

# ENVIRONMENT AND ATTRACTIVE CITY SCRUTINY COMMITTEE

12 DECEMBER 2011

## LOW CARBON VEHICLES IN THE DELIVERY OF PUBLIC SERVICES REVIEW 2011/12: PROGRESS REPORT

### 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 This report informs members of progress on the Scrutiny Committee’s Policy Review for 2011/12 into Low Carbon Vehicles – the Delivery of Public Services in Sunderland.

#### 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 The aim and terms of reference for the Policy Review can be found at **Appendix 1**.

##### *Project Plan*

- 3.2 At the Committee meeting of 12 September 2011 members agreed the approach to be taken in regard to gathering the evidence for the Policy Review. Attached for members information is an updated illustration (**Appendix 2**) which outlines the various activities and evidence gathering that will be undertaken throughout the review process. The plan seeks to finalise the evidence gathering arrangements in the coming months. Throughout the review process members will be provided with an up-to-date plan reflecting confirmed dates and additional information.

##### *Evidence Gathering To Date*

- 3.3 This is the second report to Committee detailing the progress of the policy review, to date the Committee has gathered evidence through;
- The Scene Setting Presentation;
  - A visit to Smith Electric Vehicles;
  - Presentations from Nexus and Go NorthEast regarding low carbon public transport; and

- The University of Sunderland's Industry Centre.

***University of Sunderland's Automotive and Manufacturing Advanced Practice***

- 3.4 Members of the committee visited the University of Sunderland Research and Development unit for Automotive and Manufacturing Advanced Practice (AMAP). This item of evidence principally contributes to terms of reference C, D, F and G.
- 3.5 AMAP works with regional companies to help the region become a leader for low carbon vehicles. At this point the Research and Development function is about to start putting the research it has been doing into practice and integrating some of 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 the knowledge to regional companies;
  - To develop training courses to develop the next generation of engineers and technicians; and
  - To encourage entrepreneurs and innovators to invest.
- 3.6 In recent years AMAP has worked on the following projects;
- HyPower - producing a hydrogen powered internal combustion engine
  - Eco2Trans - converting old buses to use hydrogen fuel cells;
  - Energy - producing an interchange of energy sources using ICE, battery and fuel;
  - HybriDrive - the unusual use of gearboxes in EV's – this proved not to be successful;
  - Zero Emission Transport;
  - Fleet Monitoring - developed in conjunction with Sunderland City Council's fleet ); and the
  - Nissan Test Track

***HyPower***

- 3.7 The University's first project consisted of an Almera donated by Nissan which was adapted to run on hydrogen gas. The purpose of the project was to assess the characteristics of hydrogen, to see how well the vehicle performed with this type of energy, 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.
- 3.8 A hydrogen tank was fitted in the boot of the vehicle, however due to the size of the tank the vehicle would not be useful as a family car. The hydrogen tank is very strong and unlikely to fracture in the event of an accident, however members were advised that if this did happen, hydrogen does not cause an explosion and so is relatively safe.
- 3.9 The project is currently developing bids for funding to progress this area of research to investigate how the following fuel types would work together;

- Hydrogen and diesel; and
- Hydrogen and LPG

### ***Eco2Trans***

- 3.10 This project converted two old buses to run on fuel cells. The University worked in partnership with two local companies as well as Shanghai Shenli High Technologies in China, a potential inward investment company who manufacture fuel cells. The original fuel source was stripped from the bus and fuel cells were installed. To ensure the buses could reach an adequate range two tanks were installed. This wasn't cost effective at £10k per tank. The buses now serve as a demonstration project for students.
- 3.11 The project has led to new academic programmes including the University working closely with Gateshead College to develop and deliver a Foundation Degree in low carbon technology. The University has also launched an MSC in Low Vehicle Technologies, however because of the economic downturn the course has not proved as popular as expected. To adapt to this the University will be offering shorter, less expensive qualifications than the MsC but which will, nonetheless, be very valuable to those who obtain them.

