



House of Commons
Transport Committee

Plug-in vehicles, plugged in policy?

Fourth Report of Session 2012–13

Volume I: Report, together with formal minutes, oral and written evidence

Additional written evidence is contained in Volume II, available on the Committee website at www.parliament.uk/transcom

*Ordered by the House of Commons
to be printed 12 September 2012*

HC 239

Published on 20 September 2012
by authority of the House of Commons
London: The Stationery Office Limited
£14.50

The Transport Committee

The Transport Committee is appointed by the House of Commons to examine the expenditure, administration, and policy of the Department for Transport and its Associate Public Bodies.

Current membership

Mrs Louise Ellman (*Labour/Co-operative, Liverpool Riverside*) (Chair)

Steve Baker (*Conservative, Wycombe*)

Jim Dobbin (*Labour/Co-operative, Heywood and Middleton*)

Mr Tom Harris (*Labour, Glasgow South*)

Julie Hilling (*Labour, Bolton West*)

Kwasi Kwarteng (*Conservative, Spelthorne*)

Mr John Leech (*Liberal Democrat, Manchester Withington*)

Paul Maynard (*Conservative, Blackpool North and Cleveleys*)

Iain Stewart (*Conservative, Milton Keynes South*)

Graham Stringer (*Labour, Blackley and Broughton*)

Julian Sturdy (*Conservative, York Outer*)

The following were also members of the committee during the Parliament.

Angie Bray (*Conservative, Ealing Central and Acton*)

Lilian Greenwood (*Labour, Nottingham South*)

Kelvin Hopkins (*Labour, Luton North*)

Gavin Shuker (*Labour/Co-operative, Luton South*)

Angela Smith (*Labour, Penistone and Stocksbridge*)

Powers

The Committee is one of the departmental select committees, the powers of which are set out in House of Commons Standing Orders, principally in SO No 152. These are available on the internet via www.parliament.uk.

Publication

The Reports and evidence of the Committee are published by The Stationery Office by Order of the House. All publications of the Committee (including press notices) are on the internet at <http://www.parliament.uk/transcom>. A list of Reports of the Committee in the present Parliament is at the back of this volume.

The Reports of the Committee, the formal minutes relating to that report, oral evidence taken and some or all written evidence are available in a printed volume. Additional written evidence may be published on the internet only.

Committee staff

The current staff of the Committee are Mark Egan (Clerk), Farrah Bhatti (Second Clerk), David G Davies (Senior Committee Specialist), Tony Catinella (Senior Committee Assistant), Adrian Hitchins (Committee Assistant), Stewart McIlvenna (Committee Support Assistant) and Hannah Pearce (Media Officer).

Contacts

All correspondence should be addressed to the Clerk of the Transport Committee, House of Commons, 7 Millbank, London SW1P 3JA. The telephone number for general enquiries is 020 7219 6263; the Committee's email address is transcom@parliament.uk

Contents

Report	<i>Page</i>
Summary	3
1 Introduction	5
Carbon emissions from transport	5
Decarbonising transport	6
2 Consumer demand	8
Financial incentives	8
Demand	8
Recent changes to financial incentives	9
Departmental underspend	10
3 Providing infrastructure	12
Plugged-In Places	12
Standardisation	13
Infrastructure provision and vehicle purchases	14
Chargepoints and registrations	14
4 Conclusion	17
Conclusions and recommendations	19
Formal Minutes	21
Witnesses	22
List of printed written evidence	22
List of additional written evidence	22
List of Reports from the Committee during the current Parliament	24

Summary

The Government is committed to reducing carbon emissions to 80% below 1990 levels by 2050. Emissions from domestic transport comprise approximately a quarter of the UK's total carbon dioxide emissions, with emissions from cars accounting for over half of this figure. The Government must therefore make significant efforts to decarbonise road transport if it is to meet its carbon reduction commitments under the Climate Change Act 2008. There are a number of approaches to decarbonising road transport. Plug-in vehicle technology is one of the more market-ready of these approaches.

The Government hopes to encourage consumer demand for plug-in vehicles by providing financial incentives for consumers to buy these cars and by providing funding for publicly-available vehicle charging infrastructure. Consumer demand has increased since the Government introduced the plug-in car grant, but remains relatively small. In 2011, 1,052 vehicles eligible for the plug-in car grant were registered. We have heard mixed messages from the Department for Transport about whether this demand is lower than expected or progressing according to forecasts.

The Coalition Agreement committed the Government to developing a national recharging network of publicly-available chargepoints. Plugged-In Places was launched as a series of trial projects to install these chargepoints at selected project locations across the UK. Initial public investment in charging infrastructure was designed to provide reassurance to potential plug-in vehicle owners that they would be able to charge their cars in public spaces if necessary. The DfT hopes that this will stimulate demand for plug-in vehicles. We looked at the location of chargepoints, as set out on the National Chargepoint Registry, and the location of vehicle purchases to see if a relationship between infrastructure supply and vehicle demand could be found. However, we could not see any such relationship. We instead found that the National Chargepoint Registry was far from comprehensive, lacking even the location of the majority of chargepoints installed with public funds. Further work is required before this resource can be made useful for the public. In the meantime, we recommend that the DfT should evaluate the effectiveness of providing public infrastructure as a means of encouraging plug-in vehicle sales and ensure that the locations of all chargepoints funded by plugged-in places are uploaded onto the National Chargepoint Registry within the next six months.

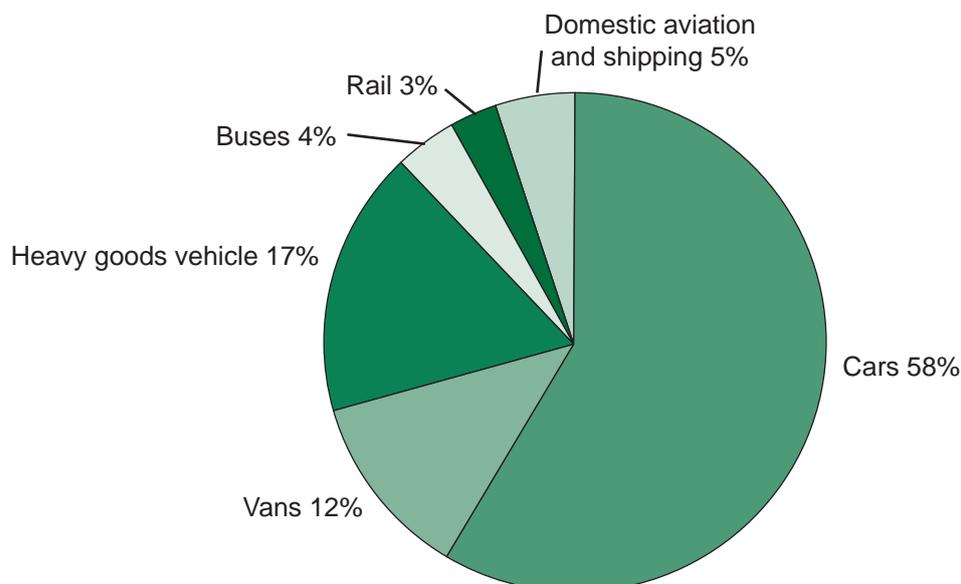
Projections in the Government's plug-in vehicle infrastructure strategy set out how the DfT expects vehicle sales to increase over the next few decades. However, we have heard differing opinions regarding whether plug-in vehicle demand is increasing according to these projections. At present the Government appears to have spent £11 million on providing infrastructure that currently benefits only a handful of vehicle owners. There may be many more beneficiaries of this infrastructure if the number of vehicle purchases increases. However, the Government should not sit back and hope that this happens. The DfT should set milestones in the medium and long-term to make sure its plug-in vehicle policy is effective and providing value for money.

1 Introduction

Carbon emissions from transport

1. The Climate Change Act 2008 set a binding target for the UK to reduce its carbon dioxide emissions to 80% below 1990 levels by 2050 and to 34% of 1990 levels by 2020.¹ Emissions from domestic transport make up 25% of the UK's total carbon dioxide emissions.² In 2009 road transport was responsible for over 90% of the UK's domestic transport emissions, with cars accounting for 58% of these emissions (figure 1).³ The Committee on Climate Change has advised that in order to reach the Climate Change Act's targets on carbon dioxide emission reduction, surface transport emissions will need to be reduced by 26% from 2008 levels by 2020 and by 91% by 2050.⁴ The Government will therefore need to make significant efforts to decarbonise road transport in order to meet these targets.

Figure 1 The percentage of domestic transport emissions from different transport sectors in 2009.



2. Preliminary assessments of carbon emissions in 2011 indicate that carbon dioxide emissions from domestic transport have fallen slightly compared to 2010 (1.4%).⁵ Emissions from transport have been falling since 2008,⁶ a trend which the Government attributes to improvements in new car efficiency, increased use of biofuels and the

1 The Carbon Plan: Delivering our low carbon future, HM Government, December 2011

2 Ev 46 para 3

3 Ev 46 para 4, Carbon Plan

4 Committee on Climate Change, <http://www.theccc.org.uk/sectors/surface-transport>

5 Ev 65

6 Committee on Climate Change, <http://www.theccc.org.uk/carbon-budgets/4th-carbon-budget-path-to-2030>

economic downturn.⁷ However, the Committee on Climate Change has warned that “there is a risk that surface transport emissions increase as the economy recovers”.⁸

Decarbonising transport

3. There are a number of approaches to reducing carbon emissions from road transport. Although the Government acknowledges that vehicle technologies using electric batteries, hydrogen fuel-cells, biofuels and more efficient internal combustion engines will play a role in decarbonising road transport,⁹ the DfT does not intend to adopt specific technology targets. It is instead following a technology-neutral approach in which it creates “a framework for improvements in average fuel efficiency” which goes on “to create the incentives for industry to develop the technologies that reduce emissions, work for consumers and make economic sense.”¹⁰

4. Up to 65% of carbon dioxide emissions from cars come from tailpipe emissions, which vary according to engine type and efficiency.¹¹ Improvements to the efficiency of internal combustion engines are being encouraged through EU targets, which state that average carbon emissions from new cars should not exceed 95 g/km by 2020.¹² However, further emissions reductions require a move away from conventional fuels towards alternatively fuelled, ultra-low emission vehicles (ULEVs). In 2011 the Government set out its vision for reducing carbon emissions from cars and vans using technologies other than internal combustion engines in the Carbon Plan. This stated:

by 2050 almost every car and van will be an ultra low emission vehicle (ULEV), with the UK automotive industry remaining at the forefront of global ULEV production, delivering investment, jobs and growth. Due to the time needed for fleet turnover, this requires almost all new cars and vans sold to be near-zero emission at the tailpipe by 2040.¹³

5. In this report we look at the Government’s strategy for plug-in vehicles, as the primary market-ready technology in the ULEV range. There are a number of technologies which can be defined as ‘plug-in’. The DfT describes plug-in vehicles in its Plug-in Vehicle Infrastructure Strategy as follows:

The term ‘plug-in vehicle’ is used to describe a wide variety of different technologies that use electric drive to power, or assist in the powering of, a vehicle. For the purpose of this Strategy, the term plug-in vehicle is used as a generic term to describe Battery Electric Vehicles (BEV), Plug-in Hybrid Electric Vehicles (PHEV) and Extended-Range Electric Vehicles (E-REV).

7 Carbon Plan p4

8 Meeting Carbon Budgets – 2012 Progress Report to Parliament, Committee on Climate Change, June 2012, p162

9 Ev 46 para 5

10 Ev 46 para 6

11 Ev w23 para 1

12 Ev w12 para 2

13 Carbon Plan 2011, p47

- In a BEV a battery pack and electric motor replace the petrol tank and internal combustion engine of a conventional vehicle. BEVs rely entirely on electricity for fuel.
- A PHEV combines both a battery pack and electric motor with an internal combustion engine. Both the electric motor and the internal combustion engine can drive the wheels. The battery pack is much smaller than in a BEV, tending to only drive the wheels at low speeds or for limited range, with the internal combustion engine driving the wheels when the battery is depleted or when extra power is required.
- An E-REV also has both a battery pack and electric motor, as well as an internal combustion engine. The battery pack tends to be larger than in a PHEV but smaller than in a BEV. The electric motor always drives the wheels, with the internal combustion engine acting as a generator to recharge the battery when it is depleted.

E-REVs and PHEVs can use a number of low carbon technologies to provide their additional range and power, such as highly efficient internal combustion engines, sustainable biofuels or hydrogen.¹⁴

All these vehicles are capable of being plugged into mains electricity. This differentiates them from a conventional hybrid [vehicle], which also uses electricity to help drive the wheels but cannot be plugged into the mains, generating electricity only through regenerative braking.

6. Following a seminar on sustainable transport in November 2011, we called for evidence in March 2012 on the take up of plug-in vehicles by the public, the effectiveness of the Government's Plugged-in Places scheme, the role of other technologies in decarbonising road transport and the approaches taken by other countries to encourage low carbon vehicle purchases. We received 25 submissions of written evidence. On 12 June 2012 we heard evidence from the Institution of Mechanical Engineers, Coventry University, Evalu8 Transport Innovations Ltd, the Society of Motor Manufacturers and Traders Ltd, Toyota, General Motors and Parliamentary Under-Secretary of State for Transport, Norman Baker MP. We are grateful to those who provided oral and written evidence.

7. The Government's Plug-In Vehicle Infrastructure Strategy states that the "policy framework aims to both stimulate and accommodate the expected substantial growth in plug-in vehicles in the UK."¹⁵ In this report we comment on each of these aspects of Government policy. We consider the Government's efforts to stimulate consumer demand for plug-in vehicles and its role in providing the infrastructure which will allow owners to charge these vehicles in public.

¹⁴ Making the Connection, The Plug-In Vehicle Infrastructure Strategy, OLEV, June 2011 p13

¹⁵ Making the Connection p14

2 Consumer demand

8. By 2015 the Government expects that we will “see tens of thousands of plug-in vehicles on the roads in the UK”.¹⁶ After that, “independent forecasts suggest that hundreds of thousands of plug-in vehicles could be on the road by 2020” or possibly an “even more rapid rate of growth”.¹⁷ The Government’s Carbon Plan predicts that low carbon cars will become widespread during the 2020s.¹⁸ However, this will only happen if the public buy these vehicles.

Financial incentives

9. Plug-in cars are more expensive at the point of purchase than conventional cars. This is a key concern for consumers.¹⁹ Price is usually a more important factor in determining which vehicle to purchase than a vehicle’s environmental credentials.²⁰ In order to encourage consumer demand for plug-in vehicles, the Government offers a number of financial incentives to reduce their up-front cost. These incentives include:

- The Plug-In Car Grant: this was launched on 1 January 2011 and is aimed at both private consumers and businesses. The Grant offers 25% off the vehicle price, up to a value of £5,000. Eligible vehicles can be electric, plug-in hybrid or hydrogen-fuelled, but must comply with certain performance, environmental and safety standards in order to be eligible.²¹
- Tax treatment: ultra-low emission vehicles can benefit from tax exemptions including from Vehicle Excise Duty, reduced Company Car Tax and other local measures such as congestion charge exemptions.²²

The Government hopes that these incentives will encourage more widespread adoption of plug-in cars, in line with the carbon reduction targets outlined in its Carbon Plan.

Demand

10. The Plug-In Car grant was launched in January 2011. In 2011 1,052 eligible plug-in car grant vehicles were registered, compared to 111 in 2010.²³ We have heard conflicting reports about whether the rate of plug-in car purchases is on track with the DfT’s ambitious predictions and whether the financial incentives on offer are effective.

16 Making the Connection p14

17 Making the Connection p14

18 Carbon Plan p5

19 Ev 21 para 13

20 Ev 24

21 Ev 49 Annex B

22 Ev 54 Annex D

23 Ev 38 para 10

11. The DfT believes that the introduction of the plug-in car consumer incentive scheme has had a positive effect on the demand for these vehicles.²⁴ Norman Baker MP, Minister for sustainable travel, told us that the DfT monitored the sales of low carbon vehicles and they are “on a trajectory on the way up.”²⁵ He was “entirely relaxed about the number of cars that have been sold” as this was “entirely in line with where we thought it was going to be.”²⁶

12. Other witnesses were not so convinced. Dr Berkeley, from Coventry University, told us that “consumer demand is still lagging way behind”²⁷ and that “the subsidy is really ineffective because the price is still too high”.²⁸ We were warned of the risk that the Government was subsidising second cars for affluent households, as plug-in cars were being purchased as a “support vehicle rather than a primary mode of transport”.²⁹

13. An additional barrier to widespread demand for plug-in cars is consumer perceptions or knowledge of these vehicles.³⁰ We heard that a lack of consumer awareness about the availability of incentives or infrastructure contributed to lagging demand for low carbon vehicles. Dr Bevis, of Evalu8 Transport Innovations Ltd,³¹ suggested that “we are probably providing a solution before the public in general understands the need for it.”³² Dr Berkeley argued that “the Government could do more to stimulate demand, particularly in terms of public awareness and public education”.³³ Dr Bevis suggested that part of this lack of education arose from restrictions placed on funding to support the installation of chargepoints through the Plugged-In Places scheme as “we are not paid to do the other nice things such as engaging with the public. We are paid to build the infrastructure. Providing freedom in that spend to do these other things would help”.³⁴ If the Government wishes to encourage take up of plug-in vehicles, it must do more to publicise the support and infrastructure which is available. **We recommend that the Government promotes public understanding of the availability of infrastructure and the support available for plug-in vehicle purchases. There should be provision in Plugged-In Places funding to undertake such initiatives.**

Recent changes to financial incentives

14. The March 2012 Budget announced a number of changes to the financial incentive programme for low carbon vehicles. General Motors commented on these changes as follows

24 Ev 47 para 13

25 Q102

26 Q108

27 Q4

28 Q7

29 Ev 21 para 14

30 Ev 22 para 16

31 The organisation running the Plugged-in Places programme in the east of England.

32 Q29

33 Q6

34 Q56

We were disappointed with the recent announcements in the 2012 budget relating to low carbon vehicles. In order for low carbon vehicles to be successful they require a taxation system that encourages their uptake. Increasing the company tax rate for low emission vehicles after 2015 and preventing leased business cars being eligible for first year capital allowances will not help this. This has made purchasing a plug-in vehicle less attractive to the corporate consumer with little overall benefit to the Exchequer.³⁵

This disappointment was echoed by other industry representatives. The Society of Motor Manufacturers and Traders (SMMT) stated “such unexpected announcements cause instability in the fleet market and provide mixed messages on market support.”³⁶ Toyota was “surprised” by the announcement and said it “may cause instability in the fleet market and send a mixed message”.³⁷

15. In addition to the potential financial impact of this change, industry witnesses told us that the perception that financial incentives were changeable was also problematic. Ian Allen, from Vauxhall, told us that such instability was particularly problematic in a “fragile, fledgling market.”³⁸ Graham Smith, from Toyota, concurred that “there are plenty of reasons why consumers might be cautious about a new technology. Therefore, anything that changes and destabilises the regime in which that purchases takes place [...] will affect particularly professional buyers.”³⁹ He argued that this change should be reconsidered and that “there is an opportunity to reverse what is a fairly negative signal towards the auto sector in the UK were those changes to be reconsidered.”⁴⁰ Toyota argued that “continuation and stability of such measures is important to avoid retreating too early from the incentive frameworks” as this “could negatively impact the consumer”.⁴¹ It stated “we encourage a coordinated cross-departmental approach by Government on policies relating to low carbon”.⁴² **We regret the Treasury’s decision to change the financial incentives framework for low carbon vehicles without prior consultation. Such unexpected changes to these incentives risk creating instability in the market for plug-in vehicles.**

Departmental underspend

16. The DfT’s 2011–12 mid-year financial review highlighted a £300 million DEL underspend. Secretary of State Justine Greening MP wrote to us to explain that this underspend had arisen from a number of budget lines. She noted that a contributory

35 Ev 45 para 4.2

36 Ev 41 para 29

37 Ev 24

38 Q80

39 Q80

40 Q90

41 Ev 24

42 Ev 29 para 6.7

factor was underspend resulting “from low take-up on the ultra-low carbon vehicle programme (£30 million)”.⁴³

17. This seemed to differ from the interpretation of these results by Mr Baker, who said “we are on target to spend £11 million by the end of 2012–13 from a budget of £30 million. That is good news. That means we have managed to achieve the uptake and the installation of charge points with the private sector without having to commit as much money as we might otherwise have done from the public sector.”⁴⁴ He also said that vehicle sales were “entirely in line” with departmental predictions.⁴⁵

18. It seems to us that the Secretary of State and her Minister have differing interpretations of the budget underspend on low carbon vehicles. The former told us that the budget underspend arose because there has been “low” take-up on this programme, whilst Mr Baker believes the underspend reflects greater private sector involvement to support a programme that is progressing entirely according to forecasts. **The DfT should clarify the reasons for the underspend in its low carbon vehicle programme.**

43 Letter from Justine Greening MP to Louise Ellman MP dated 8 June 2012

44 Q114

45 Q108

3 Providing infrastructure

Plugged-In Places

19. The Coalition Agreement commits the Government to “mandate a national recharging network for electric and plug-in hybrid vehicles.”⁴⁶ The Plugged-In Places scheme is the “key mechanism” by which the Government hopes to introduce recharging infrastructure across the UK. Plugged-In Places “offers match-funding to consortia of businesses and public sector partners to support the installation of electric vehicle recharging infrastructure in lead places across the UK.”⁴⁷ There are eight Plugged-In Places trials across the UK: Central Scotland, East of England, Greater Manchester, London, the Midlands, Milton Keynes, the North East of England and Northern Ireland. These pilot projects are expected to perform a number of roles including: helping to raise the profile of low carbon transport amongst local transport providers, encourage private sector involvement with infrastructure installation or helping to test equipment.⁴⁸ The data collected through these trials will then be used to shape the design of a national recharging infrastructure network.⁴⁹

20. The Government’s plug-in vehicles strategy outlines its approach to vehicle charging as follows

We want to see the majority of recharging taking place at home, at night, after the peak in electricity demand. Home recharging should be supported by workplace recharging for commuters and fleets, with a targeted amount of public infrastructure where it will be most used, allowing people to make the journeys they want.⁵⁰

Part of the Plugged-In Places scheme included an element of home charging.⁵¹ We heard that vehicle owners tend to prefer recharging their cars at home or at work.⁵² However, “drivers very much welcomed the public charging infrastructure”⁵³ as “people are worried, if they travel somewhere that is 45 miles, whether they have enough energy to get home.”⁵⁴ In this report we concentrate on the provision of public infrastructure, due to the public spending in this area.

21. In the period up to the end of March 2012, Plugged-In Places had installed 1,673 charge points.⁵⁵ The DfT provided us with the following breakdown of the number of

46 Coalition Agreement p31

47 Ev w45 para 1.20

48 Ev 32

49 Ev 48 para 24

50 Making the Connection p7

51 Q 11

52 Q11–12

53 Q12

54 Q 11

55 Ev 47 para 17

chargepoints installed by each Plugged-In Place in the period up to 31 March 2012 (Table 1):⁵⁶

Plugged-In Place	Chargepoints installed
East of England	135
London	640
Manchester	0
Midlands	100
Milton Keynes	115
North East	399
Northern Ireland	85
Scotland	199
Total	1673

Table 1 The number of chargepoints installed in each Plugged-In Place up to 31 March 2012.

In addition to the Plugged-In Places scheme, some private chargepoint providers are also installing electric vehicle infrastructure. The total number of chargepoints in the UK may therefore exceed 3,000.⁵⁷

22. Table 1 shows considerable variability in the number of chargepoints installed by each Plugged-In Place. This is in part a result of the trials having started at different times and therefore being at different stages of development. However, we have heard that other factors are also at play. The SMMT states that “there has been varying success in the eight Plugged-In Places projects, with some locations demonstrating commercially viable plans for when government funding ends and others whose status is less certain.”⁵⁸ The characteristics of the plugged-in place may also have a role, with larger cities tending to have a greater population of individuals willing to adopt new technologies.⁵⁹

Standardisation

23. Standardisation of access to chargepoints is an emerging concern from Plugged-In Places. If the Government wishes to encourage sales of plug-in vehicles, then consumers may need confidence that they will be able to charge their cars in public spaces, if required. Although the Plugged-In Places pilots trials have made progress towards providing infrastructure, there is further work to be done in standardising access to infrastructure, both in terms of widening access to membership schemes and ensuring interoperability of cars and infrastructure in different locations.

24. At present, many vehicle users must pre-register with a payment scheme in order to use chargepoints in their area. There are a variety of membership or registration schemes currently in operation. General Motors told us that

⁵⁶ Ev 50 Annex C

⁵⁷ Ev 48 para 20

⁵⁸ Ev 41 para 32

⁵⁹ Ev w36 para 3.3

Different charging schemes from across the UK should be harmonised. At the current point in time in order to use electric points in different parts of the country you would have to be a member of multiple schemes. [...] This is off-putting and complicated for customers and only serves to reinforce concerns over range anxiety.”⁶⁰

Making sure that vehicle owners can access chargepoints across the UK should be a priority in the DfT’s plug-in vehicle strategy. The DfT should set out how it will work to remove barriers to chargepoint access across the country.

25. There are also different types of infrastructure in use in different areas of the UK and abroad. The use of different types of connector, which allow vehicles to be plugged into chargepoints, in different areas is a particular concern. Mr Baker told us that “we have to try to settle on something that is efficient and safe to use and that is standard as far as possible”. The DfT’s approach is to push for agreement in Europe on the type of connector to be used as standard, though it recognises wider international agreement may be needed and “there is only so much the UK or even the EU can do to get international agreement on that matter.”⁶¹ **The DfT should set out how it intends to reach agreement in the EU on the type of infrastructure to be used as standard for plug-in vehicles.**

Infrastructure provision and vehicle purchases

26. There is something of a “chicken and egg” problem in encouraging the switch to plug-in vehicles. The Institution of Mechanical Engineers describes this as follows: “without a recharging infrastructure consumers will be reluctant to purchase electric vehicles, but the network will need to be in place before usage starts to increase”.⁶² So drivers will not buy vehicles without ready access to charging infrastructure, but private companies that could install chargepoints will not invest in this technology unless they can be guaranteed a sufficient market of drivers wanting to charge their cars.⁶³ The Government expects that the Plugged-In Places programme will help solve this dilemma by providing initial infrastructure investment and alleviating potential consumers’ range anxiety. This should “de-risk” subsequent private sector involvement.⁶⁴

Chargepoints and registrations

27. With the assistance of the National Audit Office, we have looked into the relationship between provision of infrastructure in an area and the registrations of plug-in vehicles in that area to see whether readily available public chargepoints can be shown to stimulate consumer demand for plug-in cars. The DVLA provided us with data regarding the number of licensed vehicles that are eligible for the plug-in car grant across different areas of the UK. We compared these data against the location of chargepoints, as listed on the National Chargepoint Registry. The National Chargepoint Registry is a database provided

60 Ev 45 para 5.2

61 Q101

62 Ev 36 para 6

63 Ev w11 para 4.2

64 Q60

by the DfT, which it states “will enable all chargepoint manufacturers and infrastructure scheme operators to make data on their chargepoints available in one place.”⁶⁵

28. Table 2 compares the number of licensed cars that would be eligible for the plug-in car grant with the number of chargepoints from the national registry across devolved authorities and English regions.

Region	Number of Licenced Cars eligible for PIG	Number of Charge Points on NCR
Northern Ireland	6	44
Scotland	70	82
Wales	14	2
East Midlands	47	18
East of England	67	9
London	147	19
North East	77	213
North West	37	10
South East	313	14
South West	180	10
West Midlands	168	28
Yorkshire and Humberside	28	3
Unknown Region	20	0
Total	1174	452

Table 2 showing the number of cars eligible for the plug-in car grant (from DVLA written evidence) and the number of chargepoints from the national registry across English regions and devolved authorities.

It is notable that the figures in the National Chargepoint Registry differ from those provided to us by the DfT for the number of chargepoints installed by the Plugged-In Places programmes across the country (table 1). From tables one and two, there does not appear to be a clear relationship between the number of plug-in vehicles registered in an area and the abundance of chargepoints in that area.

29. We have taken data from the National Chargepoint Registry, which the DfT has released so that the public can see where they are able to charge their plug-in cars, in order to reduce range-anxiety. However, this dataset is clearly far from complete. According to DfT estimates, the total number of chargepoints in the UK is more than 3,000,⁶⁶ but the National Chargepoint Registry has fewer than 500 entries. We understand that the registry is under development, but it is hard to understand why the DfT’s database does not contain at least those chargepoints it knows to have been installed using public funds.

30. The Government believes that the provision of public charging infrastructure for plug-in vehicles will provide reassurance to potential consumers and help overcome the range anxiety associated with these cars. This reassurance should encourage consumers to buy plug-in cars. However, the analysis above shows no relationship between the demand for plug-in cars and the supply of public charging infrastructure. It is unclear whether this is

65 Ev 48 para 20

66 Ev 47 para 17

because of gaps in the National Chargepoint Registry. The data provided by the DfT in table 1, relating to the Plugged-In Places scheme, does not provide any greater clarity. This may raise questions about the assumption that providing infrastructure will stimulate demand for plug-in cars.

31. While the registry remains incomplete, the Government cannot have a clear picture of the availability of charging infrastructure. Without such a picture, it is difficult to see whether Plugged-In Places is helping to stimulate consumer demand for plug-in cars. The DfT is due to renew the plug-in vehicle infrastructure strategy over the next year. **The DfT should evaluate the effectiveness of the provision of public infrastructure in encouraging consumer demand for plug-in vehicles.**

32. The DfT must take the lead in providing data on the location of chargepoints so that the public can see where they can charge their vehicles. Making this database more comprehensive by adding the location of publicly-funded chargepoint should provide an incentive for private chargepoint providers to follow suit and upload the location of chargepoints they have installed. **An accurate and comprehensive registry of chargepoints installed by the Plugged-In Places scheme should be made available within the next six months. Publication of a full registry should encourage private chargepoint providers to upload their data for public use. We recommend that it be made a requirement of Plugged-In Places funding that details of the location of chargepoints installed using this funding are uploaded to the National Chargepoint Registry.**

4 Conclusion

33. The Government must make significant efforts to decarbonise road transport in order to meet the carbon reduction plans set out in the Climate Change Act 2008. Government support for the low-carbon vehicle sector will be important to reduce carbon emissions from road transport. The intention is that plug-in cars should be a principal contributor to decarbonising road transport. But if so, they will need to be widely adopted by the public. Whilst the Minister said adoption was progressing according to forecasts, the market for these vehicles remains small (approximately 1%). Financial incentives to encourage vehicle purchases alongside initial infrastructure provision are necessary to kick-start this market and promote private sector expansion.

34. The DfT is committed to supporting the expansion of the plug-in vehicle market. A number of witnesses told us that this support was important to foster the manufacturing industry in the UK. Industry representatives told us that positive messages from Government had created an environment where vehicle manufacturers were encouraged to base production in the UK,⁶⁷ which led industry to invest in the UK and supported green growth. This commitment is outlined in the Coalition Agreement. However, changes to the financial incentives to support plug-in vehicle purchases in the March 2012 Budget have caused concern in industry about the consistency of Government support for this market. It appears that different departments are sending out different messages on this subject. **The Government must avoid creating instability in the plug-in vehicle market through a lack of consistency between departments in their approaches to financial incentives for plug-in vehicles and adopt a more coordinated approach to these incentives across Whitehall.**

35. The Government has spent £11 million on providing infrastructure and financial incentives that at present benefit only a handful of vehicle owners. It anticipates that there will be hundreds of thousands of beneficiaries from these schemes within the next few decades. If these figures are achieved, then this will be welcome progress in helping to reduce carbon emissions from road transport. However, the Government should not sit back and hope that these projections are achieved. It should set milestones in the medium and long-term so as to measure whether this policy is effective and providing value for money. **We recommend that as part of the next spending review, the Government set milestones for the numbers of plug-in cars it expects to see on the roads so that the success of its low carbon vehicles strategy can be assessed within that spending review period.**

36. We have heard potentially conflicting reasons for the DfT's underspend on low carbon vehicles. The Secretary of State told us that the underspend on low carbon vehicles was due to lower than expected take up, whilst the Minister told us that consumer demand was progressing as forecast and the private sector had provided more funding for infrastructure than expected. We have also found mixed information about the location and number of chargepoints. The DfT told us that over 1,600 had been installed by Plugged-In Places, yet their National Chargepoint Registry has fewer than 500 entries. It is difficult to see how the

DfT can be targeting infrastructure and spending to the appropriate areas if it does not have a clear picture of current provision. There needs to be greater strategic oversight of the spending on low carbon vehicles and related infrastructure.

Conclusions and recommendations

Demand

1. We recommend that the Government promotes public understanding of the availability of infrastructure and the support available for plug-in vehicle purchases. There should be provision in Plugged-In Places funding to undertake such initiatives. (Paragraph 13)
2. We regret the Treasury's decision to change the financial incentives framework for low carbon vehicles without prior consultation. Such unexpected changes to these incentives risk creating instability in the market for plug-in vehicles. (Paragraph 15)

Departmental underspend

3. The DfT should clarify the reasons for the underspend in its low carbon vehicle programme. (Paragraph 18)

Standardisation

4. Making sure that vehicle owners can access chargepoints across the UK should be a priority in the DfT's plug-in vehicle strategy. The DfT should set out how it will work to remove barriers to chargepoint access across the country. (Paragraph 24)
5. The DfT should set out how it intends to reach agreement in the EU on the type of infrastructure to be used as standard for plug-in vehicles. (Paragraph 25)

Chargepoints and registrations

6. The DfT should evaluate the effectiveness of the provision of public infrastructure in encouraging consumer demand for plug-in vehicles. (Paragraph 31)
7. An accurate and comprehensive registry of chargepoints installed by the Plugged-In Places scheme should be made available within the next six months. Publication of a full registry should encourage private chargepoint providers to upload their data for public use. We recommend that it be made a requirement of Plugged-In Places funding that details of the location of chargepoints installed using this funding are uploaded to the National Chargepoint Registry. (Paragraph 32)

Conclusion

8. The Government must avoid creating instability in the plug-in vehicle market through a lack of consistency between departments in their approaches to financial incentives for plug-in vehicles and adopt a more coordinated approach to these incentives across Whitehall. (Paragraph 34)
9. We recommend that as part of the next spending review, the Government set milestones for the numbers of plug-in cars it expects to see on the roads so that the

success of its low carbon vehicles strategy can be assessed within that spending review period. (Paragraph 35)

Formal Minutes

Wednesday 12 September 2012

Members present:

Mrs Louise Ellman, in the Chair

Kwasi Kwarteng
Julie Hilling

John Leech
Iain Stewart

Draft Report (*Plug-in vehicles, plugged-in policy?*), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 36 read and agreed to.

