Powering Future Vehicles

The Government Strategy
First Annual Report



October 2003

Cover photographs, left to right:

Launch of the Low Carbon Vehicle Partnership, January 2003.
From left to right: Professor Jim Skea (Launch Director of the LowCVP), David Jamieson MP (Transport Minister), Graham Smith (Managing Director, Toyota GB), Sue MacGregor (host of the launch event), Roger Higman (Friends of the Earth), Lord Sainsbury (Minister for Science and Innovation).

Hybrid and electric cars from the Government Car and Despatch Agency fleet.

The Enviro 200 hybrid city bus. *This new UK-built low-carbon diesel hybrid bus will start to appear on city streets in 2004.*

The new Toyota Prius. *This very low-carbon hybrid petrol car goes on sale in the UK later this year, with a Government* 'TransportEnergy' *purchase grant of £1,000.*

Powering Future Vehicles

The Government Strategy
First Annual Report

Department for Transport
Department of Trade and Industry
Department for Environment, Food and Rural Affairs
HM Treasury
Cabinet Office
Welsh Assembly Government
Scottish Executive
Northern Ireland Administration

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Department for Transport
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15 October 2003

To the Deputy Prime Minister and Members of the Ministerial Committee on the Environment

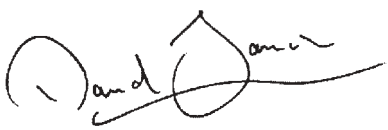
Last July, the Prime Minister launched the UK's *Powering Future Vehicles* Strategy, to ensure that the UK should lead the global shift to clean, low-carbon vehicles and fuels. He commissioned a group of key Ministers to oversee the implementation of the Strategy, and asked us to report progress to ENV Committee and to Parliament.

As current Chairman of the Ministerial Group, I attach our first annual report. It sets out the progress we have made against each of the commitments in the Strategy, which I hope you will agree represents a good start.

As the Prime Minister noted in his foreword to the Strategy, the Government is only part of the story. To be successful we need the engagement and cooperation of the UK vehicle and fuel industries, consumer, environmental and other stakeholders. The establishment of the Low Carbon Vehicle Partnership (LowCVP) has brought together all these stakeholders to lead the shift to low-carbon transport in the UK. In its first year the Partnership has made recommendations on increasing the take up of low-carbon buses – one of the specific targets in the PFV Strategy – and my Department has responded by announcing new grants for large scale trials of these buses in the UK.

One of the Strategy's other specific targets is to ensure that at least 10% of new cars in the UK are low carbon by 2012, and to drive this forward, we have launched the 'Ultra Low Carbon Car Challenge', with financial support for car makers to build and demonstrate very high fuel efficiency cars, capable of being mass produced at an affordable price within four to eight years.

I commend this report, detailing this and other progress towards the ambitious long term change we have committed ourselves to achieving.



David Jamieson, MP
Chair of the Joint Ministerial Low Carbon Group

Introduction

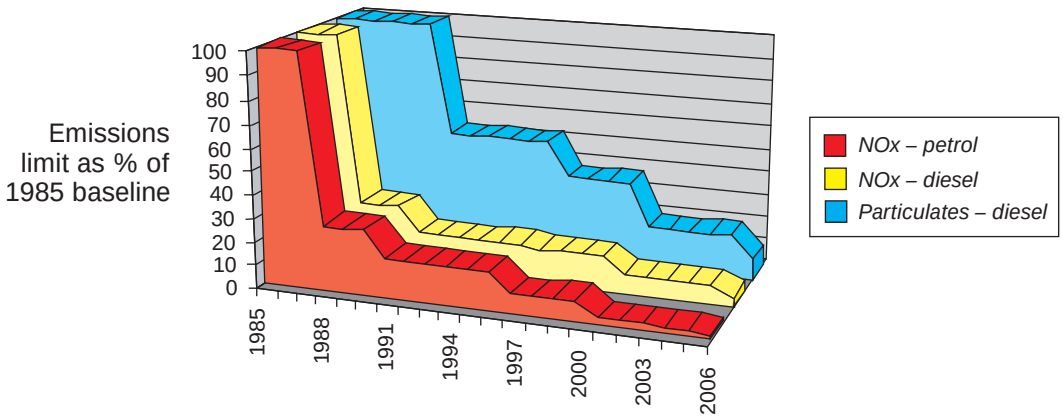
0.1 The Government's *Powering Future Vehicles* ('PFV') Strategy was launched by the Prime Minister in July 2002. The objectives of the Strategy are to:

- promote the development, introduction and take up of low-carbon vehicles and fuels
- ensure the full involvement of the UK automotive industry in the new technologies.

Low-carbon vehicles and fuels offer opportunities to radically reduce the environmental impact of road transport – both locally in terms of reduced air pollution emissions and lower noise and globally in terms of climate change. The transport sector produces about one quarter of the UK's total emissions of carbon dioxide (CO_2), the main greenhouse gas. Road transport contributes 85% of this, with passenger cars accounting for around one half of all carbon emitted by the transport sector.

0.2 Over the last two decades there has been major progress in improving air pollution emissions from cars, as a result of the progressively tighter European emissions standards, and emissions will reduce even further as new emissions standards take effect. The following graph illustrates the extent of the reduction for both petrol and diesel cars.

