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**Assessing the role of the Plug-in Car Grant and Plugged-in Places scheme in electric vehicle take-up**

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## Executive Summary

TRL and TNS-BMRB were commissioned by the Department for Transport (DfT) to undertake an investigation into the responses of early adopters of electric vehicles (EVs<sup>1</sup>) to both the Plug-in Car Grant (PiCG) and Plugged-in Places (PiP) schemes<sup>2</sup>. Barriers to adoption in both the early adopter and more mainstream markets were also investigated.

This research explored the contribution of these two schemes to the uptake of EVs. Private and organisational PiCG recipients' views and experiences of buying, owning and using EVs were explored. To further investigate the barriers to adoption, the views of those who had recently bought an internal combustion engine (ICE) vehicle rather than an EV were also investigated.

### Aims

The aims of the study were to:

- Increase knowledge about the role of the PiCG in supporting the uptake of EVs.
- Assess the effect of the PiP scheme on purchasing, driving and charging behaviour.
- Provide numerical data on the characteristics and behaviour of existing users of EVs.

The research was conducted in two strands: a quantitative survey and a series of qualitative interviews.

- The aim of the quantitative research was to provide new data on the characteristics and charging behaviour of private and organisational EV users.
- The qualitative research aimed to provide an in-depth understanding of the influence of the PiCG and the PiP scheme on the car purchasing decisions of private individuals and organisations, barriers to EV purchase, and factors that influence the driving and charging behaviour of EV users.

### Methodology

- The quantitative survey was completed by private EV purchasers (n=192) and organisational EV purchasers (n=329). The response rates were 64% and 59% respectively.
- The qualitative research included a mixture of face-to-face and telephone interviews undertaken with private EV purchasers (n=23), organisational EV purchasers<sup>3</sup> (n=24) and users (n=12), and those who had purchased an EV to either sell or lease (n=13). Private (n=30) and organisational (n=12) non-EV purchasers were also interviewed.

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<sup>1</sup> See Figure 1-2 for a description of the vehicles types included in this research.

<sup>2</sup> For a full description of the PiCG and PiP schemes, see section 1.1.

<sup>3</sup> Respondents who had bought or used vehicles in an organisational context (e.g. they were responsible for purchasing an EV for use as a pool car or they had experienced using an EV but were not responsible for its purchase).

## Key findings

### *Research and purchaser typologies*

- The qualitative interviews found that respondents' initial exploration of EVs involved a variety of information sources, but the two identified as being most useful were internet forums and test drives. Other sources included the internet, newspapers, motoring magazines, the news and TV programmes.
- Respondents varied in the amount of pre-purchase information they gathered, as well as in the time they took to make their purchase decision. Based on these two factors, a purchaser typology was developed to categorise respondents.

### *The role and effectiveness of the PiCG*

- The PiCG plays an important role in EV purchase decisions. It was deemed to be important in the purchase decision of over 85% of both private and organisational respondents.
- Most non-EV owners were unaware of the PiCG.
- The PiCG, and therefore the vehicles' affordability, was particularly important for private purchasers and purchasers from smaller organisations for whom financial considerations were key. In general, both private and organisational qualitative respondents considered the PiCG amount to be appropriate and felt that it improved the affordability of EVs.

### *The role and effectiveness of the PiP scheme in influencing the decision to purchase a plug-in vehicle*

- Public charging infrastructure was considered to be important by around 40% of both private and organisational respondents in their decision to purchase EVs. Both private and organisational EV purchasers and users expressed a desire for there to be a more 'useable' network of public charge points.
- Awareness of the PiP scheme itself was varied and unlikely to influence the purchase of a vehicle. However, respondents expressed an awareness of the available infrastructure and made use of it to varying degrees, despite not being aware that the PiP scheme (or other schemes) had delivered this infrastructure.
- For organisations, a difference was observed between the perception of how important public charge point availability would be (18% stated that their availability was a very important factor in their purchase decision), and how important it actually was in current use (36% stated that their availability was a very important factor in their current use of the vehicle). This suggests that while public charge point availability was not a priority during the purchase decision (when other factors were also under consideration), it became a more important aspect once day-to-day experience of using an EV had been accrued.
- The lack of compatibility between different charge point providers was confusing and frustrating for EV purchasers and users.

### *EV purchase: important factors and motivators*

- For private EV owners, the three most important reasons for choosing an EV over an equivalent ICE vehicle were:
  - saving money on fuel by using electricity rather than petrol or diesel

- environmental factors
- positive changes to driving style and efficiency
- For organisational purchasers, the three most important factors were:
  - saving money on fuel
  - environmental factors/corporate social responsibility
  - financial incentives
- Organisational priorities were very similar to the private EV purchaser priorities. For both groups, other important factors included a fit with lifestyle (or organisational needs), convenience and the desire to 'make a statement'.
- Environmental factors were key for some EV purchasers, while for others the environmental benefits were a favourable by-product of EV ownership rather than a key driver.

#### *EV purchase: barriers*

- A lack of knowledge about EVs was identified as one of the main barriers to EV take-up. This related to all aspects of purchasing and using EVs (e.g. purchase cost, running costs, financial incentives, range, variations in vehicle technology, available models and charging routines and infrastructure).
- Range was identified as another key barrier to EV purchase. Non-EV purchasers were concerned about the range that EVs could achieve and EV purchasers acknowledged that their own EV range had presented challenges for them as users.
- Another substantial barrier was the purchase cost of EVs; this was considered to be too high – even with the reduction offered by the PiCG, EVs were often deemed unaffordable.

#### *The EV charging experience*

- The vast majority of private respondents reported that they charged their vehicle at home, usually between the hours of 5pm and 9am.
- Over two thirds of organisations represented had charge points installed on site, a few of which were fast or rapid charge points.
- Private quantitative respondents who were PiP scheme members identified several barriers to the use of public charging infrastructure, such as a lack of rapid charging facilities on the strategic road network, a lack of charge points at 'destinations' (such as hotels and restaurants), incompatibility between various charge point providers, and a lack of accessible information about the location of charge points.
- Both private and organisational respondents felt that, at the time of the research, public charging infrastructure did not meet their needs. In order to better meet user needs, respondents suggested that the infrastructure network should expand to support them in undertaking journeys that exceeded their vehicle range.



## Recommendations

In order to increase uptake of EVs among the general population, a number of issues were identified that need to be overcome. The following sections present recommendations for increasing EV uptake.

### *The role of the PiCG and PiP schemes in EV uptake*

Consideration should be given to:

- **Developing a marketing strategy to publicise the PiCG** and resources related to it (e.g. the OLEV website describing the PiCG).
- **Harmonising charging providers and schemes** to make the use of public charge points more appealing and straightforward for current and potential EV users.
- **Improving the public's access to existing centralised directories of public charge points** (currently held by the Government), to provide a definitive source of essential information for EV users (including the location, operational status and charge type – standard, fast or rapid – of each charge point).
- Further **investigation of the potential battery degradation** effects of repeated rapid charging. This is an unanswered question of concern to EV users and relates to the use of rapid charge points.

### *Overcoming the barriers associated with EV purchase*

Consideration should be given to:

- Opportunities for key industry players to **develop a united voice to educate and inform** the public. Respondents felt that knowledge may also be increased through marketing campaigns, working with the media to produce documentaries or television features (perhaps with the support of an 'EV ambassador'), and newspaper or magazine articles. This would help to increase knowledge and dispel the myths surrounding EVs as well as communicating the benefits of EV ownership.
- **Overcoming purchaser concerns about the achievable range of EVs** by encouraging manufacturers or industry leaders to publish guidance on the limitations of the stated range<sup>4</sup>. In the longer term, this issue may be addressed by improvements to vehicle technology (i.e. improved batteries leading to greater range).

### *Maximising the effectiveness of motivators to purchase*

Consideration should be given to:

- Ensuring that future marketing campaigns related to EVs **focus on the potential long term cost-savings** related to purchaser return on investment.
- **Providing potential EV purchasers with reassurance from others** who had had successful experiences with EVs, in order to increase confidence in the

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<sup>4</sup> Current EU test cycles (the results of which determine the advertised EV range) are not necessarily representative of typical journeys (e.g. ancillaries such as climate control are not used during the tests and the standardised driving cycle is a simplified model of real driving patterns, which are much more transient).

technology. For example, case studies from EV purchasers who have demonstrated cost-savings could be provided to illustrate the financial benefits associated with EV purchase.

- **Providing potential consumers with the opportunity to adapt to the EV technology** and to better appreciate EV capabilities. EV dealerships should encourage potential consumers to undertake test drives to engage with the vehicle and EV technology. This might include extended test drives and well-publicised EV open days.
- **Encouraging manufacturers and dealers to work towards increasing EV uptake in organisations** by improving awareness of EVs and providing an opportunity for organisations to evaluate whether EVs could fit with their transport needs. Manufacturers could loan EVs to fleets which have been identified as being potentially suitable and likely to benefit from replacing ICE vehicles with EVs.

#### *Recommendations to support ongoing work*

The conclusions identified in this research substantiate the work that DfT is undertaking at the time of publication of this report, including:

- Identification of the role(s) that the Ultra-Low Emission Vehicle (ULEV) Collaborative Communications Consortium can play in **increasing awareness of the PiCG** as part of the Government's wider policies and communications on ULEVs.
- **Development of a targeted public infrastructure network**, providing subsidy support to charge point installations at destinations where they are most likely to be used, and rapid charge point installations to minimise non-driving time.
- A **detailed evaluation of the PiP scheme** to identify successes as well as areas for improvement to inform subsequent programmes.

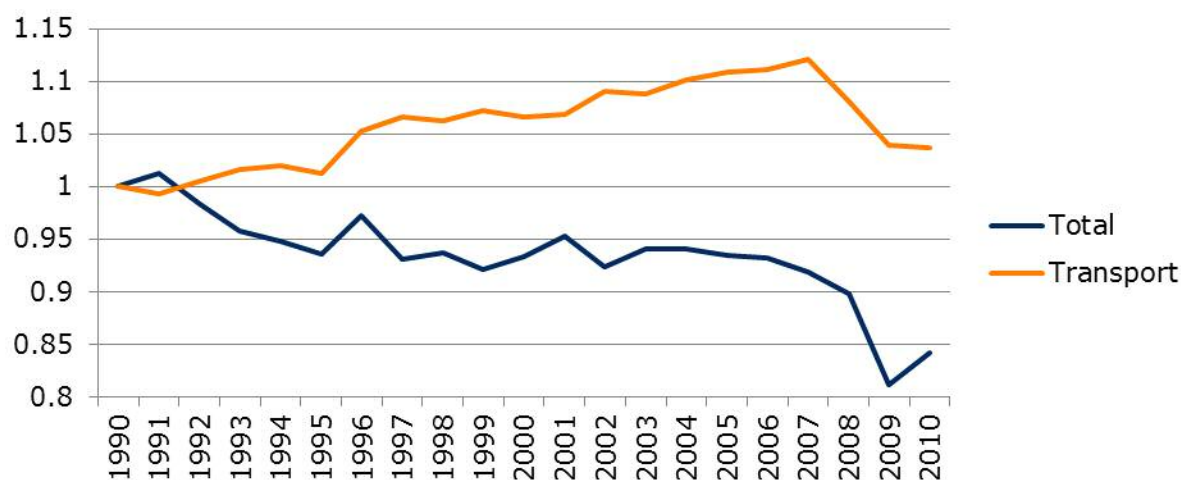
# 1 Background

## 1.1 Setting the research context

TRL and TNS-BMRB were commissioned by the Department for Transport (DfT) to investigate how early adopters of electric vehicles (EVs) have responded to both the Plug-in Car Grant (PiCG) and Plugged-in Places (PiP) schemes, as well as exploring the barriers to EV adoption in both the early adopter and more mainstream markets.

Low and ultra-low emission vehicles are a vital part of the Government's plans for a modern transport system that promotes economic growth while delivering on its climate change targets (HM Government, 2011a). Domestic transport accounts for around a quarter of the UK's total CO<sub>2</sub> emissions and 21% of total greenhouse gas emissions (Committee on Climate Change, 2011). Of these domestic transport emissions, the vast majority (around 90%) comes from road transport, with car travel accounting for over a half (58%), and heavy goods vehicle and light van traffic accounting for just under a third (Transport energy and environment statistics, 2011).

Figure 1-1 illustrates the year-by-year changes in net CO<sub>2</sub> emissions and removals, indexed to the 1990 figure, and illustrates that CO<sub>2</sub> emissions from transport have generally increased, in contrast to total CO<sub>2</sub> emissions. Transport emissions saw a dramatic decline from 2007 to 2009 which may have been as a result of the recent economic difficulties. In the 2009-2010 period, there was an increase in total emissions and a negligible decrease in transport emissions.



**Figure 1-1. UK net CO<sub>2</sub> emissions/removals (in total and in the transport sector) indexed to 1990 levels**

On the 1st December 2011, the Government published a Carbon Plan, setting out how they expect to meet the UK's legally binding carbon reduction targets over the next two decades and beyond (HM Government, 2011b). This identified the potential pathway to achieving a 50% reduction in emissions in 2025 and an 80% reduction by 2050 compared to 1990 levels. In the short term, the Government expects the most significant greenhouse gas savings from transport to continue to come from improvements to the fuel efficiency of conventional vehicles, driven by EU new vehicle

CO<sub>2</sub> targets. However, in the longer term, they indicate that a step change is needed to move away from oil-based fuels and towards ultra-low emission vehicles (ULEVs).

The Office for Low Emission Vehicles (OLEV) was formed in 2009 to position the UK at the global forefront of ULEV development, manufacture and use. 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.

The Government has committed £400m over the lifetime of the current Parliament to support the early market for electric vehicles and other ULEVs. This includes funding for a consumer incentive (the PiCG) to support the purchase of ULEVs and funding for a PiP scheme to install recharging infrastructure in eight lead places across the UK.

#### *The Plugged-in Places (PiP) scheme*

The PiP scheme was launched in 2010 as a trial project at eight selected locations across the UK and ended in March 2013 (although one additional year's funding has been allocated to these areas in 2013-14 to support targeted infrastructure projects). The scheme offered "match-funding to consortia of businesses and public sector partners to install electric vehicle charging points" (OLEV, 2013a). Potential plug-in vehicle owners in the eight PiP scheme areas were assured that they would be able to charge their cars in public locations through investment in charging infrastructure. Additional roles of the PiP scheme included raising the profile of low carbon transport and encouraging the private sector to become involved in infrastructure installation. Following the closure of the PiP scheme, a new funding package has been announced, whereby the Government will provide up to 75% of the cost of installing new charge points at homes, railway stations, on-street locations and rapid charge points in Local authority areas, and across the public sector estate, up to defined caps (OLEV, 2013b).

#### *The Plug-in Car Grant (PiCG)*

Since January 2011, purchasers of qualifying new ultra-low emission cars have been entitled to a Grant of 25% towards the vehicle cost (up to a maximum of £5,000). The PiCG applies to both organisational and private car buyers (a separate Grant for van buyers was introduced in February 2012), and currently applies to 12 specific electric cars with more being added every year. The PiCG was designed to "help make the whole-life costs of a qualifying car more comparable with petrol or diesel equivalents" (OLEV, 2010). As of 31st March 2013, 3,633 claims have been made through the PiCG scheme. In order to explore how these schemes should be implemented in the future, as well as barriers to adoption of EVs, DfT commissioned a research project to investigate PiCG recipients' views and experiences of buying, owning and using EVs.

#### *Department of Energy and Climate Change research*

In March 2012, the Department of Energy and Climate Change (DECC) undertook the first wave of a survey set up to track, understand and monitor public attitudes to its main business priority areas (which include electric cars and vans).

Results from the first wave were based on data from 2,121 face-to-face in-home interviews conducted with a representative sample of adults aged over 16 in the UK. The topic of 'electric cars and vans' was explored in terms of respondents' attitudes to them, particularly awareness of EVs and whether they would, or had, considered purchasing an EV. While 90% of respondents had heard of EVs, a very small proportion (1%) said that they were thinking about buying an EV 'quite soon'.

The results from the DECC study were fundamental in providing the research context for the current study, which will support DfT and OLEV in determining the effectiveness of the PiP and PiCG schemes at present. The results will also identify any potential improvements to the schemes to help bring about the step change that is required to meet the carbon emission target in the transport sector.

## **1.2 Vehicle types and terminology**

Purchasers of fully electric vehicles (EVs - also known as battery electric vehicles), range extended electric vehicles (referred to in this study as PHEVs) and plug-in hybrid electric vehicles (PHEVs) were included in the research. Figure 1-2 explains the differences between the various vehicle types available. Throughout the report, the term 'electric vehicle' (or 'EV') is used generically and captures all three types of electric vehicles where making a distinction is not necessary. The report will distinguish between types of electric vehicles when it is necessary (for example, if comparing responses from PHEV owners with those of EV owners).

<b>CONVENTIONAL PETROL-POWERED ENGINE</b>	<b>CONVENTIONAL HYBRID ELECTRIC VEHICLE</b>	<b>PLUG-IN HYBRID ELECTRIC VEHICLE</b>	<b>PLUG-IN FULLY ELECTRIC VEHICLE</b>	<b>RANGE-EXTENDED ELECTRIC VEHICLE</b>
<b>PETROL/DIESEL ONLY</b>	<b>PETROL/DIESEL ONLY</b>	<b>PETROL/DIESEL AND ELECTRICITY</b>	<b>ELECTRICITY ONLY</b>	<b>PETROL/DIESEL AND ELECTRICITY</b>
<p>A conventional vehicle where petrol or diesel fuel the engine.</p>	<p>Powered by a petrol or diesel engine but also has an electric motor. The motor is powered by a battery which is charged by the engine or when the car is in motion.</p> <p>The electric motor is used at lower speeds and has a limited range.</p> <p>When the battery runs out, the vehicle reverts to using petrol or diesel only.</p>	<p>Fuelled by petrol or diesel, but also contains an electric motor. Similar to a conventional hybrid, except the battery can be charged when the vehicle is parked. Plug-in hybrids have a longer electric range than conventional hybrids.</p> <p>This type of vehicle has a larger battery than conventional hybrid vehicles, which can be charged from an electric socket. This means that the car can be driven on electric power immediately (whereas conventional hybrids might be parked with a low battery level, and so will use petrol/diesel at the start of the next journey).</p> <p>Primarily uses the electric power from the battery, and uses the petrol or diesel to extend the range of the vehicle when the battery runs low.</p>	<p>Fuelled exclusively by electricity which is stored in the battery.</p> <p>The vehicle needs to be plugged into an electrical socket to charge the battery.</p> <p>The typical range of a fully charged vehicle is around 70 miles.</p>	<p>Fuelled by electricity stored in the battery and a petrol/diesel engine. However the engine is not directly linked to the drive wheels – it is there to generate energy to charge the battery.</p> <p>The vehicle runs on the battery alone until the battery capacity reaches a threshold, at which point the petrol engine kicks in and runs the electric generator.</p> <p>The range of a range-extended electric vehicle is around 380 miles.</p>

**Figure 1-2. Description of vehicle types**

## 2 Aims and methodology

This section presents the aims of the study and the research methodologies employed to achieve them.

### SUMMARY

#### Quantitative research

- Aimed to provide data on the characteristics and charging behaviour of private and organisational EV users.
- 192 private purchasers and 329 organisational purchasers took part.

#### Qualitative research

- Aimed to provide an in-depth understanding of the influence of the PiCG and the PiP scheme on the car purchasing decisions of private individuals and organisations, barriers to EV purchase, and factors that influence the driving and charging behaviour of EV users.
- 53 private purchasers (23 EV purchasers and 30 non-EV purchasers) took part.
- 61 organisational purchasers/users (49 EV purchasers/users and 12 non-EV purchasers) took part.

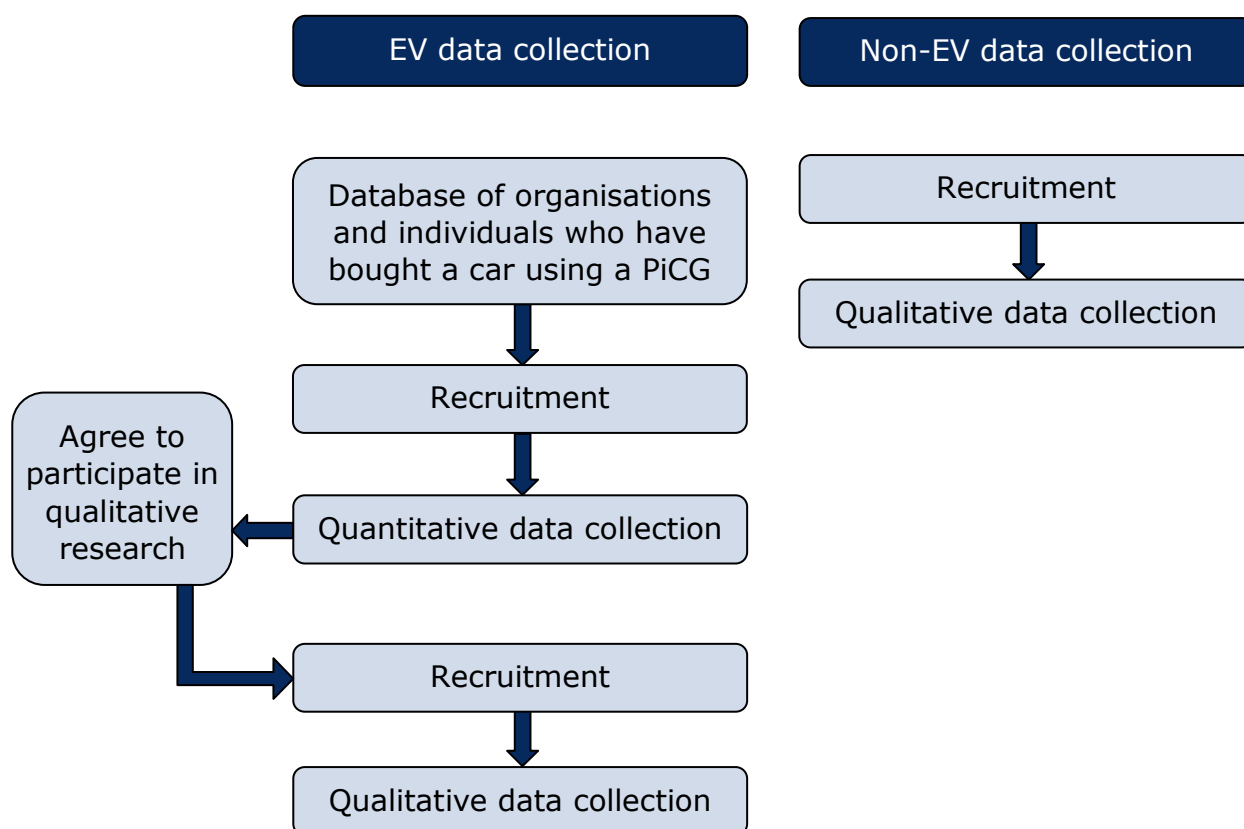
The research addressed the following three overarching aims:

- To provide numerical data on the characteristics and behaviour of existing users of EVs.
- To provide a better understanding of the role of the PiCG in the uptake of EVs.
- To provide an assessment of the effects of the PiP scheme on purchasing, driving and charging behaviour.

The research was conducted in two strands – a quantitative survey and a series of qualitative interviews. The quantitative survey was conducted with private and organisational EV purchasers. The qualitative interviews were undertaken with private and organisational EV purchasers, organisational EV users, dealers and leasers of EVs, and private and organisational non-EV (i.e. ICE) purchasers.

### 2.1 Summary of research methodology

Figure 2-1 summarises the research approach. Both quantitative and qualitative data were collected from EV users and purchasers (see sections 2.2 and 2.3 for the methods used). Non-EV purchasers (i.e. individuals who had recently purchased an internal combustion engine (ICE) vehicle) were also included in the qualitative data collection in order to provide further insight into the barriers to EV adoption.



**Figure 2-1. Summary of research methodology**

## 2.2 Quantitative research

The objective of the quantitative stage was to provide data on the characteristics and driving and charging behaviours of EV purchasers to inform assumptions and forecasts about how plug-in vehicles will be used and driven in the future. The survey consisted of two strands of research. The first strand involved private individuals who had recently received a PiCG, and the second strand involved organisations that had received a PiCG. The surveys used both a CATI (Computer Assisted Telephone Interview) and CAWI (Computer Assisted Web Interview) approach to optimise response rates by offering participants flexibility in how they could respond. Analysis of the responses by mode (CATI compared with CAWI) revealed no significant differences between the two respondent groups.

### 2.2.1 Sample

The sample was supplied by DfT and contained names and addresses of individuals and organisations who had recently purchased an EV and had received the PiCG. The sample file was cleaned to remove duplicates and in total contained the details of 512 organisations and 327 private individuals who could be contacted. As the sample did not contain telephone numbers, it was sent for automatic and manual telephone number look up. All contacts were then sent a recruitment letter detailing the aims of the study and stressing the importance of their views. The letter also contained a freephone number and an email address that recipients could use to contact TNS-BMRB or DfT if they had any queries about the research. For those where telephone numbers were still missing following the look up, the letter included a request for the recipient to provide a



contact telephone number, either by calling the freephone number, emailing the survey inbox, or returning a pre-paid postcard.

### **2.2.2 Survey**

Surveys were developed separately for private individuals and for organisations. Please see Appendix C and Appendix D for the full private and organisational surveys. In order to stay within the prescribed time limits for the interviews, the range of questions was tailored to the type of respondent (private or organisational).

The table in Appendix A lists the areas covered by the quantitative questions presented to both groups. Questions shaded in blue featured in both private and organisational surveys.

