

# **Automotive Innovation and Growth Team**

## **Environment Report**

**May 2002**

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## 1) Introduction

**The Automotive Innovation and Growth Team (AIGT) is the first of several IGTs to be initiated by the Department of Trade and Industry (DTI). They represent the start of a new approach to policy making with Government working in partnership with industry and others in key sectors to formulate and deliver policy. The concept is linked to the policy developments outlined in the recently published *White Paper on Enterprise Skills and Innovation – Opportunity for all in a world of change*. The White Paper is available online at <http://www.dti.gov.uk/opportunityforall/>. Sir Ian Gibson, former Chief Executive of Nissan’s UK and European operations, was appointed Chairman of the AIGT in April 2001.**

The primary role of the AIGT has been to identify the key drivers on which competitiveness will turn over the next 5 to 15 years and to develop a vision for a future automotive sector in Britain. Its aim is to ensure that the UK automotive sector makes the most of its opportunities as the global industry restructures and develops so as to provide a good deal for consumers and ensure that it continues to make a major contribution to the UK economy. The AIGT has made recommendations for changes in specific areas of policy such as the mobility services initiative described on page 14. It is also proposing changes to the way in which policy is made. We want to establish a continuing dialogue between industry, Government and other stakeholders such as environmental and consumer groups. The objective of this is to promote a greater mutual understanding of current and future challenges and opportunities, and to ensure that the future policy making process is as effective as possible thus ensuring that the UK provides a supportive environment for the industry.

The Environment Sub-Group of AIGT is one of four established to examine a particular set of forces shaping the future of the industry.<sup>1</sup> It set itself the goal of identifying policy, regulatory and other developments which will create opportunities for the UK automotive sector to enhance environmental quality and contribute to quality of life for car users and other groups. It is chaired by Professor Jim Skea of the Policy Studies Institute (PSI) and includes a wide range of representatives from the auto sector, government officials and environmental NGOs and specialists (See Annex I).

The Sub-Group recognised early on the breadth of the environmental challenge facing the automotive sector and the huge range of regulatory and policy interventions, all with competitiveness implications, to which it is subject. It decided to focus on two “case studies” illustrating the key types of challenge emerging over the coming years. The case studies were developed by small teams (See Annex II) bringing together representatives from government, industry and the NGO sector. The two case studies concerned the *Low Carbon Economy* and *Mobility Services*.

The case studies (Section 4) make up much of the report which follows. However, we set the scene by first describing the automotive sector and its impacts on the environment (Section 2), and then the way in which environmental policies affect the industry and its

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<sup>1</sup> The others are: Design, Development and Manufacture; Technology; and Distribution, Competition and Consumer.

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competitiveness (Section 3). Conclusions and recommendations are set out in Section 5 and include our central recommendations concerning the process for policy making.

## **2) The Automotive Sector And Its Environmental Impacts**

### **The Shape of the Industry**

**The automotive industry was one of the defining businesses of the 20<sup>th</sup> century. It continues to be one of the world's most important industries. The industry is highly - and increasingly - globalised, with complex supply chains reaching across countries and even continents. Over 80 per cent of world car production is accounted for by six major global groups.**

The industry in the UK is an integral part of this wider structure. Although there is only one UK-owned volume car manufacturer, the UK provides a manufacturing base for seven of the world's leading volume vehicle manufacturers, nine commercial vehicle production facilities, 17 of the world's top tier one suppliers (major firms which supply direct to the vehicle manufacturers), and around 20 of the world's leading independent automotive design engineering firms. The extent to which the industry is integrated in world (particularly European) markets is striking. The UK industry exported goods worth nearly £20bn in 2000, more than any other manufacturing sector. In all, 65 per cent of UK automotive output is exported; conversely, 74 per cent of UK car registrations are imports.

The automotive industry represents about 15 per cent of total UK manufacturing value added. As a leader in many areas of technology and manufacturing processes, it is a major source of best practice for the manufacturing sector as a whole. The UK industry's particular strengths include design engineering, especially advanced technology in motorsport. The UK is also increasingly becoming a centre for the production of engines and "premium" cars. These range from the new Mini, through Jaguar and Range Rover, to super-luxury cars such as Bentley and Aston-Martin.

### **Environmental Impacts**

The car has transformed the way in which the majority of people in developed countries live, giving them unprecedented degrees of mobility. The number of cars licensed in the UK rose by 17 per cent from just under 19m in 1990 to over 23m in 2000. The total number of kilometres travelled by cars and taxis rose by 13 per cent over the same period.

Inevitably, however, this has come at a price: car ownership and use has impacts on other road users, on local communities and on the natural environment. The major environmental impacts of the car include local and regional air pollution, contributions to global climate change, congestion and noise as well as the impacts of manufacturing and end-of-life disposal.

In the UK, vehicles are responsible for over a quarter of particulate emissions and almost half of total nitrogen dioxide emissions. These have been linked to damage to both air quality and health. However, although average emissions per car are falling and on course to fall further until about 2010 due to engine and fuel improvements, these savings will largely be offset by increases in traffic.

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The Government believes that climate change is one of the most serious threats facing the world's environment, economy and society. Road vehicles are the third largest source of greenhouse gas emissions in the UK. They currently account for about 22 per cent of the total emissions of carbon dioxide (CO<sub>2</sub>). Average CO<sub>2</sub> emissions from new cars are falling, driven by an EU voluntary agreement under which motor manufacturers have agreed to reduce new car emissions by 25 per cent between 1995 and 2008. However, although average CO<sub>2</sub> emissions per car are falling, total CO<sub>2</sub> emissions from vehicles will continue to rise because of increases in traffic.

