

ENVIRONMENT AND ATTRACTIVE CITY SCRUTINY COMMITTEE

16 JANUARY 2012

LOW CARBON VEHICLES IN THE DELIVERY OF PUBLIC SERVICES REVIEW 2011/12: LOCAL AUTHORITY LOW CARBON FLEETS – CASE STUDIES

REPORT OF THE CHIEF EXECUTIVE

Strategic Priority: SP5 - Attractive and Inclusive City

**Corporate Priorities: CIO1 – Delivering Customer Focused Services, CIO4
– Improving Partnership Working To Deliver ‘One City’**

1. Purpose of Report

- 1.1 The report considers best practice from other local authorities with regards to progress made in the introduction of low carbon vehicles within council fleets.

2. Background

- 2.1 Following the initial scoping of the Policy Review on 25 July 2011, members have commenced evidence gathering in relation to Low Carbon Vehicles – the Delivery of Public Services in Sunderland.

3. Current Position

- 3.1 Evidence has been provided from six local authorities, both regionally and nationally.
- 3.2 This evidence contributes to the following terms of reference:-
 - (b) To consider national and European policy in regard to the use of low carbon transport in the delivery of 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; and
 - (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

Camden Council

- 3.3 Camden Council operate a 'green' fleet of approximately 250 vehicles comprising of a high proportion of low emission vehicles including electric (2%), hybrid (2%), biomethane gas (6%) and liquid petroleum

gas (65%), with 90% of the diesel fleet meeting the Euro 4 emission standard.

- 3.4 Camden has also introduced a fuel additive, Chemecol, to the vehicles in its fleet that reduces diesel fuel consumption leading to lower CO₂, PM₁₀ and NO_x emissions.
- 3.5 Camden have committed to undertaking 'smarter driver' training, to raise awareness about fuel efficient driving to officers using its fleet. This will help reduce fuel consumption and therefore lower the fleet's CO₂ and air pollution emissions. To support these changes to fuel consumption any exhaust emissions will be displayed as officers drive the training vehicle.
- 3.6 Camden 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.
- 3.7 Following these results Camden embarked on a biomethane vehicles trial in partnership with Veolia Environmental Services Ltd, Iveco and Gasrec to trial a biofuel known as biomethane gas in 2009. Biomethane gas was used to fuel one of Veolia's compressed natural gas refuse collection vehicles, an Iveco Daily.
- 3.8 The trial investigated the performance of biomethane fuelled Iveco vehicles in comparison with existing vehicles running on compressed natural gas, and compared air pollution emissions. The project demonstrated that biomethane gas is a commercially competitive and environmentally sound fuel that can be directly substituted for natural gas, with results showing that biomethane gas improves fuel consumption by 6% compared to natural gas, reduces PM₁₀ and NO_x emissions by 90% of the Euro 3 emission limits, and is well below the Euro 6 emission limit. Lifecycle CO₂ emissions revealed a reduction of 56%.
- 3.9 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.
- 3.10 Camden used a grant from the LCVPP to purchase three electric vans and one hybrid assist van in 2010.

Coventry City Council

- 3.11 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, as well as stating it is the heart of the automotive sector in the UK with an emphasis on the production of low carbon vehicles and components within the city.
- 3.12 The Council is a member of the Coventry Low Carbon Fleet Partnership and in 2010 it purchased 45 low carbon vehicles under the LCVPP. It currently has 52 LCVs in its fleet; these are mainly commercial vehicles (small vans). The vehicles are mainly hybrid as drivers take them home at night and charging would be an issue if they were fully electric. A total of 15% of its fleet are now low carbon vehicles. Coventry introduced the first LCVs to its council fleet in 1996 (10 Peugeot 106 vans) and were the first in the country to do this.
- 3.13 Coventry has been fortunate enough to be involved in many different programmes, some of them with funding attached to them. For example it has 105 vehicles on trial (until May 2012) as part of the TSB programme; it also has 18 charging points installed around the city for free. Cenex has also installed extra charging points for buses and it is expected to get 3 electric buses operating on a park and ride system in the near future.
- 3.14 The council has experienced no problems with range anxiety, the average day to day mileage is 26 miles, which is well within the vehicle's range. One user regularly travels between Coventry and Sheffield every day on the M1 (a journey of 75 miles) and has experienced no difficulties either. EON have provided driver training for Smart cars and Mitsubishiis, both vehicles have worked very well.
- 3.15 Because of its involvement with the LCVPP it has purchased all of its vehicles rather than leased them. The vehicles are used as part of a pool but also for specific use by the Street Pride team and for the delivery of wheelie bins.