### ***Zero Emission Transport***

- 3.12 This is a very ambitious project which considers all types of low carbon vehicles and how to develop the region as a Low Carbon sector. A low carbon vehicle can be defined as one which produces less than 90g of CO<sub>2</sub> per km.
- 3.13 The university has worked with a range of partners to deliver this project, including;
- HILTech Developments;
  - AVID Vehicles;
  - Sevcon Ltd.;
  - Elecscoot Ltd.;
  - Inova Technologies Ltd.;
  - Free Energy Storage; and
  - Smiles Engineering Co Ltd

### ***Fleet Monitoring***

- 3.14 The University has designed a simulator to deliver two parts to this project, considering how information is presented to the driver and improving it.
- 3.15 Future technologies for fleet vehicles will include the ability to interconnect vehicles so that they 'talk' to each other, this could also be extended to traffic lights, which gives many opportunities for councils to deliver a more streamlined and efficient service. Vehicles will also be able to understand what is around it at any given moment and make adjustments accordingly. In terms of the fleet this could mean real time route disruption information.

- 3.16 *Fleet Evaluation Project* - This project evaluates driver behaviour and user perceptions of EVs. A tool has been produced to evaluate whether EVs are appropriate for a particular role. This will be invaluable to businesses in making a decision as to whether EVs are the right option for them.
- 3.17 *Smart Nav* - This programme will develop a system to predict available range to EVs when considering the type of journey it will be making. It takes into account charging options and driving styles and can be used to determine how well an EV will perform on a specific route. The council could use the simulator to assess whether routes, e.g. a weekly bin collection would be viable for EVs, members queried what links had been made with the council thus far and were informed that the University were linking with Les Clark, Head of Streetscene in order to progress this programme.
- 3.18 One North East previously funded this project however funding now comes from the University budget and those partners involved in projects. Members felt this posed a significant risk in a time of reduced budgets.

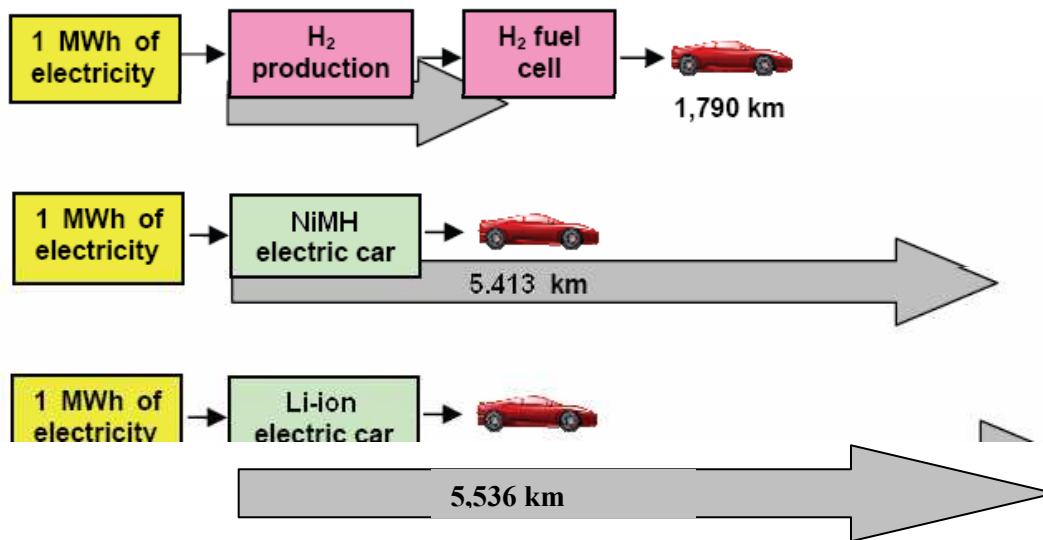
### ***DrOpLET***

- 3.19 The University has launched a programme titled DrOpLET (Driver Optimisation For Low Emissions Transport) which investigates the impact of different driving styles on fuel consumption and battery usage. On completion of the training, drivers have typically saved 25% on fuel costs whilst battery usage can be improved by up to 100%. This echoes Smith's views that driver training is key to increasing range and getting the best from EV's.

### ***Future Programmes***

- 3.20 The university plan to investigate the following in the near future:
- Determining the exact issues in a faulty fuel cell;
  - Linking the simulator and the dynamometer to introduce more than one driver into product development; and
  - Low energy spike fast charging - to avoid spikes in energy consumption.
- 3.21 AMAP are working to establish a viable EV sector in the North East. As part of this it is considering new stationary power solutions such as:
- Hydrogen generation;
  - Using compressed air for electrical generation;
  - Linking these to green energy systems such as windmills or solar power; and
  - The next generation of technicians and designers of EVs
- 3.22 The University provides engineering expertise to develop working prototypes, the Committee acknowledged that the city must work with the region on this agenda but felt that where possible, low carbon vehicle investment comes to and stays within Sunderland.