The central scenario of the 1997 National Road Traffic Forecasts estimated that road traffic as a whole would increase by 57 per cent between 1996 and 2031. Congestion is an inevitable consequence of an increase in traffic on this scale. One fifth of journey time in outer London is already spent stationary. One estimate is that journey times in many cities could increase by as much as 70 per cent over the next twenty years. Congestion is thus a major problem in itself, causing wasted time, high levels of stress and added business costs. The impact of congestion is exacerbated by the increased levels of emissions from vehicles when they are static or moving very slowly.

High levels of ambient noise can seriously reduce people's quality of life. EU standards have caused noise from individual vehicles to fall as new vehicles replace older and noisier designs. Noise in urban areas has fallen, but increased traffic has caused noise from vehicles travelling at high speeds on inter-urban roads to increase. New standards are beginning to address tyre noise, but attention is increasingly focusing on the development of better road surfaces. If traffic continues to grow, the noise problem may move up the environmental agenda.

Although 80-90 per cent of a vehicle's lifetime energy consumption takes place during its "in-use" phase, the production and scrapping of vehicles also have environmental impacts. Manufacturers have reduced the environmental impact of production processes by phasing out harmful substances such as mercury and CFCs. Manufacturing contributes to greenhouse gas emissions and results in a number of waste products (water, volatile compounds and solid waste). Once vehicles reach the end of their life, most of the material can be recycled, but 25 per cent will end up as waste. The recent EU End-of-Life Vehicles Directive requires re-use and recovery of materials to rise to 95 per cent by 2015.

### **Industry Responses**

Increasingly, business is finding it necessary to address environmental issues within the wider context of sustainable development. The four objectives of the UK's Sustainable Development Strategy are: social progress which recognises the needs of everyone; effective protection of the environment, prudent use of natural resources and the maintenance of high and stable use of economic growth and employment. All of these considerations are important in manufacturing, usage and disposal of motor vehicles. Business is increasingly alert to the possibility of seizing competitive advantage from sustainability challenges.

The automotive sector is one of the lead sectors on sustainable development. The Society of Motor Manufacturers and Traders (SMMT) has developed a sector strategy for sustainable development and is encouraging its members to commit to its principles. Signatories report progress to the SMMT annually based on a series of sustainability indicators. The information is compiled into an annual report and is used to establish targets against which

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the automotive sector's progress towards sustainable development is measured. The second report was published in November 2001.

### 3) Environmental Policy And The Automotive Sector

#### **Environmental Policy Influences**

The importance of the vehicle industry within the manufacturing sector as a whole and the impact of the expanding vehicle fleet on the environment mean that the automotive industry is exposed to a wide range of environmental policy influences, both here and in other parts of the world.

Over time, the scope and range of environmental legislation and other policy measures affecting the industry has grown and there are few signs that this will change. Box 1 shows the principal types of measures that affect manufacturers directly. Given the integrated nature of the European automotive market, most measures affecting the auto sector are developed at the EU level.

#### **BOX 1: MEASURES AFFECTING VEHICLE MANUFACTURERS DIRECTLY**

- vehicle product standards, covering emissions and other design and performance characteristics, e.g. Air Pollution Emissions from Motor Vehicles, Low Temperature Limit Values (cold start standards) adopted in December 2001 and the Emissions From Two and Three Wheeled Motor Vehicle (in conciliation in mid March).
- component product standards, covering paint, batteries and tyres for example.
- related standards with a direct bearing on vehicle design, eg some fuel quality standards, restrictions on use or disposal of certain materials (e.g. Sulphur In Petrol & Diesel Fuels proposal currently before the European Parliament awaiting a second reading).
- labelling requirements, e.g. on fuel consumption.
- end of life requirements, affecting both vehicle design and responsibility for management of the existing fleet as it enters the waste stream, e.g. End Of Life Vehicles Directive (agreed and currently in the process of implementation in the EU Member States).
- measures which control the performance of manufacturing plants, such as limits on emissions and wastes and the current EU framework of integrated pollution prevention and control (IPPC).
- negotiated agreements, e.g. the voluntary agreement on passenger car CO<sub>2</sub> emissions.
- monitoring and reporting requirements, e.g. on new passenger car CO<sub>2</sub> emissions.
- fiscal measures affecting the tax or duty on new vehicles which increasingly have an environmental component related to emission levels

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Most of the policy interventions affecting the automotive sector take the form of traditional standards or regulatory measures. Other approaches, such as voluntary agreements and fiscal measures, are beginning to be used on a limited scale. The majority of interventions are implemented through EU Directives. Fiscal measures, which are generally applied at the national level, are an exception. In principle, equivalent standards apply throughout the EU, although there can be variations in the specific rules in force in different countries and regions.

Local factors may be important when policies are directed at manufacturing plants themselves. For example, varying procedures and sensitivities in development planning may affect the location of large plants.

Measures with a less direct impact on the manufacturing process and the product *per se* are also of strategic significance, with a greater impact than that experienced by many other industries. The core characteristics of vehicles and the performance expected of them are under continual scrutiny. They need to be adapted to wider requirements concerning issues such as climate change, air quality and urban congestion. Box 2 illustrates the widening circle of indirect measures of this kind that are either in place or are under development.

**BOX 2: MEASURES AFFECTING MANUFACTURERS INDIRECTLY**

- measures affecting fossil fuel composition and quality
- policies designed to promote alternative vehicle fuels, for example, through reduced duties and subsidies.
- fiscal measures affecting the price of liquid fuels, in both relative and absolute terms.
- climate change policy in a broader sense, establishing national emission targets with implications for the road transport sector (eg. the Ozone in Ambient Air measure and the National Emissions Ceilings Directive agreed in 2001 which covers several air pollutants including NOx and VOCs.
- rules on waste electrical and electronic equipment.
- rules on noise pollution such as the Directive on Assessment and Management of Exposure to Environmental Noise proposal currently before the European Parliament.
- environmental liability e.g. Proposed Directive on Environmental Liability, January 2002.
- the Clean Air for Europe (CAFE) Programme, with implications for further tightening of vehicle emission standards.
- The emergence of “Integrated Product Policy” (IPP) thinking at EU level , which will aim to address key product sectors in a more holistic, life cycle approach to reducing environmental impacts.
- other general strategic measures such as EU Sustainable Development Strategy and the proposed Sixth Environmental Action Programme 2001-2010.
- changing approaches to urban and infrastructure planning.