Fig 1. EU emissions standards for cars

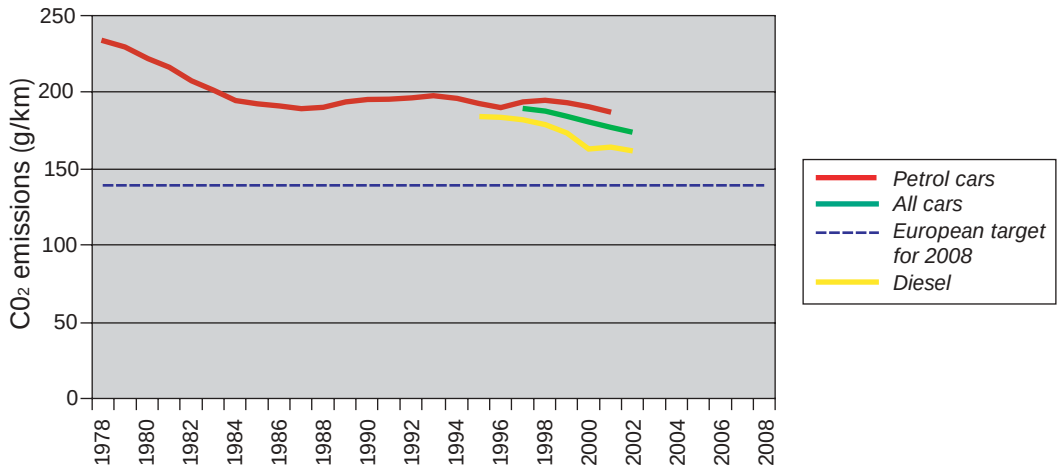


1. Emissions of oxides of nitrogen and particulate matter remain generally higher for diesel vehicles than for petrol vehicles.
2. Until 1992 NOx limits for petrol and diesel cars were based on a combined limit for both NOx and Hydrocarbons.

0.3 However, further improvements are necessary if we are to meet our air quality targets and to give everyone the benefit of cleaner air. The Strategy builds on the solid progress made to date.

0.4 This shows how advanced technology and strong policy action – nationally and with EU and other international partners – have transformed vehicles' air pollution emissions. The same radical change is needed in vehicles' fuel efficiency and carbon emissions, and this is the objective of the PFV Strategy. Figure 2 illustrates the progress that has been made to date in reducing CO_2 emissions from passenger cars, and the targets for the future.

Fig 2. Average CO_2 emissions for new cars sold in the UK



0.5 The Government's Energy White Paper *Our energy future – Creating a low carbon economy*, published in February this year, set out as one of its overarching goals that the UK should put itself on a path to cut its carbon dioxide emissions by some 60% by about 2050, with real progress by 2020. The paper underlined transport's major contribution to the UK's energy use, and the transport chapter built on the PFV Strategy, identifying the major potential for new vehicle technologies and fuels to reduce vehicles' fuel consumption and carbon emissions.

0.6 These new vehicle technologies benefit the consumer because low-carbon vehicles are also more fuel efficient. Motorists who choose low-carbon vehicles also pay less road tax, and if they drive a company car, lower company car tax.

0.7 The PFV Strategy set out the Government's objective that the UK should lead the global shift to clean, low-carbon transport. We want to make the UK a good place to research, design, develop, buy and use low-carbon vehicles, and in doing so create a new competitive edge for British manufacturing industry.

0.8 The Strategy identified the ten areas for Government action to promote low-carbon vehicles and fuels, and it made a series of commitments. This first annual report sets out the developments since we published the Strategy, and the progress made in each of the areas requiring Government action.

Delivering the Strategy

1 Engaging UK stakeholders in the shift to low-carbon transport

PFV Commitment – *The Government will work closely with all stakeholders from the automotive, energy and other sectors, establishing a forum to maximise the potential for UK business to gain competitive advantage from the Powering Future Vehicles Strategy.*

The Low Carbon Vehicle Partnership

1.1 The PFV Strategy underlines that Government action is essential, but change depends on all the stakeholders – the auto and fuel industries, consumer and environmental groups, transport operators, and central and local Government. The Strategy welcomed proposals for creating a Low Carbon Vehicle Partnership (LowCVP), bringing together all these stakeholders to work towards the UK's shift to low-carbon vehicles and fuels. The Partnership was officially launched in January 2003, and will play a key role in delivering the PFV Strategy, and maximising the competitive advantage for UK business.

1.2 The Partnership is already making an impact, with over 100 partners, including representatives from:

- the automotive industries, including component suppliers, technology providers, and the vehicle sales sectors
- the fuel and energy industries
- motoring and consumer interest groups
- environmental interest groups
- transport operators
- the finance and investment community
- the Government
- local Government
- the R&D and academic communities
- the Energy Saving Trust and the Carbon Trust.

LowCVP board

1.3 A high calibre board of 20 people provides overall strategic direction for the Partnership and its work plan. The first Chair of the Board is Graham Smith, Managing Director of Toyota GB, and the Deputy Chairs are John Wood, MD of MIRA, and Dr Bernard Bulkin, Global Chief Scientist of BP.

LowCVP board members

Jim O'Donnell	Managing Director	BMW GB Ltd
Bernard J. Bulkin	Chief Scientist	BP
Tom Delay	Chief Executive	Carbon Trust
Leslie Packer	Divisional Manager, Transport, Environment and Taxation	Department for Transport
Sarah Chambers	Director, Automotive Unit	DTI
Philip Sellwood	Chief Executive	Energy Saving Trust
Roger Putnam	Chairman, Ford of Britain	Ford Motor Co Ltd
David Hart	Centre for Energy Policy and Technology	Imperial College London
Roger Glenwright	Head of Transport	John Lewis Partnership
Jack Frost	Director, Fuel Cell Business	Johnson Matthey plc
Malcolm Noyle	Government and Green Fleet Development Manager	Lloyds TSB Autolease
Cllr Tony Brown	LGA Transport Executive; Ealing Borough Council	Local Government Association
John R Wood	Managing Director	MIRA Ltd
Nick Hartley	Senior Advisor	OXERA
Edmund King	Director	RAC Foundation
Neville Jackson	Director, Technology	Ricardo Consulting Engineers
Paul Jefferiss	Director of Strategy	Royal Society for the Protection of Birds
Graham Smith (Chair)	Managing Director	Toyota (GB) plc
John Fleming	Managing Director	Transbus
Jack Henry	Engineering Director	Travel West Midlands

LowCVP working groups

1.4 The LowCVP operates through working groups, with specific tasks and objectives. Four working groups have been established:

- **Passenger car working group** – To advise on what actions are needed by the Government and other stakeholders to achieve the PFV Strategy's 2012 target for low-carbon cars, and related issues.
- **Bus working group** – To make recommendations on how to deliver the PFV Strategy's target for low-carbon buses, ensuring the full involvement of the British bus manufacturing industry and transport operators.
- **Research and development working group** – To provide advice to the Department for Trade and Industry (DTI) on the terms of reference for the new Centre for Automotive Excellence in Fuel Cell and Low-carbon Technology; to advise on how Government can further support Research, Development and Demonstration (R,D&D) in the most effective way; and review the coverage of the UK's R,D&D activity, identifying gaps.
- **Future fuels working group** – To develop a strategic view on medium and long term options for fuelling low-carbon transport, to advise the Government on the fiscal and regulatory implications of its shared views, and to facilitate the smooth development of a new fuel distribution infrastructure.

