Air Quality Strategy for Fife 2021 - 2025

Foreword

The air that we breathe is fundamental to human life and the quality of our environment. Despite the undoubted improvements in air quality over recent years, continued and systemic action will be required to ensure we are addressing known and emerging risks.

Since our original Air Quality Strategy was published in 2015 we have made significant steps in improving air quality in the Fife area. This has been particularly relevant in our work in tackling road traffic pollution. These actions have all been detailed in our annual progress reports which are available at www.fife.gov.uk/airquality.

This updated Air Quality Strategy sets out the proposals for delivering further air quality improvements over the next five years and is set around the 9 key areas of approach as detailed in the Cleaner Air for Scotland 2 document (2020). This approach seeks to ensure consistency in the approach in tackling air quality issues across Scotland. A coherent and integrated outlook is key to avoid the risk of health-related impacts.

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

“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”

Air Quality in Fife has improved significantly over recent years, such that all objectives are being met. This improvement is due to the implementation of abatement measures by the Council, Scottish Government, private sector organisations and local residents.

However, we understand that the work is not complete and there is still more to be done as even low levels air pollution have a detrimental effect on human health and the environment. As our understanding of other pollutants and sources of pollutants improves we must continue to be proactive to ensure that any impacts are minimised as much as possible.

This **Air Quality Strategy for Fife 2021-2025** provides a framework which sets out how Fife Council will work with other organisations within Fife to build on the achievements already seen in reducing air pollution. This will be achieved through the promotion of best practice, use of the best available technology, awareness raising and encouraging behavioural change.

This Strategy builds on the first Air Quality Strategy 2016 -2020 for Fife[1]. Our Vision for clean air aligns with the Scottish Government's national Clean Air For Scotland Strategy (CAFS)[2] as we understand that a cohesive comprehensive approach to tackling air pollution at a regional, national and international level is required.

The good progress made in implementing the aims and objectives of the first Air Quality Strategy was acknowledged at the Convention of Scottish Local Authorities (COSLA) excellence awards 2017. Fife Council received a bronze award in the category of "*Tackling Inequalities and Improving Health*". With this Strategy we aim to continue this good work.

For over 15 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.

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[1] Fife Council (2015), An Air Quality Strategy for Fife, accessed at: http://publications.fifedirect.org.uk/c64_FifeAQS2014-2015V11FINAL1.pdf

[2] Scottish Government (2021), *Cleaner Air For Scotland: the road to a healthier future*, accessed at: https://www.gov.scot/publications/cleaner-air-scotland-road-healthier-future/

Aims and Objectives

1. Health

Fife aims to protect residents and visitors from the harmful effects of air pollution. Fife will:

- Work together with NHS Fife to engage with partners and communities to improve air quality and raise awareness;
- Ensure the most vulnerable are aware of the impact of air pollution on health and what can be done reduce the impact;
- Implement abatement measures outlined in the AQAPs, to ensure that the Scottish Air Quality Objectives (AQOs) continue to be achieved, and public health continues to be protected;
- Consider strategy for effective communication with nearby local authorities in terms of the transboundary air quality impacts;
- Raise awareness of the health impacts of air pollution and the health benefits of alternative travel within schools; and
- Consider the potential effects of indoor and in-vehicle air pollution and proactively align with any new policy and regulations.

2. Integrated Policy

Fife aims to integrate air quality within Council plans and strategies. Fife will:

- Integrate air quality considerations within the related Council plans and strategies;
- Ensure that air quality policies are well integrated across different departments
- Work closely with the Council's Climate Change and Zero Waste team to ensure air quality is considered;
- Work with the educational department to increase awareness of local air quality;
- Encourage contributions towards improving local air quality and minimising negative impacts from existing and future Council strategies; and
- Attend and contribute to air quality seminars, training events and pollution liaison group meetings where national measures are discussed.

3. Placemaking

Fife aims to meet the future environmental, economic, and social needs of its residents and maintain good air quality. Fife will:

- Support Council proposals for infrastructure changes that will facilitate improvements in vehicle movements;
- Use local planning considerations to take measures to mitigate the cumulative negative air quality impacts of new development;
- Ensure that development proposals are assessed for air quality impacts and where necessary, appropriate mitigation measures considered;
- Utilise existing tools and identify new innovative tools that accurately and effectively assess Air Quality in planning; and
- Incorporate updated national initiatives into local planning approval procedures.

4. Data

Provide high quality data that will accurately inform mitigation decision making

- 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;
- Incorporate Sensor technology into the Fife monitoring Network;
- Stay up to date with the latest monitoring technology and analysis tools; and
- Collect traffic and transport data to support air pollution mitigation plans

5. Public Engagement & Behaviour Change

Engage with people about how air pollution affects them and what they can do to make a difference

- Raise public awareness and understanding of local air quality issues within Fife and inform residents about ways that they can help contribute to improvements;
- Promote sustainable travel like walking, cycling and public transport over the use of cars;
- Promote Fife's Electric vehicle infrastructure;
- Promote initiatives to help members of the public take action to reduce air pollution;
- Promote and organise educational events around Clean Air Day;
- Provide information related to air quality on the Fife Council website;
- Raise public awareness of the impact of emissions from biomass boilers/ domestic wood burners; and
- Raise awareness of the impact to biodiversity from emissions of ammonia and atmospheric nitrogen.

6. Industrial

Support the control and reduction of air pollution from industrial sources

- Collaborate with SEPA on industrial emissions monitoring;
- Communicate with SEPA on industrial emission sources and pollution event 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; and
- Keep up to date with Scottish Government Guidance and Regulation for NEE and NRMM.

7. Non-Transport

Control and reduce air pollution from non-transport sources

- Household wood-burning:-
  - Further develop cooperation between the land services 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; and
  - Work with business and industry in Fife to support educational schemes.
- Agriculture:-
  - Raise awareness of ammonia emissions within the Agricultural sector;
  - Initiate discussions with Agricultural sector on the use of best practise techniques;
  - Provide advice on Government funding initiatives; and
  - Work with other local authorities to ensure a holistic approach

8. Transport

Maintain the reductions achieved in NO_2 and PM_{10} concentrations from road traffic

- Provide COVID-19 data as evidence to stakeholders of what can be achieved;
- Ensure Air Quality issues are considered in all future transport planning decisions;
- Improve monitoring of traffic data;
- Continue to use the Fife ECO Stars scheme to promote more sustainable travel within Fife;
- Explore the potential to develop Freight Quality Partnerships through the on-going implementation of the Fife ECO Stars scheme;
- Progress the sustainable travel programme, focussing on:
  1. decarbonising the Council's own fleet;
  2. reducing the need to travel by settlement and development planning and smart technology;
  3. promoting active travel;
  4. increasing vehicle efficiencies;
  5. making public transport more popular; and
  6. increasing the uptake of ultra-low emission vehicles such as hybrid-electric, full-electric and hydrogen fuel vehicles; and
  7. Support the H100 project and other uses of alternative sustainable technologies.