Private individuals took an average of 20 minutes to complete the survey by telephone, while organisational respondents took an average of nine minutes to complete the survey by telephone. 'Golden Questions'<sup>5</sup> developed by TNS-BMRB for DfT as part of the Climate Change and Transport Choices segmentation research (Thornton et al., 2011) were included in the private individuals' survey in order to segment respondents. Details of the questions and the segmentation calculation are included in Appendix L.

### **2.2.3 Fieldwork**

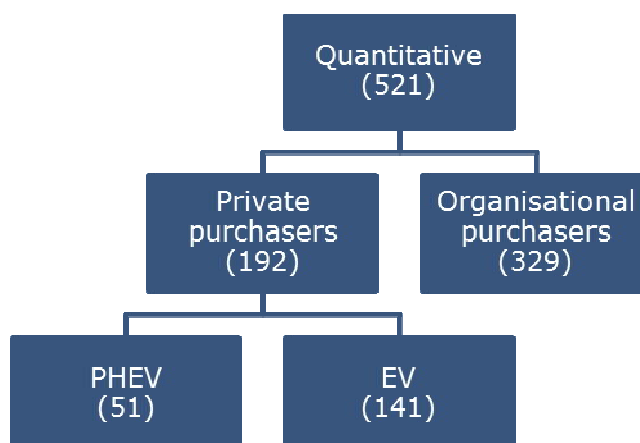
The fieldwork was conducted and coordinated by TNS-BMRB who supplied the response data in an SPSS database for analysis by TRL. The private individuals' survey was piloted on the 8<sup>th</sup> of November 2012. The main stage of fieldwork took place from the 15<sup>th</sup> of November 2012 to the 2<sup>nd</sup> of January 2013. Seven interviewers were used over the course of the fieldwork period. The organisational survey pilot took place on the 14<sup>th</sup> of November 2012. The main stage was conducted from the 26<sup>th</sup> of November 2012 to the 11<sup>th</sup> of January 2013. A total of nine interviewers worked on the organisational survey across the fieldwork period. The majority of interviews were carried out over the phone, but respondents were offered the option of completing the survey online if they preferred.

As an incentive for participation, all interview respondents were asked to select a charity (NSPCC, RSPCA or Friends of The Earth) to receive a £10 donation on their behalf as a thank you for taking part. Private individuals and organisational respondents were asked if they were willing to take part in further (qualitative) research; 84% of private respondents and 86% of organisations agreed to this.

A total of 192 interviews took place with private individuals, 37 of which were completed online. This was a response rate of 59% of all contacts (64% of useable contacts). A total of 329 interviews took place with organisations, of which 19 of were completed online. This was a response rate of 64% of all contacts (69% of useable contacts). An overview of the quantitative respondent sample can be seen in Figure 2-2.

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<sup>5</sup> In order to use question items from the Thornton et al. (2011) questionnaire in the current study, the set of questions was reduced to a set of 'Golden Questions' that discriminate best between the defined segments.



**Figure 2-2. Overview of quantitative respondent sample**

### **2.2.4 Representativeness of the sample**

Once fieldwork was completed, the profile of the interview participants was compared to the population of PiCG recipients, to establish that the interview participants were representative of the population of current EV purchasers who had registered for the PiCG since the scheme was launched. In general, the profile of the interview participants was very similar to the original sample file (see Appendix K).

For both the private individuals and organisations, the only area where there was variation of more than one to two percentage points was 'PiP scheme region'. For private individuals, the proportion of respondents in the London PiP scheme region was six percentage points fewer than in the sample population overall (15% versus 21% respectively), and the proportion of respondents living outside of a PiP scheme region was four percentage points higher than in the sample population overall (47% versus 43% respectively). The distribution within the sample is very similar to that seen in the population of PiCG recipients across all five of the variables independently. In addition, as the sample encompasses 60% of the population, we would expect the results from the sample to be a reasonable illustration of the population as a whole. For organisations, the proportion of interviews achieved in the London PiP scheme region was four percentage points lower than in the sample population overall (10% versus 14% respectively).

## **2.3 Qualitative research**

The aim of the qualitative research was to explore the motivations, views and experiences of buying and using electric cars (in both a private and an organisational context) to understand how the PiCG and PiP schemes could be improved and promoted to new users in the future. As well as interviewing purchasers and users, non-EV purchasers were interviewed to provide an insight into the barriers to EV adoption and to make recommendations for DfT to consider with regard to future implementation plans to ensure that investment can be targeted effectively.

### 2.3.1 *Sample*

Six groups of respondents were included:

- **Private EV purchasers – Respondents who had bought EVs for their own personal use.**

A face-to-face interview approach was used to gather in-depth evidence about a number of different topic areas, some of which included sensitive topics (such as financial arrangements). It also offered the opportunity to capture a detailed understanding of each owner's EV experience. Car purchasing decisions may be shared between co-habiting partners, and the decision to choose an EV may be made jointly. To understand the joint decision-making process, joint interviews were conducted with eight couples. While most of the interview was conducted with both partners together, one part of the interview was conducted with each partner separately. This approach allowed the researchers to explore what each partner's initial position was, what the 'persuasive arguments' were, and what the eventual views of the 'persuaded' partner were post-purchase.

- **Private non-EV purchasers – Respondents who had bought ICE vehicles** (fuelled by either petrol or diesel) from new since October 2010 for their own personal use.

Interviews were conducted with private purchasers of non-EV cars to assess their attitudes to EVs and understand their reasons for non-purchase of an EV. Private non-EV purchasers were not included in the quantitative research strand. See section 3.1 for more detail.

- **Organisational EV purchasers – Respondents who had bought EVs for use in an organisational context** (e.g. as company or pool cars).

These purchasers were interviewed at their premises. Interviewing people face-to-face was considered to be more effective than telephone interviews as it provided interviewers with a better understanding of each organisation's ethos. Additionally, this approach may have increased their level of engagement in the research and thus made them more likely to help source and recruit the users of the EVs they had purchased.

- **Organisational EV users – Respondents recruited through the organisational EV purchasers who use EVs in their organisations.**

Telephone interviews with the users of organisations' EVs (including pool or long-term users) were conducted. Organisational users were included in the qualitative research strand only. The roles held by organisational users included sales executives, administrative staff and office workers.

- **Dealers or leasers – Respondents who worked in an organisation which leased or sold EVs.**

Telephone interviews were conducted with dealers and leasers. These groups were considered to be important as they provide a link between the manufacturers, the Government and prospective purchasers.

- **Organisational non-EV purchasers – Respondents who had bought a new ICE vehicle** (fuelled by either petrol or diesel) within the last two years and who

had the potential to be EV purchasers based on them fitting in with segments 4, 5 and 6 from the DfT segmentation study (Thornton et al., 2011).

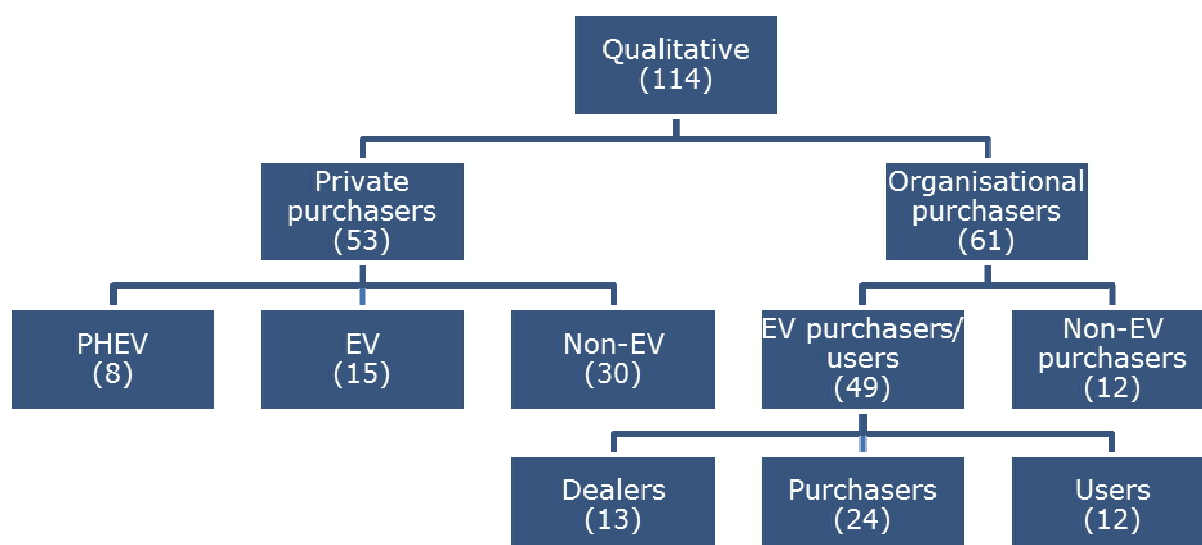
Telephone interviews were conducted with organisational non-EV purchaser respondents to assess their attitudes to EVs and understand their reasons for not purchasing an EV. Organisational non-EV purchasers were only involved in the qualitative research strand.

Table 2-1 provides more information about the different purchaser and user types, the recruitment criteria applied, the type of interview conducted and the number of interviews completed. Further information about each purchaser/user type is detailed in section 3.2.

**Table 2-1. Overview of qualitative respondents**

<b>Purchaser/ user type (no. interviewed)</b>	<b>Recruitment criteria</b>	<b>Interview type and topic guide location</b>
<b>Private EV purchaser (23)</b>	A mix of PiP and non-PiP scheme area inhabitants	Face-to-face Appendix E
	A mix of male and female respondents	
	A mix of when the PiCG was received (before/after July 2011)	
<b>Private non-EV purchaser (30)</b>	Joint, sole or main decision maker in buying cars for their household	Face-to-face Appendix F
	Bought a car from new for their household since October 2010	
	A mix of PiP scheme locations	
	A mix of the most likely segments to buy an EV based on the DfT climate change segmentation study (Thornton et al., 2011)	
	A mix of rural and urban areas (defined through population density)	
<b>Organisational EV purchaser (24)</b>	A mix of organisations from PiP and non-PiP scheme areas	Face-to-face Appendix G
	A mix of when the PiCG was received (before/after July 2011)	
	A mix of organisation sizes (measured by number of employees)	
	Impact of public charge points on decision to buy (a mix of views ranging from 'very important' to 'not at all important')	
<b>Organisational EV user (12)</b>	Worked for organisations in which the organisation's EV purchaser had been interviewed	Telephone
	Either drove an EV permanently or had the choice of choosing to drive an EV as part of a pool of EVs and non-EVs	Appendix H
<b>Dealer/leaser (13)</b>	Those who answered 'yes' when asked if their organisation had bought an EV to be used as display or demonstration models or to be sold onto customers	Telephone Appendix I
	A mix of PiP scheme areas (mature/less mature/not in a PiP scheme area)	
	Sold/leased EVs to third parties (either private consumers and/or organisations)	
	A mix of sellers/leasers and leasers only	
<b>Organisational non-EV purchaser (12)</b>	Bought a new car for their organisation since October 2010	Telephone Appendix J
	A mix of PiP scheme areas (mature/less mature/not in a PiP scheme area)	
	A mix of organisation sizes (measured by number of employees)	

An overview of the qualitative respondent sample can be seen in Figure 2-3.



**Figure 2-3. Overview of qualitative respondent sample**

### 2.3.2 Fieldwork

The qualitative fieldwork was undertaken by a team of experienced researchers, who were briefed on the aim of the topic guides to ensure a consistent approach was applied to all of the interviews.

Face-to-face interviews typically lasted around one hour, and telephone interviews around 45 minutes. Private respondents were interviewed in their homes or in a convenient location. All respondents were offered a cash incentive or an equivalent charity donation (£40 for face-to-face interviews; £20 for telephone interviews) in recognition of their contribution, and to facilitate recruitment.

### 2.3.3 Approach to analysis

The interviews were recorded using digital voice recorders (DVRs) and transcribed by an external company before the analysis was conducted by a TRL researcher, with support from the TNS-BMRB fieldwork team.

Qualitative analysis relies on the processes of describing phenomena, classifying them, and seeing how various concepts interconnect (Dey, 1993). A number of different approaches may be used to achieve this. For this study, the interview transcripts were analysed using Thematic Content Analysis (e.g. Berelson, 1952) to detect emerging themes from the interviews.

Two workshops were undertaken with all fieldworkers where themes identified from the data collection were discussed to develop a structure for analysis. The first workshop was conducted early in the data collection process and focused on EV purchasers and users. The second was conducted towards the end of the data collection period and focused on the data emerging from the non-EV purchasers. Fieldworkers also liaised with each other while the fieldwork was being undertaken to share various ideas and emerging themes.

## 2.4 Statistical significance of quantitative data

Chi-square tests were used to determine whether certain differences (for example between EV and PHEV owners) were statistically significant. Where statistically significant differences are mentioned, the p-value is  $<.05^6$ . Where differences are described as approaching statistical significance, the p-value is  $<.10$ .

## 2.5 Methodological considerations

As with any research that relies on respondents volunteering to take part, it is not always possible to establish the true representativeness of the sample. As mentioned in section 2.2.4, the achieved sample of participants in this study matched closely with the full sample of PiCG recipients showing that the research was representative of PiCG recipients up to the end of June 2012. Although the purpose of this research was never to represent the total national population of PiCG-eligible EV owners/registered keepers (as at June 2012), analysis of vehicle registration data undertaken by DfT suggests that the research included approximately half of them<sup>7</sup>. Drawing conclusions about whether certain factors were more or less common across different respondent types was not always possible (e.g. it was not possible to compare older and younger drivers as there were no respondents aged under 40). Where distinctions could be made, these are presented.

While every effort was made to stratify the sample, it is possible that the way in which respondents could choose to 'opt in' to participation in the qualitative elements of the study may have resulted in a skew towards older people (who were likely to be retired and therefore available for interview) taking part in the qualitative interviews. However, the general EV car purchaser population also tends to be skewed towards older people, suggesting that there is no reason to believe that the data obtained is unduly biased.

Data analysis could have been improved by matching the qualitative respondents to their quantitative profile, which would have allowed further insight into their EV purchasing and driving behaviour as well as their views of the PiCG and PiP schemes. Using standardised question wording would also have opened up opportunities for analysis. In a very few cases questions were posed to both organisations and private recipients (in the quantitative strand) using slightly different wording, which meant that drawing comparisons between responses from the two groups was inappropriate.

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<sup>6</sup> i.e. there is a 5% chance that the observed relationship does not truly exist

<sup>7</sup> Vehicle licensing statistics published by the Department for Transport show that at the end of June 2012 there were 1,985 PiCG-eligible cars registered in England. Internal DfT analysis of the number of separate postcodes linked to PiCG-eligible cars up to October 2012 showed that they were registered to 1,476 different postcodes (showing that the number of individual registered keepers equated to approximately 51% of the total population of registered vehicles). Applying the same metric (51%) to registrations up to June 2012 (1,985) suggests that there were approximately 1,012 individual registered keepers of PiCG-eligible cars at that time. Given that around half that number (521) participated in this research, it is likely that the research broadly reflects the views of the national population of registered keepers of PiCG-eligible cars as at June 2012.

### 3 Respondent profiles

This chapter presents the demographic profiles of all of the respondents who participated in the research.

#### SUMMARY

##### Private quantitative respondents

- The majority of private survey respondents fell into the categories 'male', 'aged between 40 and 69' and 'living in a household of two' (males aged 40 to 69 living with one other person accounted for 26% of the total sample).
- Most had at least one car in addition to the EV. The EV was the sole car in 20% of households.
- Over 90% of respondents were classed as upper, middle or lower middle class.
- There was a roughly even split between PiP scheme and non-PiP scheme areas.
- The 30 private non-EV purchasers were a mixture of the most likely segments to buy an EV based on the DfT climate change segmentation study (Thornton et al., 2011) namely Affluent Empty Nesters, Educated Suburban Families and Town and Rural Heavy Car Users.

##### Private qualitative respondents

- Compared to the quantitative sample, a similar proportion (91%) of the qualitative sample was male and the majority were aged between 40 and 69.
- There was a similar proportion of two-person households to the quantitative sample, and a higher proportion of single-person households.

##### Organisational quantitative respondents

- The vast majority of quantitative organisational purchasers belonged to the private sector and were involved in retail or 'other' business activities.
- Over half of organisations responding to the quantitative survey had fewer than 50 employees.

##### Organisational qualitative respondents

- There was a range of job roles and responsibilities in relation to the EV purchase decision. Respondents from a mixture of small, medium and large organisations were interviewed.

#### 3.1 Private purchasers and users

Private respondents had purchased their cars between February 2011 and June 2012. At the time of the qualitative fieldwork, respondents had owned their vehicles between six months and almost two years. Just over half of the private respondents (61%) had purchased their vehicle in 2011.

A set of 'Golden Questions' was developed as part of the Climate Change and Transport Choices segmentation research (Thornton et al., 2011), which identified nine population segments on the basis of their attitudes, behaviours and socio-demographic



characteristics. Details of the questions asked and the calculation for identifying the segment can be found in Appendix L. Three of the segments (Affluent Empty Nesters, Educated Suburban Families and Town and Rural Heavy Car Users) have characteristics which suggest they are potential EV purchasers. Our sample comprised six of the nine segments, as shown in Table 3-1. The private non-EV purchasers had the potential to be EV purchasers based on them fitting in with Segments 4, 5 and 6. The majority of respondents (72%) were from Segment 5. One of the descriptors of this group is “concerned about climate change but have high travel needs”. This group also tends to have a higher income and therefore is likely to have both the means and the desire to purchase and use an EV.

**Table 3-1. Respondent segmentation**

Segment number	Segment name	% of general population in Segment	% of private quantitative respondents in Segment (n=192)
1	Older, less mobile car owners	9%	5%
2	Less affluent urban young families	21%	1%
3	Less affluent older sceptics	12%	7%
4	Affluent empty nesters	9%	5%
5	Educated suburban families	17%	72%
6	Town and rural heavy car use	13%	10%

## 3.2 Respondent demographics

### 3.2.1 Private quantitative sample

All figures referred to in this section can be seen in Appendix B.

- One hundred and ninety-two people responded to the quantitative survey, 89% of whom were male, and the majority (74%) were aged between 40 and 69.
- The group with the most respondents was males aged 50-59, accounting for 25% of all respondents. Figure B-1 shows the percentage of males and females in each age group.
- Almost half (44%) of respondents belonged to a household with two members. Single-person households were represented by 11% of respondents, with 43% belonging to households of three to five, and a further 3% belonging to households with six or more members, as shown in Figure B-2.
- Most respondents came from households with two cars, including their EV (51%), with the remainder owning (or having access to) three or more cars (29%) or one car (20%). Figure B-4 shows that respondents who own a PHEV are more likely to have that vehicle as the only household vehicle (29%) than EV owners (17%).
- Respondents generally came from the middle classes. Just over a third (34%) were classified as grade A (upper middle class), a similar proportion (32%) were

grade B (middle class), and a quarter grade C1 (lower middle class) (Figure B-5). The remainder were grade C2, D and E (skilled working class, working class, and those at the lowest levels of subsistence). Of the eight respondents in grade E, seven were aged 60+, and one was aged 40-59. All but one lived in an urban area.

- Households with children aged up to 16, by respondent age, are shown in Figure B-3. Sixty percent of all respondents had no children (89% of those respondents aged 60 or over had no children). An equal number of respondents had one child or two children (18%).
- Those aged 40-59 were most likely to have one child, and those aged 16-39 and 40-59 were equally as likely to have two children at home. Only 6% of respondents had three or more children at home; these respondents were all aged between 40 and 59.
- Of the 192 respondents, 53% lived in a PiP scheme area. Figure B-6 illustrates how PiP scheme areas were represented.

### **3.2.2 Private qualitative sample**

- Compared to the quantitative sample, a similar proportion (91%) of the qualitative sample was male and, again, the majority were aged between 40 and 69 (74% of all respondents).
- There was a similar proportion of two-person households to the quantitative sample (43%), and a higher proportion of single-person households (39%). Seventeen percent of the qualitative sample belonged to households with three to five members.
- Thirty-five percent of respondents had only one car (i.e an EV or a PHEV). Just under half of the respondents had two cars (43%). The remaining 22% had three or more cars.
- Just over a quarter of the sample (26%) was classified as grade A, 35% were grade B and 35% were grade C1, one respondent was classified as grade E.

### **3.2.3 Organisational quantitative sample**

- Figure B-7 shows the sectors that participating organisations belong to. The vast majority (88%) were private sector.
- Figure B-8 presents the business activities of participating organisations. Henceforth, dealerships will be excluded from the analysis as they were not asked to respond to the majority of questions.
- One quarter of respondents classified themselves as being retailers or shops, followed by 12% who stated they were in the manufacturing industry. The remaining activities each represented 5% of the sample or fewer. A large proportion (32%) was involved in 'other' business activities.
- The number of employees in responding organisations is shown in Figure B-9. Approximately half of organisations had fewer than 50 employees (51%), with just under a quarter having over 500 employees.

- As shown in Figure B-10, most respondents (64%) had personally driven the EV owned by their organisation regularly, 32% had driven it sometimes and 4% had never done so.
- The job roles, responsibilities and remit of those responsible for EV purchasing varied considerably. While all of the respondents were involved in the decision to purchase EVs, there was much variation in their job roles; the following areas of responsibility were all described:
  - company owners and managing directors
  - transport/fleet managers
  - senior management (e.g. finance directors and general managers)
  - environmental specialists (e.g. those with a responsibility for implementing and maintaining low carbon initiatives).
- Of the 329 quantitative organisational respondents, 57% were based in a PiP scheme area.

#### **3.2.4 Organisational qualitative sample**

The organisational respondents responsible for EV purchase decisions had a range of job roles and responsibilities. Respondents from a mixture of small, medium and large organisations were interviewed.

## **4 Motivators and barriers to buying or leasing an EV**

This chapter summarises the main factors that influence whether an EV is purchased. It includes an analysis of the views and experiences of private and organisational EV owners to build a picture of motivating factors. The views of those who have not purchased an EV are also analysed to identify and further understand the barriers to adoption of EVs.

## SUMMARY

### Important factors in general vehicle purchase

The three most important factors when buying any type of car were reliability, safety and comfort (according to the quantitative data). Less important factors included engine size and brand preference.

### Important factors in EV purchase

- Organisations and private EV purchasers regarded similar factors as being important when purchasing their EVs.
- The three most important factors for private EV purchasers were: saving money on fuel; environmental factors; and a desire to be involved with new, fun and innovative technology.
- The three most important factors for organisational EV purchasers were: saving money on fuel; environmental factors/corporate social responsibility; and financial incentives.
- Other important factors included a fit with lifestyle or organisational needs, convenience and the desire to make a statement.

### Information gathering processes

- Private respondents tended to obtain information about EVs in a less structured and formalised way than organisational respondents, and were more emotionally involved in the process compared with respondents from larger organisations.
- Test drives were referred to by many respondents (both private and organisational) as being the 'tipping point' in their decision to purchase, with internet forums also being identified as a very useful information source.
- Four types of purchaser were identified based on their approach to information gathering and time taken to purchase.

### The role of the PiCG and PiP schemes

- The PiCG was 'very' or 'fairly' important for over 85% of both private and organisational quantitative respondents in their purchase decision.
- Public charging infrastructure was considered to be 'very' or 'fairly' important by around 40% of both private and organisational respondents in their decision to purchase (an) EV(s).

### Barriers

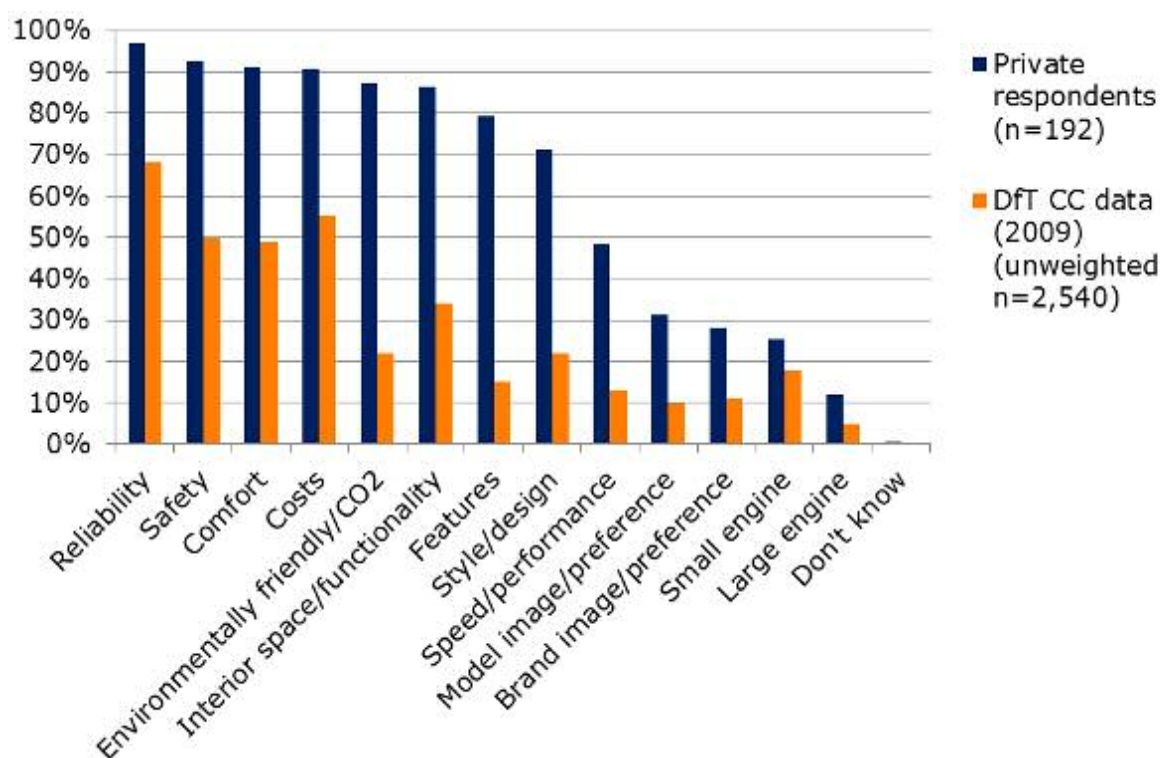
Key barriers identified based on their prevalence in the qualitative data related to:

- A general lack of knowledge about EVs, linked with negative portrayal by some media coverage. This was the biggest barrier, and was identified by most respondents (both EV and non-EV users).
- Concerns over purchase cost and range.
- Concerns over residual value and battery life for several respondents with experience of using an EV, particularly following EV purchase.