Summary agreed to.

Resolved, That the Report be the Fourth Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available, in accordance with the provisions of Standing Order No. 134.

[Adjourned till Monday 22 October at 4.00 pm]

Witnesses

Tuesday 12 June 2012

Page

Dr Keith Bevis , Managing Director, EValu8 Transport Innovations Ltd, Professor Richard Folkson , Fellow, Institution of Mechanical Engineers, and Dr Nigel Berkeley , Director, Applied Research Centre in Sustainable Regeneration, Coventry University	Ev 1
Paul Everitt , Chief Executive, The Society of Motor Manufacturers and Traders Limited, Ian Allen , Manager of Environmental Strategy, General Motors, and R Graham Smith OBE , Managing Director, Toyota Motor Europe	Ev 9
Norman Baker MP , Parliamentary Under-Secretary of State, Department for Transport	Ev 15

List of printed written evidence

1	Motor Industry Observatory	Ev 20
2	Toyota	Ev 24
3	EValu8 Transport Innovations Ltd	Ev 31
4	Institution of Mechanical Engineers	Ev 35
5	Society of Motor Manufacturers and Traders (SMMT)	Ev 37
6	General Motors UK	Ev 44
7	Department for Transport	Ev 46, Ev 65
8	DVLA	Ev 57

List of additional written evidence

(published in Volume II on the Committee's website www.parliament.uk/transcom)

1	Guide Dogs	Ev w1
2	WWF-UK	Ev w2
3	Renewable Energy Association	Ev w6
4	Pteg	Ev w9
5	Engineering the Future	Ev w12
6	Joint submission from the RAC Foundation and RAC	Ev w20
7	Jonathan Kershaw	Ev w23
8	Stephen Harding	Ev w27
9	Chartered Institute of Logistics and Transport in the UK	Ev w28
10	Air Products Plc	Ev w29
11	eMotor Cycle Industry Association	Ev w30

12	ITS (UK)	Ev w34
13	Transport for London	Ev w37
14	Campaign to Protect Rural England	Ev w41
15	Institution of Engineering and Technology	Ev w44
16	Thriev	Ev w47
17	BVRLA	Ev w50

List of Reports from the Committee during the current Parliament

The reference number of the Government's response to each Report is printed in brackets after the HC printing number.

Session 2012–13

Fourth Report	Plug-in vehicles, plugged in policy?	HC 239
Third Report	Competition in the local bus market	HC 10 (Incorporating HC 1861–i–iii)
Second Report	Road safety	HC 506 Incorporating HC 1738
First Report	Flight time limitations	HC 164 Incorporating HC 1838
Third Special Report	Sulphur emissions by ships: Government Response to the Committee's Sixteenth Report of Session 2010–12	HC 87
Second Special Report	Counting the cost: financial scrutiny of the Department for Transport 2011–12: Government Response to the Committee's Fifteenth Report of Session 2010–12	HC 15
First Special Report	Draft Civil Aviation Bill: Pre-Legislative Scrutiny: Government Response to the Committee's Thirteenth Report of Session 2010–12	HC 11

Oral evidence

Taken before the Transport Committee

on Tuesday 12 June 2012

Members present:

Mrs Louise Ellman (Chair)

Steve Baker
Jim Dobbin
Kwasi Kwarteng
Mr John Leech

Paul Maynard
Iain Stewart
Julian Sturdy

Examination of Witnesses

Witnesses: **Dr Keith Bevis**, Managing Director, EValu8 Transport Innovations Ltd, **Professor Richard Folkson**, Fellow, Institution of Mechanical Engineers, and **Dr Nigel Berkeley**, Director, Applied Research Centre in Sustainable Regeneration, Coventry University, gave evidence.

Q1 Chair: Good morning, gentlemen. Welcome to the Transport Select Committee. I would like to start by asking if you could each give your name and the organisation you are representing. This is to help our records.

Dr Berkeley: My name is Dr Nigel Berkeley. I am from Coventry university.

Professor Folkson: I am Professor Richard Folkson and I represent the Institution of Mechanical Engineers.

Dr Bevis: I am Dr Keith Bevis. I run EValu8 Transport Innovations Ltd, running Plugged-In Places in the east of England.

Q2 Chair: Could you tell us what role you think plug-in vehicles should play in reducing carbon emissions from road transport? What could they achieve? Who would like to start on that one?

Professor Folkson: I will lead off. Electric vehicles definitely play a role because we need to move to a fossil fuel-free form of transport in the future. My perspective is that they are an important enabling technology but we should not assume that they are the only technology. We should not back a single winner. There are lots of other technologies that can also play a role in decarbonising transport. The way I always express it is that, rather than having electric cars, we will have an increasing electrification of cars, and all cars will have some degree of electrification, be it from a stop-start micro hybrid all the way through to a fully electric vehicle. There will be lots of shades of these and different vehicles will suit different consumers in different ways depending on their usage. The affordability of those technologies is critical.

Q3 Chair: Does anybody else want to add to that or have a view on it?

Dr Bevis: One of the areas where they can help, particularly at the moment, is in reducing the amount of pollution in city centres. For a lot of the regular stop-start traffic that we have in cities such as white vans, taxis and that sort of traffic, which is continually producing pollution, changing some of that to EV reduces that.

Q4 Chair: The Government say that they expect to see tens of thousands of plug-in vehicles on the roads by 2015. Do you think that is realistic?

Dr Berkeley: Personally, no. I think that is very optimistic given the current level of demand. There is a huge problem. Although the willingness is there from the industry, the technology is there and electric vehicles have become more and more available, although product choice is still limited, consumer demand is still lagging way behind.

Q5 Chair: What role do you think the plug-in vehicles could play?

Dr Berkeley: I have been part of the CABLED consortium of demonstrator electric vehicles in the west midlands region. The evidence we have there from the completed trial, from the drivers, is that these electric vehicles are very much a viable alternative to urban commuting and a very good solution. The evidence is that driving patterns are no different from what people's normal daily commutes are with standard internal combustion engine vehicles.

Q6 Chair: Do you think the Government should do more to support this? Is there more that could be done?

Professor Folkson: Government play an important role in enabling it. Affordability is such a key issue that we won't get to a future state without some level of intervention and support. The problem in terms of affordability is that the batteries are so expensive—and they are going to stay expensive for some time in the future until volumes become very significant—that it is not a good rational economic case for consumers to switch to an electric vehicle at the moment, particularly if the vehicle is not used a lot. We were having this discussion outside. If you use an electric vehicle a lot in a fleet to do a high mileage, then you will save, relatively, a large amount of money in fuel, diesel or petrol. But if you are a typical user, only doing 12,000 miles a year, you only spend about £1,500 a year on petrol or diesel. That is, relatively, a small amount of money, particularly spread over the life of the car compared with the very much greater cost of an electric car's purchase price.

Dr Berkeley: I would argue that, yes, the Government could do more to stimulate demand, particularly in terms of public awareness and public education around what EVs can do for drivers. There is too much emphasis on electric vehicles as a kind of solution to the planet's ills and fuel security, whereas the evidence suggests they are decent cars as well. We should be promoting that more and educating drivers using the disseminated results we are getting from the demonstrator trials that the Government have funded. I was going to say something else, but it has slipped my mind.

Dr Bevis: The other obvious thing that the Government could do is use them. Nothing works better than a good example. We can see examples across Europe. Estonia gave an electric vehicle to all its social workers, which put them into the public arena¹. I am not arguing that particular case, but certainly there are areas where we use vehicles for public activity with a high mileage in a fleet application. If Government were to push local authorities to take up electric vehicles and support that, it would definitely show the way for the public to follow.

Q7 Chair: You are talking about a mixture of promotion and financial support.

Dr Berkeley: The plug-in grant is currently set up in such a way that the subsidy is really ineffective because the price is still too high. All you are doing is benefiting those people who could afford the vehicles anyway. I would argue that the people who are currently buying electric vehicles do not need the subsidy because they can afford it without the subsidy. Maybe we have to look at different patterns and encourage people. Using subsidies against leasing might be an alternative rather than purchase. Is purchase the only option?

Q8 Paul Maynard: So far we have 1,400 vehicles registered that have been obtained through this grant. We have spent tens of millions of pounds on a national network of recharging facilities, which are not interoperable and which face private competition, which are arguably more attractive to some people. How can we say that this is a sensible and good use of public money when customers do not seem to want to purchase the goods? Are the customers wrong?

Dr Bevis: There is a chicken and egg situation with electric vehicles. You either have to provide an infrastructure for people to buy cars and use them or allow people to buy cars worrying that there is no infrastructure. It will be wrong whichever way you do it. The solution that we have chosen is to build an infrastructure ready for the cars. You make a very valid point about interoperability. The fact that we can even say the word shows that we use it a lot.

Q9 Paul Maynard: That is something, yes.

Dr Bevis: However, if you dig underneath, you will realise that as of last week, with ourselves and east of England and the midlands, we are now allowing

roaming, which is a more friendly word. We are talking with London, and by the end of September we will be roaming there as well. The various groupings are coming together to make it easier for the drivers. What is also happening is that the commercial sector is talking to the Plugged-In Places groupings to allow roaming across those areas. We are doing the activity of beginning to break that failure in the market by putting some infrastructure in place and encouraging the commercial sector to come in and build.

Q10 Paul Maynard: Given that the private sector is now making investment, particularly in London, I gather, with NCP car parks, where you tend to find plug-in places, was there a need for the Government to invest this £30 million in these eight pilot areas? Until recently none of them seemed to be talking to each other. Greater Manchester has no plug-in points so far, according to the DfT's evidence.

It does seem to have been, as an example of Government spending—what is the polite term for it?—an absolute fiasco, particularly given that, parallel to that, the private sector has shown an ability to provide the plug-in points where people want to use them and need them. Is there any evidence as to which has been the most effective of the eight different regions in terms of people actually using them as opposed to spending Government money?

Dr Bevis: I think we are only just beginning to get the evidence on people using them—I will admit that—because we are gradually bringing that data together. The part of the evidence that we do have is that putting an electric charging point in a street or a car park is a lot more difficult than it would appear to be. The one thing that we have done is tackle all the problems involved in doing that so that, as the commercial sector comes in, we are talking about an industry that understands how to do it. Previously, if we had electric vehicles, we would be struggling with those issues. We have brought those issues to the fore in order to tackle them and share with Government how to do it and how to help local authorities as well.

Q11 Paul Maynard: We have evidence from a company called Thriev, which I think is pronounced "Thrive" but it is spelt wrongly, who say that in London there is a target in 2013 to have 1,300 public infrastructure charging points to refuel the London target of 100,000 plug-in vehicles. Most of these public points are slow charge. They say it would take 20 days of back-to-back charging to refuel this target fleet. How have Government allowed such an incomprehensible, over-optimistic and wacky system to emerge that simply cannot do what it was supposed to do? What has OLEV actually done? What value has it added, if any, to this process?

Dr Bevis: If we talk about electric vehicles in particular, one of the problems we have at the moment is that their range is not fantastic. A 100-mile range is typical. People are worried, if they travel somewhere that is 45 miles, whether they have enough energy to get home. Part of the Plugged-In Places has also introduced home charging. From the CABLED project, we already know that people will be more inclined to charge electric vehicles at home if they

¹ According to Kredex presentation dated 5.10.2012, 507 cars were allocated to social workers. At that point 378 had been ordered by the municipalities.

12 June 2012 Dr Keith Bevis, Professor Richard Folkson and Dr Nigel Berkeley

have those facilities. Therefore, the charging on the street or in a car park is more about topping up the extra 10 miles rather than charging a battery from zero.

Q12 Paul Maynard: Was that your understanding at the start of the project or have you learned that?

Dr Bevis: We have learned that home charging is more important than we thought, but we had included it at the start of the project.

Dr Berkeley: I will add to that because what Keith has just said is important. During the CABLED trial we found in the west midlands region that the drivers very much welcomed the public charging infrastructure as a kind of comfort blanket. It was not necessarily something they would use to recharge the car completely. You would use your home charger or your workplace charger, but you know then you have the added comfort and security that the public charging is there if you were short of juice on the way home and needed it and could charge your car up. I do not think it was ever anticipated that you would use that for full charging.

Professor Folkson: I think that answers Paul's question, but the other important point to make is that it is very much chicken and egg, as Keith said. I do not think you would get people to buy the cars unless they had the confidence that there is somewhere to charge them if they are worried they are running out of charge. Therefore, we have to start somewhere and that is the role that OLEV has provided.

Paul Maynard: Some chicken and some egg.

Q13 Chair: It is about the infrastructure being there.

Professor Folkson: It is.

Q14 Mr Leech: How important is the issue of confidence, both with the consumer and the industry itself? There is the whole issue about people not feeling that they will be able to find somewhere to recharge their vehicle and they cannot go the distances that they need to on a single charge. How much is the problem to do with people thinking, "We are not quite there with electric vehicles and, rather than my next car being an electric vehicle, the one after that will be an electric vehicle, because the industry will have got us to that stage"?

Dr Bevis: That is a really good question.

Q15 Mr Leech: The flipside of that in terms of the industry is how much is the problem with confidence within the industry and that by the time we are at a stage where vehicles are affordable and people want to buy them, and people are buying them, there might be another technology on the way which will be much better than electric vehicles?

Chair: Professor Folkson, you look as if you want to answer. How do we get the confidence that is required for people?

Professor Folkson: People are worried about buying electric vehicles for a number of reasons. They are worried about the residual value at the end of their life—how much they will get when they sell the car. That is a very big unknown with electric cars, particularly when the battery may need to be replaced

at some point during the life of the vehicle, which could cost more than the car is then worth. There are big confidence issues about the value of the product.

Q16 Mr Leech: What is the rough cost of a battery as a proportion of the vehicle?

Professor Folkson: It is about half. If the car is about £30,000, which is fairly typical for a vehicle with a subsidy, the battery will be £15,000 to £20,000. It is very significant. If it only lasts 10 years, you could end up having to buy a new battery at the end of 10 years. In 10 years the batteries could be cheaper. They will be somewhat cheaper but that is the unknown. That is where the confidence issue comes in. People do not know how much it will cost for a new battery once it is out of warranty, which is probably at 10 years.

Q17 Mr Leech: What about the industry itself worrying about putting vast resources into the technology and then someone coming along with something that is better?

Professor Folkson: The industry is committed to putting a lot of resources into that. There are plenty of examples of just about every company around the world working on EVs and other technologies. The problem I see is that the other technologies are getting better just as quickly as the EVs are getting better. Internal combustion engine technology is improving. The carbon emissions from petrol and diesel engines will continue to get better and better year over year. The cost gap in terms of operating a petrol or diesel engine compared with an EV will continue to stay the same as it is. That is one of my worries.

Q18 Mr Leech: I do not mean this as it might sound, but is there a danger that we are wasting our time with electric vehicles at this point and we should be looking at something further in the future?

Professor Folkson: No, I do not think we are wasting our time.

Q19 Chair: Dr Berkeley, you are shaking your head.

Dr Berkeley: I would not agree with that. In terms of confidence, going back to my earlier point, maybe something we could do in the interim is to encourage different modes by which people can access electric vehicles rather than just straightforward purchase. If cost and uncertainty is the issue, why not offer different alternatives such as leasing so that people can lease cars and use the subsidy to offset lease costs? Going back to Richard's point about using them for fleets as well, you would get them out there into the market at a time when you cannot stimulate purchase.

Q20 Steve Baker: There are so many things to ask that it is hard to know where to begin. Professor Folkson, earlier on you mentioned the £1,500 per year average cost of petrol. That is the pump price you will have used, is it not?

Professor Folkson: Yes.

Q21 Steve Baker: I know you are a humble engineer like me, but, when you do economic analysis and you

compare these technologies, do you use the underlying economic cost or, if you like, the end cost, including all Government subsidies and taxes?

Professor Folkson: We do it both ways. I do it as a simple engineer very simplistically to try and look for a high side for EVs. When I did the analysis, I took the pump price, including the taxation element, looked at the average usage and compared that with the price of buying an electric car if the electricity is free over its entire usage, so you do not pay anything for the fuel in your EV and you pay the pump price for the petrol or diesel. With the £5,000 grant, it takes five to six years to break even if you do not pay anything for your electricity. Without the grant, it is more like 10 years to get to a break-even point with an EV. That is part of the problem.

Q22 Steve Baker: But that was the pump price of fuel. If we took off the tax, it would be about a third, so that would triple all those numbers.

Professor Folkson: Yes. I assumed £1.50 a litre.

Q23 Steve Baker: The whole thing is economically and utterly irrational without the subsidy.

Professor Folkson: That is partly because I have assumed 12,000 miles a year. If we looked at fleets, who are doing more like 30,000 to 40,000 miles a year, that whole equation would change very significantly. The problem is that targeting private individuals doing relatively low mileage is not such a good economic case for subsidy as larger fleets doing much higher mileages.

Q24 Steve Baker: Have you done any analysis on the comparative cost per mile of the infrastructure? I will try and explain what I mean. We have talked about putting in home charging points or parking charging points to get 10 miles of range. How much does it cost per mile of range gained to put in the electric infrastructure compared to having a petrol station, say?

Professor Folkson: That is a good question. We have not done that analysis on infrastructure costs because the petrol pumps are already there. We have a 100-year-old infrastructure now, effectively. You could argue that we have an electrical distribution infrastructure that is already there, but with the Plugged-In Places pieces—the new bit that we are trying to add on to it—I have not done that analysis.

Q25 Steve Baker: I would be really interested if you did. Dr Bevis, just picking up on some of the things you were saying earlier about the chicken and egg problem, how did the petrol station network emerge?

Dr Bevis: I am probably the oldest member here, but not that old.

Q26 Steve Baker: Did it not just emerge spontaneously in society because people wanted them to go with their very convenient and attractive petrol engine vehicles?

Dr Bevis: Yes, but the cars were also coming out as a small introduction to society, whereas at the moment we are dealing with a mass car market and trying to introduce a number of electric vehicles into it.

Q27 Steve Baker: But isn't the key difference that people wanted the petrol engine cars at the time, whereas now I think Dr Berkeley said that consumer demand was lagging, which I automatically just translated to mean that people do not want these? What we are saying is that we are trying to get everybody in society to make a transition that they do not want to make that is extremely expensive and they are just not doing it. Is that what we are saying?

Professor Folkson: That is an interesting question: where did petrol stations come from? If you look at the very early origins of cars, they ran on wood alcohol, which was effectively biofuel, purchased from the chemist in a bottle. It was only as the car expanded to become a means of transport, rather than a rich person's toy, that the industry decided it needed to find a new and more plentiful supply of the energy it was putting into these vehicles. The petroleum industry emerged as another source of fossil fuels to wood alcohol. Then it started distributing it through a pumping process and petrol stations took off. Originally it was literally a bottle of fuel that was purchased from a chemist's shop.

Q28 Steve Baker: To wrap all of this up, because I realise the Chair will want to move on, earlier on when the term "market failure" was used and bearing in mind some of these factors we have talked about, rather than market failure, is it not a public failure just to obey the Government and do the things that Government want?

Dr Bevis: Your choice, yes.

Q29 Chair: Mr Baker's question to you was: is it the case that it is thought that people ought to do this but actually they don't want to or they are not doing it? Is that a correct analysis of where we are?

Dr Bevis: I think that is a correct analysis, because until people understand the need for it—at the moment, so long as we have plenty of petrol, there is no particular need for it, and, so long as we are not concerned about pollution and tailpipe emissions, there is no particular need for it—as companies have responsibilities for the environment and begin to look at their fleets and how they can reduce their carbon footprint, then they will begin to understand that this is part of the solution. We are probably providing a solution before the public in general understands the need for it.

Q30 Steve Baker: I want to make one more point. I have tried to make this case with a degree of humour to try and soften it a bit. When I am listening to this, what I hear is that any of this only matters if the carbon dioxide issue is an existential threat to society and to humanity. Perhaps it is not a question for you, but why can't we just be honest then and say we should just use naked power to make people get off petrol and carbon? Is it going to work trying to do it gently, to incentivise and pretend that there is freedom, or should we just abolish freedom and force people?

Chair: Please don't answer that. It is the general thrust of the question.

12 June 2012 Dr Keith Bevis, Professor Richard Folkson and Dr Nigel Berkeley

Dr Berkeley: That assumes that people are wedded to petrol as a means of driving their vehicle. Surely if the choice, the range of cars and the performance was there, it would not matter to people what was powering their cars. As long as it offered them the same choice, the same comfort, the same experience and the same security, it would not matter. The problem is trying to raise the confidence of consumers that these things are as good as the petrol alternatives, which at the moment they are not, but it is getting there. It is about education, as I said before, and using the evidence we have from trials that have happened all over Europe and the world to demonstrate what electric vehicles can do. They are not milk floats like they were 60 years ago. There are some very good electric vehicles out there.

Professor Folkson: But people are wedded to personal transportation. That is Henry Ford's quote. They are wedded to personal transportation and any Government that tried to mandate that you had to go for a much more expensive form of personal transportation than your alternative choices would have difficulties at the ballot. That is the difficulty.

Chair: That is the answer to your particular question.

Q31 Iain Stewart: I would like to go back to one of Professor Folkson's earliest comments that wholly electric cars are only going to be one part of an electrification of vehicles. Given all the concerns and worries that have been expressed about ranges and the cost of it, should we not be focusing more on the hybrid vehicles? Those will attain quite a sharp reduction in emissions but without betting the farm on one model.

Professor Folkson: It depends on the usage by the consumer—how far they travel and what their pattern of usage is. I personally believe that the Vauxhall Ampera, which is a series hybrid, is going down the right route. We will end up with vehicles that have a combination of highly efficient small internal combustion engines when you need them but an electric vehicle operating mode if you do not need to go too far, which can be carbon-free for a lot of the car's operation. The balance for the vehicle manufacturers is how much of it is internal combustion power and how much is battery power, given that the batteries are still very expensive in the Ampera. How do you manage that mix? Different consumers will have different requirements for that mix of fossil fuel versus electric energy. I hope I have explained that clearly.

Q32 Iain Stewart: What I am trying to get at is that, instead of spending all the money on putting in the charging network and the subsidies for buying wholly electric cars, would it not be a better use of the money to use that in helping the manufacturers to invest in the hybrid technology? You would have a range of vehicles to meet the different consumer needs.

Dr Berkeley: In the short term, that might be a good solution. If you look at the US model, where obviously the driving patterns are a lot different, hybrids are certainly the way forward. Maybe as a short-term solution that would be a sensible option.

Q33 Iain Stewart: Why aren't we doing it then?

Chair: Dr Bevis, do you want to tell us why?

Dr Bevis: Looking at research money that has been put into transport, it is going into a number of developments. It is up to us as researchers to come up with those proposals, working with the vehicle manufacturers. Looking particularly at the Ampera, because we have had lots of studies on it, the new technology underneath the bonnet is frighteningly advanced. There are good things happening, but there is still a place for the basic electric vehicle for levels of transport that are fairly low mileage. From the CABLED project, if we look at people's use of vehicles, more than 80% of all our car driving is less than 30 miles a day. A pure battery vehicle does actually deliver the goods.

Q34 Chair: Is the public money going into the right areas?

Professor Folkson: To answer Iain's question about whether that money should go to the vehicle manufacturers, having come from a vehicle manufacturing background, the amounts of money spent on product development by all the companies are mind-boggling. The amount of Government money that is going into this project, although it may sound a lot in UK terms, is relatively small compared with the total spent globally on vehicle development by all the manufacturers. I am not sure it would make enough of a difference globally to influence the products.

It is more important for Government money to go into incentivising the right consumer behaviours. Rather than saying, "Buy an electric car", you want money that incentivises people to buy a car with the minimum carbon footprint and measure it in a different way as opposed to saying you get a grant if it is an electric vehicle that meets these criteria. I am not sure that is the best way to spend the money. Incentivising consumers to spend their own money in the right places is probably the best use of the Government incentives.

Q35 Iain Stewart: I have a final technical question. At the moment the maximum range for an electric vehicle is about 100 miles.

Professor Folkson: Yes.

Q36 Iain Stewart: Are we likely in the next few years to see a step change in that? Is there a battery in the market that is going to double or triple that?

Professor Folkson: No. It is really about the balance between the size of the battery and the cost of the battery. If you want more range you add weight, which means that you need an even bigger battery to go further and you are on an exponential curve that makes it more expensive. It is going to be very difficult to get longer-range batteries. If anything, we might learn from experiences like CABLED to say that we don't need 100 miles really; 70 is adequate and we can produce lower cost electric cars with smaller batteries that are perfectly adequate once we have educated the consumers to use them in the right way and have the confidence in them.

Q37 Jim Dobbin: Professor Folkson was talking about incentivising the public to go down this route possibly. How does that fit into different Governments' view that we should be trying to take motor vehicles off the road and use rail or other forms of public transport?

Professor Folkson: It gets back to my point that people view personal transportation as a right these days. It would be very difficult to convince them otherwise. The rail network is already fairly well utilised near to capacity. I do not think you are going to make a quantum shift to get people off the roads in a way that is going to make a really significant difference.

Q38 Jim Dobbin: In which parts of the country is there more electric vehicle use? Have you any idea about that or is it evenly spread?

Professor Folkson: London is certainly the biggest.

Dr Bevis: London is the biggest. In terms of registrations of plugged-in car grant cars, 50% of those cars are in London, the east of England or the midlands almost exactly.

Professor Folkson: That is where the Plugged-In Places activity and trials have been focused.

Q39 Chair: Does the usage reflect where the plug-in facilities are?

Dr Berkeley: Yes, and where the TSB-funded trials have been taking place as well.

Q40 Jim Dobbin: Does that have something to do with the wealth of the different parts of the country?

Professor Folkson: It is more to do with trials and incentives. You do not pay the congestion charge in London; that is what has driven the usage there. One of the points I wanted to make is that the numbers are still tiny compared with any other vehicle use. If you are going to reduce carbon, you have to get to very large numbers of cars. The world produces about 50 million cars a year, which is a mind-bogglingly big number. If we made a 1% improvement to that 50 million cars, it would have vastly more impact than a 50% improvement in the performance of electric vehicles. It is about numbers. We need to get to big numbers of cars and at the moment the numbers are really trivial.

Dr Berkeley: The market share is 1.1% at the moment.

Q41 Julian Sturdy: Where do you see electric cars in 10 years? We are not talking about hybrids. We have already had questions on hybrids from Mr Stewart and that was a valid point. Where do you see electric cars in 10 years or the role of electric cars in 10 years?

Professor Folkson: I think they will be more mainstream. They will not be quirky but accepted as a perfectly viable alternative to an internal combustion engine for some consumers. My worry, and I think it gets back to Dr Berkeley's point, is that they are likely to be bought by affluent consumers who want them because they want them anyway irrespective of the economic considerations—

Julian Sturdy: As a second vehicle.

Professor Folkson:—as a second car, and they are going to become second cars. They will make excellent second cars where you can choose to use them on the short journeys where range is not an issue, and you will have your more expensive luxury internal combustion engine car to go on longer distances and take the family on holiday or whatever. I think they will tend to migrate to second cars in affluent families. That is how I see the market growing.

Q42 Julian Sturdy: I do not disagree with you on that point. Listening to the debate so far, we have talked about the capital cost. We have talked about very high depreciation values and a 10-year life cycle with the battery. That means basically that straight electric cars pretty much have no second-hand value. Am I correct in that?

Professor Folkson: Yes.

Q43 Julian Sturdy: That is going to limit them to certain consumers. We have also talked about electric cars not being the panacea or silver bullet to solving emissions problems. Everyone so far has agreed on that. My point is whether we should be investing solely in electric cars if you say they are going to be a second car to affluent consumers who can afford a hybrid car, but they will also have a luxury second car, just to do the short journeys, when new technology such as hydrogen technology could be potentially coming down the line in 10 years. Are we basically wasting our time and money on electric cars in the short term when there are going to be other technologies moving forward? I take Mr Stewart's point about hybrid cars because that is a different point. I am talking about purely electric.

Professor Folkson: You make a very good point about hydrogen because actually hydrogen cars are electric cars. Hydrogen is likely to be used in fuel cells and you need all of the electric car technology for the control systems, the motors and the propulsion unit. They will be the same in a hydrogen-powered car and it has a battery. The hydrogen fuel cell charges up the battery, albeit a much smaller one. Electric cars are a necessary stepping-stone technology towards the hydrogen economy as well. That is probably the strongest argument for saying that we are not wasting our time on electric vehicles. If we want to get a long way in the future, maybe 50 years hence—and where the hydrogen comes from is another big question—electric vehicle technology is a necessary stepping stone to help develop those follow-on technologies.

Q44 Chair: Would anyone else like to comment on that?

Dr Berkeley: I agree with that point. The hydrogen technology is still a long way off in terms of mass deployment. Convincing consumers over hydrogen is going to be a pretty tough job as well in terms of their fears over security with hydrogen. That is quite a difficult task in itself. In the short term, I do not see that the investment being made into alternative technologies is sensible.

Dr Bevis: I agree with the points already made.

12 June 2012 Dr Keith Bevis, Professor Richard Folkson and Dr Nigel Berkeley

Q45 Julian Sturdy: If I could come back on that point, I do not disagree with what you say, but should we not be using the hybrid cars as that stepping stone, rather than pure electric?

Professor Folkson: This is where it blurs and why I prefer the term “electrification” of cars rather than electric cars. Hybrids are another form of electric car, but they happen to have an internal combustion engine as well.

Q46 Julian Sturdy: We are not talking about a Government subsidy on the hybrid cars, are we?

Professor Folkson: You have it on the Vauxhall Ampera, which is a series hybrid. It is a very blurred division between hybrids and electric. That is correct; that is how it is going to develop over the coming years.

Q47 Mr Leech: I want to pick up on a couple of things that Professor Folkson said and hopefully suggest that the Government’s money has not been wasted perhaps as much as has been said already. You said that you think in 10 years electric vehicles will be more mainstream. Would electric vehicles be more mainstream without this Government initiative?

Professor Folkson: I believe it will go slower because of the affordability issue, and, as fewer people can afford them, fewer will buy them.

Q48 Mr Leech: Regardless of how much money has been spent, it is a step in the right direction, albeit perhaps an expensive step in the right direction.

Professor Folkson: Yes.

Dr Berkeley: Yes.

Dr Bevis: I think most steps are expensive, but in making the step now we are coming across some of the technical issues around using electric vehicles and using infrastructure that we can solve while there are fewer vehicles around. If we had to solve those issues in 10 years when the car was coming into the mass market, there would be far more disruption.

Q49 Mr Leech: On that basis, would you all agree that this is a good use of Government money?

Dr Berkeley: I would.

Dr Bevis: Yes².

Professor Folkson: I would; I think it is the right thing to do.

Chair: You are all saying yes.

Q50 Mr Leech: Slightly more positively. That was the first issue. The other one was that you said everyone was wedded to personal transportation. Of course, there are some people who are not wedded to personal transportation and who are very committed to using public transport and not driving.

Is it not part of the conundrum for the industry that the people you are most likely to persuade of the merits of electric vehicles are those who are less wedded to personal transportation? As an add-on from that, is part of the problem that at the moment some of those

people who might be committed to buying an electric vehicle are still concerned about the carbon footprint created by the current electric vehicles—particularly given the carbon generation that creates the electricity in the first place?

Professor Folkson: Those are two very good points. I will take the second one first. The whole industry is worried about the life-cycle analysis of the total emissions in producing the car and the fuel over its entire life and disposing of it at the end of its life. There is a lot of work going into comparing existing technologies with the new technologies to make sure that we have that part of the equation correct.

You are right that we tend to be a bit London-centric sitting here. If you live in London and work in London or its surrounding areas, it is quite easy to use public transport. In some ways you would be crazy to use your own car. I live in a rural area and there is no public transport. We have to be careful that a lot of the people wedded to personal transportation are wedded because that is where they live and their whole lives depend on being able to move around an area where there is either inadequate or no public transport. We cannot just assume that people are wedded to it because they love cars. It is because their whole lives are structured around that situation.

Dr Berkeley: The evidence we have had from the drivers from the CABLED trial as well is that a good proportion of those that came to our feedback meeting were what you would call “petrol heads”, who wanted to take part in the trial to see what an electric vehicle driving experience was like. The overwhelming feedback we had from the drivers was very positive. The number of people that said they would be tempted to buy an electric car was quite staggering, particularly given the affordability of an electric vehicle. To take your earlier point, it is not just those people who are more wedded to public transport who would be tempted. I think those people who are currently driving traditional internal combustion engine vehicles who have had the opportunity to drive an electric vehicle see the advantages.

Dr Bevis: I have just one point. We talk to lots of people across our region about transport planning. They are beginning to think about how you get cycling, walking, bus riding and train riding into the package. By putting electric vehicles in as part of that discussion it means that they are taking a much wider view. That story is developing across the regions.