Gateshead Council

- 3.16 In January 2011, two of Gateshead Council's zero emissions electric car fleet had completed over 7,000 miles, delivering key services to residents. The cars join a range of electric and low emissions vehicles in the Gateshead Council fleet delivering key services to residents.
- 3.17 The pair of Mitsubishi iMiev cars are part of Gateshead Council's efforts to cut carbon emissions, reduce fuel bills and accelerate the introduction of electric vehicles into regular use. Gateshead Council has become a national leader in low carbon technologies with its extensive fleet of electric, hybrid and low carbon vehicles and an ever growing electric vehicle charging infrastructure.

- 3.18 The cars are used as a normal part of Gateshead Council's vehicle fleet, transporting staff delivering key services. One of the vehicles is used as a pool car based at the Civic Centre, which can be used by any member of staff conducting work business. The other car is used by a team of technical officers who use the vehicle to carry out site visits in the borough. One of the vehicles can be classed as zero emissions, being charged by Britain's only publicly accessible solar powered charging station at Gateshead Civic Centre. The other is normally charged conventionally from a mains powered charging point. Not only have these vehicles reduced carbon emissions (similarly sized petrol alternatives to the two cars would have generated almost 1.5 tonnes of CO2 emissions covering the same distance); they have also had an impact on the cost of car mileage claims, which have reduced due to the ability to use the electric vehicle instead of employee's own private transport.
- 3.19 In addition Gateshead Council has 10 commercial vehicles which are from Smith's Electric Vehicles.
- 3.20 There are no reported problems of range anxiety; the battery life gives a maximum of 70 miles, which is well over the mileage that would be required from Gateshead Council on a day to day basis. There were some initial teething problems such as low volume of the vehicles, however reverse alarms have been fitted to address this. Staff have all been very keen to try out the technology and the regular users of the vehicles have been given driver training, provided by the Energy Savings Trust. Users have found that the heater does have quite a significant effect on battery life so this is kept turned off where possible.
- 3.21 No analysis has been undertaken in regard to financial savings as yet, however, the council is keen to introduce more low carbon vehicles in time as it believes it is the future for transport and want to be involved from the outset. Early involvement should mean it has the knowledge and experience to maximise the effectiveness of the vehicles.
- 3.22 Gateshead Council has won several awards for its efforts to reduce carbon emissions in its vehicle fleet. It was shortlisted in the Energy Savings Trust's 'Fleet Hero' awards.

Liverpool City Council

- 3.23 When Liverpool was declared a city-wide air quality management zone, the council amended its vehicle replacement programme to have regard for emissions other than carbon dioxide (CO2) such as particulate matter (PMs) and nitrogen oxide (NOx) which are harmful to human health. Diesel vehicles emit lower CO2 emissions than petrol vehicles, but significantly higher PMs and NOx. Therefore, wherever possible diesel vans have been replaced with petrol or hybrid electric

cars that emit lower CO₂, NO_x and PM's to reduce total emissions and improve driving visibility.

3.24 Liverpool was one of six councils initially selected to participate in the LCVPP, in 2010 it received the following vehicles;

- 4 electric city cars (Mitsubishi MiEV);
- 1 electric panel van; and
- 5 diesel / electric hybrid panel vans.