9. Governance

Deliver improvements to air quality in partnership with key stakeholders

- 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; and
- Review and update this Air Quality Strategy every five years.

Structure

This **Air Quality Strategy** is set out to clearly communicate the reasons and ideas behind the strategic outcomes it is intended to achieve. The strategy is set around 9 key areas of approach and aligns with CAFS. The structure is as follows:

- Policy Context – International, national and local background to the strategy 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, why it is so important and what it is like in Fife;
- Local Success Stories – A summary of some of the successful initiatives already carried out in Fife;
- 1. Health – Local issues and initiatives to minimise the impact of poor air quality on the health and wellbeing of residents, workers and visitors to Fife and also on Fife's natural heritage, both protected and non-protected;
- 2. Integrated Policy – How Fife Council 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;
- 3. 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;
- 4. Data – Air Quality data collected by Fife, how it is used and how it can be improved;
- 5. 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;
- 6. Industrial – How Fife Council continue to work with SEPA to manage industrial emissions;
- 7. Non-Transport – Work with business and industry to raise awareness of non-transport emissions and support households to make less polluting choices;
- 8. Transport – How Fife Council promotes sustainable travel to reduce the need to travel, and encourages a modal shift to minimise transport emissions;
- 9. Governance – How co-ordinated working is facilitated between Council Services and external stakeholders to improve local air quality.

List of Abbreviations

Abbreviation	Definition
APR	Annual Progress Report
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA 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.
AQO	Air Quality Objective
CAFS	Cleaner Air For Scotland
COSLA	Convention of Scottish Local Authorities
ELV	Emission Limit Value
EPS	Environmental Protection Scotland
EU	European Union
FTA	Freight Transport Association
JHPP	Joint Health Protection Plan
LAQM	Local Air Quality Management
LEZ	Low Emission Zone
NEE	Non-Exhaust Emissions
NLEF	National Low Emissions Framework
NH_3	Ammonia
NHS	National Health Service
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NPF	National Planning Framework
NRMM	Non-Road Mobile Machinery
NTS	National Transport Strategy
O_3	Ozone
PHE	Public Health England
$PM_{2.5}$	Particulate Matter with diameter of 2.5 μm (micrometres or microns) or less
PM_{10}	Particulate Matter with diameter of 10 μm or less
RHA	Road Haulage Association
SEPA	Scottish Environment Protection Agency
SEStran	South East of Scotland Transport Partnership
SNH	Scottish Natural Heritage
SO_2	Sulphur Dioxide

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.

National Legislation

Legally binding limits (air quality objectives or AQOs, see Appendix A1)[3] 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.

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.

Local Air Quality Management (LAQM)

All local authorities are required to compile A**nnual 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 members of the public could be exposed to this poor air quality, the authority is required to undertake a **Detailed Assessment of Air Quality** within this area. This assessment includes more detailed analysis of local monitoring data and may also include the application of air dispersion modelling.

If a breach of one or more of the air quality objectives is confirmed, an '**Air Quality Management Area' (AQMA)**[4] must be declared.

Following the declaration of an AQMA the authority must develop and implement an **'Air Quality Action Plan (AQAP)'** with relevant stakeholders, to reduce levels of pollution within the AQMA within the shortest timeframe possible.

There are currently a number of AQMAs in Scotland. The vast majority of these are due to emissions from road traffic.

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

Air Quality

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

What Causes Air Pollution

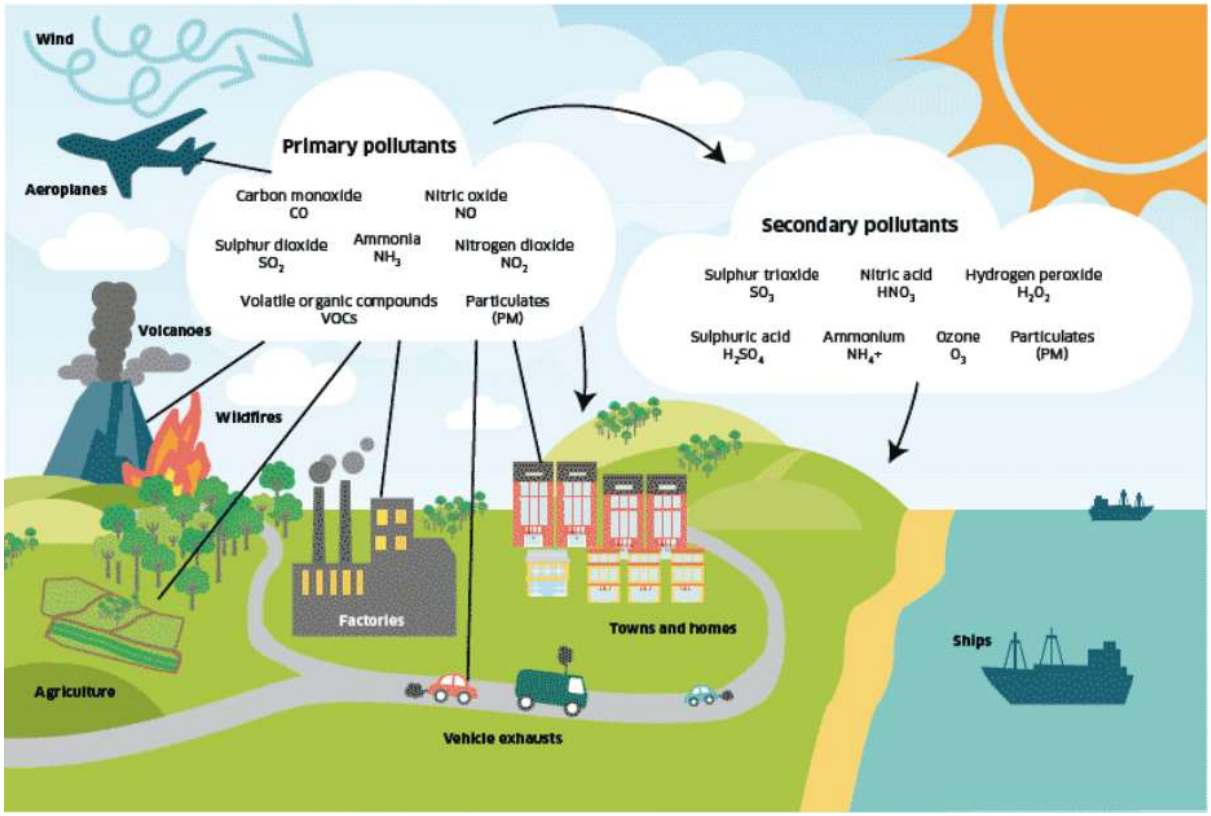
Air pollution results from the introduction of a range of substances into the atmosphere from a wide variety of sources. It can cause short and long-term effects on health and the environment.

