

CLEANER AIR FOR SCOTLAND

THE ROAD TO A HEALTHIER FUTURE

November 2015



The Scottish
Government
Riaghaltas na h-Alba

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MINISTERIAL FOREWORD



Clean air is essential for our health and wellbeing, and helps to protect the environment as a natural asset. Whilst we have made great strides towards tackling air pollution in Scotland over recent years, it must be acknowledged that there are still areas of poorer air quality in many of our towns and cities. The impacts of poor air quality are not distributed evenly across the population: it is the most vulnerable members of society – the elderly, the very young and those with cardiovascular and respiratory conditions – who bear the largest burden.

People rightly expect to be able to breathe clean air, and the Scottish Government is determined to ensure that we continue to make progress towards tackling this hugely important issue. However, although we can take the lead and set an example through our own actions, we cannot achieve this alone. Successfully addressing air pollution requires a partnership approach, involving the Government, its agencies, local authorities, business and industry, non-governmental organisations and the general public.

The purpose of Cleaner Air for Scotland – The Road to a Healthier Future is to provide a national strategy within which we can all work together towards the common aim of achieving the best possible air quality for Scotland. We already enjoy an enviable reputation for our landscape and scenery, and we want our air quality to be viewed in the same way.

Lower concentrations of air pollution don't just have a positive effect on human health and the environment. Many of the related actions we can take will make our country – particularly our urban areas, where many of us spend our lives – more pleasant to move around and spend time in. These actions include greater use of public transport, the creation of green infrastructure and enabling active travel (walking and cycling). They may also help to reduce congestion and improve traffic flow, delivering practical and financial benefits for businesses.

All of us, both in our personal and professional lives, can help to make a real difference to the quality of the air we breathe. With a concerted effort to work together towards this goal, the vision of Cleaner Air for Scotland can be realised.



A handwritten signature in black ink, appearing to read 'Aileen McLeod'.

Dr Aileen McLeod MSP
Minister for Environment,
Climate Change and Land Reform



A handwritten signature in black ink, appearing to read 'Derek Mackay'.

Derek Mackay MSP
Minister for Transport and Islands

EXECUTIVE SUMMARY

We have achieved progressively cleaner air over recent years through increasingly strict control of industrial emissions, tighter fuel and emissions standards for road vehicles and control of smoke from domestic premises.

However, even at today's lower levels, air pollution still harms human health and the environment. Ill health caused by air pollution is a health inequalities issue because it affects the more vulnerable members of the population disproportionately (people who are very young, elderly, those with pre-existing medical conditions, and those living in urban areas and deprived circumstances).

Across the UK, the impact of poor air quality on health has been estimated to cost around £15 billion per year. The total annual cost of air pollution to the UK's economy may be as much as £54 billion. In Scotland in 2010 fine particulate matter was associated with around 2,000 premature deaths and around 22,500 lost life-years across the population. At the same time, we have yet to achieve full compliance with the EU and Scottish legal requirements for air quality.

The purpose of Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) is to provide a national framework which sets out how the Scottish Government and its partner organisations propose to achieve further reductions in air pollution and fulfil our legal responsibilities as soon as possible. CAFS outlines the contribution that better air quality can make to sustainable development whilst improving health and the natural environment and reducing health inequalities for the citizens of Scotland.

Section 1, Introduction: introduces CAFS, sets out the multiple benefits of reducing air pollution and explains how air quality fits into wider Scottish Government policy.

Section 2, Structure: sets out the mission, vision and objectives of the strategy (the latter being noted below). It summarises the key actions that CAFS aims to deliver across six main objectives, with a common thread of sustainability running through these.

Transport:

A Scotland that reduces transport emissions by supporting the uptake of low and zero emission fuels and technologies, promoting a modal shift away from the car, through active travel (walking and cycling) and reducing the need to travel.



Health:

A Scotland which protects its citizens from the harmful effects of air pollution, reducing health inequalities.



Legislation and Policy:

A Scotland where all European and Scottish legal requirements relating to air quality are as a minimum complied with.



Placemaking:

A Scotland where air quality is not compromised by new or existing development and where places are designed to minimise air pollution and its effects.



Communication:

A Scotland where all citizens are well informed, engaged, and empowered to improve our air quality.



Climate Change:

A Scotland that reduces greenhouse gas emissions and achieves its renewable energy targets whilst delivering co-benefits for air quality.



Finally, this section describes the leadership and governance of CAFS, outlining the procedure for monitoring and reporting on its implementation.

Section 3, Setting the Scene: sets out the main causes of air pollution and explains why it is still a problem. It provides a brief summary of the main Scottish and European legislation on air quality and explains the interactions between air quality and the wider environment.

Sections 4 to 9 set out, for each of the six key objectives, the impacts of air quality, the current situation and the actions proposed to address these issues.

Section 10, National Modelling Framework: outlines the proposed National Modelling Framework (NMF), which is intended to provide a standard air quality assessment methodology for use across Scotland.

Section 11, National Low Emission Framework: introduces the National Low Emission Framework (NLEF). The framework sets out a procedure for local authorities to determine effective measures for addressing air quality issues in their areas.

Section 12, Key Performance Indicators: lists the Key Performance Indicators local and central government will use to report progress on their respective roles in implementing CAFS.

An accompanying technical document:

- describes the consultation process that informed the development of CAFS;
- provides more detail about the NMF and NLEF;
- lists some useful resources; and
- provides general background and links to further information on air quality legislation and policy.

CLEANER AIR FOR SCOTLAND – THE FIRST FIVE YEARS

We have a long-term vision for air quality in Scotland, and CAFS will be reviewed on a regular basis. Whilst all of the actions set out in CAFS will help us towards this target, some key actions are included in Figure 1, which summarises what we want to achieve in the first five years.

2015	2016	2017	2018	2019	2020
EU air quality targets not complied with					Full compliance with EU air quality legislation
32 local Air Quality Management Areas					Significant progress towards revocation of all Air Quality Management Areas
Establish new National Low Emission Framework (NLEF)	Complete NLEF Pre-Appraisal and begin Stage 1 Appraisal	Complete NLEF Stage 2 Appraisal	Prepare for NLEF scheme Implementation	Implement NLEF schemes	Manage and Monitor NLEF schemes
Air quality awareness campaigns for the general public, business and government					
Refocused Local Air Quality Management system					

Figure 1. Cleaner Air for Scotland - the first five years

LIST OF ABBREVIATIONS

LIST OF ABBREVIATIONS

AQMA	Air Quality Management Area
CAFS	Cleaner Air For Scotland
CAZ	Clean Air Zone
COMEAP	Committee on the Medical Effects of Air Pollutants
EU	European Union
EV	Electric vehicles
FCS	Forestry Commission Scotland
HB	Health board
HPS	Health Protection Scotland
KPI	Key performance indicator
LA	Local authority
LAQM	Local Air Quality Management
LEZ	Low Emission Zone
NLEF	National Low Emission Framework
NMF	National Modelling Framework
NPF	National Planning Framework
RTP	Regional transport partnership
RTPI	Royal Town Planning Institute
SEPA	Scottish Environment Protection Agency
SG	Scottish Government
SPP	Scottish planning policy
TS	Transport Scotland
WHO	World Health Organization

LIST OF CHEMICAL ABBREVIATIONS

CO ₂	Carbon dioxide
CO	Carbon monoxide
NMVOC	Non-methane volatile organic compounds
NH ₃	Ammonia
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxides
O ₃	Ozone
Pb	Lead
PM	Particulate matter
PM _{2.5}	Fine particulate matter smaller than 2.5 micrometres in diameter
PM ₁₀	Fine particulate matter smaller than 10 micrometres in diameter
SO ₂	Sulphur dioxide

INTRODUCTION

01

WHAT IS CAFS?

1.1 Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) is a national cross-government strategy that sets out how the Scottish Government and its partner organisations propose to reduce air pollution further to protect human health and fulfil Scotland’s legal responsibilities as soon as possible. A series of actions across a range of policy areas are outlined, and there are a number of important new initiatives:

- a National Modelling Framework;
- a National Low Emission Framework;
- adoption of World Health Organization guideline values for particulate matter in Scottish legislation; and
- proposals for a national air quality awareness campaign.

WHAT IS AIR POLLUTION?

1.2 Air quality can be defined as ‘a measurement of the pollutants in the air’¹ whilst air pollution is the ‘contamination of air by harmful gases and particulates, mainly oxides of carbon, sulphur, nitrogen and particulate matter’¹. Today, we do not usually see factory chimneys, houses or vehicles belching out black smoke. This is because of the increasingly strict legislative controls of industrial and domestic emissions, along with higher engine emissions standards for road vehicles.

1.3 Air pollutants may now be largely invisible, but the gases and particulates can be harmful to human health and the natural environment. We are not yet fully compliant with EU and Scottish legal requirements for air quality, as summarised in the Legislation and Policy² and Standards³ sections of the Air Quality in Scotland website. As a result, the Local Air Quality Management (LAQM) regime has designated over 30 Air Quality Management Areas⁴ in Scotland.

1.4 Reasons for non-compliance with legal objectives include:

- an increase in the diesel fleet over the last decade;
- an increase in the total number of vehicles since 2004⁵;
- a disparity between laboratory and real-world emissions from vehicle engines;
- topography and spatial planning of urban areas creating street canyons, which can trap air pollution close to ground level;
- limited integration of air quality with other policies related to climate change and planning; and
- transboundary emission sources.

1.5 Air pollution disproportionately affects the most vulnerable members of society, including the very young, the elderly, people with existing medical conditions and those living in deprived urban areas. Thus, the key aims of reducing air pollution are to protect human health and eliminate health inequalities, in addition to improving the quality of places and habitats in the wider environment.

1 <http://www.dictionary.reference.com>

2 <http://www.scottishairquality.co.uk/air-quality/legislation>

3 <http://www.scottishairquality.co.uk/air-quality/standards>

4 <http://www.scottishairquality.co.uk/laqm/>

5 <http://www.transportscotland.gov.uk/report/j389989-11.htm>

1.6 In the UK, the health impacts of poor air quality have been estimated to cost around £15 billion per year⁶. In the UK, the total economic costs of air pollution may be as high as £54 billion a year⁷. In Scotland in 2010 fine particulate matter was associated with around 2,000 premature deaths and a total of around 22,500 life years lost across the population⁸.

1.7 CAFS will address the major air pollutants that affect human health (and take account of greenhouse gases such as CO₂), but there will be a focus on two pollutants: nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}).

MULTIPLE BENEFITS OF CLEANER AIR

1.8 Cleaner air provides multiple benefits, but the responsibility for delivering cleaner air rests with many groups, including the general public, national and local government and businesses. Actions that can be undertaken by individuals and society to achieve cleaner air – and tangible personal benefits – are summarised in Figures 2a and 2b⁹. There are also opportunities to generate efficiencies and cost savings by linking air quality to related policy interventions, notably climate change adaption and mitigation plus noise. Efficiency gains of €2.5 billion could be achieved in the EU¹⁰ through such an approach.

AIR QUALITY AND SCOTTISH GOVERNMENT POLICY

1.9 Scotland's Economic Strategy¹¹ states that sustainable economic growth is the key to unlocking Scotland's potential. The Scottish Government's commitment to sustainable development is reflected in its Purpose¹², which is to focus government and public services on creating a more successful country, with opportunities for all of Scotland to flourish. This will be achieved by:

- creating a supportive business environment;
- achieving a low carbon economy;
- tackling health and wellbeing and social problems;
- maintaining a high-quality environment; and
- passing on a sustainable legacy for future generations.

1.10 Achieving cleaner air in Scotland will deliver positive outcomes across all of these goals.

1.11 Five strategic objectives that underpin this core Purpose – Greener, Healthier, Safer & Stronger, Smarter and Wealthier & Fairer – are in turn linked to 15 National Outcomes (see footnote 12) which set out in more detail the Government's policy priorities. Again, several of the National Outcomes – notably those focus on environment, sustainable places, environmental impact and healthier lives – relate directly to air quality.

6 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69340/pb13378-air-pollution.pdf

7 http://www.euro.who.int/__data/assets/pdf_file/0008/276956/PR_Economics-Annex_en.pdf?ua=1

8 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332854/PHE_CRCE_010.pdf

9 http://www.sepa.org.uk/media/120452/mtc_air_quality_core_doc.pdf

10 <http://www.sciencedirect.com/science/article/pii/S1462901109001129>

11 <http://www.gov.scot/Publications/2015/03/5984>

12 <http://www.gov.scot/Resource/Doc/933/0124202.pdf>

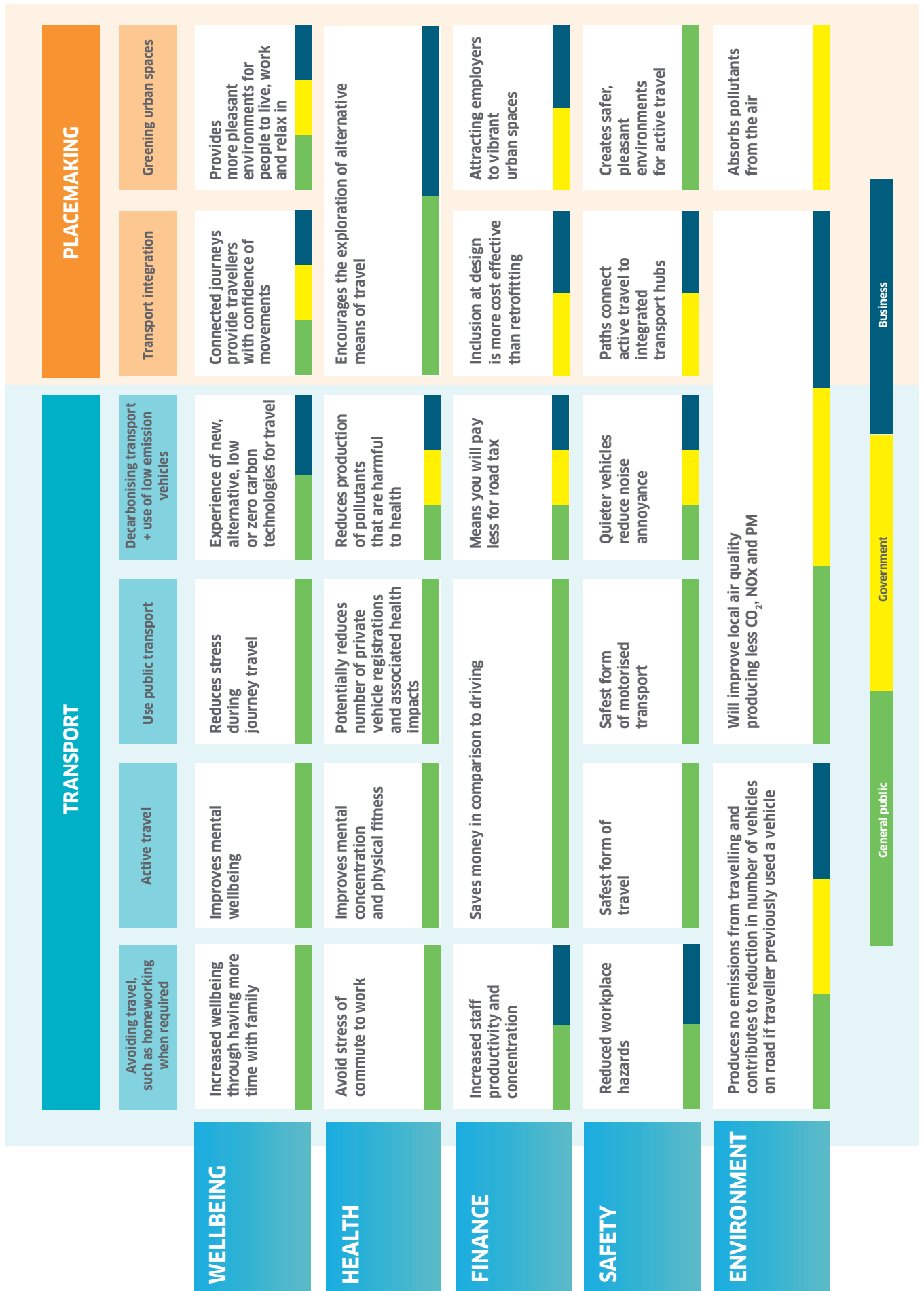


Figure 2a. Multiple benefits of good air quality

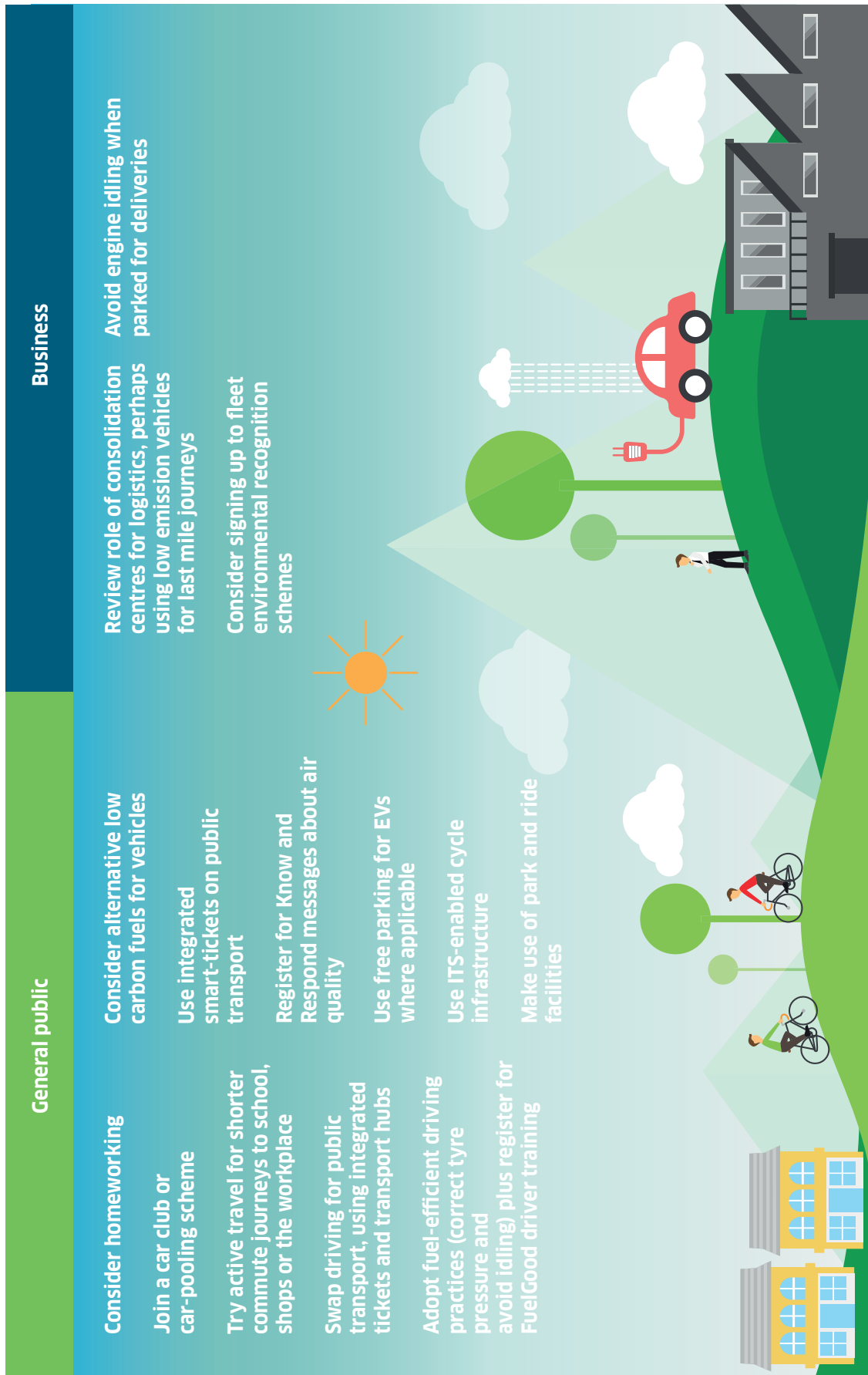


Figure 2b. Actions by individuals and business
 Source - Adapted from SEPA Making the case for the environment - air quality 2014⁹

1.12 Co-benefits from effective co-ordination of climate change and air quality policy have been noted in the ‘Low Carbon Scotland: Meeting Our Emissions Reduction Targets 2013-2027 – The Second Report on Proposals and Policies’¹³, with further detail provided in paragraph 8.5.

1.13 Action on air quality is also embedded in worldwide environmental policy. Principle 1 of the Rio Declaration (1992) on Environment and Development¹⁴ states that “human beings... are entitled to a healthy and productive life in harmony with nature.” The United Nations Sustainable Development Goals¹⁵, endorsed by the Scottish Government in 2015, also make explicit reference to air quality. The Sustainable Cities and Communities goal sets a target to “by 2030, reduce the adverse per capita environmental impact of cities, including paying special attention to air quality”.

1.14 CAFS sets out how the Scottish Government, working together with partner organisations across the public and private sectors, will deliver cleaner air across Scotland, in order to help create and maintain a strong, healthy and fair society that is capable of living within environmental limits.

13 <http://www.scotland.gov.uk/Publications/2013/06/6387/0>

14 <http://www.unep.org/Documents.Multilingual/Default.asp?documentid=78&articleid=1163>

15 <https://sustainabledevelopment.un.org/topics>

STRUCTURE

02

VISION, MISSION AND OBJECTIVES

Vision:

Scotland's air quality will be the best in Europe.