Q51 Paul Maynard: Very quickly and on the issue of whether it is money well spent, you have identified three regions that had the largest number of electric vehicles. We also know that the second highest number of charge points as of March 2012 is in the north-east, with 399. That is not an area that you highlighted. When I looked on a website at their map of charge points, it was almost like a touristic tour of rural Northumberland. It looked delightfully visually, I am sure, but I wonder how many cars are actually using them. This might be a nice way to spend public money. All spending of public money is nice, I am sure, for those who are benefiting from it. However, has this money been well spent in terms of ministerial oversight? That is my real concern. Money has been

² Unsurprisingly we all agreed. The caveat that perhaps I should have said in answer to this question is that part of my company and in particular not all but part of my salary is funded from the Plugged in Places programme.

lobbed out there with no oversight of what has been achieved. We cannot even achieve a standardised plug, for God's sake, to operate in all these places. What in heaven's name are the Ministers doing overseeing this?

Chair: That is a comment on whether you think the Government have acted in an efficient manner in relation to this and what changes you might like them to make.

Dr Bevis: I think you have to look at it in terms of the time scale. The north-east of England was part of the very beginning of the Plugged-In Places programme so it has had an extra year to run. It has learned lots of lessons, and those of us who have come into it later have stood on their shoulders in terms of how we have operated in the rest of the country. Part of that reason is just history; it started first and therefore has had more time to get going.

To take your very last point about connectors, precisely because we have the Plugged-In Places programme—and we have managed to lobby the manufacturers—we have some agreement on a connector. It has been pushing agreements on connectors and agreements on safety standards. Because we are working in the industry, we have pushed and we have those standards.

Q52 Paul Maynard: Am I wrong to say that the connector agreed upon is the Dutch model that was already in existence before the Plugged-In Places scheme began, or am I misinterpreting that?

Dr Bevis: It probably was already in place, yes.

Paul Maynard: Therefore, if we had been doing our jobs properly, you would have had that to start with rather than spending two years squabbling, but that is another matter.

Q53 Kwasi Kwarteng: I wanted to follow up a point that my colleague made with regard to ministerial oversight. It seems that there are considerable sums of money being spent, but there seems to be some confusion perhaps as to how best the money could be applied. I was wondering what your views were about whether there was enough Government oversight or scrutiny, if you like, on this spending.

Dr Bevis: As I am running a Plugged-In Places programme, I feel very scrutinised. I am reporting to Government Ministers on a monthly and three-monthly cycle. They know exactly how many charging points I have put in the public domain and how many are with companies. They know precisely how much money I am spending and the rate at which I am spending it. If I want to invest in an expensive rapid charger to give somebody much faster charging, I have to argue that out very strongly.

Dr Berkeley: It is exactly the same with the CABLED projects funded through TSB. We have been under very regular scrutiny and audit procedures, which I think was quite welcome as well.

Professor Folkson: As we have said several times, we have to get the infrastructure there to encourage the consumers to buy. It is hard to make the consumers buy when these are expensive products. What we have been saying is that with the subsidy, which is probably the greater proportion of

Government money rather than the Plugged-In Places money, there is more money being spent on subsidising vehicle purchases from my understanding than the infrastructure. That is not encouraging sufficient consumers to buy the cars yet.

Dr Berkeley: Compared to other countries, what we are actually spending in the UK is comparatively small.

Q54 Steve Baker: Are there any lessons that the UK could learn from other countries where the uptake of plug-in electric vehicles has been higher?

Dr Berkeley: There are a couple of examples that I would highlight. The French use what is called a "feebate" scheme, where they offer purchase incentives to low carbon vehicles. If you are buying one that has lower emissions, you get what they call a bonus, so you get money or a grant of up to €5,000. Once you register a higher polluting vehicle, you are penalised and you have to pay more on registration. That is a kind of carrot and stick approach, which they found was quite successful in France.

Interestingly, in Norway, where the take-up of EVs, particularly in Oslo, has been tremendous—they have sold something like 1,000 Nissan Leafs in Oslo—they do not offer the incentives but do it in a different way by offering free parking, free electricity and a lot of tax incentives as a package rather than looking for incentives at purchase. There are different ways of doing it.

The US example with tax rebates is against the weight of the battery rather than the emissions of the vehicle.

Q55 Steve Baker: Are there any developing countries who can offer us lessons in relation to decarbonisation of transport?

Professor Folkson: I can think of a couple of examples. These are very long-term issues that need continuous Government collaboration with manufacturers. If you look at Brazil and Sweden, they have had very long-term biofuel policies. Something like 80% of vehicles in Brazil are now powered by bioethanol made from sugar cane. That is partly because of their industry but you could argue that is a developing nation, now emerged, I would say. That was a very long-term policy that stimulated a whole industry as a collaboration between the Government incentivising the biofuel and the vehicle manufacturers making biofuel cars.

Q56 Chair: Is there any one change you would like the Government to make in its current strategy?

Professor Folkson: Don't keep changing direction, I would say.

Dr Berkeley: Focus more on stimulating demand through better public awareness. To come back to the point that has been made in the last few minutes, they should build on the money that has been spent to highlight what has been achieved, big up the possibilities of electric vehicles and educate the public.

Dr Bevis: Again, I would say working on the incentives and paying to develop public awareness. One of your points is that perhaps we have spent more money on infrastructure than we needed to, but in fact

12 June 2012 Dr Keith Bevis, Professor Richard Folkson and Dr Nigel Berkeley

the Government grant is structured in such a way that the money we have to spend is on infrastructure. We are not paid to do the other nice things such as engaging with the public. We are paid to build the

infrastructure. Providing freedom in that spend to do these other things would help, yes.

Chair: Thank you very much for coming and answering our questions this morning.

Examination of Witnesses

Witnesses: **Paul Everitt**, Chief Executive, The Society of Motor Manufacturers and Traders Limited, **Ian Allen**, Manager of Environmental Strategy, General Motors, and **R Graham Smith OBE**, Managing Director, Toyota Motor Europe, gave evidence.

Q57 Chair: Good morning and welcome to the Transport Select Committee. I would ask each of you to give your name and organisation. This is to help our records.

Ian Allen: I am Ian Allen and I work for Vauxhall.

Paul Everitt: I am Paul Everitt. I am the Chief Executive of the Society of Motor Manufacturers and Traders.

Graham Smith: I am Graham Smith, representing Toyota.

Q58 Chair: Thank you very much. Do you believe that we will see tens of thousands of plug-in vehicles on the roads by 2015? That is the Government's expectation. Do you think it is going to happen?

Paul Everitt: We are always wary of making forecasts in an area that is so new and developing. We will see progressively more vehicles on the roads. I do not know if it would be helpful, but I feel, having listened a little to your earlier session, that a bit of context might help the discussion along.

We need to remember that there is a regulatory framework within which the auto industry is working, particularly in Europe but also in major markets around the world—in the Americas, Japan, China and elsewhere. All those regulatory regimes have a downward pressure on CO₂ emissions. There is a great deal of convergence of those regulatory regimes, all of which means that low and ultra-low-carbon vehicles are going to be required in increasing numbers over the course of the next two to three decades. It is important that we understand that regulatory requirement. This is not solely a question of commercial choices or even consumer pressure. This is regulatory requirements effectively being set at a global level that are guiding the products that we, as an industry, need to put on to the market.

Similarly, and this is one of the big differences between your role in terms of parliamentary oversight and ours as industry, we are taking a very long-term view here. We look at the regulatory trends. We have to make a decision or are being required to make decisions about what sorts of products and what kind of technology will be commercially viable over the course of the next 10, 20 or 30 years. It is that background that leads us to believe that the course the Government have embraced is an appropriate one.

I would also like to say that for us, yes, this is a very strong regulatory requirement. People take a different view or a variety of views, but it is also a highly important environmental requirement and aspiration. For us in the UK, it is an absolutely essential industrial opportunity. We need to reflect on all three

elements in deciding whether the Government have got it right or not.

Q59 Chair: What are the barriers to making more progress?

Graham Smith: Let me lead off from our side. I would emphasise the point made in the previous session that there are a range of technologies that incorporate electric propulsion. They include hybrid vehicles, plug-in hybrid vehicles, range extender hybrid vehicles and fuel cell hybrid vehicles, all mentioned in the previous session. The two auto companies represented here are active across those ranges of technology. We expect to bring all of them to market in the near to medium term. We can talk in more detail about that. There is a direction that is incorporating electric propulsion.

In terms of the market size, just to give an indication on a global basis, we have now sold more than 4 million hybrid vehicles. That gives you some sense of the size and scale. Although it is not something that we particularly emphasise, for the sake of giving context, the Toyota Prius, a hybrid vehicle, was the world's best selling car in the first three months of this year. That will give you a sense of the rate of adoption and the developing nature of a market for vehicles with electric propulsion. That market is developing further.

We have already seen the launch of the Vauxhall Ampera; I am sure that will be touched on. Our plug-in Prius, which is today's Prius that can be externally charged and used as an electric vehicle, will occur here in the UK anyway in the next few weeks. The market is developing and growing, but it is very important that we recognise the range of electric technologies that are already deployed and will increasingly be deployed.

Ian Allen: I agree with those points. As was previously mentioned—this is a bit of a “poor me” speech—we invest billions of dollars and billions of yen in the development of all of these vehicles. One of the biggest barriers to entry is the cost of the cars because of the very technical nature of the vehicles themselves. As Graham said, it is the whole range of differing technologies. The Toyota might pave the way for us all in terms of making electric vehicles or alternative propulsion generally accepted. With electric vehicles, we are in our early days of that. Going back to your first question as to whether there will be tens of thousands of vehicles on the road, we have had decades of experience of forecasting what is going to happen on a monthly, weekly or almost daily basis with combustion engines. From our point of

view, we have been on the market for six weeks, so we are still learning.

Q60 Kwasi Kwarteng: I want to ask a question with regard to the expanding market. You said that you had sold 4 million as of now, going back. I want to know where in particular your growing markets are. Can you shed any light on where demand for this product is growing strongest and also what are the reasons in those places where it is growing very strongly?

Graham Smith: As a percentage of our total sales, one of the strongest markets is actually here in the UK. We have a major market in hybrid vehicles in north America, China, Japan and the majority of Asian markets. You don't achieve the number one world's best selling car without selling very much on a global basis. I would not particularly want to differentiate between the markets. We sell in 170 markets worldwide and there are not so many where the Prius is not available, as an example. It is only one of our hybrid technologies. Almost our entire Lexus range, with the exception of one model range, incorporates hybrid technology as well.

Q61 Kwasi Kwarteng: On that point, do you see any regional variation in terms of Government support, subsidies and policy driving this demand or is it just the same wherever you go and Governments are treating it in the same way?

Graham Smith: Paul has provided the context in terms of regulation. It is increasingly difficult to achieve the projected emissions limit values without incorporating electric drive, hybrid technology and so on. The direction is the same in all markets. Again, Paul has made the point that the regulations are to some extent coming together.

Q62 Kwasi Kwarteng: Forgive me, but you are speaking in very general terms about the regulatory environment. Surely there is a difference between the sorts of policies they have in Singapore, for instance, and the kinds of incentives we are giving in Europe. I want to get some more colour on that. We can talk here for the rest of the day about generalities and the environment, but I would like some more specific detail.

Graham Smith: There are a range of incentives around Europe in France, Germany, the Netherlands, Portugal and so on. It is typically between €5,000 and €7,000 in terms of purchase incentive. Tax structures tend to emphasise things. We have heard comment in the previous session about the "feebate" system in France. There are various fiscal structures that tend to favour low-carbon technologies. They do vary, both in terms of the structure and the amounts of money. There are public procurement programmes in the majority of the locations that you have mentioned, both in the west and in Asia. Governments are leading with their own procurement. This tends to be typical as well.

Q63 Kwasi Kwarteng: In terms of what we are doing in the UK, how does that compare with some of these other jurisdictions—these other countries? Is there more that we could be doing?

Graham Smith: I would say it is towards the leading edge in terms of the range of purchase incentives and fiscal arrangements. Exemption from the London congestion charge is an example. There are other incentives in place. It would be difficult to characterise the UK as anything other than in the leading group, although not necessarily in pole position.

Q64 Paul Maynard: Mr Everitt, you pointed out the global regulatory framework under which you are working, which is undoubtedly true. Would you agree, though, that the point you are making is that a lot of what you are trying to achieve is not within your gift to deliver? You can't be held responsible for the life-cycle carbon footprint of the cars you produce. You can't guarantee that the electricity powering the batteries in the cars is coming from a renewable source, for example. You are at the mercy of national Government energy policies.

If we in this country are not promoting renewables fast enough, are not embracing nuclear or suddenly decide to use more coal, then that in effect has more impact on you meeting regulatory requirements for reducing the overall carbon footprint than any number of million pounds here or there that you use to bung at a Plugged-In charging infrastructure.

Paul Everitt: There are two aspects to what you have asked. In the medium term, between now and 2020, the regulatory regime in Europe is solely levelled effectively on the vehicle manufacturer. It is our ability to deliver the technology to the market and get the market to take it up; the onus is on us. That is something which we cannot do very much about. That is our entire responsibility, rather, so we have to do something about that.

Beyond 2020, where the targets we expect to see both in Europe and elsewhere are beyond the limit that the technology alone can deliver, we are into a position where, unless we have a decarbonised grid and an infrastructure, whether for electric charging or hydrogen, that is available and available for the mass, we are unlikely to be able to deliver all of the expectations. Clearly, post-2020, it becomes a much more complex world where we need to see greater interaction between the vehicle industry, Government, energy generators and also infrastructure providers. I can characterise it by saying there is a shorter-term window and a longer-term challenge.

Q65 Paul Maynard: Indeed; it makes sense. There has also been great discussion among all three of you, citing international examples, of ownership figures in different countries. Looking at all of your evidence taken together and all of the different statistics quoted, I fail to see any correlation between the amount of public money spent on encouraging ownership and/or investing in charging infrastructure and the overall rate of ownership other than in Norway. That seems to be the one isolated example where there has been a difference. Is it not the case that, if the Government had spent no money at all on Plugged-In Places, there would still have been enough private sector investment to generate a charging infrastructure where the electric cars required that charging infrastructure?

12 June 2012 Paul Everitt, Ian Allen and R Graham Smith OBE

Paul Everitt: No. The Government's role has been absolutely essential in catalysing market development in the UK. In my view, it is a classic example of the role Governments can and should play in the early stages of market development. As you heard a bit earlier, they have helped to de-risk the infrastructure and the development of the infrastructure because a lot of the lessons have been learned. Government were prepared through the Plugged-In Places process to go through the sometimes difficult mechanisms of getting infrastructure put in on the ground and understanding through the demonstration projects how consumers have responded to that infrastructure. If we had gone back three or four years, the argument would have been that we need to see a mass of public infrastructure to try and support the roll-out of electric vehicles.

The process of developing the Plugged-In Places and the demonstration projects that went alongside that has demonstrated that the balance is different and that the majority of people are going to be looking for home charging or at-work charging. The level of public infrastructure needs to be high enough to give reassurance but does not need to be ubiquitous. That is part of the learning process. Had we not done that—and for me this is an industrial as well as an environmental issue—without Government's clear involvement and the signal that they sent, many of the investments that have come to the UK over the course of the last two or three years would have been less likely to have come here.

Q66 Paul Maynard: I want to try to counter that. Looking specifically at charging infrastructure, we have the eight regions. If we take London as an example where the bulk of electric vehicles have been registered, we have Source London providing a network of publicly available charging points. Yet we also have a large number of boroughs providing a parallel service and a large number of private operators providing a parallel service in car parks—NCP in particular. I struggle to comprehend what you are trying to say, which is that, without Source London providing a publicly accessible infrastructure network that people don't want because they want home charging, the private sector would not have stepped in to provide the home charging infrastructure that people do want.

Paul Everitt: My argument is that, without the catalysing impact of Government involvement in promoting and providing the seed corn for infrastructure development, the private sector companies, who are now looking to enter the marketplace, would not have done so because they would not have had the confidence to do so. Without the public involvement, we would not see a market beginning to develop. We would see no market and therefore the case for making private sector investments into some of the infrastructure provision would not have been made.

Q67 Paul Maynard: Just for clarity, do you regard the entire £30 million as seed corn funding or would part of that be seed corn and the rest not? Does the seed corn funding have to be the entire £30 million?

Paul Everitt: I do not know exactly how much of that has been spent yet. It is over a period of time. I think it is quite difficult. My view is that certainly a significant proportion of that was absolutely necessary expenditure. What we are seeing through the process over the course of the last 18 months or two years is a development and a refinement of the Government's infrastructure strategy, which is putting much more emphasis on the private sector and allowing the private sector to enter the marketplace. It is easy to be wise after the event. If Government had not made the move and had not had the catalysing impact, then we would not be sitting here with a nascent market and with investment flowing to the UK because the UK is seen to be a leading market for low and ultra-low-carbon vehicles.

Ian Allen: In terms of the infrastructure of the network itself, we do a lot of events and go out and talk to the public. One of the first questions that they ask us when they come on to our stand to talk about our car is, "Where am I going to charge it? There is nowhere to charge it." Those are mostly people in outlying areas rather than necessarily those people in the Plugged-In Places areas, who would probably potentially focus on the fact that it is a bit too expensive for them. Until we can talk to them about where they charge it and how they charge it—and, as Paul said, home charging is the basis for that—it is very difficult. The flow of information is very important, but it is also seeing posts out there, and cars being charged at posts out there, that provides that reassurance for people to make a leap of faith into an electric vehicle.

Q68 Paul Maynard: Why can't you just supply charging points at all your Vauxhall dealerships?

Ian Allen: We do.

Paul Maynard: So the private sector does it.

Q69 Chair: Mr Everitt, you said that investment had come here partly because of the Government's investment in this area. What would the alternative places be?

Paul Everitt: Across Europe? It depends where you are looking, but there is a range. We are in permanent competition with other places around Europe for automotive investment.

Graham Smith: I will give a small example. We have nine plants in Europe. We chose the UK to introduce our hybrid technology partly because of the positive overall total environment towards low-carbon and low-emission vehicles here in the UK. We could have made other choices.

Q70 Chair: Where else might you have gone?

Graham Smith: We have vehicle assembly plants in France and Turkey, as an example, but the UK was chosen. Our hybrid model here in Europe is the Auris vehicle, which is also built in Turkey.

Paul Everitt: There are two examples with which I am sure you will be familiar. Nissan have made a significant commitment to the UK in terms of a battery plant and the production of the Leaf. They have other direct plants in Spain, but through the Renault Alliance they have many around France and

other places. You will not be aware of this, but this morning BMW have announced that they will be building their conventional engine at their Hams Hall plant for their hybrid i8 product. One of the reasons why they are committing that engine development to the UK is that we are seen to be a market for new and evolving technologies.

Q71 Mr Leech: What do you estimate as the benefit to the British economy from the positive mood and steps taken by the Government in terms of investment in the British car industry here?

Paul Everitt: The total investment over the course of the last 18 months is around £5.6 billion. Over the course of the next two to three years there will be 15,000 new jobs, tens of thousands of existing jobs safeguarded and a huge opportunity down and through the supply chain in the UK to create a genuine centre of excellence around Europe for low and emerging ultra-low-carbon technologies. That will give us the opportunity not only to rebalance our economy but develop a product that we can sell around the world. The market for low-carbon vehicles is expanding at a huge rate. From a UK perspective, we absolutely need to be winning our share of that market.

Q72 Mr Leech: Without the commitment from the Government, what proportion of that investment do you think would have gone elsewhere?

Paul Everitt: It is very difficult to say it is a black and white decision. Clearly some of it would have come to the UK irrespective because that is the home for a number of products, but I think there would not have been the same enthusiasm. A significant proportion of the investment that we have seen has come from the very strong relationship that exists between Government and industry and the willingness of Government—both previous and current—to listen to the priorities that industry has and to respond positively to them.

Q73 Steve Baker: Mr Everitt, you have been pretty clear that Governments—plural—have managed to direct the car industry into making long-term decisions to produce a particular kind of vehicle.

Paul Everitt: I would not see it that way. I would say that we have had a positive conversation with Government where they have responded to the challenges and trends that we face and have tried to provide an environment in the UK best suited to our needs.

Q74 Steve Baker: You have confused me slightly now because I thought you had explained how the Government regulatory environment had caused you to produce a kind of vehicle that, in the previous session, we had heard tell that the public did not want.

Paul Everitt: No. Where I started from was that the regulatory requirements are not produced by the UK Government. They are produced at a European level in which we operate, but they are also reflected in, and there is convergence with, similar regulation emerging in the Americas, Asia and particularly in China. There is a convergence of the regulatory requirements. What the UK Government have done

is responded to industry's presentation of where the opportunities lie to create an environment in the UK that is best suited to us and allows us to invest with confidence.

Q75 Steve Baker: Given the overall trend of direction of the world in relation to this.

Paul Everitt: Exactly.

Q76 Steve Baker: We were talking earlier in terms of the size of the markets. Mr Smith, you said you had sold 4 million Priuses. How does that compare to the total market for Toyota cars? How many Toyotas did you sell in the same period?

Graham Smith: The 4 million is for total hybrids, so that is across all our hybrid model ranges and we have an increasing range. It includes Toyota and Lexus, and it is cumulative. That just gives you a sense of the scale of the developing market.

Q77 Steve Baker: But what were the total sales in the same period?

Graham Smith: That I do not have, but in a given year let me give it to you in percentages. By 2013, if you take the UK first of all, we would expect between 20% and 30% of all of our sales to be hybrid and plug-in hybrid vehicles right across our model range. In Europe, in total, it is more likely to be towards 20% than 30%. The UK is one of the larger and more progressive leading markets in Europe.

Q78 Steve Baker: But yours, of course, is one of the world's great companies. It is very well known for the development of lean methodologies and all those things. You are obviously looking to the whole world. How do you think the British market compares in terms of its potential to you as Toyota globally—not Toyota UK? How does the UK compare to, say, Africa, India and China?

Graham Smith: Obviously the UK is a much larger market even than, let us say, South Africa, which is the single most developed market in Africa. I am not an expert on Africa, but the sizes of the market, whilst they are growing rapidly for new vehicles, are still relatively small. Within Europe, the UK is one of the big five markets. Germany, France, Italy, Spain and the UK are the five largest markets in Europe, not just for us but across all vehicle manufacturers. Therefore the UK is very important indeed.

Of our nine plants, we happen to have two of them here in the UK and so it makes it doubly important. We are trying to lead from a manufacturing point of view in low emission manufacturing, not least because we have our hybrid vehicle being built there.

Q79 Steve Baker: What I am driving at is that the UK is a country of about 60 million people, but across the world billions of people are emerging from poverty and will probably want to buy cars. It seems to me that many of those billions of people are living in countries that do not have this kind of environmental regulation. Is that a fair statement about Africa, India and China?

Graham Smith: Increasingly, all markets, not least because of Kyoto, Copenhagen and climate change

12 June 2012 Paul Everitt, Ian Allen and R Graham Smith OBE

targets—broadly, in all countries, even developing emerging markets—are putting in place emissions regulations. It is not just about CO₂. In many markets, air quality emissions—particulates, NO_x and so on—are more important than, or just as important as, CO₂.

Q80 Chair: In the last Budget, there were some changes in relation to incentives. Have they affected the purchases of any of your vehicles?

Ian Allen: Certainly from our perspective. In fact, Budget day was the first day of our media launch. We could not have had more perfect timing because a lot of the questions that we faced from the journalists at the end of their drive were about the announcements in the Budget with regard to a reduction in 2015 of the benefit-in-kind taxation allowances for business car drivers and also with the taking away of first year capital allowances for leased vehicles.

The business side of the industry is seen as a big area for us in terms of sales of electric vehicles because it gives real world credence to vehicles because people see them on the road. Companies are also inclined to lower the carbon footprint of their fleet. It is a good way for companies to lower their carbon footprint and be seen to be lowering their carbon footprint. That should not really be underestimated. For us, changes in terms of incentives do create instability in an already fragile, fledgling market.

Graham Smith: I can just add to that. So far, it has already been referenced that the number of vehicles purchased with the benefit of the plug-in car grant since it was first introduced is about 1,700. It is, let us all emphasise, a very small and clearly developing market. The consumer journey is a challenging one. It is a new technology and it requires external charging of vehicles. With our plug-in Prius hybrid and the Vauxhall Ampera, electric vehicles are already in the marketplace. We need to take the consumer to the point of externally charging the vehicle and then there are the other aspects of new technology.

There is the need for reliability to be demonstrated and proven. There are plenty of reasons why consumers might be cautious about a new technology. Therefore, anything that changes and destabilises the regime within which that purchase takes place—either the plugged-in car grant or the fiscal arrangements—even going forward, because they project their own situation forward, will affect particularly professional buyers making their judgments about what the situation will be in 2015, 2016 and 2017 when they will be incurring the costs of the vehicles that they purchase today. The changes and the reduction in the fiscal benefit—the attractiveness of that regime—were particularly negative from our point of view.

Q81 Julian Sturdy: It has been mentioned a number of times now that sales in the hybrid market are expanding at a huge rate. Do you envisage that over the next few years as a result of that expansion and also the potential competition that is going to come from car manufacturers we will see the cost of hybrid cars coming down?

Ian Allen: Taking the Prius and the Auris as two good examples, they are almost mature products in the marketplace today. They do not necessarily face the

barriers that the EVs and we as an extended range electric vehicle or even the plug-in Prius will face in terms of additional cost because it is a mature vehicle on the market. It is only through economies of scale that we will manage to get a true reduction in costs.

Q82 Julian Sturdy: But you do not think the expanding market you have talked about will bring those economies of scale.

Ian Allen: At the current rate, we could argue not.

Q83 Julian Sturdy: So it is not expanding as quickly as you thought, then.

Ian Allen: To be honest, in terms of a consistent approach to the market, as we have spoken about, that is the only way to get constant take-up in terms of electric vehicles.

Graham Smith: I want to make this point. Prius is our first hybrid vehicle. It was introduced in 1997. The consumer journey and the rate of adoption was almost flat. The numbers that were bought in those early days were very modest indeed. I have made the point about the success that has been generated over an extended period of three generations of the vehicle and of course our expanding hybrid range. We have to be realistic about our expectations for the market for electrically charged vehicles.

The other point to make is that we also happen to be the world's biggest manufacturer of batteries, electric motors and electric machines. That is partly because of the fact that every one of our hybrids—every one of those 4 million—has at least one battery, at least one electric motor, an inverter, control software and various other aspects of electric vehicle technology, all of which are required in one way or another in other forms of electric vehicles. Pure electric vehicles, plug-in hybrids and range extender hybrids incorporate many of the same technologies. Fuel cell vehicles, in turn, will also incorporate those technologies.

The journey that we are all taking forward and the development of the marketplace—the volumes rising—are bringing forward the lower prices, the lower costs and the commercial accessibility of electric vehicles, range extender vehicles and plug-in hybrids. It is not one technology or another. It is a range of technologies. They are related and we are moving all of them forward at the same time. The context within which that is happening on a global basis is really important. The arrangements that Governments put in place are fundamental to that journey continuing.

Q84 Paul Maynard: Just to be clear, you are talking about hybrid vehicles at the moment, which are very different to the 1,400 vehicles for which the Government are providing a subsidy. I entirely take Mr Everitt's point that the Government are creating a climate in which it is appealing to motor manufacturers to develop new technologies. What I am trying to draw down to is what it is the Government are doing that is making a difference and, indeed, what elements of the Government's policies are not having an impact on those investment decisions. Can you confirm for me that, if the

Government had not provided a subsidy that led to the purchase of 1,400 vehicles, or indeed the provision so far of the £30 million for the Plugged-In Places scheme, investment decisions might have been taken differently? How essential were they to the creation of this beneficial climate you have been describing?

Graham Smith: I want to make one point about what qualifies and what does not. The plugged-in car grant is available to a range of electric vehicles, to the Vauxhall Ampera range extender hybrid vehicle and to the plug-in Prius. In future months I am sure other vehicles will qualify as well. There is a range of vehicle technologies, including the externally charged vehicles, that qualify for the plugged-in car grant. It is not just electric vehicles; it is the range of technologies that we are talking about.

Q85 Paul Maynard: Of which we have 1,400 so far.

Graham Smith: I could also add two vehicles. Ours is launched in a few weeks. The Vauxhall Ampera has been on the market. They are not yet included. It is too early to make any judgment.

Q86 Paul Maynard: Indeed; but it is not 4 million.

Graham Smith: No.

Paul Everitt: The key point is that, first, Government listened and have produced as a consumer incentive something based not on a specific technology but on performance criteria. If you can meet the performance criteria, then you are open to the grant. Just to re-emphasise, it is not just EV or not EV; it is a range of technologies. They are all electrified to some degree and will increasingly be so. That is very much in tune with what industry was looking for because it allows a range of technologies to compete in the marketplace, the winner being that which the consumer likes the most.

I will confirm that the Government's approach around ultra-low-carbon vehicles is about investment and collaborative R and D with industry. It is about demonstration projects, not just cars but vans, trucks and buses. It is consumer incentives not just open to private buyers but cars, vans and trucks. It is open to the marketplace. It is part of the package that makes the UK an attractive venue and an attractive location for major global vehicle manufacturers.

Q87 Julian Sturdy: I want to come back to the question of the market for hybrids. Is there a concern over the resale value and the lifespan of hybrids? I know that is potentially changing as technology moves on. Is that something of a concern with the customer?

Paul Everitt: I want to clarify something. Are we talking about hybrids or the range of technologies that are out there?

Q88 Julian Sturdy: I want to talk about the current hybrids, from the Prius moving up, if I can.

Graham Smith: Let me comment. There is no issue with the residual value of the current Prius. We have gone through three generations. It goes back to 1997. It is well established in the marketplace. It has won the JD Power customer satisfaction award on a number of occasions. The reliability has been

demonstrated, and both professional and retail buyers buy them just like any other model in our range. The residual is comparable to the residuals on similar models that are not hybrid—of a normal car. There is no issue and there has not been for some time.

The other thing you should remember is that in today's hybrid the battery lasts the lifetime of the vehicle. With an electric vehicle, there are some question marks about the length of time the battery will last because it is being used in a completely different way. That is where a view will need to be taken about residual value.

Q89 Julian Sturdy: The point I am trying to get at is that there is quite a difference in the residual value of hybrids from the pure electric.

Graham Smith: It is early days.

Paul Everitt: The normal sales process is that a new vehicle comes on the market and will probably change ownership after three years, particularly if it comes from the business sector into the private sector. It may change hands again at six or seven years. That is part of developing a residual value. Most of the technologies we are currently putting on the market have not yet been on the market for three years. They have not gone through that cycle. At the same time, many of the people who comment on or set values for these products have no experience. We are at the very earliest stage of developing a market for this product. There are lots of concerns about the battery. After 10 years the battery will be good. It might not be optimum for automotive use, but, effectively, 80% of the performance of the battery will still be there after a decade. We are confident and we believe there will be a second life for much of those batteries in stationary uses, but clearly again we have not gone through a 10-year cycle for those batteries to be used in those environments. That is why we believe that this is a long journey we are embarked upon. It is right that we should start at this point, but the big commercial take-up is still some significant time away.

Q90 Chair: We are about to see the Minister. Is there any one issue you think the Minister should think about or any one change that should be made in existing policy?

Graham Smith: We would certainly encourage him to talk to the Chancellor about the announcement made in the Budget in relation to benefit in kind as it applies to zero and ultra-low-emission vehicles. There is an opportunity to reverse what is a fairly negative signal towards the auto sector in the UK were those changes to be reconsidered. There have been one or two Budget announcements that have been reconsidered. We would very much wish to see this added to the list.

Chair: You would like it to be added to the list.

Ian Allen: I would certainly agree with Graham on that particular point. Any positive or negative decisions and announcements have a positive or negative effect on the industry. The negative effect that the announcement in the Budget had could be reversed by a positive announcement that they are being reintroduced or that other incentives are coming in to take their place.

12 June 2012 Paul Everitt, Ian Allen and R Graham Smith OBE

Graham Smith: It is such a fledgling market. It is such early days in the marketplace. The volumes and the exposure to the Treasury are tiny at present. It just seems perverse that the opportunity was taken to make a change in the outlook for benefit in kind and indeed capital write-down allowance on cars at such an inauspicious moment in the development of the marketplace.

Ian Allen: I agree on that point again. It is a lot about the consumer, whether that is a private consumer, a business or a fleet consumer, in terms of confidence. It is confidence in the industry and confidence that the vehicle that they are going to buy is still going to work in three, five, eight or 10 years. We put an eight-year warranty on our battery for that very reason. People are concerned, "What's going to happen if my battery packs up? Am I going to have to spend

£10,000 on a new battery?" It is all about the confidence of the people. As I said before, we are expecting them to make this leap of faith into an electric vehicle and make a change.

Paul Everitt: I agree with both my colleagues on the shorter-term issues. The one issue that I think Government need to address is the longer-term one. In our industry we do have a technology roadmap. We know exactly the kinds of products we are going to be putting on to the market. Government should be taking a stronger role with the infrastructure and power generators to ensure that they, too, have a coherent roadmap to deliver the resilient and decarbonised grid we need post-2025.

Graham Smith: Which we also agree with.

Chair: Thank you very much for coming and answering our questions.

Examination of Witness

Witness: **Norman Baker MP**, Parliamentary Under-Secretary of State, Department for Transport, gave evidence.

Q91 Chair: Good morning, Minister. Welcome to the Transport Committee. Could you tell us by how much carbon emissions from road transport have been reduced since you took office?

Norman Baker: It is difficult to put a specific figure on the element in relation to low carbon vehicles because there is a whole range of levers that Government will pull at any one time to try to reduce carbon. We do have to reduce carbon because 21% of our carbon emissions are, of course, from transport and 92% of those from road transport. You have to take into account, for example, the investment in rail, the money from the Local Sustainable Transport Fund and the money that is being spent in this area. It is difficult to disaggregate it and put a specific figure on each one of those. We can measure across the economy as a whole.

Q92 Chair: But by how much have the emissions been reduced in relation to road transport?

Norman Baker: I cannot give you that specific figure in terms of your base year. I will happily come back to that if you want to.³

Q93 Chair: Perhaps you could give us a figure on that. Do you feel confident that the UK is on course to see tens of thousands of plug-in vehicles on the roads by 2015?

