LestAir – Low Emission Strategy: Business and Implementation Plan

Final

Report for Leicester City Council

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Executive summary

Leicester has had an Air Quality Management Area (AQMA) in place since 2000 covering the city centre and key radial routes. The AQMA was declared on the basis of exceedances of the annual mean objectives for nitrogen dioxide (NO_2), largely as a result of emissions from road traffic. Despite measures being taken to reduce this pollution there remain widespread and substantial exceedances of the objective. Although the AQMA has been declared on the basis of NO_2, both NO_2 and coarse particulate matter (PM_{10}) are of concern. In addition, there is a growing preoccupation with the health impacts of fine particulate matter ($PM_{2.5}$).

The LestAir project has been set up to build on existing work by the Council to tackle these problems and identify new solutions going forward. It is intended to develop an integrated package of measures in the form of a Low Emission Strategy (LES) which will reduce emissions from transport activity and contribute to meeting air quality objectives.

This report sets out the key findings of the LestAir project in terms of proposals for a Low Emission Strategy for the city. The report describes the measures proposed for the LES and provides an assessment of the emissions benefits of these measures. A business plan for the LES has been developed in terms of a cost benefit analysis and a mobilisation plan in terms of how the LES fits with other city policies and programmes, how it can be funded and an indicative delivery plan.

The principal themes and measures proposed for the LES are:

- **Bus emissions strategy** – aimed at reducing bus emission on the key radial routes into the city:
  - *Bus Low Emission Zone (LEZ)*: a central area LEZ for buses only with a Euro IV standard in 2016, raising to Euro VI by 2020.
  - *Bus retrofit scheme*: to support bus companies with retrofit solutions to meet Euro 4 standards for older buses.
  - *Gas bus development project:* work with Arriva and other operators to develop a gas bus project to support a longer-term deployment of gas buses and supporting infrastructure.
- **Managing freight emissions** – which are a major source of emissions especially in outer areas:
  - *Freight consolidation measures*: work with businesses and freight operators to roll out delivery and servicing plans, with a longer term consideration of the development of an urban consolidation centre.
  - *Greener fleets*: development of a fleet improvement scheme such as Ecostars or FORS, with longer term goals of linking gas delivery vehicles to the gas bus scheme and zero emission delivery vehicles.
- **Low emission behaviours** – tackling car emissions across the city
  - *Smarter choices measures*: the LES will support wider smarter choices programmes across the city, but bring added value through inclusion of air quality, health and low emission behaviour aspects
  - *Promoting low emission vehicles*: the development of electric vehicle charging infrastructure and reduced parking fees for low emission vehicles
- **Planning, procurement and public health** – low emission policies embedded in supporting policies and programmes:
  - *LES Planning Policy*: Develop and adopt AQ & Emissions Planning Guidance to support long term LES aims
  - *LES Procurement Policy*: Integrate vehicle emission considerations as part of the review of Leicester CC procurement guidance and practice
  - *Public Health Policy*: Integrate the LES measures within the City's Health and Wellbeing strategy

The emissions impact of this package of measures within the Air Quality Management Area (AQMA) is estimated to be a14% reduction in NOx emissions and a 6%-8% reduction in PM and CO_2. The impact of the package is most significant for bus emissions, suggesting that the measures could reduce NOx emissions by nearly 40%, PM emissions by over 50% and CO_2 emissions by around 30%. In terms of the CO_2 benefit it should be noted that this is almost entirely related to the use of biomethane in the gas bus scheme. Without this renewable fuel the CO_2 reduction would be only 3-4%.

In order to ensure compliance with the NO_2 limit values across the whole AQMA a reduction of 67% in transport related NOx emissions is needed. This is well above the overall reduction that the proposed LES would achieve.

The proposed LES will make a substantial step in establishing a low emission bus fleet in the city. It is also providing the first steps in reducing emissions from freight and passenger cars. However, much more significant steps will be needed to tackle emissions from these sectors as we move to 2020 and beyond. The longer term aims of the LES include a more stringent Euro VI LEZ standard in the central area, with potentially a zero-emission freight criteria, and much more radical targets for traffic reduction and the adoption of low emission vehicles in the city.

The Cost Benefit Analysis (CBA) estimated that all of the measures in the LES package have a positive Net Present Value (NPV), showing that the benefits outweigh the costs, with the exception of the gas HGV measure. Overall the bus elements of the LES package have the greatest NPV related to the greatest NOx savings. The HGV measures, along with the smarter choices measures, have the lowest NPV.

The CBA also provided a Benefit Cost Ration (BCR) for the measures which was greater than one for all measures except the gas HGV. The gas bus and EV elements have the best BCR, with the remaining bus and HGV elements having similar BCRs. Overall the LES package is estimated to have a NPV of around £8 million and a BCR of 2.

In terms of mobilisation the LES measures site across a number of policy areas in the Council and need to be integrated into these areas in terms of delivery. At its core the LES is seeking to reduce transport emissions in order to meet air quality and climate change goals. Therefore a key delivery area will be transport programmes and policies, supporting air quality and climate change objectives. However, this all sits in a wider policy context. Firstly the principal drivers for reducing traffic emissions are improving public health and providing a high quality environment for an economically viable and thriving city. Secondly the key Council policy levels of planning and procurement complement and support emissions reduction activities across the city.

To ensure effective delivery across the council it is recommended that a Low Emission Strategy Project Board is created. Other low emission strategy projects, including those in the West Midlands and West Yorkshire, have set up project boards and found them an important element of project management, governance and delivery, while co-ordinating activity across several departments. If Leicester chooses to constitute a project board it is recommended that all key disciplines are represented by senior managers and the board is chaired at Director or Member level, ensuring a high level commitment for LES activity.

There are potentially a range of current and emerging funding sources that could assist the City Council with delivery of measures developed in the LestAir project and set out as the proposed core measures for a LES. These include:

- *Low Emission Vehicle Funding* from DfT and OLEV;
- *Transport funding* through the LTP, LSTF, Better Bus Area funds and enforcement revenues;
- *Planning and development funds* in terms of CIL, section 106 and local growth funds
- *European funding* particularly Horizon 2020 and Life.

These funding streams are explored in more detail in the report along with an indicative implantation plan. A prioritisation of measures has been suggested as are more appropriate for short term implementation and others for medium or longer term implementation as indicated below:

- *Short term*: Bus Retrofit and development of the LEZ, Freight DSPs and Ecostars, smarter choices and initial work on EVs
- *Medium term*: Introduce Bus LEZ, gas vehicle projects, wider EV work
- *Longer term*: Tighten LEZ standards, urban consolidation centre, zero emission delivery.

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Appendices

1 Introduction

The impact of transport related air pollution in Leicester is estimated to cost the city some £7.2 million per year worth of damage to families, businesses and the Leicester economy as a whole (based on IGCB estimates). The area where pollution levels exceed health based objectives covers about 3% of Leicester's population many of whom are amongst the most deprived of the city's residents. This area has been defined as an Air Quality Management Area (AQMA) and has been in place since 2000 (extended in 2008), with an associated action plan to tackle pollution levels. Nonetheless, there remain widespread and substantial exceedances of the annual mean objectives for nitrogen dioxide (NO_2). There is also little evidence of a robust downward trend in levels; in fact in recent years the situation has deteriorated in some areas.

Although the AQMA has been declared on the basis of NO_2, both NO_2 and particulate matter are of concern. While the daily and annual mean for course particulate matter (PM_{10}) objectives were achieved at all sites in 2011, at two sites only a small margin remained for achieving the daily objective. Also it needs to be recognised that fine particulate matter ($PM_{2.5}$) is one of the contributors to the local health impacts of air pollution. The main pollutant source in Leicester is road traffic, which accounts for over 90% of NOx at key locations in the AQMA. The majority of these emissions come from diesel vehicles, both diesel cars and heavy duty trucks and buses.

The LestAir project has been set up to build on existing work by the Council to tackle these problems and identify new solutions going forward. It is intended to develop an integrated package of measures in the form of a Low Emission Strategy (LES) which will reduce emissions from transport activity and contribute to meeting air quality objectives.

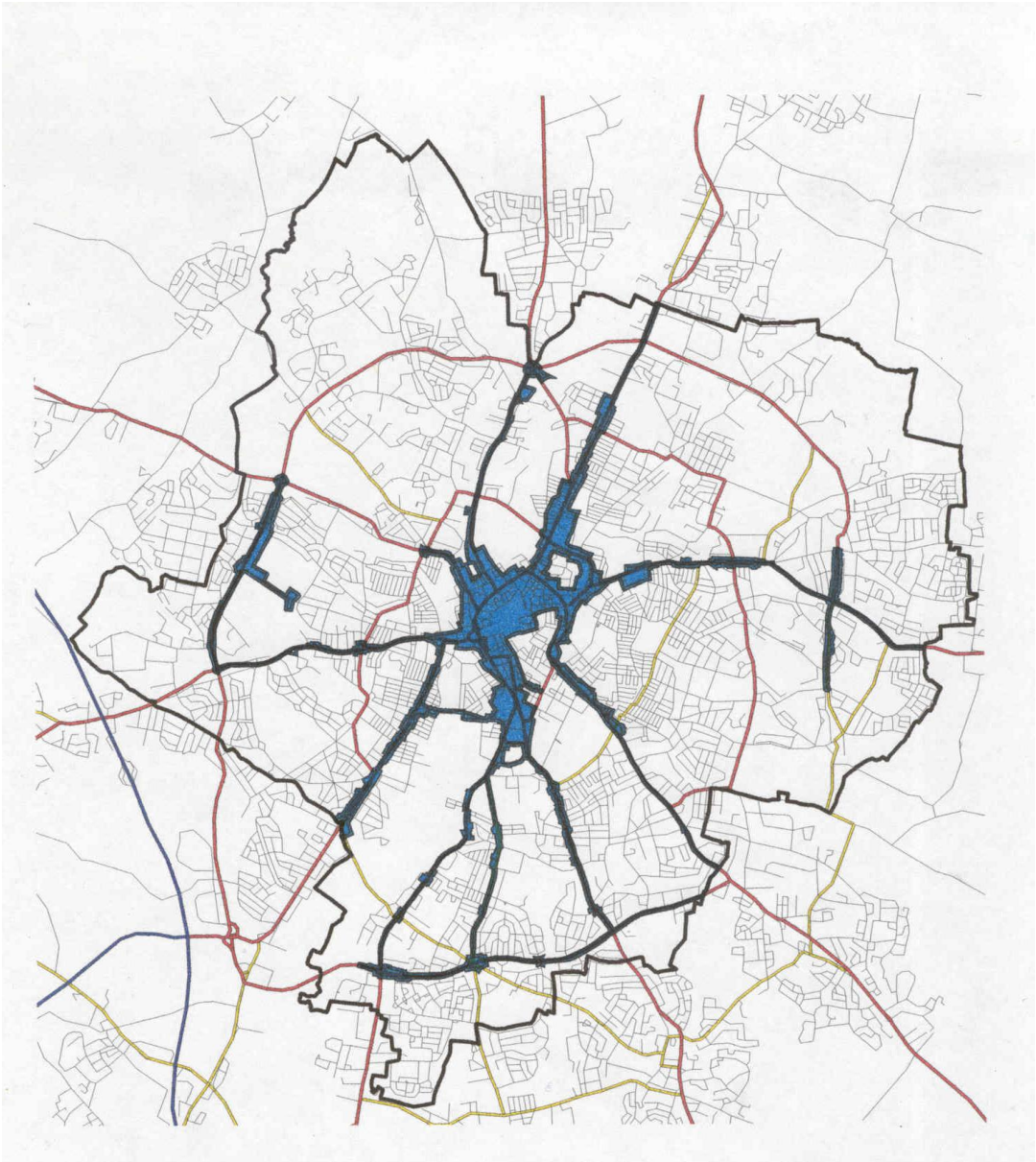
This report sets out the key findings of the LestAir project in terms of proposals for a Low Emission Strategy for the city. The air quality background is provided in section 2 along with the basic approach behind the proposed LES. Section 3 described the measures proposed for the LES and section 4 provides an assessment of the emissions benefits of the LES. A business plan for the LES has been developed in terms of a cost benefit analysis and is set out in section 5. Final section 6 provides a mobilisation plan in terms of how the LES fits with other city policies and programmes, how it can be funded and an indicative delivery plan.

2 Background to the Low Emission Strategy

2.1 Emissions and air quality

Leicester has had an Air Quality Management Area (AQMA) in place since 2000 in respect of its local air quality management duties. The current AQMA, as shown in Figure 2.1, covers about 3% of Leicester's population many of whom are amongst the most deprived of the city's residents. The AQMA was declared on the basis of breaches of the European Union Limit Value for annual mean nitrogen dioxide (NO_2) concentrations. There is little evidence of a robust downward trend in levels; in fact in recent years the situation has deteriorated in some areas.

Figure 2.1 The Leicester AQMA



Although the AQMA has been declared on the basis of NO_2, both NO_2 and particulate matter are of concern. While the daily and annual mean for course particulate matter (PM_{10}) objectives were achieved at all sites in 2011, at two sites only a small margin remained for achieving the daily objective. Also it needs to be recognised that fine particulate matter ($PM_{2.5}$) is one of the contributors to the local health impacts of air pollution. Annual average nitrogen dioxide concentrations exceeded the limit value at five measures sites in 2011 as shown in Table 2.1. The main contributor to air pollution levels in the city is road transport.