Air pollutants are produced by natural and man-made sources (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



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

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

Nitrate (NO_3-), main source is agriculture that can detrimentally affect ecosystems

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

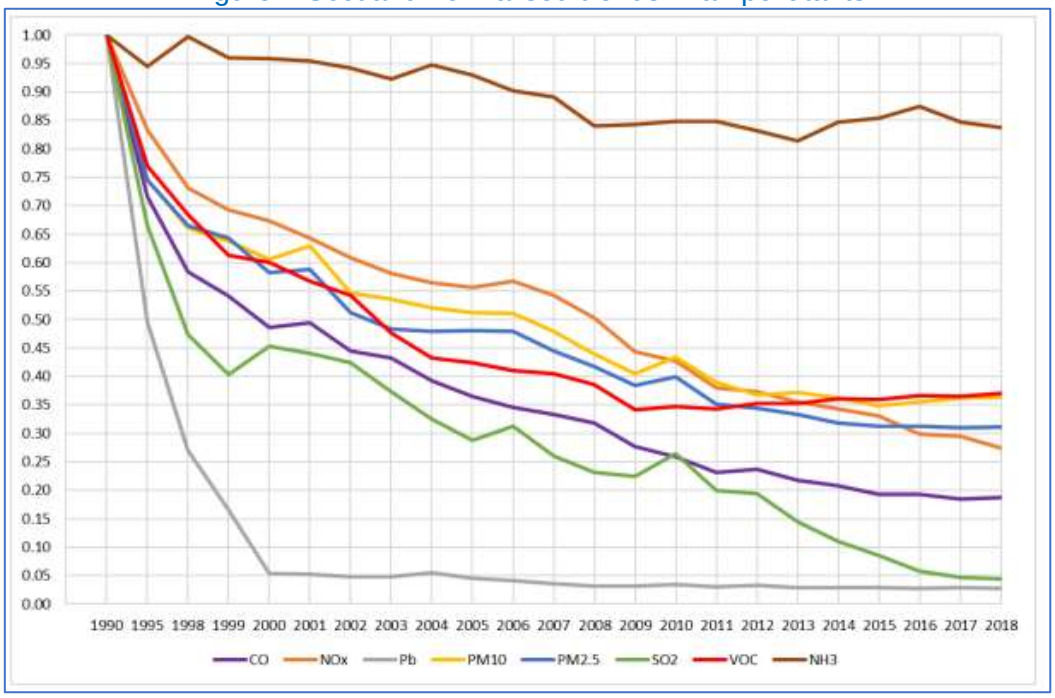
Suspended particles (Particulate matter) – primary and secondary pollutant. Made up of components such as acids, metals, and dust particles; sourced from natural and man-made activity.

Air Quality in Scotland

Over the last 20 years, Scotland has achieved progressively cleaner air (see Figure 2). There has been a strong downward trend in concentrations 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 where air quality standards are not being met. Road transport remains the main source of poor air quality within urban areas (Nitrogen Dioxide and Particulate Matter) and agricultural processes in rural areas (Ammonia). There are also concerns arising from the increasing levels of secondary air pollution such as Ozone in both rural and urban areas.

Figure 2 Scotland normalised trends in air pollutants



Source – Air Quality Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 1990-2018

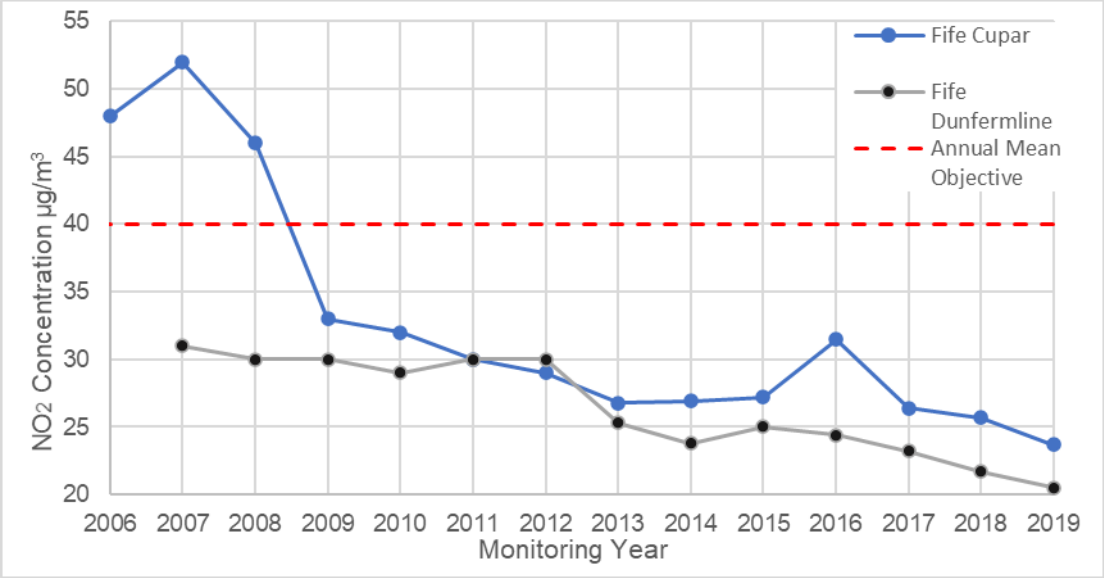
Air Quality in Fife

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 $PM_{2.5}$);
- 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 2007-2019 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}) (see Appendix A2)

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 A**ir Quality Action Plans (AQAPs),** developed by Fife Council and key partners, significantly contributing to these reductions.

Currently all of the main pollutants of concern stated within the LAQM regime are within the Scottish AQS objectives.

$PM_{2.5}$ has been measured in Fife since 2015 at 4 locations after the introduction of the AQS objective in 2016. To date concentrations at all sites have not exceeded the objective.

As a result of the decrease in NO_2 concentrations, the AQMAs were amended in 2021 to tackle Particulate Matter only. Concentrations of PM_{10} are also currently below objectives and have been for a number of years and the Council have plans to revoke the PM_{10} AQMAs in the coming years pending the collection of additional monitoring data.

This has not altered the commitment of Fife Council to maintaining good air quality levels and continue their air quality monitoring and abatement measures.

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/.

Recent reports prepared by the Council can also be found here.

Local Success Stories

As we've just seen, Fife has had great success in proactively tackling the air quality challenges in the area. These are some of the ways that this has been achieved.

The Council was recognised by the Scottish Government for their work on the Bonnygate AQAP, and specifically for the **Intelligent Transport System**. This system is used to optimise traffic flow, reduce congestion and allow for more dispersion and dilution of pollutants from vehicles. Monitoring data showed that this method of traffic management led to a significant decline in pollutant concentrations in the area.

The **TRY IT Cupar** campaign was highlighted by the Scottish Government as an example of best practice. The campaign engaged directly with the local community on air quality issues.

This involved a public communication campaign, a personalised travel planning service by trained Travel Advisors offered to individual households to encourage people to walk, cycle or use public transport when making trips within the town, provision of information on walking and cycling groups in the area, and discussion of how sustainable travel can improve health and fitness.

More generally, the Council worked in partnership with the local community to make Cupar a more sustainable community.

Fife also became the first Council in Scotland to be awarded a 5-star rating from **ECO Stars**[5], 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 237 fleet operator members (covering 8,892 vehicles) and 138 taxis and private hire operator members (covering 559 vehicles).