Mission:

To protect and enhance health, wellbeing, environment, place-making and sustainable economic growth through improved air quality across Scotland.

HEALTH



A Scotland which protects its citizens from the harmful effects of air pollution, reducing health inequalities.

WE WILL:

- Include in legislation as Scottish objectives World Health Organisation guideline values for PM₁₀ and PM_{2.5}
- Require NHS boards and their local authority partners to include reference to air quality and health in the next revision of their Joint Health Protection Plans, which should identify and address specific local priority issues

PLACEMAKING



A Scotland where air quality is not compromised by new or existing development and where places are designed to minimise air pollution and its effects.

WE WILL:

- Ensure that future updates and revisions to Scottish Planning Policy and the National Planning Framework take account of CAFS
- Expect planning authorities to review the Local Development Plan and revise at the next scheduled update to ensure policies are consistent with CAFS objectives and any local authority air quality action plans
- Work with Environmental Protection Scotland to produce updated guidance on air quality and planning
- Work with SEPA to introduce air quality training for local spatial and transport planners.
- Support SEPA in revising its guidance on Strategic Environmental Assessment to bring it into line with CAFS



CLIMATE CHANGE



A Scotland that reduces greenhouse gas emissions and achieves its renewable energy targets whilst delivering co-benefits for air quality.

WE WILL:

- Ensure that future updates to the Second Report on Proposals and Policies on meeting our climate change targets take into account air quality impacts
- Expect any Scottish local authority which has or is currently developing a Sustainable Energy Action Plan to ensure that air quality considerations are covered
- Work with Forestry Commission Scotland to publish updated guidance on the impact of biomass on air quality to help local authorities fulfil their statutory responsibilities

COMMUNICATION



A Scotland where all are well informed, engaged, and empowered to improve our air quality.

WE WILL:

- Develop a Scottish Air Quality Indicator to assist in assessing compliance with air quality legislation and delivery of CAFS objectives
- Develop a national air quality public awareness campaign
- Support the ongoing Greener Scotland communication campaigns, encouraging individuals to use the car less to improve their health and their local environment

LEGISLATION AND POLICY



A Scotland where all European and Scottish legal requirements relating to air quality are as a minimum complied with.

WE WILL:

- Implement a refocused Local Air Quality Management system
- Establish a PM_{2.5} monitoring network
- Produce revised and updated Scottish action plans to demonstrate how compliance with the EU Ambient Air Quality Directive will be achieved
- Design, develop and implement a two-level modelling system for regional and local scales to provide evidence for appraising and identifying potential transport and planning solutions to local air quality issues
- Evaluate the requirements of a regional model and then support its development during the first two years of implementing CAFS.
- Develop guidance and promote a support network for all practitioners involved in reviewing and assessing local impacts on air quality resulting from regional decision making.
- Undertake detailed modelling of all four major cities in Scotland, covering areas associated with highest levels of poor air quality
- Identify requirements and undertake data collection for additional urban areas within three years of implementing CAFS
- Implement the national databases for traffic data collection and local modelling outputs associated with CAFS
- By April 2016, in further consultation with partner organisations, ensure the NLEF criteria, tests, and processes are developed, agreed, and finalised
- Design and implement a standard appraisal process for assessing local air quality measures
- Develop the software tools and associated guidance for the NLEF, including funding options and technical reports, which will underpin the evidence on effectiveness of options

TRANSPORT



A Scotland that reduces transport emissions by supporting the uptake of low and zero emission fuels and technologies, promoting a modal shift away from the car, through active travel (walking and cycling) and reducing the need to travel.

WE WILL:

- Ensure that all local authorities have a corporate travel plan (perhaps within their carbon management plan) which is consistent with any local air quality action plan
 - Finalise and deliver the National Walking Strategy Delivery Plan by 2016
 - Work collaboratively with delivery partners to deliver our shared vision in the Cycling Action Plan for Scotland that by 2020, 10% of everyday journeys will be made by bike
 - Review support for green buses by 2016, including scope for supporting retrofitting existing vehicles, taking account of technological and market developments and the need to tackle air quality as well as climate change
 - Evaluate the Bus Investment Fund in 2016 to learn from supported projects and inform decisions on options for future support for local projects to improve public transport
 - Review the Bus Operators Grant by 2016, including consideration of options to incentivise the use of low emission buses
 - Review guidance and legislation on local transport authority powers regarding bus services by 2016 to see if they could be made more effective and to ensure sufficient consideration is given to air quality alongside other considerations
 - Continue delivery of actions contained in Switched On Scotland: A Roadmap to Widespread Adoption of Plug-In Vehicles
 - Review the Roadmap and develop a post-2015 plug-in vehicle action plan
- Work with key partners to investigate the use of hydrogen as a transport fuel, as well as exploring wider environmental and economic opportunities of using hydrogen for energy applications – especially in promoting renewables, energy balancing and storage
 - Continue to engage with our partners on the role lower carbon intensive fuels such as liquid petroleum gas, compressed natural gas and biofuels can play in the transition towards a near zero emission road transport sector by 2050
 - Encourage Freight Quality Partnerships to extend their activities to include consideration of the environmental impact of freight transport
 - Encourage local authorities with an AQMA to establish a Freight Quality Partnership – or utilise an existing RTP Freight Quality Partnership – to consider appropriate measures to achieve local air quality improvement by 2017
 - Review existing Ministerial guidance on Regional and Local Transport Strategies in the light of the refreshed National Transport Strategy. In doing so, we will consider how air quality management should be addressed and how RTPs and local authorities should use their transport strategies to support modal shift towards sustainable and active travel, including through Smarter Choices initiatives, and promote the take up of greener vehicles
 - Review trunk road impacts on AQMAs by 2016 and implement mitigation where trunk roads are the primary contributor to air pollutants by 2020



LEADERSHIP AND GOVERNANCE

2.1 Positive action on air quality will only be realised through strong national and local political leadership. There are clear links between transport, environment, health and economic development and both national and local levels of government. With this in mind, the Scottish Government is working closely with its agencies, regional transport partnerships, local authorities (transport, urban and land-use planners and environmental health), developers, employers, businesses and citizens to take action that will improve air quality.

2.2 The actions set out in CAFS cover areas which can be most influenced by the Scottish Government in partnership with others from across the public and private sectors. Local authorities in particular have a key role to play, with the Scottish Government providing support, advice and policy direction.

2.3 A CAFS Governance Group, supported by specialist subgroups, will be established to oversee implementation of CAFS (Figure 3). A number of members already have clear responsibilities with respect to air quality policy and action implementation.

2.4 The Scottish Transport Emissions Partnership (STEP)¹⁶ will be the principal mechanism for engaging with, and providing feedback to, the Governance Group from a broad community of professionals within our key audiences (as outlined in Section 9). If local authority air quality management groups are established, STEP will support these, particularly in relation to bespoke training for transport and planning professionals.

2.5 An annual CAFS progress report will be produced by the Scottish Government, to cover progress on the actions and the development of measures which require further investigation or research. The findings will be considered for inclusion in the climate change reporting forms of the public bodies represented on the Governance Group (also advocating that air quality is included in future revisions to the form template).

2.6 We will use Key Performance Indicators to measure progress against CAFS actions (see Section 12).

2.7 Where possible, funding and resources have been identified for each action. Where this is not possible at present, the Scottish Government and partner organisations will continue to work towards securing the necessary funding and will provide updates in the annual progress report.

16 <http://stepscotland.com/>

Wider audiences: General public, businesses and local government

EU / UK Government

STEP / Trade Associations / Institutions / Academia

Working groups: CAFS objectives

SG Ministers

CAFS Governance Group

Mission, Vision, objectives and actions

Figure 3. Cleaner Air for Scotland governance

SETTING THE SCENE

03

WHAT CAUSES AIR POLLUTION?

3.1 Air quality is affected by everything we do. Industry, transport, farming and power generation release pollution into the

atmosphere, along with domestic activities such as heating and cooking, and natural sources such as sea salt, wildfires, volcanic activity and soil erosion (Figure 4).

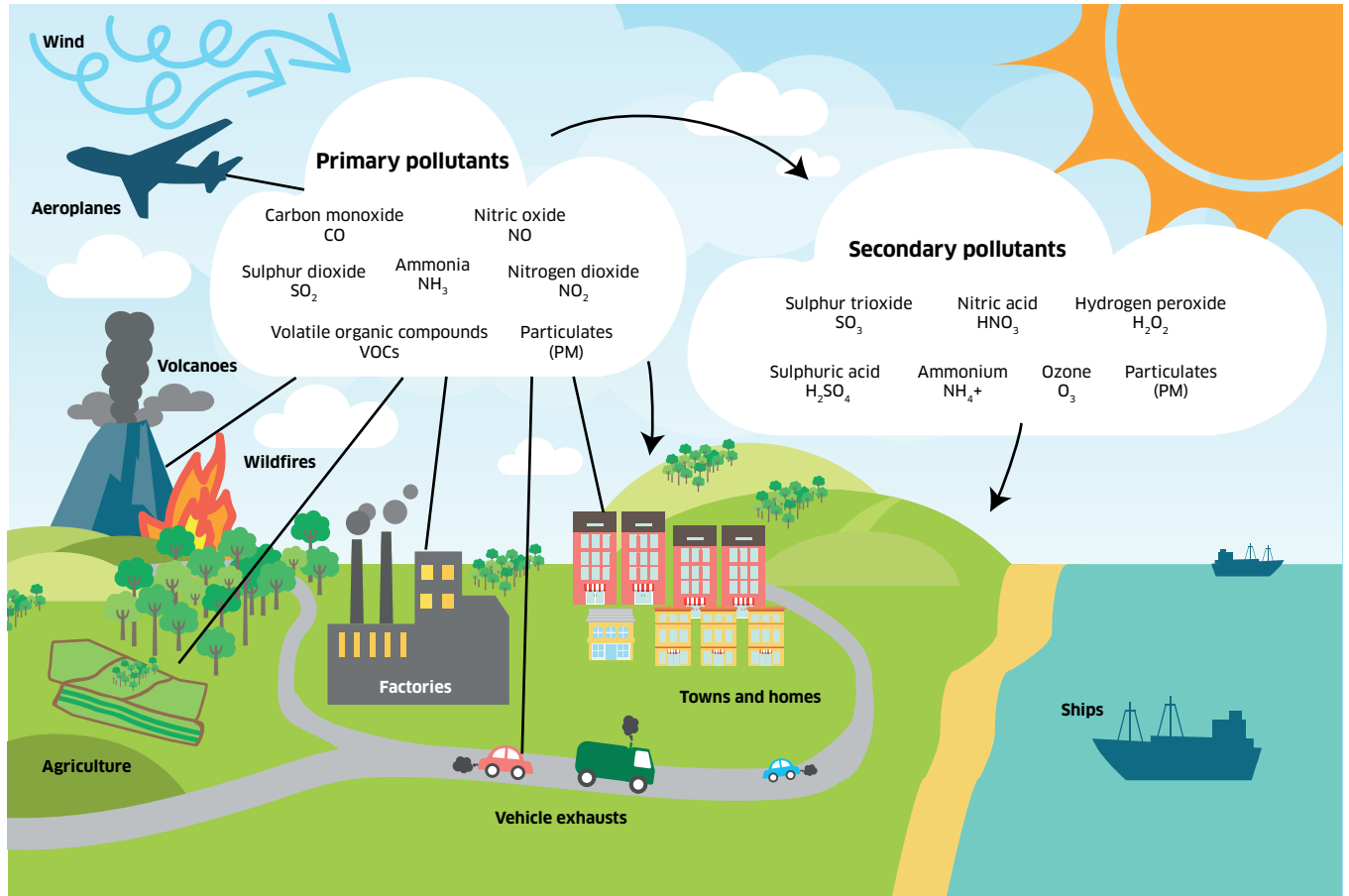


Figure 4. Sources of air pollution

Source - Scotland's Environment website¹⁷



17 <http://www.environment.scotland.gov.uk/get-informed/air/air-quality/>

3.2 When talking about air pollution we need to distinguish between:

- direct emissions of pollutants from these sources; and
- concentrations - the levels found in ambient air once the various emissions have been mixed and transported by atmospheric processes (Figure 5).

3.3 There is also a distinction between primary pollutants - emitted directly from different sources, and secondary pollutants - formed when primary pollutants undergo changes in the atmosphere.

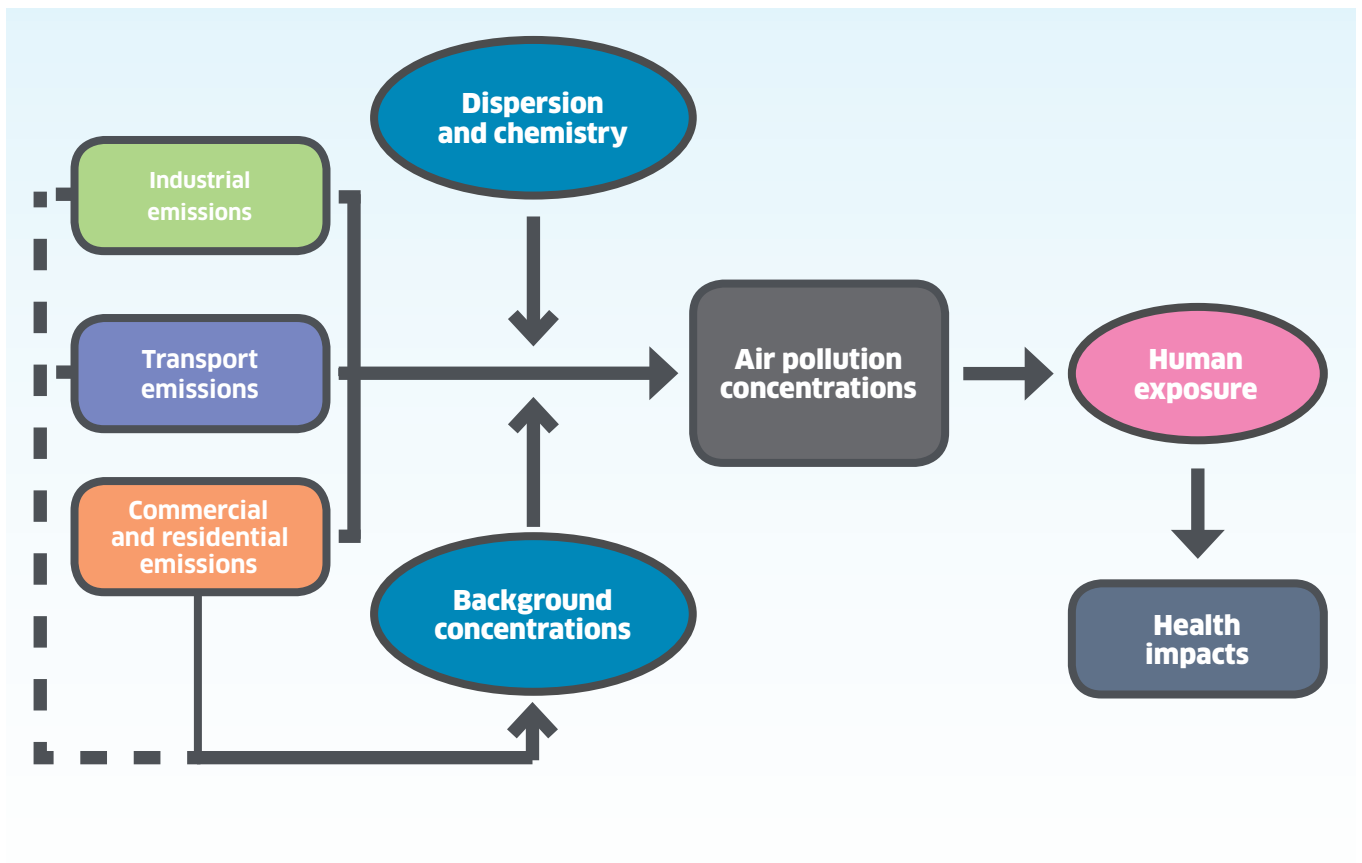


Figure 5. Relationships between air quality emissions and concentrations

Source - 'Air Quality and Road Transport: Impacts and Solutions' - Ricardo Energy & Environment report for the RAC Foundation¹⁸

18 http://www.racfoundation.org/assets/rac_foundation/content/downloadables/racf_ricardo_aea_air_quality_report_hitchcock_et_al_june_2014.pdf

3.4 Although there has been a strong overall downward trend in emissions, the picture for concentrations is less clear. Year-to-year variations in concentrations can be strongly influenced by:

- meteorological conditions;
- the chemical and physical properties of the different pollutants; and
- local factors such as building works and road closures.

3.5 Street design and the local transport mix can also affect concentrations at street level. Figure 6 shows changes in emissions of the main pollutants compared with 1990 levels. The data are normalised, which means that emissions data for each pollutant – gathered using a variety of different methods – have been converted to a common scale for ease of comparison, where 1.0 represents the situation in 1990.

3.6 Concentrations can also vary widely across relatively small areas. This is illustrated by the example of nitrogen dioxide (NO₂) level variation at four monitoring sites in Dundee (Figure 7). The red lines show overall trends.

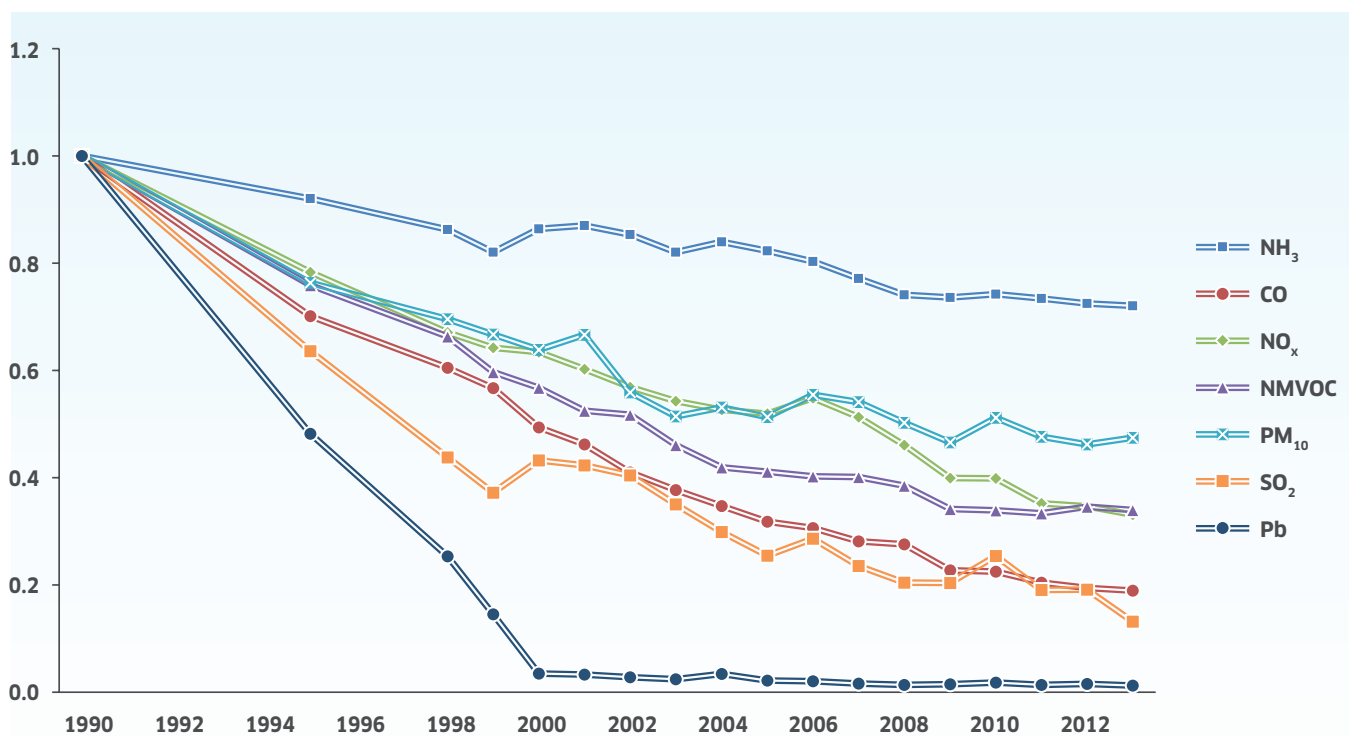


Figure 6. Emissions trends normalised for key air pollutants in Scotland since 1990. NH₃ – ammonia; CO – carbon monoxide; NO_x – oxides of nitrogen; NMVOC – non methane volatile organic compounds; PM₁₀ – particulate matter; SO₂ – sulphur dioxide; Pb – lead
 Source – Air Quality Pollutant Inventories for England, Scotland, Wales and Northern Ireland 1990-2013¹⁹

19 http://uk-air.defra.gov.uk/assets/documents/reports/cat07/1509110857_DA_AQPI_1990-2013_Report_Issue1.pdf