**Impact of Environmental Policy on Competitiveness**

The potential impact of environmental measures on costs and competitiveness has been of considerable concern to the automotive sector. However, the Sub-Group recognises that the concept of “UK competitiveness” is itself an elusive one in the context of a global industry with the complex supply chains described in the previous section. Competitiveness implications can only be assessed in relation to *specific* environmental measures. Any assessment requires a careful mapping of the UK role in the supply chain and a review of domestic competences and capabilities.

The *general* debate about environmental regulation and competitiveness has been characterised by a strong polarisation of views. In the past, industry has often argued that environmental regulations impose costs which damage competitiveness. More recently, it has

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been argued that regulatory interventions actually enhance competitiveness by stimulating innovative activity in companies and creating “first mover advantage”.

The Sub-Group, drawing on past experience of developments in the automotive sector and elsewhere, would not automatically subscribe to either of these general propositions. It agreed that the primary rationale for environmental measures must always be the environmental benefits that will ensue. Potential competitiveness gains are not by themselves a rationale for environmental policy. In the long-term, the industry needs to acknowledge and accommodate legitimate social pressures for higher environmental standards - looking for opportunities to create national competitive advantage by responding to the new pressures faster and better than competitor countries and industries. And one element in this proactive approach lies in *anticipating* how and when these pressures will emerge. Where these clearly impose costs, a debate about the balance of costs and benefits is essential.

It is clear that environmental policies and regulations do affect the relative competitiveness of both companies and individual countries, creating winners and losers. For example, public demands for better air quality in Europe led to the introduction of three-way catalytic convertors. This move, which clearly favoured German and Scandinavian producers, is often cited as an illustration of “first mover advantage”. However, it is also true that pressure for reduced emissions played to the competences of certain manufacturers who, fortuitously, found themselves able to exploit a rapidly changing market. Many of the cited examples of “first mover advantage” indeed refer to market leaders for whom environmental measures have provided the opportunity to consolidate and re-inforce market position. This underlines the message that a robust understanding of UK strengths and competences is required to manage the interactions between regulation and competitiveness.

It is also clear that the *way* in which environmental policy instruments are designed and implemented is critical. Even where most environmental policies and regulations are established at the EU level, the UK has much scope for influence. First, early involvement in EU policy making at the stage when the European Commission is developing proposals is critical. But second, there is often considerable leeway in transposing and implementing measures at the national level. Historically there has been a concern that implementation of EU measures within the UK is in step with that in other EU Member States and that the industry is not disadvantaged by domestic burdens not imposed elsewhere. This has been a major point of discussion recently in relation to the End-of-Life Vehicle (ELV) Directive. It is sometimes asserted that the UK has implemented EU measures with unnecessary thoroughness or earlier than is required. However, evidence of ‘gold plating’ by the UK government in implementing EU measures is much less impressive than conventional wisdom would suggest.

The central conclusion of the Sub-Group is that we need to be wary of generalised conclusions about the competitiveness implications of environmental policies. Nevertheless, Box 3 sets out some firm conclusions about the way in which the UK ought to move forward to manage better the competitiveness impacts of emerging environmental policy.

**BOX 3: MANAGING ENVIRONMENT AND COMPETITIVENESS: KEY NEEDS**

- government and industry must work together with others to develop foresight and horizon scanning activities which will anticipate emerging environmental challenges. This should result in clear long-term policy goals providing a framework within which planning can occur. One benefit would be a greater degree of predictability, enabling companies to meet more demanding targets and timetables.
- recognising the global situation that both consumers and governments are demanding increasingly clean and green vehicles, UK industry and government should not merely acknowledge and accommodate legitimate social pressures for higher environmental standards, but be proactive in looking for opportunities to create national competitive advantage by responding to new pressures faster and better than competitor countries and industries.
- when specific measures are under consideration, there needs to be a careful mapping of those sectors of the UK industry that might be affected and a critical assessment of competences and the ability to respond.
- the UK must exert influence over all stages of policy development in the EU, there being a particular need to work with the Commission at an early stage before the shape of draft Directives becomes “locked-in”.
- the UK needs to consider carefully the environmental and competitiveness implications when implementing EU measures at the national level.
- realistic timetables should be set for implementing and complying with new standards, both within EU legislation and in subsequent implementation in the UK.
- in anticipating longer-term environmental challenges and opportunities, government and industry need to work together to create and foster innovative potential and competences. These are the key to realising “first mover advantage” as new environmental priorities emerge. This conclusion is echoed by the Design, Development and Manufacture Sub-group and reflected in its recommendations.
- continuing dialogue between government, the industry, NGOs and other groups of the type being fostered within AIGT is needed to underpin all other activities.

#### 4) **Case Studies**

The Sub-Group's two case studies were selected to illustrate the types of environmental policy challenge which the automotive sector may face over the next 10-15 years.

The first case study, the ***Low Carbon Economy***, addresses the biggest long-term environmental challenge facing the automotive sector, that of achieving substantial reductions in carbon emissions from the vehicle fleet. This case study was developed in association with the AIGT Technology Sub-Group and addresses key issues raised in the parallel DTLR/DTI/DEFRA consultation ***Powering Future Vehicles***.

The second case study, ***Mobility Services***, addresses the environmental and competitiveness implications of more radical changes in the pattern of ownership and use of motor vehicles. Specifically, it looks at options for novel service packages, which could provide consumers, especially in urban areas, with the "right car for the journey". These services could be provided by auto manufacturers in association with other groups.