3.25 The experiences of Liverpool City Council in regard to the Mitsubishi MiEVs to date have been mixed. Whilst the cars drive very well, there have been issues with actual range, which is between 50 and 70 miles instead of 100 as listed. This greatly reduces in the winter when use of the cars' heaters and windscreen wipers increase. In addition, if the driver does not switch the vehicle off in the correct way this causes the battery to run flat and the vehicle has to be returned to the manufacturer for up to two weeks.

3.26 The City Council also operate one electric transit van and four hybrid vans. The hybrid vehicles, made by Ashwoods, have been found to be very reliable. Liverpool purchased a two outright, and some on contract hire, which was more difficult to compare because most of the costs were loaded upfront.

Purchase price (2010)

Conventional Transit	£17,078
Hybrid Transit	£28,308

3.27 The DfT paid all marginal costs in Phase 1 but Phase 2 may not cover all costs.

3.28 The savings made by having low or zero emission vehicles in the council's fleet have been marginal, however the City Council are making a clear statement of intent in regard to reducing emissions in the city. This links to Liverpool being an Air Quality Management Zone, so the implications of emissions are considered not only as a wider environmental concern, but also as in terms of the gases released that have a detrimental impact upon the health of its residents.

3.29 The City Council has extended its commitment to reducing emissions through 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.

3.30 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; ensuring drivers are trained to be 'smarter' drivers (delivered by the Energy Saving Trust); 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, often higher emission, vehicles.

- 3.31 At the national Fleet Safety Forum annual awards ceremony in July 2010, the City Council was Highly Commended in the Eco Fleet Management category for its commitment to addressing environmental issues in respect to fleet operations.

Newcastle City Council

- 3.32 Newcastle City Council is one of Cenex's pilot authorities involved in the LCVPP. Newcastle Council has purchased 25 electric vehicles for use within its fleet. The vehicles range from motorcycles to commercial vehicles and 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.
- 3.33 The City Council has trialled a home use project where staff were encouraged to take the electric vehicles home for a few days to test the range availability and the suitability for home charging. There were no issues with range but did report that problems can occur when additional lighting or long hours are required. The City Council's rubbish tipper for example is used 5 days a week from 8am-8pm and therefore has only a very short range meaning it can only be used in the city centre so that it is close to its charging point. The City Council felt strongly that there is an issue of public perception on range.
- 3.34 Newcastle Council has been involved in the Switch Electric Vehicle Demonstration Project. Switch EV is a project that will see 49 electric vehicles on trial across the North East region over a three year period from September 2010. It brings together a consortium of vehicle manufacturers, data collection experts and project managers. Many organisations and individuals will contribute toward making this a successful project and the key consortium partners include Nissan, Smiths Electric Vehicles, Liberty Electric Cars, Avid Vehicles, Simon Bailes Limited and Newcastle University.
- 3.35 At least 145 organisations and families will be given access to the vehicles for at least 6 months at a time. The project asks questions about electric vehicle use - whether they are fit for purpose, assessing their battery performance, and establishing people's existing and changing perceptions of electric vehicles. The project will also question the ability of EVs to act as a direct replacement to internal combustion engine vehicles in the future.




- 3.36 All Switch EV vehicles are fitted with data collection and transmission technology to capture real time GPS and vehicle data. This will be analysed to assess vehicle and recharging performance in many scenarios across the region, to better understand the impact of electric vehicles as part of the UK car fleet.
- 3.37 For trial candidates involved in Switch EV, the project can install domestic recharging units (Pod Points) at the individual's home address for the duration of the trial, free of charge through the Plugged in Places scheme.
- 3.38 A Nissan Leaf and Avid QV were trialled for six months amongst Newcastle City Council staff. Future Transport Systems monitored the performance of the vehicles being used in trial and the data should be come available in the near future. Currently another two Peugeot i-On vehicles are being trialled by Newcastle.
- 3.39 Newcastle are developing an evaluation tool comparing the use of it's electric vehicles against it's standard ICE vehicles. The evaluation considers aspects such as the cost of fuelling the vehicle (whether electric or diesel), range and battery performance. It is still under development and issues such as residual values, battery replacement and maintenance will be incorporated in to the tool as and when the information becomes available. The full evaluation can be found at appendix 1.
- 3.40 Newcastle compared the introduction of electric vehicles to the market place similar to that of mobile phones. Initially they are very expensive and demand is low however once the benefits start to become more evident and demand increases the costs should come down and better performing models will be produced.