And a further two working groups will be established shortly:

- **Supply chain working group** – To identify the components involved in tomorrow's low-carbon vehicles, and ensure that UK suppliers exploit the business opportunities.
- **Commercial vehicle working group** – To explore the potential for new vehicle technologies and fuels to reduce carbon emissions from commercial vehicles and to advise the Government on targets for commercial vehicles, and measures to deliver these targets.

1.5 Further details of the specific activities of the working groups are given in the relevant sections of this report.

1.6 The Partnership has a dedicated web site (www.lowcvp.org.uk), giving information on membership, aims and objectives, and updates on the activities and meetings of the Partnership and the working groups.

2 Targets for reducing vehicles' fuel consumption and carbon emissions

PFV Commitment – *The Government will set challenging targets for making the UK a world leader in the move to a low-carbon transport system, looking to the next decade and beyond.*

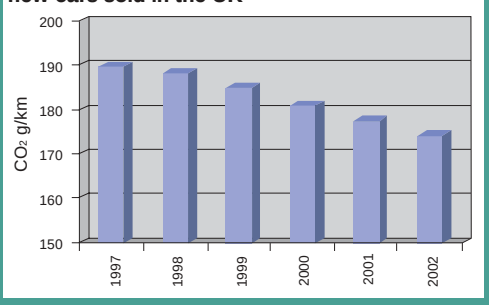
2.1 The PFV Strategy set the UK's own target for carbon performance, aimed at the leading 10% of cars sold – ***that by 2012, 10% of new cars sold in the UK will have CO_2 emissions of 100g/km or less at the tailpipe***.

The European Voluntary Agreements on reducing CO_2 emissions from cars

The key driver of accelerating the pace of technology improvements in vehicle emissions has been the Voluntary Agreements which the EU Commission and the European, Japanese and Korean car makers concluded in 1998 to reduce the average CO_2 emission of new cars from 190 grams per kilometre (g/km) in the base year 1995, to 140g/km by 2008/9 – a 25% reduction.

The agreements are working successfully, giving the vehicle makers a firm long term framework within which to develop and introduce cost effective technology improvements. Recent figures from the Society of Motor Manufacturers and Traders (SMMT) show that the average CO_2 emissions from new cars sold in the UK have been decreasing over recent years as cars become more efficient across the range [fig 2.1]. These fuel efficiency improvements have been achieved in addition to cars becoming generally bigger and more comfortable, safer, and better equipped, as well as cheaper in real terms.

Fig 2.1 Average CO_2 emissions from new cars sold in the UK



The EU Commission and the vehicle makers have begun a review of the progress towards the 2008/09 targets, and the potential for additional CO_2 reductions with a view of moving further towards the Community's objective of 120g/km by 2012.

2.2 To this end, the Government is supporting low-carbon cars at every stage, from funding for research and development programmes, to supporting trial demonstration vehicles, to other measures to encourage consumer take up of new vehicles when they reach the market place.

2.3 Much of the technology to support the next generation of low-carbon cars has been developed, but has not been brought together into working vehicles. The Department for Transport's (DfT) New Vehicle Technology Fund (NVTF) is aimed at this stage in the 'road to market', from technology ideas to finished vehicles on sale. And in April, the Secretary of State for Transport, Alistair Darling, launched an 'Ultra Low Carbon Car Challenge' under the NVTF programme, offering car makers financial support for building, demonstrating and testing cars which:

- are full size full performance cars
- are immediately practical – capable of being mass produced within a near to medium timescale of five to eight years
- could be mass produced at an affordable price
- use generally available fuel – petrol, diesel or LPG
- have well-to-wheel CO_2 emissions of less than 100 g/km
- as a result have a performance of around 80 mpg.

2.4 The Challenge stimulated a high quality response, enabling the Government to identify five projects for NVT Fund support for full development or feasibility stage investigation. This project has the focused, practical objective of pushing forward the pace at which ultra-low carbon cars reach the mainstream market place, and supports the achievement of the PFV target for 2012 – creating opportunities for this country's auto designers, component makers and car manufacturers. The NVT Fund support remains permanently open for further proposals relating to cars and other vehicles.

Ultra Low Carbon Car Challenge –
Projects selected for New Vehicle Technology Fund support

Subject to finalisation of Fund contracts

Lead partner	Other project partners	Main technology developments involved
MG Rover Group Ltd, Longbridge	MIRA, Nuneaton; Powertrain Ltd, Birmingham; Pi Technology, Cambridge	Hybrid powertrain, reduced body and chassis weight, advanced aerodynamics and thermal systems.
Ricardo UK Ltd, Shoreham, Sussex	Peugeot Citroen Automobiles, Coventry; QuinetQ, Malvern	Downsized parallel hybrid powertrain; automatic-manual transmission; advanced NiMH batteries supplemented by a supercapacitor.
Zytec Automotive Electronics Ltd, Sutton Coldfield	Motorola Daimler Chrysler	Series hybrid powertrain; high-efficiency starter-alternator
Bertrandt UK Ltd, Leamington Spa	Echo Developments, Leamington Spa CTG Ltd, Reading; Xtrac Ltd, Thatcham; SKF UK Ltd, Luton	Hybrid powertrain; Contra-rotating flywheel energy storage.
Artemis Intelligent Power Ltd, Edinburgh	Dana Corporation, Northampton; Multimatic Technical Centre Europe, Thetford	High efficiency digital displacement automatic transmission system

Sales of ultra-low-carbon cars by 2020

2.5 The 2012 target gives a clear idea of what we want to achieve in the next decade, but it is also important to send signals for the longer term. For this reason the Government has asked the LowCVP for their advice on the most effective form of a 2020 target for sales of ultra-low carbon cars, and this will be a priority for the Partnership in the coming months. The Ultra-Low Carbon Car Challenge will help bring these technologies to the demonstration stage, paving the way for the wider take up of these ultra-low carbon vehicles.