Norman Baker: Yes, I think so. What we are seeing, first of all, is a strong commitment from Government. Secondly, there is an increasing understanding from local councils that this is the way forward and that they have their role to play. Thirdly, it is very encouraging that the private sector is now investing in the vehicles themselves and, also, increasingly, it understands the opportunities to invest in the charging arrangements out there on the street, in private car parks and so on. So I think we will see that. There is a necessity, as I have explained, to reduce our carbon

emissions significantly. That is an agenda shared by all three parties, and that is going to give a consistency to Government policy in the next couple of decades.

Q94 Chair: Are there any plans to look again at Government strategy on how to achieve all of this?

Norman Baker: We launched the strategy "Making the Connection" in June 2011. It is only a year old. That is not to say that we are complacent about that because this is an ever-changing picture and we will be reviewing how far we have got later on this year to see whether or not we should make any changes.

Q95 Chair: Are electric motorbikes going to be included?

Norman Baker: We are open to any suggestion as to how we might secure reductions in carbon from motor vehicles. We have obviously looked at cars. We have brought in the plug-in van grant to pick up on those. Mike Penning has been taking forward this trial on HGVs. We have increased the money for the Green Bus Fund. We are very happy to look at any aspect of road transport where carbon emissions are involved to see whether we might be able to help or not.

Q96 Paul Maynard: I would like to look at the Plugged-In Places scheme that you have been operating and overseeing, which I gather has had £30 million invested in it. We have been listening to our witnesses, who have had mixed reports on what has been occurring. There are 1,400 electric vehicles and £30 million spent on a national infrastructure. Some have suggested it was a case of chicken and egg, which may be true, but others have described it as something of a learning curve. Do you see it as a learning curve? If so, is it a worthwhile learning curve?

Norman Baker: I would not use the words "learning curve". First of all, £30 million is a budget that has not yet been spent. That has not been fully committed yet. Of course this is a brand new area, and the

³ See Ev 65

arrangements that were set up with the Plugged-In Places quite deliberately gave some local flexibility in order to test out what might work and what does not work. We are all learning now with a brand new technology.

What has been very encouraging for me about the lead given by Government is that it has, at an earlier stage than we might have anticipated, attracted support from the private sector. We are now seeing a big commitment to charge points across the country from the private sector at an earlier stage than we would have thought. In a sense that has obviated a need for us to continue to push forward as far as might have been thought with the public Plugged-In Places. We are still committed, of course, to the eight Plugged-In Places areas. They are still progressing, and some are progressing faster than others because of the local flexibility that I have mentioned to you. We now have 6,000 charge points in the UK. Most of them are provided by the private sector. That is a very good achievement.

Q97 Paul Maynard: Are you monitoring the usage of the drive points?

Norman Baker: Yes. The Plugged-In Places areas have to keep in close contact with OLEV—the Office for Low Emission Vehicles. There is a joint arrangement set up between ourselves, the DfT, BIS and DECC. There are regular monthly checks on what is happening in terms of the individual Plugged-In Places. Yes, we do monitor that quite closely. We are doing further monitoring on a data basis later this year to establish the uses of individual charge points and so on to see what the usage is and what lessons can be learned from this. I would not say we are on a learning curve, but we are certainly in the initial stages. We have to recognise that, as we gain data and information from the usage, that will help and form future policy direction.

Q98 Paul Maynard: As our witness from the east of England made clear, in his view it was a learning curve. They have discovered, for example, that more people want home charging than public charging locations.

Norman Baker: Yes.

Q99 Paul Maynard: Do you not think it might have been better to have tried to establish some of these fairly fundamental issues before we embarked on the project, rather than spending the money to learn what was happening?

Norman Baker: I do not think it was possible to find out exactly what was happening until we tried it. There is only so much you can do on paper on a theoretical basis. How the public will react to a particular technology is difficult to predict, as lots of manufacturers in different industries will tell you.

Q100 Paul Maynard: It does strike me, though, as common sense that most people, if it is going to take six to eight hours to charge their electric vehicle, would rather do it overnight at home than go and leave their car at a public charging point.

Norman Baker: Not necessarily. It may be that there is a public charging point quite close to where they live and it is convenient for them to charge it on the street. That is one option. It may also be the case that, if we move towards the installation in some areas of fast chargers, then we have a different scenario. With a fast charger that gives you a charge within 20 or 30 minutes, that would be eminently suitable for a supermarket car park, for example. It may be that a long charge is appropriate if you have a public charge point near a railway station. You could park your car, go off to work and charge it for six to eight hours while you are away. There are all sorts of different ways in which people want to use charge points. It is that which we are learning from the experiences of the HR's Plugged-In Places and indeed from the private sector's investment.

Q101 Paul Maynard: Finally, how long did it take to agree on a standard connector plug?

Norman Baker: That is a very important question, and way beyond just the UK. The issue here is to try and get some standardisation across the world. I worry about this, because if you look at mobile phones we have a situation where everybody seems to have a different phone connection to plug in, and in my view that has not been a great success in terms of standardisation. We have to try to settle on something that is efficient and safe to use and that is standard as far as possible.

We have discussions going on within the European Union on that matter through the arrangements that are put in place between business and various member states. The first stage is to get to a standardisation within Europe if we can. We think the type 2 connector is the appropriate one to go for. I am more hopeful than not that we will get there in the European Union. The trouble is, of course, that that does not in any way link up with what the Japanese are doing or anyone else in their own home territories. That is an important issue. We are on the case with that, but there is only so much the UK or even the EU can do to get international agreement on that matter.

Q102 Mr Leech: You said that there is ongoing monitoring of the Government's scheme. Is there any individual monitoring of who is actually buying these vehicles and the impact of changing from their previous car or maybe even changing from public transport to their new electric vehicle? Will there be an assessment on the actual carbon and pollution reductions as a result of the scheme?

Norman Baker: Yes. The monitoring I was talking about a moment ago, just to be clear, was of the Plugged-In Places and the effect of the Government investment into that—that is the charge point arrangements. To be clear, you are mentioning now a second element of Government support, which is the element provided by way of subsidy for the purchase of a new car or indeed a new van. Obviously, the first thing we monitor is the sales. The sales of low carbon vehicles—cars and vans—are increasing. The penetration of sales in the UK as a percentage is roughly in line with other European countries. So we are on the same trajectory there. It is increasing, and

12 June 2012 Norman Baker MP

the first couple of months of this year have in fact shown a marked increase. That is on a trajectory on the way up. We monitor that first of all and we are quite satisfied with that. If you start with a new product, then inevitably the graph starts off in a reasonably flat line and then goes up quite steeply.

If you take the Toyota hybrid—I do not know if that was mentioned by Graham Smith here today—it took nine years for the first million to sell and then the second million was sold in a further two years. That is the sort of graph you see with sales. That is the first monitoring we do.

Of course we also make a calculation in terms of carbon. That is very important. The whole drive towards electric or low carbon vehicles is driven by the environmental necessity to deal with carbon. There is obviously a huge saving in carbon from an electric vehicle. Even with a traditional power source and even using the existing grid system, you can probably save 40% of carbon from an electric vehicle. Once you have DECC's strategy to move towards renewable and low carbon energy sources, then you can increase that still further. We quantify the carbon that is saved from the change in the mix of the cars on the road.

Q103 Mr Leech: But are we actually monitoring people's change in behaviour? Mrs Smith sells her BMW and replaces it with an electric vehicle, or is Mrs Smith a former non-driver, who is then buying an electric vehicle because she is quite happy to drive a non-polluting vehicle but was not happy to drive a polluting vehicle? Is that sort of monitoring being done so that we can see the actual impact of each individual vehicle upon pollution and carbon emissions?

Norman Baker: No; we have not done any monitoring of individual purchases, but we would expect the motor manufacturers to do that. It is in their interest to sell more vehicles and it is in their interest therefore to understand who is buying them, who is likely to buy them and where they should aim their market. That is a job for the motor manufacturers rather than the Government.

Q104 Mr Leech: But without that monitoring we will not be able to tell exactly the impact on carbon emissions or pollution.

Norman Baker: We can tell by the penetration of vehicles in the market and by the emissions from each vehicle as to what is likely to occur. I grant that we do not necessarily know the mileage of each vehicle, but, short of having a questionnaire for every individual purchaser of a vehicle, it is difficult to see how we could get that. Everybody's behaviour will be different. We are assuming, or at least I am assuming, that the majority of electric vehicle journeys will be relatively short in mileage terms because they lend themselves to those sorts of short journeys better than they do the long journeys. Some 98% of journeys by car are 50 miles or less and, therefore, with the average electric vehicle being able to do 100 miles without having to be recharged, it is perfectly possible to undertake a return journey for most people with one charge.

I suspect that part of the pattern will be that initially, at least, there will be two cars in a household, one of which will be standard technology and one of which might be an electric vehicle for running around town. That is what I imagine might happen in many households.

Q105 Mr Leech: Given the relatively low take-up of vehicles at the moment, there has been some scepticism about whether or not it has been money well spent as far as the Government are concerned. Our previous witnesses suggested that, as a result of the Government's commitment to the scheme, there has been significant additional investment within the industry in general. What has been the impact of giving investment and some incentive to industry to invest? What was the reasoning behind the Government's scheme in the first place? Was it about giving the industry some confidence or was it about trying to persuade individuals to buy vehicles?

Norman Baker: The reason for it ultimately is about carbon. That is the problem we were trying to address. Happily, I always believe it is possible to use a particular policy to achieve more than one end. Just as the local transport fund that I am responsible for has the catchphrase "Creating Growth, Cutting Carbon", so I think it is possible to see the investment of low carbon vehicles in the same way. Investing to help the environment and investing to help the economy are not opposites; they are two sides of the same coin.

Happily, what has happened—and I think the Government's policy has been effective in this area—has been that we have given out a clear steer of the direction of travel over a long period of time, which is what we have done. This is where we want to get to with electric vehicles, this is our aim for decarbonisation of road transport and these are the measures we are putting in place. There is the Plugged-In car grant, the Plugged-In van grant, the money for R & D and OLEV being set up specifically for that purpose. There are other steps we are taking, for example, to make sure that there is no VED paid on cars less than 100 gm. The suite of measures gives the industry confidence that we are serious about this direction of travel.

Part of the consequence of that has been to say to motor manufacturers, "This is a good place to invest in this country because we are ahead of the curve compared to many other countries." We are seeing the Nissan plant in Sunderland with jobs being created there. We are seeing the lithium battery plant up in the north-east. We are seeing investment from Toyota in Derby. This is very good for industry. We are seeing a win-win.

Q106 Mr Leech: Finally, has any assessment been made by the Department on what investment would not have taken place that has subsequently taken place since the decision was made by Government?

Norman Baker: That would be a rather odd bit of research to do. I am not sure it would be money well spent to try to analyse that.

Q107 Mr Leech: Has any estimate been made of the positive impacts of that investment decision?

Norman Baker: It is not always possible to say that action A leads to result B. What I am saying to you is that we have investment from motor manufacturers who are now coming to the UK to build the vehicles of the future. I think, because of the environment that we have created in Government to say, "This is what we believe we are doing, this is where we are going and you are welcome here", that has been successful.

Q108 Steve Baker: The point that it has been successful was very much echoed by the motor industry before you. They certainly said that. Before then, we heard that consumer demand is lagging behind the actions that have been stimulated by the regulatory environment and the vehicles that are being produced by the industry. Have you conducted any economic analysis to understand what might be the economic implications of driving scarce capital into particular uses that do not reflect the revealed preferences of consumers?

Norman Baker: You say "the revealed preferences of consumers", but we always thought that there would be a slow take-up. There is nothing surprising about that. I am entirely relaxed about the number of cars that have been sold. It is entirely in line with where we thought it was going to be. I know one or two of our newspapers like to present it as the Armageddon of the Department for Transport, or whatever they present it as, but it is entirely in line with what we thought it was going to be.

Any time you produce a new product, the price is higher to start with because that is what always happens. Then the price comes down as mass market penetration occurs. Secondly, you have people who are naturally tied to what they already have and do not see the need to change to something else. Therefore they want to see what is going to happen until it becomes mainstream. There is nothing unusual at all about the trajectory of sales.

I used to be in the music business. I remember when CDs first occurred. The sales of CDs in the first two or three years were minimal because people still wanted to buy LPs. The music business was quite clear that this was going to be a product of the future and invested accordingly. You will always see the investment running ahead of the consumer, but that is the same with any industry and any new product.

Steve Baker: I will probably leave this because I am in danger of going off into economics.

Q109 Chair: Do you think the Government could do more to make people more aware of the importance of these purchases?

Norman Baker: The Government can always do more, but there is a balance to be struck between what we should do and what the private sector should do. Honestly, Chair, I think we have the balance about right. I really do think we have got it right. We have the right incentives to encourage people to buy the vehicles. We have the right investment in the Plugged-In Places, which is now unlocking significant private sector investment to follow on behind.

The purpose of the first one of those investments is to deal with the point that I just made to Mr Baker, which is that you recognise that the costs will be higher to start with until you get the mass penetration that brings your costs down. The investment there is sensible and pitched at the right level. The investment in Plugged-In Places has been useful to give a clear steer and a commitment, which has then led to private sector penetration following on from that. The R & D gives the industry confidence, and that is at about the right level. The tax incentives that are there from the Treasury are by and large right. We are on track. I am really quite happy with where the Government are on this.

Q110 Chair: You say the tax incentives are by and large right. We have heard representations from the industry about the changes made in the Budget in relation to incentives. Are you having any rethink about those?

Norman Baker: I should say, first of all, that matters in the Budget are not a matter for me; they are a matter for the Chancellor, in that time-worn phrase.

Q111 Chair: But are you making any representations to those who are responsible?

Norman Baker: Obviously, we are in touch with our colleagues at the Treasury and in other Departments on an ongoing basis. We do not operate in silos. I regularly talk to the Chief Secretary, for example, about issues which are transport-related. I had a conversation with him last week about some issues. Those conversations take place all the time.

What I would say is that, while I understand exactly why the motor industry was slightly worried about one particular small issue in the Budget, it is important to say that the general direction of travel from the Treasury has not been changed. The incentives are still there, for example, in the VED arrangements. The congestion charge arrangements in London are still exempt for low carbon vehicles and so on. All those existing arrangements are still there.

Q112 Chair: On the Plugged-In vehicle scheme, do you think the schemes need to be harmonised so that vehicle users in one area can use charge points in another?

Norman Baker: In answer to Mr Maynard earlier, I indicated that allowing different ways of progressing was a sensible first step, but I do think there is a need to ensure that we have a harmonised system in the regions. My ideal vision is where we have pay-as-you-go charge points, where you just turn up with a credit card, a mobile phone or something else and just pay at a charge point you happen to find. That is where we want to get to in the end.

Q113 Chair: Is that something that the Government are working on now?

Norman Baker: Yes, that is something we are working on. We are discussing it with industry and the private sector. We are obviously discussing it with Plugged-In Places.

12 June 2012 Norman Baker MP

Q114 Paul Maynard: I want to stick with Plugged-In Places because I know I am obsessed. You said in your earlier answers that not all of the £30 million had currently been spent. Are you able to provide the Committee with the figures on what has been spent so far and what remains in the pot?

Norman Baker: We are on target to spend £11 million by the end of 2012–13 from a budget of £30 million. That is good news. That means we have managed to achieve the uptake and the installation of charge points with the private sector without having to commit as much money as we might otherwise have done from the public sector.

Q115 Paul Maynard: Having brought that private sector involvement in, is it your expectation that the entire £30 million will not be required to be spent?

Norman Baker: Yes. I do not think it will be required to be spent.

Paul Maynard: Thank you; that has made my day.

Q116 Chair: On the issue of financial incentives and looking at it another way, have you considered having financial disincentives for high emitting vehicles?

Norman Baker: There are disincentives already of course, which the Treasury introduced some time ago in respect of banding road tax, for example, by the emissions from a vehicle. There are a number of local councils that arrange their parking permits by banding

of vehicles. Of course the biggest incentive of all is the cost of fuel. Generally speaking, the more carbon you emit, the more fuel you will use so you end up paying more for your fuel. There are already economic drivers in place as well as, if you like, moral drivers to try and encourage people to move towards cleaner vehicles.

Q117 Chair: Have you done anything on improving plug-in vehicle uptake in the public procurement of vehicles?

Norman Baker: In what sense?

Q118 Chair: To improve the purchase through public procurement in the Department or elsewhere in Government.

Norman Baker: We do take steps to encourage the public sector to invest in low carbon vehicles, if that is what you mean. In fact I wrote only this week to Royal Mail to clarify for them the flexibility they had with their vehicles. We are quite keen that Royal Mail do more than they have done so far. There was some uncertainty at Royal Mail as to what they could and could not do. I have written a letter to them this week to clarify that. We do encourage the public sector wherever we can to give a lead. We have to worry about state aid issues of course, so there are sometimes complications.

Chair: Minister, thank you very much for answering our questions.

Written evidence

Written evidence from the Motor Industry Observatory

Evidence submitted to the Transport Committee inquiry into Low Carbon Vehicles by Dr Jason Begley*, Dr Nigel Berkeley*, Dr David Jarvis*, Prof Tom Donnelly*, Prof David Bailey* and Bernard Porter.**

**Motor Industry Observatory (MIO) and the Applied Research Centre in Sustainable Regeneration (SURGE), Coventry University.*

***Department Mechanical & Automotive Engineering, Coventry University*

PREFACE

1. We welcome the opportunity to comment on the questions raised in by the Transport Committee in relation to Low Carbon Vehicles. The evidence is written by a team with considerable experience in relation to the Automotive Industry and the Low Carbon Vehicle Sector in the UK, but also internationally (Donnelly *et al*, 2010; Begley and Donnelly, 2011; Berkeley and Jarvis, 2012; Bailey *et al*, 2010, 2011).

2. As an integral part of SURGE, the functions of the Motor Industry Observatory are to observe, analyse, comment and publish on developments in the automotive industry in the UK and overseas in recent years, and to assess future potential developments. MIO focuses heavily on the assembly and components sectors in the UK and nearby Europe within a global context. Research has focussed on the merger and subsequent de-merger between BMW and Rover, the latter's subsequent sell sale to the Phoenix Group, the MG Rover Crisis of 2005 and on the sale of Jaguar and Land Rover to Tata of India. Finally, the MIO was invited to give evidence to the government enquiries into the collapse and impact of MG Rover. More recent work has analysed policies to promote low carbon automobility and the economic opportunities that may result (Berkeley and Jarvis, 2012), whilst MIO staff are part of a regional consortia running a public trial of ultra-low carbon vehicles in the West Midlands (CABLED).

3. In addressing the questions posed by the Transport Committee in relation to Low Carbon Vehicles (LCVs) our aim is to widen the debate on the promotion, adoption and acceptance of LCVs as an alternative, green transport solution key to the future development of the UK transport sector as it seeks to meet the dual challenges of reducing carbon emission and future proofing against the depletion of oil reserves. We believe the points raised in the following evidence will prove of practical use to the sponsoring ministries and aid them in clarifying their final proposals to Parliament.

Question 1: *The contribution of plug-in vehicles to decarbonising transport*

4. In recent years traditional cars based on Internal Combustion Engine (ICE) technology have been targeted as major contributors to global warming and accelerators of climate change and, through urban congestion in particular, as a key cause of respiratory illness (Stern, 2007; King, 2008). In the longer term, the issue of declining oil resources mean the automotive sector has begun to develop LCVs as a potential replacement technology for the future.

5. A range of viable alternatively fuelled technologies have been pursued that have been central to the development of LCVs. These can be largely classified under three categories; bio-fuels (using ICE technology but environmentally friendly fuel), electrically powered vehicles (including battery, plug-in and hybrids) and finally hydrogen-powered vehicles. Additionally it should be noted that technological improvements in ICE technology has resulted in a reduction in CO₂ emission from new vehicles using fossil fuels as a power source. While this has been positive in terms of emissions reduction it has also served to offer greater competition to LCVs in the market, as these advances place newer ICE vehicles in the same emissions category as some of the higher CO₂ emitting LCVs (SMMT, 2011).

6. In terms of the adoption of a LCV standard, to date a consensus has yet to emerge on which technology to favour. The use of bio-fuels has proven popular in South American countries where sugar cane in particular has provided a useful base for these bio-fuels. However, in North America and Western Europe (including the UK) the focus has been on Electric Vehicles (EVs) in their various guises. Full electric vehicles offer the best return in terms of emissions while hybrids offer a convenient bridge between ICE and LCV technology, with better performance (in terms of range and power) at the expense of higher emissions. Ultimately hydrogen is seen to be the long-term future of LCVs.

7. EVs and in particular plug-in technology offers a number of advantages that help explain the decision to focus on their use in Western Europe and the UK. Hydrogen is still considered to be many years away from mass-market penetration in terms of volume-produced technology, with the best estimates placing hydrogen technology as not being ready until approximately 2050 (NAIGT, 2009). Bio-fuel technology is dependent on switching vast swathes of agricultural land to producing the ingredients for ethanol production. This process would occur at the cost of rising food prices (as demand for arable land for planting rose) and could, if demand for bio-fuel rose high enough, make the UK vulnerable to fuel import dependency.

8. In contrast plug-in EVs and hybrids would operate off existing power supplied by the grid and in tandem with growing renewable energy exploitation would see a more controlled movement towards cleaner technology with fewer repercussions in terms of strategic resources like food and imported fuel. In terms of infrastructure plug-in EVs and hybrids are comparatively cheaper than battery replacement (which would require significant roll-out of charging stations compared to the ready availability of access the national grid) and offer consumers a much easier entry point to LCV motoring.

9. The real value then of plug-in EVs and hybrids as a technology to UK consumers is in its role as a vanguard technology, encouraging consumers to adopt green technology solutions to personal transport with accessible vehicles that act as an intermediate to the later proliferation of hydrogen transport. Plug-in EVs and hybrids act as educators for the public, demonstrating the need to consider new forms of personal transportation that are environmentally sound and future technology proof.

10. From a business perspective the technological advances utilised in plug-in EVs and hybrids are also applicable to hydrogen vehicles and represent an important R&D stage for automotive manufacturers looking for entry into the LCV sector. The technology associated with plug-in EVs and hybrids is not constrained in terms of supply and entry into the LCV market via plug-in EVs and hybrids is relatively straight forward process. These vehicles also represent a significant potential market opportunity with a target of 1.7 million plug-in electric vehicles on the roads by 2020 as encouraged by the Committee on Climate Change (RAC, 2011).

Recommendation: There are a number of technologies currently being pursued that can be classified as LCV technology. However, plug-in EVs and hybrids offer significant advantages in achieving a greener UK vehicle fleet that is not dependent on a declining resource. It is important, therefore, that the LCV sector receives clear guidance and regulation from policymakers, to ensure uniform standards are adopted and the requisite support services and infrastructure is put in place to help grow this fledgling industry. This may require offering incentives and investment to start-up and existing automotive firms wishing to exploit this niche sector.

Question 2: *the uptake of plug-in vehicles and how this can be improved?*

11. The uptake of plug-in EVs and hybrids to date has been low, at approximately 1% of the UK new vehicles registrations in 2010 (SMMT, 2011). A number of barriers to adoption of LCVs and in particular plug-in EVs and hybrids exist that need to be addressed by stakeholders. The vehicles themselves are comparatively costly and their performance is not on a par with traditional ICE vehicles in terms of range, power, size and refuelling speed. The public perception of these vehicles is still one of conservative caution, a situation not aided by the realisation that plug-in EVs and hybrids are only as environmentally friendly as the production techniques and power generation of electricity used to fuel them. Currently penetration rates of UK renewable energy are as low as 2% (Royal Academy of Engineering, 2010, p. 33).

12. Producers have also proven reluctant to fully invest in the research and manufacture of these vehicles while the market remains under-developed and the capital return from previous investment in ICE production facilities still has to be realised. In addition, the fuller development of clean diesel technology and environmental improvements to existing ICE technology have, arguably, slowed the rate of investment and production of LCVs. While many auto manufacturers are developing a wide range of suitable technologies there is a natural tendency to wait for the market to mature before fully committing substantial resources to the promotion of LCVs. It should be noted however that manufacturers such as Tata and Renault are very much embracing EVs in particular as a potential growth industry for the future.

13. The major stumbling block to the proliferation of LCVs is that of demand rather than supply. While technological breakthroughs are still required before LCVs can be seen as valid competitors to existing ICE vehicles, there are a number of viable LCV solutions available on the market, but to date the general public have proven reluctant to purchase these automobiles. The two key concerns for motorists as shown by surveys are cost and performance. However, while important factors, too much emphasis can be placed on these concerns. For example the recent offer of a £5,000 grant for the purchase of EVs by the UK government did not readily translate into more significant numbers of cars bought (SMMT, 2011).

14. Equally, the issue of range anxiety and load capacity are only relevant for certain types of journeys and certain types of motorists. Recent findings from the CABLED LCV trials shows that the vast majority of car journeys were less than 40km (below that of the maximum distance that can be travelled on one charge of most fully electric models available for sale in the UK) and undertaken by just one occupant. The majority of triallists expressed their satisfaction with the vehicles and recommended them as ideal second vehicles for short, urban commutes. While it is not ideal that these LCVs should occupy a place as a support vehicle rather than a primary mode of transport (particularly for one car families) it nonetheless shows there is a considerably bigger market for these vehicles than has hitherto been the case.

15. Key then to the successful uptake of these vehicles is the consumer perception of their abilities. In part LCVs and EVs in particular suffer by comparison with EVs and gas-powered vehicles of yesteryear, cars that arrived amid much fanfare but quickly disappeared. It is important, therefore, that consumers are made to understand that EVs are not a fad and are in fact the start of a new phase of development for the automotive industry as a whole. Confidence in the longevity of the vehicle must be accompanied by efforts to ensure

standards and norms are quickly adopted and supporting infrastructure (such as charging points) are rolled out. To date the roll out of charging infrastructure has yet to reach high saturation levels nationally. Though evidence from the CABLED trials suggests that the presence of charging points is more important than the actual use of them, commitment to developing an EV network will engender confidence in consumers. In the longer term planning for inter-city travel must also be considered to ensure consumer support remains consistent.

16. Perhaps what is ultimately required is a fundamental change of mindset about how we engage in personal transportation. After over a century of developing and advancing ICE technology, consumers are now being made aware that established patterns of travel, vehicle ownership and vehicle use are undergoing change. The role of policymakers in this transition is central and the use of incentives to encourage this switch is to be lauded. However, with significant challenges still remaining and the pace of change occurring at a slow pace, the use of disincentives to purchasing and using ICE technology may also be required, or at the very least considered. The RAC's suggestion of a "feebate" scheme may be worth exploring, for example (RAC, 2011).

Recommendation: Significant barriers must be overcome to encourage the widespread use of plug-in EVs and hybrids. These include developing existing markets and improving consumer knowledge and understanding of the benefits of these vehicles. Demonstrator projects such as CABLED are providing significant learning that needs to be effectively disseminated. It is also recommended that the issues of consumer perception and how to incentivise purchases must be revisited. Additionally it may require some form of disincentive to existing private motoring norms and practises to bring about these changes. Commercial vehicles and corporate fleets could prove a fruitful ground for development.

Question 4: *The role of plug-in vehicles alongside other technologies to reduce carbon emissions from road transport*

17. The independent NAIGT report recommended that a range of technological solutions should be pursued to ease the transition from ICE to LCV technologies. The logic for this was explained as follows "It is worth resisting the temptation to pick a winner prematurely, however politically attractive it may appear. Plurality of solutions in the interim is likely and this is healthy for inter-technological competition" (NAIGT, 2009, p.45). However, the weakness of this argument is that by failing to choose one successful technology the rate of technological change could, arguably, be slowed, as consumers defer buying an emerging technology until the market is more established. Environmental imperatives make such a delay problematic. Such a diverse approach may also mean higher costs for producers looking to invest in a range of new technologies (EV, hybrids, lower emission ICE, and even hydrogen), requiring cooperation between such firms.

18. From an industrial perspective, encouraging a wide range of competing technologies therefore holds both advantages and disadvantages. On the one hand, competing technologies mean more scope for development as well as increased possibility of a technology breakthrough and potentially useful overlaps of innovation. The downside is that development in breadth rather than depth can lead to a wait-and-see attitude developing for the consumer and a sense of paralysis for the manufacturer and further down the supply chain as they become unsure which technology to favour with investment. From a government perspective competing technologies can lead to a less organised, more *ad hoc* development of supporting services and infrastructure that in turn discourage both consumers and producers from choosing a clear winner.

Recommendation: While pursuing a range of technologies has many beneficial business aspects as an approach, focussing on one technology could also speed up the speed of proliferation of LCVs and aid in meeting CO₂ emission targets.

Question 5: *Action taken by other countries to encourage the uptake of plug-in vehicles*

19. Past experience shows that environmental innovation within the automotive industry has largely been in response to government regulation. Intelligent regulation can thus stimulate innovation as suggested by the "Porter hypothesis" (Ambec *et al.*, 2011). For example EU legislation setting CO₂ emissions limits on cars (130g CO₂/km by 2012) has resulted in manufacturers improving engine technology to release fewer emissions. In Japan, government policy has similarly stimulated environmental innovation within the automotive sector. In the US the California Air Resources Board (CARB) has been instrumental in pushing forward a zero emission vehicles policy, which, in conjunction with federal decisions such as the 1992 Energy Policy Act have served to create a global drive to reduce emissions and introduce clean and LCV technology in the automotive industry (Wiesenthal, 2010).

20. The importance of government regulation in developing the supply side of LCV production is also mirrored in stimulating demand for these vehicles. Without government support in terms of the provision of services and infrastructure, consumer interest and more importantly belief in these vehicles as a viable, long-term alternative to ICE technology will not be created. Looking to the nations with the largest centres of vehicle production, particularly EV production is informative. In Japan the Ministry of International Trade and Industry (MITI) and its replacement body, the Ministry of Economy, Trade and Industry (METI) has created technological "visions" through collective foresight exercises in leading Japanese automotive firms. MITI/METI has also established intercompany knowledge networks, sponsored R&D, sponsored leasing and purchasing incentive programmes, subsidised electric vehicle manufacturers, encouraged public procurement

of LCVs (for example electric Toyota “Rav4’s were sold to some Japanese authorities as vehicle fleets) and also facilitated market entry through developing common legislation and standards (Wiesenthal, 2010).

21. In European terms, France has been a leading force in the promotion of the LCV sector, in particular for plug-in EVs and hybrids. In September 2011 the French Ministry for Industry created a ten point charter with the commitments that Industrial representatives, highway companies, parking operators, traders and dealers must meet when offering low-carbon vehicles and related products and services to consumers, featuring high performance benefits, quality, ease of use and safety. Since 2011, a large number of vehicles have been available on the French market, for purchase or rent. The French government’s *Automobile Bonus*, in place since 2008, has channelled a total of €2.3 billion into the market, supporting the acquisition of 3.9 million new low-pollution vehicles (with subsidies averaging from €2,000 to €5,000 per low-carbon vehicle). Meanwhile the *Recharge Infrastructures Working Group for electric vehicles* is responsible for consultation and coordination of all national government issues including recharge infrastructures accessibility, EV safety, standardization, support for trials and recharge infrastructure deployment (IFA, 2012). The emphasis then, in French terms, has been on a holistic, over-arching national plan for development which has attempted to align demand and supply side measures.

22. Germany is currently trailing the US, France and Japan in the market for electrically-powered vehicles. None of the country’s top car makers is mass-producing electric cars yet and only a few thousand such vehicles are on German roads at present, most of them as part of experimental projects (Crossland, 2011). Although lagging behind France’s highly integrated approach for example, Germany has significantly stepped up investment in EVs, committing to two billion Euros in R&D by 2013 (*Der Spiegel*, 2012). This funding is in addition to already existing tax rebates and dedicated parking slots for these vehicles. However, unlike France and the UK, Germany has no plans to subsidise the purchase of EVs. The country is planning to have over 1 million EVs in operation by 2020, but this is a highly ambitious target as existing numbers of EVs on German roads number in the low thousands, a fraction of the 40 million strong German fleet (Crossland, 2011). Interest in pure EVs in particular remain low, with most Germans favouring petrol, diesel or hybrids. A Gartner Inc study in 2011 showed EVs as the lowest ranked preference for a motor car in Germany, with most respondents citing cost as the key stumbling block. In light of this, it makes the German decision not to subsidise the LCV sector all the more surprising.

23. In the US the question of LCVs has been divisive topic, with CARB pushing for an incrementally higher number of zero emission vehicles being introduced by producers’ year on year, for example CARB initially sought an increase in zero emission vehicle sales of 3% of total new car sales in the US in 1998 rising to 10% by 1992. This was fiercely resisted by producers and compromises were reached in terms of emissions and vehicle sale numbers, but clearly there has been an enormous effort made in the US to push the LCV agenda. In 2009 President Obama introduced the American Recovery and Reinvestment Act worth \$2.4 billion dollars to promote electric vehicles. The act was divided into two funding streams, with the majority targeted at the manufacturing of advanced batteries and related drive components, while \$400 million was made available for transportation electrification demonstration and deployment projects (US Department of Energy, 2009). The U.S. government also presently provides a subsidy of up to \$7,500 per electric vehicle (Lee and Lovellette, 2011). The Electric Vehicle Deployment Act would, if passed, increase this subsidy to \$9,500 for the first 100,000 electric vehicles sold in selected deployment communities. The Act, currently in committee, aims to award ten selected communities up to \$300 million each to serve as domestic hubs for EV manufacturing and deployment. The bill also offers consumer incentives for the purchase of EVs and promotes utility modernization to accommodate EV deployment (Electrification Coalition, 2011).

24. All of these initiatives at national level demonstrate the importance of strong, co-ordinated national policy to drive forward both the production and proliferation of plug-in and hybrid EVs amongst consumers. Even in small, open, car neutral economies ie economies without a significant manufacturing presence, the importance of a clear national plan for the promotion of these vehicles is a necessity, as demonstrated by countries such as Denmark, Ireland and Israel (Begley and Donnelly, 2011). To date UK national policy related to the development of the LCV sector and the promotion of plug-in and hybrid EVs has been categorised by good intentions but *ad hoc* implementation. In part this has been a result of the decision to allow the LCV sector to develop according to market forces and without strong central control. The latter point has been addressed by the creation of the Office of Low Emission Vehicles and the Automotive Council, however the question of whether business led solutions will successfully develop a sector driven by environmental imperatives is open to criticism.