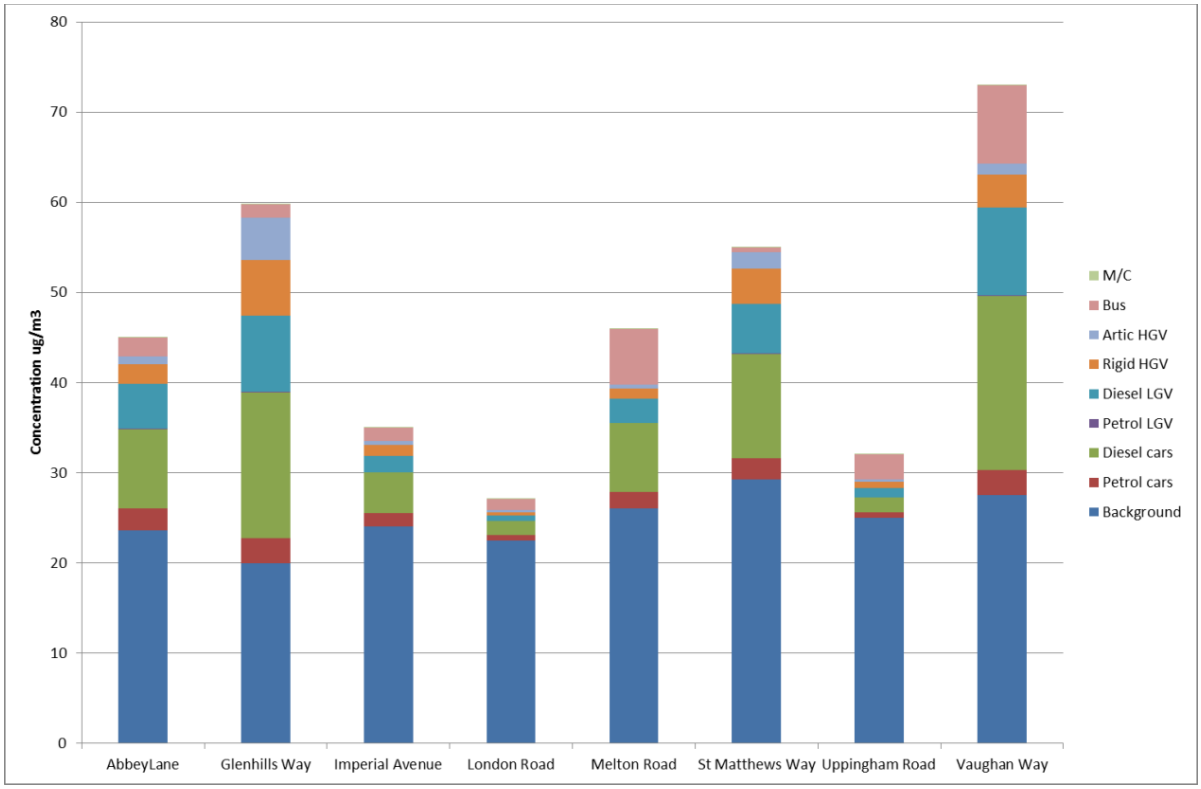
Table 2.1 NO_2 and PM_{10} concentrations at key monitoring sites in the city 2008 to 2011

Monitoring site	NO_2 Concentration, ug/m3				PM_{10} Concentration, ug/m3			
	2008	2009	2010	2011	2008	2009	2010	2011
AbbeyLane	44	54	63	45	22	21	22	24
Glenhills Way	67	75	80	60	29	28	28	32
Imperial Avenue	34	34	37	35	20	18	19	22
London Road	32	32	33	27	19	19	19	21
Melton Road	53	56	58	46	25	24	26	27
St Matthews Way	61	56	62	55	n/a	n/a	n/a	n/a
Uppingham Road	36	34	40	32	n/a	n/a	n/a	n/a
Vaughan Way	57	57	68	73	28	24	26	31

Note: Values in red exceed the limit values

Within the LestAir project an emissions model was built of the city to estimate the emissions generated by road traffic and forecast the impact of measures in future years. The model was also used to disaggregate transport emissions to provide a source apportionment analysis to understand the role of different vehicle types with respect to air pollution in the AQMA. This analysis focused on NO_x emissions and NO_2 concentrations. The results for the main monitoring locations are shown in Figure 2.2 below.

Figure 2.2 Source apportionment of NO_2 concentrations at key monitoring points in 2011



The data suggests that background NO_2 concentrations are around 25µg/m^3 with transport making up the rest. Of the transport component about half is related to cars, mainly diesel cars. Of the rest buses are important on the main radials such as Melton road, which are also key bus routes, and also on the inner ring road. Freight also has a role to play and this is more significant in the outer ring road leading to industrial sites such as on Glenhills way.

Therefore in tackling emissions and air quality there are three main targets:

- Working to reduce bus emissions on radial routes and the city centre
- Managing freight movements to reduce emissions
- Reducing car traffic and emissions across the city

2.2 Health impacts

Air pollution is a key public health issue in the UK and is estimated to be responsible to 29,000 deaths per year. Particulate matter, especially fine particulate matter, is the pollutant of most concern contributing to both respiratory and cardiovascular illness. Nitrogen dioxide and ozone also contribute to poor health, especially respiratory conditions. The Government, through the Interdepartmental Group on Costs and Benefits (IGCB), has established guidance on monetising these health impacts along with wider impacts on buildings and the natural environment. The monetised impacts are known as damage costs.

Using the IGCB guidance and the emissions model of the city we are able to estimate the damage costs associated with air pollution in the city. For the base year in 2011 air pollution related to transport emissions is estimated to cost the city some £7.2 million along with an associated 350 years of lost life. Within the AQMA itself the cost of air pollution from transport is around £1.8 million per year. If we also consider the transport related carbon emissions this adds another £10 million of costs at the city level and £2.5 million in the AQMA. These are significant costs associated with transport emissions in the city.

Recognising the compelling evidence on health impacts of poor air quality, a new indicator on air quality has been included in the Public Health Outcomes Framework (PHOF). In conjunction with the introduction of an air quality health indicator, public health has become the responsibility of local authorities. As a consequence the development of measures to reduce emissions relates to an authorities duties with respect to both local air quality management and wider public health. This key relationship with the protection of public health needs to be recognised within ant Low Emission Strategy.

2.3 Outline approach

The overall objective of the Low Emission Strategy (LES) is to reduce emissions from transport, the main contributor to air pollution in the city, in order to improve public health and comply with European and UK air quality limits. The focus of the strategy is the AQMA, which has the highest levels of pollution in the city, covering the main radial routes and the city centre. This also links with Leicester's vision for renewal and development set out in its 'Connecting Leicester' strategy. However, there is also a need to tackle emissions across the city as a whole, with car traffic being a specific target.

The development of measures for inclusion in the LES was carried out through extensive consultation with stakeholders within the Council and wider interests such as the bus companies, freight operators and businesses. This consultation work also included assessing existing actions to reduce emission and generation of potential additional measures. This consultation process produced a long list of measures for potential inclusion in the LES. Further assessment work was then carried out including an emissions assessment of the measures and cost benefit analysis to arrive at a core set of measures that were likely to be most effective. This development process is illustrated set out in 'The LestAir Process Roadmap' in Appendix 1.

This process generated the following elements as the core of the LES:

- A **bus emissions strategy** to tackle emissions from buses on key routes in the city and within the city centre;
- Measures to **manage freight emissions** on key routes and across the city more widely;
- Promoting **low emission behaviour**s for the residents of the city in terms of both reducing car based travel and using electric and low emission vehicles;
- Emission reduction actions in **procurement, planning and public health** policies

The details of the measures within each of these LES elements are set in the following sections along with an emissions assessment, business case and implementation plan.

3 The LES measures

3.1 Bus emissions strategy

Buses are an important component of emissions on the key radials into the city and within the city centre. They are also important to the wider functioning of the city's transport system. Therefore making these vehicles as clean as possible in terms of both air pollution emissions and carbon emissions is an important part of an emission strategy for the city.

The measures within this strategy comprise:

- A **bus-based Low Emission Zone (LEZ)** for the central area;
- Support for an **exhaust retrofit programme** to clean up the oldest buses and help them comply with an LEZ;
- Working with the bus operators to introduce low emission **gas buses**.

3.1.1 Bus LEZ

Buses are a significant contributor to air pollution in many cities and as such there are a growing number of cities looking to improve the bus fleet through the use of LEZs. Oxford already has a scheme in place, with a strict Euro V standard, and other cities such as Brighton and Bradford are studying this option.

The advantage of a bus only scheme over a wider LEZ is that it is more easily implemented through a Traffic Regulation Condition on bus operators in the city. Compliance with the condition forms part of their operating requirements. Enforcement can be kept to minimum in terms of random spot checks, with breaches of the condition being reported to the traffic commissioner. This removes the need for costly ANPR enforcement.

In terms of coverage of the LEZ targeting the central area will keep the scale of the scheme to a minimum but also capture most of the buses in the city as nearly all routes pass through this area.

An initial standard of Euro IV is proposed to remove the older more polluting vehicles from the fleet. However, a longer term target should also be included in the scheme to allow operators to develop their fleet towards this. A longer term target of Euro VI or equivalent is suggested by 2020.

Bus LEZ measure: a central area LEZ for buses only with a Euro IV standard in 2016, raising to Euro VI by 2020.

3.1.2 Bus retrofit programme

In preparation for a LEZ the council can work with bus operators to introduce retrofit solutions to reduce emissions from buses as an alternative to renewal. Such a scheme should be based on the experience of the Council in relation to the Clean Bus Technology Fund scheme currently being implemented in the city. This supported the introduction of retrofit SCR systems which will bring Euro III buses up to a Euro V or better standard.

This scheme will allow older buses that have significant remaining operational life to comply with the LEZ up to 2020. It is also something that can be done now in advance of a formal LEZ coming into force.

Bus retrofit measure: support bus companies with retrofit solutions to meet Euro 4 standards for older buses.

3.1.3 Gas buses project

A number of bus operators have now started to invest in gas buses which have very low emissions and the potential to generate cost savings for the operator. Arriva, GoAhead and Stagecoach have all invested in gas buses, mainly single deck MAN and Alexander Dennis/Scania, and enjoy a 6p per km BSOG rebate if certified biomethane is used. All operators report operational cost benefits that outweigh the incremental cost of gas buses. There is also a wide choice of gas refuelling suppliers and methods of supply such as wet leasing where the supplier provides the gas station and adds an increment to the cost of the gas. It is anticipated that bus manufacturers such as Alexander Dennis will start production of a double deck gas bus.

The City Council should therefore work with the operators to develop a gas bus project in the city. This will provide experience for local operators and move the bus fleet towards a much lower emission fleet. It can also be seen as a route to meeting a more stringent Euro VI LEZ in 2020.

The longer term LEZ targets can be seen as a driver for investment in such low emission vehicles. For example the engagement with bus operators in the development of the LEZ in Oxford resulted in the early implementation of Euro V Hybrid buses well ahead of the formal LEZ coming into force.

Gas bus measures: work with Arriva and other operators to develop a significant gas bus project.

3.2 Managing freight emissions

Freight vehicles, both heavy and light duty, are a significant source of emissions across the city. Working with the freight industry to improve the efficiency of its operation in the city will help reduce emissions and improve economic competiveness. The LES will work with the freight industry in two key ways:

- Supporting operators to **consolidate freight activity** in the city to reduce the amount of vehicle traffic;
- Working with operators to promoter **greener fleet** initiatives.

The concept of a low emission freight charter could be considered where businesses working with the city on consolidation and greener fleet sign up to and promote the charter.

3.2.1 Consolidating freight activity

Many business and freight operators are already very efficient in the way they deliver goods to premises. However, with smaller more diverse businesses and in certain sectors such as catering the delivery patterns can be quite fragmented and inefficient. This can be improved by businesses looking closely at their supply chains and working with delivery companies to try and reduce deliveries to site so reducing costs, traffic and emissions.

The implementation of demand side management of freight deliveries can be done through delivery and servicing plans (DSPs). These are the freight equivalent of travel plans and could be developed alongside business site travel plans. Through the DSP process freight deliveries to a site are reviewed and actions to consolidate and reduce these are developed. The can be developed for a single organisation or a group of organisations in a contained location such as a business park. A potential target good also be co-operation on deliveries between key public sector organisations in the city. The concept was developed by TfL in London and they were able to reduce deliver trips to sites by 15%-20%.

DSPs are a something that can be rolled out in the short term, potentially as part of a wider initiative in ‘smarter choices’ measures (see section 3.3) to reduce overall traffic levels in the city. In the longer term consider can also be given to supply side consolidation, by consolidating income goods through an urban distribution (consolidation) centre. The

development of such as scheme as has been done in Bristol and Heathrow is a significant undertaking and requires wide scale consultation to ensure that it is effective for both suppliers and customers.

Freight consolidation measures: work with businesses and freight operators to roll out delivery and servicing plans. In the longer term consider the development of an urban consolidation centre.

3.2.2 Greener fleets

There are a range of measures that delivery fleets can implement to improve the environmental performance of their fleets including eco-driving, better servicing and maintenance and low emission vehicles. There are various schemes in operation across the country working with operators to encourage the uptake of these measures such as the Ecostars programme, The Energy Saving Trusts Green Fleet Reviews and Motorvate programme and the FORS programme run by TfL in London.

The Council will seek to work with local operators, through the Freight Quality Partnership (FQP), to implement such an initiative. An additional element of the scheme should be to set voluntary vehicle emission standards for vehicles operating in the central area of the city. Initially this could be Euro IV to complement the bus LEZ, but with longer term targets for stricter standards. The development of a voluntary freight emission scheme is something that can be taken forward in the short term to help build up awareness of the issues with businesses.

To complement this initial scheme the possibility of linking freight vehicles into a gas bus initiative can be considered. This would allow the freight industry to pilot gas vehicles in the city working from a shared infrastructure. Like the buses, gas HGVs can be very low emission vehicles in urban operation.

In the longer term the city will need to consider how it can work towards the EU's objective of zero emission urban logistics by 2030. This could entail the vision of zero emission vehicles operating in the city centre linked to an urban distribution centre.

Greener fleets measure: development of a fleet improvement scheme such as Ecostars or FORS, with longer term goals of linking gas delivery vehicles to the gas bus scheme and zero emission delivery vehicles.

3.3 Low emission behaviours

Across the city as a whole passenger cars, especially diesel cars, contribute some 50% of emissions. Changing people's behaviour to encourage less car based travel and the use of low emission vehicles will help reduce emissions across the city. Therefore the two main measures of this element of the LES are:

- **Smarter choices** behaviour change programmes to shift people away from cars onto other modes, but including the air quality and health benefits associated with this not just congestion reduction;
- **Promoting low emission vehicles** using a range of measure, but with a focus on providing appropriate infrastructure.

