



Belfast City Council

Report to:	Strategic Policy and Resources Committee
Subject:	Options for Reducing Carbonaceous Emissions from the Council's Vehicle Fleet
Date:	21st August, 2009
Reporting Officer:	Mr. William Francey, Director of Health and Environmental Services (ext. 3260)
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Relevant Background Information

At the Council meeting of 2nd March, 2009, Councillor Mullaghan proposed the following Notice of Motion relating to options for reducing carbonaceous emissions from the Council's vehicle fleet, 'As a contribution to its climate change agenda, Belfast city Council commits to a review of the options for reducing carbon emissions from its vehicle fleet, with a view to adopting a strategy with defined targets, the report on the review to be submitted to the Council within six months.'

The Committee, at its meeting on 20th March, adopted the Director of Health and Environmental Service's recommendation to authorise the preparation of a preliminary high-level review of options for reducing carbonaceous emissions from the vehicle fleet.

Vehicle Fleet background Information

During 2008, the Council's vehicle fleet consumed approximately 1,000,000 litres of diesel resulting in the generation of around 2,630 tonnes of carbon dioxide (CO₂). Council has recently approved replacement of the fuel station at the main fuel storage facilities at Duncrue. It is anticipated that the new fuel management system will enable development of fuel consumption and CO₂ emission benchmarks

Manufacturer Reporting of Vehicle Carbon Dioxide Emissions

There is currently little European legislation requiring vehicle manufacturers to publish CO₂ emission factors for commercial vehicles. Preliminary communications suggest that the EU may adopt light commercial fleet average targets of 175g CO₂/km by 2012 and 160g CO₂/km by 2015. No comparable legislation is proposed however, for heavy goods vehicles (HGVs) at this time. It should be noted however, that CO₂ emissions are

proportional to the amount of fuel consumed and are generally lower in modern vehicles and in those with smaller engine displacements. In comparison to petrol, diesel vehicles have significantly lower CO₂ emissions per kilometre travelled due to the higher engine efficiency.

Governmental approach to reducing carbon dioxide emissions

With regard to minimising CO₂ and other greenhouse gas emissions, government has promoted a three step hierarchical approach of assessing emissions, reducing avoidable emissions and counter balancing non-avoidable emissions through offsetting.

Council fleet vehicle emission characteristics

In the case of private and light goods vehicles, the Council operates a range of relatively low emitting diesel vehicles, generating around 140g CO₂/km travelled. This emission rate is below the EU's proposed LCV targets and also compares favourably, for example, with the 'benchmark' Toyota Prius, which emits 104g CO₂/km travelled.

In terms of larger box vans, the Council predominantly operates a range of vehicles with typical emissions of around 210g CO₂/km travelled.

With regard to cleansing and refuse collection vehicles, some emit around 300g CO₂/km travelled whereas fully laden refuse collection vehicles could emit in excess of 600g CO₂/km travelled. The majority of Council fleet vehicles are less than 5 years old.

Key Issues

In terms of reducing CO₂ emissions from its vehicles, there is a range of measures, direct and indirect, that the Council could take as summarised below:-

The potential to introduce biofuels

Biofuels deliver carbon savings as the CO₂ that is emitted into the atmosphere when they are burned is offset by the amount of CO₂ that the crop absorbed as it grew. Unfortunately, first generation biofuels have come under scrutiny since their manufacture competes with food production and impacts detrimentally upon biodiversity. Second generation biofuels overcome these issues by being generated from the residual non-food parts of current crops however, the market is still very much in its infancy within the UK. In terms of vehicle maintenance, biodiesel acts as a detergent and consequently fuel filters typically have to be replaced more frequently to remove sludges. Moreover, biodiesel can attack fuel hoses and pump seals made from certain elastomers. Accordingly, the impact of biodiesel on vehicle warranties and maintenance programmes would have to be carefully considered prior to its introduction.

The potential to introduce biogas

Council could theoretically also consider the introduction of bio-methane gas from the North Foreshore as a road fuel. As with biodiesel, bio-methane gas, derived from organic waste, generates no net CO₂. Vehicles typically employ a dual fuel system, which enables the diesel engine to operate on bio-methane and diesel. Fuelling infrastructure would however, have to be installed to collect, clean, pressurise, store and distribute the gas. It should be noted that the Council has preferentially elected to generate electricity from the bio-methane at the North Foreshore, which is to be sold to the electricity grid thereby generating financial revenue whilst displacing fossil fuels in conventional power stations.

