Low Carbon Vehicle Partnership's submission to the Low Carbon Transport Innovation Strategy

Executive Summary

The Low Carbon Vehicle Partnership (LowCVP) believes that for the innovation process for low carbon vehicle technology to work well, it is essential that a clear demand signal exists for low carbon vehicles and is communicated to the innovation and supply chains. Despite strong evidence of climate change and its consequences, and high levels of awareness of the issue amongst the population, this demand signal is presently too weak to significantly influence the innovation process. This represents a clear market failure which the LowCVP believes will result in unnecessary delays to the introduction of low carbon vehicle technology.

To correct current market failings requires interventions at each stage in the innovation process from technology development through to market demand. The objective is to create a strong demand pull and hence reduce commercial risk and encourage industrial investment by making the benefits clearer to all. Specifically, five issues must be addressed:

1. Further support for research, development and demonstration to deliver the cost effective low carbon vehicle technologies. These are needed to ensure that the UK remains a centre for technological development and product development of low carbon vehicles and components.
2. *Effective* incentives are needed to encourage manufacturers to bring to market the next generation of low carbon vehicles, and to stimulate the market for low carbon fuels.
3. The framework for vehicle taxation needs to be amended to stimulate a self-sustaining market for low carbon vehicles.
4. An effective communications campaign should inform the public about the contribution of car use to climate change and the options, and benefits to motorists, of reducing emissions through driving style and purchasing.
5. An evolving framework of support to encourage supply of low carbon intensity fuels of which the Renewable Transport Fuels Obligation (RTFO) is a key element, but in its present design, an incomplete solution to stimulate demand for the full range of potential low carbon fuels in the future**.**

The UK supply chain is capable of capturing commercial benefit from the development of low carbon vehicle markets. Building upon areas of particular strength in the supply chain in; design engineering, powertrain manufacture, first tier automotive component suppliers and the diverse established second and third tier supplier base. The close working relationship between academic institutions and industry in the UK is seen as a strength internationally and should be built upon. Further investment by Government will result in the UK capturing significant returns through intellectual property rights, specialist skills and inward investment.

Government has a clear leadership role to play by creating the conditions for the demand for low carbon vehicles, tackling barriers in the innovation process and by

communicating this through the Low Carbon Transport Innovation Strategy, the Powering Future Vehicles Strategy and other key strategy documents. It is important to ensure all stakeholders in the innovation process have a shared understanding of the objectives, barriers and how they will be overcome in delivering innovation.

Much of the infrastructure needed to secure stakeholder input, establish priorities, communicate with the supply chain and support innovation already exists within:

- LowCVP - a stakeholder body to co-ordinate policy and activity to accelerate the shift in low carbon vehicles.
- Foresight Vehicle – a supply chain forum to road map strategic technologies.
- Cenex – assisting UK industry to build competitive advantage from the global shift to a low carbon economy by supporting innovation.

This report outlines technical, economic and institutional barriers to accelerating market transformation at each step of the market transformation process (Technology Development, Product Development, Market Opening and Sustainable Market Growth). LowCVP believes sustained market transformation requires *all* significant barriers be addressed – a weakness of the current Strategy. Specifically the Partnership proposes that:

- **To encourage research, development and demonstration of low carbon vehicles in the UK:**

1. The DTI's Innovation Platform approach is extended to low carbon vehicles at the earliest stage including a new call for collaborative R&D building on existing activity in this area.
2. The Government makes representations to the EU to streamline the process of obtaining state aid approval for schemes targeted at environmental improvement.
3. A programme is established to provide grant support for proof of concept and small fleet trials of low carbon vehicles undertaken in the UK.
4. Greater use should be made of the Forward Commitment strategy[1] to stimulate both public and private procurement of low carbon vehicles.
5. Funding is provided for the programme of testing, proposed by LowCVP, to examine how light and heavy commercial vehicles can be incorporated into the Strategy.

- **To support the introduction of low carbon buses in the UK:**

6. By 2009, a national demonstration of 100 low carbon buses is undertaken to prove the reliability and maintainability of these new technologies for a UK audience.
7. A review of low carbon bus demonstrations worldwide is conducted and disseminated to bus market stakeholders.
8. Either through reform of Bus Service Operators Grant (BSOG) ensuring its social benefit is not erroded, or the provision of capital grant support for low carbon buses, a market is created for these technologies.
9. Local authorities should be empowered to act on climate change within their transport policy and planning powers.

- **To stimulate the market for low carbon vehicles**

[1] Forward Commitment relates to the procurement of innovation defined by the Environmental Industries Advisory Group, Defra

10. The DfT should finalise and commence its Climate Change Communication Strategy.
11. The Government should encourage the purchase of low carbon vehicles by public bodies.
12. The framework for transport taxation should be amended to provide meaningful incentives for purchasers of low carbon vehicles and fuels.
13. The RTFO is a fundamental policy tool to encourage bio-fuels but may need to be amended in the medium-term to reward supply of lower carbon intensity fuels and ensure fuels are sourced sustainably.

