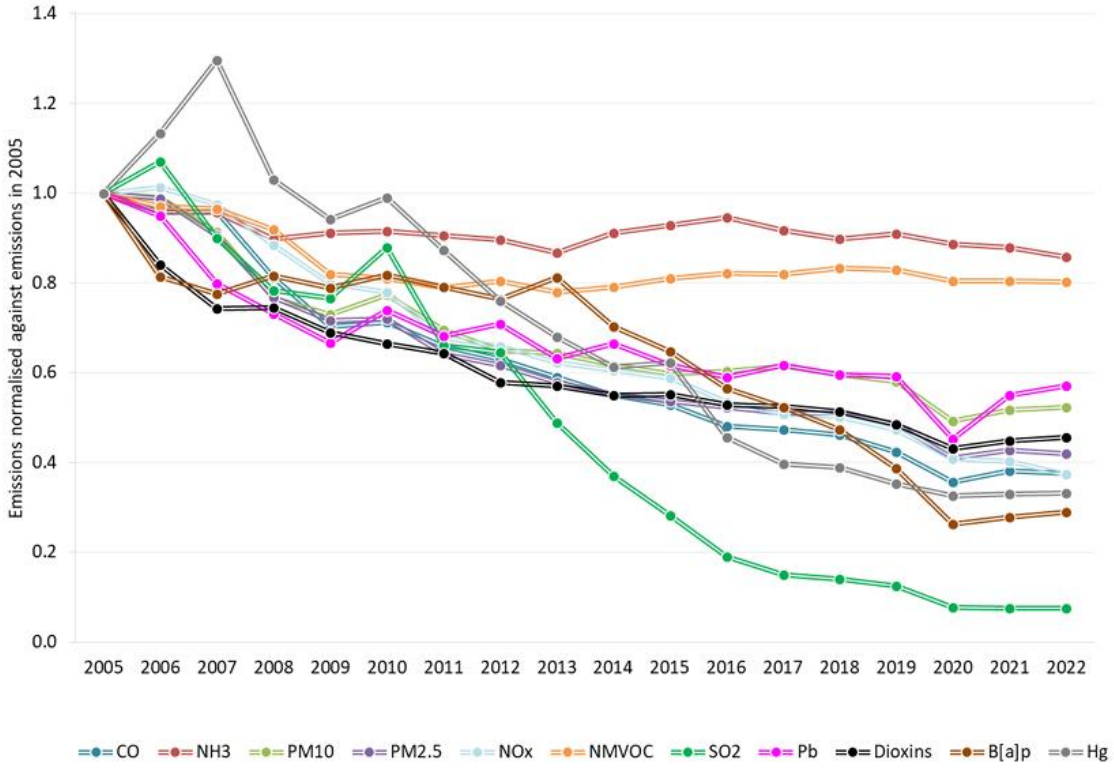
Over the last 25 years, Scotland has achieved progressively cleaner air (see Figure 2). There has been a strong downward trend in concentrations and emissions of pollutants (with the exception of Ammonia) since 1990 which have been a result in the implementation of regulations and the subsequent advances in technology. However, in recent years this trend appears to be plateauing and, in some cases, increasing.

Air quality across Scotland is generally very good but there are still areas of concern. Road transport remains the main source of poor air quality within urban areas (Nitrogen Dioxide), with agricultural processes the main source in rural areas (Ammonia). Emissions of Particulate Matter (PM_{10} and $PM_{2.5}$) have many principal sources (i.e. residential combustion, industrial processes, agriculture and transportation) and are of concern in both urban and rural areas.

There are also concerns arising from the increasing levels of secondary air pollution such as Ozone in both rural and urban areas.

The legally binding limits set in Scotland are set out in Table 1.

Figure 2: Scotland normalised trends in air pollutants



Source – Air Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 2005-2022[6]

[6] Mitchell J, Gu Y *et al.*, Air Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 2005-2022, (2024). Accessible at: https://naei.energysecurity.gov.uk/reports/air-pollutant-inventories-england-scotland-wales-and-northern-ireland-2005-2022

Table 1: Air Quality Objectives

AQ Objective-Pollutant	Concentration	Measured as	Date to be achieved by
Nitrogen Dioxide (NO_2)	200 µg m^{-3} not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg m^{-3}	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50 µg m^{-3}, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 µg m^{-3}	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10 µg m^{-3}	Annual mean	31.12.2020
Sulphur Dioxide (SO_2)	350 µg m^{-3}, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg m^{-3}, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg m^{-3}, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg m^{-3}	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg m^{-3}	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg m^{-3}	Running 8-Hour mean	31.12.2003
Lead	0.25 µg m^{-3}	Annual Mean	31.12.2008

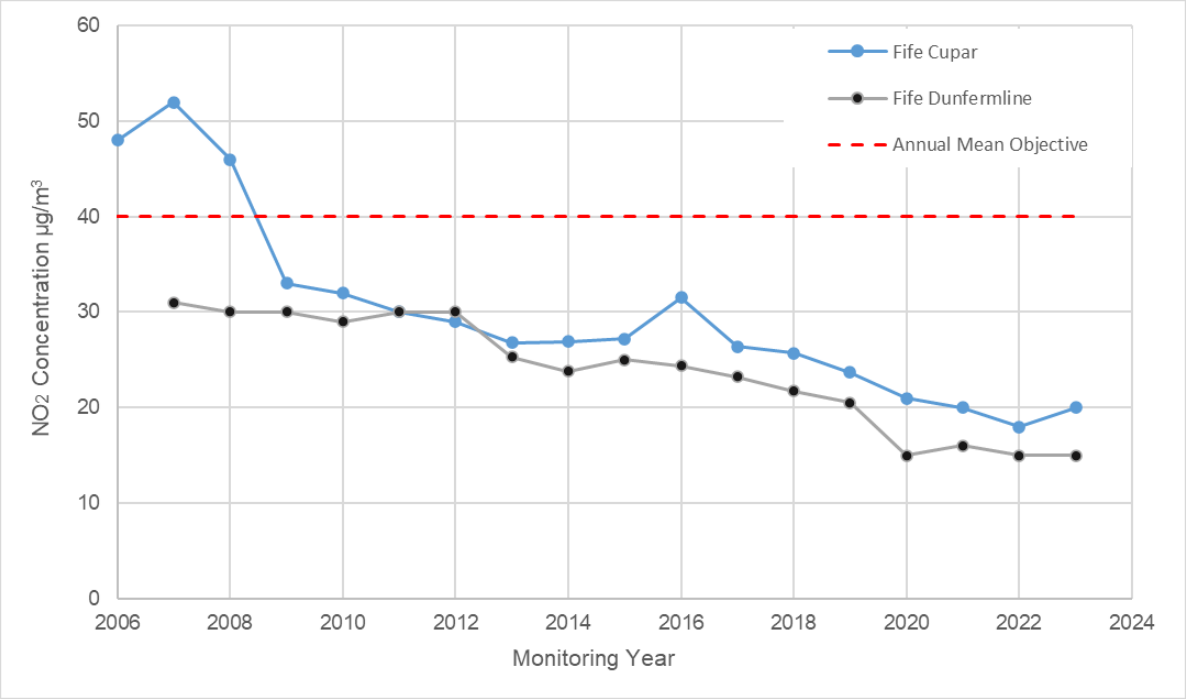
2.5 Air Quality in Fife

Fife Council are required by law to manage certain air pollutants at a local level through the Local Air Quality Management (LAQM) Regime. These are:

- Benzene;
- 1,3 Butadiene;
- Carbon Monoxide;
- Lead;
- Nitrogen Dioxide;
- Particles (PM_{10} and $PM_{2.5}$); and
- Sulphur Dioxide

Air quality throughout Fife is generally very good and has seen significant improvements over the last few decades (Figure 3). Through extensive monitoring, a few areas of concern within town centres and urban areas were identified with the main pollutants of concerns being Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}).

Figure 3: NO_2 automatic monitoring results for 2007-2023 in Cupar and Dunfermline



After further detailed analysis, the main source of these pollutants were attributed to vehicle emissions. Subsequently Fife Council declared Air Quality Management Areas (AQMAs) for pollutants NO_2 and PM_{10} at the Bonnygate in Cupar (in 2008) and Appin Crescent in Dunfermline (in 2011 for NO_2 and 2012 for PM_{10}).

In recent years, concentrations of NO_2 and PM_{10} have declined to below the objectives within the AQMAs, with the implementation of the associated **Air Quality Action Plans (AQAPs),** developed by Fife Council and key partners, significantly contributing to these reductions. **As a result the AQMAs for NO_2 were revoked in September 2021 and the AQMAs for PM_{10} revoked in December 2023.**

For more information on the monitoring, modelling and abatement measures and other work carried out by the council over the years please refer to the LAQM APR series of reports[7].