Recommendation: The example of Japan, the US and France demonstrate the value of strong governmental will and an over-arching national plan of action. While UK policy has been increasingly moving in the right direction in terms of strong central control, policymakers in the UK arguably need to take more forthright action to develop the sector, and to take a more holistic approach which better aligns supply and demand side measures.

REFERENCES:

Ambec, S, M Cohen, S Elgie and P Lanoie (2011). *The Porter Hypothesis at 20: Can Environmental Regulation enhance Innovation and Competitiveness?* Resources for the Future Discussion Paper 11–01. Washington DC: RFF. Available at: <http://www.rff.org/rff/documents/rff-dp-11-01.pdf>

Bailey, D, A de Ruyter, J Michie and P Tyler (2010). Globalisation and the Auto Industry, *Cambridge Journal of Regions, Economy and Society*, Vol 3, Iss 3, 367–382

Bailey, D, D Coffey and S MacNeill (2011), New Perspectives on Global Auto Shifts and Development and Policy Responses—Part 1, *International Journal of Automotive Technology and Management*, Vol. 11, No. 2.

Begley J and Donnelly T (2011) “Priorities and practises for developing low carbon vehicle networks in small open economies” *International Journal of Automotive Technology and Management*, Vol. 11, No. 4.

Berkeley, N., Jarvis, D. and Begley J. (2012 forthcoming) “Phoenix from the ashes: Can low carbon vehicles ensure the long-term viability of traditional automotive regions?” *International Journal of Automotive Technology and Management Special Issue*

Crossland D (2011) “Germany’s slowness to explore electric cars imperils its best industry” *The National*, 30 May 2011.

Donnelly T, Collis C and Begley J (2010) “Towards sustainable growth in the Chinese automotive industry: internal and external obstacles and comparative lessons” *International Journal of Automotive Technology and Management*, Vol. 10, Nos. 2/3.

Electrification Coalition (2011) “The Electric Vehicle Deployment Act: A National Plan for Electrification” Electrification Coalition. Available at http://www.electrificationcoalition.org/sites/default/files/A_National_Plan.pdf

Hawranek D and Neubacher A (2010) “Germany to Promote Electric Cars with Massive State Aid” *Der Spiegel*, 28 April 2010.

Invest France (2012) [Press Release] “France, Development Platform for Low-Carbon Vehicles”. Available at www.investinfrance.org

King, J (2008) *The King Review of Low Carbon Cars*. HMSO, London

Lee H and Lovellette G (2011) “Will Electric Cars Transform the U.S. Vehicle Market? An Analysis of the Key Determinants,” Discussion Paper, Belfer Center for Science and International Affairs, Cambridge, Massachusetts, US.

New Automotive Innovation and Growth Team (NAIGT) (2009) “An Independent Report on the Future of the Automotive Industry in the UK”, Department for Business, Enterprise and Regulatory Reform, London, UK.

Royal Academy of Engineering (2010) “Electric Vehicles: charged with potential” Royal Academy of Engineering, London, UK.

Royal Automobile Club (RAC) (2011) “Market Delivery of Ultra-Low Carbon Vehicles in the UK” Royal Automobile Club, London UK.

Society of Motor Manufacturers and Traders (SMMT) (2011) “2011 Sustainability Report” SMMT, London UK.

Stern, N (2007) “The Economics of Climate Change” Cambridge University Press, Cambridge.

US Department of Energy (2009) “Recovery Act Announcement: President Obama Announces \$2.4 Billion for Electric Vehicles” Washington, US.

Wiesenthal T *et al* (2010) “Research of the EU automotive industry into low-carbon vehicles and the role of public intervention” Publications Office of the European Union, Luxembourg.

April 2012

Written evidence from Toyota

EXECUTIVE SUMMARY

- Toyota’s UK businesses are a key part of our European and international operations. Toyota has invested over £2.1 billion in manufacturing since 1992 and the UK is one of our leading European markets.
- Reducing the environmental impact at every stage of the vehicles’ life cycle is fundamental to our business, and we strive for zero emissions.
- We see hybrid technology as a core platform that allows further progress in low-carbon, low emission (NOx and Particulate matter) vehicle transportation, through powertrains such as Plug-in Hybrid Electric Vehicles (PHEV), pure Electric Vehicles (EV) and Fuel Cell Vehicles (FCVs).
- The evidence suggests that no single vehicle technology will match all requirements of sustainable mobility over time. There is unlikely to be one “technology winner”.

- In order to help strive for challenging UK climate change and other environmental goals, it is vital that Government continues to treat all low-carbon technologies equally and encourages market adoption of a range of proven technologies.
- Consumers need to be confident about reliability, durability and use of new technologies. Our leading experience of introducing hybrid technology demonstrates that it takes time to “embed” any new technology and win wider acceptance beyond a niche market of early adopters. As a result, volume expectations for new plug-in vehicles should reflect the likely rate of adoption in the early stages as adoption of low-carbon technologies is encouraged. Critically, decisions taken by insurance and residual value rating companies and organisations can also impact the market size for new technologies.
- It is vital that all key stakeholders, including vehicle manufacturers and suppliers, energy and infrastructure providers and governments at all levels co-operate to help accelerate the progress of the low-carbon low emission vehicle market.
- The creation and existence of OLEV as a cross-departmental team has had a real strategic impact on developments in this field, while the Automotive Council has also made hugely positive strides in providing a clear technology based road map for the sector. These are developments and structures that should be encouraged and built upon to help provide continued certainty for the automotive industry and UK low carbon leadership. We want to work in partnership with the Government in order to meet environmental objectives important to us all.
- In order to support further take-up of low-carbon low emission vehicles, we welcome Government’s continued support for a medium to long-term policy framework. Fiscal incentives, amongst others, will have a continued key role to play. Industry research indicates that majority of consumers prioritise economic value over environmental value when purchasing a car.
- Many incentives and initiatives implemented so far both by the previous and current Governments are to be welcomed, especially the Plug-in Car Grant (PiCG). Continuation and stability of such measures is important to avoid retreating too early from the incentive frameworks or supportive fiscal arrangements which are currently in place and which, if withdrawn prematurely, could negatively impact the consumer.
- We welcome the Government’s approach to encourage lower carbon choices through the Vehicle Excise Duty and Company Car Tax (CCT) regimes, as well as first year enhanced capital allowances for ultra-low carbon vehicles. However, we were surprised by the statements made in March Budget 2012 to remove the First Year Allowance from Leasing and Rental companies. This decision may cause instability in the fleet market and send a mixed message right now, should such companies elect to increase their rentals on low carbon vehicles.

1. TOYOTA WORLDWIDE

1.1 Toyota is one of the world’s largest automobile manufacturers, typically producing over seven million vehicles each year. Toyota vehicles are manufactured in 63 plants in 27 countries, and marketed in over 170 countries. In Europe alone we have nine manufacturing plants, R&D and logistics centres, and employ around 93,400 people, directly and indirectly.

2. TOYOTA IN THE UK

2.1 *Manufacturing*

2.12 Toyota Motor Manufacturing UK (TMUK) was our first manufacturing operation in Europe. We employ approximately 3,500 members and we have invested over £2.1 billion since start of production in 1992. We have two production operations in the UK—a vehicle plant at Burnaston near Derby and an engine plant in Deeside, North Wales.

2.13 To date, we have produced over three million vehicles and three million engines at TMUK, and over 85% of this production is currently exported overseas mainly to continental Europe. The UK remains our largest supplier base for our European operations, typically purchasing around €1 billion worth of parts a year from these suppliers.

2.14 We have recently made two major announcements relating to our UK operations. Firstly, in 2010 TMUK became the first car and engine manufacturer to build a full hybrid model in Europe—the Auris Hybrid, including the first hybrid engine production located outside of Japan. This hybrid investment represented a major step in the roll-out of Toyota’s full hybrid technology and in the transition to low-carbon manufacturing in the UK and road transport more generally. Secondly, in 2011, an investment of more than £100 million was made to produce our new generation C-segment hatchbacks—including hybrid, petrol and diesel models—at our Burnaston plant, creating up to 1,500 additional jobs over the next two years.

2.15 TMUK is also one of five Toyota plants worldwide to be designated Sustainable Plant status, ensuring production facilities are designed to work in harmony with our local community and surrounding environment. TMUK was the first manufacturer in the UK to achieve ISO14001 standard for environmental management and also the first to reduce both waste to landfill and waste to incineration to zero.

2.16 Our vehicle plant this year became the first UK car manufacturer to install a large-scale solar array. Generating solar power on site to supply electricity to the plant underlines our commitment to reduce our carbon footprint further. The energy generated is capable of supplying enough power to build approximately 7,000 cars a year; saving up to 2,000 tonnes of CO₂.

2.2 Sales

2.21 Based in Epsom, Surrey, Toyota GB (PLC), is our National Marketing and Sales Company for Toyota and Lexus vehicles in the UK, employing approximately 350 members and supporting a total franchise network of approximately 235 retailers (Toyota and Lexus).

2.22 The UK is well established as one of Toyota's largest European markets and a leading market for our environmental products. Toyota's hybrid offering in the UK is set to grow this year with the introduction of an expanded vehicle line up, and by 2013 hybrid drive trains are expected to account for between 20 to 30% of our vehicle sales.

2.23 The Toyota brand has one of the lowest CO₂ emissions in the UK, despite a broader product portfolio with a sales fleet average of just 124.42g/km CO₂ (2011, source CleanGreenCars). This is compared to an industry average in the UK of 138.5g/km (2011, source CleanGreenCars).

2.24 In addition, in 2010, Toyota GB was one of the very first sales headquarters to achieve the Carbon Trust Standard in recognition of its past performance in reducing its carbon footprint (a 7.2% reduction in FY09 against the average of FY08 and FY07). The company has reduced its buildings carbon footprint by a further 18% in FY11*(*up to end Feb 12 YTD).

2.25 In 2009, Toyota GB was also the first vehicle manufacturer to start work with the Carbon Trust to lower the carbon footprint of its retailers. Toyota and Lexus retailers across the country are equipped with energy monitoring systems, have received energy management surveys and training.

3. TOYOTA AND THE ENVIRONMENT

3.1 For the automobile to remain a positive force for progress, we must continue to make the environment a priority management issue for our industry. Toyota believes that this is the only way that automakers can successfully meet the challenges of the future.

3.2 Reducing environmental impact is a key management priority for Toyota. This is fundamental to our business; we strive for zero emissions at every stage of the vehicles' life cycle—from research and development through to design, use and disposal. Now, more than ever, we are committed to redoubling our efforts to develop advanced and innovative technologies. Freeing ourselves from a dependence on oil is key to realising a low-carbon society.

3.3 We believe there are three key themes for environmental responses (See *Appendix, Slide A*):

- (i) Supporting energy diversity and reducing dependence on fossil fuels.
- (ii) Reducing carbon dioxide emissions (global warming).
- (iii) Preventing atmospheric pollution (improving air quality).

These challenges have, and will continue, to underpin our environmental technology approach, and we see hybrid systems as core technology for the development of various types of environmentally friendly vehicles.

4. ENVIRONMENTAL TECHNOLOGY LEADERSHIP

4.1 Overall Approach

4.11 Toyota is the automotive industry's leader for hybrid technology, introducing Prius—the first mass produced hybrid model—in 1997. Since then, Toyota has continued to expand its hybrid offering including Lexus and decided to make the UK its first location in Europe to build a hybrid vehicle in 2010. In 2011 in the UK, sales of Petrol-Electric Hybrids accounted for 92% of all Alternatively Fuelled Vehicles making it, still, by far the most popular alternative technology to conventional petrol or diesel ICE engines.

4.12 Toyota's strategy of developing and marketing cleaner and greener vehicles involves the simultaneous exploration of a wide variety of technological solutions. This is a reflection of the broadly varying driving conditions, fuels, vehicle infrastructures and legislation present in various regions.

4.13 The evidence suggests that no single vehicle technology will match all requirements of sustainable mobility over time. We believe that in the future, several types of eco-car will co-exist. Toyota is therefore investing in a number of technologies to address key concerns of CO₂ reduction, air quality and energy diversity. This has led to developments and leadership in hybrid technology, plug-in electric hybrid vehicles (PHEVs) and electric vehicles (EVs), cleaner petrol and diesels, fuel cells (FCVs) and alternative fuels.

4.2 Hybrid Technology

4.21 Toyota's sophisticated full hybrid system delivers maximum fuel efficiency and is engineered to automatically monitor driving conditions to decide whether to run on electricity, petrol or both, using a smooth flow of power between the two sources. The battery never needs manual charging as it is recharged automatically by regenerative braking or power from the petrol engine.

4.22 For Toyota, hybrid technology will continue to act as the core platform to allow further progress in low-carbon vehicle transport. Our unique full hybrid technology enhances the efficiency of existing internal combustion engine powertrains by delivering very low fuel consumption and less harmful tailpipe emissions (NOx and PM).

4.23 Switchable EV mode, unique to full hybrid technology delivers silent, emissions-free (at point of use) fully electric urban driving over short distances. Our full hybrid technology has also been designed to be modular and adaptable to work with different energy sources (See *Appendix, Slide B*). This means it can be readily used in PHEVs, EVs and FCVs.

4.24 Market potential is expanding fast and we will have nine new or fully renewed hybrids in Europe by end 2013, and have a target of 20% hybrid sales by 2013 in Europe. Toyota has sold over 3.6 million hybrids to date, including more than 400,000 in Europe and just over 93,000 in the UK. Together with our current generation Prius and Auris hybrid models we are expanding our range in the UK with the introduction this year of the Prius+ (seven seater version), Prius Plug-in hybrid and the Yaris hybrid.

4.25 Our premium brand Lexus, saw significant 2011 sales increase in Europe (43,637 units, +40% versus 2010) making it the fastest growing premium brand in Europe. 2012 will mark the introduction of five new or updated Lexus vehicles in Europe including the new RX, a true series/parallel hybrid system with the world's lowest premium crossover CO₂ emissions starting at just 140g/km. See *Appendix, Table 1*, for a table of some Core Toyota Hybrid Model CO₂ emissions—UK Market.

4.3 Toyota Powertrains for the future

4.31 Our powertrain direction for the future is summarised in the *Appendix, Slide C*. The slide highlights a range of powertrains from hybrid, PHEVs, EVs and Fuel Cell Vehicles (FCVs). Toyota believes that the electrification of transport can play an important role towards greater sustainable mobility.

4.32 This is because plug-in vehicles (PIVs) offer a promising solution for reducing consumption of fossil fuels and supporting energy diversification whilst also contributing to CO₂ and other emissions reduction such as NOx and particulates impacting air quality.

4.4 Plug-in Hybrid Electric Vehicles—“The best of both worlds”

4.41 Toyota's Prius Plug-in hybrid is a full hybrid equipped with a stronger lithium battery that can be recharged from the grid, resulting in extended electric vehicle range.

4.42 We refer to PHEV as “the best of both worlds”. It offers the benefits of electric vehicles with zero tailpipe emissions (when in use phase) in the city, but none of the restrictions to driving range.

4.43 Toyota will introduce its new Prius Plug-in hybrid this summer into the UK and sales have already commenced in Japan. The new Prius Plug-in hybrid can drive for around 15.5 miles in zero emissions EV mode. It has a homologated CO₂ emissions figure of just 49g/km and remarkable fuel efficiency of 134.5 mpg (European homologation combined cycle). Starting price will be £27,895, inclusive of the UK Government's Plug-in Car Grant.

4.44 In terms of initial sales target for the first full year, we have a sales target for Europe of around 6,500 units, with the UK being a key front-runner market.

4.45 We commend the work being undertaken by OLEV looking at how consumers can be enabled to charge at home and off-peak. It is important that consumers are supported to charge at home, ensuring that both the physical infrastructure is reliable and in place, as well as being able to access value-for-money tariffs.

4.46 UK Prius Plug-in hybrid Early Demonstration Results

- 4.461 Working in partnership with EDF Energy, Toyota has already leased 20 Prius Plug-in hybrid vehicles (previous generation models) to London-based businesses and Government organisations to monitor both vehicle performance and charging patterns.
- 4.462 Interim findings from Toyota and EDF Energy's demonstration give encouraging, real-world data that show the technology can deliver greatly improved fuel efficiency and lower emissions in urban driving.
- 4.463 At the same time, the car's easy to drive character and its ability to cover long distance trips without range anxiety is being appreciated by drivers and fleet operators taking part in this program.
- 4.464 The London findings, which support intelligence gathered from Toyota Prius Plug-in hybrid programmes Europe-wide, indicate that the majority of journeys logged by users are at an

average speed and cover an average distance, which allows the greater fuel efficiency and low emissions benefits of Prius Plug-in hybrid to be realised. Initial fuel consumption data indicate performance is 27% better than an equivalent diesel.

4.5 Pure Electric Vehicles—A primary mode of transportation for shorter distances

4.51 Toyota believes pure EVs are very suitable for short-range usage and city environments, and we are planning to bring our compact IQ EV model to market in Europe in 2012.

4.52 The current state of battery technology is one of the main barriers preventing further development of EVs. There is still a pressing need for further research and development.

4.53 We currently see the practical usage scenario for electric drive-only vehicles as being for short distance commutes due to the limited range of the batteries, the amount of time it takes to charge the batteries, the current cost of batteries and the lack of charging infrastructure.

4.6 Fuel Cell Vehicles—nearest vehicle yet to an ultimate eco car

4.61 Alongside hybrids, PHEVs and pure EVs, we believe that FCVs will play an important future role in realising a low-carbon society.

4.62 Our FCV is based on our hybrid system in which the combustion engine is replaced by a stack of fuel cells and the petrol tank by a hydrogen tank. Fuel cells generate electricity from the reaction between the hydrogen in the tank and oxygen in the air. The only emission is water vapour.

4.63 We plan to commercialise a fuel cell sedan type vehicle in 2015, where supply infrastructure is taking shape. This is important as limitations including infrastructure, hydrogen supply and clean hydrogen production are still challenges to overcome.

5. THE CONSUMER JOURNEY

5.1 Industry research indicates that the majority of consumers prioritise economic value over environmental value when purchasing a car; and that the “environment” as a “purchase” choice does not rank within the top ten of key decision making criteria. This is a trend which has seen little change over the past 10 years.

5.2 This is why “financial” incentives and signals are important in supporting the ambition of encouraging consumers to purchase vehicles with new lower emission technologies—beyond just the expected financial returns of lower running costs.

5.3 Consumers also need to be confident about the reliability, durability and use of new technologies. Manufacturers have to build trust. With regard to PIVs, this is even more evident with issues such as range, infrastructure and battery charging times.

5.4 Toyota’s leading experience of introducing hybrid technology demonstrates that it takes time to “embed” new technology and win wider acceptance beyond a niche market of early adopters. We believe consumers will require time to adapt to technologies and behaviours.

5.5 This can be exemplified in the *Appendix, Slide D*. Please note the shallow rate of adoption of hybrid vehicles (globally) between 1998 and 2005. More mass market adoption and penetration has accelerated only over the last five years or so, and this is due to factors such as: an increase in our hybrid product range; continuing development of the technology; the consumer becoming more familiar with such technology and its benefits; a number of governments putting in place measures to incentivise low-carbon vehicle choice in support of transport and environmental objectives.

5.6 Toyota would argue that expectations for new PIVs should be similarly modest in the early stages, and perhaps even more so because of the need for external charging. This is why it is critical to ensure we have a “package” of measures and influences over the medium to long term to encourage take up.

5.7 Such measures will ultimately include: consumer grants/incentives; national tax benefits/relief (VED/Benefit in Kind/Capital writing down allowances); adequate and supportive infrastructure; awareness raising and confidence building programmes. Equally, the consumer will also be influenced through local or regional measures such as exemption from congestion charging schemes and local parking restrictions and from access to priority vehicle lanes. Critically, decisions taken by insurance and residual value rating companies and organisations can also impact the market size for new technologies.

5.8 The UK Government’s (DECC) Carbon Plan has set the target of halving greenhouse gas emissions in the 2020s, putting the UK on a trajectory towards an 80% reduction by 2050 while maintaining energy security, and minimising costs to consumers. The UK Government Carbon Plan recognises that road transport and cars make a significant contribution with domestic transport emissions making up nearly 25% of UK total emissions and states that Electric Vehicles and other low carbon transport sources will also be pivotal to emission reduction efforts.

5.9 This ambitious challenge demonstrates the importance of a coordinated approach in partnership between industry, government and stakeholders to foster an environment which will support the development and uptake of ultra-low emission technologies including Hybrid, EVs, PHEVs and FCVs. Furthermore, European legislation regulating emissions from new cars already provides a legal framework which industry is striving towards.

6. SUPPORTING THE TAKE UP OF PLUG-IN VEHICLES

6.1 Wherever we operate, we want to work in partnership with Government in order to meet environmental objectives important to us all. We have been encouraged by the current UK Coalition Government's (as we were with the previous Labour administration's) determination to play a leading role in the development of low-carbon low emission vehicles, both in terms of production and market development. Early measures already developed and adopted by UK Government to signal the UK as a leading market have been recognised by international Head Offices abroad.

6.2 In terms of developing a market for plug-in vehicles, we strongly endorse and welcome the following steps that have been taken:

- *Office for Low Emission Vehicles (OLEV)*: The creation and existence of OLEV has had a real strategic impact. It is to the UK's credit that it has led the way internationally by facilitating the creation of a team which allows joined-up work between various governmental departments including Department for Transport, Department for Business, Innovation and Skills and the Department for Energy and Climate Change.
- *UK Automotive Council*: Similarly, the development of the UK's Automotive Council has been a hugely positive step for the sector. Most notable has been the development of the Technology Roadmap, which has set a long-term vision for the whole automotive industry to help bring new innovations in reducing CO₂ to market—including plug-in technology. (See *Appendix, Slide E*).

6.3 *Taxation Treatment*: We welcome the Government's approach to encourage lower carbon choices through the Vehicle Excise Duty and Company Car Tax (CCT) regimes, as well as first year enhanced capital allowances for ultra-low carbon vehicles. This is a welcomed direction and adds to the point about a "package of measures". Key early customers will also be fleets and businesses who will benefit from these measures. We encourage continuity of these measures as any unexpected changes to the treatment of low-carbon vehicles in relation to CCT and capital allowances could have a detrimental impact on the uptake of such technologies and deter fleet and business purchasers from making decisions on the basis of cost of a vehicle over a number of years. This is why we were surprised by the statements made in March Budget 2012 to remove the First Year Allowance from Leasing and Rental companies. This decision, as mentioned earlier may cause instability in the fleet market and could send a mixed message impacting market development right now.

6.4 *The Plug-in Car Grant (PiCG)*: The PiCG has provided a strong starting platform to promote plug-in vehicle uptake and help address consumer acceptance concerns. Specifically, the early consultation on the criteria for the PiCG with industry was invaluable in order to ensure credible performance criteria and sufficient lead times for our sector. The latest decision to continue with the PiCG scheme for the lifetime of this Parliament (until 2015) is also strongly welcomed, and will continue to provide the early market with some degree of certainty.

6.5 *Plugged-in Places (PiPs)*: Equally, the Plugged-in Places scheme has been an important step forward for low-carbon vehicle infrastructure. A "national" infrastructure spread will eventually be required if plug-in technology is to become a viable option for more of the population. The forthcoming development of the National Chargepoint Registry will also be vital in helping make plug-in technology more viable for the consumer, allowing them to understand where they can charge their vehicle on a national scale. It is also important that the infrastructure installed meets the technological requirements of the various vehicle technologies, as for example not all PHEVs including the Prius Plug-in hybrid require fast or rapid charge.

6.6 *Ultra-Low-Carbon Vehicle Demonstrations*: Both the Technology Strategy Board and CENEX ran competitions in support of trials of low-carbon vehicles in the UK including PHEVs and pure EVs prior to market introduction. Critically these trials achieved international exposure, and helped generate greater consumer awareness, and their key findings have undoubtedly helped both industry and the Government with market preparation.

6.7 *Mixed Signals and Early Retreat on Tax Treatment*: The Government must ensure that further adoption of new automotive technologies is not hindered by retreating too early from the incentive frameworks or supportive fiscal arrangements currently in place. Announcements in March 2012 Budget will lead to more normalisation of PIVs for UK tax treatment as they will reduce the relative incentive to run PIVs. Whilst this "normalisation" timing has been set for around 2015, the impact on market development is likely to be today. We encourage a coordinated cross-departmental approach by Government on policies relating to low carbon which needs to also appreciate the benefits of low emission vehicles from an air quality perspective.

7. LESSONS FROM OTHER COUNTRIES

7.1 It is encouraging to see the UK as a leading candidate country in Europe for the development of a low carbon vehicle market. Analysis of the landscape undertaken by the Society of Motor Manufacturers and Traders (SMMT) shows that uptake of vehicles is of a comparable level to that of other major markets in Europe. For example, for the whole of 2011, UK electric vehicle registrations represent a total market share of 0.06%, compared to 0.11% in France, 0.05% in Spain and 0.07% in Germany. The United States and Japan are demonstrating some higher levels of registrations with 0.16% and 0.36% market share respectively.

7.2 Other Governments are showing similar commitment to the UK, with purchase incentives available for example in France (worth up to €5,000), Spain (worth up to €7,000), Ireland (worth up to €5,000), and Portugal (worth up to €5,000). In the United States, the offer of a tax credit up to a maximum of \$7,500 is available.

7.3 However, not all countries have taken a technology-neutral stance, with some choosing to differentiate between pure EV and PHEV which may have a detrimental impact on the market and the consumer choice and fails to recognise the important long-term cost savings and emissions benefits which PHEV offers. We strongly endorse and commend the UK Government's technology neutral approach which is crucial to support the consumer journey, wider technology competition and ultimately a greater level of environmental benefit.

8 GUIDING PRINCIPLES

8.1 In order to continue to establish a more mainstream market for plug-in vehicles and ultra-low carbon vehicles we would continue to strongly endorse the following guiding principles:

- 8.11 *Positive Stakeholder Approach:* Genuine electric mobility can only succeed in the longer term with the support and commitment of all key stakeholders including vehicle manufacturers and suppliers, energy and infrastructure providers and governments at all levels (European, national, regional and local).
- 8.12 *Strategic, consistent and longer term policy framework:* In order to establish a more mainstream market for plug-in vehicles there will need to be in place a continued package of measures including targeted consumer incentives and fiscal measures, improved education and awareness campaigns, and supportive and adequate infrastructure.
- 8.13 *Encouragement for consumer adoption:* All stakeholders need to work together to encourage wider uptake of low-carbon low emission products. Consumer awareness and adoption of low emission technologies is a key challenge.
- 8.14 *Residual Value Setting/Insurance:* We consider it important that the insurance industry and vehicle manufacturers who are bringing PIVs to market engage with each other extensively in order that they fully understand the technologies involved and the extent to which vehicle manufacturers strive through design, engineering and manufacture to minimise repair costs and also costs associated with write-off were this to occur. Whilst consultation with vehicle manufacturers is an integral part of the process leading to the establishment of insurance group ratings, to ensure an appropriate depth of understanding, such consultation and discussion should be especially thorough in the case of PIVs.
- 8.15 *Fiscal incentives/Taxation:* These have a role to play in supporting early and emerging markets for plug-in technologies. We commend the Government's PiCG as a signal for low-carbon leadership, and welcomed its continuation to 2015. The supportive treatment of PIVs and low-carbon vehicles within national tax structures will also continue to have an impact both positively and negatively; and thought needs to be given to treatment and incentives post 2015 to provide greater levels of certainty for an emerging market.
- 8.16 *Equal technology treatment (PHEVs and EVs):* We support equal treatment of low emission technology use. Governments—national and local—should not be in the business of picking winners and losers, but should set the key targets and parameters around which manufacturers and others can compete.
- 8.17 *Durable, reliable and safe product:* Increasing consumer confidence and acceptance will not only come from environmental performance but also product quality, durability, reliability and safety. Manufacturers will have to continue to build trust.
- 8.18 *Standardisation:* the need for standardisation of plugs and sockets is equally as important in this journey. Compatibility of existing and planned infrastructure to any uniform standard agreed and emerging is vital.

FINAL REMARKS

We welcome the opportunity to respond to this consultation and we welcome your consideration of the feedback submitted in this paper.

APPENDIX

Slide A

Slide B

Toyota Hybrid System Applications

Slide C

Powertrain Map in Future Mobility

Slide D

Toyota & Lexus Global Hybrid Sales

Slide E

NAIGT Technology Roadmap

Table 1

Model	g/km CO ₂ Emissions*
Prius	89 g/km
Prius +	96 g/km
Prius Plug-in hybrid	49 g/km
Auris Hybrid	89 g/km
Yaris Hybrid	79 g/km

* CO₂ mass emission (combined) (g/km)

April 2012

Written evidence from EvalU8 Transport Innovations Ltd

1. INTRODUCTION & GENERAL COMMENTS

1.1 This is the submission of EVALU8 Transport Innovations Ltd (EVALU8) to the Call for Written Evidence issued on 15 March 2012 by the House of Commons Transport Committee in connection with its inquiry into low carbon vehicles. EVALU8 welcomes the opportunity to respond to this call for evidence.

1.2 EVALU8 is a not-for-profit company, set up by the University of Hertfordshire, to deliver the Government-supported plugged in places (PiP) programme in the East of England. In addition to delivering the PiP initiative, EVALU8 also provides advice and consultancy support in the wider fields of innovation, business development, and transport planning but with a focus on low carbon vehicles. EVALU8 works closely with the Centre for Sustainable Communities at the University.

1.3 Unlike most of the other PiP areas, the East of England project is not focussed on a single metropolitan or urban area. It covers a large and dispersed geographic area of 7,500 square miles with a population of 5.8 million (2009), and has a network of inter-related medium-sized cities and market towns. The East of England is also adjacent to a number of other PiP areas (London, Milton Keynes, Midlands) and has a varied Local Government structure with a mixture of two-tier and single-tier authorities.

1.4 This evidence draws upon the experience of EValu8 in delivering a PiP project in this complex region. Given this background, this evidence focusses on contributing to the Committee's third area of inquiry ie: the effectiveness of the plugged in places scheme but does touch upon other aspects.

1.5 The main points of this submission are as follows:

- PiPs have had a key role in raising the profile of low carbon transport in their areas.
- PiPs have been important catalysts for joint working and encouraging the collective confrontation of key issues that will be faced as the vehicle fleet becomes increasingly electrified.
- PiPs have acted as stimulus for increased Local Authority engagement and activity in the low carbon vehicle arena.
- PiPs have provided a useful testbed for EV-related equipment and communications and have supported the move towards increased standardisation.
- EVs are becoming a key part of the sustainable transport policy mix and PiP programmes, together with other initiatives such as the Department for Transport's Local Sustainable Transport Fund, can make an important contribution to supporting this.

2. DETAILED COMMENTS

2.1 *PiPs raise the profile of low carbon transport*

Car manufacturers and dealerships are in the business of selling vehicles and, through their various marketing initiatives, make a significant contribution to raising the profile of low carbon vehicles and encouraging wider take-up.

However, the Plugged in Places scheme in the East of England has also allowed EValu8 to contribute to promoting awareness and knowledge of electric vehicles (EVs) through working closely with a large number of local groups and networks.

This has included working with:

- business-focussed organisations including the Local Enterprise Partnerships, Chambers of Commerce, and the Federation of Small Businesses;
- public sector groupings such as the Regional Transport Forum made up of the East of England's eleven local transport authorities;
- a range of public and private sector organisations directly on a one-to-one basis; and
- the wider public through town centre exhibitions and events, using media such as radio and newspapers as a mechanism for promotion.

This has the general benefit of simply increasing the awareness of, and knowledge about, low carbon vehicles among businesses, public bodies and the general public but has also been an important mechanism for promoting the plugged in places initiative itself.

2.2 *PiPs act as a catalyst for joint-working and collectively confronting issues*

A key benefit of the PiP initiative has been to act as a catalyst for joint-working, and for the identification and resolution of key issues. EValu8 personnel have been involved in a number of working groups, committees, and other bodies across the automotive, energy, transport and environment industries over the years. Whilst these can be useful forums for discussion, such groupings rarely "get their hands dirty" and expose the real issues. The PiP in the East of England has helped address this in the low carbon vehicle sector.

At the highest level the project has been overseen by a Steering Group with a wide membership from local authorities to vehicle manufacturers. This ensures that key issues faced by the project are exposed to a range of representatives who can understand, advise on, and help resolve problems and issues as they arise.

Similarly, at a very practical level, individual charging point installations bring together a range of players including PiP leaders, charging point manufacturers, post "hosts" which can be local authorities, businesses or other organisations, and in many locations the distribution network operator.

Practical projects like Plugged in Places therefore pull together the relevant players and force them to confront and work through the practicalities that need to be overcome as transport patterns change.

2.3 PiPs are a stimulus for Local Transport Authority activity on EVs

In the East of England the PiP has provided an important stimulus for action by Local Transport Authorities (LTA) in the EV arena. The eleven LTAs in the East of England have been strong supporters of the PiP scheme from its initial pre-bid stage to operation and, through PiP funding, EValu8 has been able to support the installation of charging infrastructure in all of the LTA areas.

This process has resulted in the LTAs, working with EValu8 and other players, having to confront a range of issues surrounding EVs early on. These include selection of locations for infrastructure, issues of parking enforcement and the need for Traffic Regulation Orders, legal responsibilities for infrastructure, and the programming of work that is likely to be less structured than, say, street lighting.

This early learning should pave the way for more straightforward implementation of future infrastructure. This includes work on further installations, either underway or proposed, by a number of LTAs in the East of England as part of the Department for Transport's Local Sustainable Transport Fund (LSTF).

