

APPENDIX A: ENVIRONMENT AND ATTRACTIVE CITY SCRUTINY COMMITTEE POLICY REVIEW 2011/12: LOW CARBON VEHICLES IN THE DELIVERY OF PUBLIC SERVICES – DRAFT FINAL REPORT

1. PURPOSE OF THE REPORT

- 1.1 This report provides the findings, conclusions and recommendations of the Environment and Attractive City Scrutiny Committee's Policy Review 2011/12: Low Carbon Vehicles in the Delivery of Public Services.

2. INTRODUCTION

- 2.1 On 13 June 2011, the Environment and Attractive City Scrutiny Committee agreed to conduct a scrutiny review into 'Low Carbon Vehicles in the Delivery of Public Services in Sunderland' for 2011/12 and at a further meeting of the Committee on 25 July 2011 it agreed the approach to the review and the terms of reference.

- 2.2 In order to ensure maximum value of the review the Committee decided to narrow the scope of its efforts within the agreed terms of reference to focus in the main on services delivered by the Council and public transport.

- 2.3 The approach to work planning for the Policy Review involved evidence received in the formal committee setting and task and finish activities. All members of the Committee were invited to all of the arranged activities. The advantages to considering evidence both within the formal committee meeting and off-site were seen to;

- (a) Enable the progression of the investigation more quickly and outside of the confines of the Committee's formal meetings; and
- (b) Allow for greater investigation of the issue by members.

3. AIM OF THE POLICY REVIEW

- 3.1 To consider the city's current and future plans for the utilisation of low-carbon vehicles in the delivery of public services.

4. TERMS OF REFERENCE

- 4.1 The agreed terms of reference for the review were:-

- (a) To examine the role and responsibilities of the local authority with regard to climate change and energy;
- (b) To consider national and European policy in regard to the use of low-carbon transport in the delivery of services;

- (c) To investigate the progress made to date and future plans in the Council and across partners in regard to the introduction of low-carbon vehicles to deliver public services;
- (d) To explore the financial and non-financial future implications of the increased use of low-carbon vehicles in the delivery of council services;
- (e) To consider appropriate targets for the introduction of electric vehicles into the Council's fleet.
- (f) To consider the extent of the council's role as a leader in the use of low-carbon vehicles to deliver public services in the city; and
- (g) To consider to what extent future technologies will enable the council and partners to increase the use of low-carbon vehicles.

4.2 Although the Terms of Reference refer to low-carbon technologies, it will become obvious throughout the Review that the Committee placed more of an emphasis on the investigation of electric vehicles in recognition of it as a key driver for growing the city's economy.

5. MEMBERSHIP OF THE SCRUTINY COMMITTEE

5.1 The membership of the Environment and Attractive City Scrutiny Committee consisted of Councillors Miller (Chair), A Wright (Vice Chair), Bonnalie, Heron, E Gibson, Lauchlan, Porthouse, D Richardson, I Richardson and Tye.

6. METHODS OF INVESTIGATION

6.1 The following methods of investigation were used for the Review:

- (a) Desktop research (including consideration of best practice from other local authorities and the private sector);
- (b) Consultation with residents of the city through the City Council's Customer Services Network;
- (c) Evidence from Julie Elliott MP, Sharon Hodgson MP and Bridgette Phillipson MP;
- (d) Evidence from Smith's Electric Vehicles
- (e) Evidence from the University of Sunderland's Automotive and Manufacturing Advanced Practice;
- (f) Evidence from Gateshead College's Skills Academy for Sustainable Manufacturing and Innovation;
- (g) Evidence from the City Council's Officers;
- (h) Evidence from Cenex; and
- (i) Evidence from the low-carbon vehicle sector.

7. FINDINGS OF THE ENVIRONMENT AND ATTRACTIVE CITY SCRUTINY COMMITTEE

7.1 Sections 8 to 14 outline in detail the findings of the Policy Review – Low-carbon Vehicles in the Delivery of Public Services.

8. SETTING THE SCENE

8.1 Climate change is an issue people are very well aware of; its continued and prominent presence in the media serves to remind us that it is one, if not the most serious environmental threat facing the world. The impact of climate change is, and will continue to be felt globally as temperatures steadily increase, sea levels rise and patterns of drought and flooding change.

8.2 Rising greenhouse gas (GHG) concentrations from human activity (such as burning natural gas, coal and oil) have been attributed to the rapid warming of the earth through their enhancement of the natural 'greenhouse effect'. The impact of climate change in the UK is likely to include rising temperatures; changes to sea levels; extreme weather; threats to the survival of plants and animals; increased disease and a reduction in the availability of a variety of foods.

Climate Change Act (2008)

8.3 In 2008, legislation passed in the UK introduced the first legally binding framework to tackle the dangers of climate change. The Climate Change Act created a new approach to managing and responding to climate change in the UK. Its two key aims were to:-

- Improve carbon management, helping the transition towards a low-carbon economy in the UK; and
- Demonstrate UK leadership internationally.

8.4 The Act contains many provisions to reduce the effects of climate change, including:-

- A legally binding target of at least an 80% cut in GHG emissions by 2050;
- A reduction in emissions of at least 34% by 2020;
- A carbon budgeting system that caps emissions over five-year periods, with three budgets set at a time, to assist with monitoring against the achievement of the 2050 target; and
- Powers for Government to require public bodies and statutory undertakers to carry out risk assessments and address the issues accordingly.

8.5 The latest data in regard to emissions highlights the extent of the task faced by the Government and the enormous risks to the UK, both financially and environmentally, should the target be missed. In 2009, there was a reduction in emissions of 9%, however this was largely attributed to the recession, rather than an indication of any real progress to implementing necessary changes and the progress update published by the Committee for Climate Change (CCC) in June 2011 reports an *increase* in economy-wide emissions of 2.9% for 2010 (largely attributed to the cold weather).

8.6 In March 2011 the Government published the Carbon Plan setting out the plan of action on climate change for domestic and international activity. The

Plan sets out department by department, actions and deadlines for the next five years; as would be expected the Department for Transport (DfT) is a key contributor.

Policy Drivers – Transport

8.7 The CCC is clear that domestic transport is a significant contributor to the UK's emissions and therefore a risk to achieving the prescribed reductions in carbon emissions. In an annual report to Government in 2011, it called for a 'step change' to the pace in the development of decarbonising the transport industry over the next decade, in order for the UK to have any real impact in meeting its targets.

Key Facts and Figures

- **Surface transport emissions accounted for 22% of total CO2 emissions and 21% of GHG emissions in 2010**
- **Cars have the largest share of surface transport CO2 at 61%**
- **Surface transport emissions fell by almost 4% in 2009 remained at the same level in 2010 as they were in 1990**
- **New car emissions fell to 144.2gCO2/km in 2010**

Figure 1

The chart below gives a breakdown of surface transport CO2 emissions by mode in 2009:

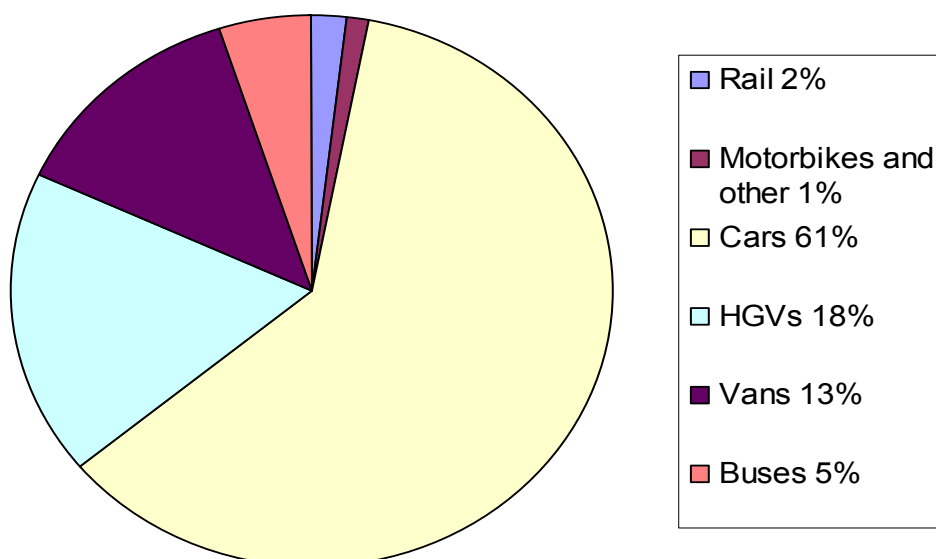


Figure 2

8.8 Cars and larger vehicles including those that are also used in the delivery of public sector services make up 97% of CO2 emissions.

- 8.9 All except 10 local authorities (98 per cent of all authorities) experienced a decrease in emissions from the road transport sector between 2008 and 2009. The North East is one of the better performing regions for the amount of carbon dioxide emissions it produces, particularly in regard to road transport which stands at 5 million tonnes (the highest being the South East at 19 million tonnes), however this can probably be attributed to regional economies, growth areas and population.
- 8.10 The table below highlights Sunderland's carbon emissions which have steadily declined since 2005. The city compares favourably with the rest of the North East Region in regard to road transport emissions, particularly when the results are given per capita (per head of the population).

Year	Industry and Commercial (kilotonnes of CO2)	Domestic (kilotonnes of CO2)	Road Transport (kilotonnes of CO2)	Total (kilotonnes of CO2)
2005	850	696	493	2,039
2006	841	681	491	2,013
2007	769	654	492	1,915
2008	728	648	475	1,851
2009	633	578	454	1,665

Figure 3

- 8.11 The Carbon Plan gives responsibility to the DfT to reduce emissions and thereby tackle climate change by:-

- (a) Supporting new low emission vehicle technologies;
- (b) Progressing high speed rail and rail electrification;
- (c) Developing a framework for sustainable aviation and shipping;
- (d) Promoting the use of sustainable biofuels;
- (e) Encouraging travel behaviour change to reduce emissions; and
- (f) Supporting technical standards for electric vehicle (EV) charging systems.

- 8.12 In accordance with these responsibilities the DfT implemented a multitude of strategies, projects and activities, collaborating across Government departments and with the public and private sectors. Some such initiatives include:-

- **Plug-In Car Grant**

- 8.13 The Government's Plug-In Car grant has been available to consumers for some time, giving a considerable discount on electric vehicles. At the

beginning of 2012, the Government announced funding to extend the Grant to vans which will offer up to £8000, or 20 per cent off the original purchase price, questions do however remain as to whether the Government has given enough support to attract consumers to purchase.

- **Plug-In Vehicle Infrastructure Strategy**

8.14 In 2011, the Office for Low-carbon Emissions (OLEV) published an infrastructure strategy. The strategy outlines the commitment to growing the market in plug-in vehicles due to the contribution they, and other low and ultra-low emission technologies, can make across the economic and environmental priorities of:-

- Climate change;
- Green growth;
- Energy security;
- Decarbonising the electricity system; and
- Air quality.

8.15 There is an assertion within the strategy that ultra-low emission vehicles are a major component in meeting the targets set out in the Climate Change Act.

- **Plugged-In Places Programme**

8.16 The Plugged-In Places programme is the key mechanism for the roll-out of recharging infrastructure in the UK and providing learning to inform the future development of a national network.

8.17 The Government initially accepted and expanded upon the previous government's policy in regard to low carbon vehicles by providing £30m in matched funding to support the development and delivery of an infrastructure of charging points. However in June 2011, it appeared to reduce its emphasis on charging points and is now promoting home re-charging as the preferred option. The view of manufacturers of electric vehicles is that this will not pose any significant problems to the growth of the electric car industry as most consumers would charge the vehicles at home the majority of the time; however Ms Elliott MP stated that:

'...this undermines the importance of giving consumers confidence they would not be caught out with a flat battery and no way of getting home'

8.18 Nevertheless, Sunderland now has 20 charging points across the city and there are plans for a further 13 (20 actual bays). The 300th charging post was recently installed in the region. To date, there are only 100 known users of electric vehicles across the North East; unfortunately the exact figure cannot be determined for Sunderland.