2.6 Air Quality in the Future

The revocation of the AQMAs has not altered the commitment of Fife Council to maintaining good air quality levels and continue our air quality monitoring regime and the implementation of existing abatement measures introduced by the AQMAs action plans. Indeed, the monitoring network has become more extensive following the introduction of the Sensor network. These additional sensor units enable Fife to monitor areas of concern more easily (due to the size of the sensor units) and at locations previously unmonitored.

More information on where air pollution is monitored in Fife, as well as historical data and the latest measurements, can be found on the Council's dedicated air quality webpages at www.fife.gov.uk/airquality and also the Air Quality in Scotland Website www.scottishairquality.scot/. Reports prepared by the Council can also be found here.

[7] https://www.scottishairquality.scot/laqm-reports/fife-council

3. LEADING BY EXAMPLE

Fife has had great success in proactively tackling the air quality challenges in the area and have often been leaders within Scotland in introducing these initiatives. These are some of the ways that this has been achieved.

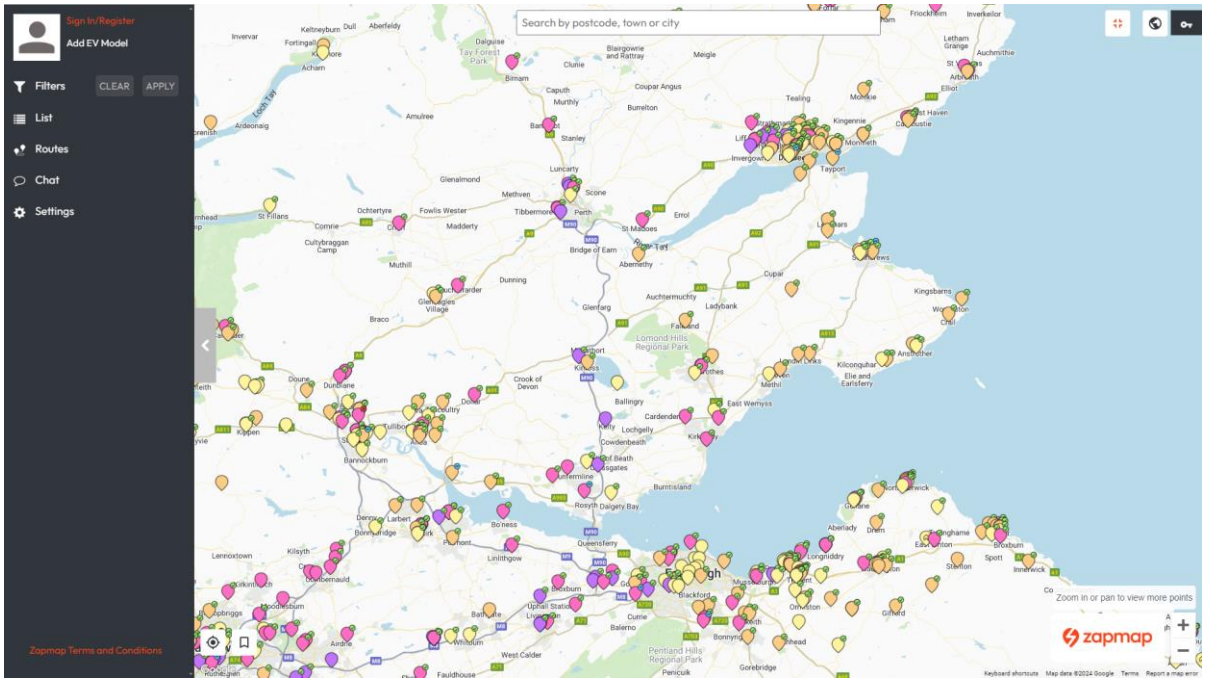
Fife became the first Council in Scotland to be awarded a 5-star rating from **ECO Stars**[8], a scheme that aims to help fleet operators improve efficiency, reduce fuel consumption and emissions and make cost savings.

Since its introduction in 2014, the ECO-stars scheme within Fife has been a huge success. At the time of writing there were around 300 fleet operator members (covering over 10,000 vehicles) and over 150 taxis and private hire operator members (covering almost 700 vehicles).

[8] https://www.ecostars-uk.com/fife-council-becomes-the-first-council-in-scotland-to-be-awarded-5-eco-stars/

Council fleet vehicles have also been playing their part in improving air quality. The proportion of electric vehicles has been rising steadily over the years and now includes the full electrification of the Councils Meals on Wheels (MoW) fleet with 29 electric vans meeting service needs across Fife.

There has also been a huge increase in **Electric vehicle charging points** over the last five years to enable behavioural change with regards the burning of fossil fuels and increase usage of electric vehicles across Fife. The extent of the charging infrastruture within Fife is best viewed using the interactive map on the Zapmap website (https://www.zap-map.com/live/).



Anti-idling campaigns have been run by Fife Council to highlight how idling vehicle engines can contribute to air pollution and impact more greatly the younger population.

Primary school children learn about air pollution and vehicle idling and think about the impact on their health, their family's health and how it affects their local environment.

School travel plans outline the commitments of each school to reduce the barriers to active travel for as many staff, pupils and parents as possible. In Fife, the plan is developed and delivered by schools and supported by a dedicated travel plan team.

Bikeability is cycle programme aimed at teaching school pupils bike skills and road safety awareness, while supporting the Curriculum for Excellence. Training is free and supported by a network of qualified instructors, who are often teachers, parents, and members of the local community.

Fife Council maintain and improve of one of the UK's most comprehensive **cycling networks**[9].

Fife has over 350 miles of sign posted cycle network, including a variety of leisure and commuting routes.

Fife Council **monitor air quality around some schools** to assess the air pollution around these sensitive locations and how it compares to current air quality objectives.

Educational packages at these Fife Council primary schools are used to support the ongoing monitoring and improve public engagement and behavioural change.

3.1 Who Should Get Involved and How

3.1.1 The Council

Fife Council recognise the impact their activities may have on air quality and is committed to lead by example. The Council has implemented a number of measures across a wide range of areas including:

- ‘De-carbonising’ the Council fleet vehicles, and public transport such as buses and taxis
- Integrating Air Quality with other Council strategies
- Implementing the Council’s Travel Plan;
- Carrying out parking management and enforcement;
- Providing information relating to Air Quality and travel options;
- Promoting sustainable travel choices; and
- Improving cycling and walking infrastructure.

3.1.2 Commercial/Public Sector Organisations

Commercial and Public Sector Organisations can also benefit by considering how air quality is impacted by their activities. For a start, being known as a ‘green’ company is no bad thing.

Businesses might also be able to reduce their operational costs by amending their working practices and

[9] https://www.welcometofife.com/view-business/fife-cycle-routes

switching to alternative technologies with lower air quality impact.

Further information is available on the dedicated Fife Council air quality web pages at www.fife.gov.uk/airquality.

3.1.3 The Public

Improving air quality helps to safeguard the health of everyone. The public have an important role in helping to improve air quality in Fife and are encouraged to consider the impact they can make through lifestyle choices such as choosing sustainable or active travel options.

Members of the public can find information related to air quality in the Air Quality in Scotland Website and Fife Council website.

An example of some of the actions that members of the public can take to help reduce air pollution include:

- Car sharing;
- Reducing car journeys by choosing to walk, cycle or take public transport instead;
- Maintain and look after your vehicle properly;
- Consider switching to an electric vehicle; and
- Reduce the use of and use best practice procedures when using domestic wood burners.
- Heating the home differently

4. HEALTH

Commitment: We aim to protect residents and visitors from the harmful effects of air pollution

4.1 The Challenge

Reduced life expectancy is associated with long-term exposure to air pollution which can cause chronic conditions such as cardiovascular and respiratory diseases as well as lung cancer. There is no evidence of a safe level of exposure to particulate matter without human health impacts[10].

The estimated annual number of deaths associated with long-term exposure to air pollution (specifically NO_2 and $PM_{2.5}$) in the UK is between 29,000 – 43,000[11]. Of these, 1,800 to 2,700 are estimated to occur in Scotland.

Evidence suggests interventions aiming to reduce population exposure to pollution will have the biggest overall health impact, although action also needs to be taken to reduce inequalities in exposure and to protect vulnerable groups[12]. The greatest burden of air pollution often falls on the most deprived communities and the most vulnerable individuals. Therefore, a precautionary approach is required to protect public health, especially those most at risk.

The main pollutants of concern and their impacts are detailed in Table 2.