Other less frequently described barriers included: what others would think; whether EVs would be fit for purpose; and a limited choice of models.

#### 4.1 Important factors when purchasing an ICE vehicle

Private respondents were asked to choose, from a pre-defined list, the factors which were important to them when buying an ICE car or van. The most important factors for early EV adopters were reliability, safety, comfort and costs – this is consistent with earlier research from the DfT climate change survey of the general population (Thornton et al., 2011) (see Figure 4-1, which shows the percentage of the sample that chose each factor as being important to them). Compared to the wider population (not limited to EV purchasers) who took part in the climate change survey, a greater proportion of the private respondents in this study placed importance on each of the factors when purchasing a non-EV. This suggests that the early adopter sample has a wider range of expectations of a vehicle, and is more likely to consider various factors, indicating a marked difference in the profile of early adopters and the general car-buying population.



**Figure 4-1. PRIVATE: Important factors when purchasing a non-EV car or van - comparison of private survey respondents with DfT climate change data**

During the qualitative interviews with non-EV purchasers, both private and organisational respondents were provided with the list of vehicle features presented in Figure 4-1. They were asked to arrange the features into order of priority (high, medium or low) when purchasing a new vehicle.

Private non-EV purchasers largely reflected the data illustrated in Figure 4-1. High priorities identified in this group of respondents focused on safety and reliability.

*"I think safety has been a predominant buying feature, hence the shift – the total shift over to [brand name removed] because of their reliability and also because of their safety record."* Private non-EV purchaser

In addition to safety and reliability, the data suggest that another high priority feature for the private non-EV purchasers related to the style and design. Respondents

suggested that it was important for them to purchase a vehicle that they liked, that appealed to them and that offered features such as safety and reliability.

*"Well I think it is like anything you buy, if you think something is ugly you are probably not going to buy it, are you, whether clothes or whatever you are buying. So I liked the look of it."* Private non-EV purchaser

For organisations, safety as a feature was not generally placed into the high priority category. However, this was not because safety was considered unimportant; instead, respondents generally felt that new vehicles sufficiently covered their safety requirements. This enabled them to focus their attention on other features necessary to provide employees with a suitable vehicle. The most frequently described high priority features included reliability, comfort and interior space/functionality. Reliability was deemed to be very important for organisations because of the impact that any vehicle failure would have on their business.

*"Reliability as I have said [is important], we have drivers going out that are on call and if they have multiple calls they can't have a vehicle that's going to let them down really."* Organisational non-EV purchaser

For respondents from organisations where employees were required to drive a lot for work (e.g. sales representatives, engineers), comfort was important because of the amount of time spent in the vehicles.

Several organisations explained that the nature of their business meant that their employees were required to either carry equipment with them or use their vehicles to transport customers. Therefore, interior space and functionality was important when they considered adding new vehicles to their fleets.

*"We've got reps they've got to take samples with them you know if they come up with a car you know like a [make/model removed] I mean that's a joke! You know, they've got to have room in that car to be able to take a, customers out and b, to be able to have samples in the car."* Organisational non-EV purchaser

Image and corporate identity were important for organisational non-EV purchasers. For these respondents, style and design were important because they felt that their vehicles represented the corporate image of their organisations.

*"One of the reasons that we provide company vehicles is to have an element of image, professional image coming through to our clients...the brand, the image, the style, the design, that is actually part of how we present and represent our business to the outside world."* Organisational non-EV purchaser

## **4.2 First encounters with EVs – Discovery and information gathering**

Many respondents reported discovering EVs via a variety of media sources including newspapers, motoring magazines, the news and television programmes featuring EVs. The two sources deemed to be most useful in supporting decision-making were internet forums and test drives.

Typically, respondents described themselves as wanting an EV specifically rather than a new non-EV when they were thinking about buying their new cars.

Smaller organisations and private respondents tended to be emotionally involved in the decision to purchase and so the information that they gathered was less likely to be

constrained by organisational policies and procedures. They also typically used similar approaches to information gathering.

*"I did a bit of reading, but it was mainly around sort of trade magazines, and I met up with [name removed] and went and drove their vehicle, and that was where my first bit of interest was, but it was mainly reading magazines."* Organisational EV purchaser

*"I just read about it and then I looked at the website for the car and it looked pretty good, [the EV] wasn't available in the UK at that time, but I think they asked for something like £100 deposit to secure a delivery slot. So I paid for that, [the deposit] was refundable so I thought 'why not?' And then you know, in time they phoned me up and said it was there. So I didn't even test drive it."* Private PHEV purchaser

Internet user forums and test driving were viewed as being important information sources when considering purchasing an EV. Forums were deemed to be important because they provided respondents with experience-based feedback about what it was really like to own and drive an EV:

*"I do like online forums, and there was an excellent online forum called [name removed] that I now actively, on a daily basis, contribute towards. That really is a group of drivers or people considering them, and just talking through the realities of owning a[n electric] car."* Organisational EV purchaser

Forums were also an on-going source of useful post-purchase information:

*"I tend to look at it almost daily to pick up snippets and things and see where people can get cheap servicing or driving tips and this sort of thing."* Private EV purchaser

For many respondents, their first experience of driving the vehicles (which commonly happened at the test drive) appeared to be an important 'tipping point' in their purchase decision.

*"The real turning point was when we went for a test drive in Oxford, that was when my wife went from sceptical to convinced. For me, it was turning it from a promising idea into something that I wanted to do."* Private EV purchaser

Other sources of information were described, including:

- magazines (motoring magazines for both private and organisational respondents, in addition, trade magazines were commonly cited by organisational purchasers)
- the internet (manufacturer websites, video-sharing websites such as YouTube, blogs, audio-downloads and international articles and literature)
- television programmes
- talking to manufacturers, dealers, corporate contacts and others
- talking to friends and family
- manufacturer events, pre-registration events
- dedicated conferences.

The dealer interview data gave an insight into the types of questions that were raised by potential purchasers who had approached them for information. The key areas for enquiry included:



- The purchase cost and what finance options were available.
- What range the vehicles could achieve.
- How long the battery was likely to last (and what replacement entailed in terms of the process and the cost).
- How easy it was to charge an EV.
- What the service intervals and costs associated with servicing were.

The amount of information gathered did seem to vary between private individuals and organisations. Private respondents tended to describe a more flexible and sometimes impulsive purchasing decision process. Some respondents were so impressed by the vehicles that they placed an order fairly quickly, even before seeing or driving the vehicle.

*Female Respondent: "As soon as we realised it was going to become available in this country, [my husband] phoned them up and said 'I want one'."*

*Male Respondent: "The person at the garage asked me if I wanted a test drive and I said 'no, I'm quite happy' and he didn't know what to do." Private EV purchasers (joint interview)*

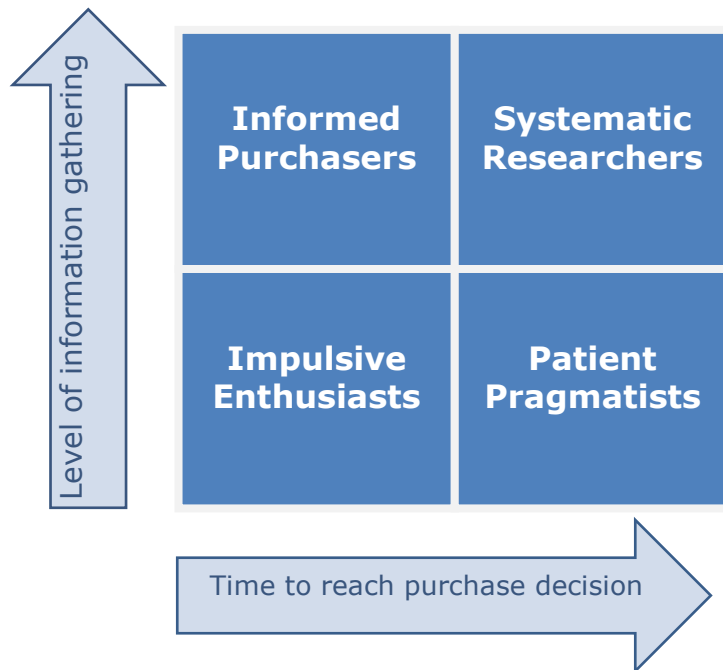
Organisations, on the other hand, typically undertook focused and detailed information gathering over a longer period of time, often being required to make business cases to demonstrate the business-related advantages of purchasing an EV.

*"I had to plan really to purchase this vehicle and it went through the [name removed] Board of course, who sanctioned it. But I had to make sure that money was available. So I made room in the capital programme for one electric vehicle, which in fact replaced a [small hatchback]." Organisational EV purchaser*

### 4.3 EV purchaser types and pre-purchase behaviours

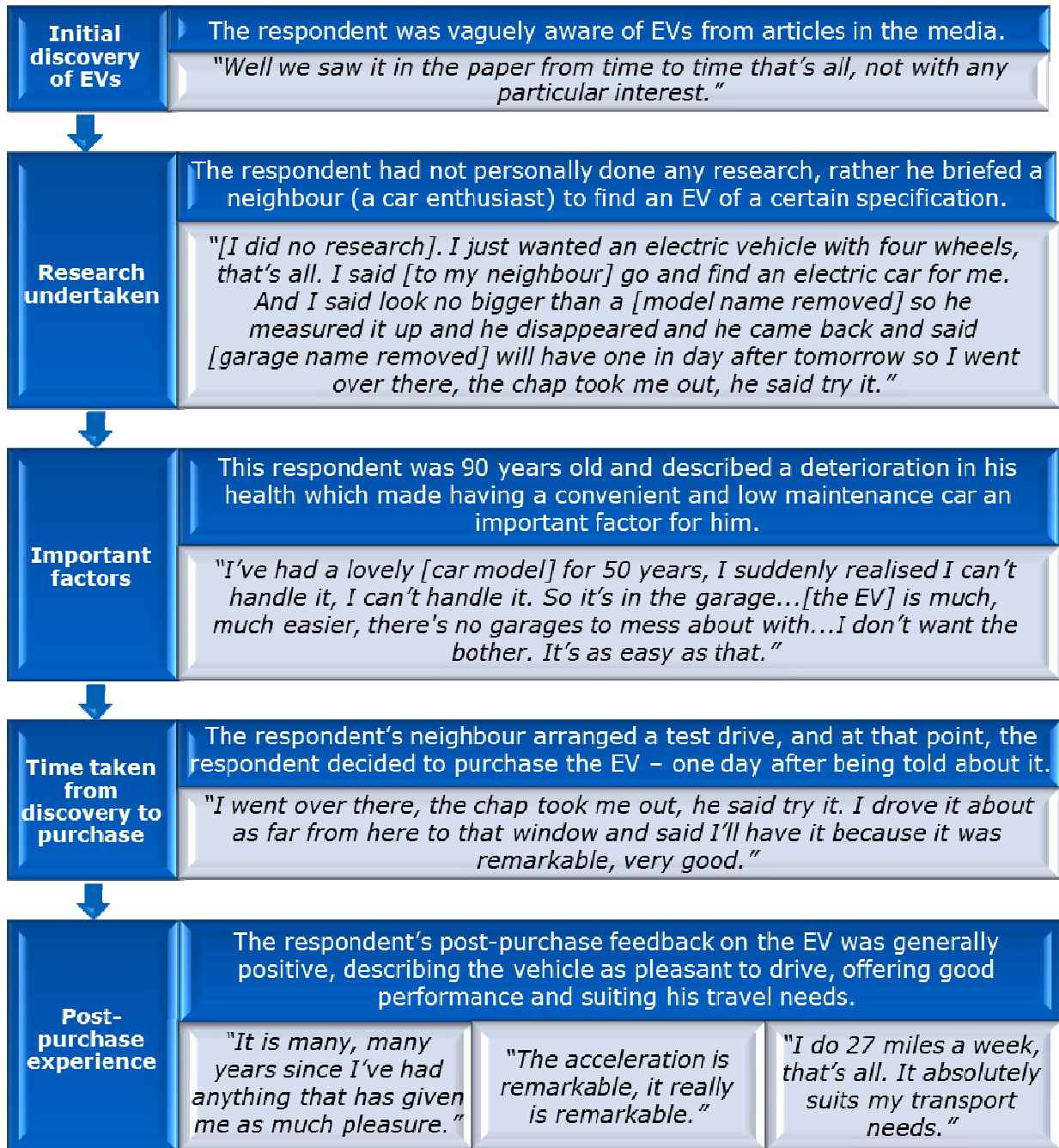
A purchaser typology was developed using the EV purchaser data. Four categories were identified (see Figure 4-2), based on two factors: the amount of information gathering undertaken, and the time to purchase. The respondents were categorised as:

- **Impulsive Enthusiasts** – this group of respondents tended to do little information gathering, were spontaneous in their purchasing habits and demonstrated a high level of emotional buy-in.
- **Informed Purchasers** – these respondents typically gathered a lot of information, but reached their decision to purchase quickly.
- **Patient Pragmatists** – this respondent group did enough information gathering to satisfy themselves that an EV would suit their needs and waited patiently for the right EV to become available before committing to purchase.
- **Systematic Researchers** – these respondents generally conducted a very detailed and systematic information gathering process, utilising many different reference sources and taking their time in reaching a decision.

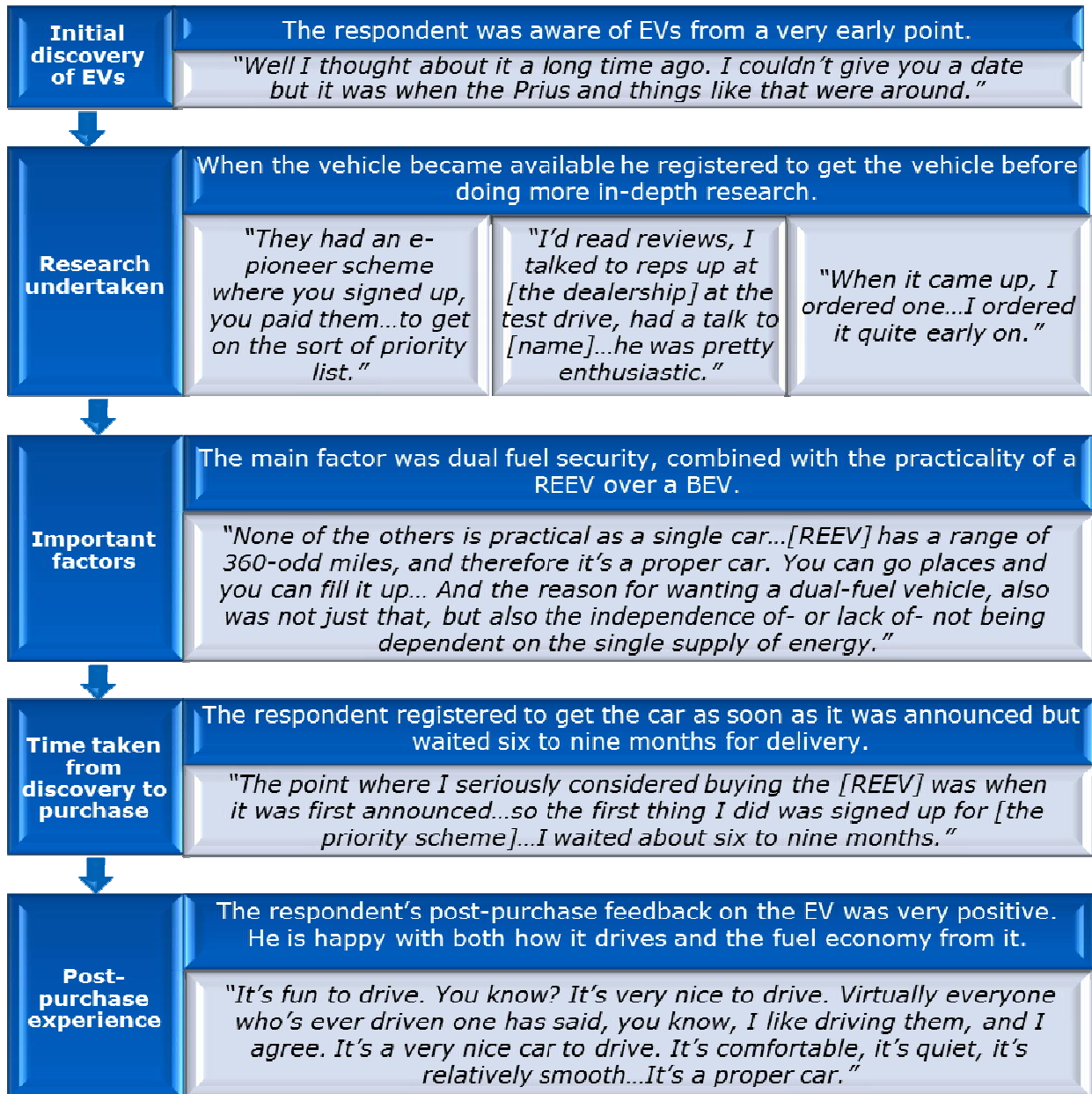


**Figure 4-2. Purchaser typology**

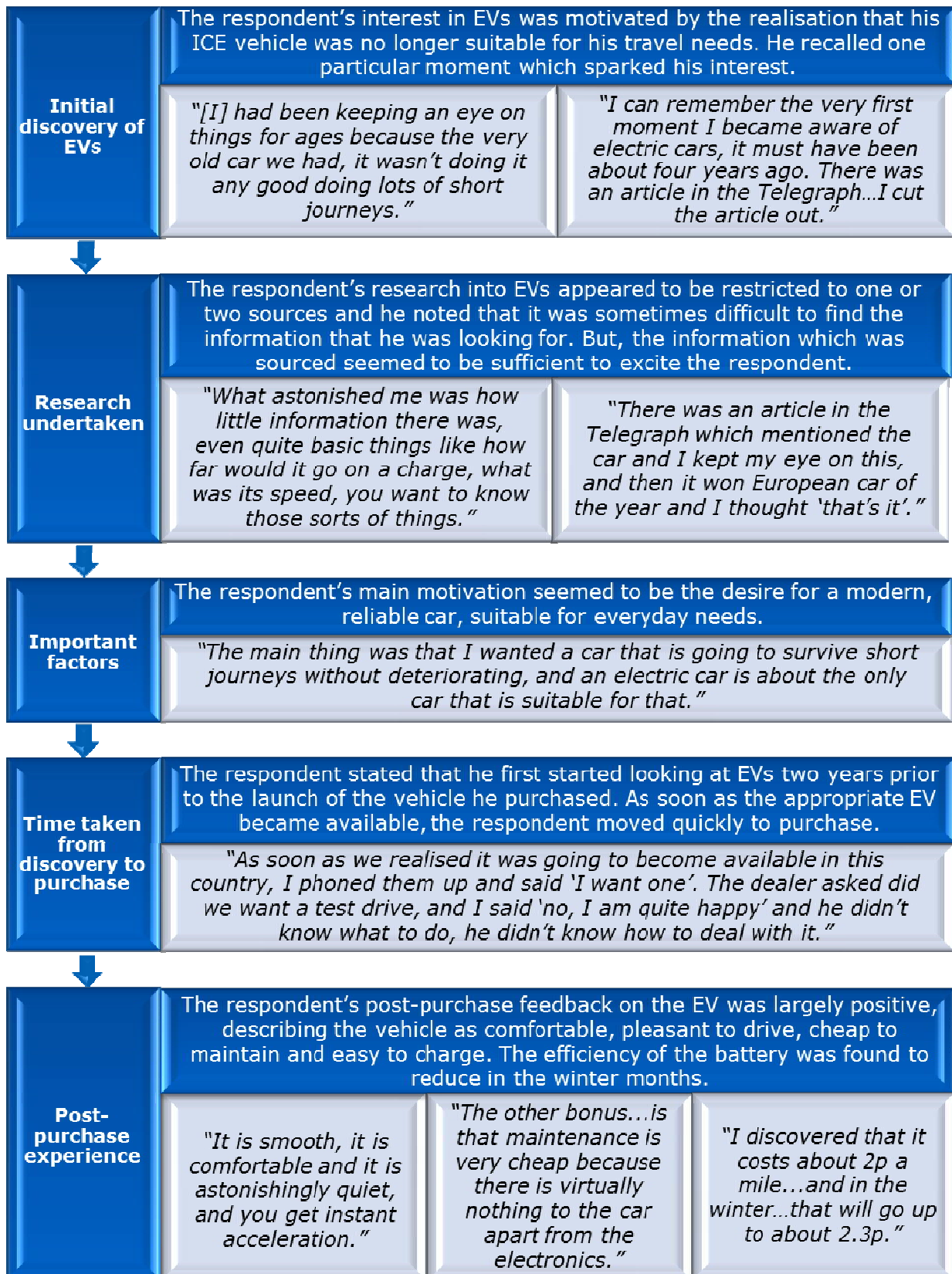
Four case studies are presented (Figures 4-3 to 4-6), each describing a particular respondent for each purchaser category, to illustrate what initially sparked respondents' interest in EVs, the amount of research undertaken, important factors in the purchase decision, the amount of time taken to reach a purchase decision and their post-purchase experiences of the EV.



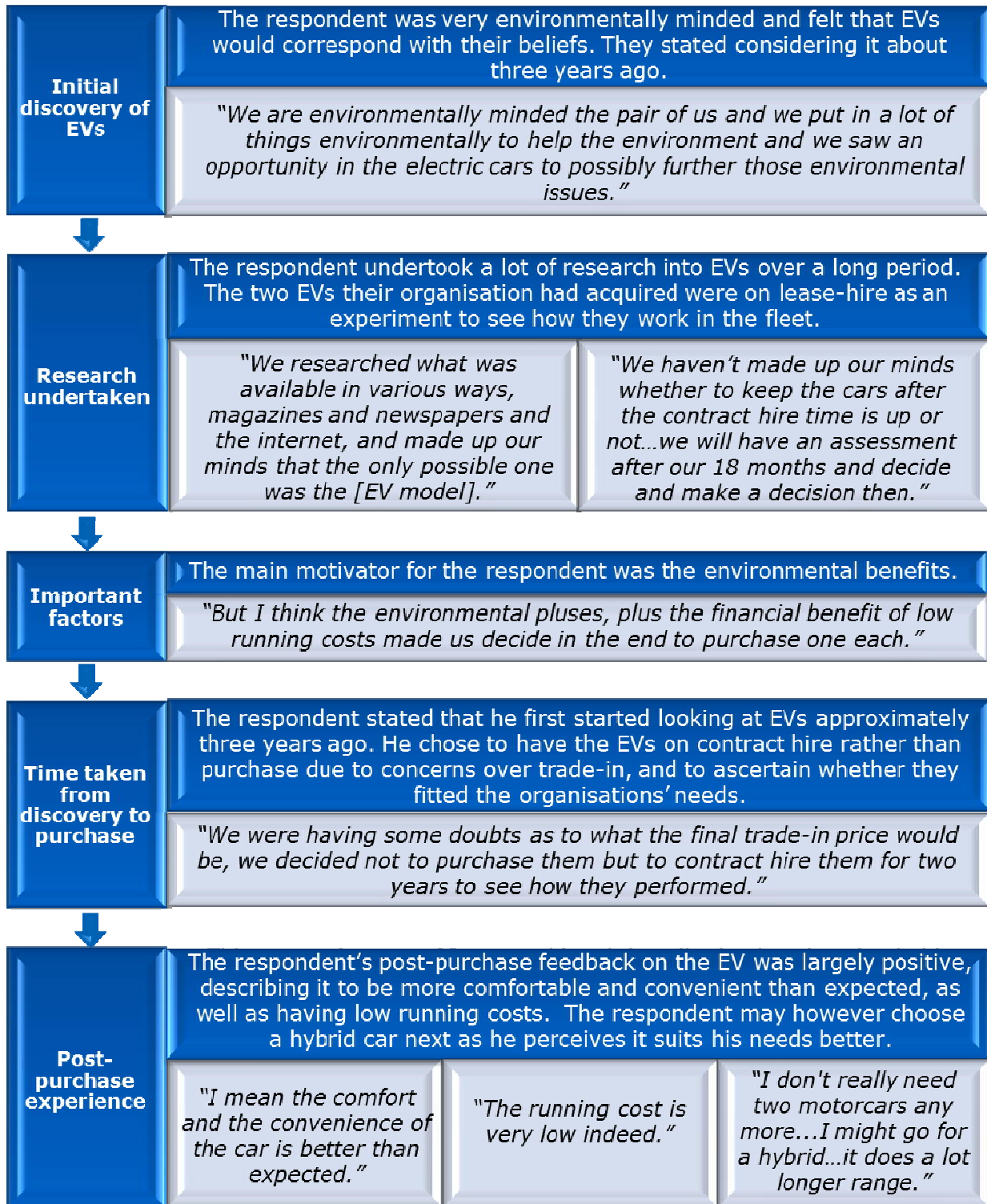
**Figure 4-3. Case Study 1: Impulsive Enthusiast (Private EV purchaser)**