- **The Low-Carbon Vehicles Innovation Platform**

8.19 The Government's programme of research and development for low-carbon vehicle technologies is delivered through the Technology Strategy Board's Low-carbon Vehicles Innovation Platform (LCIVP). This was launched in

September 2007 and has delivered a number of research projects targeted at low and ultra-low vehicle technologies. The programme's aims are:-

- To reduce carbon emissions arising from vehicles in domestic and international markets;
- To accelerate the introduction of low-carbon vehicle technologies; and
- To help the UK automotive sector benefit from growing demand for low-carbon vehicles.

- **The Ultra Low-Carbon Vehicle Demonstrator Project**

8.20 An individual strand of the LCVIP is the Ultra Low-Carbon Vehicle Demonstrator Project. This is a large trial over 340 electric and plug-in-hybrid cars in eight locations around the UK. The trial will provide data on the real world use and performance of electric vehicles, driver behaviour and recharging issues to assist in the future roll out of electric cars. Sunderland City Council has three vehicles in its pool from this project, the Nissan Leaf, the Peugeot iOn and the Avid.

- **The Low-Carbon Vehicle Public Procurement Programme**

8.21 The Government's Low Carbon Vehicle Public Procurement Programme supports a trial of over 200 electric and low emission vans in a range of public sector fleets. One of the programme's van suppliers for phase one was Smiths Electric Vehicles, based in Sunderland. The trial is collecting data about the performance and usage of the vehicles which will help drive ongoing technological development; as well as providing an understanding of the existing capabilities of the vehicles. Last year, as part of this programme, the council introduced two Nissan Leafs for use as pool vehicles by Building Control and Parking Enforcement.

8.22 A full evaluation is expected from Cenex in March 2012, however quantitative data from some of the local authorities involved in the programme is referenced in section 9. Phase two of the programme will commence from April 2012, with only one of the original manufacturers being chose to provide the low carbon vehicles (which are hybrid). Up to 500 vehicles will be made available to purchase through the programme. Whilst Phase one was restricted to Panel Vans, phase two has been extended to include Chassis Cabs, Dropsides and Tippers. Sunderland City Council has expressed an interest in being involved in this programme.

8.23 Although the Government has made a commitment to the low-carbon transport agenda, given the reductions in available monies some policy changes have already taken place in the latter part of 2011, and it is questionable how sustainable this will be in the Government's view in the longer term. The stage is now being reached whereby the Government requires a return on the heavy investment it has made; which won't happen until consumer demand increases and organisations across all sectors begin to seriously consider utilising the technology available. Any perceived reduction in Government support for this agenda could prove to be a negative factor in success.

The Local and Regional Context

- 8.24 As previously referenced, Sunderland are involved in a number of national initiatives and there are several other local and regional policy drivers and initiatives to consider as part of a review into low-carbon vehicles and it is important that this agenda is considered as part of a wider economic, financial and environmental picture for both the council and its partners, the city as a whole and the region.
- 8.25 Sunderland has made a firm commitment to reduce the city's carbon emissions by 80 per cent by 2050, along with an action plan to manage and reduce emissions over the coming years.
- 8.26 Several public commitments have been made by Sunderland to tackling climate change through the Nottingham Declaration (signed in November 2001); the EURO CITIES Declaration on Climate Change (signed in November 2008); and the EU Covenant of Mayors (signed in January 2009).
- 8.27 The Sunderland Strategy 2008-2025 details a commitment to reducing the city's transport carbon emissions by developing more sustainable modes of transport. This objective cuts across the key aims of prosperous city; attractive and inclusive city and healthy city.
- 8.28 The Sunderland Economic Masterplan is also a key policy driver for the city over a 15 year period. Aim 2 of the Plan is that Sunderland will be;
- 'A national hub of the low-carbon economy by using the opportunities offered by new low-carbon technologies to stimulate economic activity in Sunderland. This Aim emphasises the city's national potential and the need to showcase projects such as electric vehicles'.*
- 8.29 This will provide Sunderland with a platform to influence national policy and showcase electric vehicles and other low-carbon technologies. These opportunities should stimulate economic growth in the city and thereby promote the city; enhancing its reputation and attracting international investment.
- 8.30 The Local Transport Plan 3 (2011-2021) (LTP3), of which Sunderland sits within states that the intention in regard to climate change is;
- 'To reduce carbon emissions produced by local transport movements, and to strengthen our networks against the effects of climate change and extreme weather events'*
- 8.31 The LTP3 illustrates the scale of the task ahead for the region. By 2050 it must reduce road transport CO₂ emissions from a projected level of 5,591,032 tonnes down to 1,107,857 tonnes – less than a quarter of present-day levels. Emissions are actually predicted to rise over the period 2005-2050, if things remain as they are.
- 8.32 The recently formed North Eastern Local Enterprise Partnership (NELEP) sets out its vision to be;

'Recognised as the....European leader in the production of electric vehicles.'

- 8.33 In recognition of the progress the region has made to date, and in acknowledgement of the importance of a strong manufacturing base in the area to grow the economy, bringing investment and jobs, it sets out an ambition to be a leader in low-carbon industry, utilising its growing reputation in this field to secure greater competitive commercial advantage through new investments across a range of low-carbon technologies.

Fleet and Transportation in the City Council

- 8.34 The council operates a fleet of over 600 vehicles, involved in refuse collection, street cleaning, highway maintenance and in the delivery of many other services. A breakdown is given overleaf:

By Directorate	Vehicle Number	%
Chief Executive	26	4%
Corporate Services	5	1%
City Services	443	69%
Childrens Services	71	11%
HHAS	101	16%
Total	646	100%
By Vehicle Type	Vehicle Number	%
Bus	96	15%
Car	31	5%
light commercial vehicles with a maximum gross weight of 3.5 tonnes	277	43%
Large Goods vehicles over 3.5 tonnes	115	18%
Sweepers	20	3%
Tractors, Plant, platforms etc	107	17%
Total	646	100%

- 8.35 As part of the 'Sunderland Way of Working' the Fleet and Transportation Service is being reviewed. A Fleet Transport Manager was recruited in 2011 to manage a review of the transport and fleet activity across the 79 departments of the council where there is a budget for transport or fleet.
- 8.36 A research partnership has been formed between the council, the University of Sunderland, and other interested organisations to undertake a 3 -5 year research and development project. The areas of work are as follows:-
- Fleet analysis and assessment;
 - Fleet monitoring with tracking and telemetry;
 - Data collection and analysis to assess the efficiency of use and charging of the fleet;
 - High level analysis of vehicle costs and environmental impacts;
 - Assessment of maintenance schedules for the vehicles and availability/reliability;

- User/passenger satisfaction assessment; and
- Assessment of fleet and the development of a business case for improvements.

8.37 Part of this research project will be to pilot route optimisation software which will assess the current routes in delivering services such as refuse and recycling collections and determine whether these are the most effective in lowering emissions and reducing costs.

8.38 This project is longer term and has a wide remit that will consider all available low-carbon vehicle technologies, as well as a range of other methods to reduce carbon emissions. It will enable the council to take an informed, longer term decision around reducing carbon emissions in its fleet. The Scrutiny Committee's conclusions and recommendations from this Policy Review will be considered as part of this.

9. PARTNER TAKE-UP OF LOW-CARBON VEHICLES

9.1 Under the terms of reference for the review, the Committee had expressed a wish to discover to what extent public sector partners were utilising or planned to utilise low carbon vehicles; however in light of the already sizeable scope of the investigation it agreed to concentrate on public transport in light of its crucial position in contributing to reducing carbon emissions for the city and region.

Low-Carbon Public Transport

9.2 A key objective of the Economic Masterplan is to encourage public sector partners to utilise low carbon vehicles in the delivery of public services and the strategy will seek to extend the plans for low-carbon public transport. The Committee therefore sought evidence from Nexus and the city's main bus operators Stagecoach and Go NorthEast.

9.3 The Committee learnt that under European legislation, the positive environmental impact rating for public transport is based on a 'Euro' rating system, ranging from 0-5, demonstrating how much pollution any particular vehicle causes. Over three years there has been a substantial shift towards using greener, less polluting vehicles across Tyne and Wear, Figure 3 demonstrates the percentage of buses operating at the various Euro standards in 2010/11 from 2007/8. Progress is being made in larger numbers of buses as Euro 3 or higher:

'Euro' Rating of Tyne & Wear bus fleet

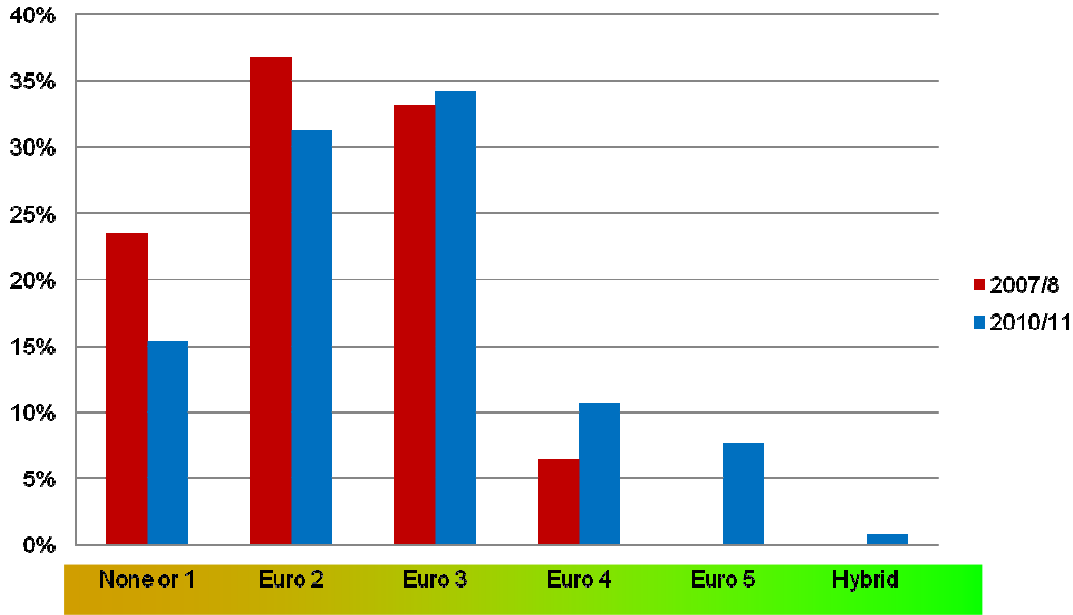


Figure 4

9.4 Figure 4 shows the distances travelled (by KM) of buses in Tyne and Wear and the relative CO2 emissions from the fleet:

Distances travelled and total CO2 emissions

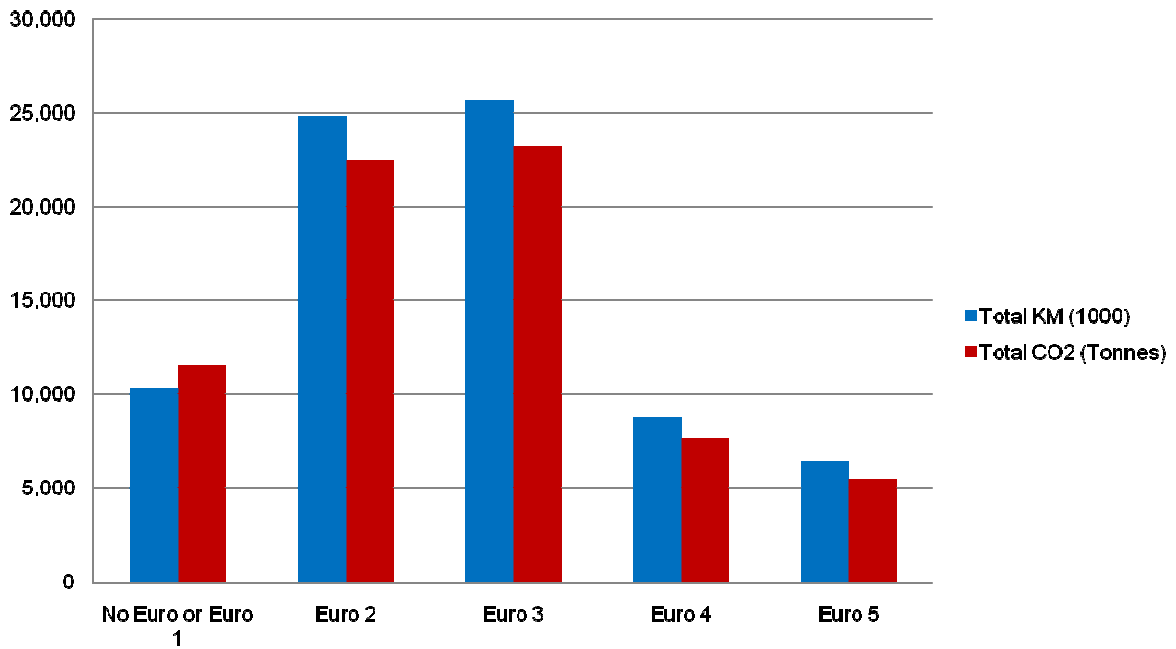


Figure 5

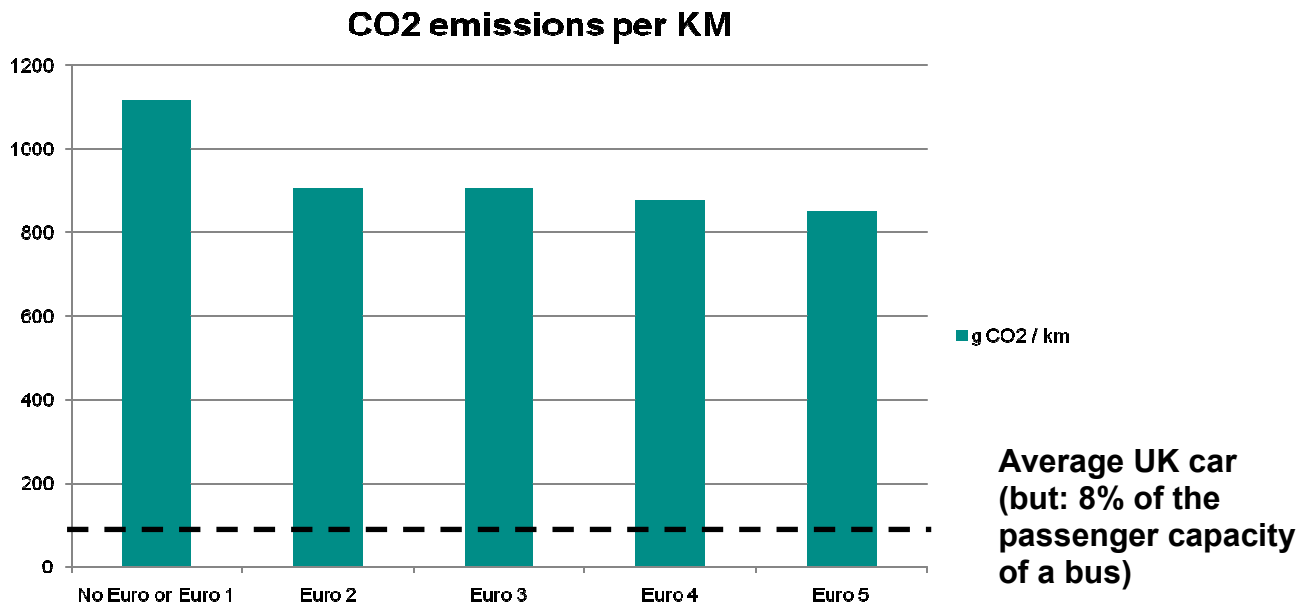


Figure 6

9.5 Figure 5 outlines bus CO2 emissions per KM. Clearly, CO2 emissions are significantly higher in comparison to cars. This is explained in part, by the loadings of buses and cars which have a significant effect on emissions; CO2 per passenger per KM is significantly lower. If a Euro 3 bus has 30 passengers each passenger will account for 30g CO2, compared to 25g CO2 in car.

Investment in Reducing Carbon Emissions

9.6 Go NorthEast and Stagecoach both reported a commitment to reducing carbon emissions. Within the last twelve months Go NorthEast has increased the quantity of Euro 5 vehicles and is now operating its first hybrid diesel/electric buses in partnership with Sunderland City Council, Nexus and the University of Sunderland. The 'Connect' service consists of two hybrid buses running between the University campuses, the city centre and the hospital. The initial performance on emissions from these buses has exceeded the specification.



9.7 Stagecoach have deployed 26 hybrid electric buses in Newcastle in 2011, as part of a £2.25m Green Bus Fund grant together with a capital investment of £5m of its own.

- 9.8 At present Go NorthEast's policy is to purchase new vehicles to the latest European standards with emissions to Euro 5 specification, and Euro 6 from January 2013. Fleet replacement timescales are lengthy, due to the high capital costs and the length of use needed to recover the investment. The emphasis this year and in future years will be for the Group to achieve a 20 per cent reduction in CO2 per passenger journey by 2015, through a combination of investment, new technologies, improving fuel usage, monitoring driver performance through vehicle telematics, reducing site energy and increasing passenger numbers.
- 9.9 Stagecoach continues to invest in modern vehicles with improved environmental performance. This investment is part of its drive to replace older vehicles and reduce the average age of the fleet. In 2012, 19 or so vehicles will be brought to the North East which will replace the older vehicles in the Sunderland fleet. This will positively impact both on the age profile and the emission standards of buses operating within the city.
- 9.10 The Committee was interested to note fleet replacement with higher Euro Standard buses was driven by legislation rather than cost as 'greener' vehicles actually use more fuel.

Alternative Technology/Fuels

- 9.11 Go NorthEast informed the Committee of its continuing investigation into technologies and alternate vehicle fuels which may provide low-carbon and more fuel efficient operation. Some examples of this would be gas buses (CNG), fuel cells, hybrids (diesel/electric), electric drives, bio-fuel 70/30 blend, fuel additives and ethanol. Trials are ongoing or about to start on a number of these initiatives within the wider Group.
- 9.12 Similarly, Stagecoach are involved in a number of projects testing more sustainable alternative energy sources, including 100 per cent of recycled biofuel manufactured from used cooking oil and other food waste; biomethane manufactured from waste; and hybrid electric engines. It is also investigating the potential of hydrogen fuel cells and other technologies.
- 9.13 Throughout discussions the Committee found that the high capital cost of all-electric/hybrid buses was deterring bus companies from purchasing these types of vehicles, however it was impressed with the range of innovative measures being taken to reduce carbon emissions from public transport in other ways.
- 9.14 The Committee also learnt from Smiles Engineering Emissions Control Systems that it was promoting the use of engine repowers to bus companies across the UK. The ability to remove a Euro 3 or below engine and repower with a Euro 4, 4+ or 5, gives bus operators huge potential in terms of providing an economical alternative to purchasing a brand new bus and comply with European legislation. Engine repowers can improve fuel consumption by up to 80 per cent, with the lowest improvement at 15-20 per cent.

Fuel Reduction

- 9.15 Go Northeast reported a significant reduction in CO₂ of 3 per cent per passenger journey achieved since 2007/08 as a result of reductions in idling, more frequent tyre pressure checks, and driver monitoring. It now aims to reduce consumption by 2 per cent in the coming year by actively exploring measures such as:-
- Tyre technology for improvement in rolling resistance;
 - Wheel/axle alignment;
 - Automatic idle shut off;
 - Acceleration limiter fitment;
 - Vehicle performance matching route topography;
 - The installation of a spill free fuel system;
 - An evaluation of hybrid technologies and new engine cooling systems;
 - Reviewing fuel specifications and their energy content; and
 - Reducing vehicle weight through the application of composite materials - a long term process working with manufacturers.
- 9.16 The Committee was interested to note that akin to other low-carbon vehicles, the driver is a key component in maximising the performance of low-carbon technologies/vehicles. A lack of driver awareness can significantly lower the performance of a vehicle/increase fuel consumption. To address this, Go NorthEast have installed telematics equipment to buses to monitor engine idling, over-revving, harsh acceleration, harsh braking and speeding, recording individual performance. Stagecoach is also deploying a similar system to improve safety, reduce fuel costs and cut carbon emissions. The system monitors speed, braking, acceleration, lane handling and turning.
- 9.17 Stagecoach Group also reported investing millions of pounds (internationally) each year in the training of its bus driving team which includes its Safe, Skilled and Fuel Efficient Driving programme. All of the company's 14,400 drivers are required to complete the course as part of a Certificate of Professional Competence.

Increasing the Use of Public Transport

- 9.18 Go NorthEast alluded to the intention to grow passenger numbers as part of its strategy to reduce CO₂ emissions per passenger, and the Committee continue to view this as a key driver in reducing carbon emissions from cars.
- 9.19 Ms Phillipson MP stated that:
- 'Introducing low-carbon buses will be a great help in reducing emissions from public transport. However, by incentivising and ensuring commuters use these services those reductions can be magnified'*
- 9.20 Whilst the remit of the Policy Review does not include an investigation of the preferences and behaviours of residents the Committee felt it important to note its agreement that the longer term goal must be to encourage the use of public transport by increasing its accessibility and suitability for commuters.

10. FINANCIAL IMPLICATIONS

- 10.1 Woven throughout the Policy Review is the thread of value for money in the context of significant budgetary pressures. The Committee therefore felt strongly that a robust analysis was required to provide sound evidence of potential costs and savings in order to strengthen the evidence of the Policy Review. It agreed to utilise its dedicated budget to commission Cenex to undertake a detailed and expert analysis of the implications and impact of the council adopting electric vehicles into its fleet.
- 10.2 Cenex is an independent, not for profit company. It was chosen by the Committee to undertake this work due to its leading expertise in understanding the market opportunities for low-carbon vehicles and fuels and the measures required to aid market transformation.
- 10.3 Cenex used its fleet carbon reduction tool to identify the costs and environmental benefits of operating electric powered cars and 3.5 tonne vans used for typical loading and unloading operations within the council's fleet operation. It sought to undertake a host of analysis including drive cycle creation (based upon the council's key stats in Figure 5); payload profile; vehicle and drivetrain model creation; and simulation.

Sunderland drive cycle key stats		
Distance	38	miles
Avg speed	20	mph
Town driving	96	%
A/B road driving	0	%
Motorway driving	5	%

Figure 7

- 10.4 The electric vehicles chosen as part of the analysis were the Smart ED (car) due to its similarity to the Nissan Leaf; and the Allied Boxer ED due to its being used by other local authorities for typical council services.
- 10.5 Two existing drive cycles were selected for analysis, the FTP72 cycle being the most representative of the council's vehicle usage. The Artemis Urban was also selected to show how heavy urban usage impacts on environmental and cost of ownership.

Electric Car Comparison Results

		Smart fortwo ED											
		Current Energy Prices						Linear Rising Energy Prices					
Mileage Scenario	Drive Cycle	90% Peak			90% Off Peak			90% Peak			90% Off Peak		
		Year 3	Year 5	Year 7	Year 3	Year 5	Year 7	Year 3	Year 5	Year 7	Year 3	Year 5	Year 7
Base mileage	SCC - FTP72	525	369	330	446	289	250	392	146	18	312	67	-61
	SCC - Artemis Urban	361	204	165	262	105	66	167	-119	-287	68	-218	-386
Increase mileage	SCC - FTP72	389	233	194	278	122	83	155	-134	-307	36	-253	-426
	SCC - Artemis Urban	159	3	-36	21	-136	-175	-182	-532	-765	-331	-681	-914

Figure 8

- 10.6 Figure 6 shows the costs and savings to the council with various differing factors. At the current mileage of 10,000 and 90 per cent peak charging time there would actually be an additional cost to the council of between £330 to £525 per vehicle; however small savings of £175 per vehicle can actually be achieved based on current fuel costs, 90 per cent charging off-peak over a 7 year period.
- 10.7 When rising diesel and electricity prices are taken into account cost savings are demonstrated from a £61 marginal saving up to a significant saving of between £426 and £914 per vehicle.
- 10.8 The Committee viewed any saving as being of benefit to the council, and therefore its residents. If the council chose to replace ten of its cars this could bring savings of between £2,530 and £6,810 over a five year period and £4,260 and £9140 over a seven year period.