3.3.1 Smarter choices

Smarter choices cover a range of measures designed to encourage a shift in travel behaviour away from cars. It includes travel plans, awareness raising programmes, car sharing initiatives and associated infrastructure such as improvements to walking and cycling facilities. There is now plenty of evidence on the effectiveness of such programmes including the Sustainable Travel Towns Demonstrations which resulted in a 7-8% reduction in road traffic in target areas, with an estimated cost of 4p per car km removed.

Significant effort has been put into such schemes over recent years, and they have been the focus of Local Sustainable Transport Funding (LSTF) from DfT. They have also be used to compliment wider transport infrastructure investment to lever greater behaviour change. For example the Better Bus Area project in Leicester included to element of smarter choices work to complement the bus infrastructure investment.

As part of the LES the city council will work through existing transport activity in this area to further promote smarter choices with a target of at least a 3% reduction on car traffic. The added value of a LES approach to such campaigns will be to:

- Promote the air quality benefits for such behaviour change;
- Work with public health colleagues in the wider health benefits from a shift to more 'active' modes such as walking and cycling
- Include within the campaigns information on eco driving and low emission vehicles

In addition, as noted above, such smarter choices programmes should link in with freight consolidation activities in terms of DSPs.

Smarter choices measures: the LES will support wider smarter choices programmes across the city, but bring added value through inclusion of air quality, health and low emission behaviour aspects.

3.3.2 Promoting electric and low emission vehicles

The use of low and ultra-low emission cars for urban journeys where a car is still necessary will further help reduce emissions. It can also encourage the growth of support industries for low emission vehicles technologies in the area which will bring added economic benefit. Activity in this area will complement the Governments initiative on ultra-low emission vehicles.

Key low emission vehicle technologies include electric vehicles and petrol hybrids, but also small low emission urban cars. The key measures within the LES to support the uptake of these vehicles will be:

- *Infrastructure development* – mainly the development of electric charging points across the city for use by the public and businesses.
- *Low emission parking* – reduce parking for electric and low emission vehicles to provide added financial benefit for the use of these vehicles in the city.

The city will also support wider promotion of the use of these vehicles through its smarter choices work and working with the local vehicle supply industry. Overall the LES will work to an initial target of 3% of light vehicles as EVs or petrol hybrids, rising to 5% by 2020.

Low emission vehicles measure: the development of electric vehicle charging infrastructure and reduce parking fees for low emission vehicles.

3.4 Planning, procurement and public health

Measures to support the reduction in emissions from transport within the LES need to be supported by and integrated into key Council policy documents. This will support the long term development of Leicester as a Low Emission City. Key policy documents that need to be developed to support the uptake of low emission technologies and behaviours across the city are:

- **Planning policy** – to ensure that as the city develop low emission issues are considered fully;
- **Procurement policy** – using the public sectors procurement powers to support the uptake of low emission technologies and industries;
- **Public health policy** – integrating the air quality and wider health benefits of low emission transport into public health activities.

3.4.1 Planning policy

While the planning process cannot solve immediate air quality issues, the National Planning Policy Framework (NPPF)[1] recognises that air quality is a relevant consideration and that planning can play an active role in delivering sustainable developments that allow future residents, businesses and visitors to make low emission vehicle choices. The NPPF states that planning policies should:

"Sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with local air quality action plans".

Effective planning policies can play a significant role in helping sustain air quality improvements by both discouraging the use of high emission vehicles (paragraph 39) and supporting the uptake of low emission vehicles, including the provision of low emission vehicle refuelling facilities, such as EV charging points (paragraph 35).

Recently published National Planning Practice Guidance (NPPG)[2] states that mitigation may include the contribution of "funding to measures, including those identified in **air quality action plans** and **low emission strategies**, designed to offset the impact on air quality arising from new development". While air quality is only one of many considerations that are relevant to planning, the NPPG states that where sustained compliance with EU Limit Values is prevented, a local authority is to "consider whether planning permission should be refused".

The Leicester CC Local Development Framework Core Strategy (2010) contains policies (including saved policies from the Local Plan 2006 eg PS11) that support the consideration of air quality and emissions, such as Core Strategy Policy 2 (6):

"Development should ensure a shift to the use of sustainable low emission transport to minimise the impact of vehicle emissions on air quality, particularly in Air Quality Management Areas. Development will be located where it is accessible by sustainable transport to support the use of public transport, walking and cycling as an alternative to the car. Higher density development will be located in areas with easy access to local facilities to reduce the need to travel."

Current guidance to support these policies tends to focus on how air quality should be assessed rather than providing clear and consistent advice to developers on feasible mitigation measures that can be integrated into scheme design. Other DEFRA funded low emission strategy projects involving the West Midland / West Yorkshire / Northampton / Warwick Authorities have produced innovative planning guidance to support their long term low emission strategy aims. Such guidance has been influenced by the NPPF and in turn has informed the NPPG. Guidance includes the integration of mitigation measures into scheme design as standard and uses a damage cost approach to inform the scale of mitigation required for major schemes.

Draft 'Air Quality & Emissions: Technical Planning Guidance' for Leicester has been adapted from the West Yorkshire Guidance and can be found in Appendix 2.

LES Planning Policy: Develop and adopt AQ & Emissions Planning Guidance to support long term LES aims

3.4.2 Procurement

The purchasing power of the public sector is significant in Leicester. Recent legislation and guidance encourages the public sector to support the uptake and deployment of low

[1] https://www.gov.uk/government/publications/national-planning-policy-framework--2
[2] http://planningguidance.planningportal.gov.uk/

emission vehicles through sustainable procurement decisions. Leicester CC is currently reviewing the need for new procurement guidance, either as a corporate document or through the identification of specific principles and measures that could be included in the Air Quality Action Plan. This review provides an opportunity to look at 3 areas of procurement that could help reduce vehicle emissions:

a) Contracts relating to goods and services provided to the Council
b) Procurement of vehicles by the Council
c) Partnerships

Goods and Services Provided to the Council:

Public sector organisations are required to look at best value, rather than lowest cost, when making procurement decisions. **The Public Services (Social Value) Act 2012**[3] came into force on the 31st January 2013. The Act, for the first time, places a duty on public bodies to consider social value, including environmental considerations, ahead of a procurement. The wording of the Act states that:

The authority must consider—
(a) how what is proposed to be procured might improve the economic, social and environmental well-being of the relevant area, and
(b) how, in conducting the process of procurement, it might act with a view to securing that improvement.

The Act provides scope to include the consideration of vehicle emissions, arising from contract delivery, and their impact on the health of the community.

Local sourcing is practised widely by local authorities, whereby local suppliers are encouraged to bid for council contracts. Such initiatives have the potential to support the local economy while helping reduce overall mileage. Local sourcing offers the potential for lighter goods vehicles to be used in delivery. Helping local suppliers develop emission strategies can provide competitive advantage in procurement decisions.

Procurement of Council Vehicles:

The Cleaner Road Transport Vehicles Regulations 2011 require public sector organisations to consider the energy use and environmental impact of vehicles they buy or lease. A key concept of the Regs is the consideration of whole life costs whereby the operational costs over a vehicle life, including pollution damage costs, are taken into account rather than just the purchase price. This helps to redress the issue of low emission vehicles costing more than conventional vehicles, while potentially having lower operating costs that outweigh the purchase increment.

Leicester CC currently runs a fleet of over 900 vehicles, including mainly diesel LGVs and HGVs, that are purchased under a procurement framework with Ford Motor Company. The Council complies with good practice criteria laid down in the Government Buying Standards for Transport[4]. In line with the development of the LES, the Council may review its vehicle procurement strategy to evaluate the potential for a transition to low emission technologies.

Draft guidance on procurement of low emission vehicles and services is provided in Appendix 3.

Partnerships:

The Council should examine the increased potential for purchase cost savings when buying low emission vehicles and deploying low emission vehicle infrastructure through innovative partnerships with both public sector organisations and the private sector

LES Procurement Policy: Integrate vehicle emission considerations as part of the review of Leicester CC procurement guidance and practice

[3] http://www.legislation.gov.uk/ukpga/2012/3/enacted
[4] http://sd.defra.gov.uk/advice/public/buying/products/transport/standards/

3.4.3 Public Health

The effects of air pollution on health are becoming increasingly understood at the local level. In the Leicester urban area, 6.6% of all deaths are attributable to fine particulates (PM2.5), accounting for 162 deaths per annum (over 25s)[5]. Road transport emissions are the most significant source of PM2.5 in the urban area. The World Health Organisation (WHO) classifies diesel fumes as carcinogenic[6]

With the inclusion of air quality in the Public Health Outcomes Framework and the integration of public health into local authorities there is a clear driver for aligning the LES clearly with the City's Health and Wellbeing strategy. Within this strategy the most relevant priorities are Priority 2 'Reduce premature mortality' in this case related to air pollution, and Priority 5 on the wider determinants of poor health and health inequality in terms of where the burdens of poor air quality lie.

In order to align the LES and the Health and Well Being strategy the following is proposed:

a) Local Health and Air Pollution Needs Assessment

The health impact of the LES needs to be further developed, building on the evidence from the LestAir project, and feeding into the strategic needs assessment. It is recommended that Leicester CC use the emission data presented for selected low emission intervention scenarios and model the resulting air quality concentration changes (this work could be carried out in conjunction with Leicester University). This data can be used by Public Health in along with Local Super Output Area (LSOA) data to map key indices, including the cross-referencing of air pollution and deprivation. Additionally, Public Health will be able to quantify the following (source suggested):

i) Deaths from all causes (COMEAP, 2010)
ii) Deaths from cardiovascular and respiratory diseases (COMEAP, 2009)
iii) Coronary events (Cesaroni, BMJ, 2014)
iv) Low birth weight <2500g (Pederson, Lancet, 2013)
v) Asthma development and wheeze symptoms (Takenoue, Paediatrics Int, 2012)

b) Communication & Education Strategy

This will include the benefits arising from the promotion of modal shift from cars to cycling and walking whereby dual benefits of reducing emissions and improving individual fitness can be achieved. Communication programmes can be developed jointly across the council including the public health, air quality and transport teams.

This may include information provided through campaigns, websites, leaflets, recognition schemes, school syllabus, media strategies etc.

Public Health Policy: Integrate the LES measures within the City's Health and Wellbeing strategy

[5] Estimating Local Mortality Burdens Associated with Particulate Air Pollution, Public Health England 2014
[6] http://www.nhs.uk/news/2012/06june/Pages/who-classes-diesel-vehicle-exhaust-fumes-as-carcinogen.aspx

4 Emissions assessment

The key measures within the LES have been assessed to provide an estimate of their emissions benefit. To carry out the assessment an emissions model was built of the city using the following basic elements:

- Traffic data taken from the Leicester and Leicestershire Integrated Transport Model (LLITM)
- Vehicle fleet data is taken from DfT classified counts on key roads and the NAEI Euro distribution, with the exception of the bus fleet which is taken from the TRL Bus Emission Study
- Speed data is taken from local Traffic Master information supplied by LCC
- Emissions modelling is done with the DEFRA Emission Factor Toolkit (EFT)

The emissions have been modelled for all the links in the LLITM, but to simplify the analysis the results have been grouped for the AQMA.

4.1 Baseline emissions

The baseline emissions modelling was done for:

- 2011 baseline – giving an estimate of the current situation and used with the monitoring data to provide the source apportionment results already provided.
- 2016 baseline – providing a 'do-nothing' forecast based on the LLITM traffic flows and the fleet composition changes from the NAEI, with the exception of the buses.

In addition a 2016 sensitivity case was carried out which assumes that Euro 6/VI does not provide the emissions benefit expected but performs the same as Euro 5/V. This was done as Euro 6/VI vehicles have a significant impact on the results and their real world performance is yet to be proved.

4.1.1 Baseline fleet composition

In order to help understand the results it is useful to look at how the fleet composition, in terms of Euro standards, is reflected in the modelling and how it changes between 2011 and 2016. These data are shown in Table 4.1 and figures 4.1 and 4.2 below. As noted above all vehicles except buses use the distribution in the NAEI and EFT. The buses are based in TRL data

Table 4.1 Euro fleet distribution 2011 and 2016

	2011					2016				
	Petrol Cars	Diesel Cars	Rigid HGV	Artic HGV	Buses	Petrol Cars	Diesel Cars	Rigid HGV	Artic HGV	Buses
Euro 0	4%	0%	0%	0%	1%	1%	0%	0%	0%	0%
Euro 1	2%	1%	0%	0%	1%	0%	0%	0%	0%	0%
Euro 2	10%	4%	8%	2%	19%	2%	0%	0%	0%	4%
Euro 3	38%	28%	35%	21%	68%	16%	9%	10%	2%	35%
Euro 4	36%	47%	25%	27%	7%	29%	25%	10%	4%	19%
Euro 5	11%	20%	32%	50%	3%	35%	44%	33%	31%	34%
Euro 6	0%	0%	0%	0%	0%	17%	21%	47%	64%	8%
Total check	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Figure 4.1 Euro fleet distribution for 2011