**Figure 4-4. Case Study: Informed Purchaser (Private PHEV purchaser)**



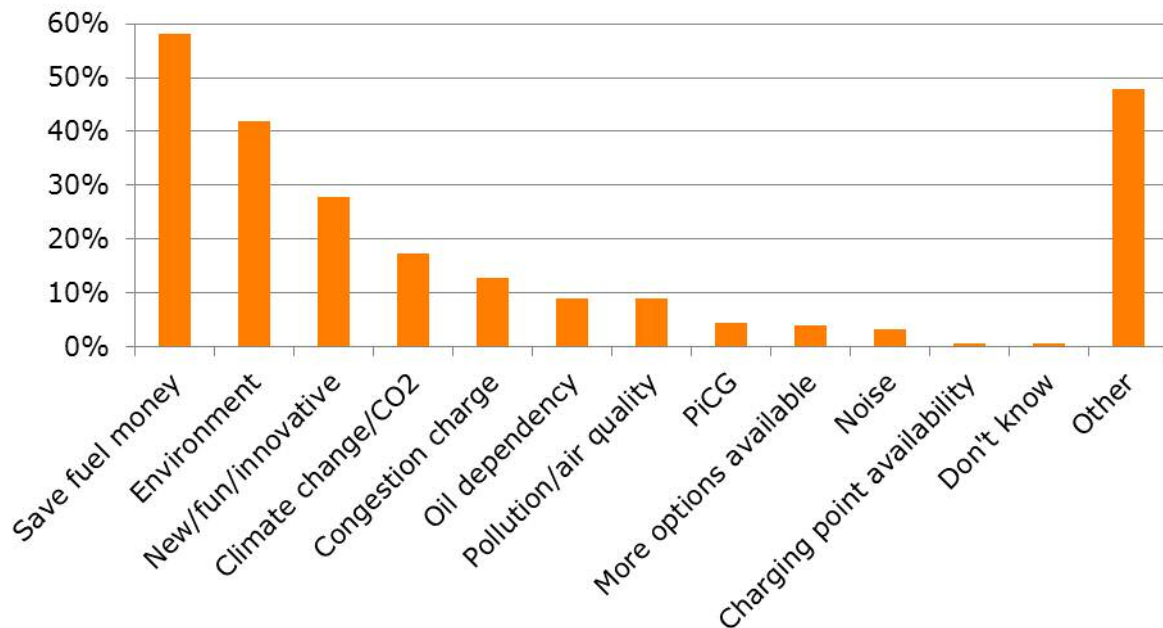
**Figure 4-5. Case Study: Patient Pragmatist (Private EV purchaser)**



**Figure 4-6. Case Study: Systematic Researcher (Organisational EV purchaser)**

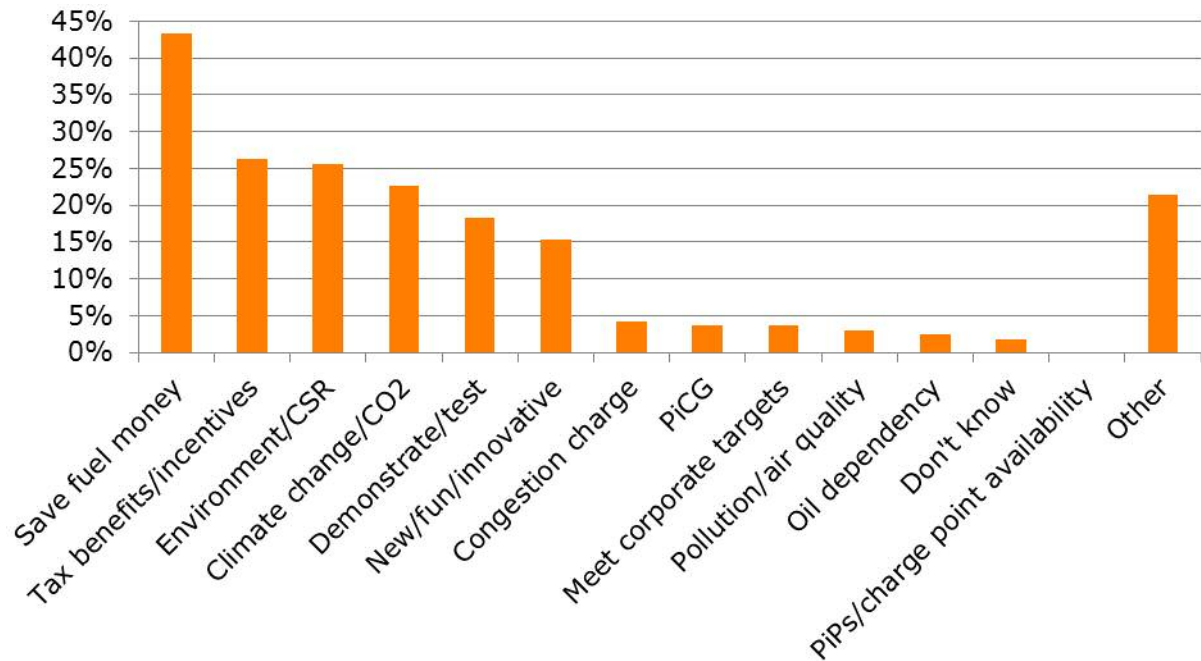
#### 4.4 Why buy an EV rather than ICE vehicle? Primary motivators

This section explores why respondents chose to purchase an EV rather than an ICE vehicle. Private EV purchasers described saving money on fuel, the environment and their desire to be involved in new/fun/innovative technology as the top three reasons for choosing an EV<sup>8</sup>. Organisational EV purchasers described saving money on fuel as a key motivator, alongside financial incentives and the environment/corporate social responsibility (i.e. the process of encouraging a positive impact on the environment through an organisation's activities). These primary motivators for private and organisational respondents are presented in Figure 4-7 and Figure 4-8, and are discussed in further detail below.



**Figure 4-7. PRIVATE: Reasons for choosing an EV rather than an ICE vehicle (367 responses from 155 telephone respondents)**

<sup>8</sup> Respondents were asked to provide reasons for buying an EV rather than an ICE vehicle. The interviewer did not prompt or probe; the respondent listed their reasons and the interviewer coded the responses.



**Figure 4-8. ORGANISATIONS: Reasons for choosing an EV rather than an ICE vehicle (314 responses from 164 telephone respondents)**

#### 4.4.1 Financial benefits

Both private and organisational respondents stated that saving money on fuel was the main reason for choosing an EV instead of an ICE vehicle. Both types of purchasers described purchasing and running an EV as an investment – they recognised that the initial purchase cost was higher than a petrol/diesel equivalent but described the purchase as being comparable to an insurance policy which offered them protection from future increases in fuel costs.

Many of the private respondents had performed cost-benefit-style calculations to demonstrate how much they would save on fuel in the short, medium and long-term. Previous research suggests that it is atypical for individuals purchasing vehicles to undertake a cost benefit analysis in this manner (see Stannard, Anable, Schuitema, Abraham & Graham-Rowe, 2010), suggesting that early EV adopters do not demonstrate traits typically associated with vehicle purchasers. Whilst cost saving calculations may be beneficial to early EV adopters, this may not be the case for mainstream consumers, most of whom are unable to make such calculations (Stannard et al., 2010).

*"The big factor for me really was it would be a saving of a certain amount and then the protection it gives you against unforeseen price hikes in petrol. [After heating and Council Tax] the next biggest expense is probably petrol, so if we can cut out one of those expenditures, that's quite a nice saving to have each year. It's basically like someone giving you £1500 a year, but obviously you pay upfront."* Private EV purchaser

Organisational respondents stressed that, in the current economic climate, any financial incentives that reduced initial fleet expenditure or on-going running costs were welcomed. As such, tax benefits and incentives (such as not having to pay vehicle excise duty) were the second most commonly cited reason for organisational respondents purchasing an EV rather than an ICE vehicle.



*"It became affordable because of the tax advantage."* Organisational EV purchaser

For some smaller organisations (typically those with fewer than nine employees and sole traders), respondents described using their association with organisations to effectively facilitate purchasing an EV for their own personal use while taking advantage of the tax benefits offered to companies.

*"I was looking for a way to increase essentially my income by reducing my expenditure. So I actually lent the money to my company to buy the car at a reasonable rate of interest, but more than I would get from a bank, so I'm getting income from that and I'm also not paying fuel, I'm not paying road fund licence...It doesn't meet the organisation's transport needs, it meets my transport needs and my wife's transport needs, because, you know, it is a perk. I don't want to sort of say that it's an important business asset, it isn't."* Organisational EV purchaser

For private respondents, incentives such as the congestion charge and no vehicle excise duty were not necessarily deemed to be a reason for buying an EV rather than an ICE vehicle, but these were considered to be useful incentives in supporting their purchase decisions, for example:

*"I am glad to be avoiding it [the congestion charge] but it is not, in fairness, I wouldn't say it is kind of like a priority because I don't habitually drive into the centre of London. But you know, I now have the flexibility of being able to do that and so I occasionally do."* Private PHEV purchaser

#### **4.4.2 Environmental factors and corporate social responsibility**

Concern about the environment was the second most commonly cited reason for an EV purchase for private respondents and the third most common reason for organisational respondents. Some respondents were motivated by the 'green credentials' of their EV, and some felt pleased to be 'doing their bit' for the environment. They had been motivated to buy a vehicle that reduced either their personal or their organisation's impact on the environment (whether at a local level in terms of air quality, or at a broader level in terms of lessening the environmental impact of cars).

*"It was the emissions, I think, really, because it's a zero emission car. I know generating electricity is not particularly environmentally friendly but, you know, at least when you are driving around, you are not polluting the immediate atmosphere."* Private EV purchaser

Organisational respondents also mentioned that purchasing an EV enabled them to set an example for others and to boost their corporate image.

*"We are only a small company, so anything we can put on our website to say 'yes we are environmentally friendly' is good for the image of the company."* Organisational EV purchaser

#### **4.4.3 Being part of something new, fun and innovative**

This response category was the third most frequently quoted reason for private respondents choosing an EV over an ICE vehicle; it was deemed to be slightly less

important for organisational respondents, but still played a role in the purchasing decision for some of them.

*"I like technology. I think electric vehicles are the way of the future for the way to go. I was quite happy and excited to be part of something new and different."*  
Organisational EV purchaser

During the interviews, several private purchasers explained that they had chosen an EV over an ICE vehicle purely because of the technology. There was a genuine sense of excitement and pride about having the opportunity to engage with what they perceived to be the next generation of vehicle technology.

*"It's the first step toward the next generation...and I just thought, 'I wouldn't mind being involved in it', because most of the reports that I read and heard about were quite phenomenal."* Private PHEV purchaser

Private respondents were also keen to share their delight at certain features of their EVs. For example, one feature offered by a certain model of EV allows the driver to pre-heat their vehicle remotely in cold weather (either to defrost the windscreen or to heat the cabin).

*"You can actually tell the car to preheat at home while it's plugged in via a message from your phone. So I can sit in the house, I'm going to go out in 20 minutes so I tap a couple of messages in the phone, and by the time I get to the car it's already hot. Now that's brilliant!"* Private EV purchaser

## 4.5 Additional motivators

### 4.5.1 Evaluation of fit with lifestyle/organisational requirements

The main additional motivator to purchasing an EV was that it was felt to provide a good fit with respondents' lifestyles and travel needs. Retired respondents described how the idea of owning an EV became increasingly attractive as the number of shorter, more local journeys that they made increased meaning that most of their travel could comfortably fit within the range of an EV on a single charge.

*"Oh yes [my travel patterns have changed], oh very much. This is one of the reasons for getting an electric car, they say in the statistics the average mileage for people is 30 miles and I mean going into Newcastle is 32 miles there and back and well within range, and I said that I wanted to drive the [model name] as a normal car, you know, use the air conditioning, use the windscreen wipers, anything, go at a decent speed and so on which largely I have done."* Private EV purchaser

Retired private purchasers also acknowledged that, because they were no longer working, they had more time available to research routes and plan journeys to ensure that their vehicles would be capable of completing various journeys.

*"I mean we have actually gone to places and checked it out first, you can do this when you have retired, you can't do it when you are trying to work as well."*  
Private EV purchaser

Several of the private EV purchasers interviewed described EVs as being more convenient to use than ICE vehicles. This was typically in terms of them being able to charge their vehicles at home rather than having to go to petrol stations and being able

to pre-heat the car remotely in cold weather. This convenience was typically mentioned by elderly EV purchasers.

*"Other people laugh and say 'it's no effort to call in the garage' [to buy petrol/diesel] but for me it is an effort, and I don't want the bother. It's as easy as that."* Private EV purchaser

For some organisational EV purchasers, the purchase of an EV was to evaluate whether EVs fitted with their organisations' needs and whether it would be viable to invest more in EVs at a later stage. For example, a respondent from a large organisation described the way in which he purchased one PHEV to gain an insight into the feasibility of the technology in his organisation.

*"What I really wanted to do was dip into the market at a time where the technology had reached a maturity where it could be used as a primary car and the [model name] was the first of this hopefully new breed of vehicles that are coming through that would allow us to use that vehicle as a first car and understand then what compromises are associated with using that technology."* Organisational PHEV purchaser

For this particular respondent, having purchased and used the PHEV, he had reached the conclusion that the organisation should not introduce EVs on a wider scale despite the PHEV being suitable for all of their needs. Reasons for this included the purchase cost and anticipated changes to company car tax rates.

#### **4.5.2 Making a statement**

Other organisational respondents reported that their purchase of an EV was driven by a desire to stand out from competitors as well as being perceived as innovative, forward thinking and embracing new ideas.

*"We wanted to make a statement. How can you differentiate yourself in the hotel market? You can't. Everyone can give a comfortable bed and good service; it would just be a bit different."* Organisational EV purchaser

The statement above was made by an Organisational Purchaser working for a chain of hotels. He felt that the purchase and use of an EV for transporting guests to and from the nearby train station had the potential to differentiate their guests' experience of the hotel from other hotel experiences.

## **4.6 The role of the PiCG in the decision making process**

This section describes respondents' awareness of the PiCG prior to purchase and its influence on their purchasing decisions. General awareness of the PiCG was also ascertained from non-EV users.

### **4.6.1 Awareness of the PiCG and the website**

In total, 84% of private respondents stated that they had been aware of the PiCG when they first considered buying an EV. While many respondents could not pinpoint precisely when or how they had heard about the PiCG, they were generally aware that it was available.

*"I don't know where I heard about it but I just, was aware of it."* Private PHEV purchaser

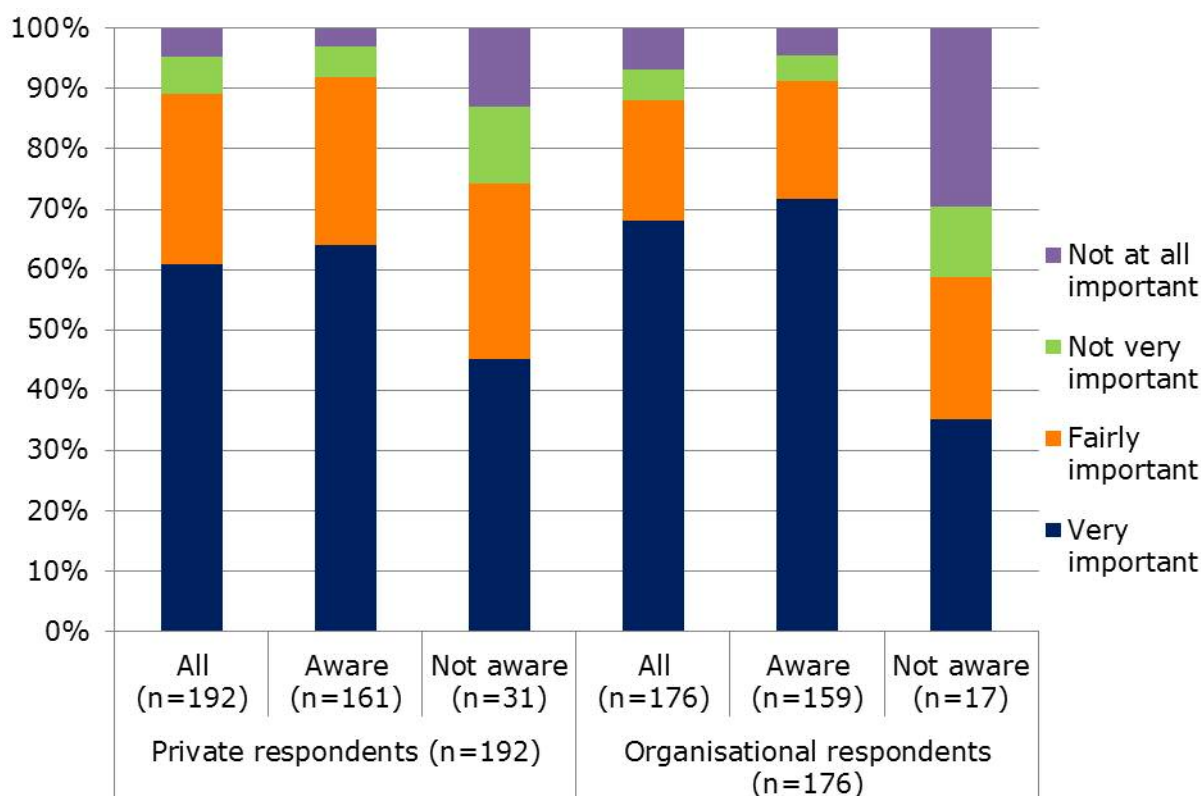
A similar proportion (90%) of organisational respondents stated that their organisation was aware of the PiCG when it first considered buying an EV. The qualitative organisational respondents also expressed a general awareness of the PiCG.

*"I knew straight from day one when I initially went to [dealer] when I began talking to them about, okay so what's the cost, and they clearly factored that into the cost, so right from the outset."* Organisational EV purchaser

Nobody reported using the OLEV website that describes the PiCG at any point in their purchasing process, which suggests that work could be done to better publicise the website.

Figure 4-9 illustrates the difference in the importance of the PiCG in the purchase decision between those who were initially aware of the Grant and those who were not. Whilst the PiCG was 'very' or 'fairly' important for over 85% of both private and organisational respondents in their purchase decision, private respondents who had been initially aware tended to rate the PiCG as being more important in their purchase decision (92% 'very/fairly important') compared to those who had not been aware (74% 'very/fairly important').

Organisational respondents had similar views overall to private individuals regarding the importance of the PiCG, with 88% stating that it was 'very important' (68%) or 'fairly important' (20%). Ninety percent of respondents stated that their organisation was aware of the PiCG when they first considered the purchase; similarly to the private respondents, organisational respondents who had been initially aware of the PiCG tended to rate it as being more important in their purchase decision (91% 'very/fairly important') compared to those who had not been aware (59% 'very/fairly important'). A chi-square test shows a statistically significant difference in the perceived importance of the PiCG for both individuals and organisations; those who were aware of the Grant when first considering an EV were more likely to perceive the PiCG as 'important' than those who were not.



**Figure 4-9. Importance of PiCG in decision to buy an EV by initial awareness of PiCG for private (n=192) and organisational respondents (n=176; all who were not dealers<sup>9</sup>, had a role in the decision making process for EVs bought as pool cars or for use by an individual, knew the importance of the PiCG in the purchase decision and knew whether they were initially aware of the PiCG)**

This indicates that an initial awareness of the PiCG may help to encourage people to consider buying an EV. Those who were not initially aware, but decided to purchase an EV anyway, were likely to have higher levels of disposable income and so rated the PiCG as less important in their decision to buy. In comparison, for those who became aware of the PiCG early on, the Grant was likely to have played a role in their decision making and so they feel it was more important in their decision to buy an EV. This is supported by the qualitative data, for example certain private respondents stated that the PiCG was viewed as more of a 'bonus' as they had already reached the decision that they were committed to buying the vehicle. However, this position was not typical.

*Respondent: "No [the PiCG was not influential] because I'd already decided I was going to buy it at £38,000 or £39,000 or whatever it was at the time."*

*Interviewer: "Okay, so that was just a..."*

*Respondent: "Bonus." Private PHEV purchaser (unaware of PiCG prior to purchase)*

Non-EV purchasers were asked in the interviews whether they were aware of any Government-backed schemes to encourage people to purchase EVs. There was a general lack of awareness of anything relating to EVs (section 4.9.1), and this included the PiCG.

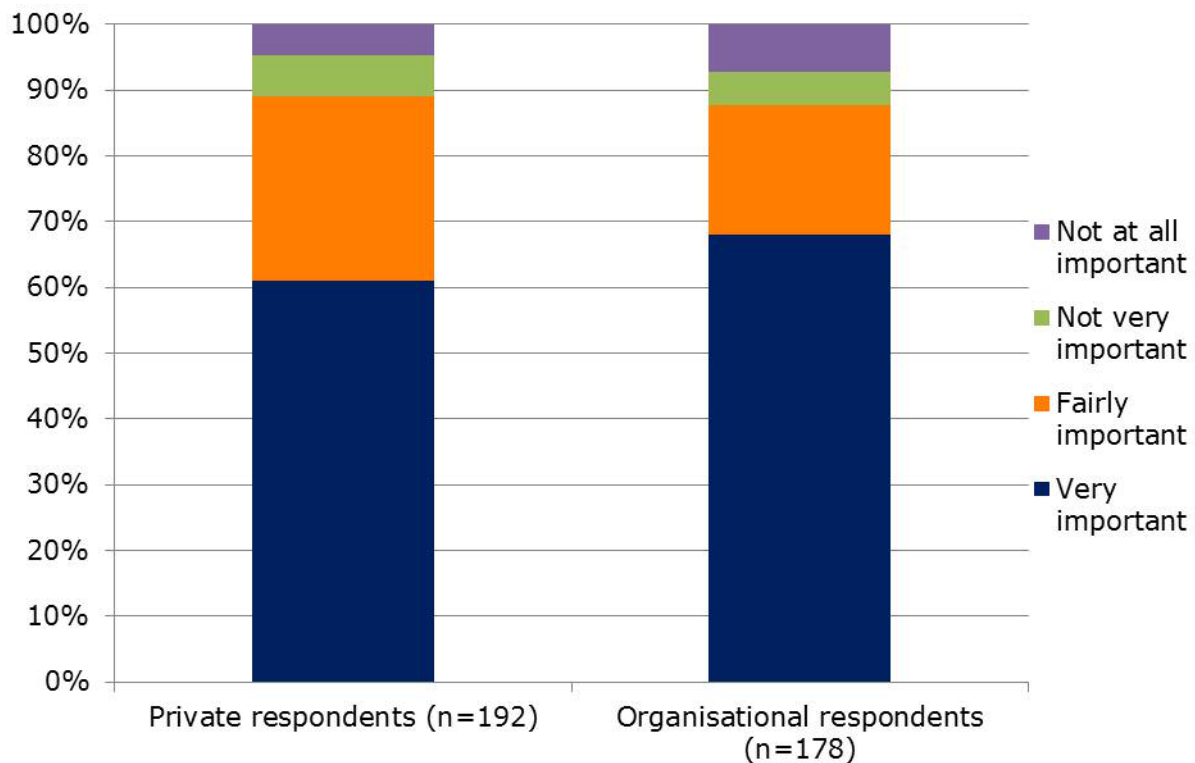
<sup>9</sup> Dealers are excluded from most analyses as they were not asked to respond to the majority of questions

Some more informed non-EV purchasers had a vague awareness of some sort of Government incentive being available, but demonstrated little understanding of the detail.

#### 4.6.2 Importance of the PiCG in the decision to buy an EV

The PiCG was an important factor in deciding whether to buy an EV for most private respondents, as shown in Figure 4-10. A total of 89% stated that the Grant was 'very' (61%) or 'fairly' important (28%).

Organisational respondents also reported that the PiCG had been important, with 87% stating that the PiCG had been 'very' (68%) or 'fairly' important (20%) in the organisation's decision to purchase an EV.



**Figure 4-10. Importance of PiCG in decision to buy an EV for private (n=192) and organisational respondents (n=178; all who were not dealers, had a role in the decision making process for EVs bought as pool cars or for use by an individual, and knew the importance of the PiCG in the purchase decision)**

The qualitative data suggest that the PiCG, and therefore the vehicles' affordability, was particularly important for private purchasers and purchasers from smaller organisations for whom financial considerations were key. Many respondents explained that they would not have been in a position to purchase their EV had they not been eligible for the Grant.

*"The thing that actually made me buy it was the five thousand pounds subsidy that I was given. I wouldn't have bought it without that."* Private EV purchaser

Respondents from larger organisations explained that the Grant may have played a less influential role in their organisations' decisions to purchase EVs because of the financial status of their organisations. The following quote illustrates the way in which the decision to purchase an EV was not necessarily motivated by affordability.