Promoting low-carbon buses in the UK

2.6 Alongside action on cars, reductions in other vehicles' emissions are important, and the PFV Strategy set a UK target for low-carbon buses, ***that by 2012, 600 or more buses coming into operation per year will be low-carbon, defined as 30% below average carbon emissions***.

2.7 The technologies for fuel efficient low-carbon buses already exist, and UK engineering and manufacturing companies have the capability to design and manufacture these vehicles in the UK. But, until now, the bus operators have not had the experience of operating these types of buses to enable them to introduce them – the sort of chicken-and-egg situation often encountered with automotive innovations. This is precisely the sort of barrier that the LowCVP was created to overcome, and why the Partnership chose to focus on low-carbon buses as a priority.

2.8 The LowCVP Bus Working Group has made recommendations on the joined up actions needed from bus manufacturers, operators and the Government to deliver the target. The Government has responded quickly to these recommendations, and Transport Minister Tony McNulty recently announced that the DfT would make grants available towards the additional cost of buying low-carbon buses while the market for these vehicles is growing. The grants, which will be awarded on a competitive basis, will support demonstration fleets, enabling low-carbon buses to be trialled on a large scale, establishing authoritative information on their operation, building confidence amongst bus operators and creating a market for these new vehicles in the UK.

2.9 Low-carbon buses are more fuel efficient, which means they offer savings to operators and they also offer reduced emissions in congested urban areas. This brings real health and quality-of-life benefits to people living in UK towns and cities. Rural areas can also benefit from quieter and more fuel efficient buses, which would make rural bus networks more cost efficient.

Low Carbon Bus Programme launched at the 2003 Bus and Coach Show

Speaking at the annual industry gathering, the DfT Minister responsible for buses, Tony McNulty, welcomed the LowCVP's work on cleaner buses, and announced the Government's Low Carbon Bus Programme, offering up to £3 million of *TransportEnergy* grants towards the additional costs of buying and running up to 150 low-carbon buses in demonstration fleets while the market for these vehicles is growing.

The Minister invited consortia of bus makers and operators to come forward with proposals for demonstration trials of low-carbon buses across a range of buses and routes, with the objective of generating authoritative information on their operation, costs and reliability. The programme is designed to provide the foundation for bus operators to adopt low-carbon buses, and bus makers to move into full-scale production, working together to achieve a transformation of the bus market.

Hybrid diesel and other low-carbon bus technologies were on display at the Bus and Coach Show. TransBus international, the UK's largest bus builder, launched its new ENVIRO 200 hybrid city bus at the show. This bus has CO_2 emissions at least 30% lower than a comparable bus of the same size, fuel economy savings of the same magnitude, and a capability to run with zero tailpipe emissions in air quality hotspots. The Go Ahead Group, with the support of Transport for London, have already announced their intention to purchase 12 buses when they become available in 2004.

Ensuring UK companies are involved in producing low-carbon vehicles

2.10 The Government wants to build a stronger position for UK businesses involved in developing low carbon vehicles. Automotive power train is an area of good UK expertise and manufacturing success. The emergence of new and alternative propulsion systems and drive chains presents both opportunities and threats. In order to address these the UK Government has asked the LowCVP's advice on how manufacturing and supply chain targets can be developed to support UK business involvement in supplying both engineering solutions and component parts and systems for tomorrow's low carbon vehicles.

3 Supporting research, development and demonstration of low-carbon vehicles

PFV commitment – *The Government will use its grant programmes to fund research, development and demonstration projects and will review them regularly to ensure that they are properly focused and working effectively together.*

3.1 The road from research and development to mass production has several stages, and the Government has programmes to support new technologies through each of these stages, from Foresight Vehicle Programme support for research and development, to the New Vehicle Technology Fund which gives financial support to demonstration trials of new low-carbon vehicles.

3.2 One of the objectives of Foresight Vehicle's recent 6th Call is to secure proposals aimed at reducing the UK fleet average CO_2 emissions. Following the technical review, nine projects have been recommended for funding, six of which address issues on improving vehicle emissions. These complement existing Foresight Vehicle projects aimed at reducing fuel consumption and CO_2 emission, such as:

- RHOLAB and ISOLAB42 – Related projects aiming to develop lead-acid battery option for hybrid vehicle applications
- ROADLITE – Developing a lightweight, chassis-less composite semi-trailer
- VPEMS – Demonstrating a vehicle emissions and control monitoring system
- CHOICE – Systems integration to build a city hybrid electric bus
- CHARGE – Defining operating parameters to control HCCI combustion processes using natural gas
- RECYCLE – Develop process technologies for lightweight polypropylene composite materials.

3.3 Since the PFV Strategy was launched in July 2002 a number of new low-carbon vehicle demonstrations have been funded through the New Vehicle Technology Fund. These projects include:

- Ford/Ricardo/Gates/Valeo – 'HyTrans' hybrid diesel delivery van

- London Taxi International – demonstration of three types of hybrid diesel taxi vehicles
- Environmental Transportation Systems – demonstration of two hybrid buses
- ENECO – demonstration of two diesel electric shuttle buses
- TDI Ltd – demonstration of electric van and battery exchange system
- London Bus Service – part funding for three fuel cell buses.