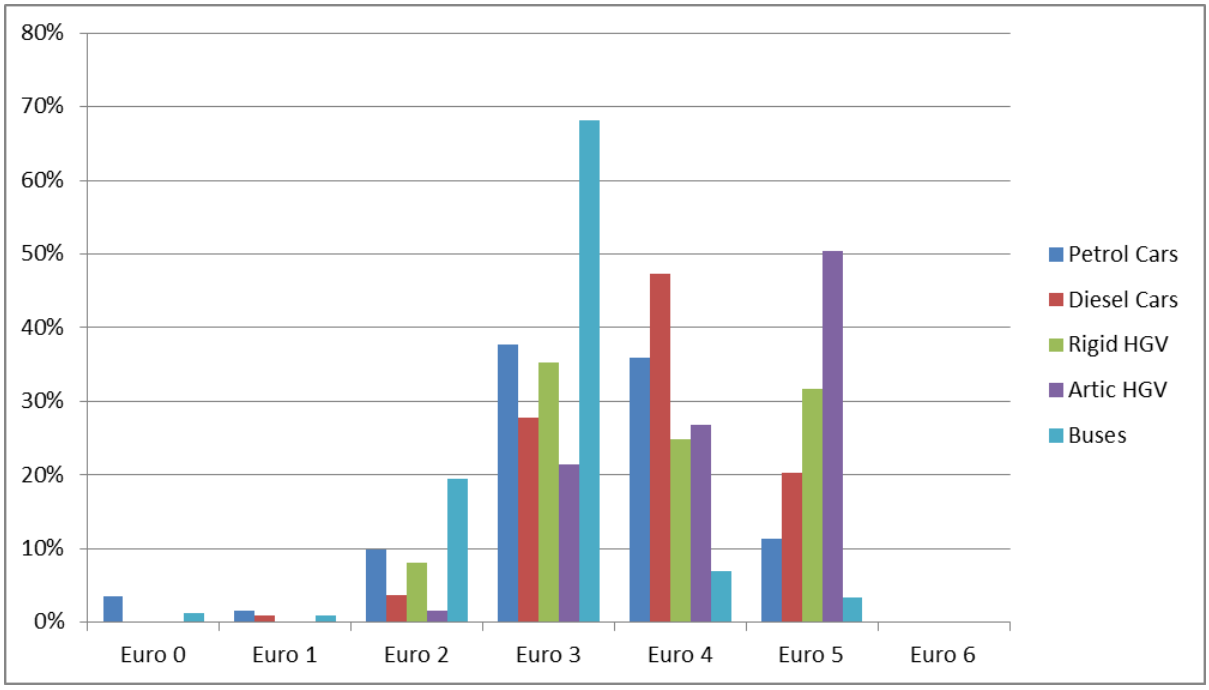
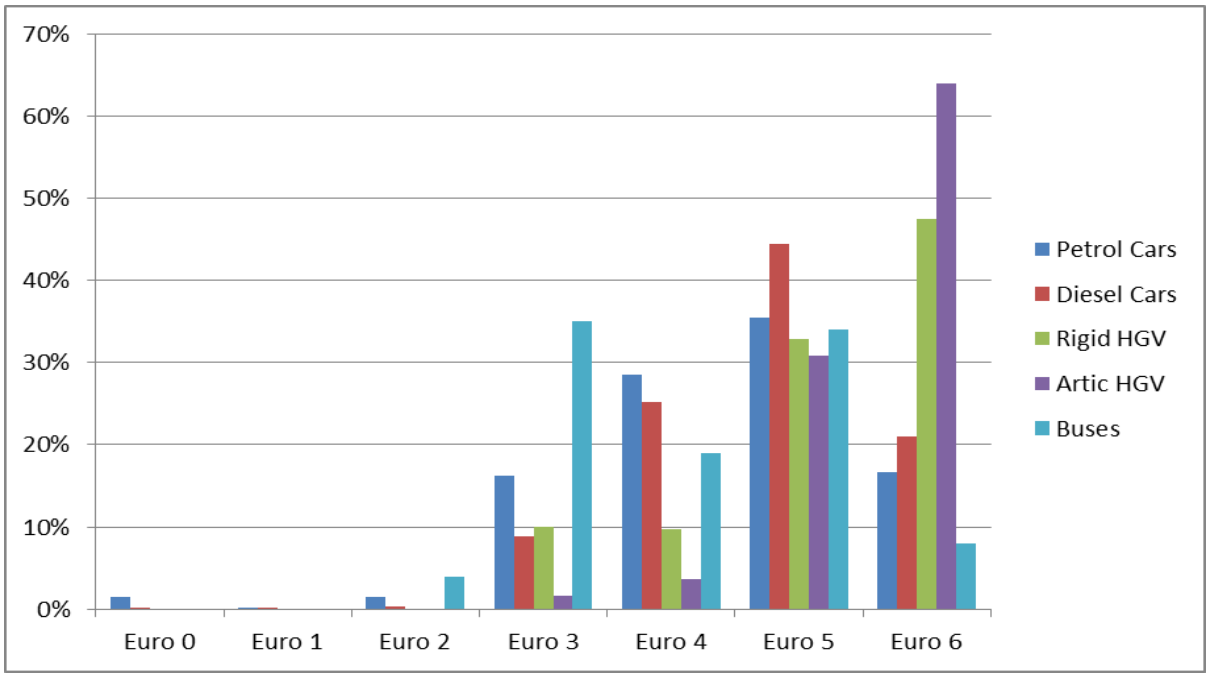


Figure 4.2 Euro fleet distribution for 2016



In terms of the buses the TRL data suggests that they are significantly older than the national average, by as much as 4 years. So for the bus fleet we have used the actual TRL data, from their ANPR counts, for the 2011 base year and the slightly adjusted NAEI 2012 profile to reflect how the bus fleet would be in 2016.

With regards the 2016 fleet profile an import point is the significant proportion of the fleet that is expected to be Euro 6/VI. This is especially true for the HGV's with 47% of rigids and 64% of artics being Euro VI. This has a big impact on the results for diesel vehicles as the Euro 6/VI emission factors for NOx are significantly lower than Euro 5/V vehicles. This is because

the Euro 5/V vehicles are now widely accepted to have not performed in real world and this has been reflected in the emission factors. The expectation is that Euro 6/VI will perform due to the new in-use compliance testing. However, their true performance still remains to be seen.

To help assess the impact of this we have also run a sensitivity analysis with a scenario where we assume all Euro 6/VI vehicles only perform the same as Euro 5/V. This scenario is labelled 2016 baseline Euro5 in the analysis.

4.1.2 Baseline emissions results

The baseline results are summarised here in relation to road links in the AQMA. The results show the percent reduction in emission from 2011 to 2016, and are shown in relation to the main 2016 baseline and the 2016 Euro 5 sensitivity scenario.

Table 4.2 Emission reductions 2011 to 2016 baseline scenarios

	Petrol Cars	Diesel Cars	Petrol LGV	Diesel LGV	Rigid HGV	Artic HGV	Bus/Coach	Total
Reduction 2011 base to 2016 base								
Nox	53.2%	-4.9%	50.3%	22.4%	41.3%	57.2%	22.5%	23.5%
PM25	13.7%	4.8%	29.1%	40.2%	35.8%	40.2%	30.1%	20.7%
PM10	13.6%	-7.3%	28.7%	29.4%	25.3%	29.1%	23.0%	12.5%
CO2	20.6%	-31.6%	28.7%	-7.9%	-5.4%	-5.6%	-6.3%	-0.4%
Reduction 2011 base to 2016 base Euro 5								
Nox	53.2%	-16.9%	50.3%	16.4%	3.1%	3.8%	11.3%	7.5%
PM25	13.7%	4.8%	29.1%	40.2%	35.8%	40.2%	29.1%	20.6%
PM10	13.6%	-7.3%	28.7%	29.4%	25.3%	29.1%	22.1%	12.4%
CO2	20.6%	-31.6%	28.7%	-7.9%	-5.4%	-5.6%	-6.3%	-0.4%

Figure 4.3 Emission reductions 2011 to 2016 baseline

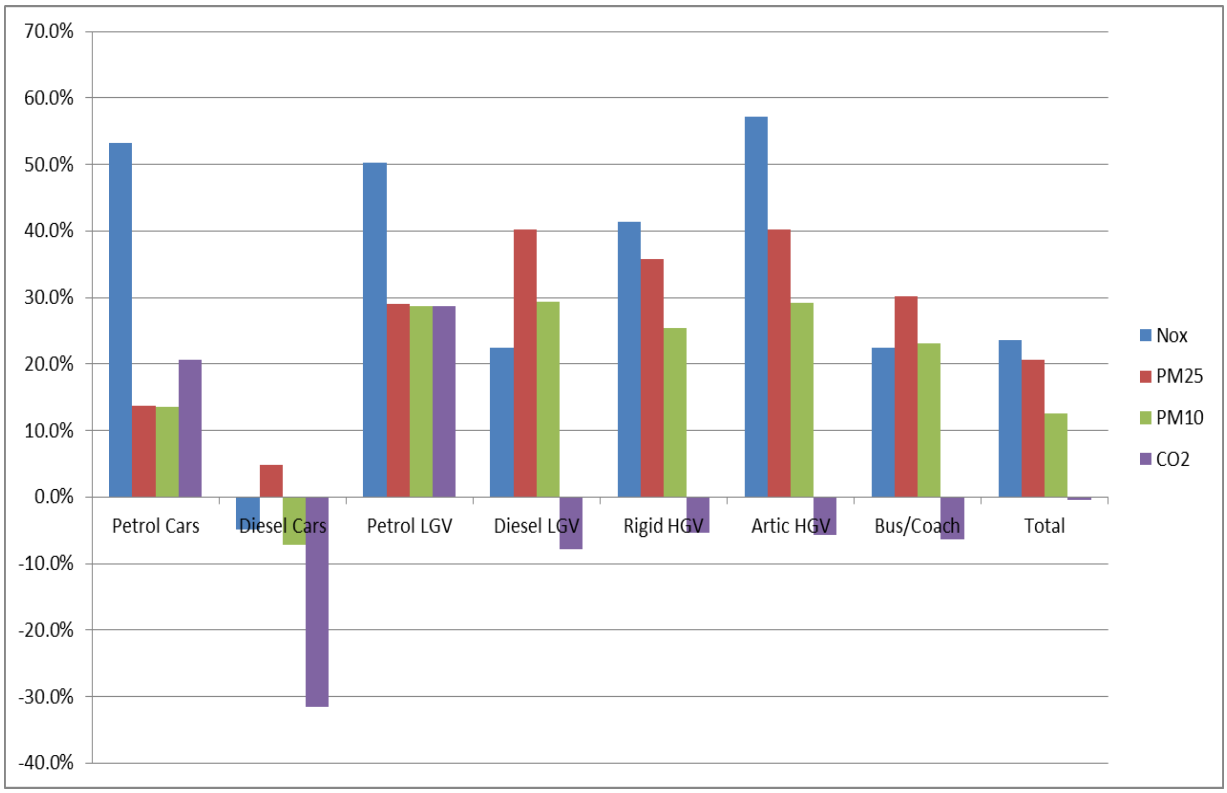
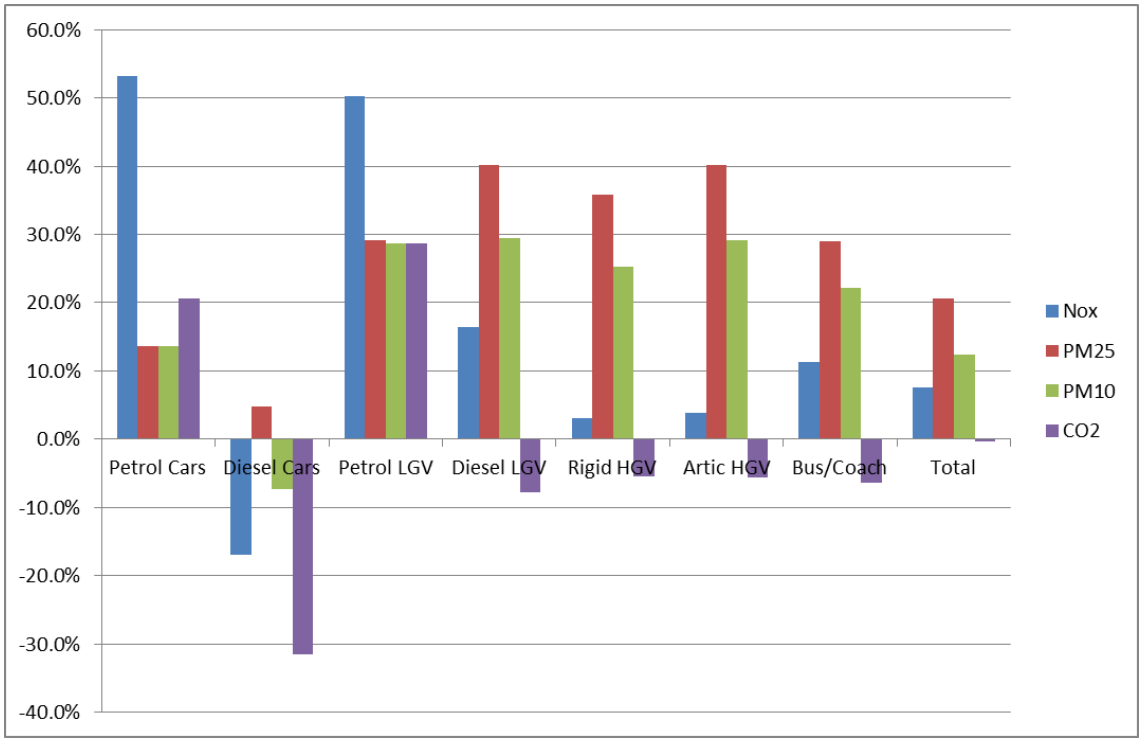


Figure 4.4 Emission reductions 2011 to 2016 baseline Euro 5 sensitivity scenario



The comparison with the main 2016 baseline shows a significant reduction in emissions in the AQMA from 2011 to 2016 with reduction of 23% in NOx, 20% in $PM_{2.5}$ and 12% in PM_{10}. There are significant reductions across all vehicle types except diesel cars. The reduction are particular significant for HGV's and petrol cars. The results for cars reflect a growth in the diesel car park, the particular poor performance of Euro 4 and 5 diesel cars and good performance of petrol cars. The results for HGV's reflect the better performance of Euro standards with heavy vehicles and the significant proportion of Euro VI vehicle sin the fleet.

The results when compared to the Euro 5 sensitivity scenario only show a difference with respect to NOx emissions. In this case the overall reduction compared to 2011 is only 7%, with minimal reduction in emissions from HGV's and a significant increase in emissions from diesel cars. These results show the impact of Euro 6/VI vehicles on the results. If their real world performance is as hoped then they will have significant benefits for air quality in cities.

In all cases there is no real improvement in CO_2 emissions.

For the remaining analysis the emission reductions are shown only in relation to the 2016 baseline. Therefore in assessing these results we need to bear in mind baseline data and the Euro distribution set out above.

4.2 Impact of the LES measures

The emissions assessment of the measures was carried out on a long list of measures developed in the consultation work with internal and external stakeholders. The results of this assessment were provided in a working paper[7] and used to short list measures for the cost benefit analysis. Following the cost benefit analysis the key measures to be taken forward in the LES where identified. The emissions analysis set out here is only for the sub set of the emissions included in the final LES.