Table 2 - Pollutants and their Associated Health Impacts

Pollutant	Associated Health Impacts
Fine Particulate Matter ($PM_{2.5}$)	'Ultrafine' particles which can enter deep into the lungs and even the bloodstream. Short term exposure (a few hours to weeks) can trigger cardiovascular disease-related mortality; longer-term exposure (e.g. a few years) increases the risk for cardiovascular mortality to an even greater extent and reduces life expectancy.
Particulate Matter (PM_{10})	'Coarse' particles can irritate the eyes, nose and throat and cause increases in respiratory illness, and deterioration in cases of cardio-respiratory disease.
Nitrogen dioxide (NO_2)	Associated with a range of adverse effects of the respiratory system. Exposure can result in irritation of the lungs and lower resistance to respiratory infections. Frequent exposure to concentrations that are typically much higher than those normally found in the ambient air may cause increased incidence of acute respiratory illness in children.
Ozone **O_3 (Ground level)**	Increase in mortality rates. Increase in cases of respiratory illness. Decreased lung function. Irritation to the eyes, and the airways of the lungs, exacerbating the symptoms of those who suffer from asthma and lung diseases.
Sulphur Dioxide (SO_2)	Even moderate concentrations have been associated with a fall in lung function in asthmatics. Sulphur dioxide pollution is considered more harmful when particulate and other pollution concentrations are also high.

[10] Review of evidence on Health Aspects of Air Pollution – REVIHAAP: final Technical Report, World Health Organization Office for Europe, 2013. Accessed at: https://www.who.int/europe/publications/i/item/WHO-EURO-2013-4101-43860-61757
[11] Public Health Scotland https://publichealthscotland.scot/population-health/environmental-health-impacts/outdoor-air-pollution-and-health/overview/scale-of-the-problem/
[12] Improving outdoor air quality and health: review of interventions. Public Health England, 2019. Accessed at: https://www.gov.uk/government/publications/improving-outdoor-air-quality-and-health-review-of-interventions

"Breathing clean air is a fundamental human right, and the realisation of that right impacts us all" according to the British Medical Association (BMA)[13].

Though it is widely recognised that long term exposure of air pollution has the greatest public health effect, short-term 'high pollution' episodes can also have a profound impact especially on individuals with pre-existing heart and lung conditions such as asthma and potentially trigger increased hospital admissions.

Acute episodes can also contribute to the premature death of people who are more vulnerable to daily changes in ambient air pollutant levels, notably the elderly and those with pre-existing health conditions.

Significant evidence of the health impacts of long-term exposure to typical lower levels of ambient air pollution has also been documented in many studies.

The BMA have stated that "In the coming decades Climate Change and Air Pollution will be the two of the biggest global public health challenges. Tackling them will be vital to the safeguarding of public and planetary health."[13]

Within Fife, air pollution from transport has the greatest impact on health, and the main pollutants of concern are NO_2 and Particulate Matter (PM_{10} and $PM_{2.5}$).

The biggest impact of particulate air pollution on human health is understood to be from long-term exposure to $PM_{2.5}$, which increases mortality risk, particularly from cardiovascular causes.

In 2016, Scotland became the first country in Europe to adopt the World Health Organisation (WHO) guideline value for $PM_{2.5}$ of 10µg m^{-3} as an annual mean and Fife Council have been monitoring $PM_{2.5}$ since 2015.

Indoor Air Quality

In urban populations in the UK, people spend up to 90% of their time indoors, therefore indoor air quality is also important to consider in terms of health impacts.

There are many factors which influence indoor air quality, including outdoor air pollution, making it challenging to address.

A coherent and integrated outlook is key to avoid the risk of unintended health impacts.

In-vehicle Emissions

Studies suggest that air quality inside vehicles can be poorer compared to roadside pollution levels experienced by pedestrians and cyclists.
This is a complex and emerging area and to date there is limited research.

Further investigation in this area is required to make improvements in the future.

4.2 How Fife Council Meet the Challenge

Fife Council has had great success in reducing concentrations of the two main pollutants of concern, NO_2 and PM_{10} in problem areas. Part of this success is down to the focus on the health and environmental impacts of air quality when engaging with the public on air quality issues, and the support from local public health agencies.

In partnership with NHS Fife and Health and Social Care Partnership (HSCP), Fife

[13] https://www.bma.org.uk/what-we-do/population-health/protecting-people-from-threats-to-health/climate-change-and-air-pollution

Council has produced a **Joint Health Protection Plan** (JHPP) which provides an overview of health protection (communicable disease and environmental health) priorities, provision and preparedness for the NHS Board area. This plan highlights the importance of a collaborative approach to tackling air quality issues.

This partnership has also produced the **MUSTER** model (**Meeting, Understanding, Surveillance, Toxicology, Evaluation and Reporting**) risk communication tool and has produced a standard pro forma for reporting Environmental Health complaints (including those relating to air quality).

Fife will also engage further with NHS Fife on health-related promotion activities such as encouraging walking and cycling in preference to the car.

The **Local Heat and Energy Efficiency Strategy and Delivery Plan**[14] sets out measures to achieve energy efficiency and decarbonised heat for buildings in Fife and specifically prioritises indoor air quality.

A reduction in levels of fine particulate matter ($PM_{2.5}$) is more challenging due to the diverse and numerous emission sources, but of great importance due to their detrimental health impacts. A further challenge is the long-range transport of $PM_{2.5}$. Around 50% of local ambient $PM_{2.5}$ concentrations relate to long-range transboundary transport from out with Scotland[15]. The council plan to work with other local authorities and the national government to tackle this issue.

We will:

- Continue to implement air pollution abatement measures, to ensure that the Scottish Air Quality Objectives (AQOs) continue to be achieved, and public health continues to be protected
- Consider and develop further actions to protect public health in the Fife area and beyond
- Work in collaboration with NHS Fife to engage with communities and those in the public and private sectors to improve air quality and raise awareness
- Communicate with the most vulnerable residents so that they are aware of the impact of air pollution on their health and what can be done to reduce the impact and protect themselves
- Raise awareness of the health benefits of alternative travel
- Consider the potential effects of indoor and in-vehicle air pollution and proactively align with any new research, policy and regulations

[14] https://www.fife.gov.uk/kb/docs/articles/environment2/local-heat-and-energy-efficiency-strategy-lhees-and-delivery-plan

[15] Ricardo Energy & Environment on behalf of the Department for Environment, Food & Rural Affairs, The Scottish Government, The Welsh Government and The Northern Ireland Department for Agriculture, Environment and Rural Affairs (2019), *Air Pollutant Inventories for England, Scotland, Wales, and Northern Ireland:1990-2017*, accessed at: https://uk-air.defra.gov.uk/assets/documents/reports/cat09/1910031755_DA_Air_Pollutant_Inventories_1990-2017_Issue_1.1.pdf

5. INTEGRATED POLICY

Commitment: We will integrate air quality within Council plans and strategies

5.1 The Challenge

Strategies, policies and plans developed for air quality management can overlap with those implemented for climate change mitigation and adaptation, noise management, transport and other polices. Co-ordinated working between national and local government brings many benefits.

Although the focus of policies around Air Quality and Climate Change is different, looking at the local scale and the global scale respectively, the two are linked. Where Air Quality investigates the causes and impacts of reactive pollutants in the short-term, Climate Change looks at the stable and long-lived pollutants that travel through the atmosphere and cause long-term effects. Both issues are caused by human activity.

Climate change can affect air quality by altering the emission, distribution, and transformation of air pollutants. For example, heatwaves can lead to more air pollution episodes, particularly ozone episodes in the summer.

Draft guidance from the IES[16] sets out how local authorities can integrate air quality and climate change in a cost-effective manner.

Nationally, there are several notable frameworks in place to guide air quality governance, including the National Transport Strategy 2[17] (NTS2), the National Planning Framework[18] (NPF4) and the Climate Change Plan[19].

5.2 How Fife Council Meet the Challenge

Fife Council maximises co-benefits between air quality and related policy areas such as climate change, noise, transport, planning and agriculture amongst others to deliver enhanced benefits.

The Local Transport Strategy (2006-2026)[20] and the Active Travel Strategy and Action Plan for Fife 2024-2034[21] set out the Council's vision for transport and active travel in Fife.