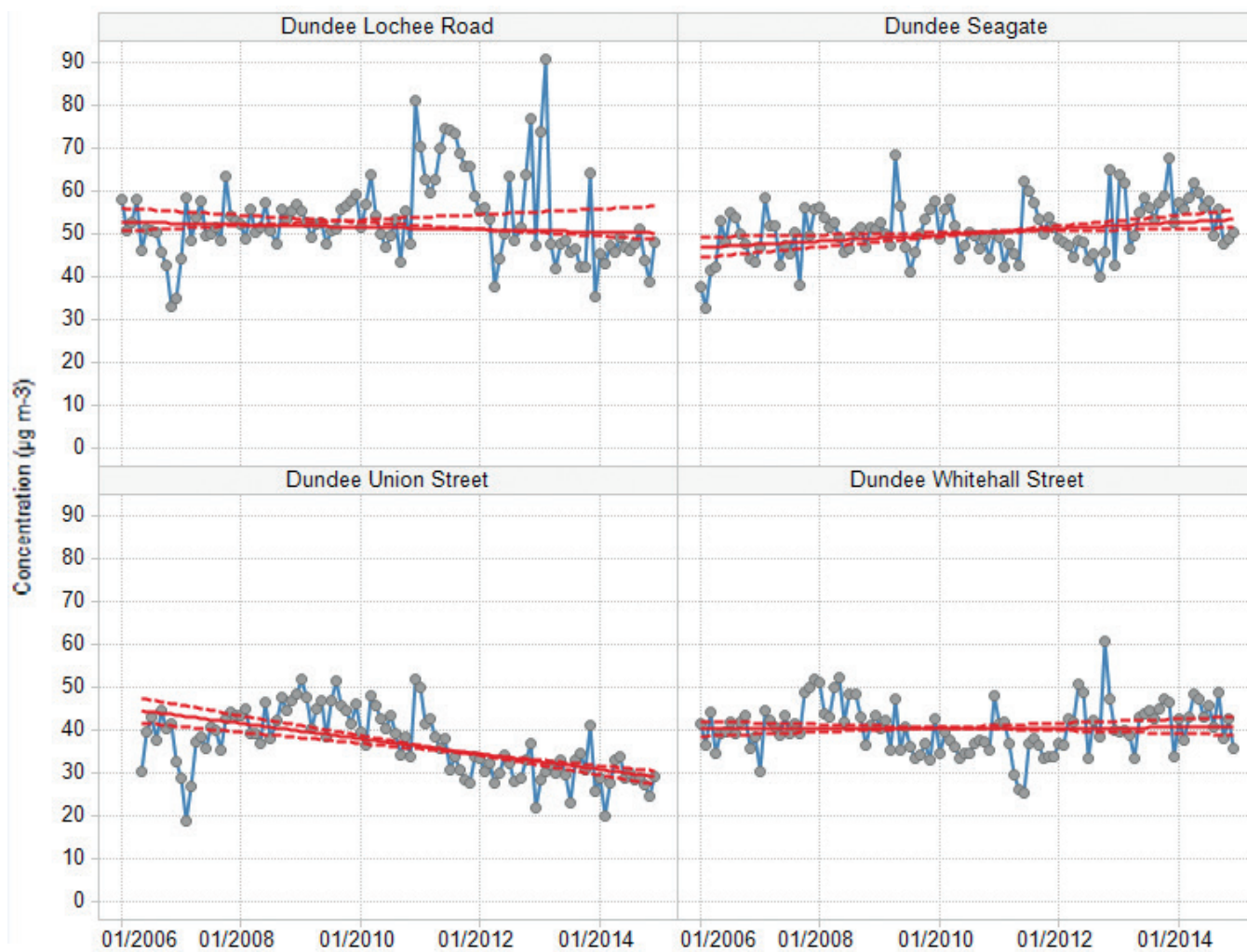


Figure 7. Trends in NO₂ concentration at four monitoring sites in Dundee, 2006–2014

Source – Scottish Air Quality Database Annual Report 2013²⁰

20 http://www.scottishairquality.co.uk/assets/documents/technical%20reports/SAQD-annual_report_2013-Issue_1.pdf

WHERE AND WHY DOES AIR POLLUTION OCCUR?

3.7 The highest levels of air pollution are found in cities and towns, but unlike the dense smogs of the past, today's air pollution is largely invisible. The effect of air pollution can be detected throughout urban Scotland, as illustrated by the fact that there are over 30 Scottish AQMAs currently in place. The actions being undertaken by local authorities to tackle these issues are outlined in the accompanying technical document.

3.8 Significant stationary pollutant sources come from industrial and domestic energy production, along with other combustion processes and agriculture (Table 1). However, given that the majority of Scotland's population lives and works in urban environments, transport emissions are the most important – but clearly, not the only – source of air pollution affecting human health.

Overall Rank	Sector	Ammonia	Carbon monoxide	Nitrogen oxides	Non methane volatile organic compounds	PM ₁₀	Sulphur dioxide	Lead
1	Other Combustion	1.3%	38.3%	11.6%	3.8%	35.2%	7.5%	27.6%
2	Transport Sources	1.8%	30.2%	38.5%	2.4%	16.4%	2.7%	7.0%
3	Industrial Combustion	0.0%	22.6%	13.0%	1.0%	5.0%	7.5%	31.1%
4	Energy Industries	0.0%	6.5%	34.6%	0.0%	5.7%	79.4%	20.8%
5	Industrial Processes	0.2%	0.0%	0.0%	47.1%	8.7%	1.6%	10.4%
6	Agriculture	86.6%	0.0%	0.0%	9.8%	21.1%	0.0%	0.0%
7	Other	5.6%	1.7%	2.3%	1.0%	6.0%	1.4%	0.3%
8	Solvent Processes	0.0%	0.0%	0.0%	20.5%	1.8%	0.0%	0.0%
8	Fugitive	0.0%	0.6%	0.0%	14.5%	0.0%	0.0%	0.0%
10	Waste	4.5%	0.0%	0.0%	0.0%	0.0%	0.0%	2.9%
Total		100%	100%	100%	100%	100%	100%	100%

Table 1. Pollutant emissions by sector in Scotland, 2013.

Source – Air Quality Pollutant Inventories for England, Scotland, Wales and Northern Ireland 1990-2013²¹

21 http://uk-air.defra.gov.uk/assets/documents/reports/cat07/1509110857_DA_AQPI_1990-2013_Report_Issue1.pdf

3.9 In relation to transport, fuel quality, emissions reduction technology and engine emission standards have all improved over the last decade or so. However, progressively tougher emissions standards are not delivering predicted real-world benefits – especially for diesel vehicles. A mismatch between regulation and real-world emissions from diesel vehicles seems to be one of the key reasons why the expected reductions in concentrations at the roadside have not materialised. This is further compounded by a growth in the proportion of diesel vehicles in the UK.

WHAT ARE THE HEALTH IMPACTS OF AIR POLLUTION?

3.10 Fine particles of material can descend deep into the lungs where they can cause irritation and inflammation. In turn, this can worsen existing conditions, such as asthma and heart and respiratory diseases²². Air pollution is a significant public health issue in terms of the collective impact on society. Evidence from research is increasingly suggesting that detectable adverse health impacts occur even at, or below, the legislative limit values which were set at levels previously assumed to be protective of health. Section 5 provides more detailed information on the health impacts and benefits associated with air quality.

LEGISLATIVE AND POLICY FRAMEWORK: EUROPE AND SCOTLAND

3.11 Table 2 summarises the key legislation and policies that direct action on air quality in Scotland. Detailed information on, and further links to, policy and legislation can be found in the accompanying technical document.

22 <http://www.documents.hps.scot.nhs.uk/environmental/briefing-notes/air-quality-and-mortality-2014-04.pdf>

Europe	
Directive 2008/50/EC on ambient air quality and cleaner air for Europe ²³	<ul style="list-style-type: none"> • Defines and fixes legal limits for air quality. • Sets limit values and/or alert thresholds (and/or target values for ozone) for several pollutants of concern for human and environmental health. • Assesses air quality according to a standardised methodology across the EU. • Sets out requirements for making information available to the public. • Compliance is legally binding on Member States.
National Emissions Ceiling Directive 2001/81/EC ²⁴	<ul style="list-style-type: none"> • Sets national emissions ceilings for certain pollutants. • Currently under review.
Industrial Emissions Directive 2010/75/EC ²⁵	<ul style="list-style-type: none"> • Controls emissions from industrial activities.
Clean Air Policy Package and Clean Air Programme for Europe ²⁶	<ul style="list-style-type: none"> • Sets out measures to ensure compliance with legislative requirements in the short term. • New air quality objectives to 2030. • Proposals to improve air quality in cities, support research and innovation, and promote international cooperation. • Revision of the National Emissions Ceiling Directive. • Proposal for a Directive on medium combustion plants.
Scotland	
Air Quality Strategy for England, Scotland, Wales & Northern Ireland ²⁷	<ul style="list-style-type: none"> • Sets out the short to medium term policy framework for air quality across the UK.
Local Air Quality Management ²⁸	<ul style="list-style-type: none"> • Defines objectives for several pollutants of concern for human health. • Sets out the policy framework for improving local air quality. • Achievement is the responsibility of local authorities, but is not legally binding.

Table 2. Air quality legislation and policy in Europe and Scotland

23 <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32008L0050&from=EN>

24 <http://ec.europa.eu/environment/air/pollutants/ceilings.htm>

25 <http://ec.europa.eu/environment/industry/stationary/ied/legislation.htm>

26 http://ec.europa.eu/environment/air/clean_air_policy.htm

27 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69336/pb12654-air-quality-strategy-vol1-070712.pdf

28 <http://www.gov.scot/Topics/Environment/waste-and-pollution/Pollution-1/16215/PG09>

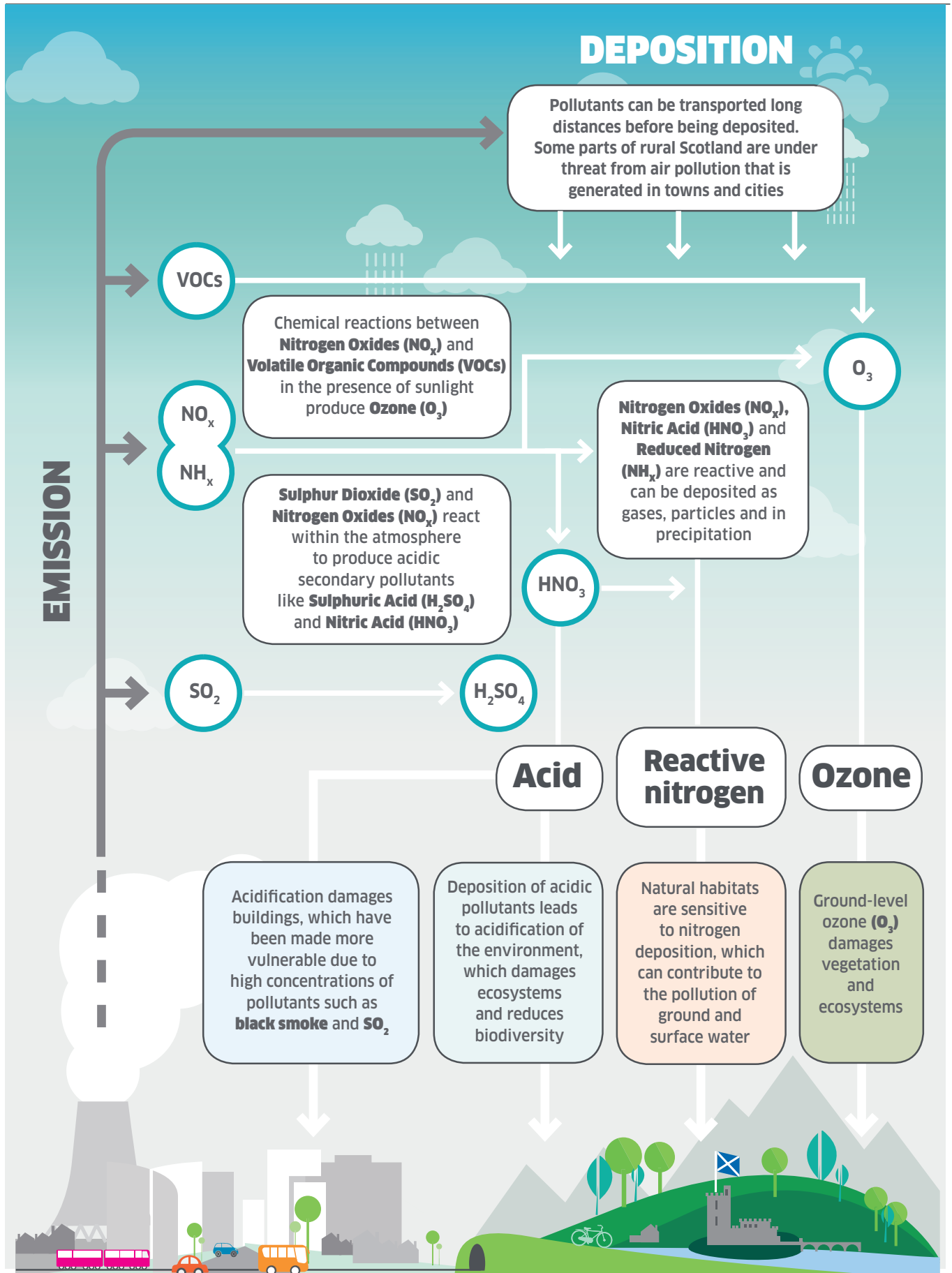


Figure 8. Links between air quality and natural and physical environment

AIR QUALITY AND THE ENVIRONMENT

3.12 Besides the effects of poor air quality on human health, there can also be a significant environmental impact²⁹, as shown in Figure 8.

AIR QUALITY AND NOISE

3.13 There is also a close relationship between air pollution and environmental noise. There are several common sources (most notably road traffic in urban areas), impacts and solutions³⁰. The environmental and health impacts (particularly associated with annoyance and sleep disturbance) are considered to be just behind those of air quality³¹, with external costs of noise in the EU amounting to at least 0.35% of its gross domestic product. Policies that can have a positive impact on both air quality and noise include:

- improving local traffic flows by using intelligent transport systems (see paragraph 6.27 for further details); and
- increased separation or buffer zones between sources and sensitive receptors.

29 <http://www.environment.scotland.gov.uk/get-informed/air/>

30 <http://www.scottishnoisemapping.org/>

31 <http://ec.europa.eu/environment/noise/>

LEGISLATION AND POLICY

04

LEGISLATION AND POLICY



A Scotland where all European and Scottish legal requirements relating to air quality are as a minimum complied with.

4.1 We will ensure that CAFS is successful by leading a collaborative approach across all policies, organisations, and professions to seek full compliance with EU air quality legislation by 2020. We will also implement new initiatives like the National Modelling Framework and the National Low Emission Framework, which are covered in Sections 10 and 11.

4.2 These goals will be supported by ensuring that the Local Air Quality Management (LAQM) system remains fit for purpose (see footnote 27). The LAQM system is the framework within which local authorities assess and tackle air pollution and is the foundation of all our efforts to improve air quality in Scotland. The Scottish Government has carried out a comprehensive review of the LAQM³² system and has produced a series of proposals³³, which will be introduced during 2016. In addition to reflecting these proposals, the revised and updated LAQM guidance will take account of the linkages between air quality and noise. Local authority action plans will continue to play an essential role as part of the LAQM system in particular, as well as in wider efforts to improve air quality.

4.3 Establishing a network to monitor fine particulate matter (PM_{2.5}) dovetails with the commitment in paragraph 5.18 to include World Health Organization (WHO) guidelines in Scottish air quality objectives.

WE WILL:

- Refocus the Local Air Quality Management system
- Establish a PM_{2.5} monitoring network
- Produce revised and updated Scottish action plans to demonstrate how we will achieve compliance with the EU ambient air quality Directive

32 <http://www.scotland.gov.uk/Topics/Environment/waste-and-pollution/Pollution-1/16215/review>

33 <http://www.scotland.gov.uk/Publications/2013/12/5214>

HEALTH

05

HEALTH



A Scotland which protects its citizens from the harmful effects of air pollution, reducing health inequalities.

HEALTH TODAY - THE HEALTH IMPACTS OF AIR POLLUTION

5.1 There is now no question that air pollution is bad for our health. The impacts first became clear last century following studies of the effect of industrial pollution associated with heavy industry. The infamous London smogs of the 1950s provided clear evidence of an association between increased deaths in urban areas and episodes of severe pollution from industrial and domestic coal fires. These sources have been addressed to a large extent and are no longer the main issue. However, evidence of the effects of exposure to air pollutants, especially from traffic, continues to accumulate.

5.2 Air pollution is less visible today and its effects on health are less obvious to the general public, which makes it harder to convince people that it is still a public health problem. Air pollution does not cause dramatic, distinctive illnesses in the same way that, for example, smoking tobacco causes lung cancer. Instead, it contributes to a range of other factors (personal, social and environmental) all of which increase the risks of common diseases (for example asthma, respiratory and heart disease), especially in people who are more vulnerable due to age (the very young and the elderly) or existing health conditions. This results in:

- increased episodes of acute and chronic (long-term) illness;
- reduced life expectancy (premature death);
- more pressure on health services (for example, increased use of medications, increased visits to GPs, increased hospital admissions);

- higher consequent costs; and
- loss of work time and school time.

5.3 Although short-term peaks in levels of urban air pollution are generally lower now than in the past, effects on health can still be identified; for example increased death rates due to heart disease a day or more after elevated pollution³⁴.

5.4 However, there is now a substantial body of international evidence demonstrating not only peaks, but also background levels of air pollution that have an impact on everyone's health. In 2010, the Committee on the Medical Effects of Air Pollutants (COMEAP) estimated that in the UK increased background levels of fine particulate matter (PM_{2.5}) raised the overall risk of death and reduced life expectancy³⁵. In Scotland this equates to the cumulative equivalent of about 2,000 deaths per year across the whole population, significantly more than the number of fatal accidents on Scottish roads³⁶. There is increasing evidence of the effects on health of PM_{2.5} at progressively lower concentrations; even lower than 5 µg/m³. Recently published updated estimates of the mortality attributable to particulate matter in the air (at the PM_{2.5} size fraction) in Scotland based on COMEAP methods³⁷, indicate that the impact varies across local authority areas depending on the average PM_{2.5} levels³⁸.

5.5 During the 2013 European Year of Air, WHO reviewed the most recent evidence on the chronic impacts of air pollution and found overwhelming evidence of the impact on mortality and morbidity, including cardiovascular and respiratory disease, birth outcomes and neurological effects³⁹.

34 <http://circ.ahajournals.org/content/121/21/2331>

35 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/304641/COMEAP_mortality_effects_of_long_term_exposure.pdf

36 <http://www.transportscotland.gov.uk/statistics/j379866-03.htm>

37 http://webarchive.nationalarchives.gov.uk/20140505104658/http://www.comeap.org.uk/images/stories/Documents/Statements/FINAL_Local_mortality_burden_statement_August_2012.pdf

38 <http://www.documents.hps.scot.nhs.uk/environmental/briefing-notes/air-quality-and-mortality-2014-04.pdf>

39 http://www.euro.who.int/_data/assets/pdf_file/0004/193108/REVIHAAP-Final-technical-report-final-version.pdf?ua=1

There is, therefore, no currently identified safe threshold for concentrations of PM, emphasising the need to continue efforts to reduce background levels.

5.6 More recent international research⁴⁰ looking at roadside air pollution suggests stronger links with coronary heart disease, deaths and illness associated with closer proximity to roads. Modelled estimates also suggest that these effects may worsen with an ageing population.

5.7 The WHO International Agency for Research on Cancer⁴¹ concluded that particulate matter from diesel engine exhausts can be classified as carcinogenic to humans. Also identified was an increasing risk of lung cancer with increasing levels of exposure to particulate matter⁴².

5.8 Research on the effects of air pollution on health has mainly focused on particulate matter, especially fine particulate matter (PM₁₀ and PM_{2.5}). However, evidence is beginning to accumulate on the potential scale of impacts associated with nitrogen oxides (NO_x), especially nitrogen dioxide (NO₂), either on its own or in combination with other pollutants. COMEAP produced an updated review of the evidence relating to NO₂ and concluded that on balance, NO₂ is responsible for some of the impacts on health identified in epidemiological studies on air pollution and health to date⁴³. This is particularly important, in view of the current concerns regarding the levels of NO₂ now associated with diesel powered vehicles. COMEAP is now developing estimates of the impact of these emissions on mortality⁴⁴.

5.9 A review of the current evidence on traffic-related air pollution has recently been completed as part of a project funded by the Scottish Government to identify the

key messages on air pollution and health in Scotland⁴⁵. The report identified limited but increasing evidence of the benefits of good air quality. A study from 2015 demonstrated that exposure to lower levels of particulate pollution (in United States of America nurses) was associated with lower levels of anxiety⁴⁶. Other studies have demonstrated that improved self-reported wellbeing is associated with lower levels of air pollution⁴⁷.

5.10 Some sources of air pollution cannot be easily controlled locally due to their transboundary nature, but traffic related air pollution is a major source that can be reduced through local and regional action. Therefore, it makes sense to continue with efforts to:

- reduce peak levels of air pollution especially in local communities (for example, by considering the introduction of access control options, such as Low Emission Zones or Clean Air Zones, as outlined in Table 4, following the stages outlined in Section 11); and
- drive down background levels of preventable air pollution.