## ***Electric Vehicles***



- 3.23 The Committee were informed that for the same amount of electricity the Li-ion (lithium battery powered) car gives the greatest range; this is the battery used in the Nissan Leaf, and is demonstrated in the illustration above.
- 3.24 Issues with EV's unfortunately remain at the current time. The Committee were interested to note that unlike internal combustion engines (ICEs), the vehicles don't have the power to heat a vehicle or to operate the window wipers. They therefore have had to be fitted with a 3kw power system to provide these comforts within the vehicle. This does however significantly affect the vehicle range, as does the topography of the route the vehicle is taking.
- 3.25 The Committee raised the issue of range anxiety and it was felt this may be more appropriately labelled as 'availability anxiety' as it is not solely the range of the vehicle that can cause problems, there are also issues around needing the vehicle at particular times of the day/night, which may be restricted due to the charging. It was felt that faster and more flexible charging technology was required to address this and this just wasn't available at the current time.

## ***Battery Second Life***

- 3.26 When the Committee visited Smith Electric Vehicles it was informed of a potential exciting prospect of a second life for electric vehicle batteries and this was echoed again by the University. The Committee understood this to be an opportunity for the Council if it purchased electric vehicles rather than leased them, as they would have the option to sell the batteries on at their end of their useful EV life and recoup some of the initial capital.
- 3.27 The residual value of batteries would be ideal for those services that need an unbreakable power supply, for example, banks, hospitals and the emergency services. Batteries can also be used to store energy. The downside is that the

batteries have different levels of deterioration depending on how they have been manufactured.

- 3.28 In addition to 'second life', the valuable chemicals and metals used in the batteries can be re-used as there is further value in lithium, plastics and platinum, all of which make the batteries expensive to produce in the first place.

### ***Further Evidence Gathering***

- 3.29 Further evidence gathering activities confirmed for December 2011 and January 2012 are as follows;

<b>Method</b>	<b>Activity</b>	<b>Location</b>	<b>Date and Time</b>	<b>Terms of Reference (Appendix 1)</b>	<b>Additional Information</b>
Task and Finish Activity	Visit to Nissan Test Track (Gateshead College)	Nissan, Washington	1.12.11: 2pm	C, D, G	
Written submission	Views of the city's MPs on the use of low carbon vehicles	NA	NA		
Formal Committee Meeting	Explore the procurement of low carbon vehicles	Committee Room 1, Civic Centre	16.11.11: 5.30pm	D, E	
Formal Committee Meeting	Explore a cost benefit analysis of introducing low carbon vehicles into the council fleet	Committee Room 1, Civic Centre	16.11.11: 5.30pm	D, E	

## **4. Recommendation**

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

## **5. Background Papers**

- Minutes of the Environment and Attractive City Scrutiny Committee; 25 July 2011, 12 September, 24 October; and
- Policy Review Progress Report; 24 October 2011.

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**Contact Officer:** **Helen Lancaster, Scrutiny Officer (0191 561 1233)**  
[Helen.lancaster@sunderland.gov.uk](mailto:Helen.lancaster@sunderland.gov.uk)

## **Appendix 1**

### **Overall Aim of the Scrutiny Policy Review**

To understand the concept of Sunderland 'the Place' and the associated issues around its identity and image, as well as the perceptions people have of Sunderland.

### **Proposed Terms of Reference for the Scrutiny Policy Review**

The draft Terms of Reference for the policy review are proposed:-

- (a) To explore what it means to have a strong sense of place, how important this is for Sunderland, and what benefits this may bring;
- (b) To gain an understanding of the current activity being undertaken within the City Council and across partner organisations with regard to developing a sense of place;
- (c) To examine the role and responsibilities of the City Council and partners in developing and implementing a strong sense of place for the city;
- (d) To understand Sunderland's 'story', where the city is positioned now and the image and identity the City Council and partners are aspiring to and working towards;
- (e) To investigate how people who live, work and study in the city view Sunderland, the place;
- (f) To investigate the approaches taken by other local authorities where there is evidence of success and progress; and
- (g) To gain an understanding of Sunderland's position both regionally and nationally, and ensure that the city is being represented appropriately by external bodies including the media