In regards to placemaking, an update to the Local Development Plan[22] (known as

[16] https://www.the-ies.org/sites/default/files/documents/aqcc_exposure_draft_final.pdf
[17] Transport Scotland (2020), *National Low Emission Framework: Protecting Our Climate and Improving Lives*, accessed at:https://www.transport.gov.scot/media/47052/national-transport-strategy.pdf
[18] Scottish Government (2020), *Scotland's Fourth National Planning Framework*, accessed at: https://www.gov.scot/publications/research-project-national-planning-framework-4-improving-air-quality-outcomes/
[19] Scottish Government (2020), *Update to the Climate Change Plan 2018-2032*, accessed at: https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/
[20] Fife Council (2006), *Local Transport Strategy 2006-2026*, accessible at: http://publications.fifedirect.org.uk/c64_LocalTransportStrategy.pdf
[21] https://www.fife.gov.uk/kb/docs/articles/roads,-travel-and-parking/roads-and-pavements/active-travel-policy-and-projects
[22] Fife Council (2017), *Local Development Plan (FIFEplan),* accessible at: https://www.fife.gov.uk/kb/docs/articles/planning-and-building2/planning/development-plan-and-planning-guidance/local-development-plan-fifeplan

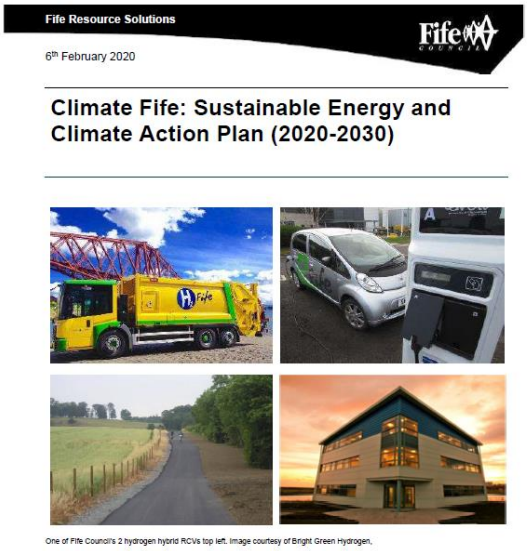
FIFEplan) is currently programmed to be adopted by the Council in 2027.

In addition, the Fife Local Heat and Energy Efficiency Strategy (LHEES) and Delivery Plan[23] will set out the plan for energy efficiency and decarbonised heat for all buildings in the area. Air quality is included in the priorities for the plan and work is currently being undertaken to understand the impact of actions on air quality. This includes the Net Zero Innovation and Delivery Programme which aims to move away from fossil fuel powered energy and heating sources and ensure our homes are ready for the impacts of the future climate.

Fife Council publish and maintain a number of local Climate Change strategies that incorporate improvements in Air Quality, including:

- Climate Fife: Sustainable Energy and Climate Action Plan (2020 - 2030)[24]
- Climate Fife 2024 Strategy and Action Plan[25]

Fife Council's Protective Services is working with colleagues in Climate and Zero Waste on a Climate Change Co-Benefits Evidence Base study. An initial modelling exercise has already been undertaken.



We will:

- Integrate air quality considerations within the existing and future Council plans and strategies
- Ensure that air quality policies are well integrated across different departments
- Collaborate with the Council's Climate Change and Zero Waste team to consider air quality
- Work with the Education department to increase awareness of local air quality
- Consider how existing and future Council strategies can encourage opportunities to contribute to improving local air quality and minimising negative impacts
- Shape and respond to National air quality measures, attending and contributing to seminars, training events and pollution liaison groups

[23] https://www.fife.gov.uk/kb/docs/articles/environment2/local-heat-and-energy-efficiency-strategy-lhees-and-delivery-plan
[24] Fife Council (2020), Climate Fife: Sustainable Energy and Climate Action Plan (2020 -2030), accessible at: https://www.fife.gov.uk/__data/assets/pdf_file/0028/219970/Climate-Fife-Sustainable-Energy-and-Climate-Action-Plan-2020-2030.pdf
[25] Fife Council (2024), Climate Fife 2024 Strategy and Action Plan, accessible at: https://www.fife.gov.uk/__data/assets/pdf_file/0020/560072/Climate-strategy-2024-final.pdf

6. PLACEMAKING

Commitment: We will meet the future environmental, economic, and social needs of Fife's residents and maintain good air quality

6.1 The Challenge

When placemaking is done well, it can improve air quality, allow sustainable and active travel, improve physical and mental health and provide a better living environment for all residents and visitors.

Local planning or placemaking can be used to improve and maintain good air quality. There are many challenges, including considering air pollution at small scale, and managing the historic built environment.

Cities and urban landscapes influence the air quality in the local area. In built-up areas, pollution hot spots can be created by street canyons, where high buildings on either side of a street make it more difficult for air pollution (from traffic) to escape.

New developments can also add to the pollution burden if not managed properly.

Traditionally, local planning has focused on privately-owned vehicles and road transport associated with development. This is still an important consideration and planning assessments must include the effects of traffic on air quality as well as mitigation measures needed to maintain the efficiency of the transport network and to avoid unacceptable effects on air quality.

In recent years, the focus has broadened to include open spaces and nature-based solutions. Nature based solutions include creation of more nature spaces in urban areas, better management of existing green spaces and technology such as "green screens" where planted fences screen out airborne pollution.

Fife Council incorporate national initiatives into our local planning approval procedures, including the National Planning Framework 4 (NPF4)[18].

6.2 How Fife Council Meet the Challenge

Fife Council ensures that local air quality is considered as part of the planning and placemaking process.

Fife Council have embedded air quality in their Local Development Plan[22] (FIFEplan) and Low Carbon Supplementary Guidance[26].

FIFEplan sets out the policies and proposals for the development and use of land across Fife. The policies in the Plan and supplementary guidance are used to determine planning applications and give

[26] Fife Council (2019), *Low Carbon Fife: Supplementary Guidance*, accessible at: http://publications.fifedirect.org.uk/c64_AdoptdLowCarbonFifeSGJan2019mr.pdf

guidance to communities and investors on where development can take place, what type of development, design guidelines and provision for protection of environmental and cultural assets.

The Low Carbon Supplementary Guidance provides guidance on the application of FIFEplan policies on air quality and the impacts on amenity of low carbon energy proposals.

In 2017 Fife Council invested in a regional scale high resolution model, the output of which is one of the most highly spatially resolved air quality models in the UK for a regional domain. The model is used by the Council to provide data on air pollution, which is then used to quickly, effectively and accurately determine what air quality impact new developments will have.

The Council plan to continue to use and enhance this resource and also identify if and where it can be effectively utilised within other departments so as to ensure a more holistic approach to tackling air pollution issues.

We will:

- Provide a dedicated team that will assess development proposals for air quality impacts and consider appropriate mitigation measures
- Consider the cumulative negative air quality impacts of new development and use local planning considerations to enforce mitigation measures
- Utilise and identify innovative tools to assess air quality in planning
- Provide planning guidance which incorporates air quality
- Incorporate national initiatives into local planning approval procedures
- Support infrastructure changes that will improve air quality

7. DATA

Commitment: We will provide high quality data that will accurately inform decision making in respect to achieving good air quality

7.1 The Challenge

The Environment Act in 1995 required the Government to support local authorities in measuring and improving air quality. This included the development of high-quality local and national monitoring networks.

Local authorities are required to publish monitoring data as part of an Annual Progress Report, describing any changes to monitoring, any improvements or new issues and a summary of new developments that might affect air quality.

Air quality measurements have traditionally been made using established reference methods (automatic sites) which provide the most accurate measured concentrations at areas of interest and indicative low-cost samplers (diffusion tubes) which provide less accurate, low resolution indicative concentrations over wider areas of interest.

Air pollution measurement technology has improved. Agile low-cost sensors can now be used to obtain data from areas of concern that were previously unattainable due to the topography.

Data from these sensors systems cannot be used to report directly against air quality objectives due to associated uncertainties however can provide a very useful indication. They also present a great opportunity to make a wider range of measurements over a larger geographical area. This can help to pinpoint any local pollution hotspots or to ease the concerns of residents in their local areas.

Traffic data can also be used to inform infrastructure interventions to reduce emissions. This feeds into journey planning and improving awareness of active and sustainable travel choices.

Emerging traffic count resources include mobile phone locational services, which are currently used to support congestion detection and Automatic Number Plate Recognition cameras.

7.2 How Fife Council Meet the Challenge

Fife Council operates an extensive network of air quality monitoring devices across Fife and this well-established monitoring network has been collecting data since the early 2000's.

The network includes automatic monitoring sites as part of the Scottish air quality monitoring network, and a comprehensive diffusion tube network strategically deployed around Fife.

Fife Council have invested in innovative sensor technology and alternative monitoring techniques to better understand air pollution levels and identify potential emerging pollution hotspots.

The data collected and the rigorous quality assurance regime implemented on said data, provides a sound basis for the development of air quality improvement measures and abatement policy. The data is reviewed regularly as part of the Local Air Quality Management commitments, to identify any gaps or areas for improvement.

Fife also use the latest models to produce data that supplements and supports existing monitoring data allowing greater spatial coverage and the assessment of sensitive areas across the region.