The PiP project has therefore helped promote the concept of EVs as part of wider sustainable transport packages among the LTAs. EV infrastructure is now increasingly being considered alongside other sustainable transport measures (from investment in walking and cycling, to behavioural change programmes) as part of area-wide proposals to make the East of England's towns and cities more sustainable in transport terms.

2.4 Electric vehicles—a key part of the transport policy mix

The provision of enhanced facilities for walking, cycling and public transport, together with accompanying marketing and promotional measures to encourage their use, is often the cornerstone of sustainable transport planning.

However, as noted in 2.3 above, there is increasing evidence of LTAs also promoting EVs as part of wider LSTF-funded transport packages. In part this has been influenced by the PiP scheme.

Other submissions will undoubtedly provide further views on the role of EVs in a wider transport planning context but EValu8 believes that, whilst walking and cycling should be the mode of choice for short journeys, and public transport has a key role on corridors of transport high demand, low emission vehicles (LEV) including EVs should have a key role in contributing to other movements.

EValu8's colleagues at CENEX in the Midlands PiP have a particular helpful graph produced originally by General Motors that demonstrates how different forms of LEV can potentially fill those gaps in the transport market that cannot be supported by walking, cycling and public transport. (See below).

This supports the idea of basic EVs for low mileage commuting, hybrids for longer distances, followed by fuel cells and then efficient diesel for long distance haulage. This demonstrates that EVs are just part of the bigger LEV picture, which itself needs to be seen within a broader transport planning context.

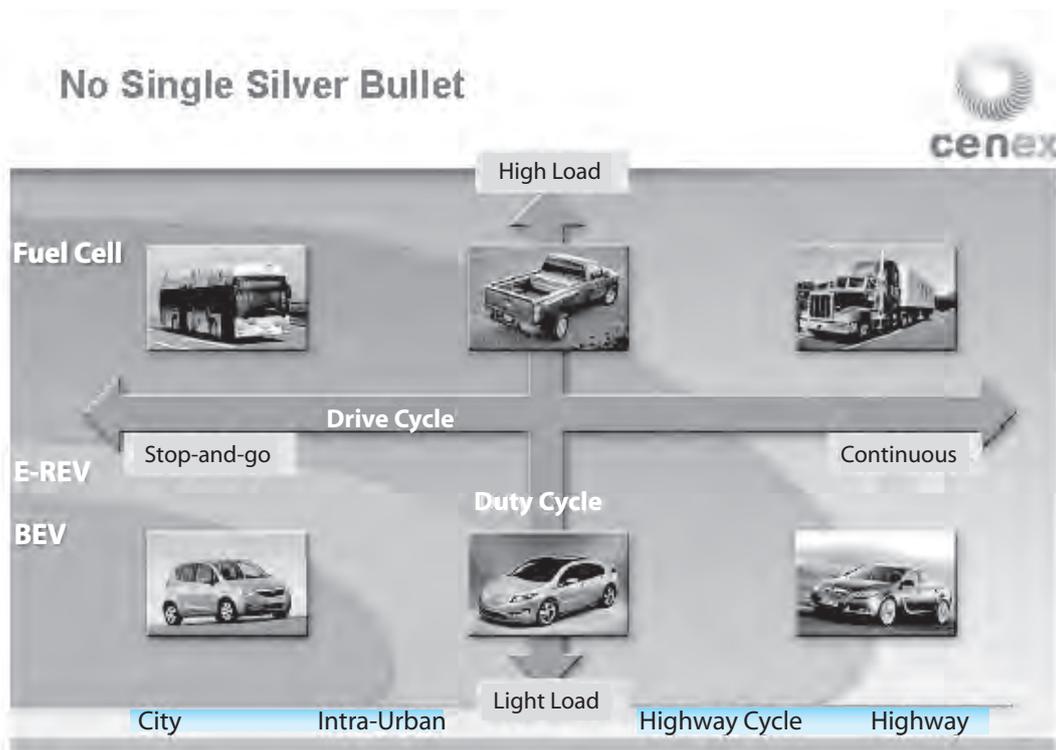


Figure used in CENEX presentation at the IMechE The Electric Vehicle Reality seminar, held on 22 September 2011.

2.5 PiPs provide a testbed for equipment and communications

The Plugged in Places schemes, including that in the East of England, have necessarily experimented with various means of control and with various manufacturers' charging equipment. Out of this has come a comprehensive list of "Lessons Learnt" to assist with future delivery. This is being collated into a guidance document by the Office of Low Emission Vehicles, OLEV, and will be shared with Local Authorities.

By working with various manufacturers, the PiPs have also unearthed a number of issues surrounding intercommunications. In particular, manufacturers tend to sell self-contained systems which in themselves have excellent operating characteristics. But just like existing forms of transport, buyers purchase different systems at different times and eventually these have to work together. This is not a simple overnight task, but in the East of England, EValu8 has worked with various manufacturers to facilitate the necessary intercommunications which shows that this is achievable.

2.6 PiPs and common standards

The Transport Committee has indicated an interest in standards. During the PiP programme progress has been made from a total uncertainty about connectors to a degree of commonality and a move towards harmonisation. It has been the active involvement of the PiPs in discussion with OLEV and others that has moved the focus of publically accessible infrastructure from the 13Amp BS1363 type socket outlet to the higher rated EN62196-2 Type 2 socket, using Mode 3 control, commonly known as the Mennekes connector. Whilst the 13 Amp outlets remain in place to support a number of legacy vehicles, the Type 2 connector is now the standard for 7kW charging points. The background technical work to achieve this standardisation has come from senior engineering staff from the North East and East of England PiPs.

PiPs have also worked closely with the Institution of Engineering and Technology (IET) which has now published a guidance document: Code of Practice for Electric Vehicle Charging Equipment Installation, ISBN: 978-1-84919-514-0. Working directly with manufacturers and installers, EValu8 is using and testing that guidance on the ground.

Colleagues in the North East PiP have also developed training material for the EV industry.

2.7 Some longer term challenges

Concerns have been raised by some commentators that there are potentially bottlenecks in the distribution network which could start to impact in the medium term. In the longer term concerns have also been raised around the implications of greater electrification of the vehicular fleet for electricity generation and capacity.

With a relatively short life the PiPs alone clearly cannot address these issues but, as noted above, by accelerating the delivery of EV infrastructure and bringing key players together, they have provided a mechanism for beginning to confront these issues.

A further issue that will arise as vehicle numbers become significant is that of how flat dwellers, and those living in denser urban areas with no off-street parking, will be able to access home charging facilities. Although a relatively low density area, even in the East of England, home charging on the drive or in the garage is the preserve of the few and for many town and city dwellers this provides a real challenge to electric vehicle ownership and use.

That said, there is potentially scope for the greater take-up of EV-based car clubs based around dedicated on-street charging posts. Such a model would allow urban dwellers access to EVs, without the need for actual vehicle ownership, and could reduce the need for home-based chargers. Subject to successful LSTF bidding, and through joint-working with EValu8, this approach will be piloted in at least one of the East of England's Local Transport Authorities and could provide some very useful learning points for the wider roll-out of EVs in urban areas.

2.8 A wider look

Historically the automotive industry has been regarded as a mature stable industry; it has had issues of size, market and economic performance, but its products have been built on relatively stable platforms. However this is now changing and EVs are an area of rapid development. Initiatives such as the Plugged in Car and Plugged in Van grants, and Plugged in Places, are all part of the story that is both accelerating the industry and also bringing EV attention to the UK.

Through wider project work, EValu8 has dealings with colleagues in Germany, Italy, Spain and Hungary, all of whom are showing great interest in developments in the UK including learning from pilot projects such as the PiPs. This includes sub-national policy makers who are keen to learn from the UK's experiences together with vehicle manufacturers.

3. CONCLUSION

EValu8 Transport Innovations Limited welcomes the opportunity to contribute to the work of the Transport Committee and would be pleased to provide further evidence to support their deliberations if required.

It is EValu8's view, however, that the EV story is still unfolding. Whilst many challenges will undoubtedly lie ahead, EVs will become an increasingly important part of the future sustainable transport toolkit and the PiPs have proven to be an important testing ground upon which to build this future.

April 2012

Written evidence from the Institution of Mechanical Engineers

The Institution of Mechanical Engineers is the fastest growing professional engineering institution in the UK. Our 100,000 members work at the heart of the country's most important and dynamic industries. With a 160-year heritage supporting us, today's Institution is a forward-looking, campaigning organisation.

SUMMARY

Current battery technology is too expensive to provide an attractive equivalent energy store for cars. Despite improvements in electric vehicle costs the gap between electric vehicles and fossil fuel vehicles is not narrowing as they are continuously become more efficient and cleaner—electric vehicles are not affordable over the long term.

At the moment electricity is primarily produced from fossil fuel sources. Until there is a major shift to low-carbon electricity, there is only a limited environmental benefit of using electricity for transport.

Implementation of LCA methodology would allow industry to be technology neutral by ensuring no bias towards petrol, diesel, electric, synthetic, biofuels or fuelcells, encouraging a greater range of methods and innovation all focussing on reducing the carbon emissions. Improvements to conventional powertrains continue with developments to the aerodynamics of the vehicles, engine downsizing, vehicle weight reduction, implementing automatic start-stop features, improving the thermal management systems and reduce the rolling resistance of tyres.

The contribution of plug-in vehicles to decarbonising transport

1. Plug-in vehicles have a potential role in decarbonising transport but there are two major obstacles to overcome—affordability and sourcing the electricity.

Battery Technology

2. Current battery technology is too expensive to provide an attractive equivalent energy store for cars, compared with the cost of fossil fuels. Developments in fossil fuel mean that their efficiency and cleanliness are improving, so despite improvements in electric vehicle costs the gap between electric vehicles and fossil fuel vehicles is not narrowing and electric vehicles are not affordable over the long term. Currently the price for battery cells used in electric vehicles has stabilised at \$300/kWh.

Electricity

3. At the moment electricity is primarily produced from fossil fuel sources. Until there is a major shift to low-carbon electricity, there is only a limited environmental benefit of using electricity for transport. Electric cars using fossil fuel power station electricity produce about 76gm/km CO₂. There is still the need to address how plug-in vehicles fit with the total energy demand that will be created. Questions need to be addressed in terms of supplying demand as we decarbonise the national grid. There is also a lack of public support for nuclear, onshore wind or solar panel farms. Electric vehicles and “reducing carbon” implies increasing renewable electricity, or will this demand for electricity result in higher demand for nuclear power?

Uptake of plug-in vehicles and how this can be improved

4. Uptake of plug-in vehicles is extremely small accounting for less than 0.01% of current vehicle sales and there is little growth in the uptake forecast to 2020. This is made worse by the current economy. The Institution of Mechanical Engineers believes that this will not improve until plug-in vehicles become affordable. Plug-in vehicles are currently around twice the cost of fossil fuelled cars, with limited savings of reduced fuel costs. Fossil fuels are still comparably cheap over a car’s life compared with the capital costs of electric vehicles (including the £5,000 government subsidy). There are concerns about reductions in electricity storage capacity over the lifetime of the vehicle as the battery depletes.

5. With the increasing uptake of electric vehicles leading to an increased energy demand the Institution of Mechanical Engineers believes that this work has to be coupled with programmes to develop more low-carbon energy, better energy storage systems, a smarter grid and encouraging intelligent travel.

The effectiveness of the Plugged-In Places scheme

6. Plugged-in places are a necessary first step in the “chicken and egg” cycle to encourage electric car adoption. Without a recharging infrastructure consumers will be reluctant to purchase electric vehicles, but the network will need to be in place before usage starts to increase. Government (OLEV) funding has been used to integrate these charging facilities into the public infrastructure. Take up by consumers is currently very low and question two makes suggestions to improve the uptake.

The role of plug-in vehicles alongside other technologies to reduce carbon emissions from road transport

7. With 90% of all transport emissions emanating from road transport plug-in vehicles will play a role in reducing carbon emissions. They are not the only solution or best mode for all consumers. There needs to be multiple technological solutions to reduce carbon emissions in transport and Government policy should not try to pick winners. The best solutions will be the most cost effective solutions for consumers.

Life cycle analysis (LCA)

8. Life cycle emissions need to be taken into account when evaluating the net carbon benefit. Provided decarbonisation of the electricity grid proceeds in step with plug-in vehicles deployment, carbon emissions will be reduced. The net impact may be lower than “well-to-wheels” analysis suggests.

9. Plug-in vehicles must be competitive across the board compared with conventional vehicles or their embedded CO₂ could lead to net increased emissions. Calculating the average of a fleet will not capture this.

10. Implementation of LCA methodology would allow industry to be technology neutral. It would ensure no bias towards petrol, diesel, electric, synthetic, biofuels or fuel cells to encourage a greater range of methods and innovation all focussing on reducing the carbon emissions.

Powertrain development

11. Improvements to conventional powertrains (internal combustion engines) are required now. Improvements that can be made include developments to the aerodynamics of the vehicles, engine downsizing, vehicle weight reduction, implementing automatic start-stop features, improving the thermal management systems and reduce the rolling resistance of tyres.

Driving style

12. By changing our driving style we can reduce the amount of energy consumed, resulting in fewer emissions being produced.

Action taken by other countries to encourage the uptake of plug-in vehicles

13. France has a major advantage over the UK with a high proportion of electricity being sourced from nuclear power (low carbon) and domestic manufacturers investing in electric vehicle production.

14. The US has promoted plug-in vehicles but uptake remains very low due to low fossil fuel prices and poor financial appeal to consumers. Lack of commitment by US Government is hindering uptake.

15. Sweden and Brazil have been much more successful in promoting biofuel through active Government co-operation with manufacturers to deliver a supportive environment for low carbon solutions.

16. New Zealand has taken a different approach by carrying out studies that address Active Mode Accessibility (AMA). This is a method by which transport activity has been modelled to address where there is a greater resilience to fuel price shocks and constraints. AMA looks at both the time that a journey takes as well as the distance travelled looking at networks for demand for travel of selected such as: food shopping, retail, social, work commuting and travelling to education facilities.

Plug-in electric vehicles will make a small contribution to reducing carbon emissions until they are cheap and sell in significant quantity. To make plug-in vehicles successful we need to ensure that there is affordable technology that consumers will buy.

April 2012

Written evidence from the Society of Motor Manufacturers and Traders (SMMT)

INTRODUCTION AND SUMMARY OF KEY POINTS

1. The Society of Motor Manufacturers and Traders (SMMT) is one of the largest and most influential trade associations in the UK. It supports the interests of the UK automotive industry at home and abroad, promoting a united position to government, stakeholders and the media. The UK automotive industry is dynamic and globally competitive. Our sector is a vital part of the UK economy with £40 billion turnover and £8.5 billion value added. With over 700,000 jobs dependent on the industry, it accounts for 10% of total UK exports and invests £1.5 billion each year in R&D. The industry plays an important role in the UK's trade balance, with vehicle manufacturers exporting almost 80% of production. The UK is home to the world's largest number of low volume vehicle manufacturers.

2. SMMT welcomes the opportunity to respond to the House of Commons Transport Select Committee inquiry on low carbon vehicles. The UK automotive industry is committed to the development of the low carbon vehicle market, where there is a significant challenge in reducing the emissions of vehicles and contributing to the wider decarbonisation of transport. SMMT has established an Electric Vehicle Group (EVG) to support the UK's emergent low carbon vehicle industry. The group includes organisations from all areas of the industry; such as traditional volume vehicle manufacturers, niche vehicle producers, battery suppliers, charger manufacturers, energy companies and many associated stakeholders.

3. Summary of key points:

- Industry is committed to low carbon vehicles and this is demonstrated by significant investment announced by automotive companies in the UK on low carbon projects. Average new car CO₂ emissions in the UK have fallen 23.7% since 2000.
- The benefits of low carbon and plug-in vehicles are wide-ranging, contributing to CO₂ emissions reduction, improved wider environmental benefits such as noise and reduced air pollution, as well as economic benefits for the UK in technology, manufacturing, exports and employment.
- The early market for plug-in vehicles is developing and government incentives are welcome, however a long-term, consistent, and joined-up government approach is essential to maximise uptake and encourage further investment.
- Infrastructure is a key element of government policy in supporting the development of a plug-in vehicle market. SMMT calls on government to ensure that it renews efforts on coordinating national recharging infrastructure as its strategy develops.
- Collaboration between industry, government and academia has provided key roadmaps for the development of new technology. Technology Strategy Board support for R&D is welcome and must remain responsive to the strategic future of automotive investment. Government should consider how it can further support investment in R&D through the TSB or its "Catapult" programme.

- SMMT welcomes the UK's approach in supporting the development of low carbon vehicles, but government must assess the effectiveness of approaches and scale of support in other countries, particularly in relation to infrastructure and R&D.

DECARBONISATION OF TRANSPORT

4. Industry views the challenge of climate change and the resulting need to reduce carbon emissions from vehicles as well as improving energy efficiency of manufacturing processes as essential to the future and current competitiveness of the sector. The low carbon agenda is core to the business of SMMT members. European legislation regulating emissions from new cars and vans provides challenging targets which the industry is working towards. The move to a low carbon economy presents many industrial opportunities for UK automotive, with companies already committed to greater investment in research, development and new technology. Recent announcements from vehicle manufacturers and companies in the supply chain already demonstrate industry's commitment to significant low carbon ambitions in the UK. Over £4 billion of investment has been announced over the last year by automotive companies in the UK.¹

5. Industry has made significant improvements to CO₂ emission levels in recent years and recognises its responsibility to deliver environmental improvements. Vehicle manufacturers have delivered more efficient and lower CO₂ emitting vehicles to the market which helped see average new car CO₂ emissions fall to a new low of 138.1g/km in 2011, 4.2% down on the 2010 level of 144.2g/km and 23.7% below the 2000 figure of 181.0g/km.²

6. The automotive sector is committed to the decarbonisation of transport. The development of the technology roadmaps, created through co-operation between industry, government and academia, recognises the long-term need for a transition to new lower carbon technology. This strategic approach has put the UK at the forefront in responding to the challenges associated to the adoption and uptake of new technology. It is important to note that a wide variety of technologies will contribute to lower carbon road transport, be that through the refinement of existing technologies and development of next generation petrol and diesel engines, to developing a range of alternatively fuelled vehicles, electrification and plug-in technology.

7. An integrated approach is proving an effective and necessary way to encourage emission reductions and lower carbon choices. Government, industry, wider stakeholders and consumers all have a crucial role to play. Driver behaviour is a particularly important area in which there is large potential for emissions savings. Industry operates a wide range of eco-driving courses, demonstrating how driving techniques can be improved to reduce emissions, increase fuel efficiency and impact positively on safety. Schemes are also being run for purchasers of ultra-low emission vehicles, adding value and demonstrating techniques to increase battery range in an electric vehicle, for example. SMMT supports the Campaign for Better Tyres, which aims to encourage individuals, business and the public sector to choose tyres that are more energy efficient.

8. The importance of the decarbonisation of the energy sector and electricity supply is crucial in the context of the decarbonisation of transport through low emission and plug-in vehicles. A failure to decarbonise the electricity supply and investment in domestic and public recharging infrastructure, will negatively impact the move towards low carbon vehicles, as purchasers will question the value of electric vehicles in environmental terms versus less costly and improving conventionally powered vehicles. Government must address uncertainties around policies such as the short notice changes to feed-in tariffs for small scale renewables to provide reassurance to consumers and industry that government is fully committed to the decarbonisation of energy supply.

9. When discussing the environmental impact of vehicles, it is also important to recognise the impact on environmental factors other than CO₂, such as air quality and noise. The regulatory push to reduce CO₂ emissions also takes place at the same time as regulatory pressures on improving air quality of vehicles through Euro standards. Plug-in vehicles have demonstrable benefits in relation to air quality, where pure electric vehicles have no tailpipe emissions. This is a particularly important factor when looking at the adoption of plug-in vehicles in large urban areas. London, for example, has continuing problems with air pollution and therefore the attraction of low carbon and electric vehicles has an obvious environmental benefit on air quality.

UPTAKE OF PLUG-IN VEHICLES

10. As of 31 March, SMMT registration figures show that 1,412 vehicles eligible for the Plug-In Car Grant have been registered in the UK since the scheme opened in January 2011. The growth of this early low and ultra-low carbon vehicle market is significant. Looking at registration figures for 2011 where full year data is available, 1,052 Plug-In Car Grant eligible vehicles were registered, representing an 847% increase over 2010, which saw 111 registered. The introduction of the grant has had a crucial impact in bringing new ultra-low carbon plug-in vehicle models to market. At present there are 10 eligible vehicles under the Plug-In Car Grant, some of which are due to be launched later this year. As further models are launched and there is an increase in the variety, type and number of models available to consumers, uptake of ultra-low carbon vehicles will steadily increase. The wider economic climate remains uncertain and this must also be taken into account when

¹ SMMT press release, 20 December 2011: <http://www.smmt.co.uk/2011/12/2011-a-step-change-year-for-uk-automotive/>

² SMMT press release, 6 January 2012: <http://www.smmt.co.uk/2012/01/new-car-market-betters-forecast-but-was-down-4-4-in-2011-to-1-94-million/>

discussing the registrations of new vehicles. Private demand in the new car market remains fragile, therefore government should focus on policies that boost consumer and business confidence.

11. Consumer acceptance of new technology traditionally follows a pattern, where in the short-term, as the technology first comes to market, uptake is modest. Mid-term, as consumers see vehicles being driven on the road and the perception of purchasers' changes, there is then a wider acceptance of technology, a change in consumer purchasing attitudes and uptake increases. An explicit example of this type of behavioural change can be seen in the uptake of petrol-electric hybrid technology. Registrations of petrol-electric hybrid vehicles shows that year-on-year between 2011 and 2010, volumes increased by 5.6%, from 22,127 units in 2010 to 23,370 units in 2011.

IMPROVING UPTAKE

12. The UK is at an early stage of the low carbon vehicle market development and this context must be fully understood when analysing the uptake of vehicles. As demonstrated above, we are seeing the steady development in the number of ultra-low carbon vehicles being sold in the UK, however there are a number of areas in which government and industry have a responsibility in ensuring that an early market becomes established, providing the basis for a mass market to grow.

13. It has been demonstrated that the introduction of purchase incentives, as well as a favourable tax regime applied to low carbon vehicles has contributed to the increased uptake of such vehicles. SMMT welcomed the government's decision at the beginning of 2012 to provide consistency and certainty for its Plug-In Car Grant through the lifetime of this Parliament. A long-term approach to such incentives gives confidence to vehicle manufacturers and bolsters consumer confidence. Schemes across government must be consistent to ensure incentives are maximised.

14. Financial incentives that can be implemented locally also have an impact on the uptake of low carbon vehicles. London's Congestion Charge provides 100% discounts for electric and plug-in vehicles as well as petrol and diesel powered vehicles that have CO₂ emissions below 100g/km and meet the Euro 5 standard for air quality. Other measures such as free or subsidised parking, free electricity from public recharging infrastructure and use of bus and car pool lanes all provide additional benefits for purchasers of low carbon vehicles, which should be considered by local authorities and government.

15. As with any new technology, increased consumer acceptance and experience will improve uptake, and there is a need for a coordinated increase in information and education for consumers. SMMT has developed an Electric Car Guide,³ which aims to answer common questions around plug-in vehicles, demonstrating the advantages of purchasing electric vehicles as well as highlighting the challenges faced. Industry is working collaboratively with government on maximising messages around electric vehicles to encourage uptake. Countries such as Denmark are funding research into consumer acceptance of electric vehicles, where initial findings are positive and demonstrate that particular perception barriers are broken down in relation to vehicle range, as well as reducing emissions.

16. Government, local authorities and public bodies can all have a positive impact on the uptake of low carbon vehicles through procurement regimes. The Department for Transport (DfT) set up the Low Carbon Vehicle Public Procurement Programme (LCVPPP) in 2007 and launched a second phase in November 2011. Concerns arose around the complexity of the initial phase, which provided an element of uncertainty to low carbon commercial vehicle manufacturers and limited the impact of the scheme in the wider uptake of low carbon vehicles in public fleets. The 2011 Autumn Statement outlined how government would be reviewing procurement policy, including improved strategic engagement with industry and simplification of the UK procurement process. These are two crucial factors in enabling procurement to become an effective mechanism to support the uptake of low carbon vehicles.

17. Fleet and business purchases of low carbon vehicles are a significant proportion of new plug-in vehicle registrations. It is therefore vital for specific action to be taken forward in promoting low carbon vehicles and their benefits to the fleet sector. Fleet demonstrations and evaluations are valuable in raising public and government awareness. SMMT has carried out specific work in relation to fleets and is looking to continue a programme of activity that will seek greater engagement and activity to support the uptake of low carbon vehicles within fleets. The Climate Group's fleet initiative⁴ is a welcome piece of work that will complement other actions to raise awareness and provide evidence-based research on the business case for introducing electric vehicles into fleets.

INCENTIVISING COMMERCIAL VEHICLES

18. SMMT welcomed government's announcement following its review of the Plug-In Car Grant that the incentive would be extended to van purchases. The Plug-In Van Grant complements the scheme in place for cars and shows determination to encourage the uptake of low carbon commercial vehicles, which is an important sector when looking to reduce emissions from all types of road transport. The additional grant also

³ SMMT Electric Car Guide, 2011: <http://www.smmt.co.uk/2011/08/electric-car-guide/>

⁴ The Climate Group, Plugged-in Fleets: A guide to deploying electric vehicles http://www.theclimategroup.org/_assets/files/EV_report_final_hi-res.pdf

strengthens the UK's offer and package of incentives that is critical in demonstrating the attractiveness of the UK as a location to invest and do business. As the vehicles eligible for the Plug-In Van Grant were announced relatively recently, it is too early to analyse any impact of the grant, however SMMT is keen to monitor this segment of the market and work with government to ensure that uptake of low carbon commercial vehicles accelerates.

19. Experience shows that commercial vehicles present a good platform for the adoption of plug-in technology. Vehicles being used in a commercial environment often have known duty cycles and pre-planned routes. The urban setting where commercial vehicles, in this case often vans, are part of fleet and go "back to base" at the end of their cycle, presents an opportunity where plug-in vehicles are well suited to operate, with a known battery range and a depot or base to provide vehicle recharging. Benefits to business in operating low carbon vehicles include reducing their carbon footprint, costs, as well as providing brand benefits in demonstrating low carbon credentials.

20. When looking at low carbon commercial vehicles, it is important to recognise the work ongoing to reduce vehicle emissions and improve efficiency performance in larger commercial vehicles. The Automotive Council's Technology Group has developed a specific commercial vehicle and off-highway roadmap which is outlined later. This reinforces the need for a multi-technology approach to bring about a lower carbon transport system.

21. The UK is a leader in low carbon bus technology, where bus operators are increasingly looking to introduce hybrid and other forms of low carbon buses into their fleets. The current and previous governments have looked to support the manufacture of low carbon buses through successive rounds of the Green Bus Fund. SMMT welcomes this vital support that encourages operators to invest in low carbon technology that has a direct impact on the design and manufacture of many low carbon buses in the UK.

22. SMMT published a low carbon heavy goods vehicle (HGV) strategy in 2010,⁵ in which industry accepted the need to reduce CO₂ from HGVs and highlighted some early strategic principles, such as the need to decarbonise the fuel, the significant contribution available from operational efficiency improvements and the understanding that operators need incentives to adopt break-through low carbon technologies. The strategy also highlighted the need for CO₂ performance to be measured in a way that recognises the load carrying capacity of the vehicle: gCO₂/tonne km or per m³ or per passenger.

23. Policies to reduce CO₂ emissions from road freight will only be successful if they reflect the complexity of the HGV market. One major problem with previous approaches has been to have a measurement procedure which enables straightforward verification of regulatory compliance. Policy measures and regulation to support the uptake of low carbon HGVs must recognise the complexity of this market (from 3.5 tonnes to 60 tonnes, different duty cycles, multi stage build).

24. Fuel efficiency is a key customer priority and the European industry has become a world leader in this area. If the rate of improvement is to increase, then the market forces need to be strengthened. An integrated approach is required leveraging activity in fuels, logistics, driver training, traffic flow and then considering vehicle technology.

25. Following close working with industry, in November 2011, DfT announced the Logistics Growth Review, which included a £9.5 million TSB competition for low carbon truck demonstration and refuelling infrastructure for alternative fuels.⁶ This is an opportunity for manufacturers to showcase the capabilities of technologies that are already available. SMMT has stressed that this would need to be carefully designed to avoid a perpetual cycle of vehicle demonstrations, without them being taken up across the mainstream fleet.

26. Alongside the publication of the review, it was confirmed that key industry bodies (including SMMT) and the DfT would work together through a Strategic Task Force to advise government on lower emission HGVs. SMMT is keen to see it build on the Automotive Council roadmap for Commercial and Off Highway Vehicles,⁷ to analyse the barriers to uptake of low carbon technologies and options to overcome them. SMMT urges government to convene the first formal meeting of the Task Force at its earliest opportunity to begin this work.

TAXATION

27. Government policies to further lower carbon choices need to retain the diversity of the UK industry as a strength and support R&D investment and innovation across the whole UK automotive industry, irrespective of industry segment or vehicle type. The tax regime in the UK is an important tool for government in shaping consumer behaviour and uptake of new technology. SMMT continues to call for long-term certainty as well as consistency and clarity so that industry and consumers have confidence to invest and plan. SMMT is engaged with the Treasury in its consultation on changes to the R&D tax credit to make it "above-the-line", which is an essential element of government policy to ensure further investment of R&D in the UK.

⁵ SMMT press release: <http://www.smmt.co.uk/2010/06/ultra-low-carbon-truck-strategy-launched/>

⁶ TSB: <https://connect.innovateuk.org/web/low-carbon-truck-demonstrator-trial>

⁷ Automotive Council: <http://www.automotivecouncil.co.uk/wp-content/uploads/2011/07/COM-OH-Roadmap.pdf>

28. SMMT has welcomed government's approach to encourage lower carbon choices through the Vehicle Excise Duty and Company Car Tax regimes, as well as first year enhanced capital allowances for ultra-low carbon vehicles. Fleets and businesses will benefit from these measures, key customers in the early ultra-low carbon vehicle market. It is important that such regimes are supported to provide clear and certain benchmarks for business. Sudden changes to the treatment of low carbon vehicles in relation to company car tax and capital allowances could be detrimental to the uptake of low carbon vehicles and put off fleet and business purchasers making decisions on the basis of cost of a vehicle over a number of years.

29. SMMT was disappointed at statements made in this year's Budget that removed the first year capital allowance incentive leased business cars, which was announced with no previous notice. Such unexpected announcements cause instability in the fleet market and provide mixed messages on market support. SMMT also expresses concern that from April 2015, the five-year exemption for zero and ultra-low emission vehicles will come to an end, sharply rising to 13% in April 2015 and 15% in 2016–17. Certainty to 2015 is welcome, however government itself has recognised the fragility of this market, and the need for a long-term framework of incentives to increase up-take and create a strong and growing low carbon vehicle market in the UK. Government and industry should work together to ensure support reflects this developing market.

30. Government must also ensure that its policies on low carbon vehicles are co-ordinated across departments. SMMT works closely with officials in the Office for Low Emission Vehicles (OLEV), which is tasked to coordinate government policy on low carbon vehicles. OLEV provides effective collaboration between the Department for Transport, Department for Business, Innovation and Skills, and the Department of Energy and Climate Change, however closer involvement of the Treasury would provide a crucial link to ensure rational and stable policy decisions.

INFRASTRUCTURE

31. SMMT welcomed the announcement under the previous government to establish the Plugged-In Places project and the commitment that the coalition government has given to see it through to completion in 2013. Ensuring there is appropriate public infrastructure for plug-in vehicles is a crucial factor for consumer acceptance and uptake of this technology, but must be managed so as to reduce the risk of stranded charging assets. SMMT also welcomed government's Plug-In Vehicle Infrastructure Strategy published in June 2011. SMMT members believe that the approach taken to focus on domestic and workplace recharging is appropriate as this is where the majority of recharging will be taking place.

32. The Plugged-In Places projects will be useful in informing government policy on the wider roll out of infrastructure. There has been varying success in the eight Plugged-In Places projects, with some locations demonstrating commercially viable plans for when government funding ends and others whose status is less certain. It is vital that when government reviews its Plug-In Vehicle Infrastructure Strategy at the beginning of 2013, actions are put in place to enable the infrastructure associated with the eight projects remains viable and open for public use. Issues of interoperability between regions have yet to be resolved with registered users of one Plugged-In Places scheme still being unable to use neighbouring schemes without separately registering. Plans for a National Whitelist, enabling interoperability, are to be welcomed but is not yet in place. Government should encourage plug-in vehicle charging infrastructure owners to sign up to the National Chargepoint Registry. Government should ensure that the disparate approaches made by Plugged-In Places regions are joined-up and complemented by a cohesive and clear plan for a national network of public recharging infrastructure.

33. SMMT is engaged with officials at OLEV on a number of issues related to plug-in vehicle recharging infrastructure, including looking at how consumers can be enabled to charge at home and off-peak. It is important that consumers are supported to be able to conveniently charge at home, ensuring that both the physical infrastructure is reliable and in place, as well as being able to access value-for-money tariffs.

34. Energy companies have a role to play in providing competitive tariffs that encourage and incentivise plug-in vehicle recharging at home and off-peak. The consumer proposition for plug-in vehicles must include running and ongoing costs. Rising oil prices will in itself make plug-in vehicles an attractive proposition, however incentives and market signals that reduce further the refuelling costs is a crucial element in increasing uptake. This reinforces the importance of an integrated approach where all stakeholders have a responsibility to ensure consumers and businesses are supported in their purchasing decisions.

35. Physical infrastructure needs for domestic and workplace recharging are a critical area of focus. Being able to install appropriate, affordable and safe charging equipment should be a key element of government's infrastructure plans. The Institution of Engineering and Technology's (IET) Code of Practice for Electric Vehicle Charging Equipment Installation is supported by SMMT and looks to set out best practice for the safe installation of electric vehicle charging equipment. Appropriate solutions will differ from customer to customer and will vary in terms of cost. Efforts should be made to minimise the cost of charging equipment installation as this could present itself as a market barrier to uptake of plug-in vehicles.