Electric Van Comparison Results

		Electric Panel Van (no PIVG)											
		Current Energy Prices						Linear Rising Energy Prices					
Mileage Scenario	Drive Cycle	90% Peak			90% Off Peak			90% Peak			90% Off Peak		
		Year 3	Year 5	Year 7	Year 3	Year 5	Year 7	Year 3	Year 5	Year 7	Year 3	Year 5	Year 7
Base mileage	SCC - FTP72	8569	5329	4071	8381	5140	3882	8231	4765	3280	8042	4576	3092
	SCC - Artemis Urban	8209	4969	3711	7983	4743	3485	7739	4186	2614	7513	3960	2388
Increase mileage	SCC - FTP72	8221	4981	3723	7957	4717	3458	7747	4191	2616	7483	3927	2352
	SCC - Artemis Urban	7718	4477	3219	7401	4161	2902	7059	3381	1684	6743	3065	1367

Figure 9

- 10.9 Figure 7 shows a very different picture to that of electric cars, this is solely due to the capital costs of larger electric vehicles at the present time. The Allied Boxer costs £64,000. Additional costs to the council range from £1367 to £8569.
- 10.10 The Committee considered that in light of these less positive results, at the current time the council should not consider adopting electric vans into its fleet. Nevertheless it is vital that the council should revisit this as the market evolves. Nissan are now in the final development phase for the EV200 van and it is believed that this vehicle and other coming onto the market will significantly lower the price, providing great opportunities for the council in the future.

Gauging Resident's Views

- 10.11 The Committee very much wanted to understand more about the views of residents in regard to the council using electric vehicles in its fleet. It was particularly concerned about the perceptions of residents due to higher capital costs, although it had been determined that should the council purchase electric vehicles this would be part of the normal replacement programme. A public consultation was therefore undertaken (Appendix 1) over a two week period at the Customer Service Centre in the city centre. The very small sample size (of 67) gives a snapshot of public opinion, however it is important to contextualise this against the total population of the city. The following question was therefore asked;

To what extent do you agree or disagree that the council should replace its vehicles with electric vehicles when they are due to be replaced?

10.12 55 per cent of respondents felt this was very important, whilst 33 per cent felt it was fairly important. This tentatively suggests support from residents for electric vehicles to be used within the council fleet when the time comes to replace older vehicles and goes some way to assuaging the Committee's concerns that the council would be viewed as 'wasting' money in times of austerity. Interestingly, those who answered 'strongly disagree' or 'tend to disagree' were mainly from the 18-24 age group.

The Opportunities and Challenges for Regional Procurement

10.13 The Committee were informed by Smith's that an audit of vehicle usage across the 12 North East local authorities found that the average daily mileage of each type of vehicle was 67 miles or under validating the use of electric vehicles to cover the average daily mileage required.

Case Study – Fleet Analysis for 12 local authorities in North-East England

	Panel Van	Tipper	Minibus	LGV	HGV	OTHER	TOTAL
Total North-East Fleet	1016	653	572	324	381	2404	5350
% of total fleet	19%	12%	11%	6%	7%	45%	100%
Av daily mileage	31	45	67	22	55	N/A	N/A

*OTHER includes cars, small vans, tractor units, refuse vehicles, street cleaning vehicles and gritters

Figure 10

10.14 The Committee found there was evidence of a common interest in at least some of the region's local authorities in the collaborative procurement of electric vehicles and the associated support infrastructure with the aim of reducing and sharing costs to meet objectives for reduced carbon commitments and to support a developing industry in the region. Authorities like Gateshead and Newcastle have made some inroads into adopting low-carbon vehicles into fleet operations; however in the main this has been through funding from programmes like the LCVPP and the risk is that the initial capital costs deter local authorities from setting appropriate targets for introducing electric vehicles into their own fleets. It was reported that this was largely due to a lack of evidence in terms of financial and environmental benefits.

10.15 The Committee considered the evidence base provided by Cenex would prove useful in convincing local authorities and other public sector partners, suppliers and contractors of the merits of using electric vehicles. It applauded the council for the efforts it had made so far and felt there should be a continuation of Sunderland as the lead authority, working with NEPO, to gaining buy-in and commitment from the region to progressing this.

10.16 A regional solution could deliver:-

- Sustainable and innovative solutions for procuring electric vehicles to provide services to the community, sharing ideas about what is capable of being delivered and to share the resulting risks and benefits;
- Focused support by the public sector for suppliers based in the region subject to the EU competition regulations, bringing forward innovative products and services which could then be marketed outside the region; and
- Commercial benefits in reducing unit costs and sharing investment by suppliers in infrastructure and support.

10.17 If the region's public sector expenditure is to have the maximum impact on job creation and economic development; investment and commitment from the region as regards procurement would provide a stronger base for expansion of regional business into other markets with the benefit of experience in winning and delivering a public sector contract as a point of reference. Other economic benefits include a standard approach to the market; in consultation with suppliers and the ability to build in social/supply chain dimensions to procurement processes.

10.18 The Committee was concerned that any investment in electric or low-carbon vehicles should benefit the local economy and bring investment and jobs for its residents but thought a significant risk to the success of such an approach was the rules around public sector procurement, which cannot discriminate in favour of local suppliers.

10.19 Consideration would need to be given to:-

- Developing a service based specification for the procurement, leasing and support of electric vehicles through a managed service provider who would then be at greater liberty to procure vehicles of choice;
- Making use of probable changes to Government policy in the next year after the decision to award the Crossrail rolling stock contract to Siemens rather than Bombardier as well as the existing ability to take into account social considerations in procurement; and
- The Department for Business Innovation and Skills' "Forward Commitment Procurement – Practical Pathways to Buying Innovative Solutions". This policy advocates a process to engage with supply markets to develop solutions for unmet needs, consistent with the Public Procurement Regulations. These principles of supplier consultation and engagement, developing a business case and governance arrangements before engaging in a formal procurement process could be well suited to this developing requirement.

10.20 The Committee stressed the importance of undertaking further investigation to properly weigh up the potential versus the risks of regional procurement, particularly as in this instance there would be very little in the way of best practice that could be consulted. It was pleased that NEPO could use its network of contacts outside of the region to establish what others are doing and determine whether regional procurement would be more cost effective and beneficial than local authorities 'going it alone' and questioned whether the NELEP have a role to play in this.

11. ASSESSING THE ECONOMIC IMPACT - SUNDERLAND AS A LOW-CARBON CITY WITHIN A LOW-CARBON REGION

Economic Masterplan (EMP)

- 11.1 Aim 2 of the EMP seeks to establish Sunderland as a leading UK city for low-carbon technology and production and to support the wider region in developing a sustainable, low-carbon economy. The Committee's view was that Sunderland City Council therefore has an indirect responsibility to promote and improve consumer take-up of low carbon vehicles, particularly EVs and support those developing and selling low-carbon vehicles and technologies
- 11.2 In 2009, Nissan announced its intention to invest in a new facility to pioneer electric vehicle battery production, and the Government announced that the UK's Low-carbon Economic Area (LCEA) for Ultra Low-carbon Vehicles would include Sunderland. The Committee agreed with Ms Hodgson's view that success could be measured in terms of cleaner air, however the real success indicator would be retaining and attracting those in the low-carbon industry to the area, thus stimulating economic growth and employment.
- 11.3 Ms Phillipson MP considered that:
- 'Sunderland City Council, Sunderland University, Nissan and other partners have led the way in the development of ultra-low-carbon vehicles and infrastructure with charging points across the city. We should be proud of all that has been achieved so far...'*
- 11.4 Being part of the LCEA provides the city with a significant opportunity to place itself at the front of national policy, which will enhance the reputation and image of the city and attract prospect of international investment.
- 11.5 This was demonstrated recently through the launch of the zero-emissions vehicle test track. Gateshead College are investing heavily in low-carbon vehicle technology. The test track at the Nissan plant is the only publicly accessible test track in the UK. It has been leased by the College for 20 years and over £1m has been invested in the development of the track.
- 11.6 Originally built by Nissan the track is a 2.8 kilometre, oval, low speed test track with multiple variable surfaces available for vehicle and infrastructure testing and research and testing of supporting technology.
- 11.7 The Committee agreed with the view that visits to the test track, Nissan and other companies in the area would substantially increase as the low-carbon vehicle industry builds and the test track becomes more widely promoted nationally through the DfT.
- 11.8 The Committee noted again that Nissan and the low-carbon vehicle agenda was fundamentally linked to the success Sunderland's economy now and in the future. This was illustrated by the fact that production of the batteries for the Nissan Leaf, as well as plans to produce the batteries for the Nissan EV200 and Renault Kangoo would have a tremendously positive impact on

the city, not only in the creation of 300-400 jobs, but also to the various suppliers of Nissan.

- 11.9 Similarly, the suppliers the Committee engaged within during the Review each play an important role in both the city's economy and profile, and the Committee felt that all low carbon vehicle businesses should be supported through any means available to the council.

Brand/Showcasing

- 11.10 Ms Phillipson MP stated that Sunderland was leading the way in EVs and that:

'Other cities will need to follow Sunderland's example'

- 11.11 This was echoed by Ms Hodgson MP who commented that:

'Sunderland already has a reputation as...the leading city in the UK in this respect, and the council's commitment to that so far has obviously been instrumental in the decision by Nissan to site production of the Leaf and battery plant here. If we are to attract further investment, I believe that it is of vital importance that this reputation is maintained and strengthened, and again the council has a leading role to play in that'

- 11.12 SASMI was very keen to stress to the Committee the importance they placed upon partnership working across the region to continue to strengthen its low-carbon brand and give it a unique footing in the market. Sunderland is very much a part of regional partnerships, as part of the LEP and particularly as Nissan and Smith's are based in the city. The Committee advocated this view, and felt there was 'strength in numbers', however it was conscious that it wanted the city to retain a distinct brand of its own.

- 11.13 The Committee referred to a previous policy review from 2010/11 Sunderland the Place, in which it was identified that there was a need to showcase Sunderland more effectively, and 'badge' it in no uncertain terms as a low-carbon city sitting within a low-carbon region. The need for better advertising of the city's brand was discussed to ensure that visitors to Sunderland are quickly aware that they are in a city home to the automotive and low-carbon sectors.

- 11.14 The council's role in leading the economic agenda for the city and region is paramount, Ms Hodgson MP supported the view that the council should 'lead by example' by committing itself to ensuring that;

'as far as possible, any new vehicles paid for by the council...are low-carbon, or even electric. It should be a matter of civic pride that we are thought of as a centre for low-carbon vehicles, and moving towards a low-carbon fleet would be a powerful symbol of that.'

- 11.15 The council has made significant progress in promoting itself as a low carbon city with a strong automotive industry. It has been actively involved in national activity including Phase One of the Low Carbon Vehicle Procurement Programme and the Ultra Low Carbon Vehicle Demonstrator Project.

Currently it has vehicles in its pool including the Nissan Leaf, the Peugeot iOn and the Avid.



- 11.16 Sunderland also has a significant number of 20 charging points across the city and there are plans for a further 13 (20 actual bays), installed as part of the Plugged in Places Programme.
- 11.17 The Committee noted that other local authorities had already captured this sentiment, for example similarly to Sunderland, Coventry City Council is actively promoting itself as a "living test bed" for low-carbon ventures such as Intelligent Transport systems and low-carbon transport. To support this a total of 15 per cent (52 vehicles) of Coventry City Council's fleet are low-carbon vehicles and the City Council is promoting low carbon vehicles wherever possible.
- 11.18 Gateshead Council and Newcastle City Council have also purchased electric vehicles for use within their fleets; ranging from motorcycles to commercial vehicles. They are used for a variety of purposes such as specialist vehicles for street sweeping, rubbish tipping and coffin carrying, and multi-purpose vehicles such as repairs and maintenance, school transport and general pooled use.
- 11.19 The Committee recognised the progress made by Sunderland and believed that the other local authorities mentioned above had also taken the right approach to supporting the economy of the area by the simple means of raising the profile of low-carbon vehicles through its own use of them and felt this was a strong reason in itself to consider the utilisation of more electric vehicles in the council.