Fife have a dedicated experienced Land and Air Quality Team who undertake the air quality review and assessment process each year in will continue to do so. Recent LAQM reports prepared by the Council can be found on www.fifedirect.org.uk and Air Quality in Scotland Website.

Fife Council also monitor traffic using traffic counters. Scottish Government funding is usually provided annually to obtain additional counters and enable the Council to monitor changes in vehicle use.

We will:

- Make available the latest measured data online via the Air Quality in Scotland website and App
- Collect high-quality data and identify trends or gaps in the information gathered
- Publish high quality data as part of LAQM obligations
- Keep the monitoring network under review to ensure remains fit for purpose
- Further develop and enhance the capabilities of the Fife Sensor monitoring network to help identify and better understand the air pollution climate in Fife
- Stay up to date with the latest monitoring technology and analysis tools
- Collect traffic and transport data to support air pollution mitigation plans.
- Utilise modelling data to inform decision making

8. PUBLIC ENGAGEMENT AND BEHAVIOUR CHANGE

Commitment: We will engage with communities on the impact of air pollution and how they can make a difference

8.1 The Challenge

Public engagement increases awareness of air quality issues and encourages behaviour that contributes to sustained local air quality improvements. Public engagement forms a huge part of the work that any Local Authority carries out.

Communicating complex scientific data to the public has its challenges, usually concepts are best understood when ideas are related to the real world. For this reason, communication of air quality issues to the public usually focuses on the health and environmental impacts, rather than specific concentrations or emissions.

Engagement with the public works well when it is supported by a range of agencies such as the national and local government, public health agencies, public transport providers, businesses and schools. Evaluation and feedback is also important so that organisers can learn about the effectiveness of the engagement.

The challenge is to educate young people about the issues of air pollution so that good air quality behaviour becomes second nature later on in life.

Citizen-led science is a great way to get the public involved in events and activities. Active involvement raises awareness and encourages behaviour change.

Many resources are freely available, for example the Learn About Air[27] is a dedicated teaching resource, linked to Scotland's Curriculum for Excellence. Air pollution detectives[28] is an interactive resource aimed at primary school children and features information on pollutants and actions that can be taken to improve air quality.

Clear the Air[29]: an educational resource for secondary school pupils to find out about air pollution, use the emissions calculator, or sign up to the Citizen Science project to get involved in understanding how air pollution is measured in the local area.

Behavioural changes usually result when the alternative is easier or more convenient or even more affordable than the current option. Public engagement must address any real or perceived barriers to behaviour change. For example, campaigns to publicise improved walking and cycling infrastructure will challenge the notion that every journey requires a car or a bus.

Social media can be a useful tool for engaging with the public on air quality issues. Websites are useful to ensure materials are made available for the public to view and to benefit other public engagement strategies. Announcements or information shared via online platforms can reach a wider audience than was possible in the past.

8.2 How Fife Council Meet the Challenge

Fife Council carry out a large number of public engagement activities, including the promotion of sustainable travel choices and providing air quality data. These activities aim to encourage a shift away

[27] http://www.learnaboutair.com/
[28] https://children.scottishairquality.scot/
[29] https://cleartheair.scottishairquality.scot/

from the use of private motor vehicles for travelling to more sustainable forms of transport or reducing the need for travel.

The improvements to air quality brought by adjustments such as a reduction in private vehicle use are huge, as can be seen in data collected during the 2020 COVID-19 lockdown.

Travel to school is still a necessity and Fife Council continue to actively promote ways to make this a sustainable journey through initiatives such as Bikeability and WOW (Walk Once a Week), as well as support from the Transport department for the development and implementation of school-specific travel plans.

Beginning in 2015, the "Walk Once a Week[30]" Campaign (WOW) partnership between Fife Council and Living Streets Scotland continues to progress the active travel agenda in Fife Primary schools and increase the uptake of active travel.

The Walk of Fame competition encourages schools across Scotland to join in and track as many active journeys as they can via the WOW Travel Tracker. This event is a fun and engaging way for schools to reach even higher levels of active travel and demonstrate how they have embedded active travel as they try and get into the national top ten of the most active schools.

The SUSTRANS initiative, Hands Up Scotland Survey[31], looks at how pupils across Scotland travel to school and nursery. Established in 2008, the survey has been providing an insight into journeys to school for more than a decade and is the largest national dataset on school travel.

In recent years Clean Air Day (CAD) has become a successful platform in raising awareness within Scotland. Fife have successfully delivered initiatives and events around CAD focussing specifically on Schools.

[30] https://www.livingstreets.org.uk/walk-to-school/primary-schools/wow-the-walk-to-school-challenge/
[31] https://www.sustrans.org.uk/our-blog/projects/hands-up-scotland-survey/

Fife Council have been able to provide a number of primary schools with an educational package, including materials to carry out their own monitoring studies using low-cost sensors. This included presentations, and hands on experience for pupils using mobile monitoring equipment and designing their own diffusion tube study.

Positive behaviour changes to help improve local air quality are promoted as part of this programme, including highlighting school travel plans, Fife Council's 'Fresh Air Frankie'[32] guides and other sustainable travel options.

Atmotube personal monitoring sensors have also been provided to pupils. These sensors have an indicator light which instantly shows what the Atmotube Air Quality Score (AQS) is when used by pupils to carry out class mobile monitoring exercises. The Atmotube App allows pupils to view graphs of air pollutants measured and the corresponding Daily Air Quality Index (DAQI) level.

In addition, dynamic sensor reports are provided to pupils to learn about the data collected by the sensors, allowing pupils to analyse the sensor information through different interactive features.

In the development of this strategy, Fife Council considered the key finding of Scottish Government's Air Quality: key behaviours report[33].

[32] https://www.fife.gov.uk/kb/docs/articles/roads,-travel-and-parking/roads-and-pavements/safety/school-travel-plans-in-fife
[33] https://www.gov.scot/publications/air-quality-key-behaviours-report/pages/4/

We will:

- Raise public awareness and understanding of local air quality issues
- Promote initiatives and involve residents in contributing to air quality improvements
- Promote sustainable travel like walking, cycling and public transport over the use of cars
- Promote Fife's Electric vehicle infrastructure
- Focus on behavioural change at Primary School Age through the continued production and implementation of educational programmes and initiatives
- Promote and organise educational events around Clean Air Day
- Provide air quality information on the Fife Council website
- Raise public awareness of the impact of emissions from biomass boilers/ domestic wood burners through a dedicated page on the Fife Council website
- Raise awareness of the impact to biodiversity from emissions of ammonia and atmospheric nitrogen
- Liaise with Scottish Government on the latest national public engagement and behavioural change policies and initiatives

9. INDUSTRIAL

Commitment: We will support the control and reduction of air pollution from industrial sources

9.1 The Challenge

Since the 1990s increasingly stringent regulations resulting from national and international legislation have been successfully implemented to curtail emission from industrial activities.

Emissions from industrial sources are strictly controlled and monitored by the Scottish Environment Protection Agency (SEPA) but also the Council to a lesser extent. Regulations require industry to meet environmental performance standards, including emission limit values (ELVs), and data is collected from regulated sites to ensure compliance. The provision of this regulatory framework within Fife is comprehensive.

Whilst SEPA deal with larger industrial sites, local authorities regulate small industries which cause air pollution. Before a small industry can operate, it must obtain an environmental permit from the local authority, which sets out air quality standards under the Industrial Emissions Directive.

The Clean Air Act 1993 gives local authorities the powers to control and avert dark smoke and harmful fumes from industrial premises, including approval powers for new emission sources.

The Local Authority can also designate smoke control areas and issue enforcement notices and fines for offences.

The contribution to air pollution in Scotland from non-exhaust emissions (NEE) and non-road mobile machinery (NRMM) including transportation refrigeration units and construction plant is also under consideration by the Scottish Government.

NRMM includes machinery such as construction plant, transportation refrigeration units and agricultural machinery. NRMM are regulated through different standards to vehicles but many fall outside the regulations as they were manufactured before the regulations were introduced.

9.2 How Fife Council Meet the Challenge

The coast of Fife has some industrial docks in Burntisland and Rosyth. The areas in the south and west of Fife, including the towns of Dunfermline, Glenrothes, Kirkcaldy and the Levenmouth region are more industrial and densely populated.

Most industrial sites have their processes and emissions regulated by SEPA so meet the regulatory requirements with regards emissions to air.

SEPA undertakes additional air quality monitoring where necessary and deploys environment protection officers to record community impacts and gather information, data and evidence.

Fife Council continue to support SEPA and local community groups to tackle any issues or complaints caused by industrial emissions.

The Council believe that providing Fife residents with access to as much accurate information and data on emissions from industry is essential in the process of raising awareness and tackling air pollution.