1 Introduction

This submission has been prepared by the Low Carbon Vehicle Partnership (LowCVP), at the invitation of the DfT, to provide input to the development of a Low Carbon Transport Innovation Strategy that will form part of the Energy White Paper.

The submission builds upon the LowCVP's response to the review of the Powering Future Vehicles (PFV) Strategy[2] which addressed the main barriers and issues hindering the development and implementation of low carbon vehicle technology in the UK. It includes outputs from a workshop LowCVP held specifically on this issue and specific inputs from the Partnership's Innovation Working Group and Steering Group.

1.1 The Low Carbon Vehicle Partnership

The LowCVP was established in 2003, as an outcome of the PFV Strategy, to accelerate the shift to low carbon vehicles and fuels in the UK. It aims to help deliver carbon reduction targets and give commercial advantage to UK business. The Partnership is a multi-stakeholder forum with 235 members including many leading car manufacturers and fuel suppliers, major fleet operators, environmental and consumer groups, academics and government departments.

The Partnership undertakes activities to both encourage the supply and raise demand for low carbon vehicles and fuels. This includes providing guidance on the priorities to stimulate market development. Some of our recent key achievements and principal current activities include:

- Brokering a voluntary agreement with the UK motor industry to introduce colour-coded fuel economy labels in all new car showrooms. On-going studies are evaluating the effectiveness of the label through research into dealer and consumer attitudes and implementation rates.
- Input to the development of the Renewable Transport Fuels Obligation – focussed on the development of sustainability assurance and carbon certification.
- Oversight of the establishment of Cenex, a public-private centre of excellence for low carbon and fuel cell technologies. The LowCVP is represented on the Board of the company.

[2] Powering Future Vehicles Review BOARD-P-06-34 (www.lowcvp.org.uk)

- The LowCVP Road Transport Challenge, a process initiated by the Partnership to bring forward innovative proposals for delivering carbon reductions from the road transport sector. The best entries were presented at a conference in June '06.

An important role of the LowCVP is to independently and constructively review and advise upon the various programmes and schemes run by Government to support market transformation as well as to highlight policy gaps and help ensure a coherent suite of interventions to accelerate the shift to low carbon vehicles in the UK. This submission has been prepared following extensive discussion throughout the Partnership and reflects the consensus view across the diverse membership.

1.2 UK Automotive Supply Chain

The UK automotive industry remains a dynamic, innovative and wealth generating sector with several areas of international strength. In 2004 it comprised of 3,334 companies, employing 221,000 and generating £9,855m in value added[3]. The globalisation of the automotive industry has resulted in an international trade in vehicles, systems and components with which the UK is heavily and successfully engaged.

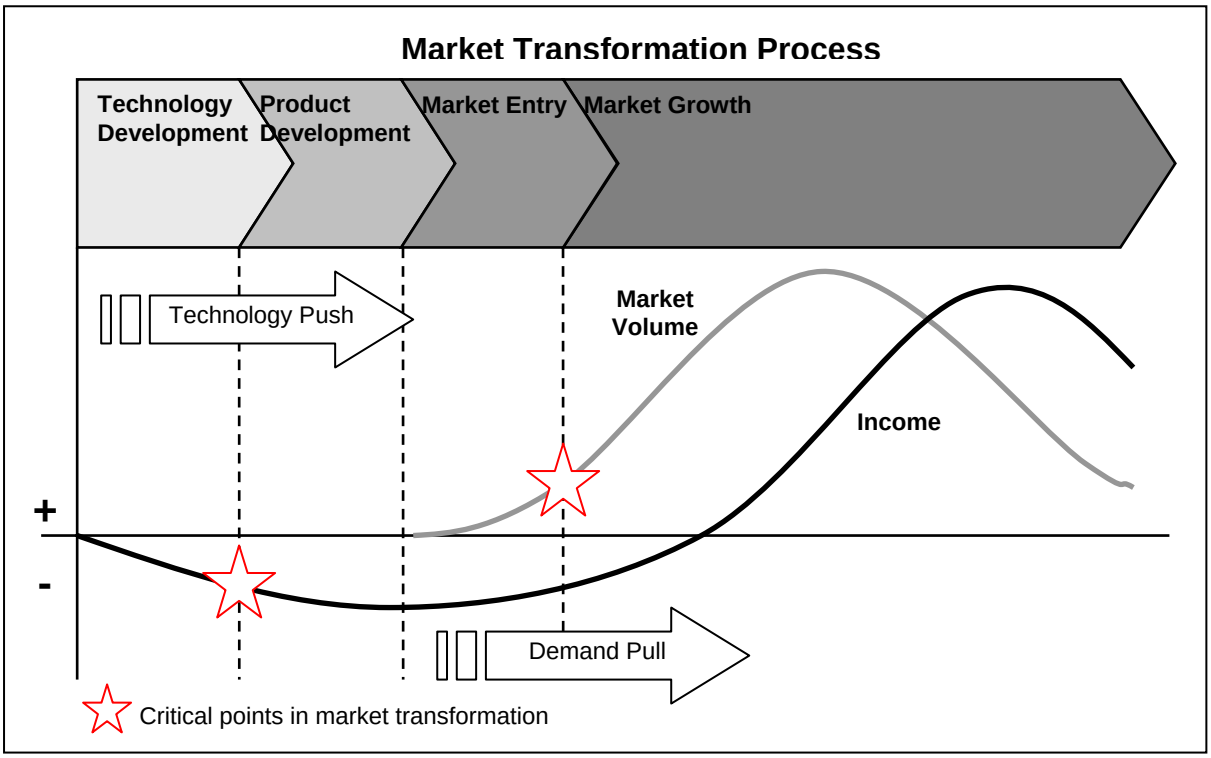
Innovation is a recognised strength, the UK Innovation Survey showing that 69% of enterprises in the UK automotive industry are undertaking innovation activity, compared to 57% of UK enterprises as a whole. The UK automotive industry is undoubtedly well placed to capture commercial benefit from the development of markets for low carbon vehicles building upon recognised supply chain strengths in:

- Design engineering
- Powertrain manufacture
- First tier automotive component suppliers
- Diverse established second and third tier suppliers

2 Accelerating the shift to low carbon vehicles

The process of market transformation in favour of low carbon vehicles is similar to that applying to other technologies or products that are more efficient (with lower running costs) but have a higher initial capital cost.

[3] Source: Office of National Statistics



Source: Derived from EST, 2006

The key stages in the process are well understood:

- Technology development
- Product development
- Market opening
- Growing a sustainable market

Whilst the proposed model is highly simplified, it nevertheless provides an effective framework to highlight the roles of Government, industry and wider society and the support needed at each stage of the process to achieve a timely, and sustainable market transformation.

For low carbon vehicles there are two principal hurdles (critical points) in the market transformation process:

- Transition from technology development to product development - at which stage the level of investment required increases significantly.
- The boundary between market entry and market growth - where the market fails to attract demand beyond the early adopters. This is especially the case where a product requires a change in behaviour of the user, for example slow charging for electric vehicles.

The sections below describe current issues in transforming the UK market in favour of low carbon transport. A combination of technical, economic and institutional barriers exists to impede market transformation in the various vehicle markets. It is generally necessary to address *all* significant barriers to achieve sustained market

growth. A failure in one link in the market transformation process will greatly diminish the impact of other measures.

In the case of radical innovation involving technologies from outside the automotive sector, policy must take account of the necessity for technologies to be deployed in different markets/sectors as part of the innovation process. For instance, the development of fuel cell technology for automotive application may require, as a stepping stone, development for application in other market sectors, such as stationary and portable power generation. To ensure the innovation process works across market sectors will require consistency in Government policy across these sectors.

The LowCVP:

- **Believes that the innovation process works best when a clear demand signal exists and is communicated back through the innovation and supply chains; and that, at present, this signal is too weak to stimulate change.**

- **Recommends that a suite of coordinated and coherent policy instruments should be employed to accelerate the shift to low carbon vehicles in the UK, across the market transformation process.**

- **Supports a partnership approach to ensure that all stakeholders in the innovation process have a shared understanding of the objectives, barriers and how they will be overcome in delivering innovation.**

2.1 Technology Development

This involves research and development to take an initial concept and develop it to a level where proof of concept can be demonstrated. The majority of R&D is funded and conducted by the private sector but where public funds are used it is typically undertaken through partnership between academia and/or industrial partners. The close working relationship between academic institutions and industry is seen as a strength of the UK internationally.

While this activity is relatively low risk (in terms of potential adverse outcomes) it nevertheless represents a considerable cost to industry. Investment in R&D is susceptible to the economic cycle and particularly challenging for smaller organisations. In the UK, Government support for technology development is principally provided through grant support for collaborative R&D - the majority of which is administered through the research councils (mainly the Engineering and Physical Sciences Research Council, EPSRC) and the DTI Technology Programme through competitive research calls. This is directed at pre-competitive research and development combining academic institutions as well as industry. In addition, the Foresight Vehicle, in its role as a knowledge transfer body for the automotive industry, has been instrumental in helping drive forward research and development in order to keep the UK at the forefront of advances in technology.