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 fuel consumption in non-electric vehicles has also seen significant reductions.

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

There has also been a huge increase in Electric vehicle charging points over the last 5 years so as to help enable behavioural change and increase usage of electric vehicles across Fife.

Other initiatives by Fife Council include a **car sharing service**, www.TripshareFife.com, and the maintenance and improvement of one of the UK's most comprehensive **cycling networks**[6]. Fife has over 350 miles of sign posted cycle network, including a variety of leisure and commuting routes.

Who Should Get Involved and How

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:

- 'De-carbonising' the Council fleet vehicles, and public transport such as buses and taxis
- Integrating Air Quality with other Council strategies, for example:

Improving the link with Local Planning and Development by developing the Low Carbon Fife Supplementary Guidance which incorporates the air quality development guidelines;

Improving the link with the Local Transport Strategy by integrating the Air Quality Management Areas;

- Implementing the Council's Travel Plan;
- Carrying out cost-benefit analysis of traffic management options for Appin Crescent, and a feasibility study for a bypass;
- 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.

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 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.

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

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 practise procedures when using domestic biomass burners.

Health

Fife aims to protect residents and visitors from the harmful effects of air pollution

The Challenge

We have a large body of evidence on the damage that poor air quality can cause to human health. UK Government statistics estimated that air pollution in the UK **reduced life expectancy of every person by an average of 7-8 months**, with an associated cost of up to **£20 billion each year**[7].

Poor air quality has been associated with a range of harmful effects, including an increased incidence of cardiovascular disease and exacerbation of the symptoms of those with pre-existing heart and lung conditions such as asthma[8].

There is also growing evidence associating air pollution with other ailments such as dementia, diabetes and adverse pregnancy outcomes[2]. Even the low concentrations measured in most of Fife can be linked to poor health outcomes.

The main pollutants of concern and their impacts are described in Table 1.

Table 1 - 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.

[7] Department for Environment, Food and Rural Affairs, *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Volume 1*. Accessed at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69336/pb12654-air-quality-strategy-vol1-070712.pdf

[8] Public Health England (2014), *PHE-CRCE-010: Estimating local mortality burdens associated with particulate air pollution*. Accessed at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/332854/PHE_CRCE_010.pdf

Ambient Air Quality

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 a large number of studies.

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 10 μg 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.

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.

Air quality has been incorporated into the NHS Fife and Fife Council 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.

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[9]. The council plan to work with other local authorities and the national government to tackle this issue.

Fife Council will:

- **Work together with NHS Fife to engage with partners in public and private sectors and with communities to improve air quality and raise awareness;**
- **Work with NHS Fife to ensure the most vulnerable are aware of the impact of air pollution on health and what can be done reduce the impact;**
- **Implement abatement measures outlined in the AQAPs, to ensure that the Scottish Air Quality Objectives (AQOs) continue to be achieved, and public health continues to be protected;**
- **Consider strategy for effective communication with nearby local authorities in terms of the transboundary air quality impacts;**
- **Raise awareness of the health impacts of air pollution and the health benefits of alternative travel within schools; and**
- **Consider the potential effects of indoor and in-vehicle air pollution and proactively align with any new policy and regulations.**

[9] 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

Integrated Policy

Fife aims to integrate air quality within Council plans and strategies

The Challenge

Co-ordinated working between national government, Agencies and other local government departments brings many benefits. As highlighted in CAFS, strategies, policies and plans developed for air quality management overlap significantly with those implemented for climate change mitigation and adaptation, noise management, the transport strategy and other polices.

Nationally, there are several notable frameworks in place to guide air quality governance, including the National Transport Strategy 2[10] (NTS2), the National Planning Framework[11] (NPF4) and the Climate Change Plan[12].

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. The connection is that both issues are caused by human activity.

On the local scale, Air Quality and Noise issues are also often linked, especially in the context of road traffic. As the Local Government delivers planning, transport delivery and public health this provides many opportunities to maximise the co-benefits of improving air quality.

How Fife Council Meet the Challenge

Fife Council ensure that the policies they develop are closely coordinated and aligned with national air quality policies. This Air Quality Strategy has been developed to align with CAFS.

Locally, air quality is managed in a cohesive way throughout all departments, with each team playing its part within Fife Council.

With increasing attention given to non-transport pollution sources and types, such as ammonia emissions from agriculture, the need to coordinate with a wide variety of sectors is essential.

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

- Carbon Management Plan (2017 – 2050)
- Climate Fife: Sustainable Energy and Climate Action Plan (2020 -2030)

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[10] 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
[11] 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/
[12] 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/

Fife Council's plans and policies on planning development and local transport also include a commitment to incorporate air quality improvements. These include:

- Local Development Plan[13] (known as FIFEplan) which was adopted in 2017; and
- Local Transport Strategy (2006-2026)[14]

Fife Council will:

- **Integrate air quality considerations within the related Council plans and strategies, including those outlined above;**
- **Ensure that air quality policies are well integrated across different departments;**
- **Work closely with the Council's Climate Change and Zero Waste team to ensure air quality is considered;**
- **Work with the educational department to increase awareness of local air quality;**
- **Encourage opportunity for contributions towards improving local air quality and minimising negative impacts from existing and future Council strategies; and**
- **Attend and contribute to air quality seminars, training events and pollution liaison group meetings where national measures are discussed.**

[13] 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

[14] Fife Council (2006), *Local Transport Strategy 2006-2026*, accessible at: http://publications.fifedirect.org.uk/c64_LocalTransportStrategy.pdf

Placemaking

Fife aims to meet the future environmental, economic, and social needs of its residents and maintain good air quality

The Challenge

If placemaking is tackled correctly, we can improve air quality, create sustainable urban locations, improve physical and mental health and provide a better living environment for all aspects of life.

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 air quality issues and can cause issues such as street canyons, where high buildings on either side of a street make it more difficult for air pollution (from traffic) to escape, and other pollution hot spots.

New developments also have the potential to 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.

However, 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.

We acknowledge that 3 specific national planning initiatives are mentioned in CAFS. These are;

- National Planning Framework 4 (NPF4)[11];
- The Place Principle; and
- The Place Standard.

Fife Council will incorporate these updated national initiatives into our local planning approval procedures.

How Fife Council Meet the Challenge

Fife Council ensures that local air quality is considered as part of the planning and placemaking process. In addition to the Council's responsibilities for protecting air quality via the LAQM regime, the Council, in its role as a planning authority, aims to minimise the potential impact of development on local air quality, particularly in close proximity to existing AQMAs.

Fife Council have provided for this in their Local Development Plan[13] (FIFEplan) and Low Carbon Supplementary Guidance[15].

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 guidance to communities and investors on where development can and cannot take place, what type of development is allowed, how it should be laid out and designed and how environmental and cultural assets will be protected. This guidance ensures that good air quality is maintained and is regularly reviewed and updated.

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. Policy 10 sets out that any development proposals that lead to a breach in National Air Quality Standards or a significant increase in concentrations of air pollution within an existing AQMA will not be supported.