36. SMMT recommends to the Committee that government considers how the Green Deal initiative could support the purchasing of electric vehicle charging infrastructure. The scope of the Green Deal, looking at energy efficiency improvements for households and businesses, fits well with the aims and objectives of plug-in vehicle technology and the decarbonisation of transport. Government itself recognises in its infrastructure

strategy that those taking up core Green Deal measures are also likely to be plug-in vehicle adopters. The scheme could offer low cost finance with no upfront cost to install home and workplace charging facilities. There is also recognition that the Green Deal could be a potential way in which information about ultra-low carbon vehicles is communicated. Such a move would compliment other measures to encourage the wider take up of low carbon vehicles. The Department of Energy and Climate Change should ensure that the offer to businesses and customers through the Green Deal reflects policy across government, and the wider efforts to reducing emissions from road transport.

37. Government’s recently published National Planning Policy Framework is a welcome move that builds on actions to promote sustainable transport through planning and development policy. Encouraging developments to incorporate facilities for charging plug-in vehicles is a positive step in supporting workplace and domestic charging. Government should further pursue considerations made in its infrastructure strategy looking to explore whether voluntary standards such as the Code for Sustainable Homes can be a route to bolster domestic infrastructure needs.

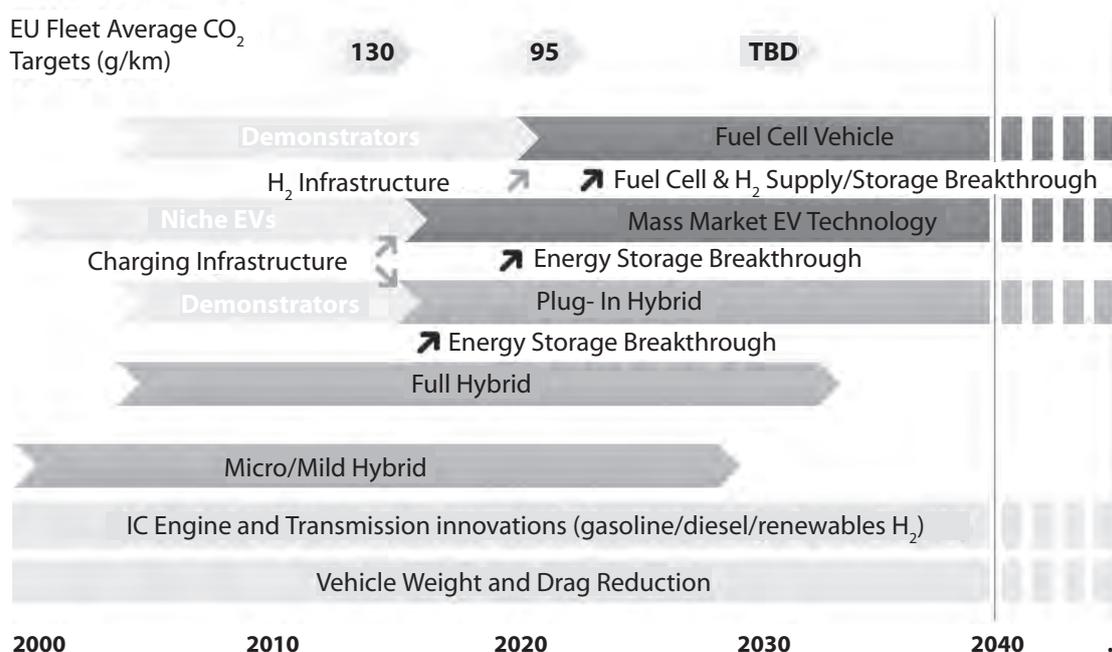
TECHNOLOGY AND R&D

38. As mentioned above, UK industry, government and academia have collaboratively developed consensus technology roadmaps for cars (Figure 1, below) which provide a key focus for industry, recognising the long-term challenges associated with the transition to ultra-low carbon vehicles. A commercial vehicle and off-highway vehicle roadmap was published in April 2011, outlining the drivers and timescales of technology development across the sector. To support these roadmaps, technology neutrality is essential for government policy, as industry has identified through the Automotive Council that there are a plethora of technologies supported by the sector.

39. The Automotive Council has set out strategic investment priorities for the move to lower carbon technologies, working with the Technology Strategy Board (TSB) in identifying five “sticky” or priority technology groups where the UK has the potential for a significant return on investment, which industry, government and R&D funding bodies should strategically exploit and support. The “sticky” technologies are: energy storage and management, electric motors and power electronics, internal combustion engines, lightweight vehicle and powertrain structures, and intelligent mobility. The UK should move quickly to support these technologies to maximise the potential economic and industrial benefits.

Figure 1

PASSENGER CAR CONSENSUS INDUSTRY TECHNOLOGY ROADMAP, SOURCE: AUTOMOTIVE COUNCIL



40. Automotive companies are investing heavily in UK R&D to develop innovative technologies that lower the emissions and environmental footprint of their products. Long-term commitments from government for continued support of new technology will enable the UK to build on this area of opportunity and strengthen the UK’s leading role. As mentioned previously, SMMT welcomed government’s announcement to introduce above-the-line R&D tax credits, which will be significant in leveraging further investment in R&D in the UK.

41. SMMT supports the Technology Strategy Board's (TSB) coordinating role in providing government funding for strategic R&D low carbon projects. The TSB is a vitally important funding body and must remain responsive to the strategic future of automotive investment. R&D support is a crucial element in supporting low carbon industrial opportunities in the UK. Compared to government support for R&D investment in other countries, as highlighted later, SMMT believes government should consider how best to further support and garner more low carbon R&D investment in the UK. In particular how government support mechanisms can address the "valley of death"—the funding gap between promising research and the transition to the marketplace.

42. An option for government could be to increase funding through the TSB, or to exploit the strategic opportunities presented following the work of the Automotive Council and the "sticky technologies" highlighted above through the "Catapult" programme. Government has already set up a Catapult centre for one of the sticky technologies—intelligent mobility and transport systems. The remaining four areas—energy storage and management, electric motors and power electronics, internal combustion engines, lightweight vehicle and powertrain structures—have support as part of the wide mix of technologies through the general Advanced Manufacturing Catapult. Government should consider the creation of new Catapult centres that focus on low carbon vehicle technologies, encompassing all areas of the low carbon automotive technical agenda. Such support would both signal government's commitment to delivering on the Automotive Council's priorities, while providing a focal point for UK R&D in these technologies.

43. Among TSB funded projects, the Ultra Low Carbon Vehicle Demonstrator Programme⁸ made available £25 million to provide some of the costs for business-led demonstration projects for low carbon vehicles. The project funded eight consortia to undertake research around consumer attitudes to low carbon vehicles. This workstream is providing important information on real-world testing that will help inform industry, government and other stakeholders to understand customer perceptions and concerns, as well as identify challenges with infrastructure.

44. Recent government and industry collaboration has seen a consortium of companies, including vehicle manufacturers, suppliers and energy companies come together to form UKH₂Mobility, with the aim to produce an evaluation on the potential for hydrogen as part of the low carbon vehicle mix in the UK, developing an action plan for anticipated roll out to consumers. This work is an important element of industry collaboration to support the economic opportunities and environmental benefits across all low carbon vehicle technologies.

45. Continual improvements to making the business environment for R&D more attractive will enhance the UK's capabilities and increase the industry's international competitiveness. Policies that support this aim would help ensure future low-carbon automotive technologies are not only deployed but developed and manufactured in the UK, as well as encouraging new technologies to be brought to market faster and encourage growth in the UK's domestic supply chain.

INTERNATIONAL COMPARISONS

46. The UK is striving to be at the forefront of the European low carbon vehicle market. SMMT analysis shows that uptake of vehicles is of a comparable level to that of other major markets in Europe. Where data is available for the whole of 2011, UK electric vehicle registrations were 1,082, representing a total market share of 0.06%. Registrations in France were 2,328, a 0.11% market share; Spain 862, representing a 0.05% market share; the Netherlands with 862, representing a 0.16% market share; Norway with 1,996, representing a 1.44% market share; and Italy with 289, representing a 0.02% market share. Partial data up to October of 2011 shows Portugal with a 0.10% market share and Germany with a 0.07% market share. Markets further afield demonstrate greater levels of registrations, with the United States recording 8,153 vehicles registered up until October 2012, representing a 0.16% market share and Japan with full year 2011 registrations of 12,600, representing a 0.36% market share.

47. The UK government's package and offer in terms of incentives for low carbon vehicles is also comparable to those provided by other European and international competitors. Purchase incentives similar to the UK's £5,000 Plug-In Car Grant are available in France (worth up to €5,000), Spain (worth up to €7,000), Ireland (worth up to €5,000), and Portugal (worth up to €5,000). In the United States the offer of a tax credit up to a maximum of \$7,500 is available. Notable markets such as the Netherlands and Germany do not offer national level grant-type incentives. It is worth noting that in some countries such as Spain, the United States, and China, regional authorities provide additional grants and incentives than those provided for at national level. In the case of the United States, significant additional grants are available in various states.

48. Application of favourable tax rates and exemptions from road and circulation taxes for low carbon vehicles are consistent throughout all the major markets in Europe, as well as the United States and Japan. Many countries have signalled a preference for incentivisation of low carbon vehicles through tax regimes. While taxation is an important element as outlined previously, SMMT believes that the UK's approach to provide an incentive at the point of purchase is a crucial factor in providing a reduction to consumers of the up-front cost of new low carbon technology.

⁸ Initial findings from TSB demonstrator programme: http://www.innovateuk.org/_assets/pdf/press-releases/ulcv_reportaug11.pdf

49. SMMT welcomes the UK's approach of supporting the entire development chain from idea through to product purchase and use. Other European countries have placed differing priorities in terms of support for the adoption and uptake of low and ultra-low carbon vehicles.

50. Infrastructure support from central government has been a major focus in Portugal and the Netherlands. Rolling out infrastructure was seen in the Netherlands as the top priority, with infrastructure being installed slightly faster than the speed of vehicles arriving on the market. In 2009 the Dutch government allocated €65 million for publically funded electric vehicle support, as well as establishing a prominent group of organisations to increase the uptake of electric vehicles in the Netherlands. The team is headed by Prince Maurits of the Netherlands and also includes two other well known Dutch business figures who are used in publicity to increase the awareness and uptake of electric vehicles. The Portuguese government chose to entirely fund the roll out of publically available infrastructure across the country, which was the world's first nationwide plug-in vehicle charging network. The "MOBILE" network had the intention of introducing over 1,300 charging points that would be operated centrally and owned by the government.

51. Elements of such support for R&D, purchase incentives and infrastructure development vary from market to market. Some markets, such as Germany, have placed a larger emphasis and considerable funds on R&D support, which looks to develop an industrial base for the research, design and manufacture of low carbon vehicles. Germany committed €2 billion of investment for battery R&D between 2007 and 2014, the French government is investing €125 million in a battery factory with Nissan and Renault. The United States has provided over \$2 billion in grants for batteries and electric motors and during the recession, the US government provided \$8 billion in Energy Department loans to help automotive manufacturers create fuel-efficient vehicles. Funds were awarded to companies that demonstrated investment to increase fuel standards at least 25% beyond 2005 levels.

April 2012

Written evidence from General Motors UK

INTRODUCTION

1.1 This is the submission of General Motors UK to the Call for Written Evidence issued on 15 March by the House of Commons Transport Committee in connection with its inquiry into Low Carbon Vehicles.

1.2 General Motors UK Limited (GM) represents the Vauxhall and Chevrolet brands in the UK and directly employs c.4,500 people at our manufacturing plants in Luton and Ellesmere Port, at our engineering facility at Millbrook Proving Ground in Mid Bedfordshire and at our Warehouse operations and Corporate Headquarters in Luton. In addition, through our nationwide network of retailers a further 23,000 people are dependent on GM as well as a further 7,000 people via our UK supply chain. GM is a large UK manufacturer and is responsible for 5.7% of UK car production and 62% of UK commercial vehicle production.

POSITION SUMMARY

- Ultra-low carbon vehicles will substantially help to decarbonise transport.
- The government should continue to create a favourable tax and regulatory regime for plug in vehicles.
- In order to be more effective, the plugged in places scheme should look to harmonise the various schemes across the UK, certain areas need to improve on communicating their roll-out plans and there needs to be more support for re-charging schemes in the home and at work.
- In the future, GM foresees that electric vehicles will be part of a range of different propulsion systems.
- Whilst there is a need for a standardised plug-in cable in the UK for vehicle manufacturers and others provision should also be made to the standard 3-pin plug-in vehicles in or coming to market.

MAIN POINTS

The contribution of plug-in vehicles to decarbonising transport

3.1 With the fear of global warming and climate change, over the past few decades we have seen a move away from the reliance on fossil fuels to new green, energy efficient technologies. In the automotive industry this has led to vehicle concepts evolving from the internal combustion engine to new propulsion systems such as the Battery Electric (BE), Plug-in Hybrid Electric (PHE) and Extended-Range Electric Vehicles (EREV).

3.2 Vauxhall's flagship, plug-in EREV vehicle, the Ampera, allows up-to 50 miles of driving from its battery pack, which meets the needs of 85% of all UK commuters.⁹ The 1.4 litre petrol engine also means that the vehicle can travel a further 310 miles, thus dealing with the problem of range anxiety faced by many consumers. Its tailpipe emissions of only 27g CO₂ per km mean that it falls well within the definition of an ultra-low

⁹ CCB EcoAuto Research, May 2010.

carbon vehicle as set out by the European Union.¹⁰ Ultimately, the uptake of these vehicles going forward will mean that less carbon dioxide and other emissions will be released into the atmosphere, decarbonising the transport system and lowering overall emissions to help the government reach its legally binding carbon dioxide targets by 2050.

Uptake of plug-in vehicles and how this can be improved

4.1 The plug-in car and van grant which allows motorists purchasing a qualifying low carbon vehicle to claim 25% of the cost of purchasing a vehicle up to a maximum of £5,000 or £8,000 is critical to the success of the future roll-out of these vehicles. Measures like these which make the vehicle more attractive to consumers will help to ensure the transition from solely internal combustion engines to plug-in vehicles. This help is welcome not least because the automotive sector has invested billions of pounds in bringing this new technology to market and will not see payback for many years to come. Added to that, we are asking customers to change purchasing behaviour to vehicles with higher initial costs but with a more competitive total cost of ownership throughout their lifespan. It is essential therefore that grant schemes like these are continued in the long-term and that the government through its tax and regulatory regime incentivises uptake of these vehicles. Furthermore, encouraging public sector procurement of ultra-low carbon vehicles would be a welcome step in this direction.

4.2 We were disappointed with the recent announcements in the 2012 budget relating to low carbon vehicles. In order for low carbon vehicles to be successful they require a taxation system that encourages their uptake. Increasing the company tax rate for low emission vehicles after 2015 and preventing leased business cars being eligible for first year capital allowances will not help this. This has made purchasing a plug-in vehicle less attractive to the corporate consumer with little overall economic benefit to the Exchequer. We urge the government not to go ahead with such detrimental measures in future if it wishes to support the roll-out of these vehicles. We firmly back the Society for Motor Manufacturers and Trader's (SMMT's) position that long-term certainty is required in the tax regime so that both consumers and industry have confidence to plan and invest.

4.3 If the government is committed going forward to harmonising the UK with current EU legislation, we believe that the government should distinguish between low and ultra-low carbon vehicles ie those that emit less than 50 grams of CO₂ per km in the tax system. Encouraging the uptake of vehicles best able to decarbonise the transport system, will help ensure that the government meet its legally binding CO₂ targets.

The effectiveness of the Plugged-In Places scheme

5.1 The scheme has in part done what it set out to achieve in that it has funded projects that see the start of electric re-charging infrastructure rolled-out to certain parts of the country. However in an emerging market, both private sector companies and government have over the past few years been working towards an intensive period of knowledge acquisition to understand the best approach to support this new technology.

5.2 We believe going forward that different charging schemes from across the UK should be harmonised. At the current point in time in order to use electric points in different parts of the country you would have to be a member of multiple schemes. For example if you use an Ampera or Chevrolet Volt and you are travelling to different parts of the country, in order to re-charge the vehicle you always need to carry about five or six charging scheme cards. This is off-putting and complicated for customers and only serves to reinforce concerns over range anxiety. A single membership that allows customers access to all charge points within the plugged-in-places scheme should be pursued.

5.3 Many projects that have been funded by the scheme have been difficult to obtain information from. London have communicated their ideas and been pro-active in seeking help and support for their plan to roll-out to their respective areas. However, in places like Greater Manchester we have not found this the case. We would like to see more detailed plans for the roll-out of charging points in all areas of the country the scheme is in place.

5.4 Alongside these projects we would also like to see greater emphasis placed on encouraging charging in the home and at work to avoid the extra cost of upgrading the national infrastructure. Vauxhall's new car of the year, the Ampera, is also available with a British Gas fast charge kit so that these vehicles can be charged at home. These are the type of schemes that we hope plugged-in places can encourage going forward. Re-charging from home is not only the most convenient place to re-charge but if done at night can maximise the environmental and economic benefits of these vehicles, whilst also minimising the impact of peak-use on our aging national grid system. We welcome the fact the Office for Low Emission Vehicles (OLEV) are working with the SMMT to ensure consumers are enabled to charge at home and off-peak.

¹⁰ Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO₂ emissions from light-duty vehicles.

The role of plug-in vehicles alongside other technologies to reduce carbon emissions from road transport

6.1 Going forward we foresee that electric plug-in vehicles will sit alongside other forms of technology such as diesel hybrids and hydrogen fuel cell powered vehicles to reduce carbon emissions. These vehicles will start being introduced in 2015 and will become more common through to 2020, so consideration must be given to assisting with higher purchase costs and re-fuelling infrastructure gaps which must be addressed shortly. We also firmly back the SMMT's position; the government should consider how best to garner further investment for research and development in low carbon projects. General Motors UK believe this will help pave the way for the above mentioned technologies to become even more efficient and looks forward to working with both organisations to help achieve this.

Action taken by other countries to encourage the uptake of plug-in vehicles

7.1 In Holland a decision was taken over which plug-in cable should be standardised for re-charging electric vehicles a long time ago. The mennekes plug has now become the standard charging plug, helping manufacturers and others design and build their products accordingly. In the UK, a standard re-charging plug may require government intervention. Whilst we would welcome the move to a standardised plug-in cable for all charging points, we would not like to see this come at the expense of vehicle owners who require the three-pin plug-in cable.

April 2012

Written evidence from the Department for Transport

1. The Government has committed £400 million over the lifetime of this Parliament to support ultra-low emission vehicles (ULEVs). This includes funding for a consumer incentive of up to £5,000 for eligible cars and up to £8,000 for eligible vans; £30 million to kick-start the installation of recharging points throughout the UK; and £82 million for research, development and procurement programmes. Work is also underway to encourage UK businesses to seize commercial opportunities in the ULEV sector, and to develop and strengthen the capability of ULEV manufacturing and its associated supply chain in the UK.

2. The Office for Low Emission Vehicles (OLEV) was formed in 2009 to simplify policy development and delivery in this area. It is a cross-departmental unit comprised of staffing and funding from the Departments for Transport, Business Innovation and Skills, and Energy and Climate Change. OLEV also has responsibility for the EU CO₂ car and van Regulations, measures which save the largest amounts of CO₂ emissions in road transport.

TRANSPORT'S ROLE IN MEETING UK CARBON TARGETS

3. Domestic transport emissions make up 25% of the UK's total CO₂ emissions and 21% of total greenhouse gas emissions.¹¹ Between 1990 and 2009, greenhouse gas emissions from transport have increased by 13%, whilst there has been a 25% fall in total greenhouse gas emissions.

4. Of these domestic transport emissions in 2009, road transport made up just over 90%, with car travel accounting for over a half (58%) and heavy goods vehicle and light van traffic accounting for just under a third (30%).¹²

5. In the short term, the major driver of emissions reductions for both cars and vans will be EU new vehicle CO₂ targets. However, to meet the Government's challenging climate change targets, the market for ULEVs needs to start now in the UK. The vision to 2050 was set out in the Government's 2011 Carbon Plan:

*"by 2050 almost every car and van will be an ultra low emission vehicle (ULEV), with the UK automotive industry remaining at the forefront of global ULEV production, delivering investment, jobs and growth. Due to the time needed for fleet turnover, this requires almost all new cars and vans sold to be near-zero emission at the tailpipe by 2040. These ULEVs could be powered by batteries, hydrogen fuel-cells, sustainable biofuels, or a mix of these and other technologies. We cannot say for sure which technologies will emerge as the most effective means of decarbonising car travel, so it is essential that the Government takes a technology neutral approach, allowing us to achieve emissions reductions in the most cost-effective way."*¹³

6. By pursuing a framework for improvements in average fuel efficiency as opposed to specific technology targets, the Government intends to create the incentives for industry to develop the technologies that reduce emissions, work for consumers and make economic sense. Technologies could include electric, hydrogen, hybridisation, and sustainable biofuels and we are likely to see these used for different transport applications. Both the Plug-In Car and Plug-In Van Grant are technology neutral.

¹¹ Committee on Climate Change Third Progress report to Parliament, 2011, http://hmcc.s3.amazonaws.com/Progress%202011/CCC%20Progress%20Report_Interactive_2.pdf

¹² Transport energy and environment statistics 2011, <http://assets.dft.gov.uk/statistics/releases/transport-energy-and-environment-statistics-2011/energy-2011.pdf>

¹³ DECC Carbon Plan 2011, <http://www.decc.gov.uk/assets/decc/11/tackling-climate-change/carbon-plan/3702-the-carbon-plan-delivering-our-low-carbon-future.pdf>

7. The Automotive Council Technology Development Roadmap (see Annex A) demonstrates the industry consensus on how alternative technologies in ULEVs are likely to develop over the next 30 years.

GOVERNMENT ACTION

8. Upfront cost and concerns about the distance vehicles can travel before re-charging (range) remain key issues for potential buyers. The Government has taken steps to address these issues through the programme:

- *upfront cost*: reducing the purchase price of vehicles through the Plug-In Car Grant (25% Grant, up to £5,000) and Plug-In Van Grant (20% Grant, up to £8,000) (more information at Annex B). ULEVs are more expensive than conventional vehicles but have lower running costs;
- *re-charging*: supporting eight Plugged-In Places (more information at Annex C). The scheme offers match-funding to local consortia of businesses and public sector partners to support the installation of a critical mass of electric vehicle recharging infrastructure in lead places across the UK; and
- *tax treatment*: ULEV's receive favorable tax treatment, including an exemption from Vehicle Excise Duty, reduced Company Car Tax and exemption from the Van Benefit Charge. These are detailed at Annex D.

9. Internationally, similar incentives are being offered by a number of countries. These are detailed at Annex E.

10. In addition, the Government is funding a programme of research and development to support this new generation of vehicles. This is delivered through the Technology Strategy Board. We are also working closely with industry and other government departments to support the development and strengthening of UK-based supply chains for ULEVs, maximising business opportunities and maintaining competitiveness in the transition to a green economy.

PROGRESS

11. As at 31 March 2012, 1,276 applications had been made for the *Plug-In Car Grant*, with Society of Motor Manufacturers and Traders (SMMT) data showing that 1,412 cars eligible for the Grant were registered over the same period.

12. Relative to the number of ULEVs registered in previous years, this is a step change and is part of a wider trend. SMMT data also shows that alternatively-fuelled vehicles represent a growing share of the total market, with registrations rising to 1.3% market share in 2011 after an 11.3% rise in volumes over the year.¹⁴

13. This demonstrates that the consumer incentive is having a positive effect on the ULEV market, although uptake has been slower than we would have liked to see. We expect sales volumes to increase through 2012 as less expensive vehicles eligible for the Grant are launched in the UK, as well as the first plug-in hybrids and range-extended electric vehicles. These vehicles will not be restricted in the distance they can travel, and may prove more attractive to the UK market than pure battery-electric vehicles which need to be charged after 75 to 100 miles.

14. More innovative finance options are also emerging from vehicle manufacturers to help reduce the upfront cost and to re-assure consumers about the battery. For example, Renault are planning to lease the battery in their vehicles to customers—thereby reducing the initial cost and alleviating any concerns about the technology.

15. Manufacturers have also announced plans for around another 20 car models to be launched by the end of 2013, which may be eligible for the Grant—thereby significantly increasing the choice available for consumers.

16. Figures are not yet available for the uptake of vans through the Plug-In Van Grant. However, vans are well suited to ultra-low emission technologies, due to their regular route and stopping patterns, back-to-base operation and the importance placed upon total cost of ownership by fleet and business purchasers. We therefore expect uptake to increase with support from the Grant.

17. The *Plugged-In Places* (PiP) programme has significantly increased the number of recharging points in the UK. Our assessment is that the number of installed chargepoints in the UK is more than 3,000 (including publically accessible, domestic and private workplace chargepoints). Of these, 1,673 have been delivered (to the end of March 2012) through the PiP programme, and the remainder by private sector organisations and other local authority schemes.

18. We have seen the emergence of private sector providers of charging points, such as Chargemaster's national "POLAR" scheme which will be the UK's first privately-funded large scale plug-in vehicle charging network. The roll out of POLAR will initially be in approximately 100 towns and cities, providing around 4,000 electric vehicle charging bays. Both Little Chef and Welcome Break have announced a network of recharging points at their motorway service stations.

¹⁴ <http://www.smmt.co.uk/2012/01/new-car-market-betters-forecast-but-was-down-4-4-in-2011-to-1-94-million/>

CURRENT ISSUES

19. There remains a lack of awareness of the benefits and availability of ULEVs among the general public which needs to be overcome to increase the sales of vehicles. This is something we intend to take forward with the vehicle manufacturers as they bring their vehicles to market. This will need to include working with both private and business consumers to help them understand their typical journey needs and where different vehicles could meet them.

20. Another important issue for consumers contemplating buying a plug-in vehicle is the ability to recharge away from home. The National Chargepoint Registry (NCR) will be launched later this year and will enable all chargepoint manufacturers and infrastructure scheme operators to make data on their chargepoints available in one place. The data will be made freely available via data.gov.uk for private sector organisations to add to websites, satellite navigation systems and for the production of smartphone apps.

21. Work is also ongoing to determine appropriate standards for recharging and for interoperability between recharging schemes. Recent progress includes the publication of the Institution of Engineering and Technology's Code of Practice for Electric Vehicle Charging Equipment Installation. Action at a European level has been slower than expected.

FURTHER WORK

22. Further work is required in order to see the widespread adoption of ULEVs. This includes addressing consumer concerns about the distance vehicles can travel between charges (range anxiety), longevity of the battery, ability to recharge vehicles safely, quickly and easily, and the upfront cost of vehicles. Government will continue to look into innovative ways to tackle these to support this early market, working closely with industry.

23. For example, we have learnt about how drivers want to recharge through the PiP programme and so are examining options for delivering a strategic rapid charger network that would support longer journeys through shorter (around 30 minutes) recharging times.

24. Work on reviewing the Infrastructure Strategy will start in the Autumn. We will use the evidence we are gathering from the PIPs and the private sector to refine the strategy and to inform decisions on the role Government should play in the recharging market.

25. Later this year we also expect decisions to be made at EU and international level concerning infrastructure standards. This should give manufacturers greater certainty for product planning and allow for cross-border interoperability.

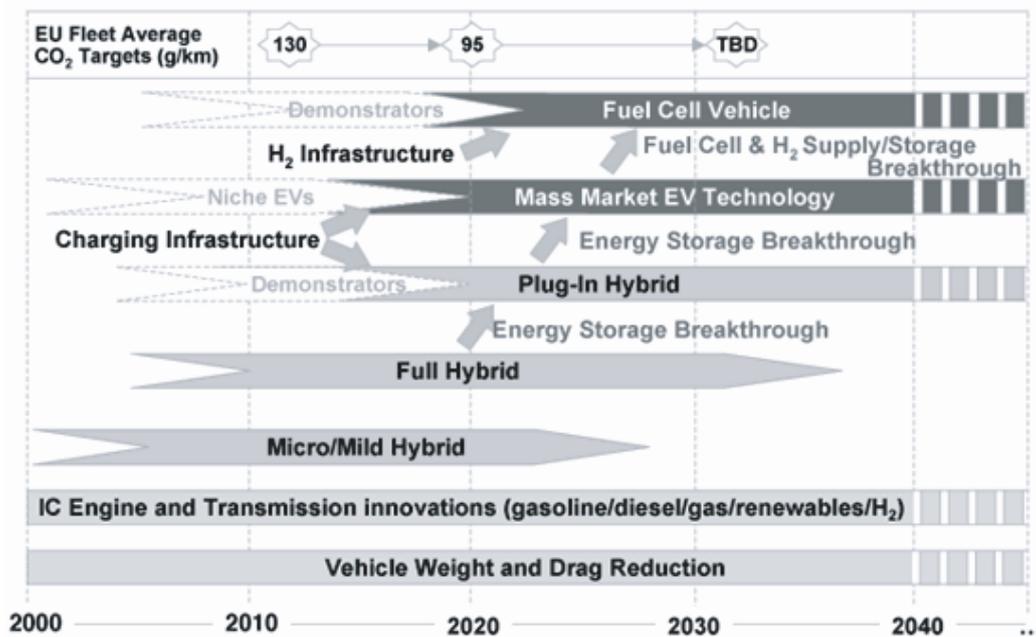
3 May 2012

Annex A

AUTOMOTIVE COUNCIL TECHNOLOGY DEVELOPMENT ROADMAP

26. In 2009, the automotive industry-led New Automotive Innovation Growth Team (NAIGT) published *An Independent Report on the Future of the Automotive Industry in the UK*. This set out its 20 year vision for the automotive industry and contained recommendations to Government and industry to achieve it. The Automotive Council was formed to take forward these recommendations and also set five strategic areas for further study and R&D.

27. The Automotive Council technology development roadmap (below) shows how alternative technologies in ULEVs are likely to develop over the next 30 years.



Annex B

PLUG-IN CAR GRANT AND PLUG-IN VAN GRANT

Plug-In Car Grant: Launched on 1 January 2011, the grant helps both private consumers and businesses purchase an electric, plug-in hybrid, or hydrogen-fuelled car. Buyers receive a grant of 25% of the vehicle price, up to a value of £5,000. Cars have to comply with performance, environmental and safety standards in order to be eligible for subsidy. These criteria are:

- Vehicle Type: New cars only (“M1” category vehicles, this includes pre-registration conversions) ie excluding motorcycles, quadricycles and vans;
- Carbon Dioxide tailpipe emissions: Less than 75g/km;
- Range: EVs minimum 70 miles, PHEVs minimum electric range 10 miles;
- Minimum top speed: 60mph;
- Warranty: three year or 60,000 miles vehicle warranty, plus, a three year battery and electric drive train warranty with a consumer option for a two year battery warranty extension;
- Battery performance: Either a minimum five year warranty on the battery and electric drive train as standard OR additional evidence of battery performance to illustrate reasonable performance after three years of use;
- Electrical Safety: Vehicles must comply with UN- ECE Reg100.00 (PHEVs will be required to show they have met the technical requirements of 01 series amendments to UN- ECE Reg 100); vehicle manufacturers will be required to identify risks associated with vehicle use and state mitigating actions;
- Vehicle crash safety: European Commission whole vehicle type approval (EC WVTA, not small series) OR evidence that the car demonstrates appropriate levels of safety as judged by international standards.

The 10 cars currently eligible for the grant are:

- Chevrolet Volt: <http://www.chevrolet.co.uk/experience-chevrolet/future-and-concept-cars/future-car-volt-production-model.html>
- Citroen cZero: <http://www.citroen.co.uk/home/#/new-cars/car-range/citroen-c-zero/>
- Mia: <http://www.mia-voiture-electrique.com/en/models/mia>
- Mitsubishi i-Miev: <http://www.mitsubishi-cars.co.uk/imiev/>
- Nissan Leaf: <http://www.nissan.co.uk/vehicles/electric-vehicles/electric-leaf/leaf.html#vehicles/electric-vehicles/electric-leaf/leaf>
- Peugeot iOn: <http://www.peugeot.co.uk/vehicles/peugeot-car-range/peugeot-ion/>
- Renault Fluence: <http://www.renault-ze.com/en-gb/gamme-voitures-electriques-renault-z.e./fluence-z.e./presentation-1935.html>

- Smart fortwo electric drive: http://uk.smart.com/smart-world-environment-smart-electric-drive/02c494d2-2eb7-5785-8988-0c63d3b6dd53?csref=thesmart_electric
- Toyota Prius Plug-In Hybrid: http://www.toyota.eu/green_technologies/plugin_hybrid_vehicles/Pages/Prius_plug-in_hybrid.aspx
- Vauxhall Ampera: <http://www.vauxhall-ampera.co.uk/index.php/eng/home>

Plug-In Van Grant: Launched on 21 February 2012, the grant helps both private consumers and businesses purchase an eligible electric, plug-in hybrid, or hydrogen-fuelled van. Buyers receive a grant of 20% of the vehicle price, up to a value of £8,000. Vans have to comply with performance, environmental and safety standards in order to be eligible for subsidy. These criteria are:

- Vehicle Type: Only new vans are eligible (vehicle category “N1” with a gross weight of 3.5 tonnes or less). This includes pre-registration conversions (normal, internal combustion engine vans that were converted to battery or hybrid versions by specialist convertors before the van’s first registration).
- Carbon Dioxide tailpipe emissions: Less than 75g/km;
- Range: Eligible fully electric vans must be able to travel a minimum of 60 miles between charges. Plug-in hybrid electric vehicles (PHEVs) must have a minimum electric range of 10 miles;
- Minimum top speed: 50mph;
- Warranty: Vehicles must have:
 - a three-year or 60,000-miles vehicle warranty (guarantee); and
 - a three-year battery and electric drive train warranty, with the option of extending the battery warranty for an extra two years;
- Battery performance: Vehicles must have either a minimum five-year warranty on the battery and electric drive train as standard or extra evidence of battery performance to show reasonable performance after three years of use;
- Electrical Safety: Vehicles must comply with certain regulations (UN-ECE Reg 100.00) that show that they are electrically safe; and
- Vehicle crash safety: To make sure vans will be safe in a crash, they must either have EC whole vehicle type approval (EC WVTA, not small series) or evidence that the car has appropriate levels of safety as judged by international standards

The seven vans initially eligible for the grant are:

- Azure Dynamics Transit Connect Electric: <http://www.azuredynamics.com/products/transit-connect-electric.htm>
- Daimler Mercedes-Benz Vito E-Cell
- Faam ECOMILE: <http://www.faam.com/index.php?action=index&p=209>
- Faam JOLLY2000: <http://www.faam.com/index.php?action=index&p=212>
- Mia U: <http://www.mia-voiture-electrique.com/en/models/mia-k>
- Renault Kangoo ZE: <http://www.renault-ze.com/en-gb/z.e.-range/kangoo-z.e./kangoo-van-z.e.-1939.html>
- Smith Electric Smith Edison: <http://smithelectric.com/smith-vehicles/models-and-configurations/>

Annex C

PLUGGED-IN PLACES

The scheme offers match-funding to local consortia of businesses and public sector partners to support the installation of a critical mass of electric vehicle recharging infrastructure in lead places across the UK. A total of £30 million has been made available over the three year scheme, due to finish in March 2013.