In carrying out the case studies, the teams were concerned not so much with reaching specific conclusions for action in each of these complex areas. Rather, the goal was to come up with recommendations for *processes* through which government, the industry and others could work together to shape new initiatives in order to secure both environmental and competitive advantage for the UK.

The key questions addressed by the case study teams were:

- What sections of the UK economy could benefit from environmental initiatives in these areas?
- Will they make the UK automotive sector as a whole more or less competitive?
- Can enhanced competitive advantage be sustained?
- What actions need to be taken by whom to exploit competitive advantage?
- How should the UK take the lead in delivering any initiatives?

##### **4.1 Low Carbon Economy**

The development of a low carbon economy will be a major influence on the future of the automotive sector in the UK. It will affect how people travel, the cars they buy, the nature of car ownership, manufacturing processes and the focus of technological development.

The Low Carbon Economy (LCE) Group was established to take a strategic view of the initiatives and developments being undertaken in this area. It has made some initial comments both on the processes for policy development and the priorities for action. An essential part of the review has been to identify potential opportunities and risks that moving to a low carbon economy may have for the competitiveness of the UK automotive sector.

## **Background**

The UK has a legally binding target to reduce greenhouse gas emissions by 12.5 per cent below 1990 levels by 2008-2012, under the Kyoto protocol. In addition it has a domestic commitment to reduce CO<sub>2</sub> emissions by 20 per cent by 2010. The latest estimates indicate that in 2010 greenhouse gas emissions will be 15 per cent below 1990 levels and CO<sub>2</sub> emissions 8 per cent below (available at <http://www.defra.gov.uk/environment/climatechange/cm4913/pdf/section1.pdf>). The Government has indicated that deeper cuts in greenhouse gas emissions will be required after 2010. The Performance and Innovation Unit Energy Review concluded that deep CO<sub>2</sub> emission reductions, as recommended by the Royal Commission on Environmental Pollution, would require the development of a low carbon transportation system (available at <http://www.cabinet-office.gov.uk/innovation/whatsnew/whatsnew.shtml>).

A UK Climate Change Programme has been established to reduce emissions. It includes several measures with a direct impact on the automotive sector such as the climate change levy (which affects 17 sites operated by vehicle manufacturers), a graduated vehicle excise duty (VED) system and a company car tax regime based on CO<sub>2</sub> emissions. Full details of the strategy can be found at <http://www.defra.gov.uk/environment/climatechange>.

The motor industry has made positive steps in reducing CO<sub>2</sub> emissions and is committed to significant reductions in the future. Members of ACEA, the European manufacturers' association, have voluntarily agreed to reduce average new car CO<sub>2</sub> emissions across Europe by 25 per cent from the 1995 level to 140 g/km in 2008. The SMMT estimates this measure will result in a saving of 14 million tonnes of CO<sub>2</sub> in the UK, or 3.8 million tonnes of carbon. This would represent over 15 per cent of the UK Government's Kyoto commitment.

The latest available data indicates that average CO<sub>2</sub> emissions from new passenger cars are on track to meet the European agreement. In the UK emissions have fallen from 190 g/km in 1997 to 178 g/km by August 2001. This is as a result of improvements in fuel efficiency, growth in sales of smaller vehicles and an increasing market share for diesel vehicles.

## **Cleaner Vehicle Technology**

Manufacturers are making available a variety of cleaner vehicle technologies including electric hybrids, liquefied petroleum gas (LPG) and compressed natural gas (CNG). There is also significant development potential for conventional technologies, particularly diesel. The combination of fuel efficiency and advanced exhaust treatments will give diesel technology an important role in powering vehicles, particularly trucks, well into the future.

There is a consensus among vehicle manufacturers and their partners that long-term, hydrogen is a key fuel for the future, particularly when the hydrogen can be made from renewable energy sources. The problems of on board vehicle hydrogen storage, lack of refuelling infrastructure, cost of fuel cell technology, and the likely price of hydrogen powered vehicles compared to conventional vehicles, however, present significant barriers to commercial viability. In the absence of a co-ordinated UK and European strategy, hydrogen and fuel cells risk remaining on the margins of mainstream markets. Hybrid vehicles have many technological elements in common with fuel cell vehicles – e.g. drive trains and electronic control systems – and it has been argued that these could act as a bridge to a

longer-term hydrogen/fuel cell future, at the same time as significantly reduced fuel use and CO<sub>2</sub> emissions.

The Department of Transport, Local Government and the Regions has published a draft strategy “Powering Future Vehicles” (available from the DTLR website at <http://www.roads.dtlr.gov.uk/>) for supporting the shift to low carbon road transport. The Government sees its role as promoting the development of cleaner vehicles and fuels, encouraging consumers to purchase and use these vehicles and to ensure the speedy development of any new fuel distribution infrastructure that may be required. In developing its approach the Government places particular emphasis on ensuring that the UK automotive sector has the best opportunity to take advantage of new developments.

The Powering Future Vehicles strategy recognises that conventional technologies continue to set demanding benchmarks for new fuels and technologies. It sees a continued role for LPG and CNG, with hybrid power systems playing an increasingly important role. In the longer-term fuel cells and sustainable hydrogen are the most likely options for delivering low carbon transport. The Government should acknowledge the growing consensus on this point and more rapidly to incorporate it into strategic planning.

### **Competitiveness Issues**

The Sub-Group concluded that the pursuit of a low carbon economy posed little immediate threat to the existing automotive manufacturing base in the UK. During the next five years decisions on the allocation of new models to UK production facilities were more likely to be influenced by broader economic considerations, such as exchange rates and skills levels.

The presence of major engine production facilities presents a great opportunity for the UK to work with the global vehicle manufacturers and persuade them to base new powertrain developments here. Failure to do so would expose this sector of the UK industry to long-term decline.