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.

Fife Council will :

- **Support Council proposals for infrastructure changes that will facilitate improvements in vehicle movements;**
- **Use local planning considerations to take measures to mitigate the cumulative negative air quality impacts of new development;**
- **Ensure that development proposals are assessed for air quality impacts and where necessary, appropriate mitigation measures considered;**
- **Utilise existing tools and identify new innovative tools that accurately and effectively assess Air Quality in planning; and**
- **Incorporate updated national initiatives into local planning approval procedures.**

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

Data

Fife aims to provide high quality data that will accurately inform mitigation decision making

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, which also describes 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.

Progress in air pollution measurement technology mean that there are now more options available, including low-cost mobile sensors.

Agile low cost sensors that read high resolution data can be used to obtain data from areas of concern that were previously unattainable due to the topography.

The range of uncertainty currently associated with this equipment means it cannot be used to report directly against compliance with legal air quality objectives. However, they provide a great opportunity to make a range of measurements over a wide geographical area. This can help to pinpoint any local pollution hotspots or to ease the concerns of residents in their local areas.

Traffic data is also collected to inform any infrastructure interventions to reduce emissions. This data is also a valuable resource for journey planning and to increase awareness of travel choices to encourage changes in behaviour that will contribute to improving local air quality.

Information is collected using traffic counts. Emerging resources include mobile phone locational services, which are currently used to support congestion detection and Automatic Number Plate Recognition cameras. Data sharing also occurs between transport agencies and agencies such as SEPA, local authorities, the NHS, Public Health Scotland and Police Scotland.

How Fife Council Meet the Challenge

Fife Council takes its air quality regulatory responsibilities very seriously and for several years now has been monitoring and improving air quality across the Kingdom of Fife, particularly in areas such as Cupar and Dunfermline where Air Quality Management Areas (AQMAs) have been declared.

Fife Council operates an extensive network of air quality monitoring devices across Fife, consisting of four automatic monitoring sites which form part of the Scottish air quality monitoring network, and a comprehensive agile diffusion tube network strategically placed at points of interest around Fife.

This well-established monitoring network has been collecting data since the early 2000's.

Fife Council have invested in and utilise sensor technology and alternative monitoring techniques in the monitoring network so as to better understand air pollution levels and identify new problem areas.

The data collected provides a sound basis for the development of air quality improvement measures. The data is reviewed regularly, as part of the Local Air Quality Management commitments, to identify any gaps or areas for improvement.

The Land and Air Quality Team of Fife Council undertake the air quality review and assessment process each year. 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.

Fife Council 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;**
- **Incorporate Sensor technology into the Fife monitoring Network;**
- **Stay up to date with the latest monitoring technology and analysis tools; and**
- **Collect traffic and transport data to support air pollution mitigation plans.**

Public Engagement and Behaviour Change

Fife aims to engage with people about how air pollution affects them and what they can do to make a difference

The Challenge

Public engagement helps to increase awareness of air quality issues and encourage changes in behaviour that will contribute to improving local air quality. Public engagement forms a huge part of the work that any Local Authority carries out, more so now as interest in improving air quality continues to increase.

Communicating complex scientific data to the public is challenging and works best when it is related to the real world. For this reason, communication of air quality issues to the public usually focus on the health and environmental impacts, rather than concentrations or emissions.

For engagement to work well, it must be supported by a range of agencies including national and local government, public health agencies, public transport providers, businesses and schools. There must also be an element of evaluation and feedback so that organisers can identify how effective the engagement is.

It is also important to support citizen-led events and activities. This active involvement can be used to raise awareness and encourage behaviour change.

There are many resources available, for example the CleanAir@School project[16] is a Europe-wide initiative, and Learn About Air[17] is a dedicated teaching resource, linked to Scotland's Curriculum for Excellence.

CleanAir@School

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.

[16] https://www.eea.europa.eu/themes/air/urban-air-quality/cleanair-at-school
[17] http://www.learnaboutair.com/

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 data to increase awareness of local air quality issues and encourage changes in behaviour that will contribute to improving local air quality. These activities aim to encourage a shift away 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 recent data collected during the 2020 COVID-19 lockdown. Analysis showed a significant fall in NO_2 concentrations within Fife towns, with a reduction of around 60% in comparison to the previous year (2019)[18]. (See the Transport section for more detail.)

Data provided by the 2020 COVID-19 lockdown identifies the improvement in air quality that can still be achieved in Fife. The Council have plans to utilise this data as a way to highlight air pollution and to encourage behavioural changes in private and public vehicle usage.

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.

The “Walk Once a Week” Campaign has been in place since 2015. WOW is a partnership between Fife Council and Living Streets Scotland that continues to progress the active travel agenda in Fife Primary schools and increase the uptake of active travel.

The Living Streets’ 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. The Walk of Fame is a fun and engaging way for schools to reach even higher levels of active travel and demonstrate how much they have embedded WOW as they try and get into the national top ten of the most active schools.

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.

As well as engagement with schools, Fife Council also engage with the public in general, providing clear information and guidance on local air quality. Fife Council was the first Local Authority in Scotland to write a Travel Plan back in 1999. This is reviewed every two years using an Employee Travel Survey, to monitor how things are changing. The Fife Council Travel Plan promotes sustainable travel with a hierarchy of walking, cycling, public transport and car share.

Fife Council have several initiatives in place, which include a car sharing service, www.TripshareFife.com, and a Cycle to Work Scheme which allows residents to

[18] http://www.scottishairquality.scot/assets/documents/news/COVID19%20lockdown%20-%20Time%20Variance%20analysis%20of%20air%20quality%20in%20Scotland%20-%2027-05-2020.html

purchase a new bike and pay direct from their salary, saving money and spreading the cost. Fife also has one of the UK's most comprehensive cycling networks. Over 350 miles of sign posted cycle network includes a variety of leisure and commuting routes.

In the future, Fife will also be looking to engage with the public on the use of household wood burners as well as on the issue of ammonia and atmospheric nitrogen pollution. This topic is covered further in the Non-Transport Emissions section.

Fife Council will:

- **Raise public awareness and understanding of local air quality issues within Fife and inform residents about ways that they can help contribute to improvements;**
- **Promote sustainable travel like walking, cycling and public transport over the use of cars;**
- **Promote Fife's Electric vehicle infrastructure;**
- **Promote initiatives to help members of the public take action to reduce air pollution;**
- **Promote and organise educational events around Clean Air Day;**
- **Provide information related to air quality on the Fife Council website;**
- **Raise public awareness of the impact of emissions from biomass boilers/ domestic wood burners; and**
- **Raise awareness of the impact to biodiversity from emissions of ammonia and atmospheric nitrogen.**

Industrial

Fife aims to support the control and reduction of air pollution from industrial sources

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 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.

There are four specific environmental principles for industry based in European law:

1. precautionary,
2. polluter pays,
3. prevention and
4. rectification at source.

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 of 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.

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}.

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.

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.