The Technology Strategy is a major Government policy focused on the transformation of knowledge created into innovation in the UK. This is implemented

via the Technology Programme by funding collaborative R&D and knowledge transfer networks. Activity relating to strategic technologies are co-ordinated through the establishment of Innovation Platforms, which bring together stakeholders to better co-ordinate policy, regulation and procurement across Government and to provide road mapping for specific technologies in order to achieve a shared understanding of what needs to be achieved and how. Although there is not currently an innovation platform for low carbon transport, Government and the Technology Strategy Board are considering establishing one. The LowCVP notes that the LowCVP, Cenex and Foresight Vehicle already provide much of the constituent parts of an innovation platform for low carbon road transport.

LowCVP is concerned that investment in technology by UK Government is lagging behind that in other major centers of automotive manufacturing and research in terms of the level of funding and longevity. Case study 1 illustrates recently announced package of support by the French Government for innovation in the French automotive industry and for the development of low carbon vehicles. The German Federal Government has also announced funding of €500m into hydrogen fuel cell vehicles over the next decade.

Case Study 1: French Government support for innovation and low carbon vehicle technology

The French government has introduced a range of polices aimed securing and fostering industry, as President Chirac recently announced" France is resolutely making the choice of science, innovation and industry". France's suite of policies include:

- Science and innovation identified as a key to progress, growth and employment - France is allocating an additional €20 billion to R&D over the period 2005-2010
- The Agence d'Innovation Industrielle (AII) is charged with encouraging and supporting large companies undertaking major projects beyond their usual scope of R&D activity - budget is €2 billion. PSA's diesel-hybrid project (VHD) is benefiting to the tune of €50 million (€100m eligible for aid, funded at 50%)
- Dominique de Villepin announced on November 29 an additional €400m to be made available over three years. €250m is for further research and development in the automotive industry - €150m euros will be used to retrain 20,000 automotive employees hit by restructuring in the sector, enabling them to find jobs elsewhere.
- In addition tax credits for R&D will increase. These will be made available to all companies but will benefit the automotive and aerospace industries in particular
- PREDIT, a state funded network of research and technological innovation, is soon to announce its latest work programme (PREDIT4) and is expected to declare 2007 to be the "Year of the Hybrid".

The establishment of a funded low carbon transport innovation platform is essential to enable the UK to compete in this strategically important area in which the UK has considerable competence. Knowledge Transfer Networks (KTN) (that bring together industry, universities, research and technology organisations and financial institutions

to share knowledge and increase innovation) are a useful mechanism to support market transformation.

It is particularly important that the UK retains its position as a leader in design engineering if it is to benefit from the shift to low carbon vehicles. The design engineering sector of the automotive industry in the UK is an important source of income generation, with turnover of £1bn per annum and investment in technology development can provide significant returns for the UK. An example of the value to UK plc of encouraging low carbon vehicle development in the UK is provided by Case Study 2. A £700,000 government funded contract directly secured £2.5m of work in the UK and led to an estimated further £20m of orders in addition to developing UK expertise in diesel emissions control.

Case Study 2: EURO 5 DIESEL – Diesel passenger car combustion and after-treatment technologies to deliver NOx emissions at Gasoline Euro 4 (0.08g/km) levels in a production-feasible manner.

The project's aim was to develop production feasible combustion and after-treatment technologies, and to demonstrate them in a D-segment passenger car (Alfa Romeo 156). The project used a Ricardo designed combustion system enabled by advanced common rail diesel technology, with lean NOx trap after-treatment to achieve this. A key part of the project was to demonstrate that production-feasible technologies could be implemented robustly with respect to production tolerances in key components.

The project was led by Ricardo UK Ltd, supported by the Dutch ministry of the environment (VROM), and the former Fiat-GM Powertrain joint venture. The project started in 2002 and was completed in 2003.

Benefits

- Secured £2.5m of R&D expenditure in the UK over a 3 year period.
- Ensured the UK developed expertise and knowledge in future passenger car diesel technology.
- Helped secure Ricardo's market leading position for diesel emission control technology, providing competitive advantage for export sales to Europe, and more recently to the Far East and North America where there is rising interest in the passenger car diesel engine.
- Helped Ricardo to secure over 20 advanced engineering and production development contracts for low emission diesel engines from 10 key vehicle manufacturers and component suppliers, with a total value of over £20m. Most of these contracts come from non-UK companies.
- Places Ricardo in a strong competitive position to respond to future diesel emissions challenges such as those posed in new markets like the USA.

Government Support

Supported by the Dutch Environment Ministry, VROM. Funding support of €700,000.