There is a lack of information and research on how new fuels or technologies may impact on automotive component manufacture and what role suppliers might have in the development process. In order for the UK to secure the supply base for hybrid vehicle technology and the hydrogen economy the transition from existing technology needs to be effectively managed and the sector equipped with the skills to address the challenges it will face.

It is important that Ministers and officials work closely with the automotive sector to ensure that any legislation supports the competitiveness of the UK industry as well as other goals. Industry and Government should discuss European initiatives during the early stages of their development to ensure that the UK maximises its influence on the European legislative process.

Incentives or policy initiatives to encourage the take up of cleaner vehicle technologies must be based on agreed European emission standards. Measures introduced to guide consumer behaviour should not favour particular technologies and should not introduce specifications that are unique to the UK market. In formulating measures, both the UK and the EU should bear in mind the impact of regulation on the research and development capabilities of the industry and identify cost-effective ways forward.

## **Working Towards a Low Carbon Transport System**

There is now a broad consensus across Government, industry and NGOs that sustainably produced hydrogen presents the best long-term opportunity to create a low carbon economy, recognising however the role that intermediate technologies such as hybrids will play along the way. In considering how to get to a low carbon transport system, the LCE Group focused on five main elements, all directly relevant to the “Powering Future Vehicles” Consultation.

### Low Carbon Vehicle Partnership

The Government intends to maximise competitive advantage for UK industry by working closely with stakeholders from the automotive, energy and other sectors. The main focus for this will be the Low Carbon Vehicle Partnership?

The Sub-Group supports the Government’s proposal to establish a Low Carbon Vehicle Partnership with the goal of maximising competitive advantage for UK business by working closely with stakeholders from the automotive, energy and other sectors. This is seen as a positive development in line with the open and co-operative approach being promoted by the AIGT. There was concern that no group or stakeholder currently owns the transition to the low carbon economy and it was recommended that the Low Carbon Vehicle Partnership could take on this responsibility. The potential remit of the partnership could include:

- Monitoring the implementation of the Powering Future Vehicles Strategy.
- Identification of potential sources of UK competitive advantage.
- Identification of R&D priorities.
- The co-ordination of industry and Government initiatives.
- Helping to set future targets, encourage buy-in among stakeholders and identify responsibility for implementation
- Assessing barriers to the take-up of low carbon vehicles.
- Provide information and advice on the market incentives for low carbon technologies.
- Provide information and advice to consumers on new low carbon technologies.

The partnership must help to create a positive and dynamic approach to the development and uptake of low carbon vehicles. This will be a long-term project and the partnership will need to evolve over time to ensure that it continues to focus on the key priorities.

Membership of the partnership should be broadly based, with Government, the automotive and energy sectors, alongside local authorities, consumer and environmental organisations. The group also recommended that the Ministerial Committee, announced in the draft Powering Future Vehicles strategy should be formally linked to the partnership with shared responsibilities.

Experience from the Commission for Integrated Transport and the Motorists Forum suggests that the effectiveness of the partnership will be maximised by the availability of a dedicated secretariat. It will be important to ensure that the partnership has access to sufficient resources to develop and promote an independent work programme. This will give the best opportunity to build up and maintain momentum for the major changes required to achieve the transition to a low carbon economy.

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### Setting Targets

The Government wants the UK to be a world leader in the move to a low carbon transport system and sees the setting of targets as important in promoting progress. The consultation document invites views on a target for sales of low carbon vehicles rising to between 8 per cent and 12 per cent of new sales by 2012. It also asks for comments on whether there should be a specific target for fuel cell vehicles, for manufacturing and the supply chain, for buses and public service vehicles.

Target setting has become an accepted way for authorities to signal their commitment to significant change. It can play an important role in focusing attention on specific areas of policy and a catalyst for changing attitudes and expectations. However, it is not enough for Government simply to set targets and expect others to respond. The target-setting process must take place in co-operation with business and other partners. For the targets to be credible, all the parties involved should share a commitment to their achievement and must be prepared to play their part in implementing them. The Low Carbon Vehicle Partnership should prove a suitable forum for this process.

Defining a low carbon vehicle in formal terms will represent a major technical and political challenge. The Government will have to establish a mechanism to balance a number of competing pressures. These will include trade offs between environmental aspirations and commercial limitations. The need for targets to send a strong signal about the commitment of the Government will also need to be balanced against the implications this might have for UK produced vehicles, and the other environmental implications of various fuels and technologies.

Setting targets for the manufacture of specific technologies of low carbon vehicles will prove difficult. It is unlikely that individual vehicle manufacturers would want to reveal too much information about future product plans, as they would regard these as commercially sensitive. It will prove equally difficult to determine meaningful targets for the component supply industries.

Government will need to ensure that the targets set are supported where necessary by changes to public policy. Targets are useful to monitor progress towards the Government's objective of a low carbon transport system, but their impacts will be determined by how they influence policy and, in particular, the incentive programmes established to promote new vehicle take up.

The public sector represents a major market for new vehicles. It is important that purchasing policies across public sector bodies encourage the take up of low carbon vehicles which provide value for money. Experience suggests that despite many good intentions, the opportunities these markets represent have not been exploited in the past.

### Meeting New Infrastructure Needs

The development and introduction of new fuels is likely to require the establishment of a new fuel infrastructure. This will require substantial investment. For this to happen there must be confidence that the technology works, the vehicles will be available and that the necessary consumer incentives will be sufficiently long lasting to establish a viable level of demand.

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In the 2001 Budget the Government indicated that they had understood this need for greater certainty by announcing that the low-duty incentives for the road fuel gases would be maintained until 2004 or longer. This is a very welcome move but it is essential to understand that it is only a start to what will be required to ensure that energy providers have sufficient confidence to invest in a new fuel infrastructure.