Plug in refuse collection units

A 'plug in' refuse collection unit for waste vehicles driven by an electric motor and battery pack charged via off-peak environmentally friendly electricity has recently come on the market. The unit can also be charged from the chassis engine in order to ensure continuity of service. Electrical operation means that CO₂ emissions are zero during loading and compacting as the RCV is at standstill. It has been estimated that CO₂ emissions are reduced by 20% during a collection round.

Hybrid refuse collection vehicles.

A hybrid solution for refuse collection vehicles that combines a normal diesel engine with an electric motor and lithium ion battery has also been developed recently. The refuse vehicle accelerates under electric power alone, promoting lower fuel consumption and lower emissions with the diesel engine cutting in once speed and power outtake have stabilised. Field trials are ongoing although it is estimated that the FE Hybrid can reduce CO₂ emissions by up to 30%.

Zero Emission Vehicles

Alternative engine technologies are also entering the panel and box van market in the form of zero emission electric vehicles (ZEV). Electric commercial vehicles now have an average range of 100 miles and a top speed of up to 70 mph. Vehicles are charged overnight and provided that a non-fossil electricity supply is used, then they can be regarded as zero emission. Electricity generated at the North Foreshore site would constitute a suitable charging source.

Route Planning

Comprehensive route planning has the capacity to reduce CO₂ emissions by reducing distances travelled and by ensuring optimum utilisation of the vehicle fleet.

Costs and service implications of introducing lower carbon technologies

Emerging vehicle technologies such as those highlighted within this report normally engender a significant price premium over established technologies. Moreover, some of the technologies are proprietary in nature and are subject to ongoing marketplace development by manufacturers. Accordingly, if the Council was to devise a fleet carbon abatement strategy, cost and maintenance, alongside a requirement for continuity of service delivery, would be significant considerations.

Carbon offsetting

Once Council has eliminated its avoidable CO₂ emissions, it might choose to undertake carbon offsetting in order to achieve a 'carbon neutral' vehicle fleet. Presently, government assured carbon offsetting is available at around £16 per tonne of CO₂ emitted. The overall cost of offsetting the Council's current vehicle fleet CO₂ emissions, without additional control measures, would be therefore around £42,000 per annum. In evaluating potential control measures, it will be important to balance the financial and environmental considerations of offsetting against the cost of operating new fleet technologies and to have due regard to the public perception and reputational issues involved in adopting offsetting as a strategy rather than employing direct carbon abatement measures.

Resource Implications

Financial.

There will be sizeable additional costs associated with implementing many of the emerging vehicle technologies and significant lead times if wasteful expenditure is to be avoided. There will also be costs associated with offsetting residual fleet CO₂ emissions.

Human Resources.

Emerging fleet technologies such as hybrid and zero emission vehicles typically have different operational and maintenance requirements to conventional fossil-fuelled vehicles. Consequently, the Fleet Management Unit may have to develop additional expertise to service and maintain such vehicles.

Asset and other Implications.

Such implications will become clearer through additional research of the various options.

Recommendations

This report presents a preliminary high-level review of options for reducing carbonaceous emissions from the Council's vehicle fleet. These options have not been costed and, consequently, further research would be required to allow informed decisions in adopting a vehicle carbon abatement strategy.

The Strategic Policy and Resources Committee is invited therefore to note the high-level options for reducing carbonaceous emissions from the Council's vehicle fleet.

The Committee is also invited to recommend that further research be undertaken to enable the development of a detailed carbon abatement strategy for the Council's vehicle fleet. This research will be undertaken with due regard to emerging legislation and will also form a component of the implementation of the new Transportation Policy, as adopted by Council at its meeting on 1st June 2009.

It is further recommended that the research be undertaken principally 'in house' by Fleet Management staff and the Council's Sustainable Development Manager. Where consultancy support is required to appraise specific fleet technologies, a project proposal detailing financial, human resource and asset resource requirements, will be presented to Committee for approval prior to inception.

Key to Abbreviations

CO ₂	-	carbon dioxide.
EU	-	European Union
g/km	-	grammes per kilometre.
LCV	-	light commercial vehicles.
HGV	-	heavy goods vehicle.
RCV	-	refuse collection vehicle.

Documents attached

N/A