We will:

- Collaborate with SEPA on industrial emissions monitoring
- Communicate with SEPA on industrial emission sources and pollution events using set procedures
- Communicate with local residents the work carried out by the Council and SEPA with regards industrial emissions and complaints
- Engage with Fife Industry and inform them of their requirements and new guidelines
- Keep up to date with Scottish Government Guidance and Regulation for NEE and NRMM

10. NON-TRANSPORT EMISSIONS

Commitment: We will control and reduce air pollution from non-transport sources

10.1 The Challenge

Whilst we continue to reduce transport emissions, we must also address the emerging challenge of emissions from the non-transport sector such as domestic (household) combustion and agriculture.

Household wood-burning

Domestic combustion refers to household wood stoves or biomass burners, which have been growing in popularity as a secondary heat source. Burning solid fuel in this way emits particulate matter, specifically fine particulate matter ($PM_{2.5}$), as well as nitrogen dioxide and sulphur dioxide.

There is a lot of variability in the magnitude of emissions and the type of pollutants released from burning wood, which makes it difficult to legislate. Local authorities have a certain amount of control over the environmental performance standards for domestic fires, stoves and fuels, however these powers do not capture every source, especially outdoor small scale wood burners.

Additionally, unless located in an AQMA, household wood burners do not require planning permission and it can therefore be difficult for local authorities to calculate the number and location of appliances in their areas. It is important to be able to evaluate the number of appliances in a relatively small urban area because it is generally the cumulative effect which contributes to overall emissions.

Agriculture

Another area which has not been traditionally targeted for air quality improvements is agriculture. Agriculture occurs on 69% of land in Scotland[34] and is responsible for around 90% of total ammonia (NH_3) emissions.

This is an important area to tackle because ammonia emissions are not decreasing over time in the same manner as the other main air pollutants (see Figure 4).

Ammonia is traditionally associated with strong odours and the resulting nuisance effect on local communities, however the environmental impacts are less well known in terms of local air quality management.

[34] https://www.gov.scot/publications/results-scottish-agricultural-census-june-2023/pages/most-of-scotlands-area-is-used-for-agriculture/

Ammonia is very reactive and its reaction products with acids and particulates are harmful to ecologically sensitive habitats and human health.

Deposition of nitrogen (from emissions of ammonia and nitrogen oxides) causes eutrophication and acidification of ecosystems.

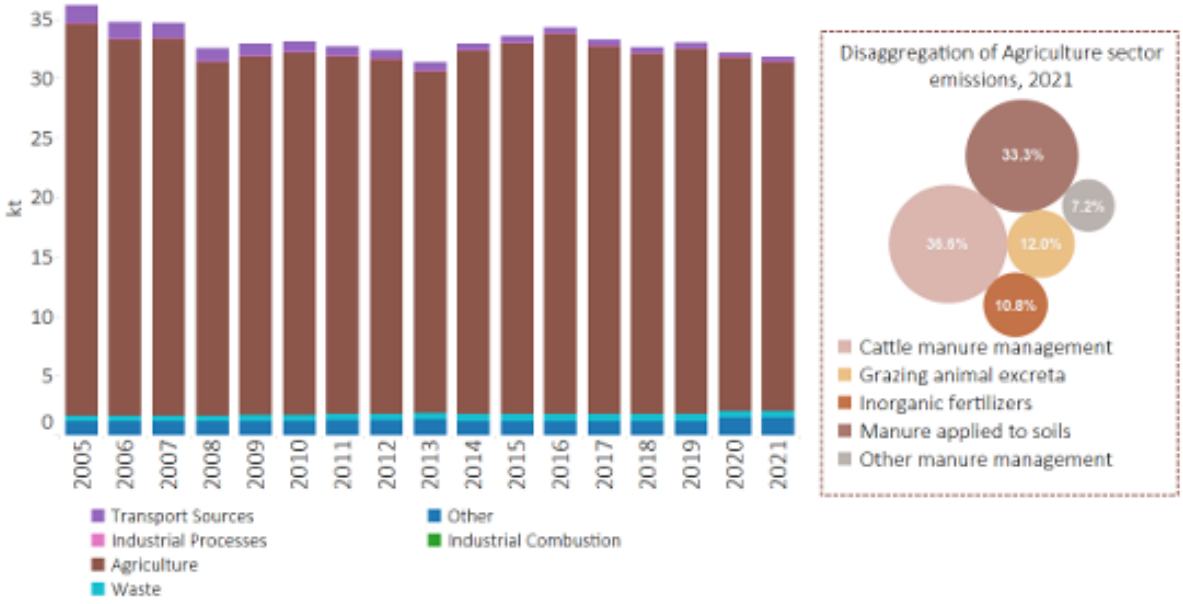
In addition, ammonia and its nitrogen-containing reaction compounds have a long lifetime in the atmosphere, transporting nitrogen compounds over long distances and causing pollution far away as well as near the source.

Areas affected in Scotland are shown in

Figure 5.

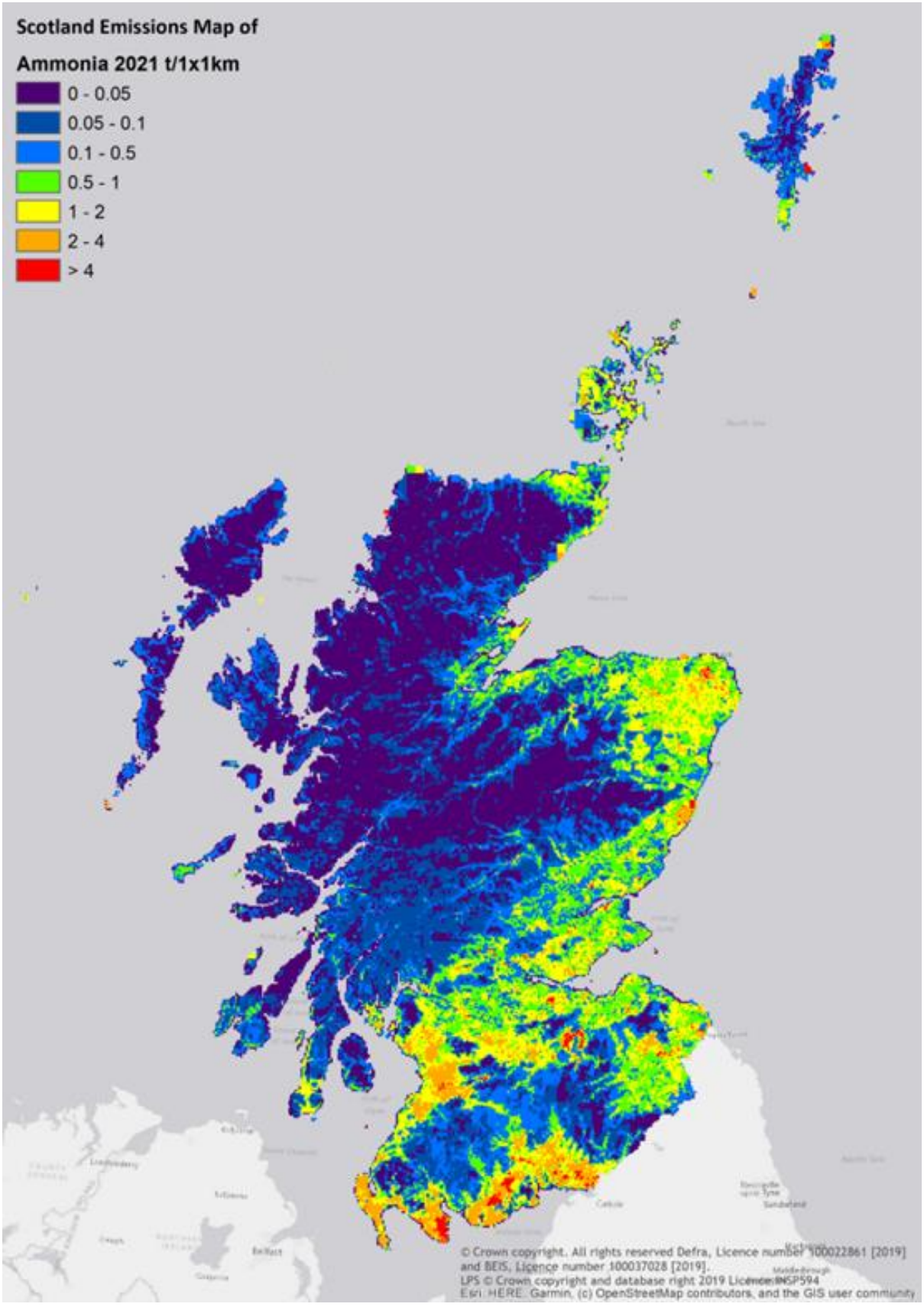
Currently, the habitat-specific damage thresholds for atmospheric nitrogen deposition (known as Critical Loads) are exceeded in three quarters of Special Areas of Conservation in Scotland and in 35% of habitats sensitive to eutrophication. It is therefore important to look at good agricultural practice and improve nitrogen use efficiency in farming.