The IPPR report on hydrogen (available from the IPPR website at <http://www.ippr.org.uk/research/files/team20/project12/hydrogenreport.pdf>) makes an important point when it stresses the need to develop a political consensus on the programme and support for low carbon fuels.

### Funding Research and Development

The motor industry generally supports the Government's view that it should not attempt to "pick winners" or second-guess the outcome of technological developments. The Government should link consumer incentives to European emission standards and allow the market to determine the best way of achieving them.

It is accepted that the UK lags behind several other key markets in its ability to take advantage of developments in the strategic low carbon technologies of hydrogen, fuel cell technology and hybrid vehicle technology. The ability to develop and manufacture components for vehicles using these systems will be critical for the future competitiveness of the UK automotive sector. If resources for research and development are not focused on a limited number of technologies little progress is likely to be made.

The LCE Group concluded that the Government should focus its support for research and development on the fuels and technologies best placed to achieve its low carbon objectives. There are risks associated with this strategy, but they are probably less than those sticking to a business as usual approach.

### The Powershift and Foresight Vehicle Programmes

The Powershift and Foresight Vehicle Programmes are funded by DTLR and DTI to promote the commercial uptake of cleaner vehicle technologies and support long-term research initiatives. The programmes do offer benefits in developing markets for cleaner vehicles and facilitating relationships between academia and industry. They are not, however, designed to address the challenges of the transition to a low carbon economy. The group felt that there should be a fundamental review of both programmes so that mechanisms more closely suited to the objectives established in the draft strategy could be developed.

**BOX 4 TOWARDS A LOW CARBON ECONOMY: KEY CONCLUSIONS**

- The introduction and development of a low carbon transport system requires a long-term and co-ordinated strategy led by the Government.
- AIGT supports the Low Carbon Vehicle Partnership. It should have a broadly based membership, be supported by a dedicated secretariat and develop a dynamic agenda to support the transition to a low carbon transport system.
- Targets have a role in signalling the Government’s commitment and expectations for a growth in low carbon vehicles. To be meaningful targets would need to be broadly supported and clearly linked to policy instruments and incentives.
- Consumer incentives encouraging the take up of cleaner vehicle technologies should be related to European emission standards.
- The establishment of a new fuels infrastructure is a costly process and there needs to be consistent support and encouragement from national and local government.
- Effort should be aimed at both hydrogen fuel cell technology and at bringing forward the other significant fuel-efficient, low-carbon opportunities available on the way, including hybrid vehicle technology.
- The Powershift and Foresight Vehicle Programmes should be reviewed and more appropriate mechanisms developed to aid the transition to a low carbon economy.
- There needs to be more information and research undertaken into the impact that new fuels and technologies would have on the competitiveness of the UK automotive supply base and other sectors.

**4.2 Mobility Services**

**Background**

For the purposes of this report, ‘mobility services’ are seen as comprising a variety of transport arrangements which allow people to enjoy the benefits of car-based mobility while doing away with the need to own a vehicle. Innovative schemes can allow people to have access to a number of different vehicle types, offering them use of the “right car for the journey”. The types of arrangement which we have considered include car-sharing networks, community-based car clubs, and innovative forms of vehicle leasing as well as lift-sharing and car-pooling.

It is clear that attachment to private vehicle ownership currently runs very deep. For the next 10 – 20 years, it is likely that general patterns of car ownership will change little. Current involvement with car-sharing arrangements has been a niche activity for a relatively small group of consumers. In general, these consumers tend to have higher than average incomes, live in urban areas and have a relatively low annual vehicle mileage. Car-sharing networks are better developed in continental Europe (especially Germany and Switzerland) and in some major North American conurbations.

Nevertheless there are reasons to believe that the current niche for mobility services may expand, in connection with a wider change in attitudes to car ownership. We have identified five trends which, taken together, could potentially lead to a significant shift of attitude, and which could potentially lead to a larger segment of the community seeking access to mobility other than through continued private vehicle ownership:

- 1 Rising vehicle numbers over the next 10 or 20 years are likely to make private vehicle ownership less attractive. Increased congestion will result in increased regulation of the parking and housing of vehicles in urban areas. This may increase the potential attractiveness of access to and use of vehicles without the burden of continuous ownership and management.
- 2 Drivers may increasingly see a benefit in avoiding the burdens of vehicle ownership, in terms of breakdown risks, problems of parking, and general difficulties of maintenance and vehicle management, if convenient access to personal mobility can be secured by other means.
- 3 Changes in lifestyles are likely to work in the same direction. Household groups are now increasingly diverse, with more people living alone, and couples living longer. A population which is increasingly mobile and diverse in its lifestyle and leisure patterns is likely to want access to a wider variety of vehicles than any individual could normally own and manage.
- 4 Inner-city living is likely to be increasingly popular. For some, resident access to public transport and difficulties of parking may make the benefits of private vehicle ownership during the week increasingly doubtful. Yet access to a vehicle will be necessary for travelling out of city centres at the weekends. Vehicles used in inner-city areas are likely to be specified differently from vehicles used for longer distance travel. Under these circumstances, car sharing or vehicle leasing may seem a suitable option.
- 5 On the supply side, vehicle manufacturers will soon have responsibility for the end-of-life disposal of vehicles. This, together with the opening-up of the motor retail sector to competition through a revised Block Exemption, may progressively change manufacturers' attitudes towards their product. Some may want to move on from manufacturing to the potentially higher margin provision of personal mobility services. This might include regular vehicle servicing and maintenance as well as original provision and final disposal. This would also contribute to more differentiated patterns of ownership, operation and use.

The possibility of a growing niche market for personal mobility services underlines the need to assess the potential environmental, transport and commercial benefits, and strategies for maximising them.

### **How Might Mobility Services Benefit the Environment?**

Although there is now about a decade's worth of experience in parts of continental Europe, there is not sufficient experience of car sharing and innovative leasing systems in the UK to make any exact judgment of their relative benefits and disadvantages.