The Government's New Vehicle Technology Fund in operation – The 'HyTrans' project for a hybrid diesel light goods vehicle

The Fund is assisting Shoreham-based Ricardo Consulting Engineers, jointly with Ford of Great Britain, Gates and Valeo Electrical Systems, to develop a demonstration trial hybrid light goods vehicle, which will use a diesel engine and belt driven starter generator, with a target reduction in fuel consumption and CO_2 emissions of up to 25% when used for stop-start urban delivery tasks, with relatively modest additional purchase cost.

This is a fast-track project – testing of the completed demonstration vehicle is programmed to start in early autumn 2004.

With large numbers of light goods vehicles used for stop-start urban driving, Ford GB are considering taking the 'HyTrans' into full production, for sale in the UK and abroad, if the demonstration HyTrans confirms projected performance and costs. The diesel hybrid engine would be made at Ford's Dagenham plant.

3.4 The PFV Strategy identified the need for closer links between the various R,D&D programmes, and the Government has asked the LowCVP R,D&D working group for its recommendations on how to improve these linkages. We have also asked for the Partnership's advice on setting up a 'single portal' to build stronger links between Government programmes and provide a single point of advice and information on the support available.

3.5 The Automotive Innovation and Growth Team which reported to the Government last year identified that in the face of the increasing sophistication of vehicles, technological capabilities are an important source of competitive advantage. The UK should improve its performance in low carbon and fuel cell technologies as they have the potential to make major changes in the way in

which vehicles are designed and used. Major research initiatives are already underway in other countries but there is scope for the UK industry to establish a lead in key niches.

3.6 AIGT also recommended the establishment of Centres of Excellence to bring together a critical mass of UK firms and research institutions with the necessary expertise and to encourage them to work together collaboratively, thus establishing the UK as a major centre of research and future commercial exploitation. The DTI, in response to the AIGT's recommendations, has asked for the LowCVP's advice on the terms of reference for the new Centre of Automotive Excellence in Fuel Cell and Low Carbon Technology. The LowCVP R&D working group will be making recommendations on this within the next year.

3.7 The DTI is also working with industry and other stakeholders on the terms of reference for a Telematics and Technologies for Sustainable Mobility Centre of Excellence. The Centre will help support enabling technologies for low-carbon vehicles and transport.

3.8 The DTI is currently preparing a proposal for a hydrogen and low-carbon fuels programme. This includes securing the necessary funding via the normal mechanisms. Subject to funding approval, it is proposed to launch the programme in the 2004/05 financial year. The objectives of the programme – currently being discussed with industry and other stakeholders – will be to complement the DTI's existing fuel cells programme. As with the fuel cells programme, the focus would be on industrially led projects rather than fundamental university research.

4 Encouraging consumer take up of low-carbon vehicles and fuels

PFV commitment – *The Government will encourage consumer take up of low-carbon vehicles and fuels, through financial measures, and overcoming market barriers.*

4.1 The Government '*Powershift*' grants, administered by the Energy Saving Trust, help offset the higher costs of low-carbon cars while the market for these vehicles is small. At present these grants cover the purchase of LPG, natural gas, hybrid and electric vehicles. *Powershift* grants are also available towards to the cost of converting vehicles to LPG and natural gas.

4.2 The Government has recently consulted on how best to target future support for the road fuel gases. In the light of this consultation, the Government is now considering the future structure of *Powershift* grants to ensure that support is targeted most effectively on the objective of support for low-carbon technologies, as well as reducing air pollution emissions, with a view to announcing decisions in the 2003 Pre Budget Report.

4.3 Consumers need reliable information on low-carbon vehicles and fuels to inform their decision making. The Energy Saving Trust have recently developed the Transport Energy web site to include information on the different vehicle technologies and the grants available to support them – see www.transportenergy.org.uk. The site also includes information on low-carbon fuels such as biodiesel and natural gas, including the locations where these fuels can be bought.

4.4 Consumers also need clear, accurate information on the fuel efficiency and CO_2 emissions of cars. All new cars are required to be labelled with this information at the point of sale. The European Commission plan to review the success of the current labelling arrangements, drawing on Member States' experience. In preparation for this, the DfT has been looking at possible new labelling schemes, and has carried out a pilot scheme to test a colour coded design

of car label, similar to the A-G energy efficiency label used on new fridges and freezers. The results of this pilot scheme will inform our input to the Commission review. We have also asked the LowCVP Passenger Car working group for their recommendations on how car labelling can be as clear and informative as possible for consumers.

4.5 Earlier this year the Government issued the '*Drive cleaner, drive cheaper*' leaflet to provide motorists with information on the environmental and financial benefits of low-carbon vehicles and fuels. The leaflet is available free of charge from the DfT's free publications centre (0870 1226 236).

5 New fuels – production, distribution infrastructure

PFV commitment – *The Government will facilitate the quick and smooth development of new fuel distribution infrastructure as it is needed.*

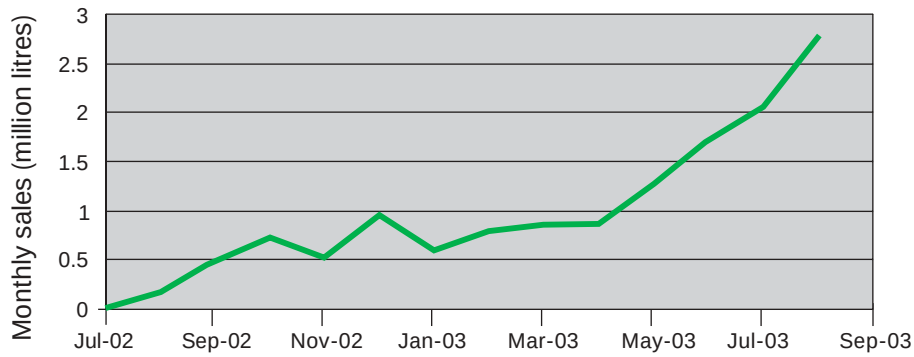
5.1 New vehicles and fuels will call for a new fuel distribution infrastructure, and the Government has an important job in facilitating its smooth development. We must make sure that we have thoroughly explored the infrastructure implications of the new technologies so that we are well prepared to take full advantage of them. The successful establishment of an LPG refuelling network across the UK – now available on over 1,300 forecourts – has provided useful and positive experience of how new fuel infrastructure can be facilitated, by close attention to planning, health and safety issues, and close working with local authorities and the fuel industry.