In addition it was not possible to model all the LES measures such as the planning and procurement policies. The list of final LES measures for which an emissions analysis has

[7] 'Emissions screening assessment of the long list of measures – LestAir working paper', Ricardo-AEA, Feb 2014

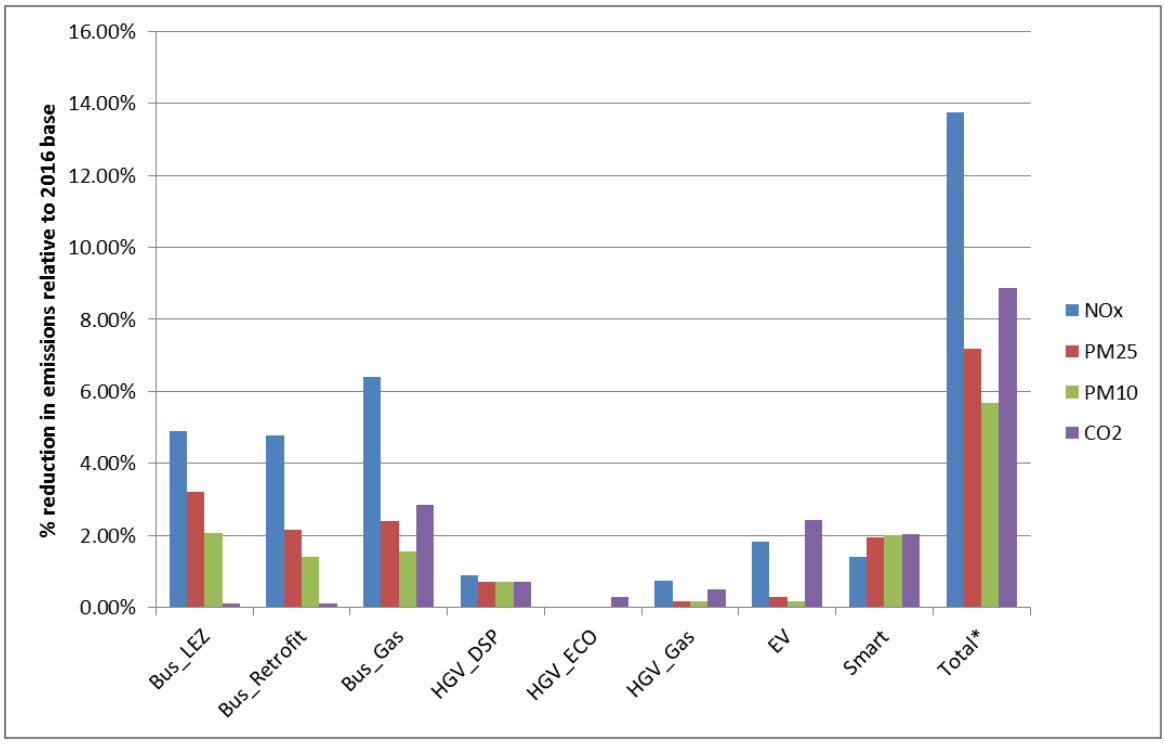
been carried out are shown in Table 4.3 along with the assumptions made in modelling the measures

Table 4.3 LES measures assessed

ID	Measure	Description
Bus emissions strategy		
Bus_LEZ	Bus only city centre LEZ	Euro 4 bus standard applying to central area within the inner ring road.
Bus_Retrofit	Partnership working to roll out SCRT retrofit	All buses not meeting the Euro 4 standard take part in an SCRT retrofit programme supported by the Council.
Bus_Gas	Gas bus scheme	Gas buses operating from main Arriva depot, using biogas. Apply to Melton road, Devonshire road and Uppingham road
Managing freight emissions		
HGV_DSP	Delivery and servicing plans	Assume target rollout to affect 20% of businesses in area. Estimate a 15% reduction in traffic for this group. Gives estimated freight traffic reduction by 3%.
HGV_Eco	Ecostars/eco driving	Roll out of driver training through Ecostars. Assume 50% of fleet work with scheme. Assume 6% improvement in fuel use for this group, gives 3% overall.
HGV_Gas	CNG HGV scheme	CNG scheme linked to bus depot. Assume 30% of HGV's are gas on the same corridors as used for gas bus scenario.
Low emission behaviours		
EV	EV strategy for cars and vans	EV strategy target set to 3% of all cars and vans. Main implementation based on charging infrastructure, but other complementary measures would also be needed
Smart	General smarter choices package	This can be considered as an overall target for trip reduction. Target of 3% overall to match bus measures in Bus3 and to present non-bus measures.

The results of the emissions assessment for each measure and each pollutant are shown in Figure 4.5. This shows the reduction in emission for each measure relative to the 2016 baseline forecast.

Figure 4.5 Emissions reduction for each of the LES measures relative to 2016 baseline

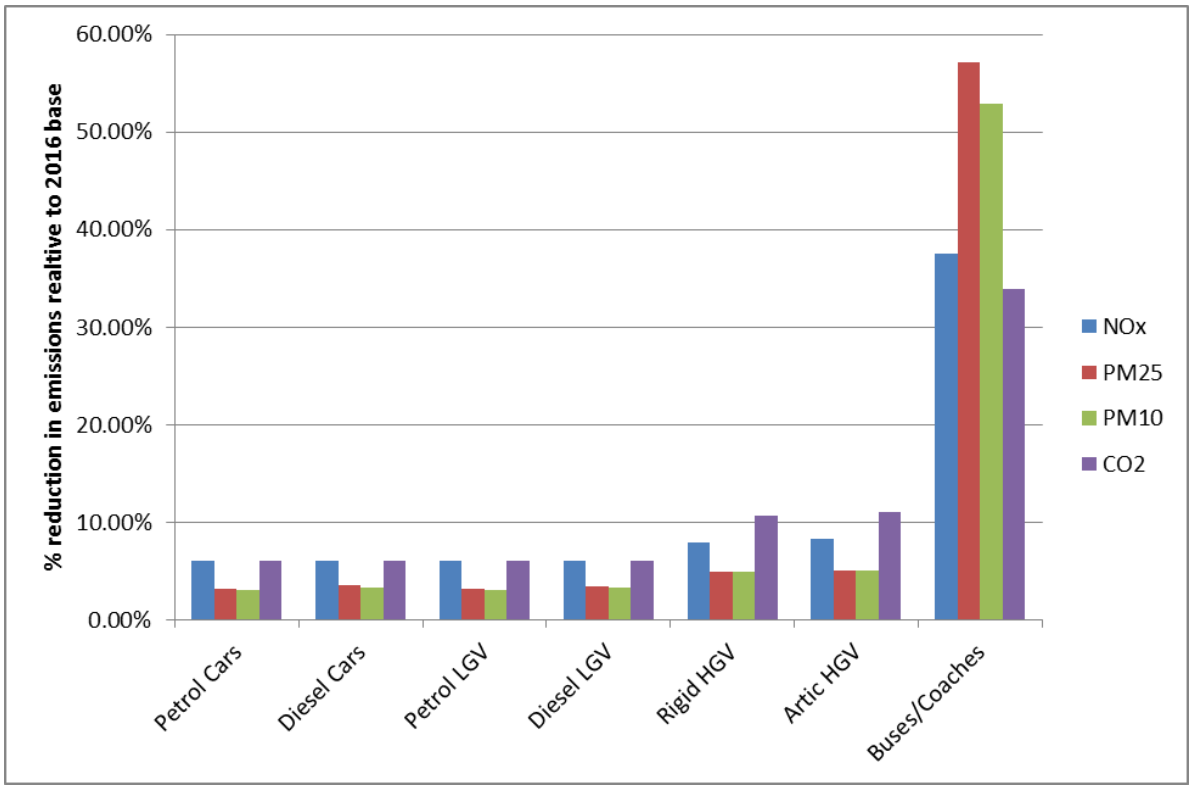


This shows clearly that within the AQMA the bus strategy measures are having the greatest impact on emissions. The measures targeted at cars then have the next biggest impact and the HGV measures have the smallest impact. The limited impact of the HGV measures reflects both their improvement in emissions from 2011 to 2016, and the smaller contribution they have to emissions in the AQMA itself.

An estimate of the total emissions impact of the LES measures has been made by simply adding the benefits of each measure. To prevent double counting the total does not include the benefits of the retrofit scheme as this would be included in the impact of the LEZ as the retrofit scheme is designed to aid compliance with the LEZ. Also the gas bus scheme would negate part of the benefit of the LEZ as they will already comply and so the benefit of the LEZ has been halved to reflect the number of gas buses. Summed in this way the package might be expected to reduce NOx emissions by 14% and PM and CO_2 emissions by 6%-8%.

Figure 4.6 shows the results for the full LES package broken down by vehicle type and pollutant within the AQMA. This shows clearly the significant impact on buses emissions of the bus measures within the LES. These measures could reduce NOx emissions by nearly 40%, PM emissions by over 50% and CO_2 emissions by about 30%. In terms of the CO_2 benefit it should be noted that this is almost entire related to the use of biomethane in the gas bus scheme. Without this the CO_2 would be only 3-4%.

Figure 4.6 Impact of the LES by vehicle type and pollutant



The impact of the measures on HGV's is the next biggest effect of the LES, though much less than the impact on buses. This shows HGV emissions reducing by some 8% for NOx, 5% for PM and 10% for CO_2. The impact on emission of passenger cars is the smallest effect at 3-6%. The effect on cars reflects the targets set for EV penetration and traffic reduction from smarter choices measures, both at 3%. Achieving higher targets for both these measures would clearly increase their impact.

4.3 Compliance with the NO_2 limit

The LestAir project has focused on the emissions impact of measures and a city wide emissions model has been built for this purpose. It has been built for a base year of 2011 and a forecast year of 2016. However, a simple compliance assessment has also been carried out using the DEFRA NOx to NO_2 tool to calculate NO_2 concentrations at 6 compliance points where monitoring data exists.

Initially the tools were used to calculate concentrations for the base 2011 year and then calibrated with the measured data. We then estimated the concentrations for 2016 based on the change in emissions at these 6 sites from 2011 to 2016. This gives the results shown in Table 4.4 below. These results predict that all the non-compliant sites will remain non-compliant in 2016 with the exception of Abbey Lane.

Table 4.4: NO_2 compliance assessment results

Monitoring site	NO2 concentrations, ug/m3		Required reduction in road emissions, %	Required reduction in emissions in AQMA, tonnes
	2011 base	2016 base		
AbbeyLane	45.0	39.17		
Glenhills Way	59.8	52.44	39.5%	106
Imperial Avenue	35.0	29.63		
London Road	27.1	22.79		
Melton Road	46.0	40.61	3.5%	9
St Matthews Way	55.0	48.49	37.9%	102
Uppingham Road	32.0	27.41		
Vaughan Way	73.0	67.72	67.8%	183

Using the 2016 concentration data and NO_2 to NOx conversion tool we can estimate the reduction required in transport NOx emissions to comply with the 40 μ/m^3 limit. This shows that Melton Road only needs a small reduction in NOx emission and would be brought into compliance by the LES measures. However, all the other points require some 40%-70% reduction in emissions to meet the limit value. This is well beyond the impact of the LES measures.

Therefore to meet compliance an emissions reduction equivalent to impact of the LES on buses, or even greater, would be needed across all vehicle types.

4.4 Conclusions

The core of the LES is the bus emission strategy with a central area bus LEZ, a supporting bus retrofit programme and a longer term programme of working to implement gas buses in the city. These measures will have a significant impact on emissions from the bus fleet reducing NOx emissions by around 40% and PM emissions by over 50%. The impact of the LES on other vehicle types is much less and over all will reduce emissions in the AQMA by 14% for NOx and 8% for PM and CO_2.

One of the stated success criteria for the LestAir project was the identification of measures that will achieve at least a 10% reduction in emissions for buses and HGVs. The proposed LES easily achieves this for the bus sector, but is less successful with the other sectors. Overall the 10% target is achieved for NOx, but not for the other emissions.

In addition an assessment of the emissions reduction needed for compliance with the NO_2 suggests that an overall reduction of 67% is needed. This is well above what the LES is achieving and even above what is being achieved just for buses.

Therefore the proposed LES will make a significant step in establishing a low emission bus fleet in the city. It is also providing the first steps in reducing emissions from freight and passenger cars. However, much more significant steps will be needed to tackle emissions from these sectors as we move to 2020 and beyond. The longer term aim of the LES is a much from stringent LEZ in the central area, with potentially a zero-emission freight criteria, and much more radical targets for traffic reduction and the adoption of low emission vehicles in the city.

5 The LES business case

A cost benefit analysis (CBA) was carried out of the short listed measures to refine the focus of what should be included in the LES[8]. The CBA was based on an estimation of the costs of implementation of each measure and the monetised emission saving benefits. The appraisal was carried out over a 10 year period to reflect the life time of the type measures being considered. The results for the final set of measures, where they were quantified, are set out in the sections below.

This CBA provides the basic economic appraisal of the LES measures. However, in addition a simple qualitative assessment of wider socio-economic impacts has been included to allow some consideration of the wider impact of the LES on the economy of the city.

5.1 Costs of the LES measures

The LES measures for which the CBA is reported here are those that were also covered in the emissions assessment above and are set out in Table 4.3. The cost estimate for each of these measures is set out below.

5.1.1 Bus LEZ

The bus LEZ assumes that buses are retrofitted to comply with the Euro IV standard. Costs for this are consistent with the Bus Retrofit measures the details of which are set out below. Based on the bus fleet data available to the study it was estimated that 50 buses would need to be retro-fitted to comply with the LEZ. This gives a vehicle compliance cost of £911,750 capital expenditure (capex) and £71,360 operational expenditure (opex). In addition a simple cost assumption of £150k has been made for the set up costs of the traffic regulation condition. This gives a total present value cost estimate over the 10 year period of £1.62m.

5.1.2 Bus retrofit measure

The Bus retrofit scenario is based on a voluntary agreement with bus operators to fit all buses not meeting a Euro IV standard with a combined selective catalytic reduction and particle trap (SCRT) technology. It is assumed that 80% of buses will comply with the voluntary agreement.