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The evidence from some car sharing networks (e.g. Mobility CarSharing Switzerland) is that each shared car leads to a further five or six vehicles being taken off the road. It is dangerous to extrapolate to the UK situation, but if this pattern were repeated it would help to reduce vehicle numbers, parking demand and congestion in urban areas. There is also evidence that most people involved in sharing networks tend to significantly reduce their annual car mileage. As people involved in these schemes face a more realistic cost for each minor journey undertaken by car, they tend to fulfil some of their mobility needs by switching to public transport or walking/cycling. This obviously has benefits in terms of reduced congestion, local air pollution and greenhouse gas emissions.

These benefits are partly offset by people joining car sharing networks who have not previously had access to a vehicle. They tend to increase their travel by car and some use of public transport is displaced. In rural areas where mobility is limited and public transport sometimes inaccessible, any marginal environmental damage may in these cases be more than offset by benefits in terms of reduced social exclusion.

A more general benefit is that some people may join a car sharing scheme rather than own a second car, pointing to the possibility that car sharing networks and leasing options may make some contribution to changing attitudes to the car and a retreat from vehicle ownership. What does seem clear is that they may offer some discouragement to private vehicle ownership by making clear the full – and sometimes partly hidden – costs of motoring.

A further potential long-term benefit of mobility service arrangements is that they could increase the speed with which new and cleaner vehicles enter and diffuse through the vehicle parc. Exploiting this potential is central to the mobility services recommendation presented in the following section.

Overall, it appears therefore that, at least in urban areas, the spread of car sharing networks and innovative leasing arrangements is likely to make a small, but not insignificant, contribution to environmental quality. Any environmental benefit will in any case complement the potentially wider social benefits that accrues from the fact of offering people a wider range of mobility options.

### **Commercial Considerations**

At one level, the UK automotive sector needs to be able to respond positively to the possible development of mobility services. There could, for instance, be implications for vehicle design and specification, e.g. fascias, car seats, or special requirements for children. However, we have identified further opportunities for market leadership stemming from the development of mobility services.

Car sharing/leasing arrangements could accelerate the introduction of new vehicles and technologies, and reduce the average of life of vehicles as a result of more intensive use. Any such benefits to manufacturers would however be offset, to some degree, by the reduction in private car ownership which sharing/leasing arrangements will promote.

The most significant potential advantage seems likely to come to companies providing the wider infrastructure required for large-scale, professionally organised mobility service arrangements. There are evident needs in the areas of telematics (locating/tracking vehicles), systems design and operational services (maintenance, reservations, billing). Although there

is as yet no clear evidence, we believe that the market will grow for car sharing/leasing arrangements – and the associated technologies and services - in developing countries, particularly to help address some of the transport problems of the mega-cities with poor public transport infrastructure but enormous congestion problems. This possibility should be kept under review.

## **Experience To Date**

UK experience of car sharing, car clubs, and innovative leasing schemes is so far relatively limited. Taken with more extensive evidence from some other European countries and from the United States there is however a basis for some tentative conclusions on how advantage might best be taken of emerging commercial and environmental opportunities.

### Car Sharing Networks/Clubs

Professionally operated car sharing networks are well established in many European countries and the number of European schemes now exceeds 200 with a total membership of more than 100,000. The most successful schemes are in Switzerland and Germany. Their popularity is also increasing in Austria and the Netherlands, Denmark, Sweden, Italy and France. Examples of countries with established schemes include:

- Switzerland – Mobility CarSharing has 30,000 members sharing 1,400 vehicles;
- Germany – Drive StadtAuto has over 7,000 members and 300 vehicles in Berlin, Hamburg and other cities, and Cambio Bremen car club has over 2,200 members in Bremen and operates in 3 other cities;
- European Car Sharing (ECS) is an umbrella organisation with 40 participating companies, operating in over 550 towns, serving some 56,000 members. It is currently represented in Denmark, Germany, Italy, Norway, Sweden and Switzerland.

Within the UK there are car clubs in Bristol, Coventry, Cranfield, Leeds, Oxford, Leicester, Bath, Carshalton, Ashburton, Liverpool, Edinburgh and Southwark. Most of the UK clubs involve from one to four cars only. The largest scheme, in Edinburgh (which folded and has restarted) involves around 10 vehicles. Typically there are from 10 to 15 car club members per vehicle, and vehicle use is normally increased by around a factor of four compared with a typical privately-owned vehicle which is used for an average of about an hour a day.

The Bristol scheme is a partnership between the local authority, a community association and Smart Moves, company which has provided vehicles and a turnkey solution to the logistical aspects. Bristol organisers emphasise the importance of community involvement in getting projects up and running successfully. It is suggested that ‘top-down’ schemes such as the one introduced in Edinburgh have experienced problems due in part to the absence of sufficient community involvement.

### Car Sharing

Lift-sharing schemes are common throughout Europe and involve millions of users per year. The Internet-based Mitfahrzentrale which operates Europe-wide, for example, has between 1.5 and 2 million users per year. Developments in the UK have been relatively slow, but there

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are now a number of schemes within the UK, the largest ('Liftshare') claiming over 22,000 registered members. Schemes have tended to develop around established communities, particularly workplaces. They tend to involve member drivers advertising their journey on a common, accessible (normally Internet-based) message board, allowing a match with registered 'sharers' who provide a contribution towards the travel cost. Key partners tend to be universities or businesses in combination with small, often voluntary organisations like Liftshare providing a technical/logistical solution designed to provide easy access to information required to bring vehicle users and potential passengers together. The wide scale introduction and adoption of the Internet has given a major boost to this type of scheme, with most schemes now adopting an Internet-based approach to matching drivers with sharers.