Fife Council 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; and**
- **Keep up to date with Scottish Government Guidance and Regulation for NEE and NRMM.**

Non-Transport Emissions

Fife aims to control and reduce air pollution from non-transport sources

The Challenge

The Cleaner Air For Scotland strategy identified a gap in emissions from the non-transport sector, including emissions from domestic (household) combustion and agriculture, as well as nitrogen deposition. An increased focus on this area has the potential to achieve greater air quality improvements than currently possible.

Household wood-burning

Domestic combustion refers to household wood burners or biomass burners which have been growing in popularity in Fife towns and urban areas in recent years as a secondary heat source. In Scotland, almost 4 out of 5 households in rural areas use solid mineral fuel as their primary fuel[19]. Burning solid fuel is a source of 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 quantity and type of emissions from burning wood, which makes it difficult to legislate. Variable factors include:

- the type of appliance used,
- the dryness and treatment of the wood burnt,
- the sulphur content of the fuel,
- the maintenance of the appliance, and
- the type of chimney.

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.

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.

[19] https://www.gov.scot/collections/scottish-house-condition-survey/

Agriculture

Another area which has not been traditionally targeted for air quality improvements is agriculture. Agriculture is responsible for around 90% of total ammonia (NH_3) emissions in Scotland.

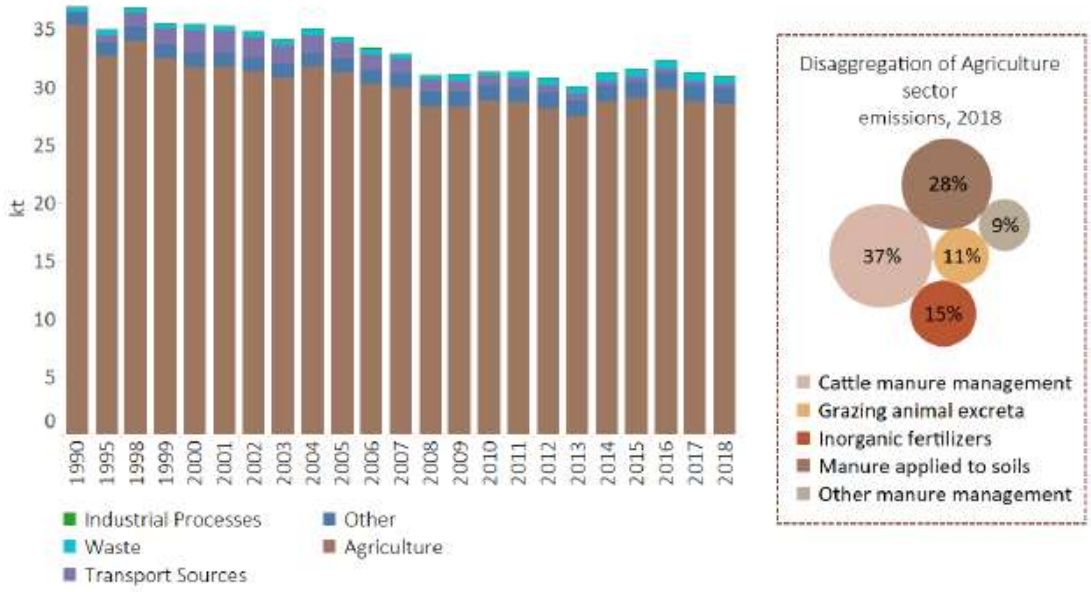
This is an important area to tackle because ammonia emissions are not decreasing over time in the same manner as the other main air pollutants (see Figure 4).

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. 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.

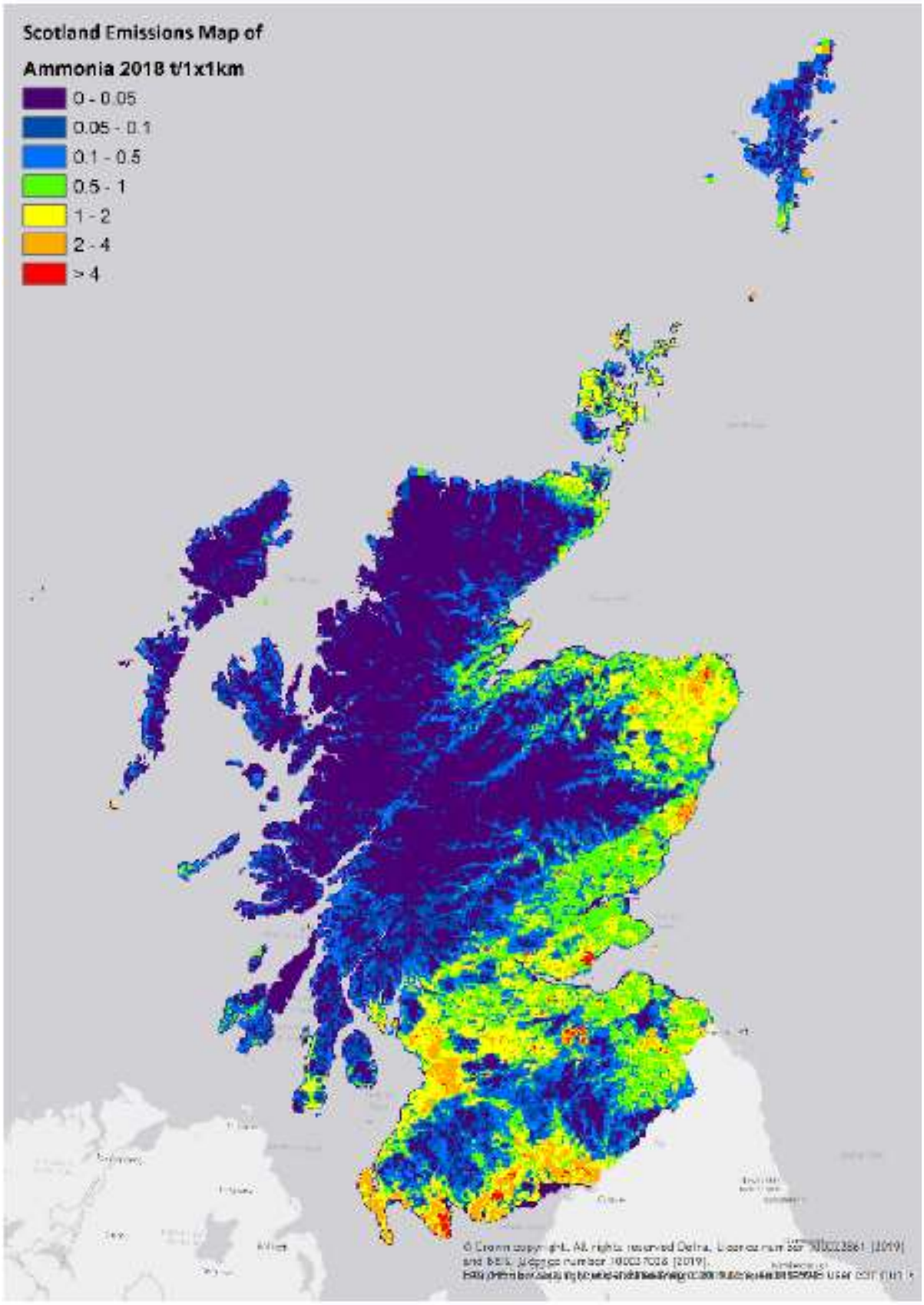
Currently, the habitat-specific damage thresholds for atmospheric nitrogen deposition (known as Critical Loads) are exceeded in three quarters of Special Areas of Conservation in Scotland and in 35% of habitats sensitive to eutrophication. It is therefore important to look at good agricultural practice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