Data derived from the programme about how drivers use and recharge their electric vehicles will inform any design of a national system of recharging infrastructure. The eight Plugged-In Places are:

- London: <https://www.sourcelondon.net/>
- North East: <http://www.chargeyourcar.org.uk/>
- East of England: <http://www.sourceeast.net/>
- Milton Keynes: <http://chargemasterplc.com/charging-schemes/milton-keynes/>
- Midlands: <http://www.pluggedinmidlands.co.uk/>
- Northern Ireland: <http://www.nidirect.gov.uk/ecar>
- Scotland: www.transportscotland.gov.uk/roads/sustainable-transport/Alternative-Fuels

The chargepoints installed to date by Plugged-In Places areas are detailed below. The eight schemes are at varying stages of maturity, which is reflected in the number of chargepoints they have installed so far.

<i>Plugged-In Place</i>	<i>Chargepoints installed (up to end March 2012)</i>
East of England	135
London	640
Manchester	0
Midlands	100
Milton Keynes	115
North East	399
Northern Ireland	85
Scotland	199
Total	1673

<i>Locations covered</i>	<i>Lead organisation</i>	<i>Defining features</i>
Northern Ireland (all of Northern Ireland, with a focus on border towns): <i>e-car</i>	Northern Ireland Executive (Department for Environment/ Department for Regional Development)	— Carbon savings—the region generates a significant proportion of its electricity renewably (31%) and has set itself a renewable electricity target for the next decade of 80%. — Working closely with the Republic of Ireland to ensure cross-border interoperability—the project aims to electrify cross-border trade; — Developing plans for a network based mainly on fast charging units; — Looking to test a user prepayment system.

CURRENT GOVERNMENT OFFER

The table below summarises the package of financial incentives that are available for buyers that choose a plug-in car or van instead of a petrol or diesel equivalent. For illustrative purposes, the table identifies potential savings for a Nissan Leaf electric car (list price £30,990) when compared to the best selling equivalent in its segment—Ford Focus Zetec 1.6l (list price £18,637). The table also identifies potential savings for an electric Ford Connect van compared to a diesel Ford Connect.

	<i>Plug in Car</i>	<i>Plug in Van</i>
The following incentives are available to all buyers		
Plug in Grant	Up to £5,000	Up to £8,000
Vehicle Excise Duty exemption	£135 saving each year.	£135 saving each year.
Lower fuel tax and costs —EVs typically cost 2–3p a mile compared to 13p for conventional car, saving £100 for every 1,000 miles.	£1,200 —over 12,000 miles	£1,200 —over 12,000 miles
In addition, the following incentives are also available to business buyers:		
Enhanced Capital Allowance VAT registered businesses can write-down the whole purchase price of an EV against tax in the first year—confirmed until 2015.	Approx £4,000 additional benefit for a firm purchasing a Nissan Leaf instead of the Ford Focus (at 2011–12 rates).	Approx £5,000 additional benefit for a firm purchasing a Ford Connect electric instead of a diesel version (at 2011–12 rates).
Employer Company Car Tax & Fuel Benefit Charge. National Insurance Contribution exemption for the employer when providing a zero emission company car until 2015.	Approx £600 per year saving for the employer when an employee (40% income tax bracket) opts for a Nissan Leaf instead of the Ford Focus.	NA
Employee Company Car Tax & Fuel Benefit Charge —will remain zero rated for employees receiving a zero emission company car until 2015.	Approx £2,500 per year saving for employees (in 40% income tax bracket) who opt for Nissan Leaf instead of Ford Focus.	NA
Van Benefit Charge —when employers provide employees with a van for private and business use, a £3000 Van Benefit Charge is payable. Electric vans are exempt until 2015.	NA	£3,000 saving for an employee who opts for an electric van.
Ultra Low Emission Vehicles can also benefit from local measures, including:		
London Congestion Charge —Electric and Plug in Hybrid vehicles receive a 100% discount.	Save £2,000 for a vehicle entering zone 200 days in a year.	Save £2,000 for a vehicle entering zone 200 days in a year.

SUMMARY OF G20 COUNTRY ELECTRIC VEHICLE POLICIES

Source: International Energy Agency, http://www.iea.org/papers/2011/G20_paper.pdf

The UK's approach to encouraging ULEV uptake is similar to that employed in other EU countries, and internationally. Financial incentives, such as the Plug-In Car Grant, are available in EU countries including France, Italy, Spain, and the United States:

	<i>Electric Vehicle Sales/stock targets</i>	<i>Fiscal Incentive</i>	<i>Other targets/data</i>
Argentina	N/A	N/A	Renault-Nissan research deal
Australia	Up to 60% stock by 2050	N/A	Electric vehicle trial funded through the Smart Grid, Smart City programme that commenced early 2011. Current priorities are: <ul style="list-style-type: none"> — To examine market barriers to the broader adoption of electric and natural gas vehicles—to be conducted by the Australian Energy Market Commission (AEMC). — To support electric vehicle demonstration projects to explore business models and integration with electricity/gas distribution networks.
Brazil	N/A	N/A	Fiat Brazil to produce and sell electric cars
Canada	Stock target of 500,000 by 2018	\$5,000 to \$8,500 (CAD) for the first 10,000 units	Vancouver is the first North American city to link development rules to EV infrastructure
China	Stock target of 10,000,000 hybrids, plug-in hybrids and EVs by 2020. About half are expected to be plug-in hybrid vehicles.	Maximum Yuan 60,000 (USD \$9,100) per vehicle in five pilot cities (total 1.76 billion by 2012)	Pilot programme for electric vehicles in five cities
EU	3,300,000 EVs (CE Delft projection)	Electromobility initiative, Green eMotion, supported through €41.8m	Rules on the interoperability of charging infrastructure for clean vehicles.
France	Stock target of 2,000,000 PHEVs/EVs by 2020	Incentive budget €560m; tax credit to 2012 €400m	Government fleet commitment of 50,000 electric vehicles
Germany	Stock target of 1,000,000 PHEVs/EVs by 2020	Tax exemptions until 2015	€500m EV infrastructure plan announced
India	Indian manufacturer Reva is aiming for 5,000 EVs by 2012	100,000 INR (\$2,200 USD) per vehicle (total 840 vehicles to 2012)	VAT rates for EVs reduced in several states
Indonesia	Audi is aiming to produce 2,700 EVs for the domestic market	N/A	Indonesia is the first country in South East Asia to have the Smart Electric Drive
Italy	Specific target for EVs unclear	€1,500 to €4,500 per vehicle for low CO ₂ vehicles, budget of €0.3–0.5bn	400 charging points in Rome, Pisa and Milan
Japan	PHEV/EV sales target of 15–20% of total LDV sales in 2020	Incentive budget of \$300m (USD) per year (2010)	2 million normal chargers and 5000 quick chargers by 2020.

	<i>Electric Vehicle Sales/stock targets</i>	<i>Fiscal Incentive</i>	<i>Other targets/data</i>
Korea	1,200,000 green cars (EV, PHEV, FCEV, CDV) by 2015	N/A	KRW 400bn (\$342.6m USD) by 2014 on research and development for high-performance batteries and other related systems
Mexico	N/A	N/A	N/A
Russia	Up to 100,000 hybrid cars per year (E-mobile)	N/A	Government backs production of hybrid cars with electric transmission
Saudi Arabia	N/A	N/A	N/A
South Africa	N/A	N/A	Research centre established
Spain	Stock of 250,000 Evs/PHEVs by 2014 and 2,500,000 by 2020	€6,000 per vehicle	Smart cities and smart grid research; MOVELE Demonstration Project and the "Integral Strategy to Impulse the EV/PHEV in Spain 2010-14"
Turkey	N/A	Lowered tax rates for EVs	Domestic manufacturing of EVs has begun
United Kingdom	N/A	Customer incentive of up to £5,000 (\$7,700 USD) per eligible ultra-low emission vehicle	£400m to support consumer incentive, infrastructure and research and development up to 2015. London Mayor committed to 25,000 charging points in London by 2015
United States	Stock target of 1,000,000 by 2015	\$7,500 USD per vehicle	American Recovery and Reinvestment Act included \$2.4bn for battery and electric drive component.

Written evidence from the DVLA (LCV 25)

Annex 1 contains information about the number of electric vehicles broken down by body type and the upper tier local authority in which they are registered.

Whilst many of these vehicles (especially the cars) will be a “plug-in” vehicle (ie the vehicle itself is plugged into a mains electricity charging point), some of them may not be. For instance, the bulk of the vehicles (mostly in the “other” column) will be milk floats and disability carriages. These vehicles may use other mechanisms for charging; for instance, they may have removable batteries which are charged off-vehicle.

It should be noted that not all the electric cars recorded here will be eligible for the Plug-In Car Grant. Some of the cars are technically quadricycles and are therefore not eligible for the grant. Examples of this are cars produced by G-Wiz.

Annex 2 gives the registration location of all the cars that are eligible for the Grant. This does not mean that the grant was definitely claimed for all of the eligible cars.

This is a one-off snapshot of licensed vehicles as at 31 December. It is possible that additional electric vehicles will have had a Statutory Off Road Notification at that point in time so whilst they existed and remained registered in Great Britain they were not allowed to drive on the roads at the time. It is also likely that the numbers and locations of vehicles will have changed by June (eg vehicles will have moved, some will have been scrapped/crashed, some new ones will have entered the fleet).

In addition, the local authority is based on the postcode. Not all keepers keep their postcode up-to-date and mistakes in recording the postcode can be made when registering the vehicle. This means that some of the registration locations are incorrect or cannot be matched to a single local authority. Similarly, vehicles are not always used within the local authority in which they are registered. Finally, the data are taken from the DVLA register of vehicles.”

July 2012

Annex 1

NUMBER OF LICENSED ELECTRIC VEHICLES BY BODY TYPE AND LA, UK: AS AT 31ST DECEMBER 2011

<i>Region</i>	<i>Upper tier LA</i>	<i>Cars</i>	<i>Motor cycles</i>	<i>Light vans</i>	<i>Heavy goods vehicles</i>	<i>Buses/coaches</i>	<i>Others</i>
Unknown region	Unknown LA	47	28	94	33	2	2,383
East Midlands	Derby UA	4	3	14	0	0	278
East Midlands	Derbyshire	10	11	15	8	1	960
East Midlands	Leicester UA	18	34	108	8	0	370
East Midlands	Leicestershire	16	4	38	2	0	914
East Midlands	Lincolnshire	4	19	18	2	0	2,003
East Midlands	Northamptonshire	12	8	37	0	1	621
East Midlands	Nottingham UA	6	7	11	0	3	325
East Midlands	Nottinghamshire	6	18	9	2	2	1,271
East Midlands	Rutland UA	1	6	0	0	0	28
East Midlands	Unknown LA	0	0	1	0	1	1
East of England	Bedford UA	2	5	1	0	0	93
East of England	Cambridgeshire	14	23	47	3	0	686
East of England	Central Bedfordshire UA	19	8	11	0	9	172
East of England	Essex	53	32	42	1	1	1,458
East of England	Hertfordshire	33	17	32	3	0	635
East of England	Luton UA	6	3	2	1	0	97
East of England	Norfolk	18	26	15	1	1	1,525
East of England	Peterborough UA	6	7	3	0	0	277
East of England	Southend-on-Sea UA	3	5	1	1	0	221
East of England	Suffolk	8	15	25	6	4	1,371
East of England	Thurrock UA	1	1	2	0	0	102
East of England	Unknown LA	0	0	0	0	0	1
London	Unknown LA	1	0	19	0	0	32
London	Barking and Dagenham	4	2	9	1	0	111
London	Barnet	109	7	12	0	0	73
London	Bexley	5	3	7	0	0	157
London	Brent	56	7	2	3	0	48

<i>Region</i>	<i>Upper tier LA</i>	<i>Cars</i>	<i>Motor cycles</i>	<i>Light vans</i>	<i>Heavy goods vehicles</i>	<i>Buses/coaches</i>	<i>Others</i>
London	Bromley	12	10	4	0	0	150
London	Camden	159	8	26	3	0	61
London	City of London	5	0	4	0	0	16
London	Croydon	10	6	6	0	0	110
London	Ealing	31	5	6	2	0	81
London	Enfield	11	5	12	2	2	87
London	Greenwich	4	1	14	2	0	129
London	Hackney	20	4	7	1	0	41
London	Hammersmith and Fulham	41	5	5	0	1	79
London	Haringey	42	11	18	0	0	46
London	Harrow	8	1	2	0	0	44
London	Havering	9	1	1	0	0	97
London	Hillingdon	18	19	30	0	0	132
London	Hounslow	12	8	155	6	0	258
London	Islington	36	11	40	1	0	40
London	Kensington and Chelsea	64	16	14	0	0	24
London	Kingston upon Thames	10	5	1	0	0	89
London	Lambeth	34	7	46	0	0	99
London	Lewisham	10	4	1	0	0	88
London	Merton	13	5	5	0	0	52
London	Newham	1	2	6	0	0	65
London	Redbridge	2	3	0	0	0	50
London	Richmond upon Thames	18	11	9	0	0	72
London	Southwark	37	8	51	3	0	173
London	Sutton	4	2	3	0	0	57
London	Tower Hamlets	9	10	18	0	0	68
London	Waltham Forest	2	3	8	12	0	49
London	Wandsworth	55	14	13	0	0	51
London	Westminster	157	17	34	0	3	418
North East	Unknown LA	0	0	2	0	0	6
North East	Darlington UA	2	3	2	1	0	78
North East	Durham UA	12	7	27	12	0	503
North East	Gateshead	16	6	21	3	0	84
North East	Hartlepool UA	0	4	1	0	0	54
North East	Middlesbrough UA	1	0	1	0	0	64
North East	Newcastle upon Tyne	8	3	14	3	1	92
North East	North Tyneside	1	1	0	0	0	79
North East	Northumberland UA	18	10	12	3	0	267
North East	Redcar and Cleveland UA	0	3	0	0	0	107
North East	South Tyneside	5	1	4	7	0	100
North East	Stockton-on-Tees UA	20	2	6	0	0	83
North East	Sunderland	9	2	45	8	10	153
North East	Unknown LA	0	0	2	0	1	1
North West	Unknown LA	0	0	0	0	0	1
North West	Blackburn with Darwen UA	2	1	2	0	0	113
North West	Blackpool UA	0	1	3	0	0	370
North West	Bolton	1	3	6	0	0	188
North West	Bury	2	3	2	0	0	88
North West	Cheshire East UA	4	5	16	3	0	298
North West	Cheshire West and Chester UA	8	8	16	2	0	275
North West	Cumbria	4	3	5	1	0	453
North West	Halton UA	9	0	0	2	3	105

<i>Region</i>	<i>Upper tier LA</i>	<i>Cars</i>	<i>Motor cycles</i>	<i>Light vans</i>	<i>Heavy goods vehicles</i>	<i>Buses/coaches</i>	<i>Others</i>
North West	Knowsley	0	0	0	0	0	55
North West	Lancashire	10	21	62	6	0	1,192
North West	Liverpool	2	7	79	7	0	129
North West	Manchester	5	5	17	5	1	331
North West	Oldham	1	3	8	0	0	108
North West	Rochdale	1	5	0	0	0	124
North West	Salford	5	3	38	21	0	155
North West	Sefton	0	5	58	4	0	169
North West	St. Helens	1	2	2	0	0	100
North West	Stockport	2	9	13	1	1	161
North West	Tameside	1	0	1	3	0	147
North West	Trafford	3	4	7	10	0	178
North West	Unknown LA	0	1	0	0	0	2
North West	Warrington UA	0	1	4	0	0	140
North West	Wigan	4	4	25	1	0	231
North West	Wirral	3	5	1	0	0	212
Northern Ireland	Antrim	2	4	2	0	0	8
Northern Ireland	Ards	0	3	1	0	0	11
Northern Ireland	Armagh	0	3	0	0	0	6
Northern Ireland	Ballymena	0	2	0	0	0	5
Northern Ireland	Ballymoney	0	0	1	0	0	2
Northern Ireland	Banbridge	0	1	0	0	0	7
Northern Ireland	Belfast	4	11	4	1	0	24
Northern Ireland	Carrickfergus	0	1	0	0	0	5
Northern Ireland	Castlereagh	0	1	1	0	0	4
Northern Ireland	Coleraine	0	1	0	0	0	5
Northern Ireland	Cookstown	0	0	0	0	0	1
Northern Ireland	Craigavon	0	2	0	0	0	12
Northern Ireland	Derry City	1	2	0	0	0	4
Northern Ireland	Down	1	0	0	0	0	2
Northern Ireland	Dungannon	1	3	0	0	0	1
Northern Ireland	Fermanagh	0	1	0	0	0	4
Northern Ireland	Larne	0	0	0	0	0	5
Northern Ireland	Limavady	0	1	0	0	0	1
Northern Ireland	Lisburn	0	2	2	2	0	6
Northern Ireland	Magherafelt	0	2	0	0	0	1
Northern Ireland	Moyle	0	1	0	0	0	0
Northern Ireland	Newry and Mourne	0	3	0	0	0	10
Northern Ireland	Newtownabbey	1	2	1	1	0	4
Northern Ireland	North Down	0	3	0	0	0	10
Northern Ireland	Omagh	1	1	0	0	0	2
Northern Ireland	Strabane	0	1	0	0	0	1
Northern Ireland	Unknown LA	0	0	0	0	0	1
Scotland	Aberdeen City UA	2	4	6	1	0	60
Scotland	Aberdeenshire UA	2	4	7	0	0	100
Scotland	Angus UA	0	1	0	0	0	67
Scotland	Argyll and Bute UA	2	3	0	0	0	41
Scotland	Clackmannanshire UA	0	0	0	0	0	19
Scotland	Dumfries and Galloway UA	1	3	0	0	0	127
Scotland	Dundee City UA	10	2	17	1	0	85
Scotland	East Ayrshire UA	1	2	0	1	0	56
Scotland	East Dunbartonshire UA	0	1	0	0	0	15
Scotland	East Lothian UA	2	3	3	0	0	72
Scotland	East Renfrewshire UA	0	2	0	0	0	13

<i>Region</i>	<i>Upper tier LA</i>	<i>Cars</i>	<i>Motor cycles</i>	<i>Light vans</i>	<i>Heavy goods vehicles</i>	<i>Buses/coaches</i>	<i>Others</i>
Scotland	Edinburgh, City of UA	9	15	9	0	1	85
Scotland	Eilean Siar UA	2	0	1	0	0	7
Scotland	Falkirk UA	0	0	1	0	0	50
Scotland	Fife UA	10	9	9	1	0	204
Scotland	Glasgow City UA	51	2	15	1	0	99
Scotland	Highland UA	6	0	8	0	0	230
Scotland	Inverclyde UA	4	0	0	0	0	8
Scotland	Midlothian UA	1	0	2	0	0	32
Scotland	Moray UA	1	0	2	0	1	66
Scotland	North Ayrshire UA	0	3	0	0	0	62
Scotland	North Lanarkshire UA	12	1	3	2	0	77
Scotland	Orkney Islands UA	1	0	0	0	0	28
Scotland	Perth and Kinross UA	1	1	2	0	0	102
Scotland	Renfrewshire UA	1	0	9	0	0	53
Scotland	Scottish Borders UA	4	1	2	1	0	100
Scotland	Shetland Islands UA	1	1	1	0	0	2
Scotland	South Ayrshire UA	0	1	2	0	0	52
Scotland	South Lanarkshire UA	0	1	4	1	0	108
Scotland	Stirling UA	3	0	0	0	0	21
Scotland	Unknown LA	0	0	6	0	0	3
Scotland	West Dunbartonshire UA	3	0	0	0	0	23
Scotland	West Lothian UA	2	2	2	0	0	78
South East	Bracknell Forest UA	1	4	17	3	1	151
South East	Brighton and Hove UA	5	4	7	1	0	198
South East	Buckinghamshire	6	8	11	2	0	265
South East	East Sussex	18	17	17	8	0	641
South East	Hampshire	29	51	818	456	0	1,599
South East	Isle of Wight UA	1	5	2	2	0	229
South East	Kent	25	38	49	2	1	1,854
South East	Medway UA	5	5	1	0	0	178
South East	Milton Keynes UA	97	2	20	3	0	282
South East	Oxfordshire	38	16	79	3	0	562
South East	Portsmouth UA	11	3	11	0	2	217
South East	Reading UA	1	3	2	0	2	78
South East	Slough UA	66	2	15	5	0	60
South East	Southampton UA	3	15	6	4	0	190
South East	Surrey	45	35	106	7	0	593
South East	Unknown LA	0	0	3	0	1	3
South East	West Berkshire UA	19	6	3	0	0	1,172
South East	West Sussex	20	17	15	3	2	1,055
South East	Windsor and Maidenhead UA	18	1	7	9	0	100
South East	Wokingham UA	3	6	4	1	4	83
South West	Bath and North East Somerset UA	3	3	7	2	0	119
South West	Bournemouth UA	4	3	0	0	0	190

<i>Region</i>	<i>Upper tier LA</i>	<i>Cars</i>	<i>Motor cycles</i>	<i>Light vans</i>	<i>Heavy goods vehicles</i>	<i>Buses/coaches</i>	<i>Others</i>
South West	Bristol, City of UA	8	6	11	2	0	569
South West	Cornwall UA	15	18	22	0	0	1,056
South West	Devon	17	55	21	0	0	1,207
South West	Dorset	19	8	18	1	1	777
South West	Gloucestershire	55	30	38	11	0	718
South West	Isles of Scilly UA	1	1	1	1	0	41
South West	North Somerset UA	2	8	11	0	0	326
South West	Plymouth UA	0	2	3	0	0	217
South West	Poole UA	5	17	5	0	0	170
South West	Somerset	23	32	17	0	0	847
South West	South Gloucestershire UA	5	14	10	1	0	290
South West	Swindon UA	58	5	21	0	0	199
South West	Torbay UA	2	9	0	0	0	201
South West	Unknown LA	0	1	2	0	0	3
South West	Wiltshire UA	12	9	48	21	0	477
Wales	Blaenau Gwent UA	0	0	0	0	0	24
Wales	Bridgend UA	1	1	1	0	0	86
Wales	Caerphilly UA	0	0	0	0	0	90
Wales	Cardiff UA	3	3	27	0	1	201
Wales	Carmarthenshire UA	2	4	4	0	0	125
Wales	Ceredigion UA	5	0	0	0	0	43
Wales	Conwy UA	2	4	2	0	0	230
Wales	Denbighshire UA	0	5	5	1	0	183
Wales	Flintshire UA	1	3	5	0	0	145
Wales	Gwynedd UA	1	2	2	0	0	76
Wales	Isle of Anglesey UA	0	1	2	0	0	59
Wales	Merthyr Tydfil UA	0	0	0	0	0	16
Wales	Monmouthshire UA	0	0	2	0	0	60
Wales	Neath Port Talbot UA	1	1	0	0	0	137
Wales	Newport UA	1	1	3	0	0	79
Wales	Pembrokeshire UA	4	1	3	0	0	129
Wales	Powys UA	2	1	7	1	0	115
Wales	Rhondda, Cynon, Taff UA	1	1	2	1	0	72
Wales	Swansea UA	1	4	12	1	0	934
Wales	The Vale of Glamorgan UA	0	7	13	1	0	71
Wales	Torfaen UA	0	1	2	0	0	32
Wales	Unknown LA	0	0	3	0	0	13
Wales	Wrexham UA	0	3	1	0	0	76
West Midlands	Unknown LA	1	0	0	0	0	1
West Midlands	Birmingham	31	16	44	3	2	522
West Midlands	Coventry	65	6	44	2	0	143
West Midlands	Dudley	6	16	15	5	1	152
West Midlands	Herefordshire, County of UA	3	7	5	4	0	193
West Midlands	Sandwell	2	3	3	0	0	189
West Midlands	Shropshire UA	6	6	5	2	1	266
West Midlands	Solihull	65	11	18	2	1	107
West Midlands	Staffordshire	8	15	76	9	2	690
West Midlands	Stoke-on-Trent UA	2	3	6	2	0	305

<i>Region</i>	<i>Upper tier LA</i>	<i>Cars</i>	<i>Motor cycles</i>	<i>Light vans</i>	<i>Heavy goods vehicles</i>	<i>Buses/coaches</i>	<i>Others</i>
West Midlands	Telford and Wrekin UA	1	3	4	0	0	168
West Midlands	Unknown LA	0	0	0	0	0	2
West Midlands	Walsall	8	4	7	0	0	151
West Midlands	Warwickshire	14	6	23	54	0	600
West Midlands	Wolverhampton	0	1	6	2	0	157
West Midlands	Worcestershire	54	9	15	2	0	545
Yorkshire and Humberside	Unknown LA	0	0	1	0	0	1
Yorkshire and Humberside	Barnsley	0	2	2	0	1	458
Yorkshire and Humberside	Bradford	1	2	4	0	3	235
Yorkshire and Humberside	Calderdale	2	0	2	0	0	115
Yorkshire and Humberside	Doncaster	54	30	6	1	1	747
Yorkshire and Humberside	East Riding of Yorkshire UA	1	10	4	1	0	585
Yorkshire and Humberside	Kingston upon Hull, City of UA	2	3	6	1	0	500
Yorkshire and Humberside	Kirklees	2	5	4	3	1	220
Yorkshire and Humberside	Leeds	13	10	28	2	0	554
Yorkshire and Humberside	North East Lincolnshire UA	1	4	4	0	0	240
Yorkshire and Humberside	North Lincolnshire UA	0	4	2	0	9	257
Yorkshire and Humberside	North Yorkshire	13	12	6	7	0	875
Yorkshire and Humberside	Rotherham	1	2	3	0	0	353
Yorkshire and Humberside	Sheffield	0	10	58	7	0	425
Yorkshire and Humberside	Unknown LA	0	0	0	0	0	1
Yorkshire and Humberside	Wakefield	1	1	13	1	0	531
Yorkshire and Humberside	York UA	0	4	62	0	0	228

Annex 2

NUMBER OF LICENSED CARS WHICH WERE ELIGIBLE FOR THE PLUG-IN CAR GRANT BY LA, UK: AS AT 31ST DECEMBER 2011

<i>Region</i>	<i>Upper tier LA</i>	<i>Total</i>
Unknown region	Unknown LA	20
East Midlands	Derby UA	2
East Midlands	Derbyshire	6
East Midlands	Leicester UA	16
East Midlands	Leicestershire	12
East Midlands	Lincolnshire	3
East Midlands	Northamptonshire	1
East Midlands	Nottingham UA	4
East Midlands	Nottinghamshire	2
East Midlands	Rutland UA	1
East of England	Bedford UA	1
East of England	Cambridgeshire	6
East of England	Central Bedfordshire UA	9
East of England	Essex	13
East of England	Hertfordshire	16

<i>Region</i>	<i>Upper tier LA</i>	<i>Total</i>
East of England	Luton UA	7
East of England	Norfolk	9
East of England	Peterborough UA	2
East of England	Southend-on-Sea UA	1
East of England	Suffolk	3
London	Barking and Dagenham	2
London	Barnet	15
London	Bexley	1
London	Brent	5
London	Bromley	3
London	Camden	22
London	City of London	1
London	Croydon	4
London	Ealing	3
London	Enfield	5
London	Greenwich	2
London	Hammersmith and Fulham	2
London	Haringey	5
London	Harrow	3
London	Havering	7
London	Hillingdon	9
London	Hounslow	1
London	Islington	1
London	Kensington and Chelsea	6
London	Kingston upon Thames	1
London	Lambeth	3
London	Lewisham	1
London	Redbridge	2
London	Richmond upon Thames	2
London	Southwark	6
London	Tower Hamlets	1
London	Unknown LA	1
London	Waltham Forest	1
London	Wandsworth	8
London	Westminster	24
North East	Darlington UA	1
North East	Durham UA	10
North East	Gateshead	16
North East	Middlesbrough UA	1
North East	Newcastle upon Tyne	8
North East	North Tyneside	1
North East	Northumberland UA	11
North East	South Tyneside	5
North East	Stockton-on-Tees UA	20
North East	Sunderland	4
North West	Blackburn with Darwen UA	1
North West	Bury	2
North West	Cheshire East UA	3
North West	Cheshire West and Chester UA	6
North West	Cumbria	2
North West	Halton UA	6
North West	Lancashire	6
North West	Manchester	5
North West	Salford	1
North West	Stockport	2
North West	Trafford	1
North West	Wigan	1
North West	Wirral	1
Northern Ireland	Belfast	3
Northern Ireland	Down	1
Northern Ireland	Dungannon	1
Northern Ireland	Newtownabbey	1
Scotland	Aberdeen City UA	2
Scotland	Aberdeenshire UA	2
Scotland	Argyll and Bute UA	1
Scotland	Dundee City UA	8

<i>Region</i>	<i>Upper tier LA</i>	<i>Total</i>
Scotland	Edinburgh, City of UA	8
Scotland	Fife UA	9
Scotland	Glasgow City UA	8
Scotland	Highland UA	4
Scotland	Inverclyde UA	4
Scotland	Midlothian UA	1
Scotland	Moray UA	1
Scotland	North Lanarkshire UA	12
Scotland	Orkney Islands UA	1
Scotland	Perth and Kinross UA	1
Scotland	Scottish Borders UA	3
Scotland	Shetland Islands UA	1
Scotland	Stirling UA	3
Scotland	West Lothian UA	1
South East	Brighton and Hove UA	2
South East	Buckinghamshire	3
South East	East Sussex	9
South East	Hampshire	14
South East	Isle of Wight UA	1
South East	Kent	8
South East	Medway UA	5
South East	Milton Keynes UA	87
South East	Oxfordshire	29
South East	Portsmouth UA	11
South East	Slough UA	63
South East	Southampton UA	1
South East	Surrey	45
South East	West Berkshire UA	15
South East	West Sussex	15
South East	Windsor and Maidenhead UA	3
South East	Wokingham UA	2
South West	Bath and North East Somerset UA	1
South West	Bournemouth UA	3
South West	Bristol, City of UA	6
South West	Cornwall UA	13
South West	Devon	9
South West	Dorset	10
South West	Gloucestershire	49
South West	North Somerset UA	1
South West	Poole UA	5
South West	Somerset	18
South West	South Gloucestershire UA	3
South West	Swindon UA	57
South West	Torbay UA	1
South West	Wiltshire UA	4
Wales	Bridgend UA	1
Wales	Cardiff UA	2
Wales	Carmarthenshire UA	2
Wales	Ceredigion UA	1
Wales	Flintshire UA	1
Wales	Gwynedd UA	1
Wales	Newport UA	1
Wales	Pembrokeshire UA	3
Wales	Rhondda, Cynon, Taff UA	1
Wales	Swansea UA	1
West Midlands	Birmingham	28
West Midlands	Coventry	7
West Midlands	Herefordshire, County of UA	1
West Midlands	Shropshire UA	1
West Midlands	Solihull	57
West Midlands	Staffordshire	5
West Midlands	Stoke-on-Trent UA	1
West Midlands	Unknown LA	1
West Midlands	Walsall	8
West Midlands	Warwickshire	7

<i>Region</i>	<i>Upper tier LA</i>	<i>Total</i>
West Midlands	Worcestershire	52
Yorkshire and Humberside	Bradford	1
Yorkshire and Humberside	Calderdale	1
Yorkshire and Humberside	Doncaster	1
Yorkshire and Humberside	East Riding of Yorkshire UA	1
Yorkshire and Humberside	Kingston upon Hull, City of UA	2
Yorkshire and Humberside	Kirklees	2
Yorkshire and Humberside	Leeds	7
Yorkshire and Humberside	North East Lincolnshire UA	1
Yorkshire and Humberside	North Yorkshire	11
Yorkshire and Humberside	Wakefield	1

Further written evidence from the Department for Transport (LCV 22A)

During my evidence at the Transport Select Committee inquiry into Low Carbon Vehicles on 12 June 2012, I undertook to provide information on the extent to which carbon emissions from road transport had fallen since the coalition Government came to office.

Data submitted to the United Nations Framework Convention for Climate Change shows that in 2010, carbon dioxide emissions from road transport were 145 thousand tonnes lower than in 2009, a fall of 0.1%.

Final data for 2011 for road transport emissions is not yet available. Provisional figures (published by DECC) for carbon dioxide emissions for domestic transport as a whole in 2011 show a fall of 1.7 million tonnes or 1.4% from 2010.

You might also like to note that since my appearance, the Committee on Climate Change has published its 4th Annual Progress Report which provides further context and details of recent emissions trends in different sectors.

I hope that this reply helps to clarify the position.

16 July 2012

ISBN 978-0-215-04851-6



9 780215 048516