5.2 The Government is preparing a guidance note for local planning authorities on the issues raised by renewable electricity infrastructure. This will also address the planning issues raised by new fuel distribution infrastructures.

Biodiesel

5.3 A duty differential (20 pence per litre below the ULSD rate) was introduced for biodiesel in July 2002 to encourage the use of this low-carbon fuel. Since this duty change was made, sales of biodiesel have grown to over two million litres per month, and it is now available in over 130 outlets in the UK (Fig 5.1). Most of these suppliers are independent retailers but two major supermarket chains have also started to sell biodiesel blends at some of their sites. A full list of retailers selling biodiesel is available from the EST's Transport Energy web site, www.transportenergy.co.uk, to help consumers use this new fuel.

Fig 5.1. Biodiesel sales in the UK



Note: Consumption of conventional diesel is around 1,600 million litres per month.

5.4 Currently around half of the UK's biodiesel is imported from Europe and is manufactured from virgin rape seed oil. Of the biodiesel produced in the UK, the majority comes from recycled vegetable oil. UK production is set to receive a significant boost shortly with the opening of several major biodiesel production plants. Argent Energy is constructing a new plant in Newarthill, near Motherwell, which is scheduled to start operation in spring 2004. The plant, which will produce biodiesel from recycled vegetable oils and fats, is expected to produce 50 million litres of biodiesel a year. The Scottish Executive is actively supporting this project, recognising its potential contribution to sustainable development, renewable energy, and waste reduction. A second producer, Global Commodities UK, has purchased a large plant at Lowestoft, which should increase their production of biodiesel from waste vegetable oil to over 180 million litres per year.

5.5 As these and other plants come into production, sales of biodiesel in the UK could make up some 1% of total diesel sales. Biodiesel mainly goes in to 5% blend fuel, which all vehicles can use without adaptation, and under vehicle warranty. Biodiesel blend fuel could thus account, by the end of 2004, for around a fifth of all diesel sales in the UK.

5.6 The European Union Biofuels Directive requires member states to set indicative targets for sales of biofuels to be met by 2005 and 2010. The Government is currently considering the level of targets that should be set for the UK, and will be consulting on possible targets in early 2004.

Bioethanol

5.7 Budget 2003 announced the Government's intention to introduce a new low duty rate for bioethanol (also 20 pence per litre below the ULSP rate) from 1st January 2005.

Hydrogen

5.8 The Energy White Paper identified the potential for both hydrogen and biomass-based fuels to play major roles in a very low-carbon transport economy, with benefits also in terms of improved energy security and diversity. The White Paper noted that each had major implications for both fuel production and fuel distribution, and it included a commitment that the Government would over the next year make 'an assessment of the overall energy implications of both a hydrogen economy, and of large scale use of biomass-based fuels' (Energy White Paper, paragraph 5.22).

5.9 This assessment is now in progress, involving industry, environmental and other stakeholders. There is a web site to provide information on progress and developments, and to allow open access for comment and input to the assessment (www.dti.gov.uk/energy/sepn/futuretransport.shtml). The Low Carbon Vehicle Partnership will also be involved, providing its expert advice on the issues involved in the new fuels.

5.10 Three hydrogen buses are due to be trialled in London for two years from December 2003, and the Government is providing support for these buses through the New Vehicle Technology Fund. As part of this trial, BOC products are installing hydrogen refuelling facilities in East London, with financial support through the Government Green Fuels Challenge.

Trials of hydrogen buses in London

From December 2003, three Daimler Chrysler hydrogen fuel cell buses will be in operation on a public bus route in central London as part of a European-wide demonstration programme called Clean Urban Transport for Europe (CUTE). The buses will operate as part of the London Buses fleet, and will be operated by First Group under contract to Transport for London. BP will be providing the hydrogen-refuelling infrastructure at a stand-alone site away from the bus depot, which will enable other hydrogen vehicles to use the facilities for future trials. The DfT is providing part funding for the buses and refuelling facilities through the EST's New Vehicle Technology Fund programme.

The buses will be running on hydrogen made from natural gas, and will emit only water vapour at the point of use, which offers air quality benefits in urban areas.

The Daimler Chrysler hydrogen fuel cell bus.

5.11 Two types of hydrogen cars will also be trialled in the UK during 2004 by Ford Great Britain, in conjunction with BP, involving up to six cars – the Ford Focus, a hydrogen fuel cell car; and a Cmax hybrid internal combustion engine car, both using compressed hydrogen. This will be part of a European wide trial.

The hydrogen fuel cell Ford Focus, to be trialled in the UK next year.

Gas to liquids

5.12 Since July 2003 Shell have been trialling 'gas to liquids' fuels in a bus in London. This technology enables a liquid fuel to be produced from natural gas. The liquid fuel can be used in conventional diesel vehicles with no engine modification and offers reduced emissions, and potential security and diversity of supply benefits. Details of emissions will be reported at the end of the trial.

A London bus, currently trialling the performance of Shell's new 'gas to liquid' fuel.

Road fuel gases

5.13 There are now over 1,300 LPG refuelling stations in the UK, and over 100,000 vehicles capable of running on LPG. There are a small number of natural gas refuelling stations – 26 in total – open to the public. Many of the 850 natural gas vehicles in the UK are HGVs operated by major UK retailers from private depots.

5.14 The Government has recently consulted stakeholders on how best to establish a consistent and durable framework of the Government support for road fuel gases. The consultation period closed on 17 September 2003 and the Government is now considering the responses.