*"As far as the company [is concerned], I suspect the £5,000 wouldn't have made that big a difference between [company name deleted] buying two cars or not buying two cars because it was partly a marketing exercise."* Organisational EV user

#### 4.6.2.1 Grant size and effectiveness

Most respondents felt that the PiCG was an effective incentive for the Government to increase EV uptake. There was a strong sense that a reduction in the size of the Grant may deter potential purchasers:

*"Was it an appropriate size Grant? I suppose it was big enough that it was going to make a difference. And I don't think you could have justified anything bigger because – I mean, if you made it bigger, then I think there'd be accusations of the Government wasting the money, so you couldn't have made it bigger. But if it were much smaller, it probably wouldn't have been instrumental in people making the decisions."* Organisational EV purchaser

A small proportion of respondents suggested that the relatively small number of EVs on the road indicated that the PiCG was not an effective way for the Government to increase uptake:

*"If it encouraged people, then they'd be selling like hotcakes, but they're not...the price is so high and the Grant brings it down to 'high' as opposed to 'so high'."* Private PHEV purchaser

The size of the PiCG was generally perceived among both private and organisational respondents to be appropriate in terms of the amount given. Respondents explained that it supported their decision to purchase an EV. The quote below illustrates the way in which many respondents described their views of the Grant size:

*"I think anyone buying vehicles would say 'it would be great if it could be more' but I think it is a fairly substantial contribution, £5,000 off a £30,000 vehicle."* Organisational EV user

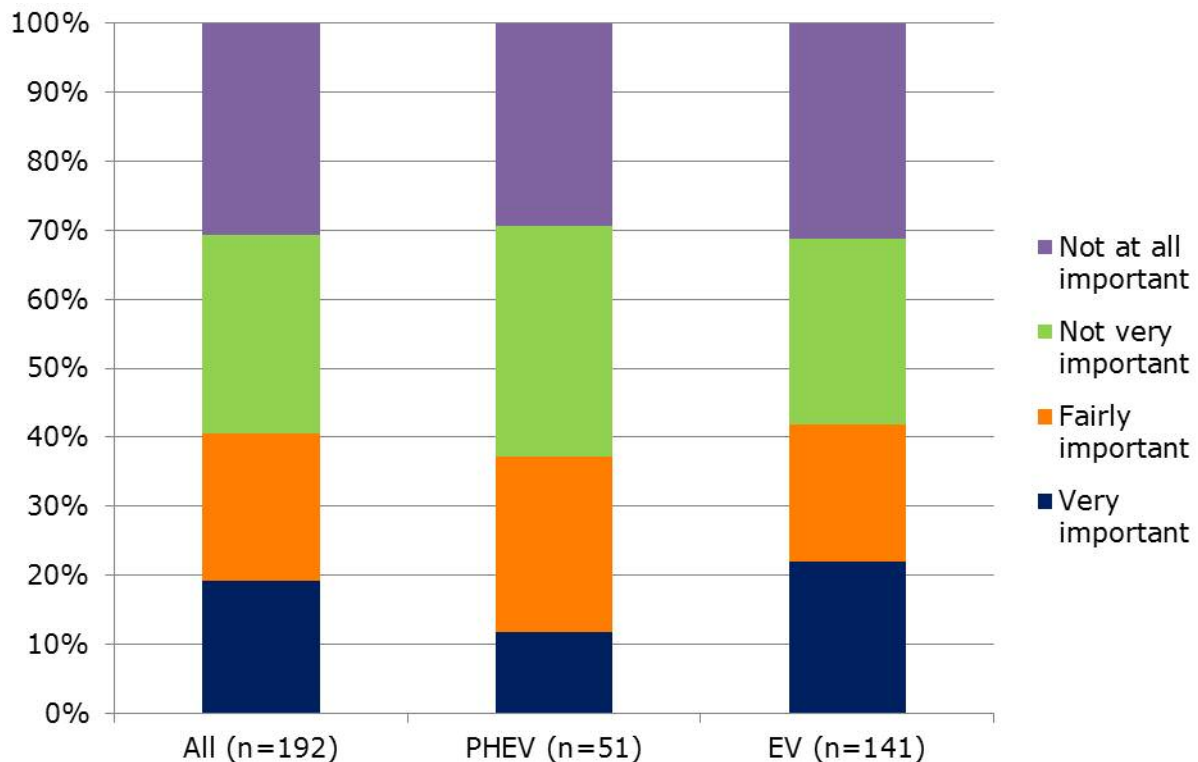
Others suggested that, for people who are not in a comfortable financial position, the purchase price may discourage them from purchasing (even with the support offered by the Grant). It was perceived that a reduction in purchase price would be effective in increasing EV uptake in the future. It was felt that there were equivalent ICE vehicles available on the market with similar specifications for a lower purchase price.

*"The problem is you can buy a conventional diesel engine for thirteen, fourteen grand; that's a big ask for people to even fork out twenty five grand, really that's why only business can buy, you very rarely see a Joe public person having a [model name] really because they're too expensive."* Organisational EV purchaser

This raises the question of whether the PiCG is achieving its aim, which has been described as helping to "make the whole-life costs of a qualifying car more comparable with petrol or diesel equivalents" (OLEV, 2010).

#### 4.7 The role of PiP schemes and other public charging schemes in the decision making process and in EV usage

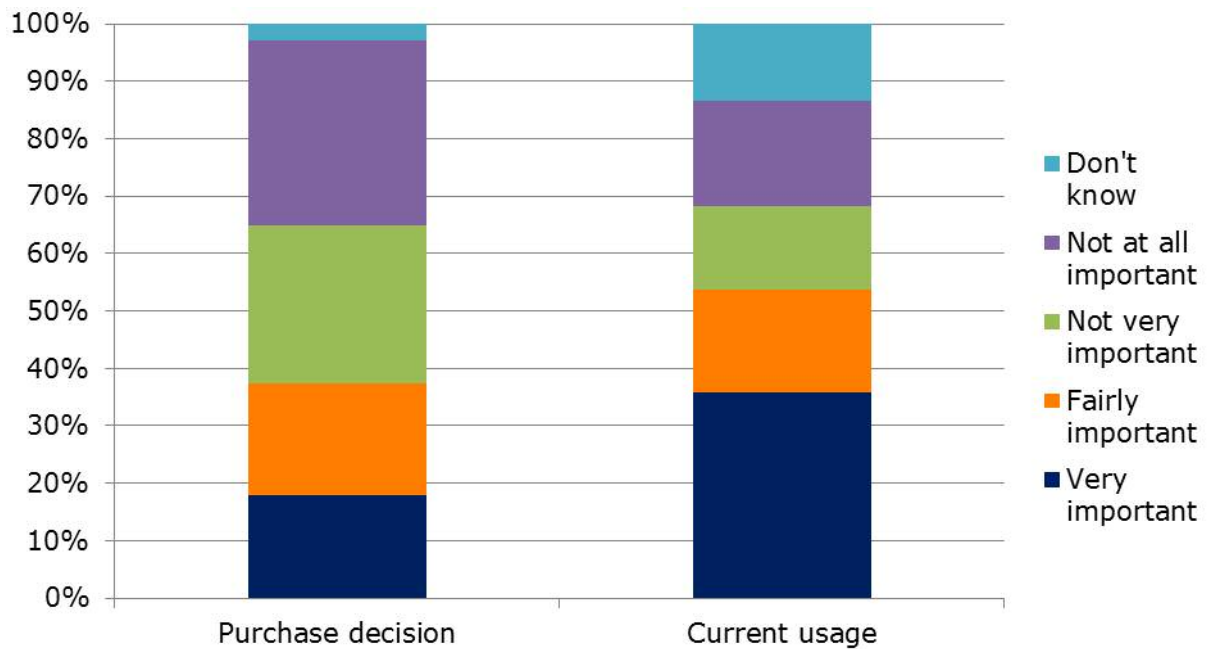
Overall, 41% of respondents stated that the availability of public charge points was 'very' or 'fairly' important (see Figure 4-11). Public charge point availability was more likely to be 'very important' to respondents who purchased an EV (22%) than PHEV owners (12%); however no statistically significant difference was found between the two groups.



**Figure 4-11. PRIVATE: Importance of public charge point availability in purchase decision, by vehicle type (n=192)**

Figure 4-12 shows that public charge point availability was not an important factor for organisations that decided to purchase (an) EV(s) for use by employees; 60% stated that it was 'not very' (27%) or 'not at all' (32%) important. In contrast, 18% stated that it was 'very' important.





**Figure 4-12. ORGANISATIONS: Importance of charge point availability in purchase decision and current EV usage (n=179; all who were not dealers and had a role in the decision making process for EVs bought as pool cars or for use by an individual)**

Organisations were also asked how important the availability of public charge points was in their current use of the EV. A clear difference emerged between the perception of how important public charge point availability would be, prior to purchase, and how important it was actually in current use. Public charge point availability was 'very' important to 36% of organisational respondents in their current use of the EV – double the percentage that stated that it was 'very' important in the purchase decision. This shift suggests that organisational EV purchasers often do not take public charge point availability into account sufficiently during the purchase decision.

*Interviewer: "Does the availability of public charging infrastructure impact on the use of your EV?"*

*Respondent: "It restricts it...there are journeys that we would have made but we didn't because essentially I can't find a charge point."* Organisational EV user

#### 4.8 Decision makers

The chief decision makers in the private purchaser qualitative sample were typically male<sup>10</sup>. This was found to be the case in both the single and the joint interviews. In the joint interviews, respondents often described that while the couple discussed the idea to purchase an EV together, the males (in a sample that comprised wholly of male-female couples) tended to undertake most of the research and make the final decision.

<sup>10</sup> A review of the available literature suggests that there is very little evidence regarding the demographics of chief decision makers in ICE vehicle purchases, so it was not possible to draw comparisons between ICE and EV decision makers.

*"My wife came along, and she was very ambivalent about the whole thing, and she said 'you know you want it, don't ask me, go on you have it'."* Private EV purchaser

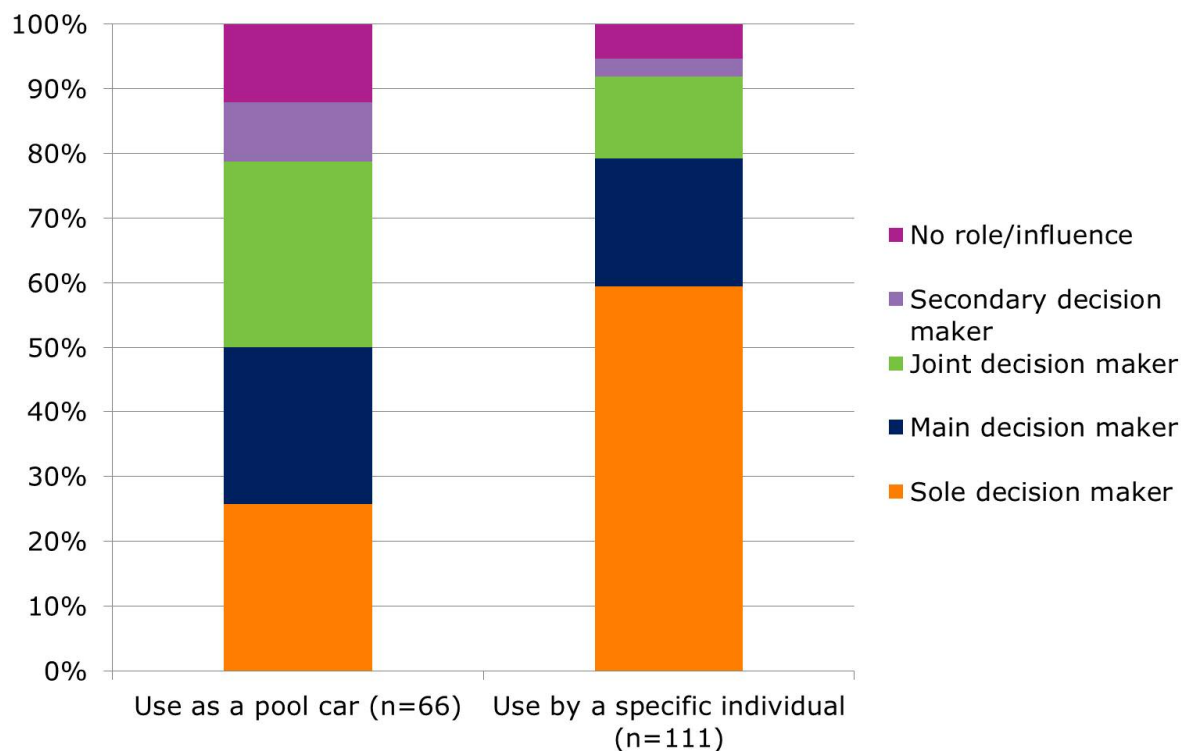
In organisations it was common for one person (normally the fleet manager) to be responsible for introducing EVs to the fleet, although additional levels of permission were sometimes required. When this was the case, respondents described how they had to propose business cases to their board to get approval to purchase the EVs.

*"It was my decision to introduce the car, but in order to get it on to the fleet we had to get – well there was a little bit of work with the internal UK finance team to get the approvals – partly because we wanted to make a small investment by putting in the charging point, so they were involved in it as well."* Organisational EV purchaser

The plugged-in fleets initiative (PIFI) research found that "unless high level decision makers (ideally board level or above) are involved, then it can prove very difficult to ensure change happens within an organisation" (Energy Savings Trust, 2013, p.7). The current study found that the initial impetus did not always come from a high level decision maker. In some cases individuals who were not involved in fleet management and did not hold a senior position championed EVs and successfully convinced the decision makers to invest in an EV.

#### **4.8.1 Roles in organisational decision making**

Figure 4-13 shows the organisational respondents' role in the decision making for purchasing an EV as a pool car and as a car for use by specific individuals, respectively. Respondents were much more likely to be the sole decision maker when purchasing a vehicle for use by specific individuals (59%) compared to purchasing pool cars (26%). This is likely to be due to the individuals in very small organisations purchasing a vehicle for their own personal use. See section 5.1 for further discussion.



**Figure 4-13. ORGANISATIONS: Role in decision making for purchasing an EV as a pool car (n=66; all who were not dealers and had purchased an EV for use as a pool car) and for use by specific individuals (n=111; all who were not dealers and had purchased an EV for use by a specific individual)**

## 4.9 Barriers to EV purchase or lease

This section is largely informed by the data emerging from interviews with non-EV purchasers. As discussed in section 2.3, these respondents fit the profile of prospective EV purchasers; therefore it was important to assess their attitudes to EVs and understand their reasons for non-purchase.

### 4.9.1 Poor knowledge of EVs among non-EV purchasers

One of the biggest barriers expressed by non-EV purchasers across all of the segments was that they had a general lack of knowledge about EVs. Many had not given any consideration to purchasing or leasing an EV as a result.

*"I could do with some more education on them before I considered them as another car."* Private non-EV purchaser

These respondents (both private and organisational) typically demonstrated a consistent lack of knowledge about:

- the differences between EVs and PHEVs
- EV purchase cost
- EV models currently available
- EV range
- charging - how to do it, how long it takes, how much it costs.

Certain non-EV purchasers had some awareness of EVs, but this was unusual. This suggests that there is an uninformed potential EV market that could benefit from better education and more information about EVs.

Despite acknowledging that they knew very little about EVs, several of the non-EV respondents had formulated preconceptions and ideas about – in particular – cost and range. They had also formulated a mixture of positive and negative ideas about what it would be like to drive an EV and whether it would fit with their lifestyle.

#### 4.9.2 EV range

Linked with lack of knowledge, many non-EV purchasers expressed concerns about the range offered by EVs.

*"I mean unless we've got a car that would do up to five hundred miles in a day and charge overnight so it's ready to go out the following day, forget it. If it only does a hundred miles what's the point in that."* Organisational non-EV purchaser

The issue of range and the associated anxiety was felt strongly by female respondents particularly, for whom being stranded or unable to complete important or urgent journeys were big issues.

*"If I'm sat in a traffic-jam and I get down to Bristol now presumably that I've used some of the charge by sitting in a traffic jam. You know, maybe it's like a mobile phone I don't know...And if that's the case I'm going to be sat there thinking "s\*\*\*, s\*\*\*, s\*\*\*...! How am I going to get home?" I've got kids to pick up. And that's no good to me."* Private non-EV purchaser

For more informed respondents (particularly organisations who used vehicles for work-related journeys on a regular basis), it was felt that the current range offered by EVs meant that they were not a viable option to meet respondents' needs.

*"Until they can get the consumption [i.e. available range] right, the distance [you can achieve], then we wouldn't even consider it, wouldn't even look at them."* Organisational non-EV purchaser

These findings suggest that, irrespective of the level of engagement with EVs, across all groups included in this study the range of EVs (particularly BEVs) is a fundamental issue. It is less of an issue for PHEV purchasers, whose vehicles have a range similar to that of an ICE vehicle:

*"The [PHEV] has a range of 360-odd miles, and therefore it's a proper car. You can go places without having to plug it in anywhere."* Private PHEV purchaser

#### 4.9.3 Negative media portrayal

Many respondents (both purchasers and non-purchasers) referred to negative media coverage associated with EVs. Owners acknowledged that it might put off prospective purchasers:

*"If you talk to the average petrol-head, the feedback you get about electric vehicles is quite biased and often inaccurate...this isn't helped by things like these silly stunts that [programme] did on the TV which were arranged in such a way as to be highly misleading...it gave a false impression, which really annoyed us frankly."* Private EV purchaser

For non-EV purchasers, television programmes were typically described as being their only insight into EVs. Given the negative portrayal of EVs on some of these programmes, they explained that any potential for interest in EVs had been dismissed.

*"What you hear about [EVs] is not necessarily the most positive press perhaps."*  
Non-EV purchaser

#### **4.9.4 Concerns about sub-optimal performance**

Several of the non-EV purchasers (who were generally male) rated vehicle performance as a high priority for them when purchasing a vehicle.

*"When I was looking around [for a new car] I was looking for performance still to be in a similar vein to what [my previous car] was. The top three [important features] when I was initially looking would probably have been speed, performance, certainly, and features would have been there."* Private non-EV purchaser

Comparisons were made between EVs and other, low-performance battery-powered vehicles.

*"To me it would be like going back to golf, going round in a golf buggy or I was on a milk float you know."* Private non-EV purchaser

Among those respondents who had purchased an EV, the concern about the EV being like a 'milk float' was acknowledged but, following actual driving experience, was quickly dismissed:

*"Originally we thought that the performance on it was just going to be like a milk float, very slow, but it's not at all, it is better than some of the petrol cars I've owned in the past."* Private EV purchaser

#### **4.9.5 Purchase cost**

For more informed non-EV purchasers, purchase cost was a barrier. This was also a problem acknowledged by some of the private and organisational EV purchasers:

*Interviewer: "Would your organisation consider electric vehicles or hybrid vehicles?"*

*Respondent: "Not at the moment - they're too expensive."* Organisational non-EV purchaser

For some respondents, the purchase cost was the only thing that they knew about EVs, and this was enough of a barrier for them not to pursue any further information about them.

*"Apart from [knowing that] they're very expensive to buy I don't know much about them."* Private non-EV purchaser

#### **4.9.6 Residual value and battery life**

Other possible barriers related to issues surrounding the residual value of EVs and expected battery lifespan (which in some cases overlapped). Concerns over residual value seemed to be more important for organisational respondents than for private purchasers.

*"As it stands, most of the trade magazines and trade information suppliers are still very cautious about residual value of the car. And obviously we still have the same concerns about the amount of battery life, how long the batteries will last."*  
Organisational EV purchaser

However, many private respondents said that they were generally committed to the EV technology for the long term and would not be looking to sell their EVs in the future.

Dealers and leasers expressed concerns over the residual value of EVs. One respondent explained that his dealership had been required to buy an EV, as part of the terms and conditions of their franchise agreement. Limited interest from prospective customers had resulted in the price of the vehicle depreciating over time.

*"We purchased it for [purchase amount], plus the VAT at [VAT amount] and it's done about 250 miles, we have now got it up at [sale amount]. So you know, it is a loss. Obviously you are going to make losses on cars, but, looking at it from a financial viewpoint, as far as this dealership is concerned, it has not been a very good commercial decision for us."* Dealer

Another respondent from a company that leased EVs to its customers explained that he was so concerned about the depreciation on an EV he had sourced for a customer that he had insisted the customer bought the car outright from him rather than leasing it from him.

The possible lifespan of EV batteries was also a concern to potential purchasers:

*"Those batteries are so expensive. So that's one thing that would preclude us from having the vehicles in the fleet, the cost of a potential replacement battery."*  
Organisational non-EV purchaser

For those who had purchased an EV, they were pragmatic, but cautious that the vehicle might outlast the batteries. Some respondents also voiced concerns about the impact of using certain types of charger and their effect on the batteries.

#### **4.9.7 Other concerns**

There seemed to be a perception among non-EV purchasers that an EV would not look or function like a 'normal' car. There was a sense that they would be small, that the batteries would take up a lot of the available space and that they would not meet respondents' travel needs.

*"I wouldn't see an electric car as a family car really. I don't know a lot about them, so that's perhaps not justified, but I understand they haven't got a lot of room in them because they've got the battery, so I can't imagine putting two kids and your luggage in."* Private non-EV purchaser

For some respondents there was a degree of interest in EVs, but this was dampened by concerns over what others would think of them if they were to buy an EV. This was despite non-EV purchasers themselves describing EV drivers in a positive light (see section 5.4 for further information). There was also a reluctance to be the 'first' ones to invest in the technology (described by both private and organisational respondents).

For some, there was a reluctance to be different and to stand out from their peers:

*"I think you'd become maybe a bit of the talk of the playground and what have you if you turned up in an electric car. People would think you were nuts...what*

*you hear about is not necessarily the most positive press perhaps.”* Private non-EV purchaser

There was also a sense of trepidation about being early adopters. Non-EV purchasers (both private and organisational respondents) suggested that they would be more open to considering EVs if they had evidence that others had had positive and successful experiences with them.

## 5 The EV driving experience

This chapter presents findings related to respondents' experiences of owning and using EVs. It provides an insight into the ways in which EVs are used in terms of their annual mileage, the types of journey undertaken and use of different types of road. EV owners' and users' perceptions of the advantages and limitations associated with EV use are also discussed. The chapter closes by summarising respondents' views about what owning an EV says about an individual or organisation.



## SUMMARY

### Use of EVs

- EVs were described as being the main car in 78% of households with two cars, and 69% of those with three or more cars.
- Comparing vehicle types, PHEVs were the main car in 69% of households and EVs were the main car in 76% of households.
- Typical journey purposes among private respondents included: food shopping, other leisure trips (e.g. going to the cinema or out for dinner) and visiting friends and family.
- Organisational uses of EVs were classified into three categories:
  1. Use by employees (i.e. either as pool cars or as company cars assigned to specific individuals)
  2. Use as display or demonstration models
  3. Vehicles purchased to lease to customers

### Annual mileage of EVs

- Reports of high annual mileages for private owners of both PHEVs and EVs were rare.
- Private and organisational respondents' EVs were more likely to accumulate a lower annual mileage than PHEVs.
- Organisation-owned PHEVs tended to accumulate higher annual mileages than privately-owned PHEVs.

### Types of road used

Private EV owners were more likely to use A-roads on a regular basis than motorways, and 27% of respondents had not used motorways at all.

### Experience of owning and using an EV

Positive aspects of owning and using an EV include:

- The actual driving experience
- Cost savings
- Positive changes to driving style and efficiency

Limitations identified through experience with EVs include:

- Range-related challenges
- Public charging infrastructure not meeting user needs
- EVs not meeting respondents' travel needs

Generally purchasers in the sample were pleased with their EV, despite acknowledging that the technology has limitations.

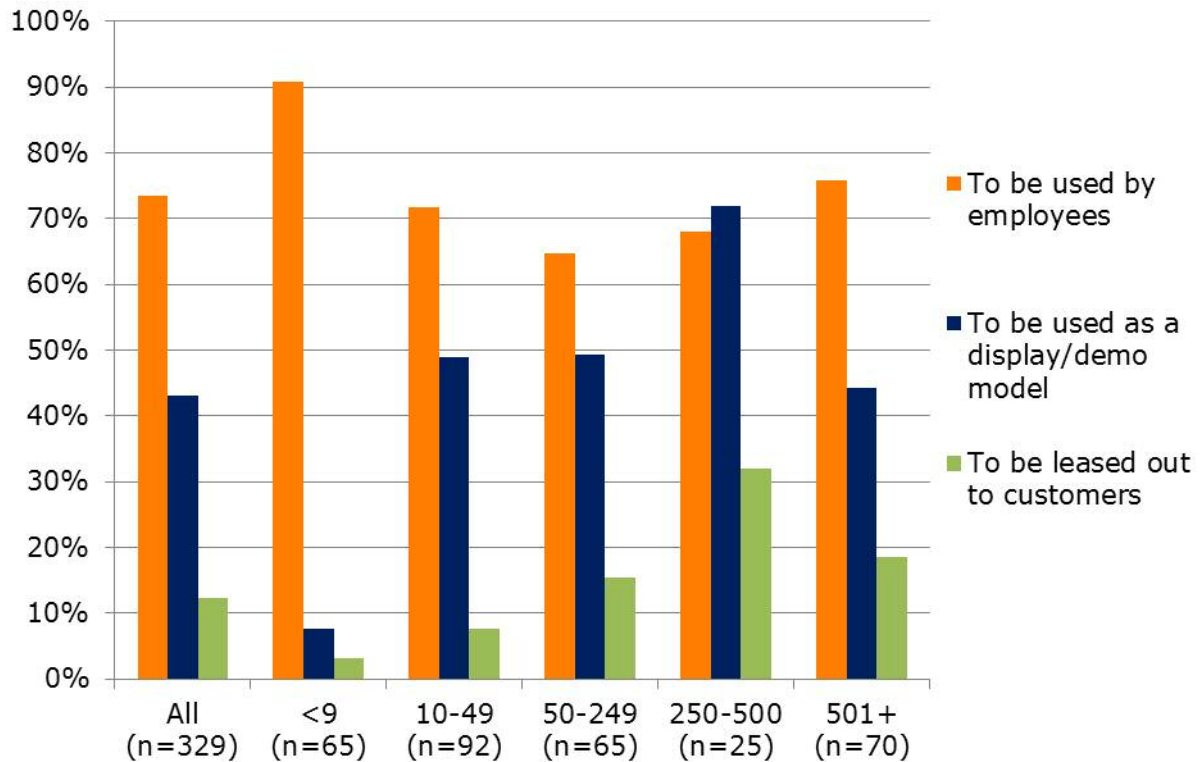
## 5.1 How are EVs used by organisations?

### 5.1.1 Purpose of organisational EV purchases

In our sample the majority of EVs were purchased by organisations for use by employees, followed by use as a display/demo model, with the lowest proportion of EVs being purchased to be leased out to customers.