Research and Development

- 11.20 Throughout the evidence gathering the Committee were pleased to note that efforts are being made to foster innovation and progress. The Committee learnt that the research and development unit for Automotive and Manufacturing Advanced Practice (AMAP), which is part of the University of Sunderland, supports the region in being a leader for low carbon vehicles. The Research and Development function is about to start implementing the

findings from its research and integrating the technologies into vehicles. The rationale for this work programme is;

- To ready the region for low-carbon vehicles;
- To learn vital lessons regarding conversions;
- To transfer knowledge to low-carbon businesses within the region;
- To develop training courses to develop the next generation of engineers and technicians; and
- To encourage entrepreneurs and innovators to invest.

11.21 An example of the type of work undertaken by AMAP was given as the Zero Emissions Project, which gives consideration to all types of low-carbon vehicles and how to develop the region as a low-carbon hub. AMAP has worked with a range of business partners to deliver this project.

11.22 AMAP aren't the only educational establishment working progressing research and development; SASMI's Skills Academy includes an Innovation Centre, home to SME's, academics and research staff aiming to encourage collaboration and generate commercial ideas.

Training and Skills

11.23 The Economic MasterPlan gives a requirement for the current and future workforce within Sunderland to be appropriately skilled in low-carbon technologies; therefore the Committee deemed that educational establishments such as schools, Colleges and Universities in the city, as well as across the wider region, are essential partners in progressing and achieving low-carbon aspirations. The Committee also made the indirect links to Aim 1 of the EMP as the University will play a key role in encouraging innovation and entrepreneurship in this field.

11.24 The Committee found that the growth of the low-carbon industry has led to a number of academic and research opportunities ranging from NVQs through to a PHD. SASMI are working in partnership with the University to deliver qualifications to support this. Qualifications include routine maintenance and repair; hazard management; electric vehicle and battery manufacture and hydrogen safety. In addition SASMI is working with Nissan to deliver a programme aimed at unemployed people, whereby upon successful completion of a 5 week programme, there is a guaranteed opportunity to take the trial for Nissan for a job within the plant. The Committee considered this to be a practical and innovative solution to providing unemployed people with skills and the chance of stable employment.

Low-Carbon Vehicle Industry

11.25 The Committee found a growing low-carbon industry in the North East region and the Committee felt it important to highlight the types of technology being developed and delivered. Four case studies are given at Appendix 2.

11.26 The Committee was impressed by some of the innovation as part of this review and considered that the council has an indirect obligation to promote

and improve consumer take-up of low carbon vehicles and support those developing and selling low carbon vehicles and technologies in the region.

Future Delivery of Public Services

11.27 The Committee was aware that Government policy and legislation advocates that local authorities are not always necessarily the right public service provider and considered that this policy shift, coupled with the efficiencies the council is required to make over the coming years will increase the number of public services commissioned and procured by the council. In this instance the council should be mindful that where possible it advocates and encourages service providers to utilise low-carbon vehicles.

12. ENVIRONMENTAL IMPACT

12.1 The Committee felt the environmental impact of introducing electric vehicles into the fleet was an enormously important consideration. It therefore commissioned Cenex to undertake some specific environment analysis in addition to cost benefits. Well to Wheel (WTW) emissions were measured in the comparisons.

Electric Car Comparison

12.2 WTW CO2 Emissions (kg CO2 per annum):

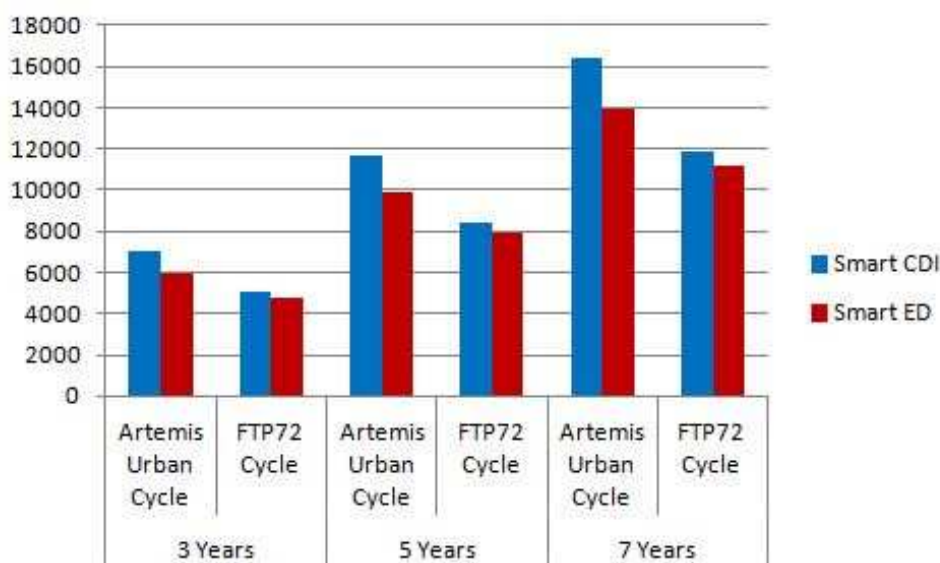


Figure 11

12.3 CO2 emissions are more pronounced when driving 'around town', i.e. stopping and starting the vehicle at regular intervals (as would be the majority of use by the council). Emission reductions for the council would range from 9 per cent to 15 per cent per vehicle.

Electric Van Comparison

12.4 WTW CO2 Emissions (kg CO2 per annum):

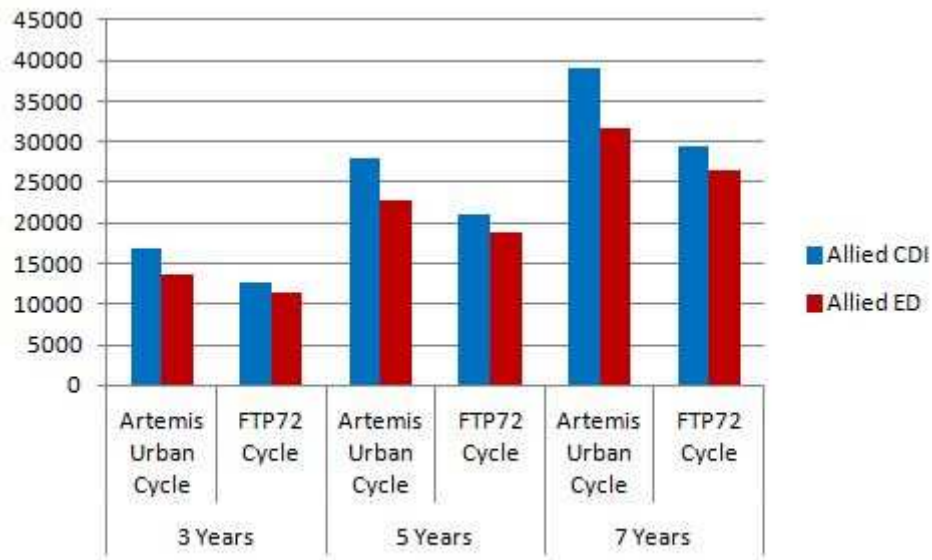


Figure 12

12.5 Again, the results demonstrate that CO2 emissions are more pronounced when driving 'around town'. Emission reductions for the council in this instance would range from 10 per cent to 19 per cent per vehicle.

12.6 Whilst a relatively small saving in the context of the wider emissions of the council and city as a whole, the Committee viewed these results very positively in terms of the impact the vehicles' CO2 reductions could make, to both the councils targets for reducing emissions and to the air quality of the city and the health of residents. Nevertheless, this serves to reemphasise the need for a range of measures to complement a strategy of utilising electric vehicles in the fleet.

Gauging Resident's Views

12.7 The public consultation undertaken by the Committee (Appendix 1) included some questions to seek resident's views about the environment and the role the council plays in this. Resident's were asked;

1. *How concerned are you about the effect of transport on climate change?*

12.8 There was a mixed response to this question. A third of respondents were very concerned about the effect of transport on climate change, whilst almost half said they were fairly concerned. One fifth did not show much concern.

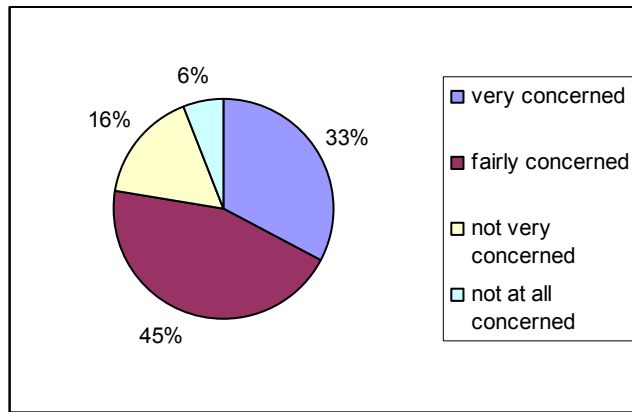


Figure 13

2. *How concerned are you about exhaust fumes from traffic?*

12.9 An overwhelming 59 per cent of respondents said they were very concerned about exhaust fumes from traffic and 24 per cent of people were fairly concerned.

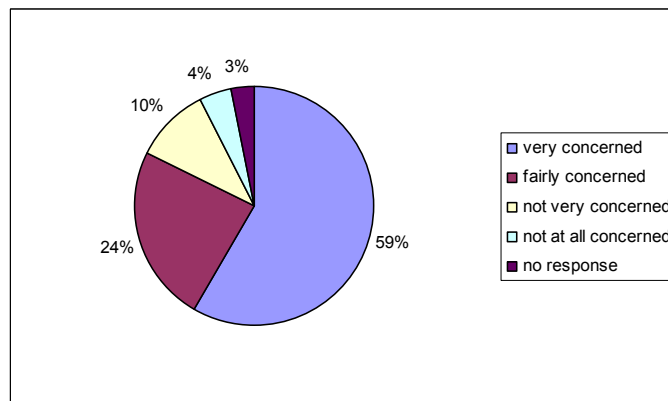


Figure 14

12.10 More respondents showed concern about exhaust fumes from traffic than the effect of transport on climate change. Three out of four of the respondents who said they were not at all concerned about the effect of transport on climate change said they were fairly concerned about exhaust fumes from traffic. This would indicate that the issue of climate change is more remote and intangible whereas the health issues caused by the effects of exhaust fumes are important issues. Perhaps there also is a lack of knowledge around how climate change will impact upon the city in the future. The age group data has shown a trend in a lack of concern from the younger age groups (18-24 and 25-34). The trend also shows that the higher the age group, the more likely they are to be concerned about the effect of transport on climate change and the effect of exhaust fumes on traffic.

3. *Sunderland is aiming to cut its carbon emissions by 29% by 2020 and 80% by 2050 and has an action plan to achieve this for the city. How important do you think it is for Sunderland City Council to contribute to this by reducing its own carbon emissions?*

12.11 61 per cent of respondents felt this was very important, whilst 33 per cent felt it was fairly important, demonstrating that there is support for the council in making a contribution to the reduction of carbon emissions.

- 12.12 Once again, those who felt it was not at all important or not very important were all from the 18-24 age category. This might suggest that younger people do not see the reduction of carbon emissions as a priority, or have a more limited knowledge or understanding of the council's role.