Figure 4 Time series of Scotland's ammonia emissions 1990-2018[20]



[20] Ricardo Energy & Environment on behalf of The Scottish Government, Scottish Air Quality Database (2020) *Air pollution in Scotland 2019* (Accessed at http://www.scottishairquality.scot/news/reports?view=technical&id=636)

Figure 5 - Scotland Emissions Map of Ammonia 2018[20]



How Fife Council Meet the Challenge

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 and if these are near to, or within, an AQMA then these are also passed to the Land & Air Quality team for comment.

It is likely that the first step in tackling this issue will focus on raising awareness, both in terms of operation of appliances and the choice of fuel. At a UK-level, Burnright[21] is an educational campaign which provides a range of materials and resources for stove users. Within Scotland, Home Energy Scotland[22] 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[23]" programme which looks to lower emissions and improve efficiency in wood burners.

As of 2016, over half of the land in Fife is used for crops or fallow, the largest proportion in Scotland[24]. 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 improving air quality.

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. 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.

Fife Council will:

Household wood-burning:-

- **Further develop cooperation between the land services 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; and**
- **Work with business and industry in Fife to support educational schemes.**
- **Promote educational schemes**

Agriculture:-

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

[21] https://burnright.co.uk/
[22] https://energysavingtrust.org.uk/scotland/home-energy-scotland
[23] https://op.europa.eu/en/publication-detail/-/publication/c6ccf626-2f6d-11e5-9f85-01aa75ed71a1/language-en
[24] https://www2.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/agritopics/LandUseAll

Transport

Fife aims to provide a transport system that minimises air pollution and promotes sustainable travel

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.

For example, in 2016 the contribution of road traffic to local emissions of NOx and subsequently concentrations of NO_2, was over 70% in the Appin Crescent AQMA and almost 80% in the Bonnygate AQMA.

Furthermore, the study revealed that in addition to volume, traffic congestion also made a significant contribution to elevated local concentrations of pollution. Though Fife has achieved much in the reduction of pollution from vehicle there is still work to be done. This was made evident by the 2020 COVID-19 lockdown.

The 2020 lockdown restrictions arising from COVID-19 significantly reduced travel in the UK and brought improvements to local air quality. Vehicle traffic across the UK decreased by about 70% by mid-April according to Department for Transport data[25].

The most striking reductions to vehicle related pollutant concentrations were seen in urban areas. Average reductions of 20 - 30% of Nitrogen dioxide (NO_2) were recorded over the lockdown period[26].

In Fife, analysis carried out showed significant reductions in NO_2 concentrations at all four automatic monitoring site which coincide with the decrease in traffic (Figure 6). The greatest reductions were seen at Dunfermline with a reduction in NO_2 of 60% during April and May compared to the previous year.

Analysis of the COVID-19 data also noted a significant reduction in PM_{10} which again highlight the possible contribution of Particulate Matter 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.

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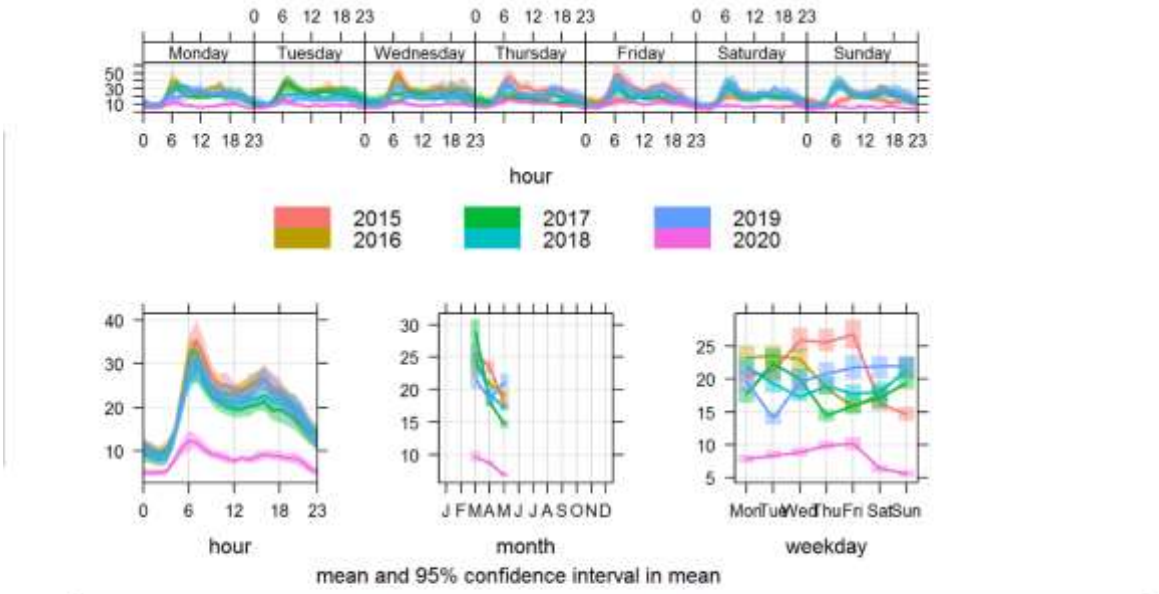
[25] https://www.gov.uk/government/publications/slides-and-datasets-to-accompany-coronavirus-press-conference-21-may-2020

[26] 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

Figure 6 NO_2 concentrations during COVID-19 lockdown - Time Variance analysis of Air Quality in Fife[27]



	2015	2016	2017	2018	2019	2020
Fife Dunfermline	22	21	18	19	20	8
% drop in 2020 concentrations relative to comparison year (23 March - 26 May)	-64%	-62%	-56%	-58%	-60%	-

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.

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.

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
- Cost-benefit analysis of traffic management options to improve air quality within Appin Crescent.

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

[27] http://www.scottishairquality.scot/news/reports?view=technical&id=631

In 2020 the Council completed the National Low Emission Framework Screening process. It was determined that given the improvements in air quality in recent years it would be unnecessary to implement any LEZs within Fife.

ECO Stars

Fife became the first Council in Scotland to be awarded a 5-star rating from ECO Stars[28], 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 has been a huge success, at the time of writing there were 237 fleet operator members (covering 8,892 vehicles) and 138 taxis and private hire operator members (covering 559 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.