- For respondents whose organisation purchased the EV(s) for use by employees, this was generally to enable employees to make trips as part of their work (e.g. business trips, visiting customers or suppliers, delivering goods, escorting people).
- Where the vehicles were purchased to be used as display or demonstration models (e.g. in car showrooms) or to be sold to customers, the organisation was classed as a dealership. The interviews with respondents who worked in dealerships revealed that there is often little choice about whether they are required to include EVs in their range of available vehicles. It appears that if a manufacturer releases an EV onto the market, it must be displayed or demonstrated in that manufacturer's dealership. Dealerships reported relatively low levels of interest from their customers, suggesting that there was more of a curiosity towards EVs than an actual desire to purchase. Dealerships typically only sold EVs to private purchasers, suggesting that organisations tend not to purchase EVs from dealerships.
- The interviews with leasers (respondents who stated that the EVs had been purchased to be leased out to customers) revealed that they had very little interaction with private purchasers – their main customer base was almost exclusively organisational respondents. Interview respondents from leasing companies suggested that the addition of EVs to their range of vehicles was very much determined by their customer's requirements rather than their own preference to include them.

Figure 5-1 shows what percentage of the organisational sample (by the number of employees in the organisation) used EVs for one of the specific purposes stated in the survey.

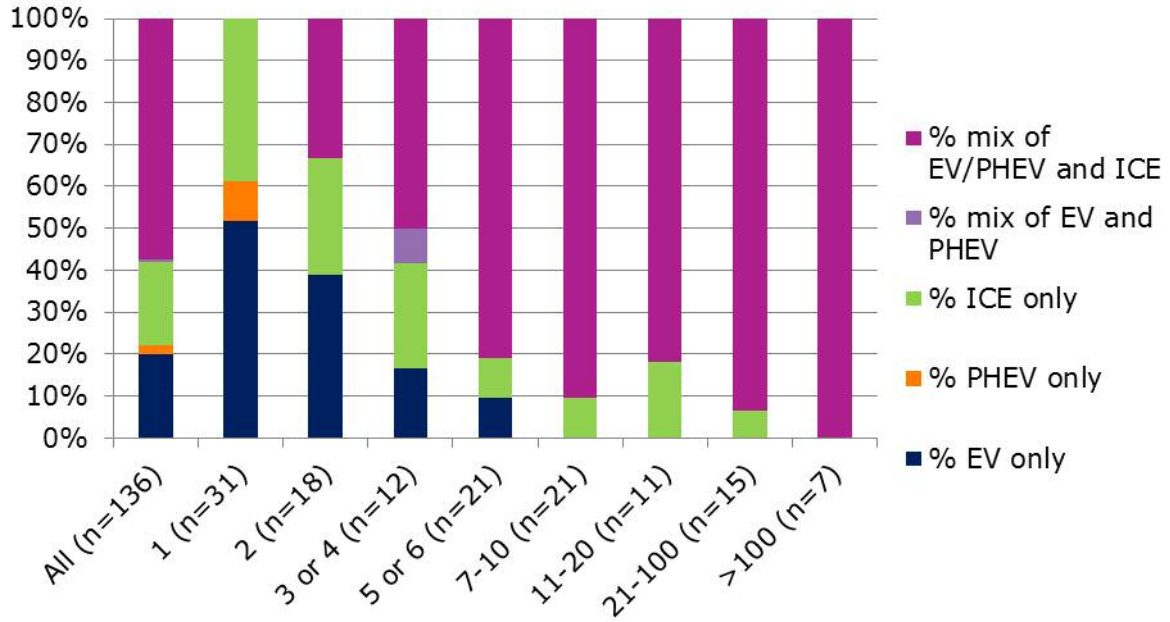


**Figure 5-1. ORGANISATIONS: Purpose of EV purchase, by number of employees in organisation (n=329)<sup>11</sup>**

**5.1.2 Pool cars**

Figure 5-2 shows the proportion of pool cars which are EVs, PHEVs, ICE vehicles or a mixture. The more vehicles an organisation had, the more likely it was to include a mix of vehicle types. Overall, 20% of organisations only had EVs in their pool of cars, while just 2% had PHEVs only. Twenty percent had ICE vehicles only, and the remaining 57% had a mixture of electric and ICE vehicles.

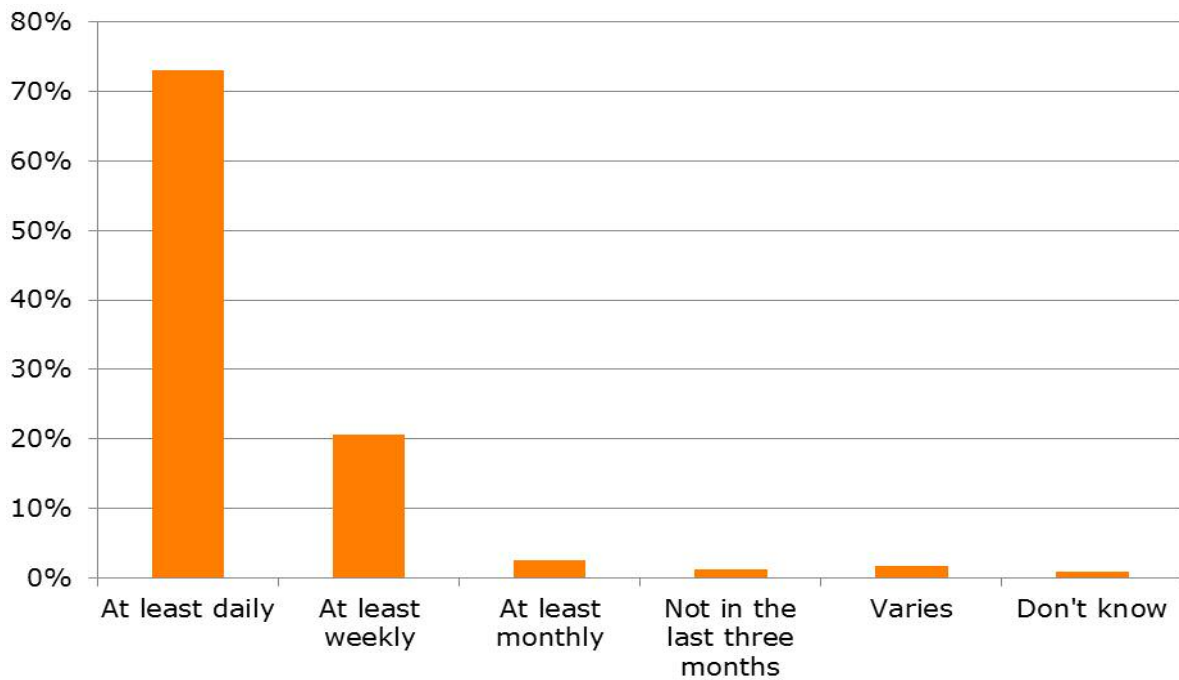
<sup>11</sup> Some organisations fell into more than one category, therefore the responses do not add up to 100%. Twelve respondents did not know the number of employees in their organisation.



**Figure 5-2. ORGANISATIONS: Proportion of pool cars of different vehicle types, by fleet size (n=136; all with pool cars)**

**5.1.3 Frequency of EV use by employees**

Figure 5-3 illustrates how frequently EVs were used by employees in the last three months. In the majority of organisations represented, the EV(s) had been used on a daily basis, and in nearly all cases (94%) the vehicle(s) had been used once a week or more.



**Figure 5-3. ORGANISATIONS: Frequency of EV use by employees to make trips in the last three months (n=232; all who had purchased an EV for employee use)**

#### **5.1.4 Annual mileage**

Organisation-owned EVs were more likely to have a lower annual mileage than organisation-owned PHEVs (68% of EVs had an annual mileage of below 12,000 miles, compared to 41% of PHEVs).

Organisation-owned PHEVs tended to have a higher annual mileage than privately-owned PHEVs (48% above 12,000 miles, compared to 27% for privately-owned PHEVs). However the distribution of annual mileages appears to be similar for privately-owned and organisation-owned EVs.

### **5.2 How are EVs used by private purchasers?**

#### **5.2.1 Is the EV the main household vehicle?**

Private respondents were asked to state whether the EV was the main vehicle in the household (i.e. the one that is driven most frequently in a normal week). An EV was the only (and therefore main) vehicle in 20% of households (29% for PHEV owners and 17% for EV owners). For those households with more than one vehicle, 82% of respondents stated that the EV was the main household vehicle<sup>11</sup>. As the number of household cars increases, the likelihood of the EV being the main vehicle decreases (88% of the 86<sup>12</sup> two-car households stated that the EV was the main vehicle, as did 72% of the 53 three-car households).

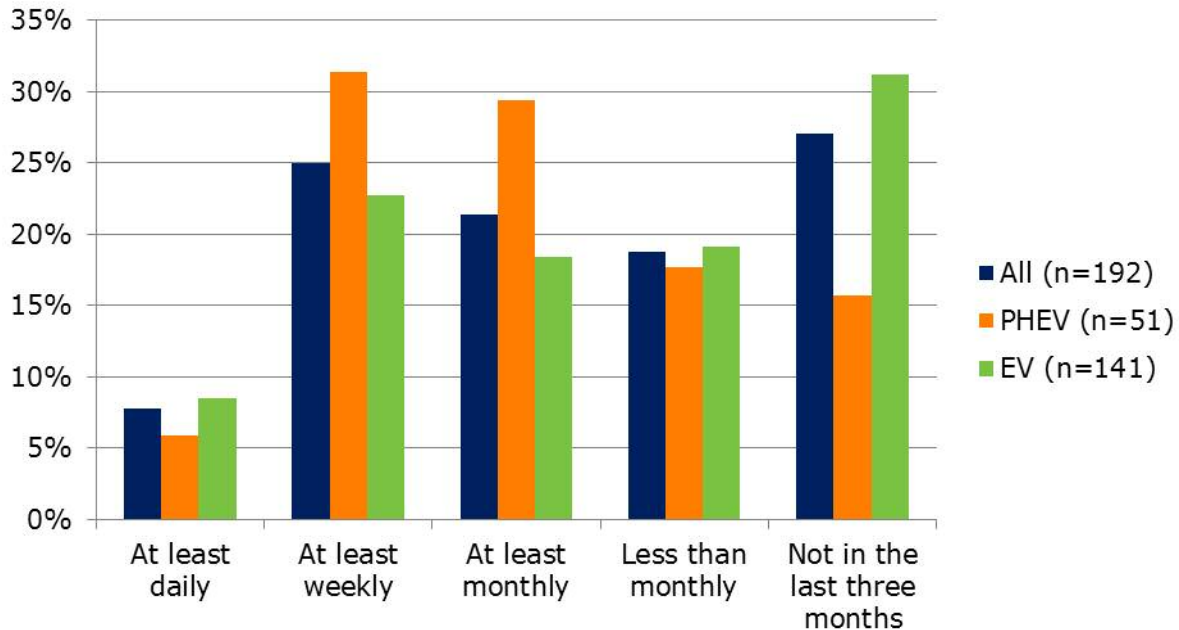
Comparing EVs and PHEVs, respondents were less likely to say that the PHEV was the main vehicle (71%) compared to EVs (86%). Nine percent of all respondents did not know whether the EV or PHEV was their main household vehicle, suggesting that the frequency of use may be similar to that of secondary household vehicles; EV owners were more likely to fall into this category (11%), compared to PHEV owners (3%).

#### **5.2.2 Motorway use**

Private respondents were asked to state how frequently they had used their EV on a motorway in the last three months. Figure 5-4 illustrates the responses by vehicle type, and shows that 27% of all respondents had not used a motorway at all. However, this was almost twice as likely for EV owners (31%) than PHEV owners (16%). Consequently, PHEV drivers were more likely to use motorways than EV drivers, with 67% of PHEV drivers using a motorway at least once a month, compared to 50% of EV drivers (however these differences were not statistically significant).

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<sup>12</sup> This excludes respondents who did not know whether the EV was the main household car (12 of the two-car households and two of the three-car households)



**Figure 5-4. PRIVATE: Motorway use in the last three months (by vehicle type) (n=192)**

It was commonplace for private respondents to adapt their routes to avoid use of motorways because of the rapid decrease in range associated with this type of driving.

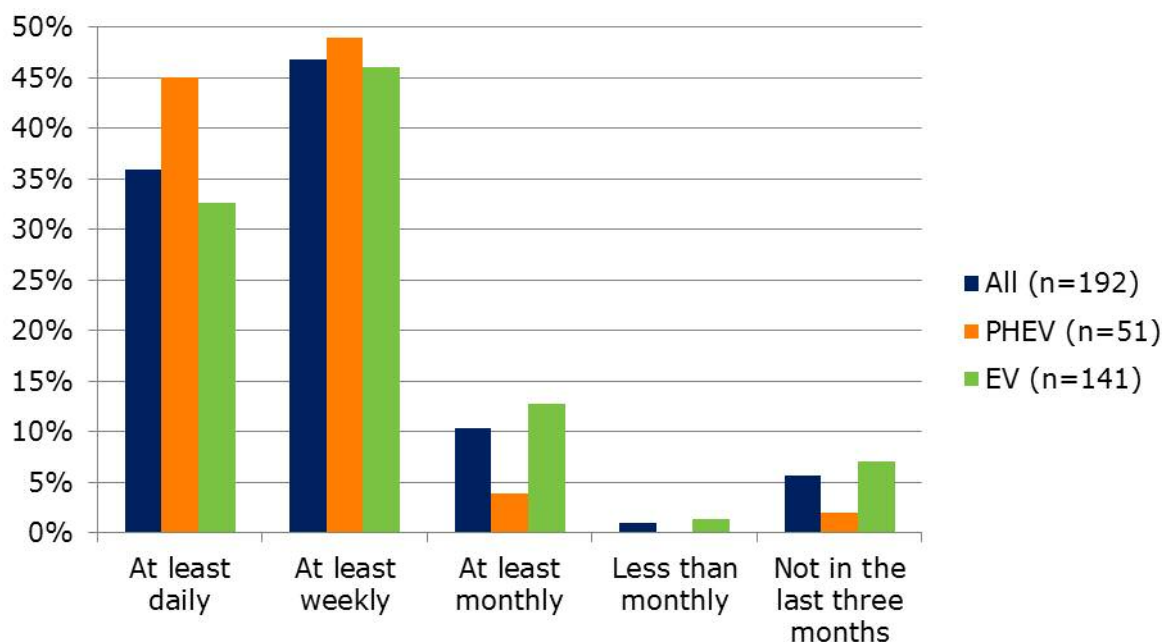
*"You go on the motorway and the fuel gauge [battery range] just plummets down and it'll do 70 mile an hour no problem whatsoever, keeps up the traffic, but you don't, you sit in the inside lane at 56 mile an hour with the lorries...I don't go on motorways."* Private EV purchaser

Respondents described actively calculating the most efficient routes possible to reach their desired destinations:

*"Whereas previously I'd have...to go to, let's say, Stansted Airport, in the past I might have gone down the motorway, around the motorway, M25, and up the M11, but now I look at it and say, well, it's a shorter route to go across country and I'll take that one because I'll use more of my electric power on, you know, as a percentage of the total journey."* Private PHEV purchaser

### 5.2.3 A-road use by vehicle type

A-roads are used far more frequently than motorways by both EV and PHEV drivers (Figure 5-5). A-roads were used at least weekly by 83% of all respondents compared to 36% using a motorway at least weekly. A-roads were not used at all by 6% of respondents (although EV drivers were more likely to fall into this category than PHEV drivers; 7% and 2% respectively). Over one third of respondents (36%) used an A road at least daily; this was more likely for PHEV drivers (45%) than EV drivers (33%), at a level approaching statistical significance.

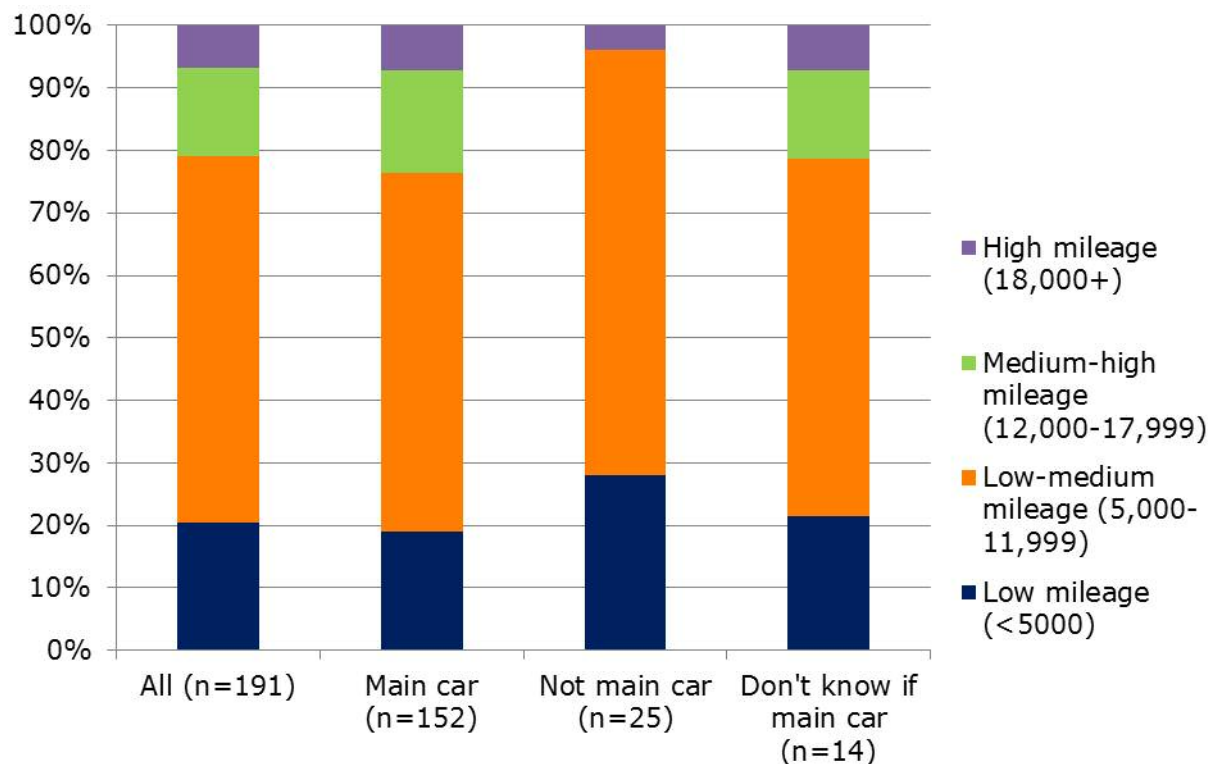


**Figure 5-5. PRIVATE: A-road use in the last three months (by vehicle type) (n=192)**

### 5.2.4 Annual mileage

Figure 5-6 shows the annual mileage of the EV for private respondents, differentiated by main versus secondary household vehicle. Across groups, over half (57%) of vehicles had a 'low-medium' annual mileage, 21% had a 'low' annual mileage, 14% had a 'medium-high' mileage and 7% had a 'high' mileage. As may be expected, when the EV was the main car it was more likely to do a 'medium' or 'high' mileage (24%) compared to EVs that were not the main car (4%).

The estimated average annual mileage of the main household car (based on the interval mid-points) was 8,850 miles. This is similar to the national estimated average annual mileage per car of 8,430 miles (2010 National Travel Survey data, DfT, 2011).



**Figure 5-6. PRIVATE: Annual mileage of EV (by whether it is the main household car) (n=191; all who knew annual mileage)**

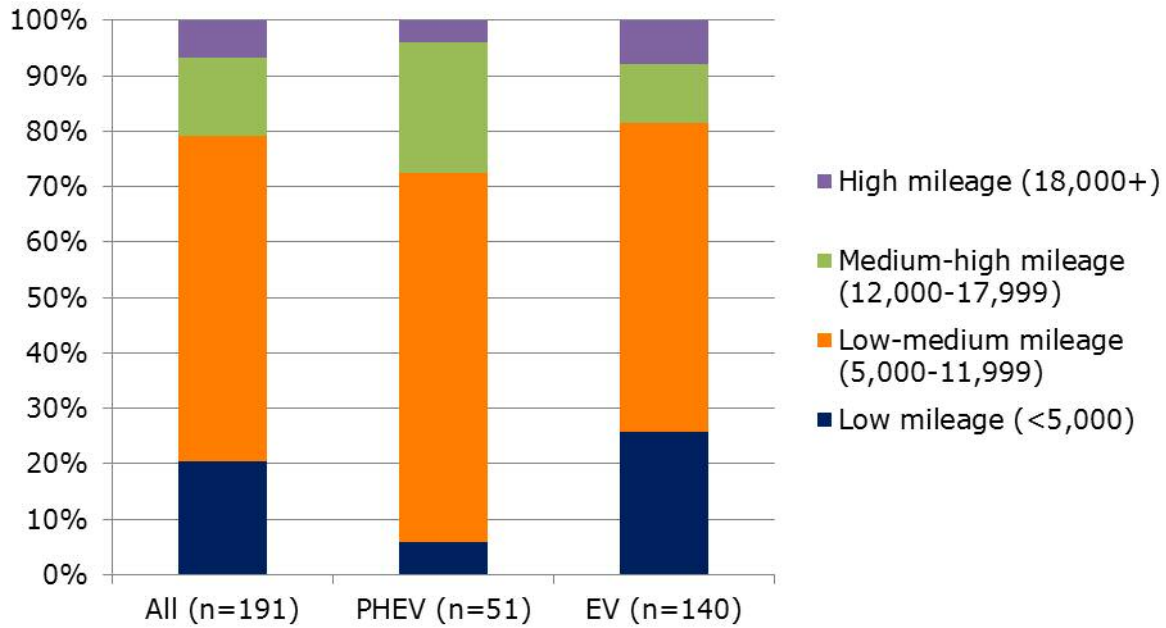
Caution should be exercised in relation to self-reported annual mileages, as it has been shown that vehicle owners tend to overestimate their annual mileage on low-usage vehicles, and underestimate their annual mileage on high-usage vehicles (e.g. White, 1976). A lack of awareness of annual mileage was also acknowledged by certain respondents:

*"When the gentleman phoned me up about how much mileage I'd done, I hadn't a clue and I said 4,000, but it's been 8,500 I've done in a year."* Private EV purchaser

This may be as a result of a general lack of knowledge, not having owned the vehicle for a sufficient period to determine the annual mileage, or perhaps multiple people using the same vehicle.

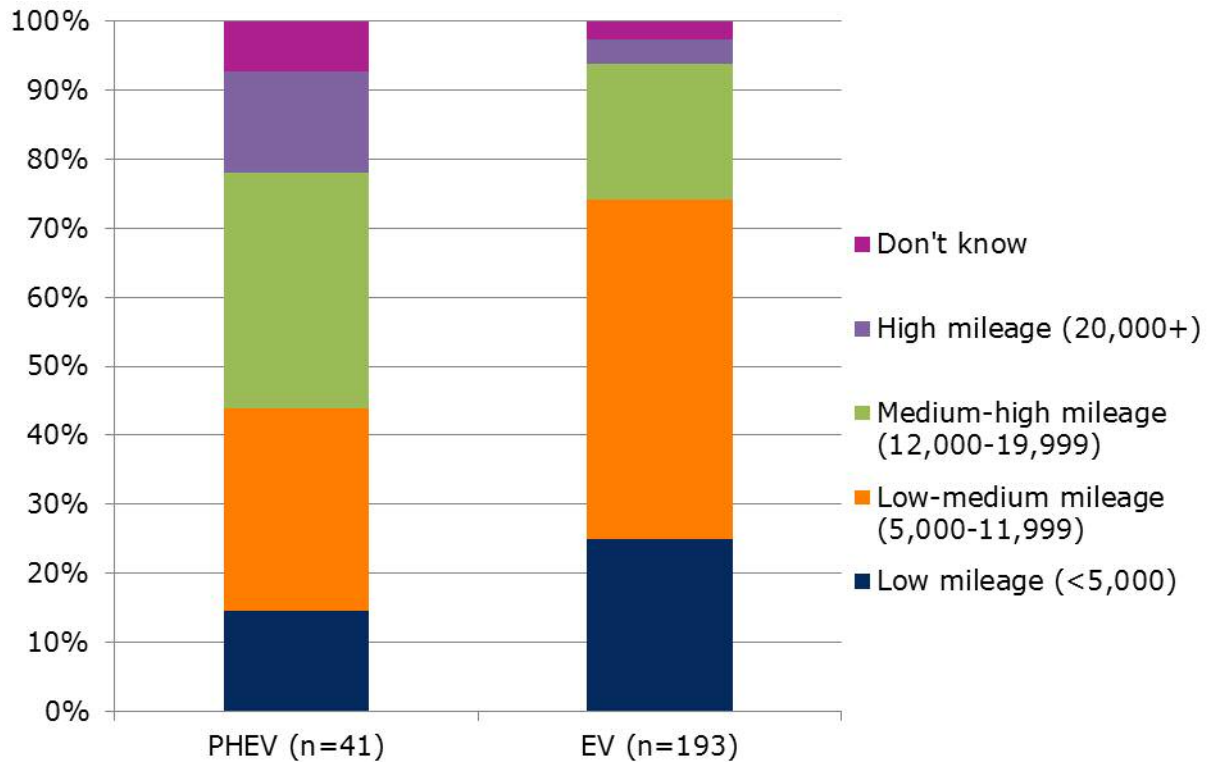
Figure 5-7 shows the annual mileage of the private vehicles, differentiated by vehicle type. Generally, respondents' EVs were more likely to do a lower annual mileage than PHEVs (26% of EVs had an annual mileage of 5,000 miles or below, compared to 6% of PHEVs). Very few PHEV and EV owners reported high mileages; 4% and 8% respectively stated an annual mileage of 18,000 miles or more. Five EV owners stated that they drove 21,000 miles or more per year, which is high (but not impossible) for a vehicle with an average range of 70 miles; 21,000 miles a year would work out at approximately 60 miles per day if driving every day. EV owners were statistically significantly more likely to report a low annual mileage for their vehicle compared to PHEV owners.