Manufacturing Emissions

- 12.13 The Committee wanted to explore the carbon footprint of manufacturing EVs due to the contention that the vehicle is not truly zero emissions until the manufacturing process and the source of electricity to charge the vehicle are also zero emissions. Whilst it is true that Electric vehicles produce more emissions than conventional cars in production, they still have a far lower carbon footprint over their lifetimes.
- 12.14 Smith's Electric Vehicles confirmed that currently there is no industry standard against which to measure emissions as each manufacturer has very different operations, supply chains etc. That being said some targets are expected from OLEV in 2012. As a responsible manufacturer Smith's continuously monitors its carbon footprint; to make the Washington plant carbon neutral it needs to produce 200 vehicles or more per year - currently, the plant produce in excess of this amount. In addition, Smith's works with its supply chain to encourage further reductions in emissions.

Commitment to Cleaner Air

- 12.15 The Committee found that other local authorities have set out a clear intention to reduce carbon emissions to improve the health of its residents. When Liverpool was declared a city-wide Air Quality Management Zone, the City Council amended its vehicle replacement programme to have regard for emissions other than carbon dioxide (CO₂) such as particulate matter (PMs) and nitrogen oxide (NO_x) which are harmful to human health. Diesel vehicles emit lower CO₂ emissions than petrol vehicles, but significantly higher PMs and NO_x.
- 12.16 The savings made by having low carbon vehicles in the council's fleet have been marginal; however the City Council wants to make a clear statement of intent to reducing emissions in the city. It has extended its commitment to reducing emissions from transport by arranging for 240 employees to attend free 'smarter driving' training which will save 82 tonnes CO₂ / year when the acquired driving skills are transferred to domestic cars. In addition, a corporate Drivers Handbook has been produced which contains tips on clean driving. The handbook is currently being issued to all staff that use a vehicle for council business.
- 12.7 The City Council has also lowered its fleet emissions through a range of other measures, including replacing vans and larger cars with small, 'city' cars whenever possible and giving officers who have high mileage claims access to lower emission lease vehicles for business use in order to reduce the amount of miles driven in their own vehicles.

12.8 The Committee referred to the Sunderland Strategy and the many supporting policies in place which aspire for the city to be 'cleaner and greener'. It was acknowledged that the adoption of electric vehicles into fleet operations would be a significant step towards achieving this, however, this alone would not assist the city in meeting its own target of reducing emissions by 80 per cent by 2050. Instead, this should be seen as one part of a much wider drive to reduce carbon emissions from transport from the council and its workforce.

13. TECHNOLOGY/SUITABILITY

13.1 The Committee agreed to consider all forms of low-carbon transport and technology during the course of the review but took a view that there should be a focus on electric vehicles as this is of key economic importance to the city.

13.2 There remain many questions surrounding low-carbon vehicles and the Committee recognised there are still significant gaps in knowledge and understanding, not only in research and development but also in consumer/business attitudes to these products.

Electric Vehicles

13.3 Electricity is one of the practical options available as an alternative to oil, as it can be produced from sustainable sources and can be readily supplied. Charging costs are substantially less than petrol or diesel engines, from £1.03-£4.01 per 100 miles (which is the average range of an electric vehicle). Recently there have been considerable advancements in technology in regard to this type of vehicle and improvements have been made in terms of range and driveability.

13.4 The Committee found that electric vehicles would not be suitable for everybody and stakeholders in the low-carbon vehicle industry expect a realistic take up of electric vehicles would be around 10 per cent by 2020-2025, accounting for the challenges still to be addressed.

13.5 To date there has been limited take up of electric vehicles in the delivery of services, particularly in the public sector. Smith's Electric Vehicles informed the Committee that larger private sector organisations are starting to recognise the benefits of using electric vehicles and it's customers include:-

- Pepsi Co
- Transport for London
- John Lewis (transportation of customers);
- DHL (delivery of goods);
- Sainsburys (delivery of internet grocery shopping);
- TNT Express (delivery of goods);
- Royal Mail (parcel and post distribution); and

- Balfour Beatty.

Sainsburys

Sainsbury's is the third largest chain of supermarkets, operating 567 supermarkets and 377 convenience stores. In 2005 Sainsbury's Online trialled Smith Electric Vehicles (the Edison) in its home shopping delivery applications in and around Central London. The 3.5 tonne vans were modified to meet Sainsbury's specific requirements for its urban online deliveries, with each vehicle restricted to 40 miles per hour with a range of 60 miles per day.

Each zero emission van saves 5 tonnes of CO₂ per year – the equivalent of one round trip from London to Rio de Janeiro, or the entire annual CO₂ footprint of a small UK household. Sainsbury's find that the electricity used to power its electric vehicles generates around 50 per cent less CO₂ than diesel vans, as well as reduced particulates, NO_x and noise. Other key benefits realised through the trial included reduced running costs (fuel savings, congestion charge exemption, tax breaks, etc), reduced maintenance costs and improved driver safety and drivability.

Additionally, the use of greener technologies has proven to be a soft benefit as the company's stakeholders are increasingly valuing emission free operations.

The trial established the importance of having robust charging routines in place and close ties to electric vehicle maintenance providers. The electric vehicles are plugged in whenever they are at the store; there are three drop off cycle's per day and they charge for ½ hour between these runs. They return to base for the last time at around 10pm and the vehicle has its main charge overnight. Driver training has also been key in ensuring drivers are maximising the potential of the vehicle; for instance through regenerative braking.

- 13.6 Smith's has worked with some local authorities through the LCVPP to introduce electric vehicles into council fleets including Gateshead, Newcastle, Islington and Camden. Wakefield University has also taken up the use of an electric minibus to transport students between campuses.

Addressing public perceptions and the EV urban myths

- 13.7 The Committee understood that a number of public perceptions had built up around low carbon vehicles and in particular electric vehicles, and considered that business perceptions may mirror those of individual consumers and this is likely to be contributing to the reluctance across all sectors to embrace these types of vehicles.

- **Cost**

- 13.8 Smith's Electric Vehicles confirmed that that the biggest concern for business in adopting electric vehicles into fleets is the initial high capital cost. The Committee understood this was also the case for individual consumers, however it was considered important to promote the longer term view to give the appropriate context to the initial costs of purchasing an electric vehicle.

- 13.9 The Committee strongly felt that it was the ten year time period that would prove the most attractive to organisations and would give the most incentive to switch to electric vehicles, however serious questions remain as to the state of the vehicle after a ten year period, particularly where the service provided involves heavy and prolonged usage.
- 13.10 SASMI considered that the advent of Nissan and Renault's mass production of all-electric transit vans will increase the accessibility and usage of the electric van in fleet services by substantially lowering the capital cost for purchase. The Committee felt this would make electric vehicles a significantly more economically viable option for the Council.
- 13.11 An effective way of reducing cost barriers would be to provide leasing or financing arrangements and as such a number of partners in the financial sector were now signed up to assisting potential customers of Smith's. The Committee agreed that a lease option may be considered by Sunderland City Council given the difficult financial constraints within which it is now working.
- 13.12 Another issue considered by the Committee was the lifespan of an electric vehicle battery and costs to replace the battery. Reports throughout the evidence gathering were mixed, however it was understood that the battery becomes 80% efficient after 5-10 years, determined by the quality of the battery. A replacement battery could cost up to £10,000 - this should reduce - but only if demand and production increases.
- 13.13 In addition, the Committee learnt that a number of new 'second life' industries are emerging to make use of batteries that no longer have the efficiency to power an electric vehicle. Several examples were given to the Committee including:-
- Energy storage for wind farms, and in third world countries with a large supply of energy from the sun;
 - As back up generators for services that require an unbreakable power supply such as banks, hospitals and the emergency services; and
 - To power ships.
- 13.14 The second life concept for future business opportunities remains unknown but could yield substantial economic benefit dependant on what that reality may be in 10-15 years. If a strong, viable market existed, ultimately, this 'second life' would give the battery a residual value which the owner of the vehicle (in this instance, the council or other public sector bodies) could off-set against the cost of a replacement battery. It would also reduce the initial purchase price of an electric vehicle as the current cost includes disposal.
- **Vehicle Performance**
- 13.15 Electric vehicles are often marketed as having a 100 plus mile range however the Committee gathered from a range of sources that this could be somewhat optimistic. Unlike an internal combustion engine (ICE), electric vehicles do not produce excess heat with which to heat the vehicle, operate the windscreen wipers or use the radio. The vehicles are therefore fitted with a

3kw power system to provide this capacity. Other local authorities have found that this does significantly affect the vehicle range. In addition the topography of a route will also reduce the range. The Committee felt the council would need to consider the actual range for the city as each local area has its own unique 'fingerprint' in terms of topography and traffic.

- 13.16 Smith's advocated the use of electric vehicles for use within local authority fleets as vehicles tend to cover static routes over small geographical areas which are well within the range of the vehicle.
- 13.17 The Committee however, found that experiences of electric vehicles within council fleets were mixed. Coventry City Council reported that one user travels between Coventry and Sheffield on the M1 every day (a journey of 75 miles) and had experienced no difficulties. Gateshead also reported no issues of range; the electric vehicles in its fleet had an average range of 70, which was well above the average daily use.
- 13.18 Newcastle City Council had trialled a home-use project whereby staff were encouraged to take the electric vehicles home for several days to test the range availability and the suitability for home charging. There were no issues with range but there were reports that problems can occur when additional lighting or long hours are required.
- 13.19 Liverpool City Council found that whilst the cars drove very well there were issues with actual range, which was between 50 and 70 miles instead of 100 as listed. This greatly reduced in the winter when cars' heaters and windscreen wipers were in use more. In addition, if the vehicle is not switched off in the correct way the battery runs flat and the vehicle has to be returned to the manufacturer for up to two weeks.
- 13.20 It became apparent to the Committee that it was widely acknowledged in the industry that reduced range and other issues could often be attributed to the way the vehicles are driven. Smith's had found there was a range increase of up to 30% when driven by a trained driver. AMAP has also evidenced this and introduced the DrOpLET (Driver Optimisation for Low Emissions Transport), which investigated the impact of different driving styles for both battery usage and fuel consumption. It found that upon completion of the training, drivers had typically saved 25% on fuel costs whilst battery usage could be improved by up to 100%.
- 13.21 Those local authorities who had introduced electric vehicles into the fleet operations agreed; Coventry City Council, Gateshead Council and Liverpool City Council had all taken steps to ensure drivers were fully trained in the use of EVs. This training was delivered by the Energy Saving Trust. The Committee considered that, should the Council adopt electric vehicles into its fleet, appropriate training for drivers should be taken into account, to address these issues before they occur.

- **Safety and Maintenance**

- 13.22 The Committee raised a concern in regard to the increased chance of road accidents due the greatly reduced noise of the vehicles. It was clarified that

electric vehicles do not operate silently however a noise generator can and has been fitted to make them more audible to pedestrians. The Committee has long promoted pedestrian safety on the city's roads and felt that issue this would be something to bear in mind, given the Council's fleet would be operating in all weathers and at all times of the day and night.

13.23 It was acknowledged that, at the present time very little was known among the emergency services about the consequences of an accident involving one or two electric vehicles in comparison with ICE vehicles. This has been recognised as an issue and Northumbria Police and Gateshead College have begun to investigate the possible outcomes of road accidents involving electric vehicles and provide appropriate training to those who would attend such accidents. In addition ElecScoot will shortly be providing training to the RAC to enable them to assist users.

- **Charging and Infrastructure**

13.24 In order to charge an electric vehicle at home an individual consumer requires a 'home charging kit' however for a larger 'fleet' electric vehicle, dedicated charging points are unnecessary; as long as the vehicle is returned to base at the end of each shift it can be charged using what is in effect an electric socket which can be installed for as little as £100.

Hybrid Vehicles

13.25 The Committee found that beside electric vehicles, hybrid vehicles were the most established technology currently available in the low-carbon market. In some respects hybrids are equally as attractive as the all-electric vehicles; whilst the emissions are higher, the requirement to charge is mitigated by the ICE contained within the vehicle.

13.26 For the delivery of some services, public transport, for example, electric vehicles are not currently fit for purpose due to the limited range, and in these cases hybrid vehicles offer a reasonable alternative to those organisations wishing to address carbon emissions through its fleet.