The Leicester Clean Bus Technology Fund Project (BREATHE - Bus REtrofit: ATtenuating Harmful Emissions) estimated the cost of purchasing and fitting SCRT technology as £18,235 per bus (14,235 for SCRT technology and £4,000 for the micro-hybrid eFan). Additional operating costs net of savings (including fuel) was estimated at £2,136 per bus over five years or £427 per annum (it was anticipated that SCRT fuel increase will be offset by the micro-hybrid eFan fuel saving). Estimated additional maintenance costs net of savings per bus over five years was £5,000 cost per bus over 5 years (or £1,000 per annum).

We scaled these costs up to the number of buses which we estimated to around 40, based on modelled bus mileage and compliance with the scheme. This gives a total capital cost of £729k and an annual operational cost of £57k. We have assumed that the operating and maintenance costs (opex) are annual for the full ten years of the appraisal period. Thus, the total estimated present value cost is £1.190m.

[8] 'Cost benefit analysis of short listed measures – LestAir working paper', May 2014, Ricardo-AEA

5.1.3 Gas bus costs

The gas bus scenario assumes that gas buses will operate from the Arriva depot in the North of the city in place of diesel buses. The marginal capital cost of the gas buses over the diesel buses has been estimated at £25,000 per bus based on data from the CENEX biomethane toolkit (2009)[9]. This is consistent with recent information on a Stagecoach green bus fund project which quotes total capital cost for 17 Scania gas buses as £2.5m[10].

The gas buses were assumed to be running on three key bus routes into the city operating from the Arriva depot. This amounted to some 45 buses which would switch to gas. This is based upon the total mileage of buses operating on these corridors (3,140,433 km) from our emissions modelling divided by an assumed average bus mileage (65,000km).

The service and maintenance costs have been assumed as the same as diesel buses based upon the CENEX biomethane tool kit (2009).

Running costs (in terms of fuel use) based on data from previous study work[11] were estimated at £0.27 per km for the diesel buses and £0.17 per km for CNG buses. Thus, there is a cost saving of £0.10 per km from switching from diesel to gas. We have scaled up this saving based upon the total mileage of buses and this equates to a total saving of £312,850 per annum or £6,257 per vehicle per annum. We have assumed these savings continue for the 10 year duration of the appraisal.

In addition to the buses a gas refuelling infrastructure is required. The scheme run by stagecoach in Sunderland noted above gave a cost of £1million for associated refuelling infrastructure. A study by Ricardo-AEA report for Transport for London (2013) gives a cost of about £0.5million for converting an existing site to CNG. For this project we have assumed a mid-point between these two of £0.75million as the initial capital investment. Running costs of the filling station as assumed to be covered in the fuel price.

Based on these assumptions the annual fuel savings will out weight the initial capital cost over a 10 year appraisal period. This gives a total estimated present value cost of -£1.095m which is a net cost saving.

5.1.4 Delivery and Servicing Plans (DSP)

The DSP scenario assumes a 20% uptake of a freight delivery and servicing plans by businesses in the AQMA, reducing freight traffic by 3%. The cost is the effort to promote and monitor these plans, which could be similar to the smarter choices cost. The cost of the smarter choices programme is stated as 4p/km saved in 2009 prices[12]. This price has been updated to 4.4p/km, the 2013 price, using CPI data (ONS, 2013).

The number of journeys saved would equate to around 1,785,227km, which is 3% of the total HGV and LGV freight km from this project's modelling data. Thus, we have estimated the one off cost to equate to around £79k.

It is assumed that investment would need to continue annually to maintain the impact of the scheme during the appraisal period. We have assumed the annual cost of maintaining the scheme would be around 30% of the upfront cost. This is £23.7k per annum for the 10 year appraisal period.

The total present value cost of the HGV5 scenario is estimated to be £0.293m.

5.1.5 Freight Eco-driving scheme

The Eco-driving scheme assumes a 50% uptake of such training by HGV drivers in the city. Targeting such a measure on the AQMA and based on HGV movements in the AQMA an

[9] 'Biomethane Toolkit: a guide to the production and use of biomethane as a road transport fuel', CENEX, 2009.
[10] Stagecoach press release 2014, http://www.stagecoachbus.com/Gas%20Bus%20Open%20Day.aspx
[11] 'Strategy to Reduce Heavy Duty Vehicle Emissions in Abu Dhabi – Technology Review', STS and MVA, 2011
[12] 'The Effects of the Smarter Choice Programmes in the Sustianble Travel Towns: Summary report', Sloman, L, et. al., 2010

estimated 300 drivers would be trained. The cost of training is assumed at £300 giving an initial capital cost of £90,000. It is then assume that top up training will be required at 30% of the initial number each year or some £27,000 per year.

The main aim of the eco-driving is to improve the fuel consumption of the vehicles and this was assumed to be around a 6% improvement. This fuel saving will generate cost savings for the operators. Based on average fuel consumption rates for HGV's this is estimated at £82,000 per year. Therefore the training will pay for itself in just over a year.

Based on this assumptions the net present value capex is £308,951 and the opex saving is £767,596, giving a net cost benefit of £458,645.

5.1.6 Gas HGV scheme

This scenario assumes that about 30% of the freight vehicles operating on the same three corridors as the gas buses would convert to gas. Based on HGV mileage on these routes this gave an estimated 50 vehicles transferring to gas. The marginal cost of these vehicles over new diesel vehicles is assumed to be £25,000 for rigid trucks and £35,000 for articulated trucks. Appling this to the number of trucks transferring gives a capital cost of £2.393 million. To service these trucks it is assumed that the gas filling station would need to double in size at a cost of £0.75 million.

Against the capital cost will be fuel cost savings. These have been estimated on average diesel and gas fuel consumption data for HGVs[13] and the same fuel costs as for the gas bus scenario. This gave an estimate annual fuel cost saving across the 50 vehicles of £81,131. These fuel cost savings have only be estimated for mileage in the AQMA itself.

Based on these assumptions the total NPV capex of the scheme is £2.158 million and the opex saving is £0.757 million, giving a total NPV cost of £1.4 million.

5.1.7 EV strategy

The EV scenario assumes a 3% uptake of electric vehicles by providing charging facilities across the city. This is a very simple assumption as it is difficult to directly relate infrastructure provision to EV uptake, however, the costing has been based on this assumption. Within this measure no account has been taken of the private cost and benefits in terms of the costs of purchasing EV's and the difference in running costs between petrol/diesel vehicles and the EV.

The Ricardo-AEA report for Transport for London (2013) 'Environments support to the development of a London Low Emission Vehicle Road Map' stated that the cost of standard (3-7kW) charging points at work places would be £1,800 (capex) plus £90 per annum (opex).

The costs have been scaled up based on 200 charge points that could service 10 vehicles each or 2,000 additional electric vehicles in total. The 2,000 EV's are the estimated number of vehicles required to meet the 3% uptake target. This is calculated from 3% of all car and van mileage at 11 million km and an annual average EV mileage of 6,000km.

The estimated total present value cost of the EV option is £0.492m.

5.1.8 Smarter choices programme

The general smarter choices package will provide information, incentives and support to encourage fewer journeys. The Smart scenario assumes that 3% fewer journeys are taken.

The cost of the Smart scenario is derived using a similar method to the HGV 5 costs. The cost of the smarter choices programme is stated as 4p/km saved in 2009 prices. This price has been updated to 4.4p/km, the 2013 price, using CPI data (ONS, 2013).

[13] 'Strategy to Reduce Heavy Duty Vehicle Emissions in Abu Dhabi – Technology Review', STS and MVA, 2011

The number of journeys saved would equate to around 10,258,695km, which is 3% of the total car km from this project's modelling data. Thus, we have estimated the one off cost to equate to around £455k.

Investment would need to continue annually in order to continue the impact of the scheme during the appraisal period. We have assumed the annual cost of maintaining a 3% car mileage reduction would be around 30% of the upfront cost. This is £136k per annum for the 10 year appraisal period.

The total present value cost of the SMART scenario is estimated to be £1.686m.

5.1.9 Summary measure costs

Table 5.1 provides a summary of the present value (PV) costs for each of the measures over the 10 year appraisal period. It shows both the capital (CAPEX) and operating (OPEX) costs. The most expensive measures are the bus LEZ and the smarter choices programme. The LEZ has both high capital and operating costs, whereas the smarter choices programme has a modest setup cost but this investment is needed on an ongoing basis. The lowest cost measures are the gas bus and the HGV Eco-driving measures which actually generate a net present benefit through fuel cost savings.

Table 5.1 Net Present Value costs for each of the LES measures

Scenario	Total PV CAPEX (£millions)	Total PV OPEX (£millions)	Total PV Cost (£millions)	Rank (most costly)
Bus_LEZ	£0.96	£0.67	£1.62	2
Bus_Retrofit	£0.66	£0.53	£1.19	4
Bus_Gas	£1.83	-£2.92	-£1.10	8
HGV_DSP	£0.07	£0.22	£0.29	6
HGV_Eco	£0.31	-£0.77	-£0.46	7
HGV_Gas	£2.16	-£0.76	£1.40	3
EV	£0.32	£0.17	£0.49	5
Smart	£0.41	£1.28	£1.69	1

5.2 Damage and abatement costs savings

Air pollution impacts on human health and the natural and built environment. In particular, there are chronic mortality effects (loss of life years due to air pollution), morbidity effects (increase in the number of hospital admissions for respiratory or cardiovascular illness), damage to buildings (from particulates) and impacts on materials. The Interdepartmental Group on Costs and Benefits (IGCB, 2008) provides guidance on monetising these damage costs for use in appraisal.

The damage cost approach has been used to calculate the damage costs savings from proposed LES measures in order to understand the magnitude of the benefits of changes in emissions. Where the magnitude is estimated to be greater than £50m, a full impact pathway assessment would be required, but this is not the case for this project.

In addition the 'abatement cost guidance for valuing changes in air quality' (Defra, 2013) states that where air quality is in breach of a regulation and a full impact pathway assessment is not necessary, the use of the abatement cost approach is required. So in the case of Leicester AQMA which breaches the NO_2 we also need to consider the abatement cost approach.

5.2.1 Damage cost savings

The IGCB guidance has been implemented in the form of a Damage Cost Calculator (IGCB, 2008) which has been used for this study. The calculator requires information on appraisal timeframe and emissions to be inputted. For this assessment, 2016 was inputted as the base year by which emissions were compared to reflect our modelling scenario baseline. Benefits were calculated over a 10 year period to reflect an interest in a medium to long term effects of the measures.

Our emissions modelling provided information on the estimated change in NOx, PM and CO_2 emissions compared to a 2016 forecasted baseline within the AQMA area which is the focus of the analysis. These data were entered into the Damage Cost Calculator.

The calculator then multiplied our emissions data by the adapted annual pulse damage costs, as set out within Table 2 of the Damage Cost Calculator Guidance (IGCB, 2008). The annual pulse damage costs were adapted by the calculator by inflating 2008 price data to 2016 prices assuming an inflation rate of 2.5% and uplifting the damage cost values by 2% per annum to reflect increases in willingness to pay. A damage cost schedule over 10 years was then discounted at a rate of 3.5% per year as set out in the Treasury's Green Book (2003) to estimate the 2016-2025 present value damage avoidance costs.

Table 5.1 presents the results of the analysis. It shows the damage costs saved by each measure compared to the 2016 baseline. Separate damage cost savings are shown relating to the changes in emissions of oxides of nitrogen, particulate matter and carbon dioxide. The table illustrates the total damage cost saved for each measure and the estimated range[14]. The low range reflects a potential 40 year time lag between a change in particulates and impact on health, while the high range reflects a 0 year time lag.[15]

Table 5.2 Present Value damage costs savings

Scenario	PV damage costs saved 2016-2025 (£millions)						
	NO_x	PM	CO_2	Total	Low range	High range	Rank (most beneficial)
Bus_LEZ	0.11	0.28	0.03	0.42	0.33	0.48	4
Bus_Retrofit	0.11	0.19	0.03	0.33	0.26	0.37	5
Bus_Gas	0.15	0.21	0.74	1.10	0.96	1.30	1
HGV_DSP	0.02	0.10	0.18	0.30	0.26	0.35	6
HGV_Eco	0.00	0.00	0.08	0.08	0.07	0.10	8
HGV_Gas	0.02	0.02	0.13	0.17	0.15	0.20	7
EV	0.04	0.03	0.63	0.70	0.63	0.84	3
Smart	0.03	0.27	0.53	0.83	0.72	0.98	2

The measures with the highest damage cost savings are those that generate both air pollution (NOx and PM) and CO_2 benefits and include the gas bus measures, the smarter choices programme and the EV scheme. The HGV measures only generate small emission benefits compared to the other measures and so had the lowest damage cost savings. The Bus LEZ measures are in between as although they generate good air pollution benefits they produce little in the way of CO_2 benefits.

[14] The calculator also provides high and low sensitivity ranges, but since these are the same as the low and high ranges, we have not provided them here.

[15] The Damage Cost Calculator Guidance, (IGCB, 2008), states that "although the evidence is limited, the recent expert judgement from COMEAP tends towards a greater proportion of the effect occurring in the years soon after a pollution reduction rather than later. This suggests that more weight should be given to the high end (0-year lag) of the damage costs range."

5.2.2 Abatement costs savings

The abatement cost approach reflects the cost of mitigation to comply with the regulation. .In essence the approach aims to determine the abatement costs that would be necessary to comply with the limit which are avoided by the proposed measures in Leicester. This is in contrast to the damage cost approach which aims to quantify the damage costs avoided by the emissions savings. The abatement costs are to be applied only to the emissions which exceed legally binding obligations, so in this case only applies to NOx emissions that contribute to the NO_2 breaches. In addition it only applies to the emissions savings that would be needed to reach compliance and not emission savings that would go beyond compliance.

The compliance assessment shown in section 4.3 indicated that up to a 67% reduction in NOx emissions would be needed to meeting the NO_2 across the whole AQMA. The LES package will not produce the level of reduction and so the abatement costs can be applied to all of the NOx emission savings. Therefore in this case the NOx savings can be value using the abatement costs rather than the damage costs.