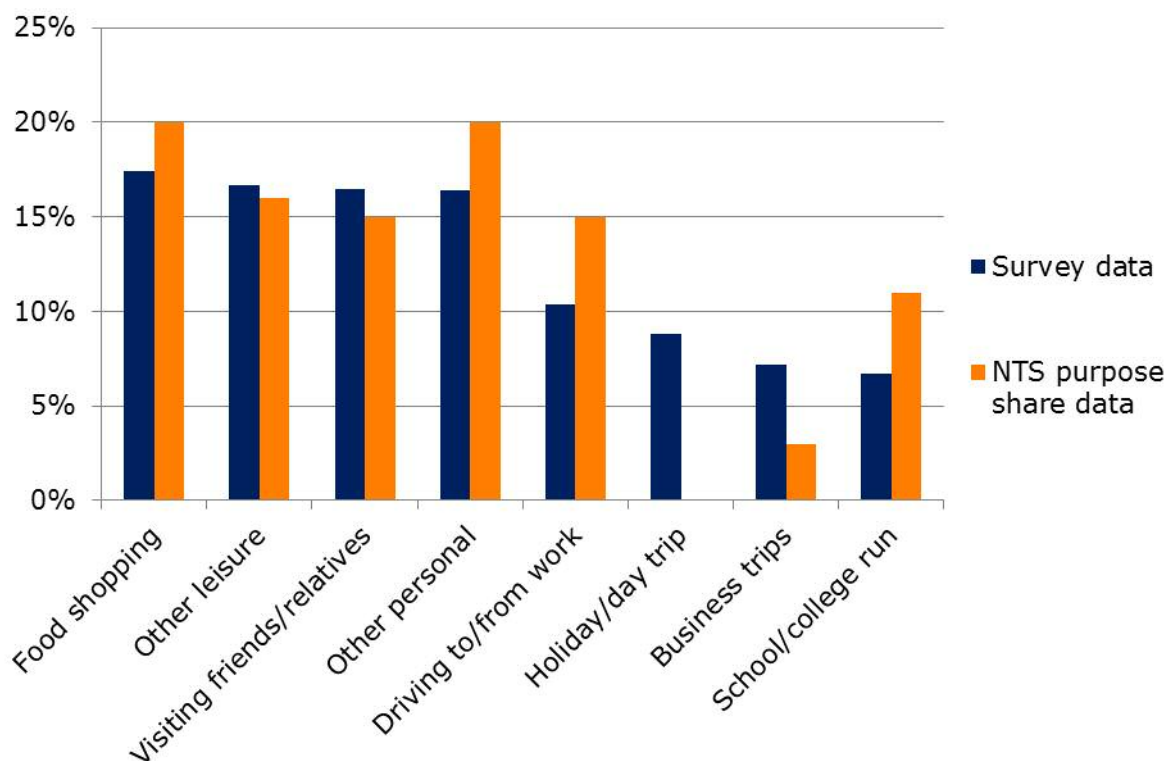
**Figure 5-7. PRIVATE: Annual mileage of EV (by vehicle type) (n=191; all who knew annual mileage)**

Figure 5-8 shows the annual mileage of the vehicles owned by organisations. The mileage groupings available to the private respondents were slightly different, and so a direct comparison with the organisational respondents is not possible. Also, a combined graph showing 'all' vehicles is not included as some organisations had both EVs and PHEVs.



**Figure 5-8. ORGANISATIONS: Annual mileage of EV (by vehicle type) (n=234; all who had purchased an EV for employee use, and were not used solely as pool cars)**

Figure 5-9 shows the journey purposes of private respondents, who were asked to choose from a list the journey types they had made in the EV over the last three months. For comparison, data from the National Travel Survey for Great Britain in 2011 is used (note that in the NTS survey, day trips and holidays were included in 'other leisure'). The data are fairly similar for both surveys, with the NTS respondents reporting a slightly higher proportion of school run, commuting, food shopping and 'other personal' journeys; however, these differences were not statistically significant.



**Figure 5-9. PRIVATE: Journey purpose of respondents (1,039 responses from 192 respondents) compared to NTS purpose share data (GB, 2011, n=18,069)**

### 5.3 Perceived advantages of owning and using an EV

#### 5.3.1 The driving experience

Respondents described that the main advantages of driving an EV included the quiet and smooth driving experience, saving money on fuel, and use of new technology. The key advantage of owning or using an EV was the actual driving experience. Both private and organisational respondents expressed a sense of delight when talking about what their EVs were like to drive. Respondents commonly used words such as 'relaxing' and 'smooth' to describe the driving experience. They referred to driving an EV as being particularly enjoyable as a result of several EV-specific features, including the gearless direct drive provided by an electric motor, and the lack of engine noise which aided their sense of a relaxing driving experience.

*"It's really nice when you stop and it's silent and it's nice when you glide off."*  
Private EV purchaser

They also described being impressed by the responsiveness and handling of the vehicle. Several respondents explained that the vehicle had exceeded their pre-purchase expectations in terms of the performance offered.

*"I think the impression, the immediate impression I got when I first got into it – I was thrilled with it really – has remained. I am not disappointed in it. It's fun to drive and I like the silence of it, the smoothness, and it has got quite good acceleration. I just liked it and still do. I don't think I have changed."* Private EV purchaser

### 5.3.2 Cost savings

Some respondents described the fact that they no longer needed to purchase petrol or diesel regularly (PHEV owners) or ever (EV owners), were not reliant on fossil fuels, and could conveniently charge at home rather than using petrol stations as key advantages of EV ownership:

*"I was one of the people queuing up there [for petrol] six months ago, it takes ten minutes to get to the pumps, and now it seems to be that there are twice as many cars going there and you just pass them, it is a great feeling, that you are not in the queue, you go home, you plug in and you have got power to use the vehicle the next day."* Private EV purchaser

Respondents also tended to be very aware of the amount that using an EV had saved them, and described the cost savings they had made:

*"The fuel cost savings are enormous. I was previously budgeting about £200 a month for petrol... and now I'm spending about £20-25 a month instead. I figured out that the costs would be roughly a fifth, they ended up being about a tenth. I worked out that I saved roughly £3000 over the course of the year, so it's significant, it really is."* Private EV purchaser

### 5.3.3 Positive changes to driving style and efficiency

Respondents reflected positively on the ways in which their driving style had changed as a result of them owning or using an EV. Observations made related to the efficiency of driving, planning and use of road types and a shift in thinking.

It appeared that by having various in-vehicle features in place, the vehicles had prompted respondents to think about their driving style. Examples of such features include satellite navigation systems which offer drivers a choice of either the quickest (in terms of time taken from journey start to finish) or the shortest route (in terms of distance from start point to finish point) and in-vehicle efficiency monitors. Respondents talked about how this had, over a period of time, led to a change in their driving behaviour.

*"We don't go on motorways anymore so we can go the shortest route which is so much prettier and so much more interesting...the country is way more beautiful than you realise because you are not on a motorway, and you see things that are a lot more interesting."* Private EV purchaser

Linked to efficiency, respondents explained that since purchasing their vehicles, they had undertaken greater planning of routes. For certain respondents, the requirement to undertake more planning was viewed as a negative and restrictive feature of owning an EV, however, this was not a common opinion.

*"You have to be organised when [you go out] and you have to calculate the distances. You can't deviate [from plans]...it's the most restrictive car."* Private EV purchaser

There appears to be a gap in the literature relating to whether EV drivers demonstrate a more efficient/economical driving style than non-EV drivers. However, research does exist to show that some EV drivers do change their driving style to match the specific attributes of EVs. For example, a study by Gärling (2001) found that 30% of participants stated that they changed their driving style due to the limited range of the vehicle.

## 5.4 Perceived limitations of owning and using an EV

The most frequently cited limitations to EV use raised by respondents related to battery range and public charging infrastructure.

### 5.4.1 Range achieved by respondents is lower than advertised range

This was the most commonly raised theme for both private and organisational respondents. There was a sense of disappointment and frustration at the disparity between the advertised range and the range that they achieved, and the unforeseen factors that played a role in reducing the range. Some private respondents suggested that they would have been discouraged from buying their EV had they realised what the achievable range was.

*"I feel that [Manufacturer name removed] should be taken to task about it and I feel that the Government should introduce a regime of regulating what electric car manufacturers promote as the range."* Private EV purchaser

For some organisational purchasers, feedback suggested that staff were apprehensive and cautious about using the EVs. The following quote suggests that this was an on-going concern; it is taken from an organisational EV purchaser who had had an EV on the fleet for over a year:

*"We had some initial concerns about people being nervous about driving it because the range suddenly saying you have got 50 miles left and within a mile you have only got 24 left, so range is still an issue for us."* Organisational EV purchaser

Respondents had experienced a variety of issues which had unexpectedly impacted on range including: seasonal differences and weather conditions, use of auxiliary features (e.g. radio, lights, windscreen wipers), driving style, speed and road topography. Of these factors, seasonal differences and weather conditions seemed to be the most frequently raised issues.

*"I didn't realise how weather dependent it was, you know, like seasonally dependent...it does degrade the battery performance range hugely...in the summer it's 80 miles top whack and in the winter it's 50 miles top whack."* Private EV purchaser

The weather-related effects described by respondents typically related to cold weather conditions, use of the heaters to defrost or demist the car, keeping the windscreen and windows clear while driving, and keeping the drivers and passengers warm. Several respondents also commented that use of the air conditioning in warm weather had a negative effect on the battery level, but that could be easily alleviated by opening the windows rather than using the air conditioning.

Respondents found that pre-heating the vehicle before removing the charging cable minimised use of energy directly from the battery. Some also restricted use of their EV during cold weather.

### 5.4.2 Public charging infrastructure does not currently meet user needs

Another limitation associated with owning and using an EV related to the public charging infrastructure available to EV purchasers and users. Two key issues arose from the interview data. The first issue was that at the point of purchase, respondents were led to

believe that public charging infrastructure would be expanding in the near future and that they would be able to use it to support them in undertaking journeys that exceeded their vehicle range. There was a sense of disappointment that, at the time of the survey, infrastructure was not as well established as they would have liked<sup>13</sup>.

*"The infrastructure support for electric vehicles has been a lot slower than I was led to believe."* Private EV purchaser

The second issue arising from the data related to EV purchasers' and users' perceptions of the suitability of the public charging infrastructure available in terms of location. In general, it was felt that having public charge points near to where they lived and/worked was not useful given that they would not have committed to purchasing their EV had they not had appropriate local charging locations in mind.

*"We don't need them in our local area; we need them on the edge of our range."* Private EV Purchaser

Instead, respondents expressed a desire for infrastructure to be provided at strategic locations (such as motorway service stations) and destinations (such as hotels or restaurants) where they could re-charge their EVs quickly (using rapid charging facilities), in order to undertake longer journeys than they were currently able to.

*"I think OLEV need to concentrate on... 'Where do these points really need to be?' and 'What needs to go in the ground?' and the answer to that is they need to be in locations that link places and they need to be the relevant technology for the vehicles that are available now."* Organisational EV Purchaser

*"It isn't in a supermarket car park that you want it, because how far are you going to drive to a supermarket? At best you can drive 10 miles, you don't charge the car after 10 miles do you?... Nobody is going to be very far from a supermarket, you do not need to charge... I reckon where they do need them is plonk in the middle of a motorway because that is where you are likely to suddenly need to recharge."* Private EV purchaser

Some EV owners made use of off-street charge points because it entitled them to free parking, and so they used them despite not needing to charge their vehicle. Some respondents had charged their vehicle at a dealership. A lack of collaboration between different dealerships and charge point providers was reported, which, if overcome, could improve the available charging network:

*"Each individual company that operates the charging stations, they are all protective of their own charging posts, and even down to dealers... yesterday we phoned up the dealership that we bought it from... their rapid charger was broken... there was also a [different] garage which was about three miles away from there, and because theirs was broken we phoned them up and said can we call in and use your charger, and they said no, it is exclusive for [car make] customers... it is not sort of like giving any confidence to people, if everybody shared their charging points it opens up a greater network for people to use."* Private EV purchaser

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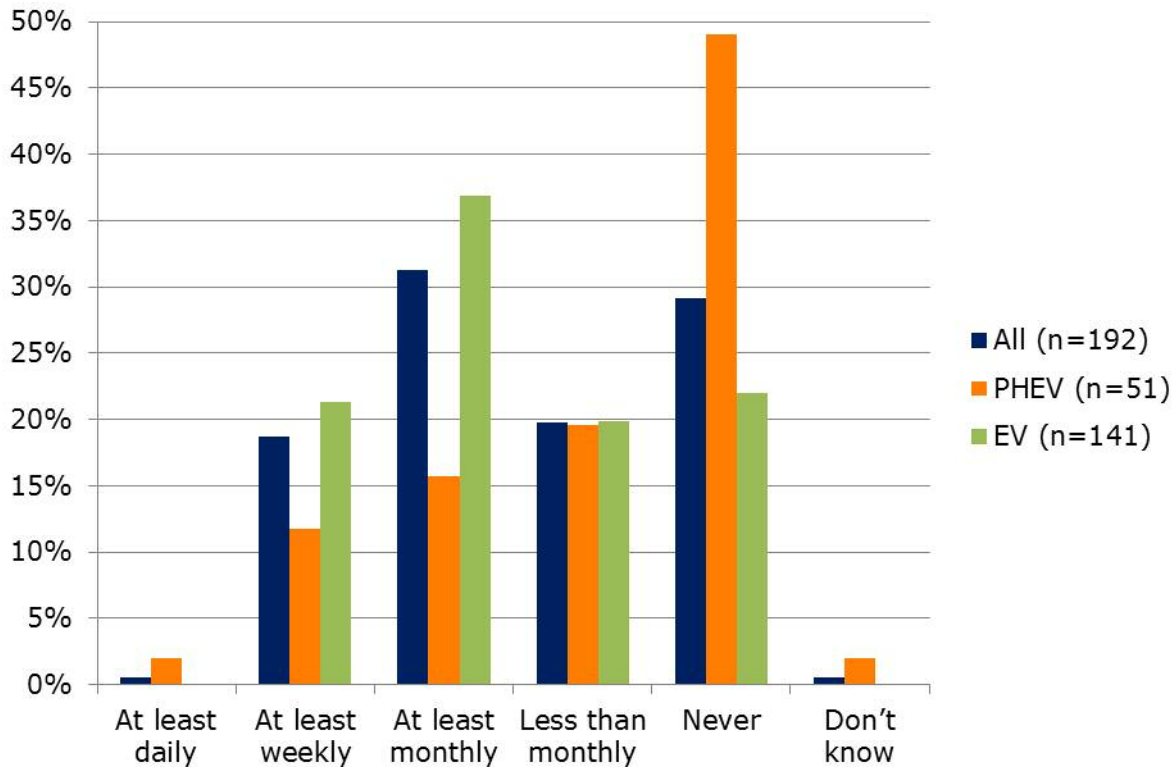
<sup>13</sup> There has been an increase in the number of charge points since the surveys were undertaken.

Those respondents who had made use of public charge points had experienced a number of issues with them which affected their confidence about using them again in the future. Negative experiences described by respondents included:

- Difficulty identifying locations of public charge points.  
*"Getting the information about where the charging points are is the hardest part, and also getting information about whether the charging point will work for you or whether it won't. Until you get there it seems to be a bit hit and miss."* Private PHEV purchaser
- Arriving at charge points that were not operational.  
*"On two occasions, I've had [public] chargers not working. You've really got to work at it and plan it before you go on any longer journey, even to the extent of phoning them to make sure that it's working, to make sure that you can plug it in."* Private EV purchaser
- A lack of consistency between different public charge point providers (a particular concern for private respondents).  
*"If I go to some city and I find a charge point on the map, I don't know until I find it what network it belongs to, and if it's not one I've got, I can't use it. And so the frustration, the sheer frustration in getting there and finding it's unavailable to me is off the charts because I'm stranded, I have to know upfront if I can use it."* Private EV purchaser

### **5.4.3 Suitability of EVs for required journeys**

Figure 5-10 shows how frequently private respondents claimed that they had used a different vehicle or mode of transport in the last three months because they felt their PHEV/EV was unsuitable for the journey. In total, 71% of respondents had experienced this in the last three months. EV owners were more likely than PHEV owners to say that this had happened at least once (78%, compared to 49% of PHEV owners). It happened at least once a month for 58% of EV owners, and 29% of PHEV owners.



**Figure 5-10. PRIVATE: Frequency of EV being unsuitable for a journey, in the last three months (n=192)**

Overall, EV purchasers felt that their EVs were suitable for most of the regular journeys that they needed to make. However, there was a concern that EVs may not be suitable for less frequent or unplanned journeys.

*"We still haven't been really ambitious, you know we haven't tried to get somewhere and charge and get back, all that sort of thing."* Private EV purchaser

When EV owners and users were faced with journeys that were not suitable for their EVs, it was common for such journeys to be completed using an alternative (ICE) vehicle.

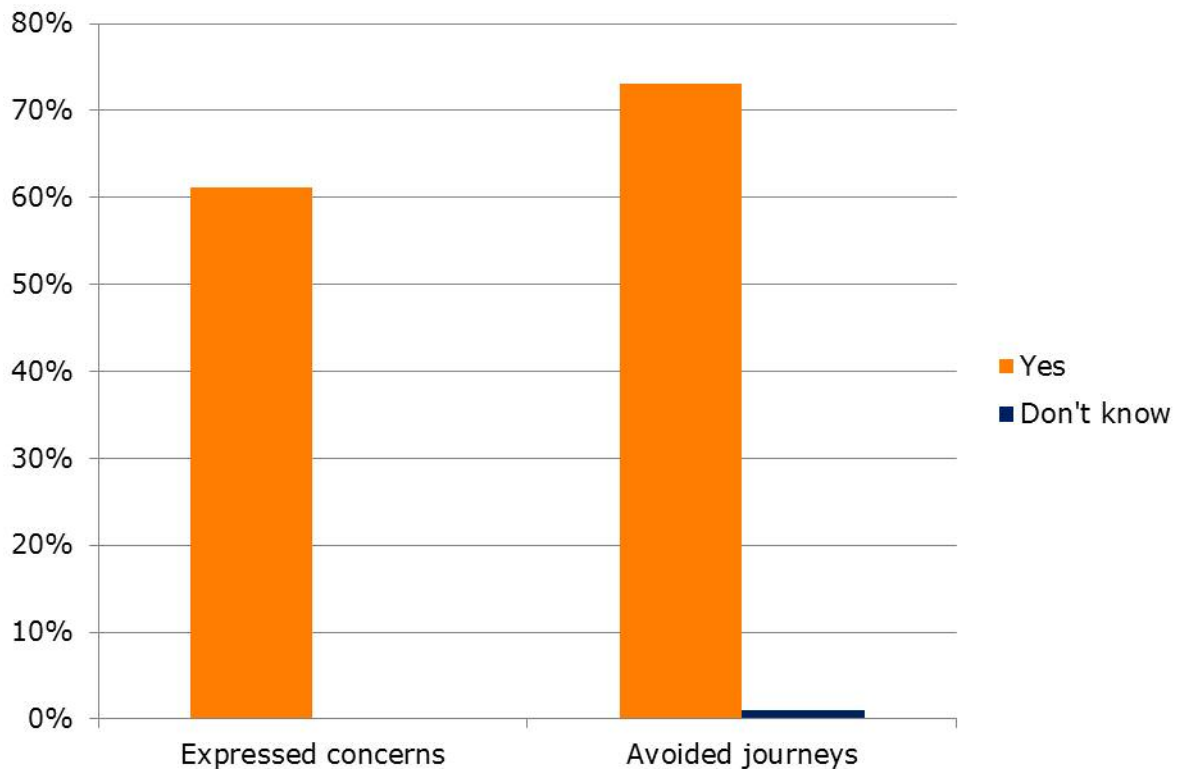
*"We have two cars in the household, we have had for quite a while, and our main car, at least in terms of mileage is the EV [model name] which we bought last year. Our second car we reserve essentially for long distances."* Private EV purchaser

As discussed in section 4.9.2, for PHEV owners, range was not an issue and so there were no journeys that they considered unsuitable.

*"Because it's got a range extender, there is no such thing as an unsuitable journey."* Private PHEV purchaser

Figure 5-11 shows that concerns were expressed by employees about EV range in 61% of organisations, with employees avoiding making journeys in the EV in 73% of organisations. Note that these figures are based on the respondents' perception of the issue; the response may not be an accurate reflection of the true situation, particularly in larger organisations.





**Figure 5-11. ORGANISATIONS: Proportion of respondents who felt that employees had expressed concerns about making journeys in the EV, or avoided making journeys, because of worries about the range (n=193; all who have EVs (excluding PHEVs) for individual employee use)**

Organisational respondents in the interviews reported that some members of staff at their organisations had expressed concerns about using an EV for work. Concerns were typically based on a lack of knowledge related to EVs. However, these concerns seemed to reduce over time as staff got used to the vehicles.

*"[We expected that] people wouldn't want to be seen in it, but that hasn't been the case at all. Once people started, the initial stage of going out and having like a little test drive in it, they were 'Oh great, when can I go out again?' you know, I think most staff have just encompassed the idea and love it."* Organisational EV purchaser

For many organisations, a range of vehicles were typically available for staff use (typically with fewer EVs than non-EVs), meaning that there was an option for staff to select a non-EV to undertake journeys that they were concerned about making in an EV or that fell outside of the achievable range of the EV.

## 5.5 Outsider observations

While some private EV purchasers viewed themselves as being innovative and entrepreneurial, certain members of this group explained that these perceptions were not always shared by others. Several respondents described situations in which they were regularly mocked or ridiculed by friends and family members who tended to have little knowledge of EVs.

However, non-EV respondents tended to view EV purchasers in a positive light, describing EV purchasers as being forward-thinking, innovative, and technologically and environmentally aware.

*"It's somebody who's a bit forward thinking really, thinking about the next step on rather than being stuck in the industrial revolution with the rest of us. Somebody who's looking to new things for the future, and also somebody who's concerned about the world they live in."* Private non-EV purchaser

Organisational purchasers tended to believe that others viewed their organisations' use of EVs in a more positive light than was the case for the private respondents. They felt that their decision to purchase an EV gave a message to others that they as an organisation were making a statement. The sorts of statements being made varied by organisation, but were related to environmental issues, a desire to separate themselves from their competitors or simply as a source of information to others, providing education and insight into EVs.

*"I think it says that I'm trying to do my bit and it says that I'm trying to change perceptions and that I'm prepared to put my money where my mouth is."* Organisational EV purchaser

## 6 The EV charging experience

This chapter presents an exploration of the factors associated with charging an EV. Topics include the location (at home, at work, on- or off-street) and the frequency of charging. Insights into typical charging routines (including time of day, electricity tariffs and types of charge point used) are discussed. Respondents' perceptions and understanding of the PiP schemes and other public charging schemes are also presented alongside barriers to their use and misperceptions about public charging infrastructure.

### SUMMARY

#### Charging locations

Almost all private quantitative respondents had charged their vehicle at home, and over a third had used off-street charging points. Experience of charging at work was more limited, with only a fifth of respondents having done this. A similar proportion (17%) reported that they had used an on-street charging point.

#### Charging periods

Just under half of respondents stated that they charged their battery routinely, regardless of the battery level; this was significantly more likely for PHEV users than EV users. Of those who charged routinely, 38% plugged the vehicle in overnight (9pm-9am) while 32% did so in the evening (5pm-9pm).

#### Organisational charge points

Over two thirds of organisational respondents stated that there was a charging point installed on site. The majority of these were standard points, with a few reporting that their organisation had installed fast or rapid charging points.

#### Rapid charging points

Experience of using rapid charging points was fairly low, although EV owners were more likely to have used a rapid charging point compared to PHEV owners.

#### PiP scheme use and non-use

Private quantitative respondents were evenly split in terms of whether or not they were members of a PiP scheme, while 38% of responding organisations were scheme members.

#### Barriers to use of public charging infrastructure

There is a desire for an improvement to the available public charging infrastructure, particularly for more rapid charging points on the strategic road network, and charge points at 'destinations' such as hotels and restaurants. Incompatibility between various charge point providers was identified, as was a lack of information about the location of charge points.

## 6.1 Charging locations

### 6.1.1 Home charge points

Most respondents regularly charged their vehicles at home, and tended not to use other available charging infrastructure<sup>14</sup>. Just over half (54%) of private respondents stated that they had a charge point installed at their home specifically for charging their vehicle. This was the same proportion for EV and PHEV owners. There may have been some confusion over the term 'charge point'. When talking about their home charge points, many respondents described that they had a plug socket which was for the sole purpose of charging their EV rather than a specifically-installed charge point.

*"You plug it in, you switch it on, it goes beep. The next morning, you unplug it and drive off. I just use a standard 13-amp socket."* Private PHEV purchaser

Generally, respondents felt that having a charge point for their EV installed at home did not appeal because the costs associated with installation outweighed their desire to charge over a shorter period of time.