13.27 Go NorthEast reported that the hybrid vehicles in its fleet account for an improvement in fuel consumption of between 15%-20%, however the cost of the bus is prohibitive at £100k, even taking into account the savings made in fuel reduction. It clearly stated that until the cost reduces it would be unable to utilise this vehicle option as much as it would wish to.

13.28 The Committee considered that it would be sensible for the Council to give consideration to hybrid vehicles for the delivery of any service whereby the range was greater than 70 miles or the capacity to regularly charge an electric vehicle was not possible.

Vehicles Powered by a Hydrogen Fuel Cell

13.29 The Committee found that many people, including those in public transport and research, felt that the advantages of hydrogen fuel cell technology would be hugely important for the future as it releases zero emissions, although at

the current time several issues were still to be resolved which were holding up hydrogen as a viable option for fuelling transportation.

- 13.30 AMAP has been conducting research and development for the hydrogen fuel cell. Its first project consisted of an Almera donated by Nissan which was adapted to run on hydrogen gas. The project was designed to assess the characteristics of hydrogen; to check vehicle performance; health and safety issues; and the cost implications attached. The University worked with local SMEs on this project to help train them in the use of hydrogen to power vehicles.
- 13.31 A hydrogen tank was fitted into the boot of the vehicle, however due to the size of the tank the vehicle would not be useful as a family car. This view was echoed by SASMI who felt that the hydrogen fuel cell's main use would be SUVs, vans, buses and lorries and would therefore be a feasible option for use in the delivery of services.

Bio-fuel

- 13.32 The Committee found that this technology appeared to have had limited take up among local authorities, however Camden City Council had commissioned research to investigate the life cycle environmental impacts of road transport biofuels to inform the fleet procurement policy. Three biofuels (biomethane, biodiesel and biofuel) were compared to conventional diesel and petrol vehicles. Biomethane was shown to have the lowest overall environmental impacts, based on air quality and green house gas emissions. Biomethane is also a renewable transport fuel as it is derived from methane gas released during the decomposition of organic waste.
- 13.33 Following these results Camden embarked on a biomethane vehicles trial in partnership with Veolia Environmental Services Ltd, Iveco and Gasrec and as a result of the positive outcome of the trial and research project, Camden introduced 15 compressed biomethane vans in December 2010 manufactured by VW Caddy and Mercedes Benz.
- 13.34 The debate continues in regard to the sustainability of biofuels. Whilst they have the potential to provide a renewable source of fuel, there is a risk of an adverse social and environmental impact which could actually increase in carbon emissions. The Committee agreed that whilst biofuels continued to come under significant scrutiny, the Council should continue to keep a watching brief on future developments.

14. CONCLUSIONS

- 14.1 The Scrutiny Committee have made a number of conclusions based on the evidence gathered throughout the review. These are:-
- (a) The targets set out within the Climate Change Act 2008 highlight the extent of the task faced nationally, regionally and locally, and there are significant financial and environmental implications should the target be missed. It is therefore imperative, particularly in the context of mounting budgetary

pressures, that this agenda continues to be given the highest priority allowing for the financial position of the Council;

- (b) The Fleet and Transportation Review of the Council is timely, and will be supported by the evidence gathered throughout the Policy Review. Whilst this Review places more emphasis upon electric vehicles it is acknowledged that there are limitations on their use as part of the Council's fleet and it is therefore sensible to consider all types of low-carbon technology. The longer time period of the research and development project in partnership with the University of Sunderland will give the Council the maximum scope to find the range of options that best suit its need;
- (c) Improvements to public transport in the city, and across the region will have a unique contribution to make in reducing carbon emissions and the continuation of the improvement journey in line with European legislation and beyond will be essential;
- (d) The research and analysis undertaken by Cenex provides evidence advocating the adoption of electric cars into the Council's fleet. In addition, the Council may now provide other local authorities and public sector bodies with a robust business case, not previously available;
- (e) The potential benefits of regional procurement are acknowledged, particularly in order to meet the objectives for reducing carbon emissions and supporting a developing industry in the region; however further investigation to ensure this is the better option. Additionally the opportunities afforded to regional suppliers should be maximised whilst giving due regard to EU procurement rules;
- (f) There is little doubt that, with such emphasis within the city's Economic Masterplan on low-carbon industries and technology that the success of low-carbon vehicles is fundamental to the success of the city's economy and that the Council must show itself to be leading the way if it expects other organisations and individuals to follow;
- (g) A previous recommendation of this Scrutiny Committee as part of the Policy Review 'Sunderland the Place' in regard to raising the profile of the city is ever pertinent if the city is cement its position as a low-carbon city. This should be continually reviewed to ensure the city is getting the right messages to those outside and within the city;
- (h) It is important that the Council doesn't consider the adoption of electric and other low-carbon vehicles into the fleet in isolation, and considers other appropriate measures that can be easily and readily implemented to reduce carbon emissions from transport by the Council and its workforce;
- (i) At the present time consumer confidence in electric vehicles is low. A number of 'urban myths' have built up around this mode of transport and it is reasonable to suggest that an appropriate charging infrastructure and a raised profile of electric vehicles on the roads of the city will go some way to fostering consumer confidence;

- (j) Electric vehicles drive and look the same as a traditional car, however there are distinct differences and the mishandling of an electric vehicle can reduce its performance by up to 30% and damage the battery. Effective training for drivers can, for the most part mitigate this;
- (k) The consideration of leasing vehicles rather than purchasing them outright may mitigate the financial risks involved to the Council;
- (l) At the current time the focus should be on setting appropriate goals in regard to reducing carbon emissions through the Council's fleet. Only once progress has been made in this regard can the Council effectively encourage partners, suppliers and contractors to utilise low-carbon vehicles; and
- (m) At the current time it is not financially feasible to introduce larger electric vans into the Council fleet, however as the capital costs of these vehicles reduce the Council should be ready to re-visit the cost benefit analysis. Whilst some of the technology covered within this Policy Review is at different stages and more or less was known low-carbon vehicle technology is moving at pace and the Council should fully exploit new technologies if it will enable the delivery of improved services to residents, reduced costs and protect the environment.

15. RECOMMENDATIONS

15.1 The Environment and Attractive City Scrutiny Committee has taken evidence from a variety of sources to assist in the formulation of a balanced range of recommendations. The Committee's key recommendations to the Cabinet are as outlined below:-

- (a) That the Scrutiny Committee be informed of the outcome of the Fleet and Transportation Review and progress in regard to implementation;
- (b) That the Council considers implementing appropriate targets for the replacement of its current fleet cars with electric counterparts based upon the findings and recommendation of Cenex with a view to revisiting the cost benefit analysis for larger vans as capital costs change;
- (c) That the Council considers an electric car pool system for its staff and that the appropriateness of extending this to the wider community is investigated;
- (d) That the Council commissions a comprehensive training programme for drivers should electric vehicles be utilised within the fleet;
- (e) That the impact of efforts made to establish the city as a 'Low-Carbon City' be continually monitored to ensure tangible benefits to the city;
- (f) That the Council considers a range of innovative methods of reducing carbon emissions from all forms of transport and keeps a 'watching brief' on the developments of technology for low-carbon vehicles;
- (g) That the Council explores ways in which to encourage partners to explore the use of low-carbon vehicles where appropriate;

- (h) That the Council collaborates with NEPO to present the business case to the region's local authorities and other public sector bodies, to gain the level of commitment required to progress this agenda;
- (i) That NEPO considers undertaking further research and analysis to ensure there is clear business case for regional procurement;
- (j) That any procurement, whether regional or the Council acting as an individual organisation, maximises the opportunities available to local suppliers; and
- (k) That the Committee receives specific progress updates on the improvements to public transport in regard to reducing carbon emissions as part of wider annual updates given by Nexus.

16. ACKNOWLEDGEMENTS

- 16.1 The Scrutiny Committee is grateful to all those who have presented evidence during the course of our review. We would like to place on record our appreciation, in particular of the willingness and co-operation we have received from the below named:-

Les Clark, Head of Street Scene, Sunderland City Council

Paul Muir, Engineer, Sunderland City Council

Ian Bell, Fleet and Transport Manager, Sunderland City Council

Julie Elliott MP, Sunderland Central

Sharon Hodgson MP, Washington and Sunderland West

Bridget Phillipson MP, Houghton and Sunderland South

Geoff Allison, Smith Electric Vehicles

Bernard Garner, Nexus

Kevin Carr, Go North East

Robin Knight, Stagecoach Group

Adrian Morris, University of Sunderland

Paul Gough, Gateshead College

Dr. Colin Herron, Zero Carbon Futures, Gateshead College

Ian Taylor, North East Purchasing Organisation

Gordon Mockett, Smiles Engineering

Chris Baylis, Avid Technologies

Mark Nailis, Innova Power

Ian Allison, Elecscoot

17. BACKGROUND PAPERS

17.1 The following background papers were consulted or referred to in the preparation of this report:

- (a) Sunderland Strategy (2008-2025)
- (b) Sunderland Economic Masterplan (2010)
- (c) Weather and Climate Risk Management Strategy: Revision 1
- (d) Local Transport Plan 3 (2011)
- (e) Climate Change Act (2008)
- (f) DECC: Carbon Plan (March 2011)
- (g) DfT: Ultra Low-carbon Vehicles in the UK (2009)
- (h) Committee on Climate Change, Surface transport:
www.theccc.org.uk/sectors/surface-transport
- (i) DfT/OLEV: Making the Connection: The Plug-In Vehicle Infrastructure Strategy (2011)
- (j) Committee on Climate Change - Third annual report to Parliament, 'Meeting carbon budgets' (2011)
- (k) SMMT Environment: Electric Car Guide 2011
- (l) RAC Foundation: Shades of Green – Which low-carbon cars are the most eco friendly? (2011)
- (m) DECC: **www.decc.gov.uk**

18. GLOSSARY OF TERMS

Biofuel	Biofuels are fossil fuel substitutes. They can be made from a range of agricultural crops, usually oily crops for biodiesel and crops rich in sugars or starch for bioethanol. By-products and wastes like used cooking oil, tallow and municipal solid waste can also be used to produce biofuels. Blended into fossil fuels in small proportions, bioethanol and biodiesel can be safely used in today's road vehicles.
CRT	Continuous Regeneration Traps - an emission control technology that contains a Platinum catalyst and a particulate filter. It is designed for use with large diesel engines, particularly large trucks and buses.
CNG	Compressed Natural Gas – Stored in a high-pressure container (usually at 3000 to 3600 psi) it is used mainly as an alternative fuel for internal combustion engines (such as automobile engines). It generates low hydrocarbon emissions, but a significant quantity of nitrogen oxide emissions.
CO2	Carbon Dioxide
DECC	Department for Energy and Climate Change
DfT	Department for Transport
EGR	Exhaust Gas Recirculation - In internal combustion engines, exhaust gas recirculation is a technique to reduce nitrogen oxide (NOx) emissions used in petrol/gasoline and diesel engines. It works by re-circulating a portion of an engine's exhaust gas back to the engine cylinders.
EMP	Economic Masterplan
EV	Electric Vehicle - any vehicle powered, in part or in full by a battery that can be plugged into a mains electricity supply and has zero emissions at the point of use.
GHG	Greenhouse Gas
Hybrid	A hybrid vehicle is a vehicle that uses two or more distinct power sources to move the vehicle. Most hybrid electric vehicles combine an internal combustion engine and one or more electric motors.
Hydrogen Fuel Cell	A device that converts the chemical energy from a fuel (hydrogen) into electricity through a chemical reaction with oxygen or another oxidizing agent.
ICE	Internal Combustion Engine
LCVPPP	Low-carbon Vehicle Public Procurement Programme
LCVIP	Low-carbon Vehicles Innovation Platform

Li-ion	Lithium ion battery - is a family of rechargeable battery types in which lithium ions move from the negative electrode to the positive electrode during discharge, and back when charging.
LTP3	Local Transport Plan 3 2011-2021
NEPO	North East Purchasing Organisation
NiMH	Nickel Metal Hydride – a type of rechargeable battery which uses a hydrogen absorbing alloy for the negative electrode.
NTM	National Transport Model
NOx	Mono-nitrogen oxides – A combination of NO and NO ₂ (nitric oxide and nitrogen dioxide). They are produced from the reaction of nitrogen and oxygen gases in the air during combustion, especially at high temperatures. In areas of high motor vehicle traffic, such as in large cities, the amount of nitrogen oxides emitted into the atmosphere as air pollution can be significant. NOx gases are formed everywhere where there is combustion – like in an engine.
SCCP	Selective Catalytic Conversion Process – a technology which uses ammonia to break down dangerous NOx emissions produced by diesel engines into nitrogen and water.
ULCVD	Ultra Low-carbon Vehicle Demonstration
ULSD	Ultra Low Sulphur Diesel

Contact Officer: Helen Lancaster - Scrutiny Officer
Office of the Chief Executive – Scrutiny and Area Arrangements
Telephone: 0191 561 1233
Email: helen.lancaster@sunderland.gov.uk

Appendix 1

Environment and Attractive City Scrutiny Committee Public Consultation – Low Carbon Vehicles

A consultation was carried out with members of public over a two week period at the customer service centre in Sunderland city centre. 67 residents participated in answering 4 simple questions to gain their views on the reduction of carbon emissions through the provision of low carbon vehicles. This is a very small sample size in comparison to the population therefore the following findings should be taken in context. The purpose of the consultation was to give a snapshot of the public opinion around the introduction of low carbon vehicles to the Council fleet.