LowCVP:

- **Welcomes the establishment of the Low Carbon and Fuel Cell KTN being operated by CENEX and would welcome the opportunity to contribute to this initiative.**

- **Recommends that the innovation platform approach be extended to low carbon vehicles at the earliest stage; and specifically that: Demonstration of proof of concept for a range of low carbon vehicle technologies (particularly for buses, but also for other vehicles) should be a priority in future R&D calls for environmental friendly vehicles in order to develop low carbon vehicle technologies for incorporation into vehicles in the next decade.**

- **Would welcome the opportunity to develop the Low Carbon Transport Innovation Platform being developed by the DTI working with Cenex and other partners as appropriate.**

- **Is concerned that investment in technology by UK Government is lagging behind that in other major centers of automotive manufacturing and research in terms of the level of funding and longevity.**

2.2 Product Development

The Product Development stage involves further development and demonstration to optimise technology/product performance. During this stage the technology/product is taken through product feasibility, concept, prototyping and validation processes. The final stages are typically undertaken through close collaboration between vehicle operators and suppliers, allowing data to be obtained on reliability and maintainability. Dissemination of information to investors and the general public in preparation for market opening is common.

Commencing product development is high risk for manufacturers. The scale of investment, is considerable whilst the prospects of return on investment remain uncertain. Once the product is exposed to vehicle operators, there is the added risk of an adverse impact on company reputation if the product performs poorly. This is particularly the case for promising technologies which require significant product engineering to move from the proof-of-concept stage to a manufacturing ready product at reasonable cost.

Despite the high risk of failure at this stage there is little support provided by the UK Government to encourage industry to undertake this work in the UK. This limits the opportunity for UK businesses to be exposed to new innovations in low carbon technologies. The LowCVP welcomes the establishment of the DTI's HFCCAT (Hydrogen, Fuel Cells and Carbon Abatement Technologies) Demonstration Programme which will assist in this area for fuel cells. This should be built upon in order to allow the UK automotive businesses to participate in demonstrating other low carbon technologies and so obtain important experience and expertise.

A fundamental issue in encouraging innovation in low carbon vehicle technology is the need for industry and investors to understand the value of carbon emissions. While clear demand signals and appropriate support targeted at the needs of specific technologies will be very effective, Government involvement in an issue has a significant effect in persuading the business community of the importance of an issue.

The major vehicle and component manufacturers undertake wide ranging research, demonstration and development (R, D&D) programmes into a wide range of technologies across the globe. However, local market demand has a strong influence on the location of this effort and arising investment. This is due to a number of factors:

- Desire to reduce risk. The sharing of risk through national support, although potentially quite small, can have an important influence on investment decisions.
- Marketing departments, from large markets such as the UK, do have a big influence on decision making.

Government activity to create clear market signals regarding low carbon vehicles and consistent programmes to support innovation in low carbon vehicle technology will assist in creating inward investment into the UK. In order to provide investor confidence Government policies relating to technology innovation must be in place for longer than the development cycle for technologies. In supporting low carbon technologies, Government should be careful to provide a balance between:

- Long term frameworks that should be designed to achieve the overall market transformation objective through technology neutrality; and
- Short term policies designed to address barriers and market conditions facing specific technologies.

Case study 3 provides an indication of the benefit that would accrue to the UK from supporting product development in the UK. Alexander Dennis led a consortium to develop a hybrid bus with a zero emission operating capability. £0.69m of Government funding secured a project valued at £1.38m, employing staff equivalent to 17 man years and which will deliver competitive advantage to UK manufacturing in the domestic and export markets for buses. However, this valuable expertise is currently frustrated in the domestic bus market due to current Government policy that fails to reward the use of low carbon buses.

Case Study 3: CHOICE – City hybrid electric bus with optimised efficiency using information and guidance systems for passenger convenience and vehicle energy consumption.

The project led by Alexander Dennis Ltd, Britain's leading manufacturer of buses, supported by seven UK organisations.

The project's aim was to design, build and evaluate a diesel series hybrid city bus incorporating vehicle and passenger information systems. The novel component of the research being the real time adaptation of engine power cycle and battery management to take account of terrain and drive cycle.

Benefits

- Secured £1.38m of R&D expenditure in the UK over a 4 year period providing employment equivalent to 17.9 man years for staff across the companies involved.
- Ensures the UK develops expertise and knowledge in future passenger bus service, in terms of efficiency/economy of use, exhaust cleanliness and passenger desirability.
- Helps secure Alexander Dennis market leading position in the UK bus market, and provides competitive advantage in export sales, particularly in the Far East and North America.
- Provides marketable skills and expertise for UK suppliers and research institutions.

Government Support

Supported by the DTI funded through the Foresight Vehicle Programme's Hybrid, Electric and Alternative Fuelled Vehicles (HEFAV) thematic group. Funding support of £0.69m.