6 Taxation measures for low-carbon vehicles and fuels

PFV commitment – *The Government will support the move to a low-carbon transport system by ensuring the appropriate taxation of vehicles, fuels and infrastructures.*

New taxation measures

6.1 Budget 2003 built on the existing support for low-carbon vehicles and fuels by announcing further measures, including:

- a new low 'AAA' vehicle excise duty VED band for cars which emit 100 grams of CO_2 per km or less. This new rate which came into force from May 2003 means that motorists who buy these low-carbon cars pay only £65 a year for their VED – £100 less than a car in the highest VED band
- an announcement that the Company Car Tax (CCT) regime will be further developed to support the 2012 target for introduction and take up of very low carbon cars. For the financial year 2005/6 the level at which company car drivers qualify for the lowest rate of company car tax will be reduced by 5%
- a new low duty rate for bioethanol to be introduced from January 2005
- a duty differential for sulphur free fuels to be introduced from 1 September 2004
- a review of how best to continue support for clean low-carbon road fuel gas vehicles. This consultation was launched on 18 June 2003 and closed on 17 September. The Government is now considering the results of the consultation.

Sulphur Free Fuels

Sulphur free fuels offer further environmental benefits over ultra-low sulphur fuels, delivering greater long term reductions in carbon emissions when used in new engine technologies such as Petrol Direct Injection (PDI), and further air quality improvements. In Budget 2003 the Government announced that it would introduce a duty incentive for sulphur free fuels of half a penny per litre relative to the rates for ultra-low sulphur fuels from 1 September 2004 to bring forward the introduction of these fuels.

Success of existing taxation measures

6.2 Since the introduction of a 20 pence per litre duty differential in July 2002 there has been a significant growth in biodiesel sales and biodiesel outlets, as detailed above. Biodiesel production in the UK is currently almost exclusively from waste oil, and the current incentives have not yet led to industry development based on oil from oilseed rape.

6.3 The Government is evaluating the impact of the new CO_2 linked CCT and VED regimes. The early indications are that CCT is already having an impact on company car sales. The Government will consider the outcome of these evaluations in deciding on future changes to the VED and Company Car Taxation regimes.

7 European and international actions

PFV commitments – *The Government will work proactively with the EU and other partners in the international aspects of securing the development, introduction and take up of new vehicles and fuels.*

The Government will ensure that appropriate standards and testing procedures are put in place for new vehicles, fuels and fuel distribution infrastructure.

Actions at the European level

7.1 The European Commission Voluntary Agreements with the European and Far Eastern motor manufacturers is an important mechanism for reducing average CO_2 emissions from new cars. The agreement has been successful to date in reducing CO_2 emissions from new cars as the graph on page 5 illustrates. The existing Voluntary Agreements are expected to deliver savings of 4MtC in the UK by 2010, a key part of transport's contribution to reducing carbon emissions.

7.2 A detailed technology assessment which the Government commissioned from Ricardo Engineering Consultancy in 2002[1] indicated the range of further technology improvements which could cost effectively reduce the fuel consumption and CO_2 emissions of standard full performance cars down to 100g/km or less, over the next two decades. Ricardo are currently updating their assessment. This will be completed shortly, and the update will be placed on the DfT web site.

7.3 In the Energy White Paper, the Government indicated its strong support for the EU Voluntary Agreements as a cost effective mechanism for making cars better for the consumer, and better for the environment. And it announced that:

1 ' "Carbon to Hydrogen" Roadmaps for passenger cars', a study by Ricardo Consulting Engineers for the DfT and the DTI, November 2002. Available on the DfT web site www.dft.gov.uk.

'We will work with the Commission in developing further Voluntary Agreements to continue the reduction in average new car emissions or other arrangements with the same objective.'

7.4 The Government is now liaising with the Commission, as it starts on its programmed review of progress towards the 2008/09 Voluntary Agreement targets and the potential for further CO_2 reductions. We are also liaising with other involved Member States, including France, Germany and the Netherlands, which has identified progress on the Voluntary Agreements as one of their Presidency objectives for the second half of 2004.

7.5 The Government is actively participating in a European Commission Group on Alternative Fuels, which is exploring the potential for hydrogen, biofuels and natural gas as alternative fuels in Europe.

7.6 The Government is also working with the European Commission to agree a test cycle for light goods vehicles, which will enable the fuel efficiency of these vehicles to be measured, and a target to be set. The new test cycle will come into effect on 1 January 2005 for new type approvals.

International action

7.7 The DfT and the DTI contributed to the Japanese Government's Environmentally Friendly Vehicles conference in January 2003 which focused on the potential for new vehicle technologies to reduce carbon and air quality emissions from vehicles.

7.8 In July this year the Prime Minister met the Japanese Prime Minister, Junichiro Koizumi to discuss ways of reducing carbon emissions from transport and other sectors. The two Prime Ministers signed a joint statement on *'Tackling Environmental Challenges Together'* and this included an announcement that *'the UK will host a joint forum with a view to exchanging information and providing an opportunity for seeking possible bilateral collaboration and investments in R&D for future alternative vehicles and fuels.'* This Forum will start with a seminar in London on 2 December 2003, with programmes of visits to UK universities and companies involved in low-carbon R&D.

7.9 The UK also ensured that the G8 Summit at Evian in July 2003 included positive conclusions on clean, low-carbon vehicle technologies. G8 Heads of the Government agreed in particular to facilitate the development of fuel cell and hydrogen technologies by increasing international cooperation in pre-competitive research and by accelerating the development of internationally agreed codes and standards for fuel cell vehicles.

8 Health and safety matters

PFV commitment – *The Government will continue to ensure that health and safety and environmental concerns are fully dealt with in the move to new vehicle technologies and new fuels.*

8.1 New vehicle technologies must be safe for motorists and other members of the public. New vehicles are required to meet all the many existing safety standards set out in legislation. The legislation, based on international standards, or special statutory orders covering new technologies, covers both primary safety (the prevention of accidents) and secondary safety (the prevention or mitigation of injury in the event of an accident). In the latter category, legislation has traditionally aimed to protect vehicle occupants. However there is an increased recognition of the role of car design in reducing injury to pedestrians and other vulnerable road users, and this has led to the development of a European Directive on pedestrian protection. Subject to final agreement, the Directive will apply to new car designs from 2005, and has the potential to reduce pedestrian fatalities and serious injuries by 20%.