5.11 There is no doubt that air pollution has negative impacts on health⁴⁸ and the evidence of good air quality improving wellbeing is accumulating (Figure 9). Reducing levels of air pollution, especially from transport, will have positive impacts on health and lessen health inequalities. This will also reduce the cost burden on health and other services. Strategies to encourage people to consider the travel hierarchy outlined in Section 6 will have positive health co-benefits helping to tackle other chronic public health problems, such as those associated with a sedentary lifestyle.

40 <http://ehp.niehs.nih.gov/1408865/>

41 http://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf

42 http://www.iarc.fr/en/media-centre/pr/2013/pdfs/pr221_E.pdf

43 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/411756/COMEAP_The_evidence_for_the_effects_of_nitrogen_dioxide.pdf

44 <http://www.airqualitynews.com/2014/12/05/uk-nitrogen-dioxide-mortality-figures-due-next-year/>

45 <http://www.environment.scotland.gov.uk/media/126007/iom-seweb-aq-health-behaviour-review.pdf>

46 <http://www.bmj.com/content/350/bmj.h1111>

47 <http://www.environment.scotland.gov.uk/media/126007/iom-seweb-aq-health-behaviour-review.pdf>

48 <http://www.documents.hps.scot.nhs.uk/environmental/briefing-notes/air-quality-and-mortality-2014-04.pdf>

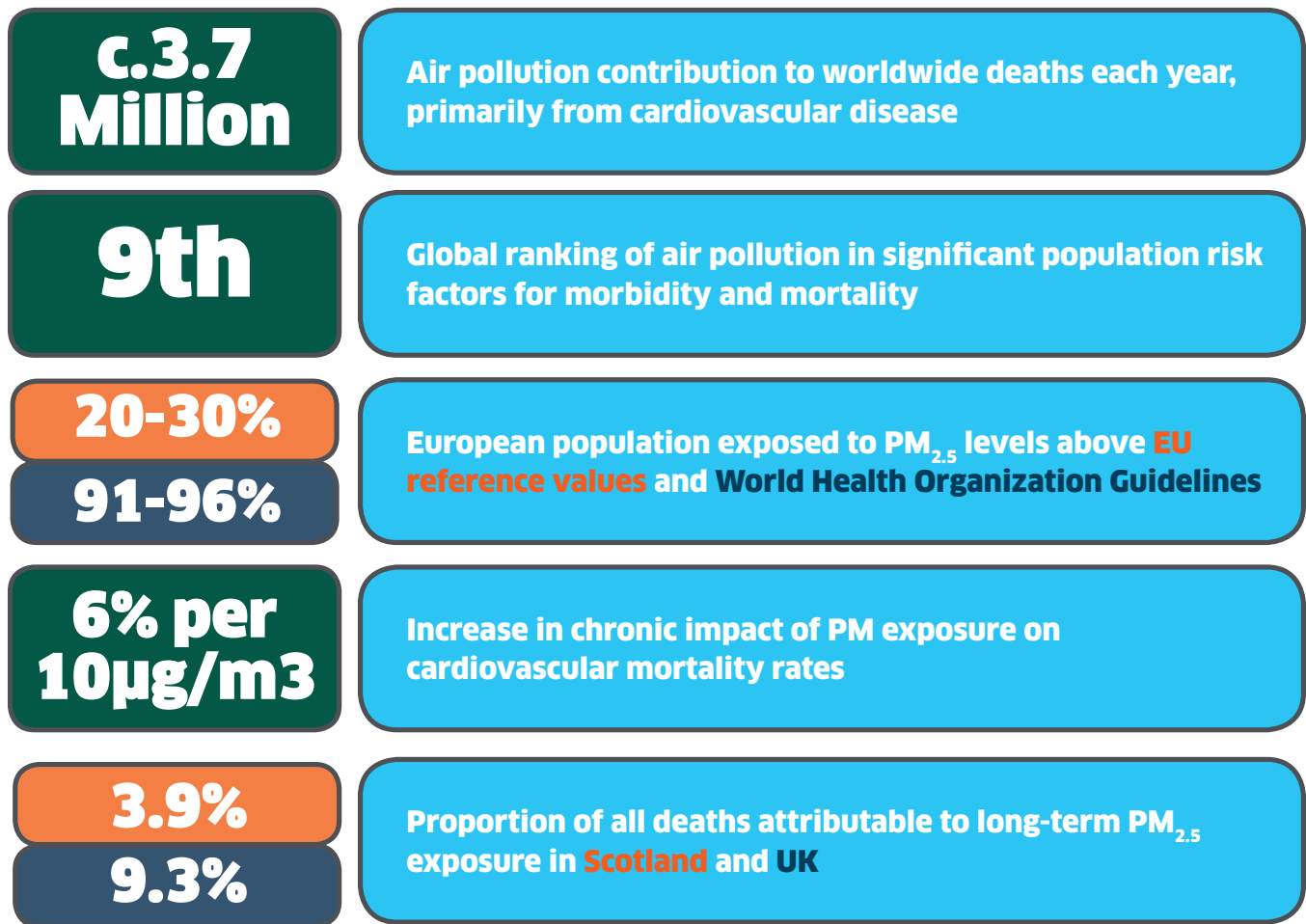


Figure 9. Air quality links to health^{49 50 51 52}

49 <http://www.who.int/mediacentre/factsheets/fs313/en/>

50 <http://www.eea.europa.eu/publications/air-quality-in-europe-2013>

51 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/304641/COMEAP_mortality_effects_of_long_term_exposure.pdf

52 <https://www.gov.uk/government/publications/estimating-local-mortality-burdens-associated-with-particulate-air-pollution>

HEALTH TOMORROW – WHAT MORE DO WE NEED TO DO?

5.12 Changing personal behaviour to improve health is always a challenging task. Evidence⁵³ indicates that to make people appreciate the significance of the issue, they need to be given information that helps them understand what individual air pollutants do to them physically (see case study 1). People also need personalised information on air pollution in their local environment, to complement more general information. However, simply raising concerns about air pollution and health without providing any solutions or practical alternatives to enable personal change, is likely to be counterproductive and result in a negative, resigned attitude to the issues. Case study 2 provides an example of how to provide a simple message to the general public and businesses so that they can make a personal contribution to cleaner air.

5.13 It is essential, therefore, to get the messages right about air pollution and health and provide accurate information to people. However, urging individuals to change their own habits for the wider benefit of the population or the environment will not be enough. Communication aimed at encouraging behavioural change needs to take account not only of *individual* personal factors that determine people's habits (personal circumstances, beliefs and preferences) but also wider issues such as:

- their *social* context (social norms and expectations, such as the social acceptability of driving a car); and
- *material* issues that constrain and shape people's behaviour (for example, the transport infrastructure, the availability of practical alternatives to car travel, and the costs of change)⁵⁴.

5.14 Providing personalised and targeted individual information to help people develop a personal travel plan with practical alternatives to car travel can work⁵⁵.

5.15 Local agencies working together, especially local authorities and local NHS boards, have a significant role to play in supporting the aims of CAFS by encouraging behaviour change to improve health and reduce health inequalities in local communities. Guidance is available at the local level to help agencies identify ways to raise the profile of air pollution and health and develop local action plans⁵⁶.

5.16 One option to raise the profile of air pollution in Scotland is to make use of the existing framework for joint planning on health protection. The Public Health Etc. (Scotland) Act 2008 requires each Health Board, in partnership with the local authorities in its area, to prepare a joint health protection plan. These plans provide an overview of the priorities, provision and preparedness for health protection (in relation to communicable disease and environmental health). Incorporating a section specifically about air quality and health, making use of available local data on the impacts to health (such as the estimated mortality attributable to PM pollution) would be one way to:

- highlight the issues locally;⁵⁷
- set out agreed plans to promote the provision of local information about air quality; and
- link to other local initiatives (for example, encouraging active travel).

53 http://www.google.co.uk/url?url=http://randd.defra.gov.uk/Document.aspx?Document%3D12465_AQ1010FinalProjectReport.pdf&rct=j&frm=1&q=&esrc=s&sa=U&ved=0CCAQFjACahUKEwj4_bCg_MHHAhWHzRQKHbJhDG8&usg=AFQjCNEWbdJSst3EGPijAT--0WZ5V0BaVw

54 <http://www.gov.scot/resource/0042/00423436.pdf>

55 <http://www.sciencedirect.com/science/article/pii/S0967070X06000023>

56 <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=18580>

57 <http://www.legislation.gov.uk/asp/2008/5/contents>

WE WILL:

Require NHS boards and their local authority partners to include reference to air quality and health in the next revision of their joint health protection plans, which should identify and address specific local priority issues

5.17 Also recognising the need for action at national level, the Scottish Government will focus on setting health-based objectives for air quality to reflect the growing evidence that health effects can be identified even at relatively low levels of air pollution.

5.18 An increasing body of evidence suggests that fine particulate matter (PM_{2.5}) is the most significant fraction of particulate pollution in terms of health impacts. The WHO has set guideline PM₁₀ and PM_{2.5} values of 20 µg/m³ and 10 µg/m³ respectively as annual means⁵⁸. These values are considerably more stringent than the equivalent EU and UK targets, but similar to the Scottish objectives of 18 µg/m³ and 12 µg/m³. Following the review of the Local Air Quality Management system (see paragraph 4.2 for more information), the Scottish Government has decided to replace the existing Scottish objectives with the WHO guideline values. Whilst this is undoubtedly a positive step, the approach will create challenges, with respect to the transboundary impacts on PM_{2.5} in particular.

WE WILL:

Include in legislation as Scottish objectives World Health Organization (WHO) guideline values for PM₁₀ and PM_{2.5}



58 http://whqlibdoc.who.int/hq/2006/WHO_SDE_PHE_OEH_06.02_eng.pdf?ua=1

CASE STUDY 1

Improving public awareness of air quality impact on health – British Heart Foundation

Air pollution can make existing heart conditions worse and cause cardiovascular events in vulnerable groups. Since 2010 the British Heart Foundation (BHF) has provided £6.9 million for medical research to help better understand the link between air pollution and cardiovascular disease. However in February 2015 a survey of general public awareness of air quality issues by the BHF revealed the following:

- Only 20% were aware of a risk of stroke due to poor air quality.
- 49% of Scots were unaware of the risk of heart disease from air pollution.
- 58% of Scots did not know what the local air quality was in their area, or where to go to find this information.

These statistics clearly showed the need for a wide reaching communications campaign to inform and equip the public on the dangers of air pollution and the actions they can take to reduce their exposure. In response to this need the BHF provided an online information sheet on how air quality affects the heart, who is most at risk, what individuals can do, and where to go for further information. The BHF also tweets about episodes of high air pollution when they occur and is strongly supportive of the Scottish Government's commitment to ensure that people across Scotland are aware of the importance of air quality.

CASE STUDY 2

Switch Off and Breathe – West Lothian, East Lothian, Midlothian and Falkirk Councils

In 2007 the East Central Scotland Vehicle Emissions Partnership (VEP) – a partnership of four Scottish local authorities – launched a campaign to help reduce vehicle emissions through educating the general public by the provision of vehicle emissions testing, free to the public and supported by Scottish Government funding, and encouraging drivers to switch off their engine whenever possible. VEP actively deals with reports from members of the public who identify vehicles which are excessively smoky and also stationary vehicles which idle their engines for long periods.

The emission testing service allows drivers to check emissions from their vehicles, without penalty, to ensure that they will pass the MOT test and comply with legal requirements. It also helps to ensure that people are not breathing unnecessary noxious fumes created by vehicles.

To publicise its messages and to try and change driving habits across the country, VEP makes extensive use of local radio, television and newspaper advertising, along with a website

<http://www.switchoffandbreathe.org/>

The campaign highlights the health benefits of reducing pollution levels to both prevent and alleviate illnesses such as asthma and heart and lung conditions.



TRANSPORT

06

TRANSPORT



A Scotland that reduces transport emissions by supporting the uptake of low and zero emission fuels and technologies, promoting a modal shift away from the car, through active travel (walking and cycling) and reducing the need to travel.

TRANSPORT TODAY – THE KEY ISSUES

6.1 Transport generates just over one-sixth of Scotland’s total PM₁₀ and over one-third of the total emissions of nitrogen oxides (NOx) (see Table 1). The majority of these emissions are caused by road transport.⁵⁹ Emissions of NOx from road transport are improving – as shown in Figures 10 and 12 – but not at the expected rate, considering the tightening of engine emission standards in recent years. Summaries of Scottish transport statistics and the associated emissions are provided in Figures 11 and 12 respectively.

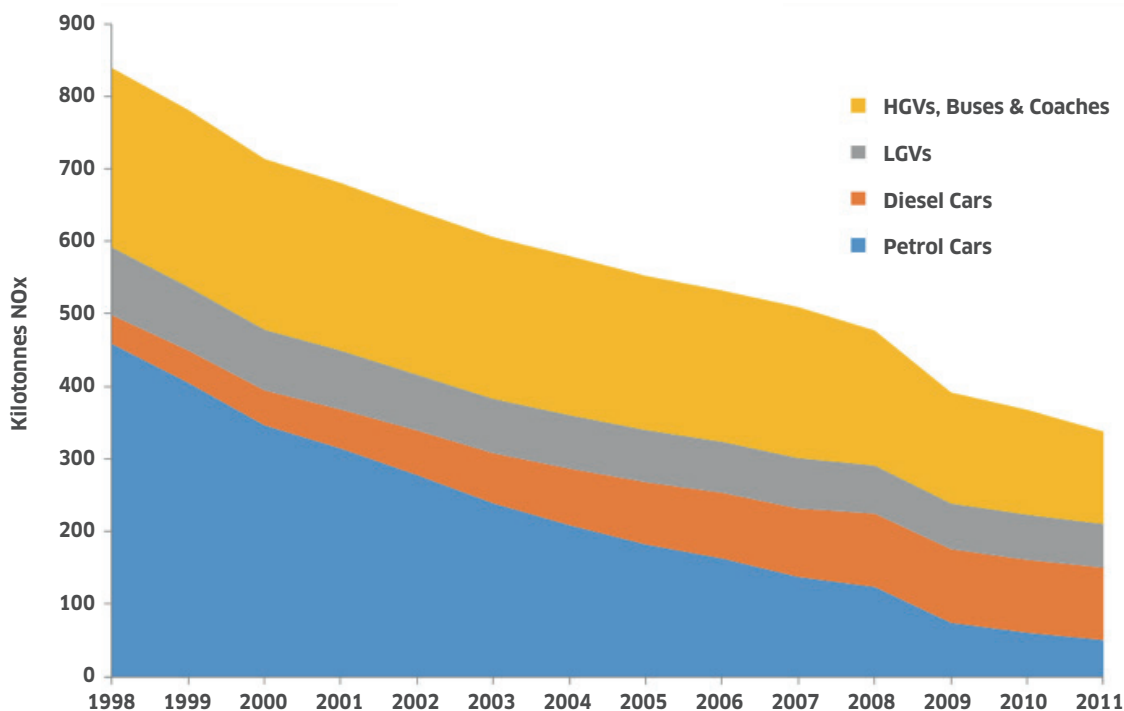


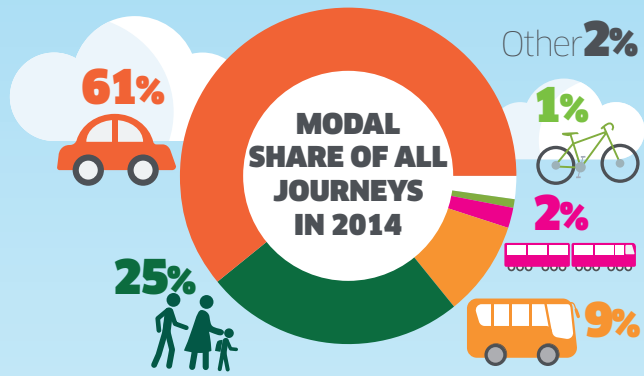
Figure 10. Changes in UK NOx emissions by vehicle type

Source – ‘Air Quality and Road Transport: Impacts and Solutions’ – Ricardo Energy & Environment report for the RAC Foundation (see footnote 18).

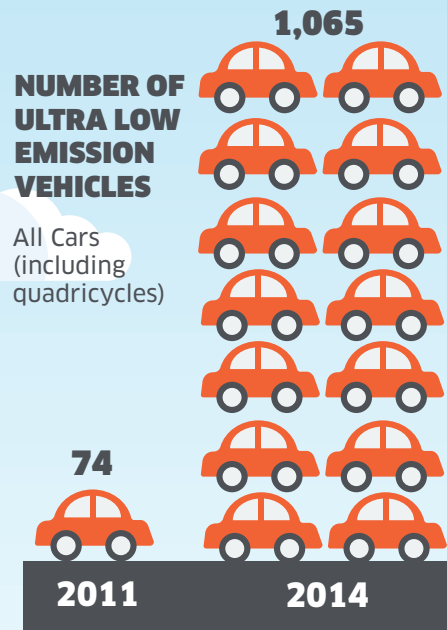
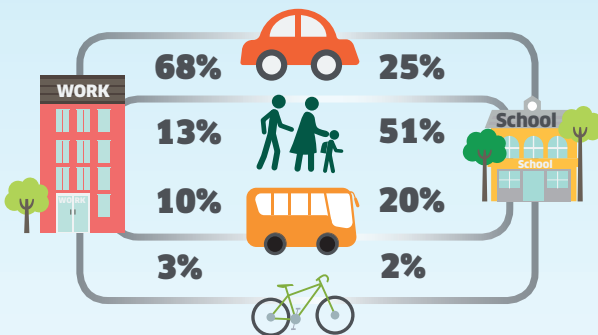
59 http://uk-air.defra.gov.uk/assets/documents/reports/cat07/1309111039_DA_AQPI_1990-2011_MainBody_Issue1.0.pdf

OVERVIEW OF TRAVEL TRENDS IN SCOTLAND, SHOWING PERCENTAGE CHANGE OVER 1 YEAR AND PERCENTAGE CHANGE OVER 5 YEARS

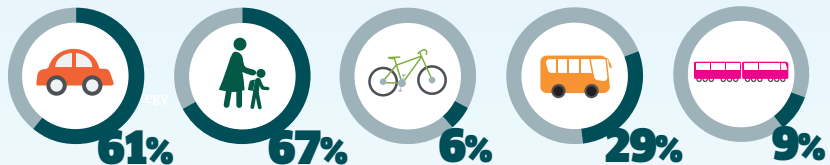
	CHANGE OVER 1 YEAR	CHANGE OVER 5 YEARS
	1.7%	0.0%
	3.0%	18.1%
	7.3%	20.5%
	-1.2%	-8.5%
	3.6%	7.0%
	0.7%	-4.7%



PERCENTAGE OF JOURNEYS MADE BY MAIN MODE OF TRAVEL BETWEEN 2004 AND 2014

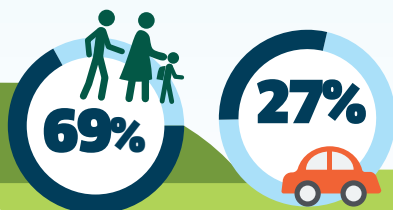


PERCENTAGE OF ADULTS USING EACH MODE AT LEAST ONCE PER WEEK IN 2014



HOW FAR DO PEOPLE TRAVEL ACROSS MODES?

More than two thirds (69%) of journeys in 2014 under 1 km were made on foot, however car journeys accounted for most of the remainder (27%) in 2014



The mean journey length in 2014:

- Walking = 1.1km
- Bicycle = 4.4km
- Bus = 8.3km
- Rail = 28.4
- Car = 10.4km



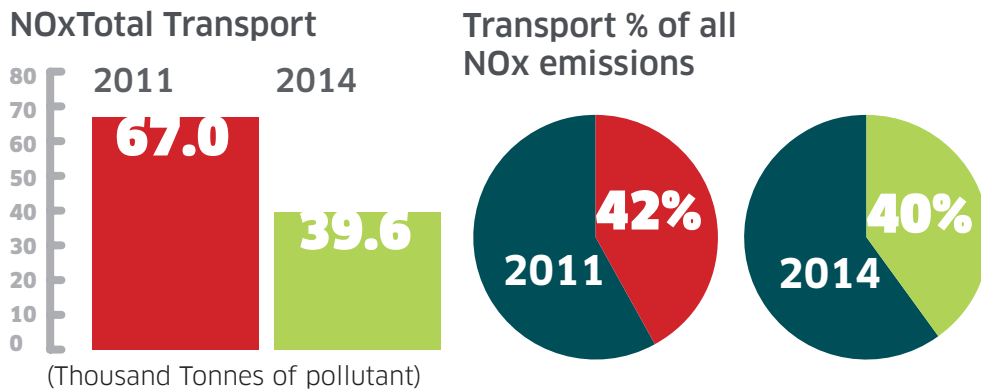
Figure 11. Summary of transport statistics for Scotland in 2014.

Source – Transport Scotland’s Transport and Travel in Scotland 2014: Overview of travel trends in Scotland⁶⁰ and Scottish Transport Statistics No 33 2014 Edition as published by Transport Scotland⁶¹.