Whilst EU state aid legislation limits the support Member States can provide as an innovative product nears commercial exploitation, the Partnership believes the UK Government does not take sufficient advantage of the support/incentives it could provide. The LowCVP believes that the DfT could take a more robust stance regarding state aid approval and should seek improvements from the EU in the handling of state aid applications. While the LowCVP welcomes the limited support for proof of concept and small fleet trials of low carbon vehicles through the EST R&D programme and Cenex's activities, the LowCVP believes there should be additional support for demonstration and in particular support for larger field trials building on the existing activity in this area.

LowCVP:

- **Believes the Government should increase support and incentivise product development to provide a strong signal of its desire to accelerate the shift to low carbon vehicles.**

- **Recommends the LCTIS include proposals for:**
  - **Grant support for small fleet demonstration, typically 10-30 vehicles**
  - **Grant support for field trials, potentially 100-200 vehicles**
  - **Legislative requirements which would need to be introduced at an EU level to be effective**
  - **Tax incentives and allowances against mainstream taxation**
  - **Dissemination of information, market education**
  - **Support brokering introductions between companies seeking inward investment and the financial community.**
  - **A combination of long-term technology neutral frameworks of support complemented by short to medium term tactical programmes of assistance for specific technologies**.

The Partnership believes it would be beneficial to develop targets for development of low carbon vehicle technology to 2020. This would provide a signal of long term policy and encourage investment in low carbon vehicles. The target should be met by providing targeted support for different vehicle types :

- **Low Carbon Cars**
  - **Provide grant funding for proof of concept and small, limited volume, fleet trials.**

- **Low Carbon Buses**
  - **Reinstate the proposed Low Carbon Bus Programme (or an equivalent form of support)**
  - **Undertake a widespread demonstration of 100 low carbon buses to prove reliability and maintainability.**
  - **Undertake a review of low carbon bus demonstrations worldwide, comprising a research study, the results from which will be disseminated via seminar to bus market stakeholders to be organised by DTI.**

- **Low Carbon Commercial Vehicles**
  - **Develop a basis for defining low carbon commercial vehicles.**
  - **Provide grant funding for proof of concept and small fleet trials.**

The EU could facilitate further investment by OEMs by:

- Streamlining the process of getting state aid approval
- Providing a searchable database of Member State schemes which have received approval
- Providing better guidance on areas where Member States should act, such as climate change, and in the role of road transport.

2.3 Market opening

Market entry of low carbon vehicles is initially targeted at innovators that account for about 2.5% of total market share and have both a strong aptitude and need for the technology. At this stage in the market transformation low carbon vehicles usually have a significantly higher capital cost which is off set by lower operating costs due to better efficiency. Purchase costs are also inflated by the need to recoup a proportion of the R&D costs on a relatively low volume of sales since long-term sales volumes remain uncertain.

The form of support available at market opening is constrained by EU state aid rules. However, targeted support to kick-start the market is permissible and necessary such as through:

- Capital grant support for low carbon buses which offer significant environmental benefits but do not provide a payback in a reasonable period of time
- Tax incentives and allowances
- The use of procurement policy to provide demand pull

- Communication campaigns
- Assistance in removing non-fiscal market entry barriers – such as for refuelling

As far as is practicable, incentives should be based upon a vehicle's environmental performance and not technology. Support, where provided, should be linked to specific barriers and objectives and removed whilst these have been overcome. LowCVP does not support the long-term use of subsidies or consider that necessarily all innovators and early adopters need to benefit from subsidies.

The LowCVP is disappointed the Government has chosen not to go ahead with grant support programmes which could have made an important contribution to this stage of the market transformation if targeted appropriately. The DfT decision was based upon the poor cost effectiveness of proposed grant programmes. A critical factor in arriving at this conclusion was the assertion that because the market transformation effects would be difficult to quantify that they should be ignored. This is an inappropriate assertion and biases the results when compared to other measures within the Climate Change Programme Review. The LowCVP strongly urges the DfT to incorporate market transformation impacts in assessing the low carbon bus and car programmes to provide a true and fair assessment of cost effectiveness. In doing this it should draw upon the experience of the Carbon Trust in evaluating the benefits of innovation in renewable technologies.

Action is specifically needed to address the obstacle to the introduction of low carbon buses created by the operation of the Bus Service Operators Grant (BSOG). BSOG operates by supporting the operating cost of buses on public service routes, rather than the capital or any other costs involved in providing the service. BSOG provides a rebate of 80% of fuel duty paid and means the benefits of low carbon technologies in terms of reduced operating costs do not compensate for the higher capital cost of the bus. We welcome the recent DfT announcement it "is reviewing whether there is a case for reforming " the rebate; but note that previous reviews have not lead to changes that would create a significant UK market for low carbon buses outside of London.