Of the 67 respondents, 42 were female (63%) and 24 were male (36%). Responses came from a broad range of age groups, and there was a good response in particular from those aged 18-24.

Sunderland is aiming to cut its carbon emissions by 29% by 2020 and 80% by 2050 and has an action plan to achieve this for the city. How important do you think it is for Sunderland City Council to contribute to this by reducing its own carbon emissions?

61% of respondents felt this was very important, whilst 33% felt it was fairly important, demonstrating that there is support for Sunderland City Council in making a contribution to the reduction of carbon emissions.

Interestingly, those who felt it was not at all important or not very important were all from the 18-24 age category. This might suggest that younger people do not see the reduction of carbon emissions as a priority, or have a more limited knowledge or understanding of the Council's role.

To what extent do you agree or disagree that the Council should replace its vehicles with electric vehicles when they are due to be replaced?

55% of respondents felt this was very important, whilst 33% felt it was fairly important. This might suggest strong support from residents for electric vehicles to be used within the Council fleet when the time comes to replace older vehicles.

Similarly to the first question, those who answered 'strongly disagree or 'tend to disagree' were mainly from the 18-24 age group.

How concerned are you about the effect of transport on climate change?

There was a mixed response to this question. A third of respondents were very concerned about the effect of transport on climate change, whilst almost half said they were fairly concerned and one fifth did not show much concern.

How concerned are you about exhaust fumes from traffic?

An overwhelming 59% of respondents said they were very concerned about exhaust fumes from traffic and 24% of people were fairly concerned.

More respondents showed concern about exhaust fumes from traffic than the effect of transport on climate change. Three out of four of the respondents who said they were not at all concerned about the effect of transport on climate change said they were fairly concerned about exhaust fumes from traffic. This would indicate that the issue of climate change is more remote and intangible to residents where as the health issues caused by the effects of exhaust fumes are. Perhaps there also is a lack of knowledge around how climate change will impact upon the city in the future.

The age group data has shown a trend in a lack of concern from the younger age groups (18-24 and 25-34).

The trend also shows that the higher the age group, the more likely they are to be concerned about the effect of transport on climate change and the effect of exhaust fumes on traffic.

	No. of people concerned about the effect of transport on climate change				No. of people concerned about exhaust fumes from traffic			
	Very	Fairly	Not very	Not at all	Very	Fairly	Not very	Not at all
18-24	1	4	8	2	1	7	5	2
25-34	1	4	8	2	1	7	5	2
35-44	2	4	1	1	4	3	1	0
45-54	5	7	0	0	9	3	0	0
55-64	3	5	0	0	6	1	1	0
Over 65	6	2	0	0	6	1	1	0

When considering the responses by gender, there was a trend amongst females showing slightly more concern about both the effect of transport on climate change and the effects of exhaust fumes.

Conclusions

- There was strong support from respondents for Sunderland City Council making a contribution to the reduction of carbon emissions.
- The majority of respondents agreed that the City Council should replace its vehicles with electric vehicles when they are due to be replaced.
- Respondents showed significantly more concern for the effects of exhaust fumes than the effect of transport on climate change.
- There appears to be less concern and interest about climate change and the use of electric vehicles from younger people.

Appendix 2

Inova Power/The Hydrogen and Fuel Cell Co-operative

Inova Power has developed a hydrogen generation system which is designed for vehicle and stationary use. Recognising the demands of the consumer in terms of extending the range of electric vehicles, it is collaborating with a large EU consortium of companies in France, the UK and Spain to utilise the technology in a major fuel cell vehicle demonstration on a project called HyVan, which will produce 50-100 electric and fuel cell range extended vehicles.

Inova has approached Smith Electric Vehicles to produce the vehicles. A network has been developed, which includes County Councils (across the country), a major multiple super market chain and a port, all of which will take part as the end users of the vehicles in the UK. The project will run for 24 months and will involve the construction of a chain of H2 refuelling stations across the 3 main countries. An estimated start date for this programme will be the end of 2012.

The Hydrogen and Fuel cell Co-operative is a not for profit venture made up of 6 SME companies and Sunderland University's AMAP Institute. The Co-operative has come together as a supply chain which can deliver a hydrogen infrastructure. There are two projects currently in place, linked to building a Hydrogen Corridor to Scotland.

Inova will collaborate with Gateshead College and will be run by Aberdeen City Council. The project is part of a North Sea Interreg (an EU-funded programme that helps Europe's regions form partnerships to work together on common projects). The Co-operative is positioning itself with others to influence policy in the UK and Europe, ensuring the North East region is in the best position to influence and win funding and contracts.

In addition Inova is developing a modular design for a new type of portable refueling station and a renewable energy storage system for both wind and solar. This is linked to organisations in Canada, Scotland, Norway and the Co-operative is hoping to utilise technology from a North East Blue chip based in the Team Valley.

Avid

The AVID Technology Group Ltd is an engineering business that designs and manufactures low and zero emission vehicle technology products and specialist electric vehicles.

AVID Vehicles Ltd was set up with colleagues in ComeSys Europe Ltd with the intention of creating products for ComeSys to manufacture. The company has built a range of electric vehicles including Range Rover, sports cars, CUE-V City car, Electric UTV and supported many other projects in its first year.

There are 3 companies operating in the group; AVID Technology making components, AVID Inovations managing client projects and AVID Electric Vehicles building production electric vehicles. Chris is now focusing on business and IPR development for the group.

AVID Electric Vehicles manufactures an affordable, practical, zero emission vehicle; the eBear. This type of vehicle is known as a UTV which stands for Utility All Terrain Vehicle. UTVs are designed to go on and off road, and be used for a wide variety of applications. The global market for UTV's is around 1 million units per year.

eBear uses less than 1 pence of electricity per mile and also benefits from free road tax and 100% enhanced capital allowance (in the UK). It is available to users in the commercial and industrial sector and has many inner urban applications. It can be fitted with a range of attachment options such as snow ploughs and grit spreaders as well as different body options.

AVID Innovation licences technology and provides engineering development services for leading global vehicle manufacturers and tier 1 suppliers. It helps customers develop the vehicles and powertrain the components of tomorrow; providing expertise, knowhow and IP in control systems, electric vehicles and hybrid vehicles.

AVID Technology makes products and systems that control vehicle emissions and improve fuel efficiency with a team of specialists in the areas of drive-by-wire controls, thermal systems and mobile electronics. The drive by wire controls can be found on construction machinery, trucks, buses and niche vehicles from leading global brands helping customers to meet ever more demanding government legislation for exhaust emission quality.

AVID's advanced thermal systems are used by bus manufacturers and operators to reduce fuel consumption and emissions, and by hybrid and electric vehicle manufacturers to control the temperature of the sensitive power electronics.

Elecscoot

Elecscoot Ltd was established in 2007.

The original idea was to source vehicles from the Far East and retail them here in the UK and Europe.

We now have a power train that to date has a zero failure, meaning the company has gone from 100% return to zero returns. Elecscoot has had a brand new scooter designed and developed here in the North East, and will also be completing the Controller and BMS (what does this stand for?) in the near future which is hoped will be the best in the world market to date.

From its experience Elecscoot also recognised there was little or no training available to enable people to extend their current trade or to enter into the world of EVs. As a result of that Elecscoot has written a course which is currently being evaluated for an accreditation.

Elecscoot works with contacts in many areas including the unemployment sector and will be offering this course to those currently unemployed, particularly aiming at those aged 16 to 25. Participants can sit the course from the very start and come away with certificates allowing them to work on EVs and in any sector of this industry. Once they have sat the courses and passed guarantee placements will be made available for them, thus bringing the unemployment levels down.

Elecscoot feels courses like these are invaluable to organisations such as the City Council and its garage maintenance teams. Participants can do the courses on day release, and then become certified to work on High Voltage EV systems, again a huge bonus for councils having qualified staff to service and repair electric vehicles.

Elecscoot also runs a basic introduction course which they highly recommend to anyone interested in the EV world and the demand there will be for qualified personnel in the very near future.

The basic course will cover the history of EVs, different types of power train, film footage of caring for the environment, older EVs and current models available, and some practical work where participants can observe a power train at work. The end of the course would outline what training is available, what areas will bring highest demand and the opportunity to book courses in advance.

Elecscoot's EV range is also extending to the 4 wheel market, particularly the commercial vehicles.

Elecscoot feels its pricing structure is geared up to be very competitive. It will be retailing 1 particular truck, with many different applications available from £18,000 plus vat, where other companies in the sector are charging £90,000 for a medium sized commercial vehicle.

To summarise Elecscoot is a company that has grown on demand, and although a smaller company, it will be a major player in the commercial and training sectors.

Smiles Engineering (NE) Ltd

Smiles specialises in engine and emission control systems for commercial vehicles predominantly for bus and coach operators. The business activity focuses on the engineering and development of bus engine repowers and its unique selling point is the ability to remove an existing engine and insert a new engine in its place.

The business has 30 years of experience initially specialising in the machining and remanufacture of engines for a wide range of applications. During this time the company gained a wealth of knowledge, experience and workforce skill sets. In 2009, the business was acquired by Gordon Mockett with a view to developing the existing scope of the company.

The company offers a range of services including engine repowers, chassis refurbishment, emissions control systems and diesel particulate filter cleaning (car/bus).

- Emissions Control Systems

Exhaust emissions are harmful to air quality and various after market systems have been designed and marketed to fit older vehicles, which have no emission control fitted as standard.

The purpose of the emissions control process is to maintain the system and clean the particulate filters. To do this the company has invested in equipment which cleans the filters by a baking process, as recommended by the major filter substrate manufacturers. The procedure tests the filter before cleaning; clean the filter; and re-test it. Tests are compared to determine how efficient the cleaning has been and if the filter is fit for further use. Smiles customers have included Go Ahead, Arriva, Stagecoach and Travel London, amongst others, and the bus operators find this process to efficient and economical.

- Engine Repowers

The ability to remove a Euro 3 or below engine and repower with a Euro 4, 4+ or 5, gives bus operators huge potential in terms of providing an economical alternative to purchasing a brand new bus and comply with European legislation. Engine repowers can improve fuel consumption by up to 80%, with the lowest improvement 15-20%.

Stagecoach, East Scotland have provided a bus for repower and will monitor fuel economy, performance and reliability 'in-service'. After an appropriate time, an evaluation will be carried out to determine whether the repower has achieved the expected efficiency of 1.5 to 2 miles per gallon. The data gathered from this will be used to market the repower to other prospective customers.

As the business grows there will be a requirement to recruit a skilled workforce of technical employees to support the engineering design and development.