60 <http://www.transportscotland.gov.uk/report/j389989-00.htm>

61 <http://www.transportscotland.gov.uk/statistics/j357783-00.htm>

EMISSIONS OF OXIDES OF NITROGEN (NOX) BETWEEN 2002 AND 2012
 SHOWING THE TRANSPORT TOTAL OF ALL NOX EMISSIONS



EMISSIONS OF PARTICULATE MATTER (PM10) BETWEEN 2002 AND 2012
 SHOWING THE TRANSPORT TOTAL OF ALL PM10 EMISSIONS

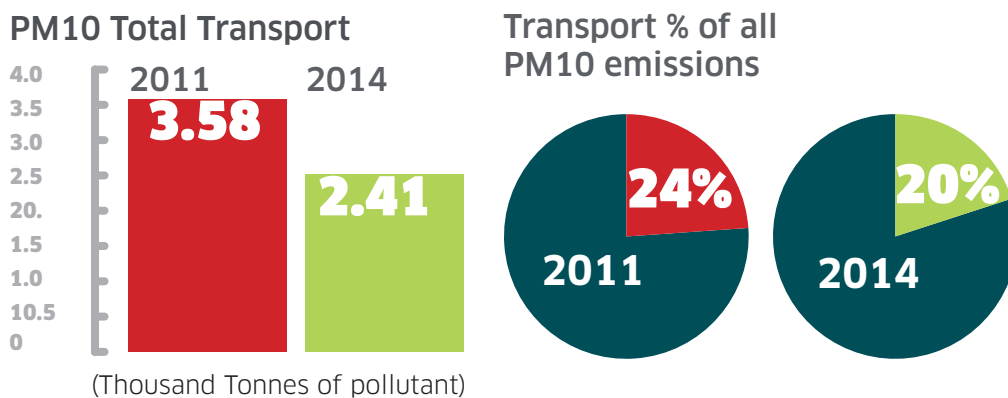


Figure 12. Summary of transport emissions statistics for Scotland in 2014.

Source - Scottish Transport Statistics No 33 2014 Edition (see footnote 61)

6.2 Transport Scotland⁶² is the Scottish Government's national transport agency. National transport projects and policies in Scotland are governed by the National Transport Strategy⁶³, which includes a strategic outcome to 'reduce emissions, to tackle the issues of climate change, air quality and health improvement which impact on our high-level objective for protecting the environment and improving health.' To achieve this strategic outcome Transport Scotland has prioritised:

- seeking low carbon technology and infrastructure with reduced emissions; and
- demonstrating environmental sustainability through the delivery of environmental protection across Transport Scotland's operations.

6.3 A refresh of the National Transport Strategy will be completed by the end of 2015.

6.4 At a local level, regional transport partnerships⁶⁴ (RTPs) bring together local authorities and others under regional transport strategies that influence when and how projects and proposals are delivered. Local transport strategies also have an important role to play.

TRANSPORT TOMORROW – WHAT MORE DO WE NEED TO DO?

6.5 Reducing transport emissions does not simply equate to reducing volumes of traffic or numbers of journeys, although this approach would help to achieve cleaner air. As 'air pollution is a systematic issue that requires a long-term approach across interdependent sectors',⁶⁵ a combination of the following strategies⁶⁶ endorsed by the United Nations Environment Programme is

needed. Collectively, these will contribute to reducing emissions from transport that affect air quality:

- **Avoiding** travel through (i) spatial planning and (ii) digital technology;
- Making a **shift** to lower emission transport modes and active travel;
- Using intelligent traffic system **management** to make the most efficient use of the existing transport assets; and
- **Improving** engine technology and increasing the uptake of ultra-low emission vehicles that use a new network of vehicle charging infrastructure.

Avoiding travel

6.6 The greenest mile is the mile not travelled; zero travel equates to zero emissions from transport. Scotland's Digital Future⁶⁷ and the associated Scottish Public Sector Green Information and Communications Technology (ICT) Strategy⁶⁸ can enable employers to minimise emissions from staff commutes by promoting more homeworking through a corporate travel plan. National Planning Framework (NPF3)⁶⁹ has identified building a digital fibre network to link up our most peripheral communities as a national development. Digital technologies will allow people to connect without travelling by providing high-quality mobile and fixed broadband connections for communities and businesses in rural and urban areas. Employers should also consider adopting mobile and flexible working encompassing a mix of working from home, working from multiple offices that may be closer to the employee's home or non-office mobile working.

62 <http://www.transportscotland.gov.uk/>

63 <http://www.gov.scot/Resource/Doc/157751/0042649.pdf>

64 <http://www.transportscotland.gov.uk/public-transport/regional-transport-partnerships>

65 http://www.racfoundation.org/assets/rac_foundation/content/downloadables/racf_ricardo_aea_air_quality_report_hitchcock_et_al_june_2014.pdf

66 http://www.unep.org/greeneconomy/Portals/88/documents/ger/GER_10_Transport.pdf

67 <http://www.gov.scot/Publications/2011/03/04162416/0>

68 <http://www.gov.scot/Publications/2015/04/4462>

69 <http://www.gov.scot/Publications/2014/06/3539/8>

WE WILL:

- Ensure that all local authorities have a corporate travel plan (perhaps within their carbon management plan) that is consistent with any local air quality action plan

Active travel - walking and cycling

6.7 Active travel is inextricably linked to improving air quality, reducing environmental noise and easing congestion. The National Walking Strategy⁷⁰ and the Cycling Action Plan for Scotland⁷¹ set out clear ambitions for increasing the proportion of short journeys completed by walking or cycling. The shared vision in the Cycling Action Plan for Scotland is that, by 2020, 10% of everyday journeys will be completed by bike. Helping people to choose active modes of travel for short journeys rather than using the car has many clear and proven benefits including reducing air pollution, improving people's quality of life and physical and mental wellbeing. In turn, these gains can improve workforce productivity and children's attainment along with economic gains such as saving money on healthcare and supporting local economies through higher footfall and visitor spending.

6.8 In recent years the Scottish Government has invested significant resources in improving the walking and cycling infrastructure and encouraging people to use these modes of travel. For example, in 2014/2015 Transport Scotland invested £19 million in the Community Links⁷² programme, administered by Sustrans Scotland, to build new or improve existing short walking and cycling paths in communities across Scotland. Our investment was matched by £25 million from local authorities and other delivery partners. In 2015/2016, £20 million has been committed to the Community Links programme,



which, in turn, will attract £24 million of match funding. Since it was launched in 2011, Community Links has supported the construction of 190 kilometres of path.

6.9 In addition, in 2015/2016 Transport Scotland has allocated £5 million to the Smarter Choices, Smarter Places programme (administered by Paths for All) for behaviour change initiatives around travel. This is being matched by £6.5 million from local authorities and their partners. A significant proportion of this funding is being used to promote active travel for short journeys, particularly in areas where there has been significant investment in new and enhanced infrastructure in recent years.

6.10 To achieve the ambitions set out below, we must keep improving conditions for walking and cycling, whilst continuing to tackle the cultural, attitudinal and perceived barriers that prevent more people from choosing to walk or cycle for short journeys. Another focus will be to improve the integration between active and public transport.

70 <http://www.gov.scot/Publications/2014/06/5743>

71 <http://www.transportscotland.gov.uk/report/j0002-00.htm>

72 <http://www.community-links.org/>



WE WILL:

- Finalise and deliver the National Walking Strategy Delivery Plan by 2016
- Work collaboratively with partners to deliver our shared vision in the Cycling Action Plan for Scotland that by 2020, 10% of everyday journeys will be made by bike

Public transport

6.11 Buses are the most frequently used and most widely available mode of public transport in Scotland. The bus market is loosely regulated and services are diverse, reflecting the characteristics of the different communities they serve. Most services are provided on a commercial basis, with Transport Scotland providing substantial financial support in the form of the Bus Service Operators Grant. Around 20% of bus services (in terms of kilometres) are provided under contract to local transport authorities (that is local authorities and, in

some areas, regional transport partnerships) to meet social needs that otherwise would not be met.

6.12 As well as through funding, local transport and roads authorities can strongly influence services at the local level by:

- providing a suitable infrastructure; and
- using regulatory tools, such as Quality Partnership Schemes and Quality Contract Schemes.

6.13 Suitable infrastructure can help operators make services more attractive or affordable and encourage modal shift (of the travelling public). Quality Partnership Schemes and Quality Contract Schemes can be used to attach conditions to vehicles and services in order to deliver a range of objectives, including those relating to air quality. Through the Bus Investment and Scottish Green Bus Funds, Transport Scotland supports local transport authorities and operators to invest in infrastructure and greener vehicles. Transport Scotland is also working actively with transport operators to deliver nationwide integrated ticketing arrangements across operators and modes of transport, which will attract more people to use public transport instead of cars.

6.14 By speeding up the introduction of newer, lower emission buses, the Scottish Green Bus Fund has contributed to improving air quality and reducing carbon. In the last five years, the Fund has helped support over £200 million of investment by bus operators on new fleet.

6.15 The rail industry's impact on air quality is generally local to large stations. Network Rail has taken action to prevent the majority of vehicles (mostly taxis) accessing the interior of prominent Scottish stations such as Glasgow Central and Edinburgh Waverley. The electrification of Scotland's rail network will also minimise air pollution from trains.

CASE STUDY 3

Dundee – Scotland’s Electric Vehicle Capital

Dundee is already recognised as one of the UK’s leading cities for EV adoption and has ambitious plans to build on this and become globally recognised as a leader for innovative EV development.

With 60 electric cars and vans in their fleet, Dundee City Council already have more EVs than any other council in the UK. They also have ambitions to become one of the first councils in the world to have a 100% ultra-low emission fleet of light duty vehicles.

The Council have also been an active partner in Transport Scotland’s EV infrastructure programme, ChargePlace Scotland. Indeed, the city hosts the UK’s first and most extensive urban rapid charger network.

It is not just the Council taking action. Local taxi operator 203020 Electric now boasts the UK’s largest electric taxi fleet, comprising over 40 EVs, with plans to significantly expand this number in the near future.

Furthermore, the University of Dundee has extended its EV fleet to include seven electric vans, as well as rolling out 12 electric bikes, aiming for a nine-tonne saving in CO₂ emissions and £10,000 cost reduction per year.

WE WILL:

- Review support for green buses by 2016, including the scope for supporting retrofitting existing vehicles, taking account of technological and market developments and the need to tackle air quality as well as climate change
- Evaluate the Bus Investment Fund in 2016 to learn from supported projects and inform decisions on options for future support for local projects to improve public transport
- By 2016, review the Bus Operators Grant including options to incentivise the use of low emission buses
- By 2016, review guidance and legislation on the powers of local transport authorities regarding bus services to see if they could be made more effective and to ensure enough priority is given to air quality alongside other considerations

Low emission vehicles and fuels

6.16 Switched On Scotland: A Roadmap to Widespread Adoption of Plug-in Vehicles⁷³ sets out the measures that Transport Scotland and its partners will take to accelerate the uptake of plug-in vehicles.

This will help Scotland achieve the vision of:

- freeing Scotland’s towns, cities and communities from the damaging effects of petrol and diesel fuelled vehicles by 2050; and
- phasing out half of all petrol and diesel fuelled vehicles from our urban environments by 2030.

6.17 Significant progress has been made towards the actions set out in the Roadmap. For example, the *ChargePlace* Scotland charging network for electric vehicles now has over 800 public charging bays (over 400 units) across Scotland including rapid charging units to support Scotland’s strategic road network.

73 <http://www.transportscotland.gov.uk/report/j272736-00.htm>

6.18 In addition, the Switched On Fleets initiative is supporting the uptake of electric vehicles (EVs) into public sector fleets. This initiative offers free, evidence-based analysis, identifying new opportunities for the cost effective deployment of EVs in each of Scotland's 32 community planning partnerships. Transport Scotland is backing this with £2.5 million of grant funding to enable these partnerships to buy or lease EVs. The initiative is being run from 2014 to 2016, and the first year of operation saw 145 new EVs introduced across the fleets of 22 public sector organisations.

6.19 There are more than 20,000 taxis and private hire cars in Scotland, offering further potential for increased adoption of EVs. Dundee is leading the way with the UK's largest electric taxi fleet (see case study 3), in tandem with Dundee City Council's approach to decarbonising its fleet. Through the Energy Saving Trust's Low Carbon Transport Loan, Transport Scotland is also offering an interest-free loan of up to £100,000 to businesses, including taxi operators, to encourage them to switch to EVs. A loan of up to £50,000 is available to individuals.

6.20 To ensure momentum is maintained, Transport Scotland will begin a review of the Roadmap in 2015/2016 to assess progress towards these actions and develop an action plan for plug-in vehicle for 2015 onwards.

6.21 Transport Scotland is also working with a range of partners to identify how best to support new technologies and alternative fuels which can help reduce transport emissions. For example, it is supporting the Aberdeen Hydrogen Bus Project⁷⁴ which comprises Europe's largest fleet of zero emission hydrogen fuel cell buses as well as the UK's first large scale green hydrogen production and refuelling facility (see case study 4). Transport Scotland is also engaging with industry on the role that less carbon intensive fuels such as liquid petroleum gas,

compressed natural gas and biofuels can play in the transition to a near zero emission road transport sector in 2050.

WE WILL:

- Continue delivering actions contained in Switched On Scotland: A Roadmap to Widespread Adoption of Plug-In Vehicles
- Review the Roadmap and develop a post-2015 plug-in vehicle action plan
- Work with key partners to investigate the use of hydrogen as a transport fuel and explore wider environmental and economic opportunities to use hydrogen for energy applications - especially in promoting renewables, energy balancing and storage
- Continue to engage with our partners on the role less carbon intensive fuels such as LPG, CNG and biofuels can play in the transition to a near zero emission road transport sector by 2050

Freight

6.22 At the national level, Transport Scotland is working with the Scottish Freight Logistics Advisory Group to develop freight efficiencies. At a regional level, Freight Quality Partnerships or forums have been set up by most regional transport partnerships to address the environmental impact of freight transport. At the local authority level, several freight environmental recognition schemes have been initiated in Scotland to improve the environmental performance of the road freight sector.

WE WILL:

- Encourage each local authority with an AQMA to establish a Freight Quality Partnership (or utilise an existing RTP Freight Quality Partnership) and consider appropriate measures for improving local air quality by 2017
- Encourage freight quality partnerships to extend their activities to include consideration of the environmental impact of freight transport

⁷⁴ <http://aberdeeninvestlivevisit.co.uk/Invest/Aberdeens-Economy/City-Projects/H2-Aberdeen/Hydrogen-Bus/Hydrogen-Bus-Project.aspx>

CASE STUDY 4

Aberdeen Hydrogen Bus Project – H2 Aberdeen

Key industry and public sector organisations joined forces in 2015 to fund and deliver the world’s largest demonstration of hydrogen fuel cell buses in Aberdeen. The £20 million project sought to establish the Aberdeen City region as a world-leading zone for low carbon technology, and to stimulate a hydrogen economy. To date, the initiative has achieved the following:

- production of a hydrogen strategy for the city region;
- delivery of state-of-the-art green hydrogen production and refuelling station in the city; and
- the introduction of 10 hydrogen fuel cell buses – Europe’s largest fleet, plus a small pool of hydrogen/diesel hybrid vans and fuel cell range extended electric vans.

The buses emit only water vapour, reducing carbon emissions and air pollution, as well as being quieter and smoother running. Building on Aberdeen’s worldwide reputation in the energy industry, the project is enabling the development and practical deployment of hydrogen infrastructure. This work will open the way for wider new and innovative hydrogen technology projects, accelerating commercial use of hydrogen as a clean, green fuel.

CASE STUDY 5

Car club benefits – Co-wheels Car Club, Aberdeen

The Developing Car Clubs in Scotland (DCCS) programme, administered by CarPlus, aims to reduce car dependency. The 8,000 plus members of car clubs are either individuals or corporate members from both public and private sector organisations. Each car club vehicle is estimated to take the place of 13 privately owned vehicles. Key benefits of this new approach to accessing cars and vans when required, rather than owning, are as follows:

- Helps to support improvements in air quality emissions by providing cleaner electric, hybrid, and low emission vehicles, as a shared resource.
- The average car club vehicle produces 37% less carbon from tailpipe emissions than the average car in Scotland.
- Car club members walk, cycle and take public transport more than average.

Aberdeen Co-wheels Car Club replaced the local authority pool fleet in 2012. The club initially ran 12 vehicles located on on-street bays in 2012, rising to 38 in 2015 with 50% of these being electric vehicles, and now has over 1,050 members.

Aberdeen City Council has noted that “The car club reduces the headache of owning your own car and also helps reduce parking pressure, congestion and improve air quality.”

Regional and local transport partnerships

6.23 National, regional and local transport authorities all play a role in improving air quality. Including RTPs in the governance of CAFS alongside central and local government will enhance and strengthen this role.

6.24 Regional and local transport strategies and local development plans must provide a clear policy statement and associated objectives for promoting and increasing modal shift, low carbon vehicles and active travel (particularly in urban areas), travel plans and car clubs (see case study 5). These strategies should also demonstrate an awareness of Scottish and European legislative requirements for air quality.

6.25 Transport Scotland will review how air quality considerations are reflected in associated guidance as part of a wider review during 2016, after the National Transport Strategy refresh has been concluded.

6.26 Local transport strategy guidance already includes a section on Local Air Quality Management. This includes promoting sustainable and active travel choices. Regional transport strategy guidance is similar; it refers to UK and Scottish air quality strategies and the importance of air quality as one of the social and environmental impacts of transport.

WE WILL:

- Review existing Ministerial guidance on regional and local transport strategies in the light of the refreshed National Transport Strategy. In doing so, we will consider how:
 - air quality management should be addressed; and
 - RTPs and local authorities should use their transport strategies to support a modal shift towards sustainable and active travel, including through Smarter Choices initiatives, and promote the take up of greener vehicles

Intelligent Transport System management

6.27 Local authorities are being challenged to optimise the operation of road space within urban areas. Traffic volumes in Scotland have increased by approximately 5% since 2003 whilst journeys made by bicycle have risen over the same period⁷⁵. Both modes of travel make use of our existing road networks, with new urban cycle networks altering the physical road layout in some cases. Intelligent transport systems are already being employed on national and local roads to optimise the flow of traffic across all modes of transport (see case studies 7 and 8 for Fife and Newcastle City Councils respectively). The challenge for local authorities is to put in place traffic management procedures through intelligent transport systems to find a balance that:

- optimises the movement of existing traffic to minimise stop-start movements of vehicles within Air Quality Management Areas (AQMAs); and
- makes short distance active travel routes (within and beyond large urban areas and AQMAs in particular) more attractive by considering prioritising urban cycling corridors through harmonised traffic-junction light settings. This would support the Cycling Action Plan for Scotland vision of encouraging modal shift to cycling, particularly for short urban journeys of less than two miles.

6.28 This re-examination will be supported by the implementation of the National Low Emission Framework (NLEF, covered in Section 11), which will focus on:

- the range of intelligent transport systems management solutions that local authorities are currently adopting within AQMAs (for example, see case study 6); and
- any alterations or amendments to intelligent transport systems that should be considered (or research that could utilise intelligent transport systems to reduce air quality impacts, as shown in case study 7 from Newcastle).

75 <http://www.transportscotland.gov.uk/statistics/j357783-08.htm>

CASE STUDY 6

Intelligent Traffic System (ITS) at the Bonnygate – Fife Council

Fife Council has prioritised the Intelligent Transport System at the Bonnygate in Cupar to manage air quality improvement. ITS can be configured to not only optimise traffic flow, but also to contribute to congestion reduction, and minimising the air quality impact of street canyons. The co-ordinated system of traffic lights and new pedestrian control realised significant air quality improvements for NO₂ and PM₁₀, by allowing for more rapid dilution and dispersal of pollutants through traffic queue relocation into a wider and more open environment westwards of the Bonnygate:

- The latest monitoring data shows a dramatic improvement in the NO₂ concentrations in the Bonnygate area coinciding with the introduction of the overall action plan. This is mainly due to the relocation of the traffic queue outside the Bonnygate street canyon
- Similar improvements were also noted with a decline in PM₁₀ concentrations
- Further traffic management measures (including changes to traffic light sequencing) in Cupar town centre are proposed to improve traffic flow and help reduce road traffic pollutant concentrations.

The work was recognised by the Scottish Government, which described the ITS measure, and the Bonnygate Air Quality Action Plan as an example of best practice.

CASE STUDY 7

Compass4D trial – Newcastle City Council

Bordeaux, Copenhagen, Helmond, Newcastle, Thessaloniki, Verona and Vigo took part in a three-year EU co-funded project called Compass4D to trial a new application of Intelligent Transport System. Newcastle concentrated on the use of ITS to create energy efficient junctions. Buses, taxis, emergency vehicles and private cars in the trial were equipped to communicate with over 20 traffic lights in the city centre, which were programmed to offer priority signalling at set times. The research outputs suggest that this type of ITS application can achieve a:

- 15% reduction in fuel consumption;
- 66% reduction in vehicles travelling at 5mph or less; and
- reduced congestion and vehicle idling.



Air Quality Management Areas and the trunk road network

6.29 Just over one-third of the AQMAs in Scotland have a trunk road within their boundary. In most cases, the trunk road contributes to nitrogen dioxide (NO₂) and/or fine particulate matter (PM₁₀) impacts. However, at the A90 at Aberdeen and the A85 at Crieff, the trunk road is the primary contributor.