4. Recommendation

- 4.1 That members of the Environment and Attractive City Scrutiny Committee note and comment on the information provided.

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Appendix 1: Newcastle City Council's Comparison of Cars

COMPARISONS BETWEEN ELECTRIC AND DIESEL MEDIUM SIZED CARS			
			
Vehicle make	Nissan	Ford Focus	Nissan
Model	Leaf	1.6TDCi Zetec	Leaf
Type	5 DR Hatchback	5 DR Hatchback	5 DR Hatchback
Length	4445mm	4358mm	4445mm
Height	1550mm	1461mm	1550mm
Width Incl Mirrors	1970mm	2010mm	1970mm
Kerbweight	1545kg	1344kg	
Gross Vehicle Mass	1965kg	1900kg	
Payload	420kg	556kg	
Power Source	Electric Motor	Ford 1.6 Duratorq TDCi Diesel (115PS) (Stop/Start)	Electric Motor
Drive	Fully Automatic	Durashift 6 Speed Manual	Fully Automatic
Fuel Source	Electricity	Diesel	Electricity
Fuel Capacity	23 kW Battery	11.66 Gallons	23 kW Battery
Current Fuel Cost May 2011	£0.09 kW/hr	£5.23 Gallon	£0.09 kW/hr
Refuel or Recharge cost from Empty or Flat	£2.28	£60.98	£2.07

Range from full capacity based on urban cycle figures	109miles	646miles	109miles
Total cost of Fuel 10,000 miles	£209.17	£943.50	£189.91
Recharge / Refuel Time	6 - 8 Hours	5 minutes	6 - 8 Hours
Warranty Details	3 Years Vehicle 5 Years all electric Components (60,000 miles)	3 years	3 Years Vehicle 5 Years all electric Components (60,000 miles)
MOT Requirements	Annual After First 3 Years	Annual After First 3 Years	Annual After First 3 Years
CO ² Emission Figure (g/km)	nil	109	
Purchase Price Excl VAT	£21,613.00	£13,112.32	Leased including maintenance
Annual Lease Charge based on a 5 year 60,000 mile Agreement Excl VAT			£4,141.00
Annual Finance Charge Based on a 5 year Specialised Repayment Plan (No Residual)	£5,100.12	£3,094.18	N/A
Maint	£866.34	£866.34	N/A
Tracking	£343.80	£343.80	£343.80
Admin	£444.97	£444.97	£444.97
Road Tax	£0.00	£20.00	£0.00
Total Annual SLA	£6,755.23	£4,769.29	£4,929.77
Total cost of Fuel 10,000 miles	£209.17	£943.50	£209.17
Combined Annual SLA Fuel Cost	£6,964.40	£5,712.79	£5,138.94
Cost per mile (10,000)	£0.70	£0.57	£0.51
Total SLA Costs over 5 years	£33,776.15	£23,846.45	£24,648.85
Total Fuel cost over 5 Years	£1,045.85	£4,717.50	£1,045.85

Combined SLA,Fuel Cost 5 Years	£34,822.00	£28,563.95	£25,694.70
Cost per mile (5 years 50,000 miles)	£0.70	£0.57	£0.51

Figures above are based on a Council Department Operation

Based on manufacturers estimates of a 15% reduction in maintenance

Residual Values aren't included above, but we know by past experience that the Diesel Focus would achieve at least 20% of the purchase price at auction (£2,622.00). This can't be said with regards to the electric leaf