Figure 4 – Time series of Scotland's ammonia emissions 2005-2021[35]



[35] Ricardo Energy & Environment on behalf of The Scottish Government, Scottish Air Quality Database (2023) *Air pollution in Scotland 2022* (Accessed at https://www.scottishairquality.scot/sites/default/files/publications/2023-12/SAQD_annual_report_2022_issue_1.pdf)

Figure 5 – Scotland Emissions Map of Ammonia 2019[35]



10.2 How Fife Council Meet the Challenge

Household wood burning

There is an increasing focus on fine particulate matter pollution and control over the use of woodburning fires is likely to be of increasing importance to local authorities tackling air pollution. Currently, Fife Council's Public Protection team assesses applications for the use of domestic combustion with support from the Land & Air Quality team. The Public Protection team also investigate complaints in relation to nuisance from smoke. More information is available on the Council website[36].

Fife have undertaken a number of projects and initiatives (such as domestic fuel use survey within the now revoked AQMAs (Bonnygate, Cupar and Appin Crescent, Dunfermline)) to further understand the contribution of this source. Innovative technologies are also employed to investigate pollution from wood burning and allow Fife to develop an understanding of any problem areas.

Smoke Control Areas (SCAs) are designated across Fife. Within these areas there are specifications for what material may be burned and which appliances may be used. Fines can be issued for non-compliance. More information on SCAs is available on the Council website.

Tackling the issue of household wood burning will focus on raising awareness, both in terms of operation of appliances and the choice of fuel. At a UK-level, Burnright[37] is an educational campaign which provides a range of materials and resources for stove users. Within Scotland, Home Energy Scotland[38] provides advice and support to households considering low-carbon heating for their homes. Fife will also focus on implementing and promoting the EU led "Ecodesign[39]" programme which looks to lower emissions and improve efficiency in wood burners.

A Scotland-led approach to engagement and a focus on public health is expected from the national government. Behavioural change will be at the forefront of this challenge. In this regard a page dedicated to wood burning installations (including best practice guidance) has recently been added to the Council's dedicated air quality webpages at www.fife.gov.uk/airquality

Agriculture

As of 2016, over half of the land in Fife is used for crops or fallow, the largest proportion in Scotland[40]. The Council's Public Protection team regularly deals with the odour and nuisance aspect associated with agricultural activities, and Fife Council is now looking at ways to encourage best working practices for air quality improvements.

Fife plan to raise awareness of the air pollution issues, which results from farming practises, within the farming community. In an already heavily scrutinised sector, it will be a difficult to encourage behavioural and practice change.

[36] https://www.fife.gov.uk/kb/docs/articles/environment2/environmental-health/nuisances
[37] https://burnright.co.uk/
[38] https://energysavingtrust.org.uk/scotland/home-energy-scotland
[39] https://op.europa.eu/en/publication-detail/-/publication/c6ccf626-2f6d-11e5-9f85-01aa75ed71a1/language-en
[40] https://www2.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/agritopics/LandUseAll

The Council believe that the best approach will be to highlight the additional benefits to these changes such as increased yields and also provide advice on any government funding initiatives.

Advice on best practice will follow Scottish Government Guidance. The CAFS2 Agriculture and Environment Working Group (AEWG) have considered a range of ammonia nitrogen measures for the agricultural sector.

Alternative Energy Sources

Scottish Gas Network (SGN) are developing zero carbon hydrogen generation from offshore wind in Fife in the Levenmouth area. H100 Fife is a pioneering project that will demonstrate 100% green hydrogen heating in homes for the first time through a world-first hydrogen network. This project aims to lay the foundations for this change while giving residents in the local area the opportunity to be at the leading edge of the low-carbon economy.

In the project's first phase, the network will heat around 300 local homes using green hydrogen generated from offshore wind. Further information on the project is available at: https://sgn.co.uk/H100Fife and https://www.investinfife.co.uk/blogs/news/1190/redir/.

Household wood-burning – we will:

- Further develop co-operation between the Land and Air Quality team and Public Protection team
- Raise awareness of air quality issues associated with domestic (household) combustion
- Raise awareness of the benefits of using Ecodesign wood burners using national and local initiatives
- Work with business and industry in Fife to support educational schemes
- Provide a dedicated team to investigate complaints

Agriculture – we will:

- Raise awareness of ammonia emissions within the Agricultural sector
- Continue discussions with Agricultural sector on the use of best practise techniques
- Provide advice on Government funding initiatives
- Work with other local authorities to ensure a holistic approach

Alternative Energy Sources – we will:

- Assess progress with the H100 project in Levenmouth

11. TRANSPORT

Commitment: We will provide a transport system that minimises air pollution and promotes sustainable travel

11.1 The Challenge

Motor vehicles are the major cause of local air quality issues in Fife and the main source attributed to the establishment of both of Fife's AQMAs.

Fife Council have identified, through the LAQM process, that road transport contributes a significant proportion of emissions in areas where there are air quality problems. In addition to volume, traffic congestion also made a significant contribution to elevated local concentrations of pollution.

Fife has achieved a huge reduction in pollution from vehicles and this must be maintained. This was made evident by the 2020 COVID-19 lockdown when vehicle traffic across the UK decreased by about 70% by mid-April[41].

The most striking reductions to vehicle related pollutant concentrations were seen in urban areas. An average reduction of 25% NO_2 was recorded during lockdown[42].

Fife recorded significant reductions in NO_2 concentrations coinciding with the decrease in traffic. A significant reduction in PM_{10} again highlights the possible contribution of PM from vehicles.

This reduction in concentrations provides evidence of what can be achieved if further action is taken. However, it is acknowledged by the Council that these actions should coincide with the sustainable development of the region.

Non-exhaust emissions (NEE) from road traffic consist of particles from the wear of brakes, tyres and the road surface and from the resuspension of road dust. Of the particulate emissions from road transport, particles from brake wear, tyre wear and road surface wear constitute over half of $PM_{2.5}$ and almost three quarters of primary PM_{10}.

Scottish Government has set targets to be reached in the next five to ten years on sales of petrol and diesel cars, use of renewable fuels and removing vehicle emissions from city centres.

Increasing provision of electric and hydrogen powered vehicles is part of the solution, however actively reducing the use of private vehicles is considered the most effective way to ease congestion and decrease emissions from the transport sector.

[41] https://www.gov.uk/government/publications/slides-and-datasets-to-accompany-coronavirus-press-conference-21-may-2020

[42] Air Quality Expert Group (2020), *Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK: Rapid evidence review – June 2020.* Accessed at: https://uk-air.defra.gov.uk/assets/documents/reports/cat09/2007010844_Estimation_of_Changes_in_Air_Pollution_During_COVID-19_outbreak_in_the_UK.pdf

11.2 How Fife Council Meet the Challenge

LAQM

Due to the actions and abatement measures implemented by Fife Council, combined with technological advances prompted by the vehicle Euro emissions standards and other legislation, concentrations of NO_2 and PM_{10} within both AQMAs have declined significantly to below AQS objectives and in turn resulted in the revocation of both AQMAs.

Action plan measures successfully implemented by the Council have included;

- Implementation of new urban traffic management and control system and changes to pedestrian crossings in Cupar
- Traffic management optimisation
- Modelling studies for the Northern relief road

The Council continue to implement these abatement measures and will actively identify new measures so that good air quality is maintained and, where possible, improved.

ECO Stars

Fife became the first Council in Scotland to be awarded a 5-star rating from ECO Stars[43], a scheme that aims to help fleet operators improve efficiency, reduce fuel consumption and emissions and make cost savings.

Since its introduction in 2014, the ECO-stars scheme within Fife has been a huge success. At the time of writing there were around 300 fleet operator members (covering over 10,000 vehicles) and over 150 taxis and private hire operator members (covering almost 700 vehicles).

Some of the initiatives put in place by Fife Council to achieve the highest 5-star rating include:

- A dedicated Fuel Champion – monitoring and reporting on fuel usage and spend;
- Extensive driver training and skills development
- Replacement of older vehicles with efficient, cost-effective Euro6 diesel, electric or hydrogen engines; and
- Support systems to inform drivers of potentially inefficient driving practices.

Fife's ECO Stars Fleet Recognition scheme continues to recruit strongly and has seen a year-on-year increase in the number of operators considering Ultra Low Emission Vehicles.

ECO Stars continues to be supported by the Scottish Government as part of its CAFS strategy, and the profile of the scheme is raised at local forums such as the SEStran Logistics and Freight Forum.