6.30 Scottish local authorities have clear responsibilities for assessing local air quality, designating AQMAs and writing action plans. Where primary impacts on NO₂ and PM₁₀ from the trunk road are identified (along with the sites where contributing sources are known), local authorities must seek and rely on collaboration with partner organisations such as Transport Scotland. A number of options will be explored:

- Several AQMAs with trunk roads in their boundaries have been declared only recently, so no action plans have yet been published. Transport Scotland will seek to partner with relevant local authorities and SEPA during 2016/2017 to develop action plans.
- For the AQMA on the A85 at Crieff, Transport Scotland will collaborate with Perth and Kinross Council to identify practical and feasible mitigation options to reduce air pollution impacts.
- For other relevant AQMAs, the contributory factor of the trunk road will be examined during 2016/2017 (where published actions plans exist).

WE WILL:

- By 2016, review the impacts of trunk roads on AQMAs and implement mitigation where trunk roads are the primary contributor to air pollutants by 2020

Measures requiring further investigation and research

6.31 Not all transport policies are devolved. However, there are opportunities for governments to collaborate, as noted by the RAC Foundation⁷⁶. We will work with the UK Government to:

- investigate and support the European Real Driving Emissions package of procedures;
- investigate the merits of a scrappage scheme for the oldest, dirtiest vehicles;
- understand how fiscal instruments such as fuel duty and vehicle excise duty could be altered to incorporate the costs to society of the impacts on air quality;
- understand how Vehicle Excise Duty might be used for transport maintenance activities; and
- revisit the reporting and target setting requirements of the Road Traffic Reduction Act 1997.

⁷⁶ http://www.racfoundation.org/assets/rac_foundation/content/downloadables/racf_ricardo_aea_air_quality_report_hitchcock_et_al_june_2014.pdf

6.32 Other topics worth further investigation during the life of CAFS include the following:

- considering workplace car parking levies, specifically targeting AQMAs, with exemptions for ultra low emissions vehicles and vehicles which are part of an approved shared ownership scheme, such as car clubs (see case study 5);
- reviewing the role and contribution of lower speed limits to improving air quality in certain locations;
- examining how (i) resident and trade visitor parking policies and (ii) allowing certain vehicles to use bus lanes could encourage the uptake of low emission vehicle (and motorcycle/scooters). However, such proposals may reveal unintended side effects on our transport networks (note case study 8 from the City of Edinburgh Council regarding parking near schools);
- understanding how the principle of 'last mile' logistics could be adopted across Scotland with a particular focus on targeting city centres with AQMAs. Also considering how such solutions could dovetail with, and inform the work undertaken within, the National Low Emission Framework.
- Review ITS solutions across relevant AQMAs to optimise traffic flows and prioritise urban cycle corridors as part of the National Low Emission Framework.

CASE STUDY 8

Trial of parking restrictions near schools – City of Edinburgh Council

The City of Edinburgh Council has trialled a ban on motor traffic around several primary schools at the beginning and end of the school day, in a move that could lead to a city-wide ban:

- The pilot scheme bans cars from exclusion zones around six schools for an hour at drop off and pick up times each school day for 18 months, in an attempt to boost road safety and encourage active travel to school;
- The trial continued in late 2015, outside Abbeyhill, Duddingston, Colinton, Cramond, Sciennes and St John's RC primary schools;
- Following the trial, the Council will decide whether to roll out the scheme across more schools.

The schools were chosen after they reported road safety issues with congestion and the intention is to reduce the level of traffic at the school entrances and to encourage children and their families to scoot, cycle or walk to school, making it safer for them to enter school.

The project follows similar schemes developed in East Lothian during 2014 which involved schools and East Lothian Council working together to introduce traffic calming, parking restrictions, signage and new pathways to improve safety.

PLACEMAKING

07

PLACEMAKING



A Scotland where air quality is not compromised by new or existing development and where places are designed to minimise air pollution and its effects.

WHY IS PLACEMAKING IMPORTANT FOR AIR QUALITY?

7.1 Placemaking is the way in which we plan, design and manage our towns and cities. This can make a big difference to air quality and is at the heart of the Scottish Government's spatial planning policies.

7.2 We can tackle air pollution through innovative placemaking. For example, integrating greenspaces into new and existing developments can act as a buffer against noise and air emissions from vehicles, whilst providing open spaces for walking, cycling and nature.

7.3 Placemaking is also important in helping to better manage the vehicles in our towns and cities. New developments can be designed so that they generate less traffic, are well linked to public transport routes, walking and cycling routes and, where appropriate, prioritise active travellers over people using vehicles.

7.4 Getting placemaking right helps to tackle air pollution, but also creates sustainable places that are vibrant and healthy to live and work in. This makes them more attractive places for businesses to invest in.

PLACEMAKING TODAY – WHAT ARE WE ALREADY DOING?

7.5 The National Planning Framework 3⁷⁷ (NPF3) and Scottish Planning Policy⁷⁸ (SPP) set out the Scottish Government's national spatial strategy and planning policies based around a vision for Scotland – as noted below – which is directly relevant to CAFS:

- a more connected place (NPF3 and SPP);

- a successful, sustainable place;
- a low carbon place; and
- a natural, resilient place.

7.6 The NPF3 and SPP provide a framework for a planning system supporting development that:

- creates high-quality, diverse and sustainable places that promote wellbeing and attract investment;
- reduces the need to travel;
- integrates different transport modes;
- provides safe and convenient opportunities for walking and cycling; and
- promotes the transition to a low carbon economy.

7.7 Embedding these principles into statutory Strategic and Local Development Plans helps to create places that attract investment and new development, but also ensures that air quality is protected and improved. Planning Advice Note 51⁷⁹ provides additional detail on the role of the planning system in relation to environmental protection regimes.

7.8 The following requirements already ensure that planning authorities consider air quality as part of their decision making:

- Strategic and Local Development Plans must take into account the implications of development for air quality;
- Strategic Environmental Assessments and Environmental Impact Assessments must identify the potential effects of plans and developments on air quality and how these can be mitigated;
- the impacts of development plans on the transport network must be assessed in line with Transport Scotland's Development Planning and Management Transport Appraisal Guidance (DPMTAG)⁸⁰; and

77 <http://www.gov.scot/Topics/Built-Environment/planning/NPF3-SPP-Review/NPF3>

78 <http://www.gov.scot/Publications/2014/06/5823>

79 <http://www.gov.scot/Publications/2014/06/5823>

80 <http://www.transportscotland.gov.uk/development-planning-and-management-transport-appraisal-guidance-dpmtag>

- air quality action plans must provide clear direction on when an assessment of air quality is required and what issues should be covered. These assessments must be based on the Scottish monitoring network or modelling data and use the national modelling methodology. Local authorities can also require developers to carry out monitoring over fixed periods.

PLACEMAKING TOMORROW – WHAT MORE DO WE NEED TO DO?

7.9 Land use and transport planners play a key role in designing spaces that avoid reducing air quality in the short term and enhance it in the long term. Scottish Planning Policy requires that Strategic and Local Development Plans, and the planning policies and decisions arising from these plans should consider the implications of development for air quality.

WE WILL:

- Ensure that future updates and revisions to Scottish Planning Policy and the National Planning Framework take account of CAFS

7.10 Preparation of development plans and consideration of individual planning applications should:

- demonstrate how the land use planning system can contribute to achieving the CAFS planning objective;
- investigate and clearly explain how new developments might affect air quality now and in the future, particularly in and around AQMAs;
- evaluate the impacts on the transport network in line with Transport Scotland’s DPMTAG;
- locate new developments where they reduce the need to travel and/or offer good access to public transport and shared private transport; and
- ensure that planning decisions are aligned with, and support the delivery of, air quality action plans.

WE WILL:

- Expect planning authorities to review their Local Development Plan and revise at the next scheduled update to ensure policies are consistent with CAFS objectives and any local authority air quality action plans

7.11 It is important that planners should have access to, and are made aware of, information that can facilitate better air quality. Clear, simple guidance or protocols on mitigating air pollution in urban and rural spaces can be developed to support this goal (see case studies 10 and 11 for examples of good practice on this issue).

WE WILL:

- Work with Environmental Protection Scotland to produce updated guidance on air quality and planning
- Work with SEPA to introduce air quality training for local authority spatial and transport planners

7.12 Strategic and Local Development Plans are required to undergo a Strategic Environmental Assessment. This provides the opportunity to predict the potential effects of these plans, and associated individual developments, on the air and climate, and identify how these effects can be minimised. We must be able to demonstrate that air quality is being considered consistently throughout this process.

WE WILL:

- Support SEPA in revising its guidance on Strategic Environmental Assessment to bring it into line with CAFS

Measures requiring further investigation and research

7.13 During the lifetime of CAFS, the Scottish Government will also:

- consider aligning planning guidance on air quality with the requirements of CAFS; and
- review evidence for the positive and negative effects of permitted development rights for domestic biomass flues, given the significant figures for 'other combustion' noted in Table 1.

7.14 Progress on developing specific actions associated with these issues will be outlined in the first CAFS annual report.

CASE STUDY 9

Supplementary Planning Document on Air Quality and Development – Mid Devon District Council

In 2005, Mid Devon District Council adopted a robust policy to planning decisions and air quality impact. The focus was on:

- Providing a simple, fixed contribution rate;
- Being transparent and proportionate; and
- Avoiding decisions which could be viewed as 'licence to pollute'.

In May 2008, the Council published supplementary planning guidance to ensure that planning decisions contributed to reducing emissions which cause damage to health and quality of life. The guidance underlined the Council commitment to improving air quality in the District, by explicitly stating:

- the importance of air quality as a material planning consideration;
- the type of development that would require an air quality assessment;
- the Council's approach to assessment, planning conditions and agreements with respect to air quality; and
- a range of mitigation measures including transport interventions and monitoring approaches.

CASE STUDY 10

Stirling LDP Place Making Guidance – Stirling Council

In 2001, the Scottish Government published Designing Places. This document raised the standards of design in our built environment. In 2011, Stirling Council produced draft supplementary guidance on placemaking linked to their Local Development Plan for anyone considering development within their area. The guidance emphasised the need to design urban spaces without detriment to air quality, particularly on heavily trafficked streets.

Designers were encouraged to deliver mitigation measures, such as blocks of tree planting to create microclimates that would allow vehicle fumes to dissipate. Specific references to transport included:

- spaces should consider the needs of pedestrians, cyclists and public transport ahead of private motor vehicles;
- developments should help to create a clear hierarchy and structure to open spaces and routes; and
- overall designs should be well connected and interlinked by transport.



CLIMATE CHANGE

08

CLIMATE CHANGE



A Scotland that reduces greenhouse gas emissions and achieves its renewable energy targets whilst delivering co-benefits for air quality.

AIR QUALITY AND CLIMATE CHANGE – A JOINED-UP APPROACH

8.1 Climate change is one of the most serious threats facing global society⁸¹. Changes in several aspects of climate, such as an increase in temperature and changes in precipitation patterns can already be detected in Scotland⁸². The future impacts are expected to have far-reaching effects on Scotland's economy, people and environment.

8.2 The interactions between air pollution and climate change are complex. For instance, if the predicted Scottish climate of hotter, drier summers is realised, an increase in cases of ground level ozone (O₃) pollution could be possible, with consequences for the health of people and ecosystems⁸³.

8.3 On the other hand, emissions of pollutants that harm human health and ecosystems could have an important impact on the climate. For instance, some pollutants are also greenhouse gases (such as O₃) or contribute to greenhouse gas formation (for example, carbon monoxide). Particulate matter, depending on the size and composition of the particles, can reflect or absorb sunlight and can also influence cloud formation and snow melt.

8.4 Air quality and climate change are inextricably linked; air pollution often originates from the same activities that contribute to climate change. However, some policies to address air quality or climate change have not interacted (and, at times, have been in conflict) despite the potential benefits of joining up the two policy topics. The CAFS Governance Group will seek to change this. Although considering and tackling these areas separately may allow us to make some progress towards the respective environmental targets, it will also lead to unintended consequences and trade-offs. For instance, in the UK we have been incentivised to use diesel vehicles as they have less impact than petrol vehicles on the climate, but they typically have more impact on human health. Domestic biomass burning is another example of benefits for greenhouse gas emissions but a potentially negative impact on local air quality⁸⁴.



81 <https://www.ipcc.ch/index.htm>

82 http://www.environment.scotland.gov.uk/climate_trends_handbook/

83 <http://www.gov.scot/Topics/Statistics/Browse/Environment/TrendOzone>

84 <http://www.gov.scot/Publications/2008/11/05160512/0>

CLIMATE CHANGE TODAY - WHAT ARE WE ALREADY DOING?

8.5 Mitigating the effects of, and adapting to, climate change are perhaps the most significant environmental challenges for society today. In 2009 the Scottish Parliament passed the most ambitious climate change legislation anywhere in the world. The Climate Change (Scotland) Act 2009⁸⁵ requires Scotland to achieve at least an 80% reduction in greenhouse gas emissions by 2050 and sets statutory annual emission reduction targets. 'Low Carbon Scotland: Meeting Our Emissions Reduction Targets 2013-2027 - The Second Report on Proposals and Policies' sets out how Scotland intends to achieve these targets whilst

delivering benefits for air quality and the wider environment. Reducing emissions in Scotland: 2015 progress report summarises the progress made towards the targets⁸⁶.

8.6 Commitments to decarbonise the Scottish economy should help reduce air pollution, but choices about the route taken to 2050 will influence the scale of additional improvements for air quality. Energy efficiency and demand management, as well as a shift towards low or zero emission energy sources and transport for example, should provide mutual benefits for air quality and climate change. A summary of some policy measures and their respective impacts on air quality and climate change is captured in Figure 13.

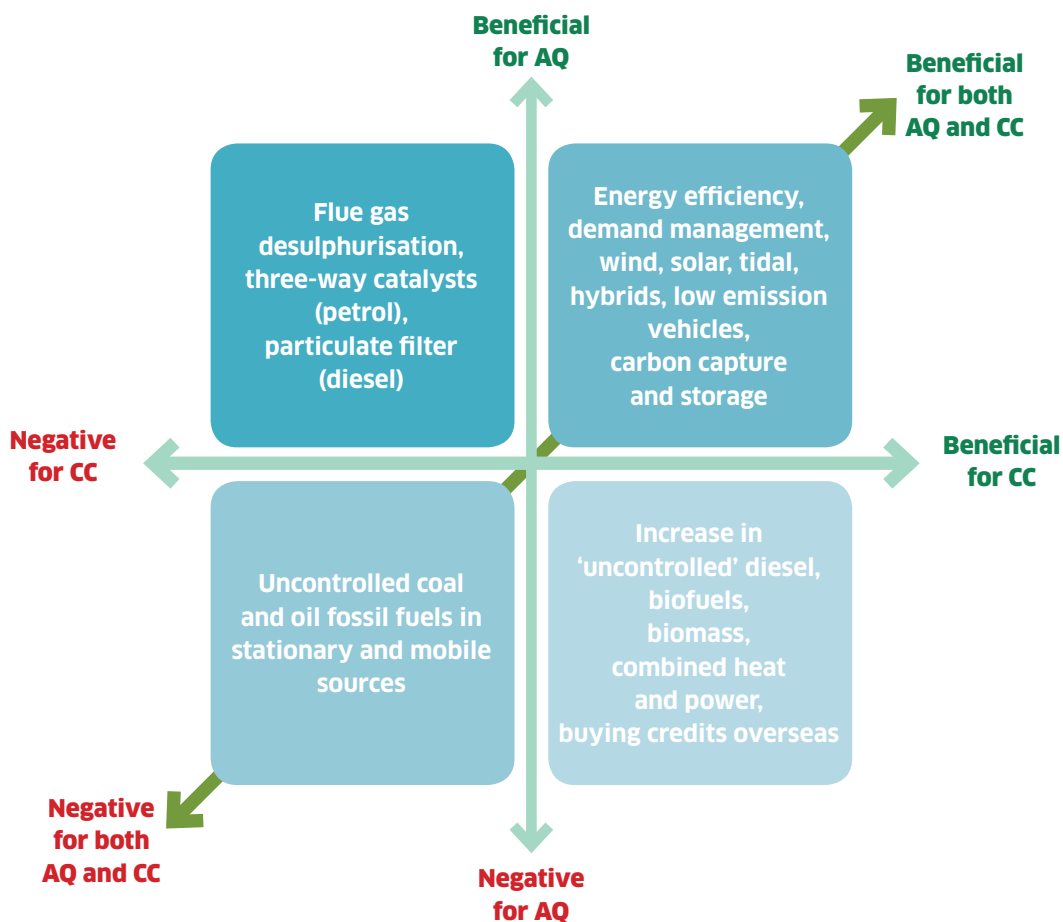


Figure 13. Air quality (AQ) and climate change (CC) interactions

Source - Air Pollution: Action in Changing Climate⁸⁷

85 <http://www.legislation.gov.uk/asp/2009/12/contents>

86 <https://www.theccc.org.uk/wp-content/uploads/2015/01/Scotland-report-v6-WEB.pdf>

87 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69340/pb13378-air-pollution.pdf

BLACK CARBON – A CASE FOR INTEGRATING AIR QUALITY, CLIMATE CHANGE AND HEALTH

8.7 Black carbon, often referred to as soot, is the major component of fine particulate matter and results from incomplete or inefficient combustion of fossil fuels and biomass. Within the urban environment, black carbon is associated with the inefficient combustion of diesel in particular. The number of diesel-powered cars and vans on our roads has increased significantly over recent years, with the proportion of new diesel cars sold rising from 14% to 46% over the last decade. Black carbon is a serious threat to human health as the particles are very small and can enter the deepest parts of the lungs; the smallest of these can pass through the lungs and into the blood. In the atmosphere this pollutant contributes to climate change by absorbing heat; in polar regions it reduces the reflectivity of the snow, which also increases the absorption of heat and leads to melting of snow and ice. Although black carbon is considered to be short-lived and localised in the atmosphere in comparison to carbon dioxide (CO₂), evidence suggests that its warming effect is 460 to 1,500 times stronger than that of CO₂⁸⁸.

ENERGY AND AIR QUALITY

8.8 The use of fossil fuels to produce energy – mainly through gas and coal fired power stations, but also other methods such as waste incineration and the recovery of waste heat – contributes to air pollution. The impacts on air quality and the climate could be minimised by:

- making energy use as efficient as possible;
- moving to renewable energy sources; and
- using low emission fuels such as certain biofuels, liquid petroleum gas, biopropane and hydrogen, as shown in case study 4 (along with experimental fuels such as liquid air or liquid nitrogen).

CLIMATE CHANGE TOMORROW – WHAT MORE DO WE NEED TO DO?

8.9 Climate change adaptation and mitigation can bring additional benefits for air quality, which, in turn, may lead to human and ecosystem health improvements. In particular, we know that reducing carbon emissions by using more sustainable travel can result in cleaner air.

8.10 Climate change actions noted in ‘Low Carbon Scotland: Meeting Our Emissions Reduction Targets 2013-2027 – The Second Report on Proposals and Policies’ that help to protect and enhance air quality include:

- a largely decarbonised electricity generation sector by 2030;
- a largely decarbonised heat sector by 2050 with significant progress by 2030;
- almost complete decarbonisation of road transport by 2050, with significant progress by 2030; and
- significant modal shift from the private car to public transport and active travel.

WE WILL:

- Ensure that future updates to the ‘Low Carbon Scotland: Meeting Our Emissions Reduction Targets’ publication on meeting our climate change targets take into account air quality impacts

8.11 A Sustainable Energy Action Plan is a key document in which signatories to the Covenant of Mayors⁸⁹ – a Europe-wide organisation representing local authorities of all sizes – outline how they intend to reach their reduction targets for CO₂ by 2020.

WE WILL:

- Expect any Scottish local authority which has or is currently developing a Sustainable Energy Action Plan to ensure that air quality considerations are covered

88 <http://www.unep.org/ccac/Short-LivedClimatePollutants/Definitions/tabid/130285/Default.aspx>

89 http://www.eumayors.eu/about/covenant-of-mayors_en.html

8.12 The Low Carbon Scotland: Behaviours Framework⁹⁰ outlines what the Scottish Government will do to drive and support the move to low carbon living in the lead-up to the first key climate change target in 2020. Reducing emissions from transport is one of the framework's main focus areas, which will also benefit air quality.

8.13 As part of its climate change commitments, the Scottish Government has set ambitious renewable energy targets for 2020:

- 100% electricity demand equivalent from renewables;
- 11% of demand from heat to come from renewables;
- at least 30% of the overall demand for energy to come from renewables; and
- 500 MW to come from community and locally-owned renewable energy

8.14 The Routemap for Renewable Energy in Scotland⁹¹, which is updated annually⁹², sets out how the Scottish Government intends to achieve these targets. Moving away from a dependence on fossil fuels will benefit both air quality and reduce greenhouse gases, provided that increased biomass uptake is managed well⁹³.

WE WILL:

- Work with Forestry Commission Scotland to publish updated guidance on the impact of biomass on air quality to help local authorities fulfil their statutory responsibilities (noting existing guidance as stated in footnote 93)

90 <http://www.gov.scot/Publications/2013/03/8172/0>

91 <http://www.gov.scot/Publications/2011/08/04110353/0>

92 <http://www.gov.scot/Resource/0044/00441628.pdf>

93 http://www.iaqm.co.uk/text/guidance/epuk/biomass_guidance_scotland.pdf



COMMUNICATION

09



COMMUNICATION

A Scotland where all citizens are well informed, engaged, and empowered to improve our air quality.