The public sector should more effective support innovation in low carbon vehicles, through preferential procurement of the lowest carbon vehicles to create a demand pull. This would also help to demonstrate the credibility and market readiness of new technology to early adopters. The LowCVP welcomes the announcement of the programme to procure green cars and light commercial vehicles for 38 Government Departments developed by the Office of Government Commerce (OGC) and announced on the 1st December this year. However, we are aware of similar public procurement initiatives and targets that have failed to be delivered in practice. We urge the OGC to effectively monitor and report upon progress annually. We would also encourage the extension of this policy to all public sector bodies.

The use of a Forward Commitment strategy, as proposed by the Environmental Innovations Advisory Group (EIAG) and being developed by Cenex, should be actively encouraged and supported because it will provide a clear demand signal back through the innovation and supply chains.

Consistent fiscal measures can provide visibility to future demand for low carbon vehicle technology also. For instance company car taxation has an important role to play in opening the market for low carbon vehicles and fuels, by stimulating demand from the private sector company car fleet. To maximise this impact, company car taxation needs to take account of the carbon dioxide impact of the fuel in addition to tailpipe carbon dioxide emissions of company cars.

Case Study 4 provides an indication of the benefit that accrues to the UK from supporting market opening in the UK. Government incentives for the introduction of LPG vehicles during the 1990s led to Vauxhall introducing them in 1998. This decision secured in excess of £5m inward investment in the UK, allowed for employment of 50 staff directly and another 20-30 indirectly, as approximately 50% of components were locally sourced. The intellectual property (IP) developed is owned in the UK and could still lead to export sales.

LowCVP encourages the Government to examine a range of policy options to support the market entry of low carbon vehicles including for:

- **Low carbon cars**
  - **To actively encourage procurement of the best available low carbon technologies by the public sector**

- **Low carbon buses**
  - **Obtain a similar level of grant support for low carbon buses, independent of fuel type or drive-line technology, as provided by BSOG for diesel buses. This could be provided as an amendment to BSOG, but remain within current the ceiling of support BSOG could be expected to provide over the life of the bus. Alternatively, a supplementary capital grant could be provided by reinstating the Low Carbon Bus Programme.**
  - **Initiate a public procurement plan, working together with other interested European countries, to replace all buses currently used in park and ride schemes with low carbon buses: the additional cost to be funded by local revenues and DfT's Local Transport Plan settlements.**

- **Low carbon commercial vehicles**
  - **Develop an Enhanced Capital Allowances (ECA) scheme for commercial vehicles, and potentially services which reduce fleet carbon emissions, achieving a low carbon standard.**

Case study 4: Benefit of grants for market opening - Vauxhall investment in LPG

In 1998, in response to Government policies to encourage clean fuelled vehicles, and so reduce regulated and carbon emissions, Vauxhall introduced LPG vehicles in the UK.

Benefit
All the engineering investment was made in the UK as a result of Millbrook's key skills in research, prototyping, development testing and validation. In addition the production facility was built in the UK, which at its peak was producing 4,000 vehicles per year.

GM Europe's total investment in LPG vehicles was in excess of £5m with over £1m invested in development and production facilities in the UK employing 50 staff directly. This represented inward investment from GME into the UK and was justified on the basis of securing incremental vehicle sales from fleets with a green policy and sole supplier, and securing production facility utilisation.

Between 40%-50% of components were locally sourced with annual expenditure of approximately £1.2m during peak production which is estimated to have created employment for a further 20 to 30 staff in UK suppliers. Further UK sourcing of components might have resulted had not there been an existing European market for LPG with a mature supplier base from which major components were sourced.

The IP developed was owned in the UK and could still lead to export sales if the same kit is fitted to GM vehicles elsewhere in Europe.

Government Support
Through the EST Powershift programme which established significantly higher emission standards for clean fuelled vehicles than for equivalent petrol and diesel vehicles and than achieved by clean fuelled vehicles elsewhere in the world.

2.4 Growing a sustainable market

To create the market conditions to move beyond the first innovators and attract early adopters into the market (a market share of between 2.5% and 13.5%) requires:

- Government to create the appropriate market conditions for growth
- Non-fiscal barriers to market growth to be addressed
- Suppliers to focus on product completeness from the point of view of the user (including servicing and maintenance, refuelling, insurance, parts availability and residual values).

There are many examples of markets for new technologies in which innovators have been the only adopters – for example Autogas. Even robust products/technologies can fail at this stage if the product requires the user to change their behaviour. For example, the bus market's response to CNG buses has been weak. This is in part due to the higher capital cost of CNG buses and the inadequate payback as a result

of the operation of the BSOG. In addition the longer refuelling times compared to diesel buses presented considerable problems. This would have required a change in the washing, refuelling and parking of buses in most depots at the end of each day which was difficult to accommodate. Another example is the impact of forecast residual values and warranty issues for vehicles converted to LPG.