Regional Transport Strategy

The Regional Transport Strategy[44] from South East of Scotland Transport Partnership (SEStran) supports "Transitioning to a sustainable, post-carbon transport system" (Objective 1), "Facilitating healthier travel options" (Objective 2), and "Supporting safe, sustainable, and efficient movement of people and freight across the region" (Objective 4).

[43] https://www.ecostars-uk.com/fife-council-becomes-the-first-council-in-scotland-to-be-awarded-5-eco-stars/

[44] South East of Scotland Transport Partnership (SEStran) (2022), *SEStran 2035 Regional Transport Strategy*. Accessible at: https://sestran.gov.uk/sestran-2035-regional-transport-strategy/

Alternative Technology

The electric vehicle charging network is being expanded across Fife, doubling the previous provision and making it easier for residents and those visiting to move to electric vehicles.

We will:

- Maintain the reductions achieved in NO_2 and PM_{10} concentrations from road traffic
- Continue to implement existing abatement measures introduced for the now revoked AQMAs and seek out new measures that will seek further improvements
- Ensure Air Quality is considered in all transport planning decisions
- Continue to use the Fife ECO Stars scheme to promote more sustainable travel within Fife
- Progress the sustainable travel programme, focussing on
    - decarbonising the Council's own fleet;
    - reducing the need to travel by settlement and development planning and smart technology;
    - promoting active travel;
    - increasing vehicle efficiencies;
    - making public transport more popular; and
    - increasing the uptake of ultra-low emission vehicles such as hybrid-electric and full-electric vehicles

12. GOVERNANCE

Commitment: We will deliver improvements to air quality in collaboration with the community and other key stakeholders

12.1 The Challenge

Fair and open governance is essential to deliver continued improvements in air quality. This requires transparency and public accountability. There are diverse connections between air quality and many other areas, so effective coordination is also key.

Locally, the emphasis remains on recognition and consideration of air quality across teams and departments. This includes specific air quality policies within development plans and guidance documents. See the Integrated Policy section for more detail.

12.2 How Fife Council Meet the Challenge

Much of the improvements in air quality in Fife identified in recent years are the result of the implementation of the air quality action plans and previous Air Quality Strategy developed by Fife Council in partnership with key stakeholders.

Fife Council recognises that no one single authority or Council service can have all the solutions to improving air quality. Consequently, the Council has sought to develop a collaborative approach with key partners and stakeholders being asked to outline their commitment to supporting Fife Council's intentions of adopting a holistic approach to improving air quality within the Kingdom of Fife.

Key stakeholders have confirmed their commitment to supporting Fife Council in the delivery of the Strategy by appending their signatures below.

Organisations who endorse the Strategy are also provided.

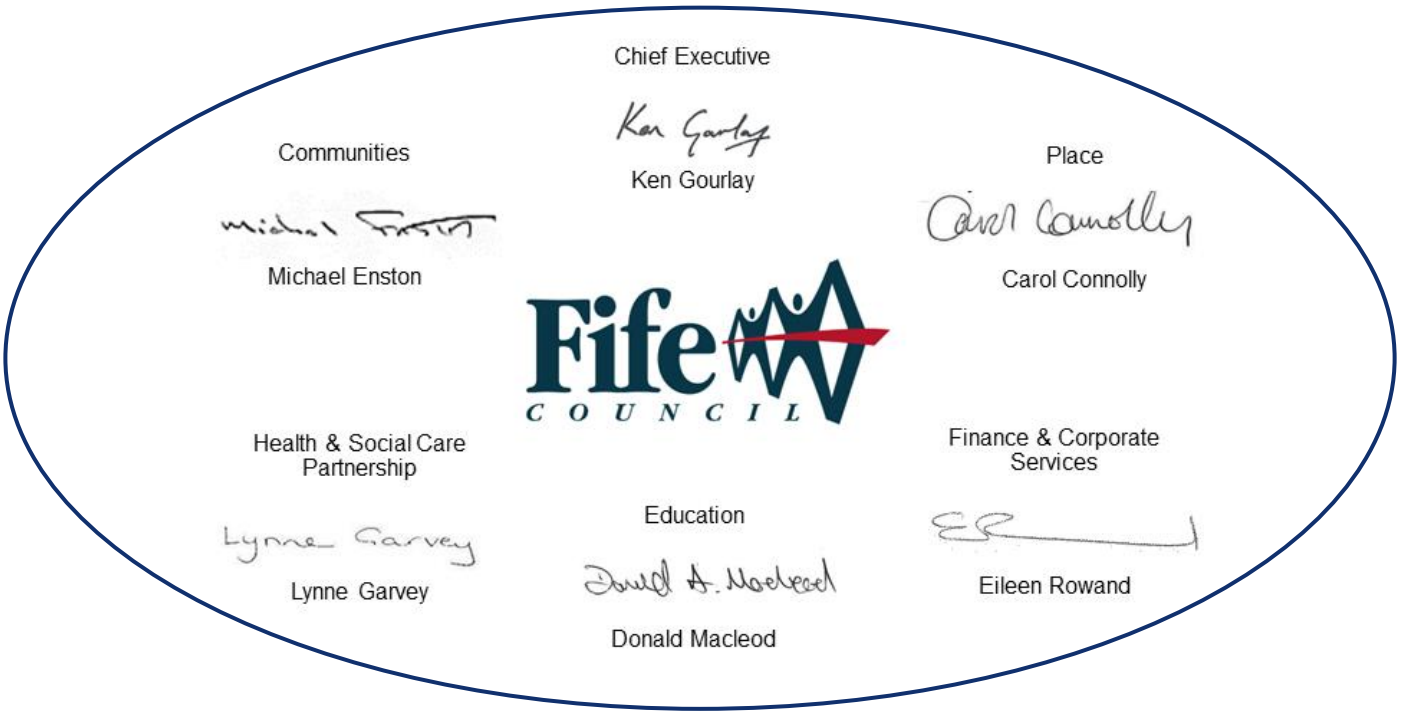
The Fife Air Quality Steering Group will take ownership of implementing and ensuring the successful progression of the Air Quality Strategy. The Fife Air Quality Steering Group, chaired by Land and Air Quality Team (Protective Services) and consisting of Council representatives from Transportation and Environmental Services, Locality Services, Development Management Team, SEPA, NHS Fife and representatives of local community councils.

The Steering Group will review progress on the adoption of the Strategy on a quarterly basis, with new information being used to populate the Fife Air Quality webpages, and a summary of progress will be prepared annually to support the Council's Local Air Quality Management obligations and wider environmental commitments. The Strategy will be reviewed and updated in accordance with the latest legislation and guidance

We will continue to:

- Work closely across Council departments to promote and tackle Air Quality issues
- Hold regular meetings of the Air Quality Steering Group to ensure progression
- Uphold our LAQM obligations
- Review and update this Air Quality Strategy every five years

Key Stakeholders in the Fife Air Quality Strategy



Organisations who support this Strategy

SEPA Scottish Environment Protection Agency Buidheann Dìon Àrainneachd na h-Alba

GO SEStran South East of Scotland Transport Partnership

transition university of st andrews

Scottish Government Riaghaltas na h-Alba gov.scot

sustrans JOIN THE MOVEMENT

Environmental Protection Scotland

TRANSPORT SCOTLAND CÒMHDHAIL ALBA

NatureScot NàdarAlba Scotland's Nature Agency Buidheann Nàdair na h-Alba

HISTORIC ENVIRONMENT SCOTLAND | ÀRAINNEACHD EACHDRAIDHEIL ALBA

Resources

- Air Quality Management Areas (AQMA) - Air Quality Management Areas (scottishairquality.scot)
- Air quality monitoring data - Measurement and annual statistics | Scottish Air Quality
- Scottish Air Quality Database (SAQD) website - Home page | Scottish Air Quality
- Air pollution email bulletin: You can sign up to receive emails about air pollution in Scotland from the SAQD website.
- Know and Respond app: A free service to subscribers in Scotland that sends registered users an alert message if air pollution in their area is forecast to be moderate, high or very high.
- Cleaner Air for Scotland 2 (CAFS2): An air quality strategy setting out the Scottish Government's air quality policy framework for the next five years and a series of actions to deliver further air quality improvements.
- Air pollution forecasting (X, formerly known as Twitter): Follow @scotairquality for the latest pollution information for Scotland.

Glossary of Terms

Abbreviation	Description
AQ	Air quality
AQO	Air Quality Objective
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
AQS	Air Quality Strategy
APR	Annual Progress Report
CAFS2	Cleaner Air for Scotland 2
Defra	Department for Environment, Food and Rural Affairs
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
SAQD	Scottish Air Quality Database
SEPA	Scottish Environment Protection Agency