### Innovative Vehicle Leasing Schemes

This option is the least well tested, but might in the long run prove the most significant. At present the average vehicle rental is about four days, while leasing arrangements extend normally for 12 months or more. The question is whether there are intermediate options which can allow customers regular or periodic access to a variety of appropriate vehicles to fit their personal working and recreational patterns.

Actual experience so far has not been encouraging, but there are grounds for considering that there remain options worth pursuing. The most notable initiative was by Mercedes Benz Finance and involved a 'life-style product' which gave customers access to the kind of vehicle they wanted – urban commuter car, MPV, off-road vehicle or even sports car – when they wanted it. In this form the project proved not to be commercially viable with the same customers naturally tending to want the same sorts of vehicle at the same times and in the same weather conditions.

The key requirement is to solve the problem of vehicle utilisation which ultimately depends on identifying and matching niche markets. Possibilities under consideration include, for instance, a scheme which would involve availability of MPVs for family weekend use, with their use for organised school transport during the week.

The key to expanding the market for mobility services in the UK (Box 5) lies in identifying niche markets with a potential for growth, exploiting economies of scale and scope, engaging business partners with complementary skills and competences, building credibility in the marketplace and exploiting opportunities to diffuse new technologies, whether these relate directly to the vehicle or to wider infrastructure needs.

**BOX 5 MOBILITY SERVICES: ISSUES FOR THE UK**

- There is a need to put in place an effective mechanism which tracks emerging trends and encourages all relevant sectors of UK industry to anticipate their implications.
- A more systematic assessment of the lessons from experience so far, and of the environmental and commercial implications, than has so far been possible, should be undertaken. The UK is somewhat behind other countries in accumulating experience in this field. There would be benefit in it being steered co-operatively by AIGT partners, and it must clearly look at foreign as well as local experience.
- The government cannot directly underwrite car sharing networks or other commercial ventures. However there is a need to find new ways to roll out cleaner vehicles and technologies and to promote innovative thinking on urban traffic problems. Mobility services could well play a key role here. There is therefore a strong *prima facie* case for a substantial initiative by government to promote a major car club/vehicle leasing capability in London or another UK city on a scale that has not so far been attempted, with government support geared to environmental and social outcomes and to the development of more effective mechanisms for rolling out cleaner technology.

## 5) Conclusions And Recommendations

The Sub-Group's work has led to three key areas of recommendation. The first draws on the lessons we have drawn from the interplay of environmental policy and competitiveness and is intended to lead to better policy making processes. The two case studies have each generated a policy recommendation.

### **Recommendation 1**

**A study should be commissioned into likely future priorities for EU and wider international environmental policy over the coming decade and the implications for the industry. A consultative forum involving industry, government and environmental groups should then be established to look at the environmental issues and the competitiveness implications for the UK industry.**

The study should look review impending and longer term policy options in the context of environmental priorities taking into account the high-level objectives of key documents like the EU Sustainable Development Strategy and the Sixth Environmental Action Programme. The implications of each policy option should be assessed in terms of the potential impact on the UK automotive sector and its competitiveness. The study should serve as the basis on which the consultative forum could consider how best environmental pressures can be met while retaining or improving competitiveness.

The forum should be drawn from all stakeholder groups and have the ability and resources to undertake its own research projects. The aim of the forum would be to inform EU policy making in such a way as to support both environmental priorities and UK competitiveness. To do this the forum should maintain an up to date picture of the UK's sources of competitive advantage within the automotive industry and areas in which environmental performance could be raised. The forum should also consider how the UK should implement EU policy in a way that both meets our obligations and supports the UK's competitiveness.

The forum should maintain a clear picture of both global and European environmental priorities. It should be proactive in identifying new policy initiatives and then taking its vision of an environmental policy agenda to policy makers in the EU. Emerging EU policy on Integrated Product Policy, as it might come to be applied to the automotive sector, would provide a good initial focus for the forum.

### **Recommendation 2**

**A Low Carbon Vehicle Partnership should be established as suggested by the consultation draft of the Powering Future Vehicles strategy.**

The partnership should be tasked with taking the lead in the transition to a low carbon future for the automotive sector. There is a strong consensus in the industry that effort should be aimed at *both* the hydrogen based fuel cells which are generally agreed to represent the final low-carbon solution, *and* at bringing forward the other significant fuel-efficient low-carbon opportunities available on the way – including hybrid vehicle technology, which both offers major fuel and emissions reductions and creates vehicle technology building blocks for fuel cell vehicles. We therefore strongly urge that both hydrogen/fuel cells and hybrid technology are given priority. The partnership should involve senior figures from industry, government,

research organisations and NGOs. It should be supported by dedicated secretariat and have significant resources to fund research projects on technical and commercial issues. An early priority should be to commission research into the impact that new fuels and technologies would have on the competitiveness of the UK automotive supply base and the potential for undertaking initiatives to encourage the development of these technologies in the UK. The partnership should play a key role in helping the Government to set targets which engage all the relevant players.

### **Recommendation 3**

**The government should initiate a systematic assessment of international experience of mobility services schemes. Subject to the findings of this study a large scale pilot mobility services project should be undertaken in London or another UK city with the aims of accelerating the adoption of low pollution vehicles and demonstrating new approaches to providing mobility.**

This would require the involvement of vehicle firms able to provide electric, hybrid or other low pollution vehicles, local authorities, government, finance companies, infrastructure providers and firms specialising in logistics and support. The aim would be to move the mobility services concept from being a niche product sold on its environmental benefits alone to something with a much wider appeal, which will reduce emissions and lead to competitiveness benefits. It is essential that the project is undertaken on a substantial scale to allow service providers to identify the operational infrastructure required to support the new technology and develop new service packages for consumers. This programme will also provide opportunities for UK based businesses and institutions to assess the detailed product requirements for low carbon vehicles, and how competitive advantage for the supply base in these technologies can be most effectively developed.

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