8.2 New fuels may pose different risks to conventional fuels and it is therefore important that these risks are assessed and guidance is given about the safe handling of these fuels. For example, hydrogen has very different chemical and physical properties from liquid fuels and the Health and Safety Executive are producing guidance on the safe use of fuel cells, which will give advice on how to minimise the risks when storing and handling hydrogen. This guidance will be published in January 2004.

9 Transport participation in the UK Emission Trading Scheme

PFV commitment – *The DfT will work with business transport users to develop projects through which carbon savings made in the transport sector can be brought within the Government's Emissions Trading Scheme.*

9.1 The policy context on greenhouse gas emissions trading continues to develop and change rapidly. Focus has shifted from expanding the UK Emissions Trading Scheme, as originally envisaged in the PFV Strategy, to the EU Emissions Trading Scheme (EU ETS). The EU scheme will start in January 2005[2]. The transport sector will not be involved in its first phase in 2005-08. The Directive, however, requires the European Commission, when reporting on its application in 2006, to consider how and whether the trading scheme should be extended to the transport sector in subsequent phases. The Government will support future work by the Commission to consider expanding the scope of the scheme to include transport and other sectors.

9.2 Most recently, the Commission has come forward with a proposal[3] to link the project based activities defined by the Kyoto Protocol – joint implementation (JI) between developed countries and the clean development mechanism (CDM) between a developed country and a developing country host – to the EU ETS. Similar to the pilot project phase originally envisaged under the UK ETS, this would allow approved emissions reduction projects to generate emissions reductions credits that can then be sold on. The proposal does not, however, currently envisage 'unilateral' projects taking place in one Member State only. Work on analysing the Commission's proposal and its impact for possible credit generating projects in the transport sector is ongoing.

2 Reference to *Directive establishing a scheme for greenhouse gas emission allowance trading within the community and amending Council Directive 96/61/EC*, currently http://europa.eu.int/comm/environment/climat/030723provisionaltext.pdf

3 Reference to *Proposal for a Directive amending the Directive establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms – COM (2003)403.*

10 The Government's vehicle fleet

PFV commitment – *The Government will make maximum use of new vehicles and fuels in its own vehicle fleets, and encourage other public authorities to do so.*

10.1 The Government must lead by example, and the 'Framework for Sustainable Development on the Government Estate' sets targets for the Government Departments' own vehicle fleets. Against a baseline year of 2002/3, the target is to reduce road transport vehicle carbon dioxide emissions by at least 10% by March 2006. This is to be achieved through any combination of:

- reducing total business vehicle mileage
- improving the average fuel efficiency of vehicles
- reducing total fuel consumed.

10.2 The Government Car and Despatch Agency (GCDA), which supplies cars for the Government Car Service (GCS) fleet, has set itself the target of reducing the average CO_2 emissions from the GCS fleet by 2% by March 2004 against a March 2003 benchmark. A total of 29% of the Agency's fleet uses low-carbon vehicle technologies or alternative fuels (see fig 10.1). The Agency is currently reviewing the choice of cars for Ministers and the review will take account of the latest low-carbon vehicle and fuel technologies, including the latest hybrid cars. The Agency is also encouraging manufacturers to develop LPG conversions for some of their later models where currently no conversion exists.

Hybrid and electric cars from the Government Car and Despatch Agency's fleet.

Figure 10.1, Composition of the GCDA fleet

Fuel category	***Vehicle type***	***Number in fleet***	***% of fleet by category***
Electric Battery	Peugeot Partner Vans Ford Think Car	2 1	1.2%
Electric – Hybrid	Toyota Prius	4	1.6%
LPG	Cars – mixed makes Ford Transit Vans Vauxhall Combo Vans	42 22 2	25.8%
Diesel	Ford Transit Vans Peugeot Cars	31 1	12.5%
Petrol	Cars – mixed makes	151	58.9%

10.3 The Agency's fleet includes 53 Ford Transit vans which provides good scope for the use of 5% blend biodiesel fuel. The GCDA is negotiating with fuel suppliers to secure competitively priced biodiesel with the aim of running its entire van fleet on a biodiesel blend. In the meantime, GCDA will be extending its use of biodiesel obtained from retail sources wherever possible.

10.4 The Scottish Executive has increased the number of vehicles that use Liquefied Petroleum Gas from 111 during 2001/02 to 128 during 2002/03. This means that 80% of the fleet (including two electric vehicles) is now equipped to use alternative fuel.

10.5 In addition Government Departments own around 950 alternatively fuelled vehicles, the majority of which are fuelled by LPG. This is some 9% of the total Government owned fleet, which numbers just over 10,500 vehicles.

10.6 The DfT intend to hold a Low Carbon Transport Government Procurement seminar shortly, to encourage both central and local Government to use low-carbon vehicles in their fleets, and to consider using biofuels and other alternative fuels.

Next steps

This first year of work on implementing the *Powering Future Vehicles* strategy has been busy and challenging. The genesis of the LowCVP has been a key foundation in the implementation of the Strategy, and the support and interest from all the stakeholders is much valued. It reflects the importance placed on the Strategy by the Government.

But the PFV strategy is a task for action over many years, working closely with the Low-Carbon Vehicle Partnership and other stakeholders. In particular, we recognise that the success of the Strategy depends not only on the promotion of the new vehicle technologies themselves but also on tackling the associated issues of future energy generation and infrastructure. These will be priorities for us over the coming year, alongside vigorous carry-through on the Ultra Low Carbon Car Challenge, the Low Carbon Bus Programme, and other important initiatives launched this year.



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