COMMUNICATION TODAY – COMMUNICATING AIR POLLUTION INFORMATION

9.1 Currently, air quality lacks a single indicator that is recognised and easily understood by the general public and others in the way that CO₂ emissions are associated with climate change. A key obstacle to developing such an indicator for air quality is the range of different pollutants that contribute to air pollution.

9.2 The Daily Air Quality Index⁹⁴ is used by most air pollution information services in the UK and is based on a banding system approved by COMEAP. This is the best currently available representation of overall air pollution. To complement this, the Scottish Government has started to work on developing an air quality indicator specific to Scotland.

WE WILL:

- Develop a Scottish Air Quality Indicator to assist in assessing compliance with air quality legislation and delivery of CAFS objectives.

CASE STUDY 11

In town without my car – Aberdeen City Council

During September 2015, Aberdeen City Council and NESTRANS using the Getabout Aberdeen brand organised a week of events aligned to European Mobility Week, to encourage the public to ‘Choose, Change, Combine’ when considering transport choice.

Since 2002 European Mobility Week has influenced mobility and urban transport issues, as well as improved the health and quality of life of citizens. The campaign gives the public the opportunity to explore what the role of city streets really is, and to explore solutions to tackle urban challenges, such as air pollution.

COMMUNICATION TOMORROW – WHAT MORE DO WE NEED TO DO?

9.3 Encouraging behavioural change to help achieve the aims of CAFS will require a communications approach focused on the actions that our key audiences (see paragraph 9.5) can take. We will link into existing Greener Scotland climate change campaigns, which have previously focused on specific messaging such as encouraging more people to walk or cycle for shorter journeys. As outlined in paragraph 5.12, the communication strategy will focus on promoting and marketing the wider health and environmental benefits of tackling air quality. It is essential that the key messages clearly show how:

- air pollution has a direct impact on citizens’ own lives;
- individual actions can affect air quality; and
- making personal changes will benefit an individual’s health and wellbeing, besides creating more attractive and sustainable places in which to live and work.

94 <http://www.scottishairquality.co.uk/air-quality/daq>

9.4 Links will also be created with other initiatives such as Environmental Protection Scotland's Breathe Scotland campaign⁹⁵ and various local community and citizen science projects within schools in particular (see Aberdeen City Council and Fife Council case studies 12 and 13 for recent examples in Scotland).

9.5 The three key audiences are central and local government, business and the general public. The goal must be to make sure they are:

- well informed about, knowledgeable of, and responsible for their contribution to, protecting and enhancing air quality, specifically the impacts and benefits to health and wellbeing; for example, reducing the burden on health services or fewer working days lost to sickness absence; and
- aware of the actions they can take to reduce their own pollution footprint.

9.6 To support this, we will produce a national public awareness campaign, with input from the Cleaner Air for Scotland Governance Group and Health Protection Scotland in particular, to focus on:

- providing technical scientific evidence on the Scottish Air Quality website for all three audiences;
- utilising the Scotland's Environment website and the Scottish Transport Emissions Partnership to promote air quality and engage central/local government and business audiences through seminars, social media and conferences;
- using variable message signs – and other forms of advertising – on our road network to communicate with drivers about how to reduce the impacts of air pollution;

- using the citizen science approach to promote air quality to young people; and
- conducting research to understand the general public's awareness of the links between air quality and public health, and test whether raising such awareness would strengthen or weaken behaviour change.

9.7 Following this, we will aim to identify the key behaviours and, through engagement with the Greener Scotland campaign, highlight the measures that the three audiences can take.

WE WILL:

- Support the ongoing Greener Scotland communication campaigns, encouraging individuals to use the car less to improve their health and their local environment
- Develop a national air quality public awareness campaign

95 <http://www.breathescotland.org.uk/>

CASE STUDY 12

TRY IT Cupar campaign – Fife Council

The Bonnygate area of Cupar was designated an Air Quality Management Area after monitoring showed levels of two pollutants, nitrogen dioxide (NO₂) and fine particles (PM₁₀), exceeded air quality objectives. The main cause of this is high traffic volumes in the narrow Bonnygate, with the results of a travel survey showing that 53% of all journeys made by residents of Cupar were to destinations within the town. An action plan to tackle the problem was approved in November 2010.

To engage directly with the challenge, Fife Council introduced the TRY IT Cupar campaign to engage directly with the local community on the air quality challenge. This involved the following:

- An extensive marketing and public communications campaign.
- Trained Travel Advisors offered personalised travel planning at the doorstep of all households in the Bonnygate area to encourage people to walk, cycle or use public transport when making trips within the town.
- Information on walking and cycling groups and how sustainable travel can improve their health and fitness, help take care of their town, and even meet new people was made available to all residents of Cupar.
- Fife Council is now working in partnership with residents and local community groups to make Cupar a more sustainable community, increasing the use of public transport and encouraging people to cycle and walk when possible.

NATIONAL MODELLING FRAMEWORK

10

LEGISLATION AND POLICY



A Scotland where all European and Scottish legal requirements relating to air quality are as a minimum complied with.

INTRODUCTION

10.1 The new National Modelling Framework (NMF) is a key element of the delivery of CAFS. The NMF will provide a significant proportion of the quantitative evidence for the National Low Emission Framework (NLEF) described in Section 11. The NMF will also support decision making around placemaking and transport planning in relation to air quality management.

WE WILL:

- Design, develop and implement a two-level modelling system on regional and local scales to provide evidence for appraising and identifying potential transport and planning solutions to local air quality issues

10.2 Through improved data requirements and data analysis, the NMF aims to provide local authorities with the information required to improve urban air quality. The NMF will set out a coordinated approach with respect to:

- the collection of traffic data;
- air quality models;
- related monitoring; and
- the development of the tools for appraising actions.

10.3 To deliver the NMF, the Scottish Government will work collaboratively with partners to:

- **Collect** appropriate traffic data for relevant cities and towns;
- **Support** the National Traffic Data System (see paragraph 10.15) to store traffic data;
- **Model** the city centre areas and associated adjoining spaces of all four major cities in Scotland by 2018; and

- **Evaluate** the requirements of a regional model and support its development.

COLLABORATION AND PARTNERSHIP

10.4 We recognise that the success of the NMF will rely on the support of many organisations and professions. The Scottish Government, Transport Scotland and SEPA have been working collaboratively to develop the NMF with a range of partners since 2013, learning from the success of early pilot work in Aberdeen (which was being prepared for peer review as CAFS went to press). We will continue to build on this work, and use existing systems, experience, and advice to gather the necessary input data, collate models, and develop new software tools that will provide outputs to support the NLEF and its associated transport and planning decisions, in contributing to the CAFS vision.

10.5 We will continue to work in partnership with each of the Scottish local authorities, RTPs, and other organisations to deliver the NMF. Key to this will be the development of an open access approach to sharing data and models.

A NATIONAL APPROACH

10.6 The NMF will provide a standardised approach to modelling air quality at regional and local levels (as shown in Figure 14). This will feed directly into new tools developed to support decisions on potential transport and planning options in order to improve air quality. The NMF will help make sure that the evidence, analysis and decision making is consistent across Scotland, even though transport issues and sources of emissions differ between geographical areas. The issue of emissions from domestic burning will be particularly important in city centre areas, where space heating (listed as 'other combustion' in Table 1) contributes significantly to background emission levels.

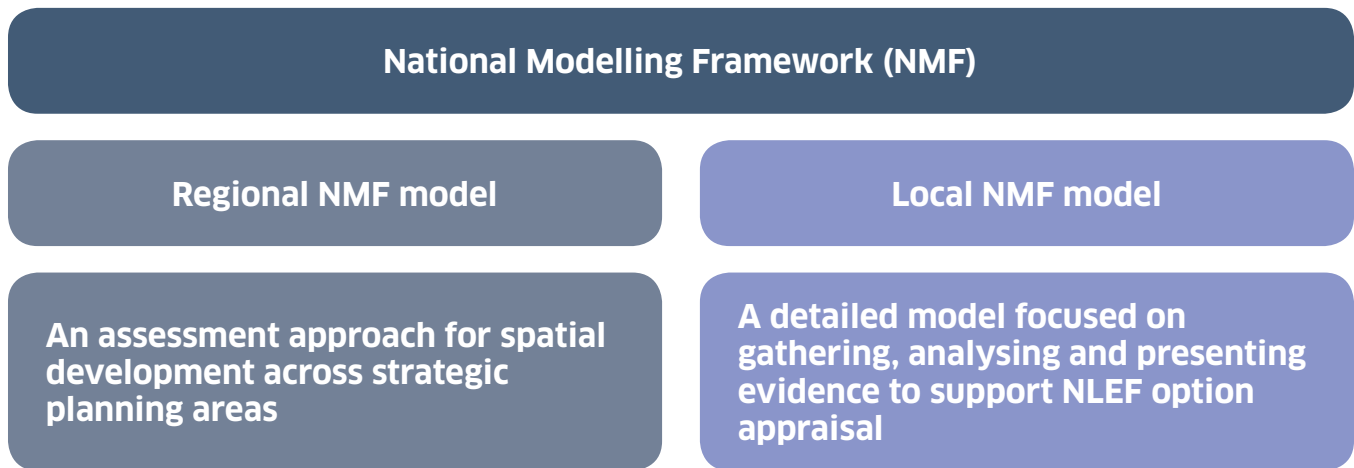


Figure 14. The NMF approach

10.7 The regional NMF model will link closely to existing models such as the Transport Scotland Land Use in Transport Integration in Scotland model, and the RTP models. It will introduce a consistent approach, open access to data, and correlation with the local NMF model. The local NMF models will provide the ability to analyse the various parts of the transport fleet contributing to problems with air quality.

10.8 The NMF will be developed using a problem solving approach. We will begin by gathering data which will be analysed to create data visualisation. We will then test for uncertainties to ensure the correct evidence is available to support decision making. The four main steps in this cyclic process are shown in Figure 15.

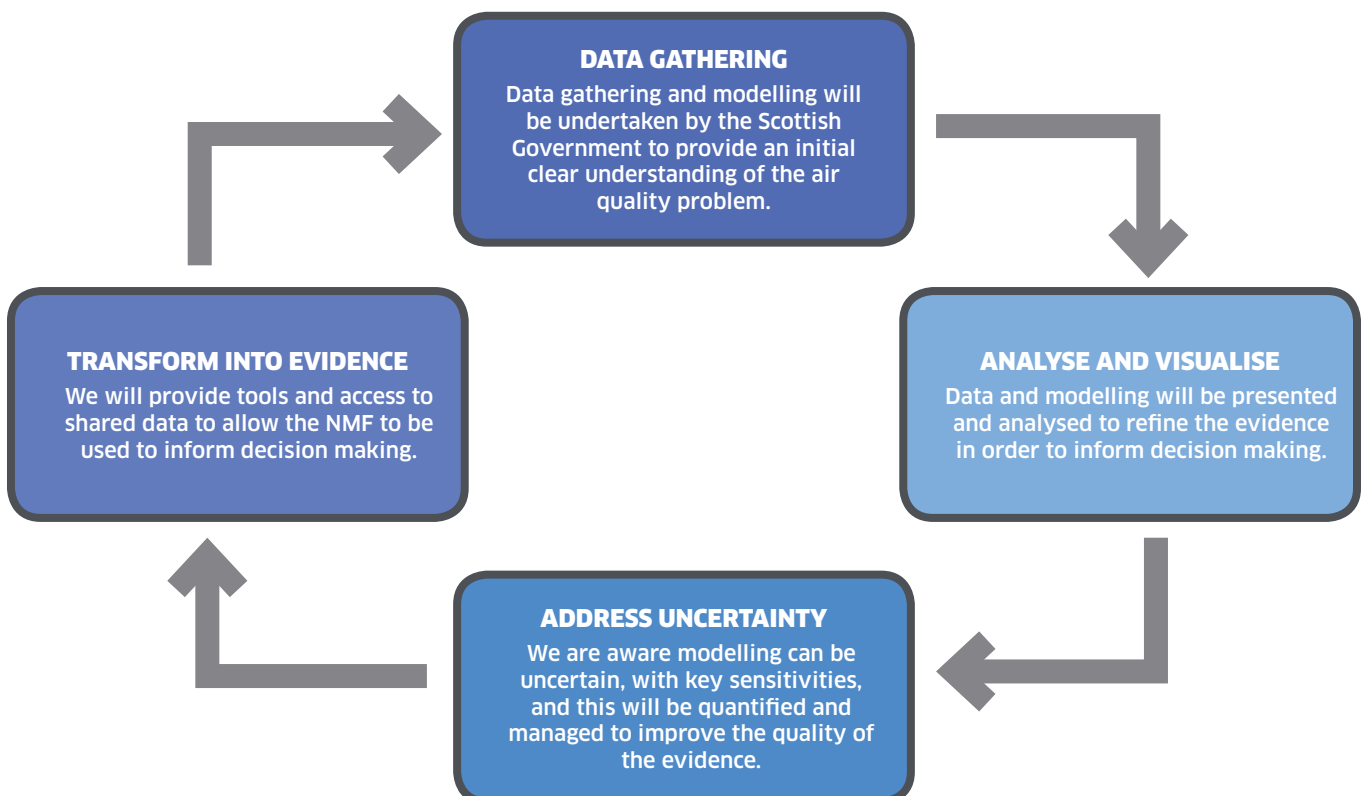


Figure 15 - NMF Cyclic process

REGIONAL NMF MODEL

10.9 Many transport and planning decisions across Scotland affect areas beyond individual local authority boundaries. To assess the impact of these decisions on air quality, we will develop a detailed regional assessment model. The regional model will take cognisance of the approach already successfully adopted in other European countries (such as Belgium and the Netherlands, as shown in case study 13). Initially focus will be on the main agglomerations within the four strategic development planning authority areas (shown in Figure 16):

- Aberdeen City and Shire.
- Tay Plan.
- SES Plan.
- Glasgow and Clyde Valley.

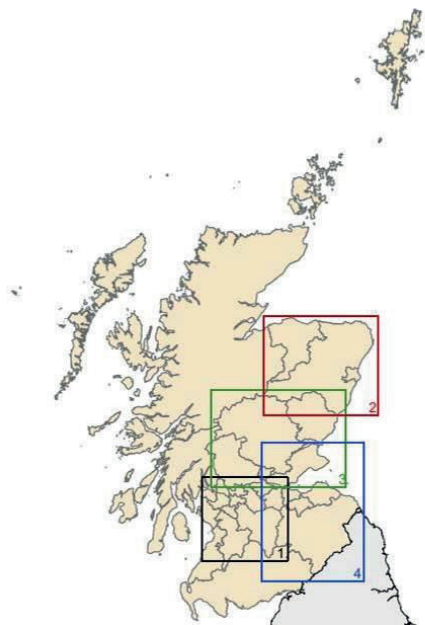


Figure 16 – Regional NMF areas. 1 = Aberdeen City and Shire, 2 = Tay Plan, 3 = Glasgow and Clyde Valley, 4 = SES Plan

Source – Circular 1/2013 Strategic Development Plan Areas⁹⁶

10.10 The regional model will be available to all local authorities and will be developed to allow annual reporting on spatial planning development. The model will be developed collaboratively with SEPA leading on the reporting and model maintenance, and Transport Scotland leading on gathering

transport data and storing the data in the National Traffic Database System. The model will be held on a central system made accessible to all local authorities.

WE WILL:

- Evaluate the requirements of a regional model and then support its development during the first two years of implementing CAFS
- Develop guidance and promote a support network for all practitioners involved in reviewing and assessing local impacts on air quality resulting from regional decision making

LOCAL NMF MODEL

10.11 The local element of the NMF will focus on gathering, analysing and presenting evidence in a consistent manner to support the NLEF option appraisal stages, whilst also helping to inform planning decisions.

10.12 An effective local NMF model will rely on accurate, high-quality, local fleet composition data (especially in densely populated city centres) and up-to-date emission factors. To achieve this we will follow a two-phased approach. The first phase will ensure that data is collected over a sufficiently large area to inform the model build. The second phase will involve collecting more detailed traffic categorisation data, including Automatic Number Plate Recognition and tailpipe monitoring at specific locations of particular concern. This will ensure that local models – for city centres and surrounding areas of all four major cities in Scotland – are produced at a resolution that offers accurate, insightful information. We will also include future prediction modelling to:

- evaluate the impact of planned improvements to the fleet; and
- develop a national cost/benefit analysis process for assessing actions related to potential scenarios.

WE WILL:

- Undertake detailed modelling of all four major cities and associated adjoining spaces in Scotland, covering areas associated with highest levels of poor air quality
- Identify requirements and undertake data collection for additional urban areas within three years of implementing CAFS

FEEDBACK BETWEEN THE NMF MODEL AND NLEF PROCESS

10.13 The local model will support a standard approach to providing quantitative evidence for the NLEF appraisal, as outlined in Section 11. The NMF and NLEF must work as a feedback loop (Figure 17). This approach will ensure that NLEF assessments have a robust evidence base to be used in the appraisal of various assess controls, such as Low Emission Zones or Clean Air Zones (as outlined in the NLEF).

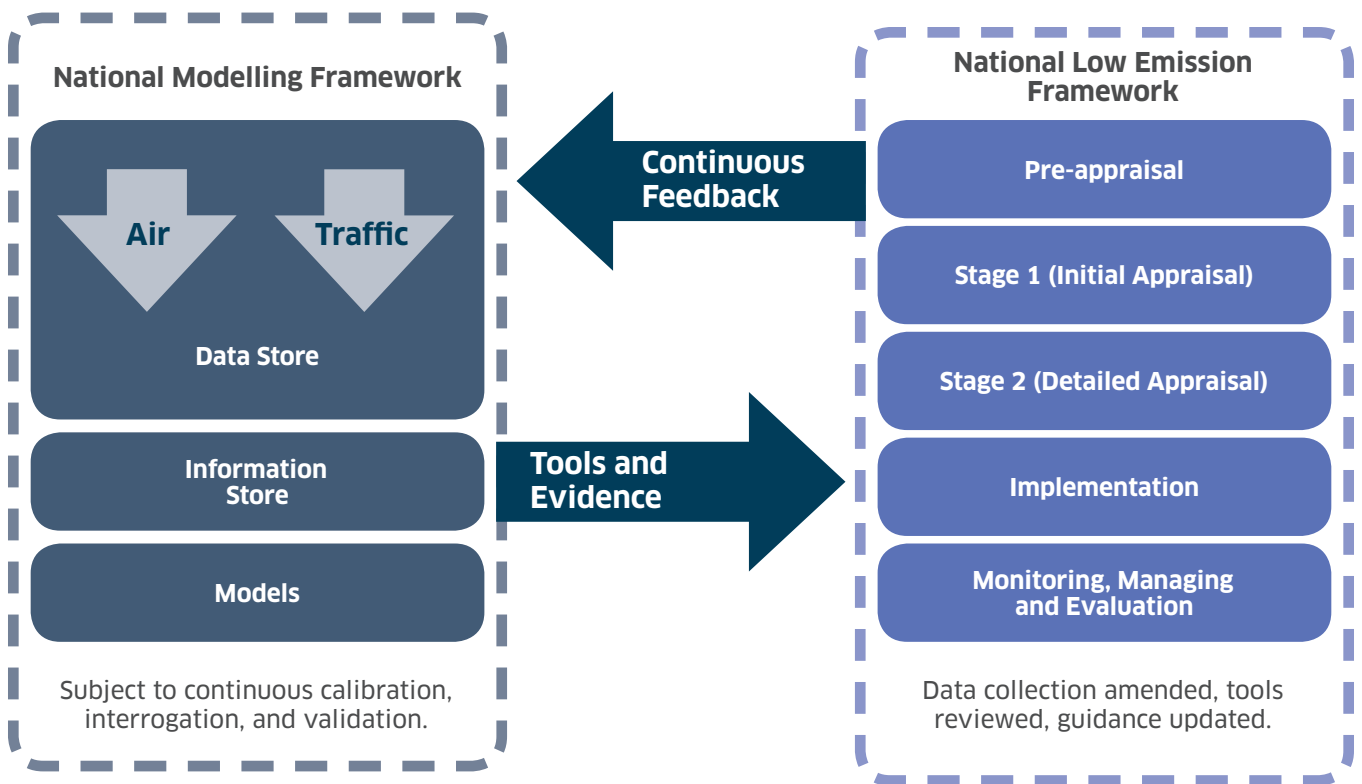


Figure 17. Interlinkages between NMF and NLEF

10.14 Evidence generated by the NLEF appraisal process (outlined in Section 11) whilst relevant to the local geographical areas, will also be integrated into the regional NMF model for future analysis.

DATA REPOSITORIES

10.15 The NMF will be supported by the following linked national databases:

- Air quality modelling database – developed from the Scottish Urban Air Quality Database, this will hold all air quality data collected for the NMF;
- National Traffic Data System – developed by Transport Scotland as a national database, this will hold the traffic data from the NMF;
- Air quality management database – developed by SEPA and accessible through the air quality in Scotland website, this will hold all modelling undertaken as part of CAFS, including the NLEF appraisal and the scenario testing tools.