In growing market share for low carbon cars the key barrier is to address the low priority currently given to environmental issues and fuel economy by most new car buyers. Elements of the solution will include:

- Consumer education campaigns – including raising awareness of fuel economy through labelling
- Enhancing the desirability of low carbon vehicles through effective advertising and promotion
- Expanding the choice of vehicles available in all segments of the market
- Strengthening incentives for users of low carbon cars and fuels

A key issue is to ensure an appropriate, long-term fiscal environment to encourage sustained market penetration. Without this there is little incentive to encourage the automotive supply chain to invest in developing low carbon technologies.

At present there is incomplete consensus within the Partnership on the optimum policy measures that will support a sustainable market for low carbon vehicles. There is however agreement that the following principles should form the basis for market incentives:

- Predictable and consistent – to build confidence in Government policy
- Not prescriptive – outcome based
- Technology neutral - Performance related
- Avoiding market distortions – no sharp boundary conditions
- Consistent with the EU policy framework and compatible with global market requirements
- Holistic – avoiding policy clashes
- Based upon sound impact assessment
- Regular policy assessment undertaken
- Stakeholder input at early stage
- Balanced package of incentives and penalties
- Partnership approach – Govt policy to support industry agreements
- Long term and consistent across all government departments and devolved administrations, including local authorities.

Specific measures that are supported by most LowCVP members include:

- Further use of tax incentives and allowances (such as Enhanced Capital Allowances) to encourage the purchase of low carbon vehicles and fuels.
- Public engagement and awareness campaigns on both climate change and options to reduce road transport emissions
- Empowering local authorities to act on climate change within their transport policy and planning powers

- Increase bus patronage by requiring councils to formulate and initiate integrated transport plans which include a strategy for the use of low carbon buses.
- The RTFO as a mechanism to encourage supply of alternative fuels.

3 Conclusions

To accelerate the shift to low carbon vehicles five issues must be addressed:

- Further support for research, development and demonstration to deliver the cost effective low carbon vehicle technologies. These are needed to ensure the UK remains a centre for technological development and product development of low carbon vehicles and components.
- *Effective* incentives to encourage manufacturers to bring to market the next generation of low carbon vehicles, and to stimulate the market for low carbon fuels.
- The framework for vehicle taxation needs to be amended to stimulate a self-sustaining market for low carbon vehicles.
- An effective communications campaign should inform the public about the contribution of car use to climate change and the options, and benefits to motorists, of reducing emissions through driving style and purchasing.
- An evolving framework of support to encourage supply of low carbon intensity fuels of which the Renewable Transport Fuels Obligation (RTFO) is a key element, but in its present design, an incomplete solution to stimulate demand for the full range of potential low carbon fuels in the future**.**

Specifically, LowCVP members propose that:

- **To encourage research, development and demonstration of low carbon vehicles in the UK:**
  1. The DTI's Innovation Platform approach is extended to low carbon vehicles at the earliest stage including a new call for collaborative R&D building on existing activity in this area.
  2. The Government makes representations to the EU to streamline the process of obtaining state aid approval for schemes targeted at environmental improvement.
  3. A programme is established to provide grant support for proof of concept and small fleet trials of low carbon vehicles undertaken in the UK.
  4. Greater use should be made of the Forward Commitment strategy[4] to stimulate both public and private procurement of low carbon vehicles
  5. Funding is provided for the programme of testing, proposed by LowCVP, to examine how light and heavy commercial vehicles can be incorporated into the Strategy.
- **To support the introduction of low carbon buses in the UK:**

[4] Forward Commitment relates to the procurement of innovation defined by the Environmental Industries Advisory Group, Defra

6. By 2009, a national demonstration of 100 low carbon buses is undertaken to prove the reliability and maintainability of these new technologies for a UK audience.
7. A review of low carbon bus demonstrations worldwide is conducted and disseminated to bus market stakeholders.
8. Either through reform of BSOG ensuring its social benefit is not eroded, or the provision of capital grant support for low carbon buses, a market is created for these technologies.
9. Local authorities should be empowered to act on climate change within their transport policy and planning powers.

- **To stimulate the market for low carbon vehicles**

10. The DfT should finalise and commence its Climate Change Communication Strategy.
11. The Government should encourage the purchase of low carbon vehicles by public bodies.
12. The framework for transport taxation should be amended to provide meaningful incentives for purchasers of low carbon vehicles and fuels.
13. The RTFO is a fundamental policy tool to encourage bio-fuels but may need to be amended in the medium-term to reward supply of lower carbon intensity fuels and ensure fuels are sourced sustainably.