Appendix 2: Newcastle City Council's Comparison of Vans

COMPARISONS BETWEEN ELECTRIC AND DIESEL FORD TRANSIT VANS WITH CENEX GRANT FUNDING				
Vehicle Make / Model	SEV ELECTRIC 350 TRANSIT	FORD 100 350 TRANSIT	SEV ELECTRIC 350 TRANSIT	FORD 100 350 TRANSIT
Type	LWB HIGH ROOF VAN	LWB HIGH ROOF VAN	MWB MEDIUM ROOF VAN	MWB MEDIUM ROOF VAN
Length	5680mm	5680mm	5230mm	5230mm
Height	2619mm	2619mm	2390mm	2390mm
Width Incl Mirrors	2374mm	2374mm	2374mm	2374mm
Gross vehicle Weight	3500kg	3500kg	3500kg	3500kg
Kerb Weight	2720kg	2047kg	2670kg	1993mm
Payload	780kg	1453kg	830kg	1507kg
Power Source	Electric Motor 90kW peak 239Nm peak	Ford 2.4 Duratorq TDCi Diesel 74KW (100PS) 2402cc	Electric Motor 90kW peak 239Nm peak	Ford 2.4 Duratorq TDCi Diesel 74KW (100PS) 2402cc
Drive	Fully Automatic	5 Speed Manual Gearbox	Fully Automatic	5 Speed Manual Gearbox
Fuel source	Electric	Diesel	Electric	Diesel
Fuel Capacity	47kW Battery	17.58 Gallons	47kW Battery	Standard 80 Litres Fuel Tank
Current Fuel Cost Sept 2011 £122.05 Litre	£0.10 kW/hr	£5,55 Gallon	£0.10 kW/hr	£113.89 Litre
Refuel or Recharge cost from empty	£5,50	£97.57	£5,50	100 miles
Range from full capacity *	100 miles	423.69 miles	100 miles	423.69 miles
Total Cost of Fuel 10,000 miles	£550.00	£2,302.85	£550.00	£2,302.85
Recharge / Refuel Time **	8 Hours	5 minutes	8 Hours	5 minutes
Warranty Details	3 Yrs (100,000miles)	3 Yrs (100,000miles)	3 Yrs (100,000miles)	3 Yrs (100,000miles)

MOT	Exempt at Present	Annual	Exempt at Present	Annual
CO ² Emission Figure (g/km)***	Nil		Nil	
Service Frequency	Annual	Annual	Annual	Annual
Exhaust Emmisions				
Purchase Price Excl VAT	£63,937.75	£17,648.25	£63,937.75	£16,844.25
Cenex Grant Value	£46,289.50		£47,093.50	
Outstanding Balance	£17,648.25		£16,844.25	
Annual Finance Charge Based on a 5 year Specialised Repayment Plan (No Residual)	£4,164.54	£4,164.54	£3,974.82	£3,974.82
Maint	£1,538.35	£1,538.35	£1,538.35	£1,538.35
Tracking	£343.80	£343.80	£343.80	£343.80
Admin	£446.67	£446.67	£446.67	£446.67
Road Tax	£0.00	£210.00	£0.00	£210.00
Total Annual SLA	£6,493.36	£6,703.36	£6,303.64	£6,513.64
Total cost of Fuel 10,000 miles	£550.00	£2,302.85	£550.00	£2,302.85
Estimated annual running cost	£7,043.36	£9,006.21	£6,853.64	£8,816.49
Total SLA Costs over 5 years	£32,466.80	£33,516.80	£31,518.20	£32,568.20
Total Fuel cost over 5 Years	£2,750.00	£11,514.25	£2,750.00	£11,514.25
	£35,216.80	£45,031.05	£34,268.20	£44,082.45
Cost per mile (5 years 50,000 miles)	£0.70	£0.90	£0.69	£0.88