WE WILL:

- Implement the national databases for traffic data collection and local modelling outputs associated with CAFS

CASE STUDY 13

Nationally consistent modelling – Government of the Netherlands

During the 2000s the Dutch Government noted that a range of disconnected air quality models were used, by a wide range of organisations, to evaluate air quality problems. Recognising the need to improve air quality, and meet air pollution limit values quickly, while allowing for new spatial development projects, in November 2006 the Government introduced a new law on air quality, including a National Air Quality Co-operation Plan. From this plan, a national consistent modelling approach and a new software analysis tool (Saneringstool) were developed to allow stakeholders to calculate the causes of poor air quality and agree appropriate mitigation measures. This new process was designed to deliver the following benefits:

- Reduced workload of municipal authorities.
- Central government and local authorities adopting a joint approach to improving air quality.
- PM₁₀ emission exceedances to largely disappear as a result of national and international policies, however NO₂ emission exceedances may be more challenging.

The software tool assists users in resolving NO₂ and PM₁₀ exceedances along roads by implementing generic regional and location-specific policy measures. The Clean Air Policy Tool maps the air quality situation along the entire Dutch road network and distinguishes between the secondary road network (132,000 km) and the main road network (2,400 km). It enables users to analyse the air quality situation at different levels of scale, and evaluate the effectiveness of two types of action, generic regional policy measures, and location-specific measures.

NATIONAL LOW EMISSION FRAMEWORK

11

LEGISLATION AND POLICY



A Scotland where all European and Scottish legal requirements relating to air quality are as a minimum complied with.

INTRODUCTION

11.1 The National Low Emission Framework (NLEF) is designed to enable local authorities to appraise, justify the business case for, and implement a range of, air quality improvement options related to transport (and associated land use). The NLEF will support and build on the work already being done through the Local Air Quality Management system and, as noted in paragraph 10.14, will support public and private sector contributions to practical sustainable development. It will be supported by the analysis and evidence provided by the National Modelling Framework (NMF), as described in Section 10.

WE WILL:

- By April 2016, in further consultation with partner organisations, ensure the NLEF criteria, tests, and processes are developed, agreed, and finalised
- Design and implement a standard appraisal process for assessing local air quality measures
- Develop the software tools and associated guidance for the NLEF, including funding options and technical reports, which will underpin the evidence on effectiveness of options

THE NLEF PROCESS

11.2 The NLEF will be based on the principles of the Scottish Transport Appraisal Guidance⁹⁷, which are well established and understood. This approach gives practitioners confidence that the outputs will be robust, honest, defensible and practical, supporting a business case for implementing any measures. The NLEF process and the associated timeline for delivery are outlined in Table 3. In the meantime, the Scottish Government expects local authorities to continue with ongoing action planning work whilst the process is being developed.

11.3 The NLEF assessment will apply only to local authorities where transport is the main contributor to air quality problems. The NLEF will have a clear link with Air Quality Management Areas (AQMAs) in Scotland. Therefore, as part of the pre-appraisal process, the Scottish Government and Transport Scotland will assess all authorities with existing or potential AQMAs. Where necessary, local authorities, regional transport partnerships and strategic development planning authorities will work with the Scottish Government and Transport Scotland on the Stage 1 (initial) appraisal and, if necessary, on the Stage 2 (detailed) appraisal. At each stage, national and local government must take account of the outputs of the NLEF process to either progress to the next step or conclude the process. At the end of the Stage 2 appraisal, when positive recommendations are identified, national and local government must work together to develop a robust business case to support these recommendations.

⁹⁷ <http://www.transportscotland.gov.uk/stag>

Completed by	Stage	Key Organisations	Outcome	Actions required
2015-16	Pre-appraisal	Local authorities Regional transport partnerships Scottish Government SEPA Strategic Development Planning Authorities Transport Scotland	Defined set of NLEF options Defined areas for NLEF assessment Set of NLEF options for each defined area for NLEF assessment NMF tools and NLEF guidance	Pre-appraisal evidence report Joint milestone workshop providing agreement to proceed to Stage 1
2016-17	Stage 1 (Initial) Appraisal	Local authorities Regional transport partnerships SEPA Transport Scotland	Impact of NLEF options Costs and benefits of NLEF options Identification of further detail required Business case for NLEF options to progress to Stage 2 (Detailed Appraisal)	Initial assessment report Joint milestone workshop providing agreement to proceed to Stage 2
2017-18	Stage 2 (Detailed) Appraisal	Local authorities Regional transport partnerships SEPA Transport Scotland	Clearly defined impacts Clearly defined costs and benefits of proposed NLEF scheme Business case for NLEF options - within a defined area of enforcement - that should be permitted, to progress to implementation	Detailed assessment report Outline business case report Joint milestone workshop providing agreement to proceed to implementation
2018 - 19	Implementation	Local authorities Regional transport partnerships Scottish Government SEPA Strategic Development Planning Authorities Transport Scotland	Clear definition of scheme benefits and detail Identification of regulatory mechanisms and support required Understanding of infrastructure required Defined funding	Application for relevant Transport Regulation Orders Update to licensing agreements Implementation plan Joint supporting measures
Ongoing	Monitoring Management and Evaluation	As above	Defined approach to before and after monitoring, to enable modification and adoption of new solutions following an evaluation-of-effectiveness phase	Monitoring plan Joint evaluation Test effectiveness of intervention(s) to ensure objectives are achieved and realised

Table 3. The NLEF process

NLEF OPTIONS

11.4 The NLEF will develop a range of transport options for appraisal. The options available to manage the impact of transport or air quality should not be limited to Low Emission Zones (LEZs) and Clean Air Zones (CAZs), as these may not be appropriate for

all areas and scenarios. Therefore, the NLEF will also involve considering a wider range of options (see the non-exhaustive list of examples in Table 4) to improve local air quality. These options will be developed further as part of the pre-appraisal process.

Option	What it is	Key steps (see Technical Annex for more detail)
1A – Low Emission Zone (LEZ)	Setting minimum emission standards for access to a defined area; either charging vehicles to enter the area or excluding those vehicles that do not meet the standards (such as the example shown in case study 14 from Germany).	<ul style="list-style-type: none"> Evaluate the current range of vehicles operating in the specified area. Define consistent emission standards (or most polluting vehicles), the vehicle types and classes to be excluded and the operation times for the LEZ. Develop a consistent approach to implementation.
1B – Clean Air Zone (CAZ)	Assessing vehicles operating in a defined area. Targeting implementation of measures, other than exclusion, at the most polluting vehicles that enter a space on a regular basis; note the recent guidance published by City of York Council ⁹⁸ (as noted in case study 15).	<ul style="list-style-type: none"> Identify the vehicles to be targeted, with a focus on setting different entry standards for vehicles based how often a day they enter the CAZ. Engage with operators and others to identify current management and improvement measures. Develop additional measures to deliver further improvements.
2 – Other Access Regulation Schemes	Controlling access to a zone based on weight (physical urban access regulation schemes, also known as p-ARS) ⁹⁹ or at certain times of day (major access regulation schemes, also known as Key-ARS) ¹⁰⁰ .	<ul style="list-style-type: none"> Evaluate the range of such measures across Scotland. Develop a consistent approach within the NLEF.
3 – Traffic Management	Appraising traffic management in an area and introducing new measures designed to improve air quality.	<ul style="list-style-type: none"> Identify existing measures in the specified area. Define, appraise and, where appropriate, implement a range of additional traffic management measures to improve air quality, including Intelligent Transport Management, road junction upgrades, cycle lanes, cycle corridor lighting prioritisation and public messaging.
4 – Vehicle Licensing Regulations	Requiring compliance with specified air quality objectives through conditions attached to vehicle licences for buses and/or taxis.	<ul style="list-style-type: none"> Evaluate the potential effectiveness of this approach for improving air quality. Develop guidance for vehicle licensing in a specified area.

Table 4. Access regulation control options within the NLEF. Note that the options provided in Table 4 are not a full list of options, and other options beyond strict access control may achieve the desired outcome of managing the impacts on air quality; for example, improvements to active travel infrastructure, integrating greenspace, strengthening use of information and communication technologies or such like might achieve the desired outcome to manage air quality impacts. A single form of 'zone' could be adopted in Scotland (where the LEZ and CAZ are amalgamated between 1A and 1B) in order to ensure consistency in standards across the country.

98 <http://democracy.york.gov.uk/documents/s92610/Annex%203.pdf>

99 <http://urbanaccessregulations.eu/>

100 <http://www.etoa.org/media/all-news/news-item/one-stop-website-on-driving-in-european-cities>

CASE STUDY 14

Low Emission Zones in Germany – Federal Republic of Germany

Since 2006, over 70 German cities have set up low emission zones (LEZs), with more than 25 cities excluding vehicles using a vehicle windscreen display sticker (Umweltplakette). The appropriate sticker depends on the emissions code in the vehicle registration, and any further emissions improvement equipment certificate.

In Berlin, Bremen, Frankfurt am Main, Hanover, Leipzig, Osnabrück and Stuttgart vehicles without a green particulate sticker are excluded from the inner city LEZ area. Drivers, who infringe the regulations, risk a 40 euro fine and one penalty point on their licence.

In 2008, all vehicle owners in the state of Bremen were offered the opportunity to apply for and display one of three coloured stickers (red, yellow, and green) based on the emissions category of their vehicle. Control of vehicles in the LEZ was then implemented in a phased manner as follows:

- Phase 1 (January 2009), vehicles with a red, yellow or green windscreen sticker (at least Euro class 2) could enter the LEZ.
- Phase 2 (January 2010), only vehicles with a yellow or green sticker (at least emission Euro class 3) could enter the LEZ.
- Phase 3 (July 2011), only vehicles with a green sticker (at least Euro Class 4) were permitted to enter the LEZ.
- The phased introduction of the LEZ was supported by a wide range of national implementation measures including a large public awareness campaign, close liaison and collaboration with major freight and bus companies, and a detailed analysis of the fleet.

11.5 None of the measures in Table 4 are new. LEZs and CAZs in particular are well established across Europe. However, the benefits and challenges of implementing these can vary depending on the location and the nature of the air quality issues to be tackled. At present, local authorities in Scotland have powers to establish LEZs and CAZs, and to set their own emissions standards and conditions of use. A number of authorities have considered LEZs, yet none have been taken beyond the feasibility stage.

11.6 The consideration of options, as noted in Table 4, must also demonstrate consideration of the sustainability principle. Multiple benefits in addition to improvements in air quality could be realised, such as:

- benefits to health and wellbeing (increased uptake of active travel, reduced costs to the healthcare system);
- societal benefits (through community engagement); and
- an increased shift to low carbon behaviours.

11.7 The NLEF, supported by a robust NMF, aims to encourage and facilitate a shift from feasibility to implementation by:

- offering a nationally consistent approach to appraising and implementing measures to improve local air quality; and
- sharing responsibility across national and local government.

CASE STUDY 15

Proposed Clean Air Zone – City of York

In 2014, City of York Council unveiled a package of proposed measures to improve air quality. Their proposals included a Clean Air Zone (CAZ) plan to regulate bus emissions in the city centre. The CAZ will control the types of buses able to operate in certain areas of the city. However, unlike an LEZ, the entry criterion will not be a blanket Euro emission standard for all buses. Rather, the CAZ will set different entry standards for vehicles based on the frequency per day at which they enter the Zone.

The CAZ approach has been developed for the following reasons:

- it requires emission improvement costs that are more proportionate to the frequency at which vehicles travel through AQMAs and the impact they have on local air quality;
- it is likely to achieve greater overall air quality benefits than a blanket Euro emission standard based LEZ applied to all buses, but will limit the financial impact on smaller operators and infrequent rural services;
- it will give operators a clear 10-year timetable from which to plan their upgrades and organise their fleets in a way that limits the number of vehicles that have to be exchanged or redirected to other cities; and
- it allows expansion of similar flexible emission entry controls for other vehicle types in the future if this becomes necessary.

KEY PERFORMANCE INDICATORS

12

MONITORING PROGRESS

12.1 It is important that a methodology is in place for monitoring progress with CAFS. One approach to this will be through regular reporting on the key outcomes and objectives. Additionally, for central government and local authorities, a series of Key Performance Indicators (KPIs) is proposed. The suggested KPIs are:

- % change in NO₂ at each monitoring location, averaged over a three-year period.
- % change in PM₁₀ at each monitoring location, averaged over a three-year period.
- Share of public transport journeys in the overall modal split - % change and/or comparison to the national average.
- Share of low emission vehicles in the overall modal split - % change and/or comparison to the national average.
- Share of cycling and walking journeys in the overall modal split - % change and/or comparison to the national average.

12.2 The detailed information required under each KPI will be worked up during the first year of CAFS implementation and further information will be included in the first annual progress report.

MEASUREMENT AND REPORTING

12.3 We aim to report on the actions in CAFS annually in tandem with an update on the KPIs. The KPIs have been designed so that the information required should mostly be already available, thereby keeping to a minimum the additional work required. Local authorities should gather the necessary information on an annual basis and include such information as an annex to their air quality progress reports.



STRATEGIC ENVIRONMENTAL ASSESSMENT AND EQUALITY CONSIDERATIONS

13

STRATEGIC ENVIRONMENTAL ASSESSMENT

13.1 As required by the Environmental Assessment (Scotland) Act 2005, the Scottish Government has considered the requirement for a Strategic Environmental Assessment of CAFS. Given the overarching role of the strategy, it has been concluded that CAFS itself will have no or minimal environmental effects; therefore, it has been exempted following completion of a screening report¹⁰¹. Any proposals set out in CAFS that could have significant environmental implications when they are developed into more detailed policies and plans, such as the National Low Emission Framework, will be subjected to a Strategic Environmental Assessment.

EQUALITY

13.2 Scotland's strong commitment to equality is a core aspect of CAFS, particularly in relation to reducing health inequalities arising from the impacts of air pollution. Any proposals set out in CAFS that may be developed into specific policies and plans will be informed by assessing their impact on equality, and where appropriate will be developed in line with the Public Sector Equality Duty.

¹⁰¹ <http://www.gov.scot/Topics/Environment/environmental-assessment/sea/SEAG>

LIST OF ACTIONS

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#	Action	Deliver Organisation	15/16	16/17	17/18	18/19	19/20	Funding
COMMUNICATION								
Advice and information to key audiences on air quality								
C1	A Scottish Air Quality Indicator will be developed which will assist in assessing compliance with air quality legislation and delivery of CAFS objectives.	SG and framework contractor*		•				✓*
C2	CAFS will support the ongoing Greener Scotland communication campaigns, encouraging individuals to use the car less to improve their health and their local environment.	SG/TS		•				-+
C3	A national air quality public awareness campaign will be developed.	HPS/SG/TS	•	•	•	•	•	✓
LEGISLATION AND POLICY								
Local and national air quality management								
LP1	A refocused Local Air Quality Management system will be implemented.	SG		•	•	•	•	✓
LP2	A PM _{2.5} monitoring network will be established.	SG		•	•			✓
LP3	Revised and updated Scottish action plans will be produced to demonstrate how compliance with the EU Ambient Air Quality Directive will be achieved.	SG	•	•	•	•	•	✓
National Modelling Framework and National Low Emission Framework								
LP4	Design, develop and implement a two-level modelling system for regional and local scales to provide evidence for appraising and identifying potential transport and planning solutions to local air quality issues.	SG/TS/SEPA	•	•				-
LP5	Evaluate the requirements of a regional model and then support its development during the first two years of implementing CAFS.	SG/TS/SEPA		•	•			-
LP6	Develop guidance and promote a support network for all practitioners involved in reviewing and assessing local impacts on air quality resulting from regional decision making.	SG/TS/SEPA	•	•				✓
LP7	Undertake detailed modelling of all four major cities and associated adjoining spaces in Scotland, covering areas associated with highest levels of poor air quality.	SG/TS/SEPA		•				✓
LP8	Identify requirements and undertake data collection requirements for additional urban areas within three years of implementing CAFS.	SG/TS/SEPA		•	•	•		✓
LP9	Implement the national databases for traffic data collection and local modelling outputs associated with CAFS.	SG/TS/SEPA	•	•				✓
LP10	By April 2016, in further consultation with partner organisations, the NLEF criteria, tests, and processes will be developed, agreed, and finalised.	SG/TS/SEPA	•	•				✓

#	Action	Deliver Organisation	15/16	16/17	17/18	18/19	19/20	Funding
LP11	A standard appraisal process will be designed and implemented for assessing local air quality measures.	SG/TS/SEPA	•	•				-
LP12	Develop the software tools and associated guidance for the NLEF, including funding options and technical reports, that will underpin the evidence on effectiveness of options.	SG/TS/SEPA	•					✓
HEALTH								
Protection of human health								
H1	World Health Organization guideline values for PM ₁₀ and PM _{2.5} will be included in legislation as Scottish objectives.	SG		•				✓
H2	NHS boards and their local authority partners will include reference to air quality and health in the next revision of their Joint Health Protection Plans, which should identify and address specific local priority issues.	HBs		•				-
TRANSPORT								
Avoiding travel								
T1	All local authorities should ensure that they have a corporate travel plan (perhaps within a carbon management plan) which is consistent with any local air quality action plan.	LA		•				-
Active travel								
T2	We will finalise and deliver the National Walking Strategy Delivery Plan by 2016.	TS		•				✓
T3	We will work with partners to deliver our shared vision in the Cycling Action Plan for Scotland that by 2020, 10% of everyday journeys will be made by bike.	TS/LA		•	•	•	•	✓
Public transport								
T4	Review support for green buses will be reviewed by 2016 including scope for supporting retrofitting existing vehicles, taking account of technological and market developments and the need to tackle air quality as well as climate change.	TS		•				✓
T5	Evaluate the Bus Investment Fund in 2016 to learn from supported projects and inform decisions on options for future support for local projects to improve public transport.	TS		•				✓
T6	The Bus Operators Grant will be reviewed by 2016 including options to incentivise the use of low emission buses.	TS		•				✓
T7	By 2016, review guidance and legislation on the powers of local transport authorities regarding bus service to see if they could be made more effective and to ensure enough priority is given to air quality alongside other considerations.	TS		•				-

#	Action	Deliver Organisation	15/16	16/17	17/18	18/19	19/20	Funding
Low Emission Vehicles								
T8	Continue delivery of actions contained in Switched On Scotland: A Roadmap to Widespread Adoption of Plug-In Vehicles.	TS		•	•	•	•	✓
T9	Review the Roadmap and develop a post-2015 plug-in vehicle action plan.	TS/SG		•				-
T10	Work with key partners to investigate the use of hydrogen as a transport fuel, as well as exploring wider environmental and economic opportunities of using hydrogen for energy applications – especially in promoting renewables, energy balancing and storage.	TS	•	•				-
T11	Continue to engage with our partners on the role less carbon intensive fuels such as liquid petroleum gas, compressed natural gas and biofuels can play in the transition to a near zero emission road transport sector by 2050.	TS		•	•	•	•	-
Freight								
T12	Encourage each local authority with an AQMA to create a Freight Quality Partnership (or utilise an existing RTP Freight Quality Partnership) and consider appropriate measures for local air quality improvement by 2017.	LAs/RTPs/TS			•			-
T13	Encourage Freight Quality Partnerships to extend their activities to include consideration of the environmental impact of freight transport.	SG/TS			•			✓
Regional and Local Transport Partnerships								
T14	Review existing Ministerial guidance on Regional and Local Transport Strategies during 2016 in the light of the refreshed National Transport Strategy. In doing so, we will consider how: <ul style="list-style-type: none"> air quality management should be addressed and how RTPs and local authorities should use their transport strategies to support modal shift towards sustainable and active travel, including through Smarter Choices initiatives, and promote the take up of greener vehicles. 	TS/RTP		•				-

#	Action	Deliver Organisation	15/16	16/17	17/18	18/19	19/20	Funding
Air Quality Management Areas and the trunk road network								
T15	Trunk road impacts on AQMAs will be reviewed and implement mitigation where trunk roads are the primary contributor to air pollutants.	TS		•	•			✓
PLACEMAKING								
Contribution of placemaking to air quality improvements								
P1	Ensure that future updates and revisions to Scottish Planning Policy and the National Planning Framework will take account of CAFS.	SG		•	•	•	•	✓
P2	Expect planning authorities to review the Local Development Plan and revise at the next scheduled update to ensure policies are consistent with CAFS objectives and any local authority air quality action plans.	SG		•				✓
P3	Work with Environmental Protection Scotland to produce updated guidance on air quality and planning.	SG	•	•				✓
P4	Work with SEPA to introduce air quality training for local authority spatial and transport planners.	SG	•	•				✓
P5	Support SEPA in revising its guidance on Strategic Environmental Assessment to bring it into line with CAFS.	SG	•	•				✓
CLIMATE CHANGE								
Effective co-ordination of climate change and air quality policies to deliver co-benefits								
CC1	Ensure that future updates to the 'Low Carbon Scotland: Meeting Our Emissions Reduction Targets' publication on meeting our climate change targets take into account air quality impacts.	SG		•				-
CC2	Expect any Scottish local authority which has or is currently developing a Sustainable Energy Action Plan to ensure that air quality considerations are covered.	SG/LA				•		-
CC3	The Forestry Commission Scotland will publish updated guidance on the impact of biomass on air quality to help local authorities fulfil their statutory responsibilities.	FCS	•	•				✓

Table 5. List of CAFS actions across the six objectives

* Funding embedded in current policy

+Funding options in development

Front cover image was drawn by pupils of Bearsden Primary in 2014 for use in the Bearsden AQMA. The image is provided courtesy of East Dunbartonshire Council



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