The unit abatement cost is provided in terms of the marginal cost of emissions, usually measured in £/tonne. Defra's guidance recommends that the appraiser should decide which value is most appropriate for a particular case. If there is no clear rationale to use a particular measure the recommended default value is £29,150 per tonne. For simplicity and clarity we have opted to use the default value for all scenarios, so that they are all assessed in the same way.

Table 5.3 below gives the abatement cost savings results for NOx for each of the measures along with the damage cost savings for PM and CO_2 to give the total emission cost benefits. These results show clearly that the unit abatement costs are significantly higher than the unit damage costs. This makes the NOx emissions savings the dominate cost saving for the measures. This analysis indicates that the bus measures provided the greatest overall emission cost benefits related mainly to the NOx savings. The HGV measures have the lowest overall emissions cost saving as they have the lowest NOx emissions benefit.

Table 5.3 Abatement and damage cost savings for the LES measures

Scenario	PV emission costs savings 2016 - 2025 (£ million)				
	Abatement costs	Damage costs		Total	Rank
	NO_x	PM	CO_2		
Bus_LEZ	£3.18	£0.28	£0.03	£3.49	2
Bus_Retrofit	£3.11	£0.19	£0.03	£3.32	3
Bus_Gas	£4.17	£0.21	£0.74	£5.12	1
HGV_DSP	£0.58	£0.10	£0.18	£0.86	6
HGV_Eco	£0.00	£0.00	£0.08	£0.08	8
HGV_Gas	£0.49	£0.02	£0.13	£0.64	7
EV	£1.19	£0.03	£0.63	£1.85	4
Smart	£0.91	£0.27	£0.53	£1.70	5

5.3 Cost benefit results

The full cost benefit results are derived by aggregating the present value cost of each scenario with the benefits. For NOx we have used the abatement cost approach to valuing emission savings and for PM and CO_2 we have used the damage cost approach.

The Net Present Value results (net present benefits minus net present costs) and the results for the benefit cost ratio test (net present benefits divided by net present costs) are presented in the table 5.4 below. We understand that for air quality, the preferred option is made on the

basis of benefit cost ratio (BCR). This is the measure which will reap more benefits per pound spent. In terms of the BCR any OPEX savings have been added to the emission cost benefits to get the full benefit in relation to costs.

Table 5.4 Cost benefit analysis results

Scenario	Total PV benefits 2016-2025 (£millions)	Total PV cost 2016-2025 (£millions)	NPV (£millions)	Rank (NPV)	Benefit Cost Ratio	Rank (BCR)
Bus_LEZ	£3.49	£1.62	£1.87	3	2.15	6
Bus_Retrofit	£3.32	£1.19	£2.13	2	2.79	4
Bus_Gas	£8.04	£1.83	£6.21	1	4.40	1
HGV_DSP	£0.86	£0.29	£0.57	5	2.93	3
HGV_Eco	£0.85	£0.31	£0.54	6	2.74	5
HGV_Gas	£0.64	£1.40	-£0.76	8	0.46	8
EV	£1.85	£0.49	£1.36	4	3.76	2
Smart	£1.70	£1.69	£0.02	7	1.01	7
Total*	£15.68	£7.63	£8.05		2.05	

All of the measures in the LES have a positive NPV, showing that the benefits out weight the costs, except for the gas HGV measure. In terms of the gas HGV scheme we have only considered the fuel savings in the AQMA as this is where the boundary of our assessment lies, but the savings would also accumulate for mileage done outside this area and so would improve the overall NPV.

Overall the bus elements of the LES package have the greatest NPV related to the greatest NOx savings. The HGV measures, along with the smarter choices measures, have the lowest NPV. However, in terms of BCR the picture is slightly different. The gas bus and EV elements have the best BCR, with the remaining bus and HGV elements having similar BCRs.

As well the assessment of each measure we have combined the measures to give a CBA for the whole LES package. In order to prevent double counting where measures overlap the total CBA results are estimated by summing the results for each measures but with the following adjustments:

- The bus retrofit results are not included as they overlap with the bus LEZ measure in terms of compliance costs and benefits;
- The full LEZ costs are included but only half the benefits, as the gas bus scheme would account for about half the compliant vehicles if it were implemented.

Calculated in this way the LES package is estimated to have a NPV of around £8 million and a BCR of 2. The BCR of 2 meets one of the success criteria for the for the package to measures to be developed by the LestAir project.

5.4 Wider socio-economic impacts

The cost benefit analysis presented above is based on the IGCB/DEFRA damage and abatement costs estimates and the scheme costs estimates. The damage costs are based on the best available information for the most robust evidence available. It does not include a range of other costs including:

- ‘Effects on ecosystems (through acidification, eutrophication, etc);
- Impacts of trans-boundary pollution;
- Effects on cultural or historic buildings from air pollution;

- Potential additional morbidity from acute exposure to PM;
- Potential mortality effects in children from acute exposure to PM;
- Potential morbidity effects from chronic (long-term) exposure to PM or
- other pollutants;
- Effects of exposure to ozone, including both health impacts and effects on
- materials;
- Change in visibility (visual range);
- Macroeconomic effects of reduced crop yield and damage to building
- materials; and
- Non-ozone effects on agriculture'

Therefore the damage cost benefits will be a conservative estimate and will potentially under estimate the benefits. In addition no account has been taken of potential wider socio-economic benefits of the measures. An indication of which measures may have wider benefits is shown in table 5.5 below and considers:

- Congestion;
- Noise;
- Social inclusion – covering improved access to jobs and services, and improve equity of the transport system
- Economic competiveness – including improved competitive and business opportunities.

Table 5.5 Wider socio-economic benefits of the LES measures

Scenario	Congestion	Safety	Noise	Social inclusion	Economic competiveness
Bus_LEZ					✓ *Retrofit business opportunities*
Bus_Retrofit					✓ *Retrofit business opportunities*
Bus_Gas			✓ *Quieter buses*		✓ *Gas vehicle supply and support*
HGV_DSP	✓ *Freight traffic reduction*				✓ *Improved efficiency of supply chains*
HGV_Eco		✓ *Includes safer driving*			✓ *Training provision, non-fuel savings*
HGV_Gas			✓ *Quieter HGVs*		✓ *Gas vehicle supply and support*
EV			✓ *Quieter vehicles*		✓ *EV supply and support*
Smart	✓ *Traffic reduction*			✓ *Better, equal access; health benefits*	

6 Mobilisation plan

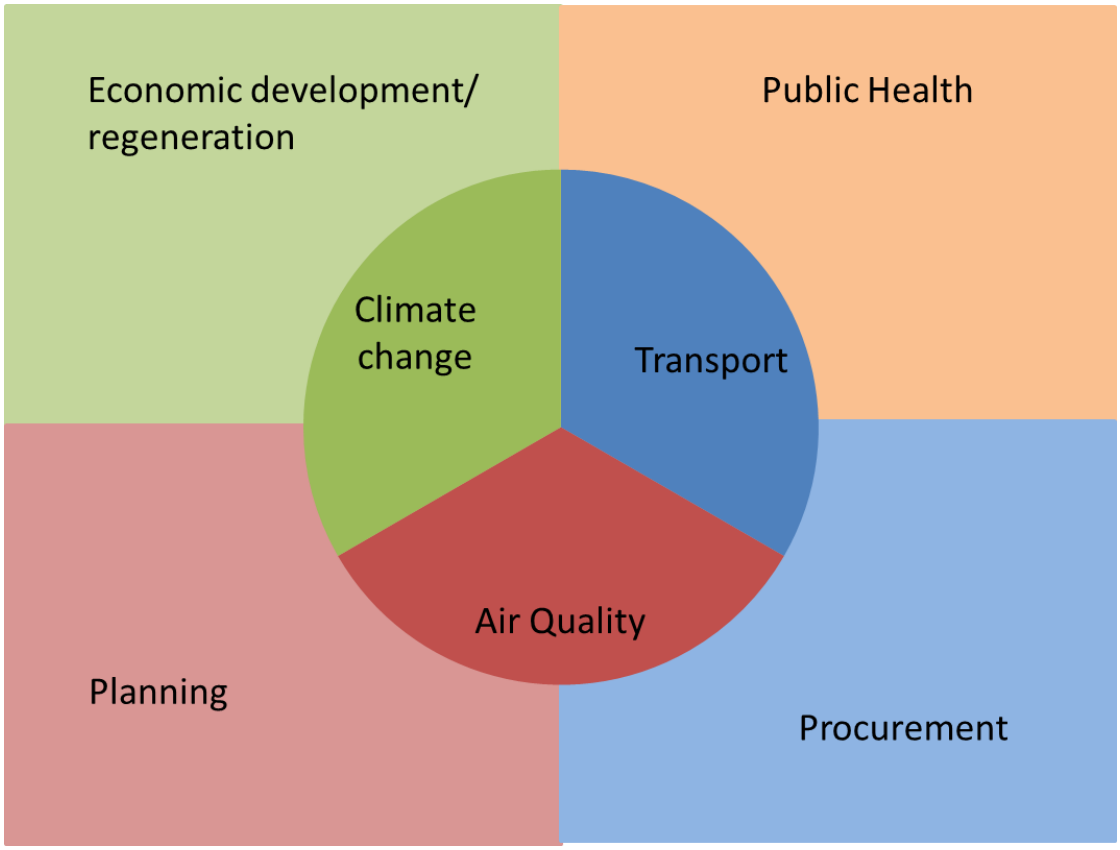
In taking the Low Emission Strategy forward the mobilisation plan considers how the LES sits in relation to other policies and programmes in the Council, engagement with key stakeholders and potential funding routes.

6.1 Policy integration

The LES measures site across a number of policy areas in the Council and need to be integrated into these areas in terms of delivery as illustrated in Figure 6.1. At its core the LES is seeking to reduce transport emissions in order to meet air quality and climate change goals. Therefore a key delivery area will be transport programmes and policies, supporting air quality and climate change objectives.

However, this all sites in a wider policy context. Firstly the principal drivers for reducing traffic emissions are improving public health and providing a high quality environment for an economically viable and thriving city. Secondly the key Council policy levels of planning and procurement complement and support emissions reduction activities across the city.

Figure 6.1 Integrating the LES into Council Policy



6.1.1 Air quality and climate change

Local air quality management and climate change policy are the key formal drivers for the LES. Transport is the major source of air pollution emissions in the city and a significant source of carbon emissions. The LES itself pulls together the key transport emissions reduction measures in relation to both these policy areas.

The LES will be a core element of the Council's formal Air Quality Action Plan, in relation to its duties under LAQM. It will also provide a framework for transport emission reduction in relation to climate change action plan.

However, the key delivery of measures within the LES will be carried out in other policy and programme areas such as transport, planning and procurement. Therefore the LES objectives and measures need to be integrated into these delivery areas.

6.1.2 Transport

Transport will be the key delivery area for much of the LES. The primary delivery strategy is the Local Transport Plan (LTP). Within Leicester the LTP already includes an air quality and climate change theme. In addition the AQAP forms part of the LTP. So the integration is already in place and can be built on to ensure successful delivery of the LES.

The current LTP has a strong focus on demand management to reduce traffic levels in the city. This work is being complemented by additional Local Sustainable Transport Funding (LSTF) funding. This provides a clear home for the LES measures on ***Smarter Choices*** and ***freight delivery and servicing plans (DSPs)***. The important linkage here is to ensure that the air quality, emissions and public health messages are built into these activities. This can also include wider low emission behaviours such as promoting eco-driving and purchasing low emission vehicles.

The ***bus emissions strategy*** is a key element of the LES. Developing these elements of the LES will require co-operation and support of the bus companies. Again the transport team will take a lead on developing bus measures. The work of the Bus Quality Partnership (BQP) then provides a natural home for the wider development and consultation on these measures.

Measures to ***manage freight traffic*** will also be led by the transport team. Traditionally work in this area has been less developed as the Council has fewer powers at its disposal to influence freight activity. However, the Freight Quality Partnership can be used to develop and take forward ideas around an Ecostars type scheme, initiatives on gas vehicles and ideas in relation to delivery and servicing plans.

6.1.3 Public Health

With the inclusion of air quality in the Public Health Outcomes Framework and the integration of public health into local authorities there is a clear driver for aligning the LES clearly with the City's Health and Wellbeing strategy. Within this strategy the most relevant priorities are Priority 2 'Reduce premature mortality' in this case related to air pollution, and Priority 5 on the wider determinants of poor health and health inequality in terms of where the burdens of poor air quality lie. To support this the health impact of the LES needs to be further developed, building on the evidence from the LestAir project, and feeding into the strategic needs assessment.

In terms of action the main linkage is the integration of information and communication campaigns around public health, air quality and active travel in relation to the ***smarter choices measures***. Working with public health provides additional added value and wider communication routes than may be available to either air quality or transport professionals. Similarly the LES provides an evidence based framework as a focus for air quality action in relation to public health.

6.1.4 Economic development and regeneration

The main geographical focus of the LES is Leicester's Air Quality Management Area (AQMA) covering the key routes into the centre and the central area itself. This is consistent with the focus of regeneration activities in the City in relation to the 'Connecting Leicester' strategy. This seeks to improve access and the quality of the environment in these areas to promote

economic development. Thus the LES and 'Connecting Leicester' are complementary and need to work together to ensure they are fully aligned.

The LES itself also needs to ensure that it is supporting wider economic development as well as improving the quality of the environment. Its potential wider economic benefits were identified in the business plan in section 5 and include:

- Improved business efficiency through measures to manage freight activity such as DSPs and eco-starts;
- Business opportunities in the supply and support of new technologies such as electric and gas vehicles.

To ensure maximum economic potential is gained it needs support from and engagement with the Local Enterprise Partnership (LEP) and recognition within the Strategic Economic Plan.

6.1.5 Planning and procurement

Planning and procurement provide key policy levers to support low emission activities in relation to improving air quality and reducing carbon emissions. Integration of low emission transport consideration into planning and procurement is supported by national policy and legislation and provides a key plank of the LES as set out in section 3.4

6.1.6 The LES as a policy document

The proposed set of measures form an overall package to help reduce emissions from transport in the city and although the delivery will take place across a number of policy areas an overall strategy is needed to aid co-ordination and delivery. This can be probably best be done in one of two ways:

1. A formal *Low Emission Strategy* that is published and promoted by the City clearly showing what the City's plans are in terms of reducing transport emissions. A formal strategy can provide more profile for the work, help with external stakeholders, support wider communication and provide a hook for developing funding proposals. This is the approach taken by York, Bradford and Oxford.