Alternative Technology

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

The pioneering Levenmouth Community Energy Project, a collaborative initiative led by Bright Green Hydrogen and supported by a number of partners including Fife Council and Toshiba, also promotes alternative technologies. Part of this project involved Levenmouth becoming home to one of Europe's largest fleet of hydrogen dual-fuel vehicles, a proportion of which are operated by Fife Council.

Scottish Gas Network (SGN) are to progress the feasibility of zero carbon hydrogen generation from offshore wind in Fife in the Levenmouth area with Ofgem approval.

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

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/.

Fife Council will:

- **Maintain the reductions achieved in NO_2 and PM_{10} concentrations from road traffic;**
- **Provide COVID-19 data as evidence to stakeholders of what can be achieved;**
- **Ensure Air Quality issues are considered in all future transport planning decisions;**
- **Improve monitoring of traffic data;**
- **Continue to use the Fife ECO Stars scheme to promote more sustainable travel within Fife;**
- **Explore the potential to develop Freight Quality Partnerships through the on-going implementation of the Fife ECO Stars scheme;**
- **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, full-electric and hydrogen fuel vehicles; and**
- **Support the H100 project and other uses of alternative sustainable technologies.**

Governance

Fife aims to deliver improvements to air quality in partnership with key stakeholders

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.

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.

Fife Council 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; and**
- **Review and update this Air Quality Strategy every five years.**

Key Stakeholders in the Fife Air Quality Strategy:

The Organisations who endorse the Strategy are;

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

Scottish Government Riaghaltas na h-Alba gov.scot

NHS Fife

Environmental Protection Scotland

TRANSPORT SCOTLAND CÒMHDHAIL ALBA

GO SEStran South East of Scotland Transport Partnership

HISTORIC ENVIRONMENT SCOTLAND | ÀRAINNEACHD EACHDRAIDHEIL ALBA

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

RHA

A1 Air Quality Objectives in Scotland

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

A2 Air Quality Management Areas in Fife

Figure 7 Bonnygate, Cupar AQMA Boundary

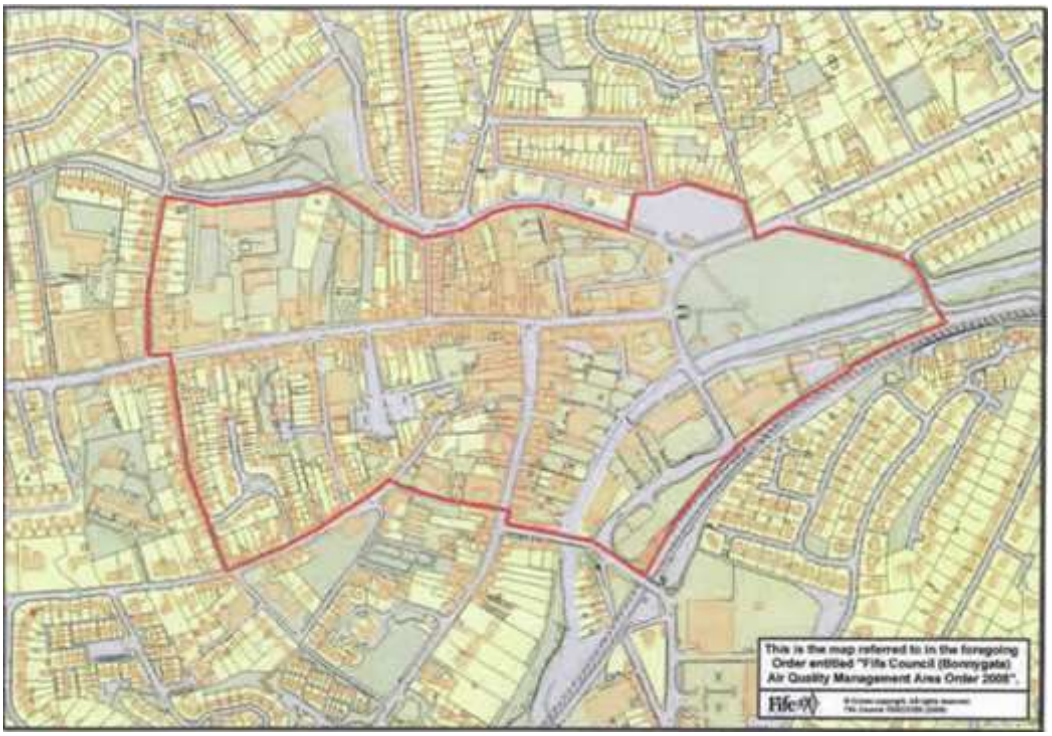
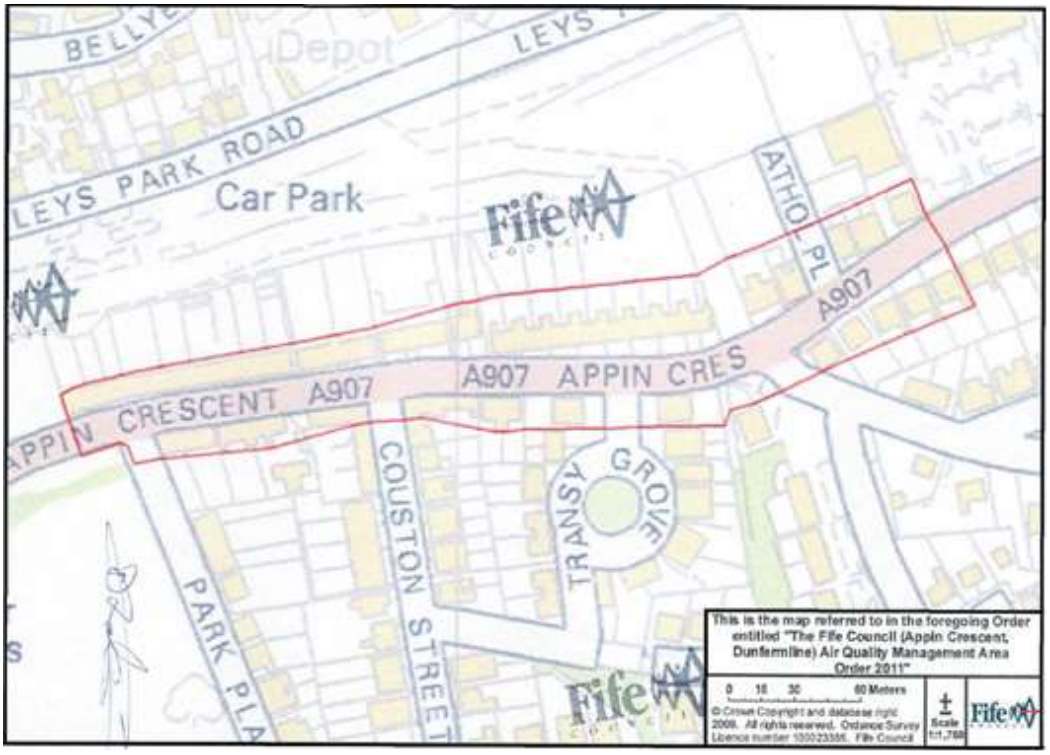


Figure 8 Appin Crescent, Dunfermline AQMA Boundary



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