2. *Integration into the Air Quality Action Plan* as the transport component of the plan, alongside non-transport measures. This will equally provide a formal status for the LES measures as it is a statutory document, which can be particular important in relation to planning. In the case of Leicester it is also part of the LTP and so will automatically put the LES measures in the LTP. However, it lacks the identity of a separate formal strategy.

6.2 Stakeholders engagement and mobilisation

In order to take the LES forward the support and engagement of a number of stakeholders will be required. As discussed above the LES sits across a range of council activities and as such these departments will need to be fully engaged, with an integrated purpose. Also to ensure the success of the measures it is important to engage with external stakeholders to get their buy in and support.

A summary of the key stakeholders that need to be engaged, the suggested methods of engagement and key outcomes are shown in Table 6.1 below.

Table 6.1 LES Stakeholder engagement

Stakeholder	Engagement method	Outcome
Internal		
Air quality	Lead team for LES and AQAP	Align LES and AQAP
Transport team	Internal meetings/ Project delivery teams	Integration of LES measures into LTP and delivery programmes
Planning	Internal meetings	Integration of Low Emission consideration into planning documents and guidance
Procurement	Internal meetings	Integration of Low Emission consideration into procurement documents and guidance
Public Health	Internal meetings/ Public health and AQ working group	Development of AQ and public health policy, supporting LES
Climate change	Internal meetings	Align climate change action plan and LES
Economic development and regeneration	Internal meetings LEP meetings	Recognition of the LES in 'Connecting Leicester' and the Local Economic Strategy
External		
Bus companies	BQP LCC public transport team	General acceptance of LEZ Identification of partners for retrofit and gas bus schemes.
Freight companies	FQP LCC procurement	Engagement with Ecostars scheme Engagement with DSP activity Identify potential partners for gas vehicle project. Influence through procurement
Local Businesses	LEP Chamber of Commerce LCC Procurement	Engagement with the DSP activity Support for LEZ Support through Local Economic Strategy for LES measures and LSTF funding Influence through procurement
Local residents	Smarter choices programme LEV/EV promotion events Public health campaigns	Involvement in behaviour change activities Support for wider emission reduction measures.

At the Lestair workshop with internal stakeholders on the 4th June there was strong support for the creation of a Low Emission Strategy Project Board to co-ordinate activity. Other low emission strategy projects, including those in the West Midlands and West Yorkshire, have set up project boards and found them an important element of project management, governance and delivery, while co-ordinating activity across several departments. If Leicester chooses to constitute a project board it is recommended that all key disciplines are represented by senior managers and the board is chaired at Director or Member level, ensuring a high level commitment for LES activity. Suggested LES Project Board members should represent the following disciplines:

- Air Quality Management
- Transport Planning
- Public Health
- Carbon Management
- Planning & Development Control
- Procurement
- Economic Development
- Fleet Management

Consideration could also be given to a wider forum including external stakeholders in the form of a city wide low emission partnership.

6.3 Funding sources

There are several current and emerging funding sources that could assist Leicester CC with delivery of measures developed in the LestAir project and set out as the proposed core measures for a LES. These and other Government incentives for low emission vehicles are discussed. The main funding sources are summarised below and in table 6.2.

6.3.1 Low Emission Vehicle Funding from DfT and OLEV

Clean Vehicle Technology Fund (CVTF, DfT)

The CVTF was announced on the 2nd June 2014 and provides £5m of funding to modify and upgrade key vehicle types that significantly contribute to elevated concentrations of NO_2. This can include buses, taxis, lorries and local authority vehicles, such as RCVs, vans and welfare buses, however, there needs to be an evidence base for vehicle types selected for funding. The funding is available for Euro 3/III, 4/IV and 5/V vehicles, which must continue in operation for at least 5 years once modified. While the retrofit/modification technologies that can be used are not specified, it is anticipated that selective catalytic reduction (SCR and SCRT – with particle trap), hybridisation and gas conversions are likely to be the favoured options.

Bids of up to £500,000 are permitted. Last year Leicester CC was awarded £760,000 to upgrade 32 Euro 3/III Arriva double deckers on the Melton and Loughborough Road routes. The LestAir study and previous bus analysis suggests that targeting buses under this programme will have benefits for air quality in Leicester.

Applications for CVTF funding should be submitted by 25th July 2014. All applications are required to specify that any funding of commercial operators should be within State Aid rules

Existing schemes for EV Re-charging/Plug-in Car/Van/Hybrid Van Grant (OLEV)

OLEV currently provides funding for charging infrastructure for electric vehicles and for the purchase of electric cars and electric and hybrid vans, in support of its strategy 'Driving the future today: a strategy for ultra low emission vehicles in the UK' (2013)

Funding of some £37m has been made available for local authorities, hospitals and stations to assist with the installation of charging points for electric vehicles. Bids for this funding stream closed on the 30th October 2013

A grant of £5,000 is still available towards the purchase of an electric car and £8,000 towards the cost of an electric van. A subsidy of £3,600 is also available towards the purchase of an Ashwoods Hybrid Transit van

Low Emission Vehicle Programme 2015-20

OLEV has announced £500m of new funding for low emission vehicles from 2015 – 2020. The programme details are yet to be worked out, including some State Aid issues, however, it is anticipated that more details and applications will be announced in the Autumn. OLEV is aware that Leicester may be interested in some of the funding streams and will invite representatives to a workshop to help shape programme parameters. The funding will cover:

- £200m will be available to continue support for the purchase of electric and plug-in electric cars with a grant of upto £5,000.
- £30m will be made available to support electric vans up to 3.5 tonnes and may be made available to other ultra low emission vehicles (ULEV) such as quadricycles and 2 –wheelers
- £32m will be made available for the deployment of rapid electric vehicle charging infrastructure
- £20m will be made available to local authorities to support the uptake of ULEV taxis
- £30m will be made available for the purchase of low emission buses. This programme will replace the Green Bus Fund. Further funding may be made available through the Green Investment Bank
- £4m will be made available for gas infrastructure to support the switch to gas HGVs
- Funding for hydrogen fuelling infrastructure will be announced
- £35m will be made available for local authorities and communities to apply for ***'Low Emission City'*** status, aimed at making a step change in the deployment of low and ultra low emission vehicles in 2 to 4 cities. While details have yet to be finalised, it is anticipated that winning bids will include innovative solutions to incentivising the uptake of LEV/ULEV.
- Leicester is well placed to bid for all of these funding streams

The Low Emissions City funding would seem to be a key source to develop the work of the LestAir project and the proposed LES measures. The LestAir study would give a strong evidence base for developing a coherent bid to this programme.

6.3.2 Transport Funding

Local Transport Plans – existing capital & revenue streams

While spending programmes for both the 2nd and 3rd Local Transport Plans may have been decided, there may be possibilities for the consideration of funding of measures identified for the LES. LTP2 identified air quality as a key target indicator and LTP3 identifies carbon emissions as a key indicator. The current LTP already includes resource for 'Smarter Choices' type measures and this could be built on with wider air quality and public health messages.

Local Sustainable Transport Fund (LSTF)

There is another round of LSTF funding which may be appropriate for funding further work 'Smarter Choice' measures and freight DSP's as noted in the proposed LES. Funding is now tied in with measures that are also supported through regional growth funds linked to Local Enterprise Partnerships (LEP). Discussions with the LEP are required to identify which measures can be supported and appropriate projects defined.

Better Bus Area Funding / BSOG Incentives

Leicester has already secured funding under this programme and is looking at the introduction of several measures to improve passenger take-up of bus travel through initiatives such as smarter ticketing.

Further Better Bus Area funding would require applying for Better Bus Area status. This would all funding from the Bus Service Operators Grant (BSOG) to be used locally for the improvement of bus services. Applying for this status needs to be done in agreement with bus operators in the area and relate to an agreed set of improvement projects.

In addition a BSOG subsidy of 6p per km is available where low carbon emission buses are deployed. The definition of a low carbon emission bus is where CO2 emissions are 30% lower than a Euro 3/III bus. This can be achieved through the use of various technologies such as hybrids or the use of biomethane as a fuel.

Enforcement Revenues

Consideration should be given to the use of bus lane and parking enforcement revenues to support and incentivise the take up of low emission vehicles within the parameters allowed.

6.3.3 Planning and Development Funding

Section 106 & Community Infrastructure Levy (CIL)

It isn't clear yet whether Leicester CC will make a charge for CIL on new developments as this will depend on scheme viability. The CIL Regulations allow for funding secured to be spent on infrastructure for transport such as gas refuelling and EV charging. There is a great deal of uncertainty as to the amount of funding that may be secured through CIL and whether low emission vehicle infrastructure would be prioritised ahead of other funding issues such as schools and roads.

Section 106 Agreements, under the Town and Country Planning Act, allow for contributions to made for measures that may make a scheme acceptable in planning terms. The National Planning Practice Guidance states that Section 106 contributions may be used to off-set the pollution impact of a scheme through the funding of measures contained in an Air Quality Action Plan or Low Emission Strategy. As part of the LestAir project, draft technical planning guidance on the consideration of road transport emissions has been produced and can be found in the appendices. The draft guidance provides a methodology for calculating the damage costs associated with major schemes and provides a suite of measures that could be funded to offset the impact of the scheme.

Local Enterprise Partnership (LEP) / Local Growth Funds related to Strategic Economic Plan

Local Growth Funds are available through the LEP and should be related to the Strategic Economic Plan (SEP). The Leicester SEP identifies areas, currently suffering environmental problems, including poor air quality, and supports initiatives for environmental improvement. The Leicester SEP was cited as supporting evidence for the successful CBTF bid 2013/14.

Public Private Partnerships

Many commercial organisations, as with the public sector, are implementing measures to reduce vehicle emissions, often in association with CSR agendas. Leicester CC should identify key organisations in Leicester that may be interested in deployment low emission vehicle infrastructure, such as gas refuelling, in partnership with the Council, allowing 3rd party usage.

Public Health Funding

Leicester CC should work closely with Public Health to identify possible funding streams that could be used to raise awareness of harmful vehicle emissions and the benefits of improving emissions and reducing public exposure.

European Funding

There are several EU funding programmes that may be appropriate for funding measures identified in the Lestair Report. Leicester CC & University have a strong track record in securing European funding.

- *Horizon 2020*

This is the European Commission's main funding framework for RD&D projects. The programme runs through to 2020 and has themes including *'Smart, green and integrated transport'.* Within the 2015 funding programme there is a topic (MG.5.5-2015) on 'Demonstrating and testing innovative solutions for cleaner and better urban transport and mobility'.

These are major urban transport demonstration projects and could provide significant resources for developing LES measures and making Leicester into a leading Low Emission City. The scale of the projects are some 12-18 million Euros split between 4-5 city demonstration. There is also a strong interest in the programme in linking with Chinese cities to promote UK/China exchange of ideas and technology.

There is the potential to match fund a H2020 bid with OLEV Low Emission Cities funding, as the H2020 programme only funds schemes at 70% and additional funding will be needed.

The H2020 call is due in March 2015.

- *Life 2014*

The Life Programme allows for funding bids of between 1m to 4m Euros to help Members States to implement key environmental directives. A funding call will be made in June 2014 and it is anticipated that 20m Euros will be made available for UK projects. Life does not require projects to have other European partnerships but does require projects to have potential knowledge transfer across Europe. Match funding of between 25 to 75%, depending on project type, is required.

Projects are determined, primarily by Defra, and previous, successful projects have included measures to evaluate and support the uptake of low emission vehicles.

Table 6.2 Funding opportunities for LES Measures

LES Measure	OLEV	Transport	Planning	Development	EU
Bus emissions strategy					
Bus LEZ	Low emission cities	LTP		LEP/Growth funds?	Life
Bus Retrofit	Low Emission bus fund		CIL		
Gas buses	Low emission cities		CIL		H2020
Managing freight emissions					
Freight consolidation		LTP/LSTF	S106	LEP/Growth funds?	H2020
Greener fleets	Low emission cities/Gas infrastructure		CIL	LEP/Growth funds?	H2020
Low emission behaviours					
EV	Low emission cities /EV infrastructure		CIL	LEP/Growth funds?	*H2020*
Smart		LTP/LSTF	S106		Life

6.4 Delivery plan

An indicative delivery plan is shown in figure 6.2 below. Various funding programmes, identified in section 6.3, will need to be pursued in order to take the LES forward. In relation to the LES measures some are more appropriate for short term implementation and others for medium or longer term implementation:

- Short term: Bus Retrofit and development of the LEZ, Freight DSPs and Ecostars,, smarter choices and initial work on EVs
- Medium term: Introduce Bus LEZ, gas vehicle projects, wider EV work
- Longer term: Tighten LEZ standards, urban consolidation centre, zero emission delivery.

Figure 6.2 Indicative delivery plan

	Short term					Medium term				Long term	
	2014	2015				2016	2017	2018	2019	2020	2020+
	Q4	Q1	Q2	Q3	Q4						
Funding streams											
Low emission cities	Application			Funds							
Life	Application				Funds						
H2020		Application				Funds					
Bus emissions strategy											
Bus LEZ		Planning				Implementation				Phase 2	
Retrofit programme	Planning		Implementation								
Gas bus scheme						Planning	Implement				
Managing frieght emissions											
Frieght DSP	setup		Implementation								
Urban consolidation centre											
Ecostars		setup		Implementation							
Gas vehicle scheme						Planning	Implement				
Zero emission deliveries											
Low emission behavious											
Smarter choices campaigns	Ongoing?										
EV infrastucture		Planning			Implementation						
LEV/EV promotion		Planning			Implementation						

Appendices

Appendix 1: LestAir Process Roadmap

Appendix 2: Leicester CC Air Quality & Emissions: Technical Planning Guidance (draft) 2014

Appendix 3: Procurement of Low Emission Vehicles and Transport Services (draft)

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