*"I know that there's the standard one which is the one we've got or you can get [an energy provider] to come and install one that's slightly quicker, at your home for a thousand pounds but I thought, no I don't think – I wasn't going to use it so I thought well there's no point really. I don't care whether it takes twelve hours or eight hours to charge. I'm still going to leave it on overnight anyway."* Private EV purchaser

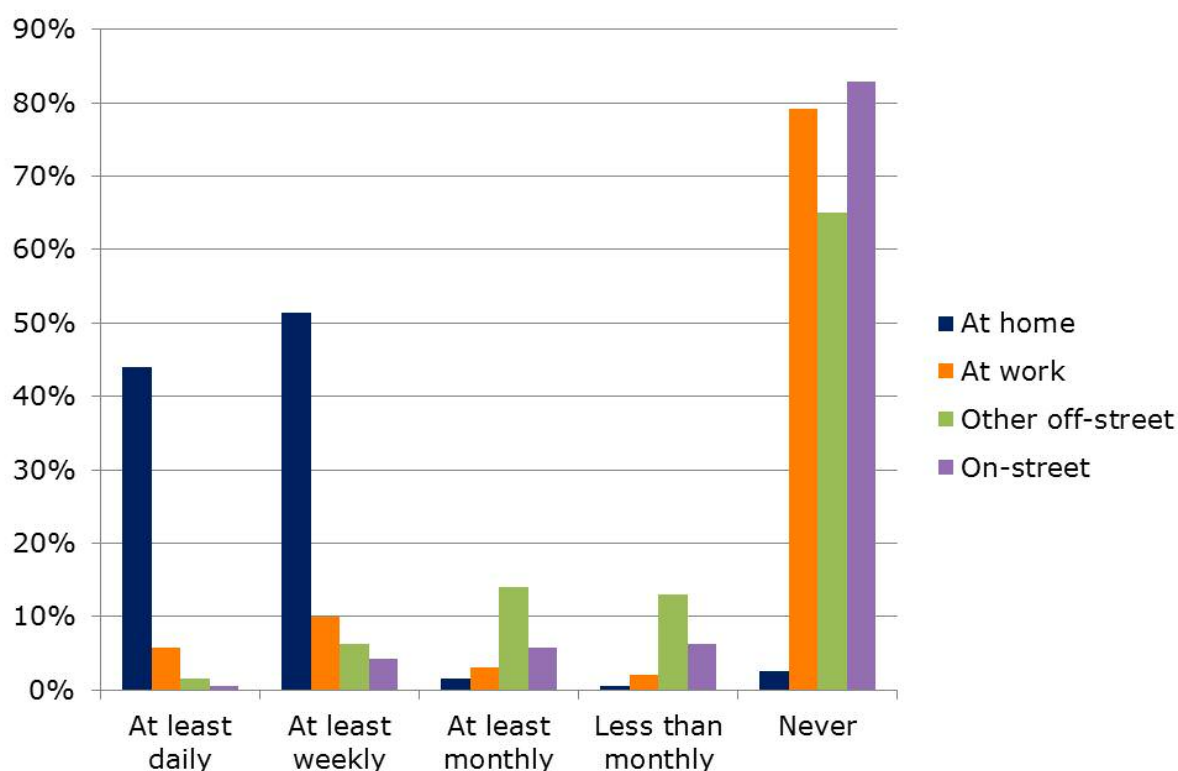
### 6.1.2 Charging locations used

Figure 6-1 shows the proportion of private respondents who have charged their vehicle at home, at work, at another off-street charge point, or at an on-street charge point<sup>15</sup>. Almost all respondents had experience of charging their vehicle at home, while just over a third had used an off-street charge point (e.g. car parks, motorway service stations). One fifth had charged their vehicle at work (although many respondents were retired) and 17% had used an on-street charge point. EV owners were generally more likely than PHEV owners to have experience of charging their vehicle in various locations. Further details of charging frequency are presented in Figure 6-2 to Figure 6-5.

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<sup>14</sup> It was not possible to determine from the data what proportion of respondents who charged at home did so because they had no other choice (i.e. no public charging facilities available in their area).

<sup>15</sup> Note that some respondents will have better access to work, off-street and on-street charge points.



**Figure 6-1. PRIVATE: Frequency with which respondents report using various charging locations, by vehicle type (n=192)**

The high prevalence of home charging found in the survey was supported by the qualitative data:

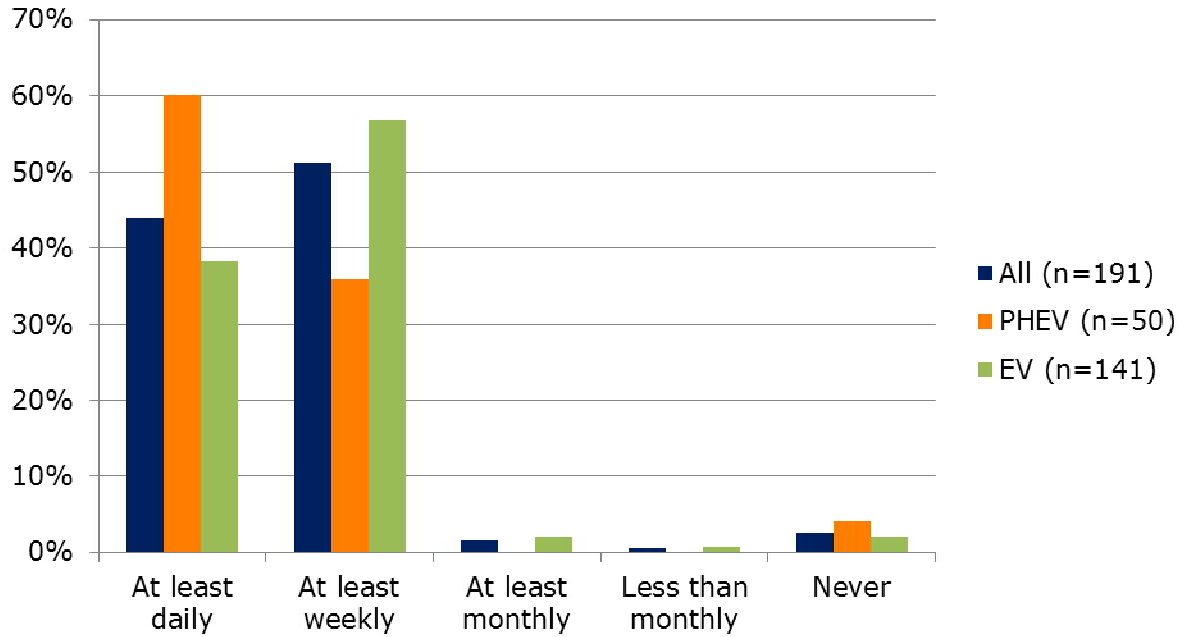
*"I haven't charged it anywhere else [other than at home]...it's always plugged in. It has a timer on it and it works on cheap rate."* Private EV purchaser

As discussed in section 5.4.2, there was a sense of confusion about public charge points, and a negative preconception about them in some cases.

### 6.1.3 Frequency of charging at home

Almost all private respondents (97%) had charged their car at home at least once. As shown in Figure 6-2, 44% of respondents charged their vehicle at least once a day, and 51% did so at least once a week. PHEV owners were more likely to charge their vehicle at least once a day (60%) than EV owners (30%); this difference was found to be statistically significant. PHEV owners tended to charge more frequently due to the lower electric range of their vehicle. Similar patterns have been reported in other studies. For example, the American-based EV Project (an on-going evaluation of over 7,000 organisational and private EV and PHEV owners) has found that PHEV drivers charge away from home 21% of the time, compared to 11% for EV owners. This is attributed to the fact that the PHEV's battery stores enough charge for up to 30 miles of all-electric driving, compared to 80 miles or more for the EV.

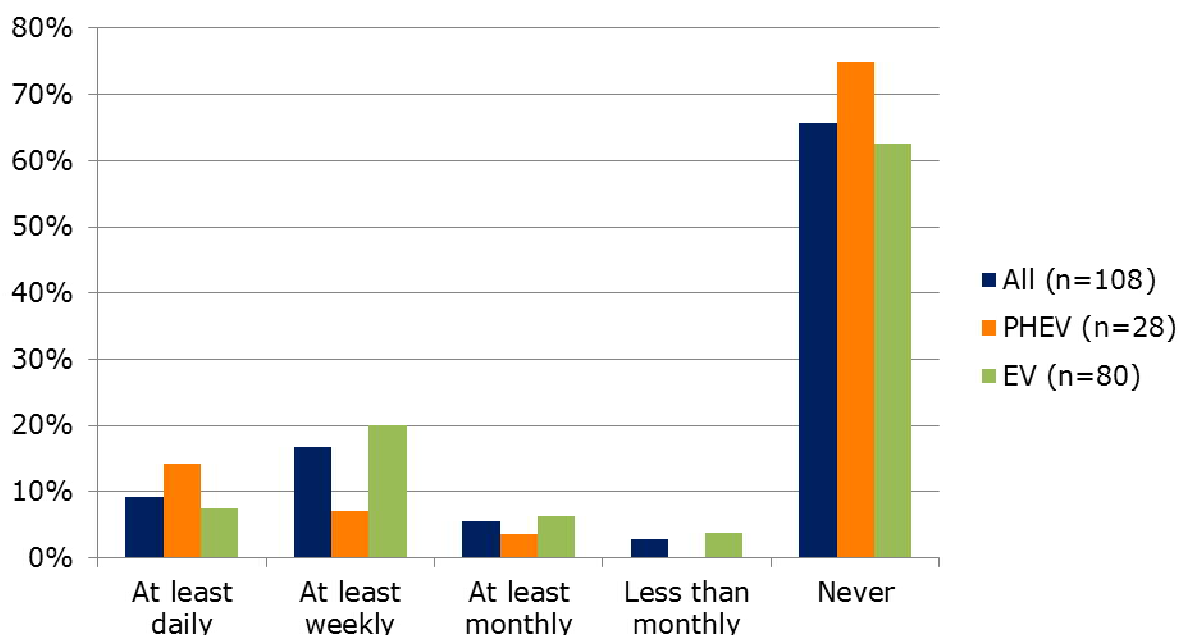
Of those respondents who had charged their vehicle at home, 52% had never charged at any other location.



**Figure 6-2. PRIVATE: Frequency of charging at home, by vehicle type (n=191; all who knew frequency of charging at home)**

**6.1.4 Frequency of charging at work**

As discussed in section 6.1.2, 21% of all private respondents had charged their vehicle at work. However, many of these respondents were of retirement age or did not work. Therefore only those respondents who stated that they drove to and from work are subsequently considered. Of this group, two thirds had never charged at work, and 26% did so once a week or more often, as shown in Figure 6-3.



**Figure 6-3. PRIVATE: Frequency of charging at work, by vehicle type (n=108; all respondents who commute to work only)**

Data on the availability of charging facilities at work was not gathered; therefore it is not possible to identify what proportion of those who were able to charge their vehicle at work chose to do so. However, the qualitative data provides evidence that EV owners are not always able to charge their vehicle at work:

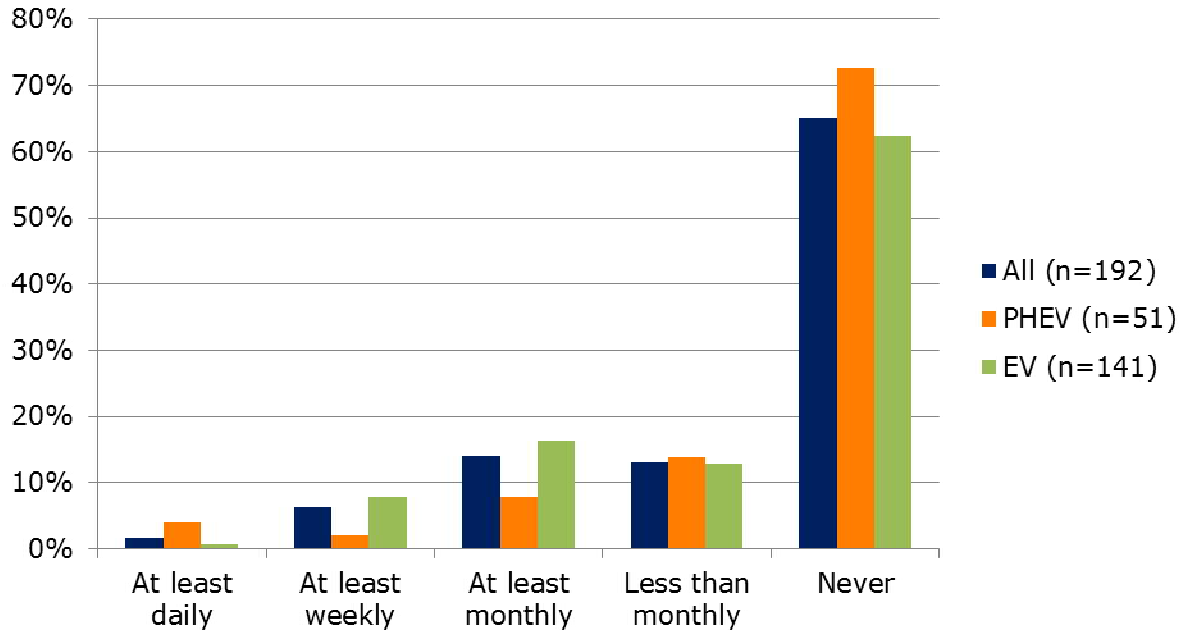
*"Unfortunately I can't [charge at work], the [place of work] has been claiming that it's looking to installing a charge point for over two years."* Private EV purchaser

Where charge points are available at work, EV users find them very convenient, both in terms of being able to charge while working, and not paying for the electricity:

*"I charge to a hundred percent [at work] because I'm not basically effectively paying for it."* Private EV purchaser

### 6.1.5 Frequency of charging at other off-street charge points

Other off-street charge points (e.g. supermarket car parks, car dealerships or motorway service stations) had been used by 35% of private respondents, as shown in Figure 6-4. PHEV owners were more likely to use off-street charge points on a daily basis (4%) compared to EV owners (less than 1%). Those respondents who had used off-street charge points mainly used them on a monthly, or less than monthly basis.



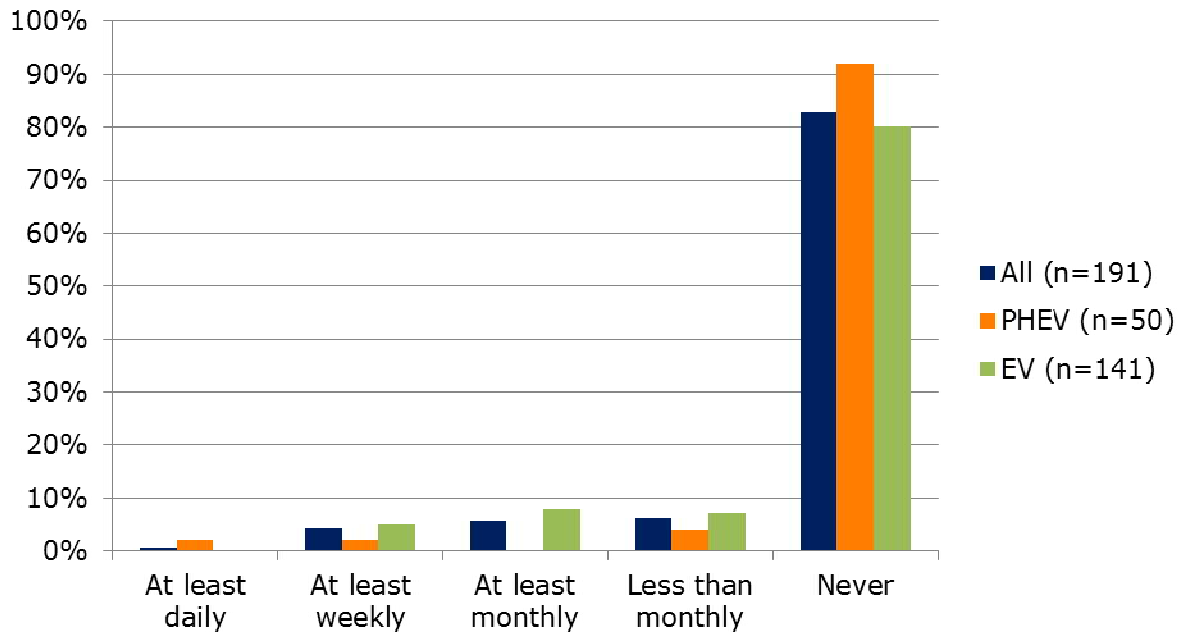
**Figure 6-4. PRIVATE: Frequency of charging at other off-street charge points, by vehicle type (n=192)**

**6.1.6 Frequency of charging at on-street charge point**

Eighty-three percent of respondents had never used an on-street charge point to charge their car (one respondent did not know whether they had done so)<sup>16</sup>. As shown in Figure 6-5, only one participant used on-street charge points on a daily basis, and this was a PHEV user.

<sup>16</sup> It was not possible to determine from the data how many respondents had access to on-street charge points.





**Figure 6-5. PRIVATE: Frequency of charging at on-street charge points, by vehicle type (n=191; all who knew frequency of charging at on-street points)**

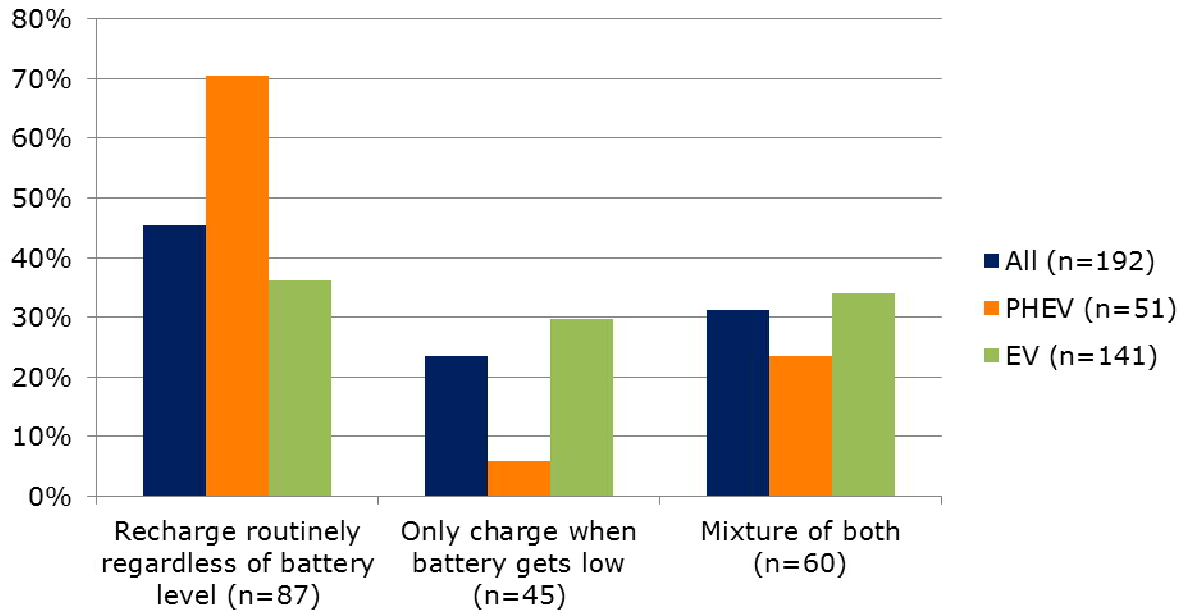
Some respondents raised concerns about the security of on-street charging, particularly with regard to charging cables being tampered with or vandalised (despite not reporting any evidence of this) and the impact that such behaviours might have on respondents completing their journeys.

*"If I want to go a 300 mile trip I should want to charge something like four times, the present rate of availability of them, not being connected, not working, someone vandalised them or what have you means that you probably wouldn't complete the trip anyway."* Private EV purchaser

## 6.2 Charging periods

### 6.2.1 Charging routine

Almost half of the respondents (45%) charged their vehicle on a routine basis, irrespective of the battery level, as can be seen in Figure 6-6. PHEV owners charged routinely twice as often (71%) as EV owners (36%). This difference is statistically significant and is in line with the findings on charging frequency at various locations.. Just 6% of PHEV owners reported that they only charged when the battery was low, compared to 23% of EV owners.



**Figure 6-6. PRIVATE: Proportion of respondents by type of charging routine (n=192)**

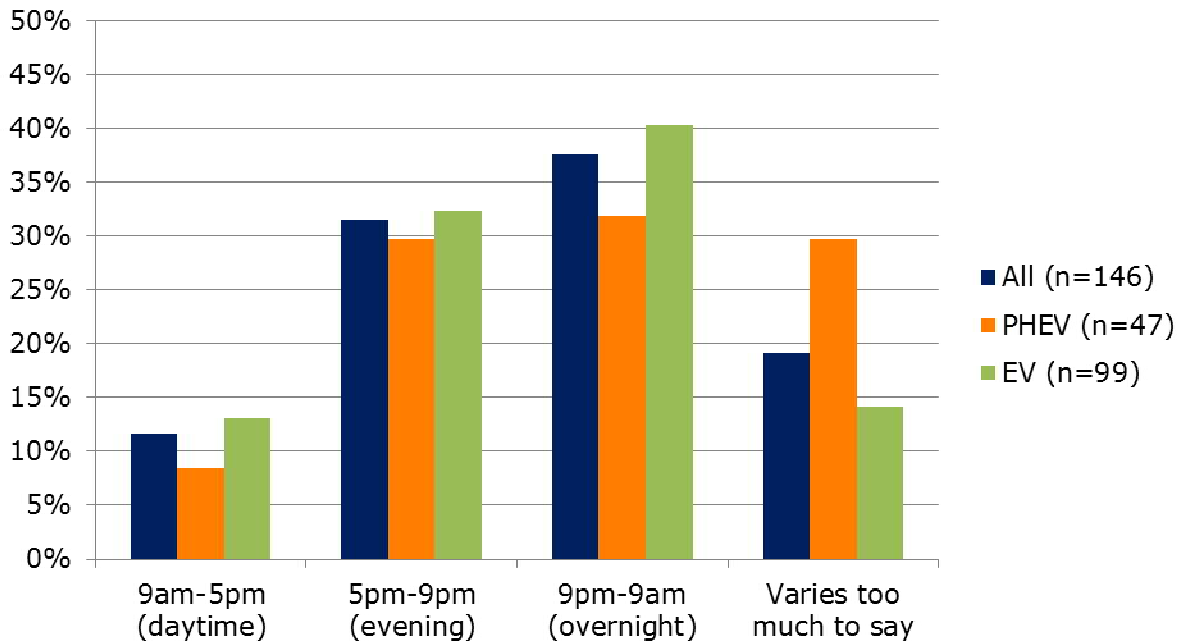
There was some uncertainty over whether constantly charging the battery had a degrading effect on it. Some respondents reported a preference for a fully charged vehicle, irrespective of the potential deterioration of the battery.

*"[I charge it] every time I put it back into the parking place, if I have used it at all. Now there has been an awful lot of discussion about how often you should charge it and whether you should just charge it up when it is empty and so on. I have got the philosophy, fill it up every time and then it is ready to whatever."*

Private EV purchaser

### 6.2.2 Time of charging

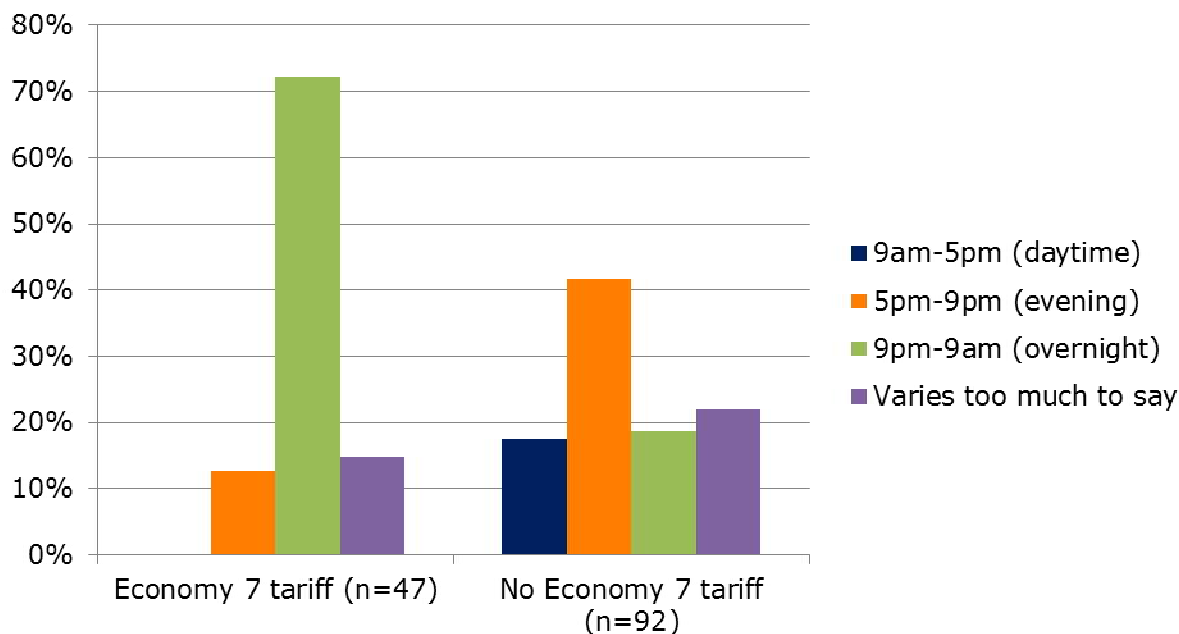
Most charging took place at night. Those respondents who charged routinely (either all of the time or some of the time) generally charged either in the evening (32%) or overnight (38%) (Figure 6-7). Just over a tenth (12%) did so between 9am and 5pm.



**Figure 6-7. PRIVATE: Time of day respondents begin charging the vehicle (n=146; all who charge regularly and know what time they begin charging the vehicle)**

There was a clear preference for overnight charging amongst those with an Economy 7 tariff<sup>17</sup> (or equivalent) as shown in Figure 6-8; 72% of those with an off-peak tariff began charging between 9pm and 9am, compared to 19% of those without.

<sup>17</sup> A tariff which provides cheap off-peak electricity overnight.



**Figure 6-8. PRIVATE: Time of day respondents begin charging the vehicle by use of Economy 7 tariff (or equivalent) (n=138; all who charge regularly, know what time they begin charging the vehicle, and know whether they use Economy 7 or equivalent)**

Some respondents reported using a timer switch to take advantage of the cheaper tariff.

*"Because I'm on an overnight tariff I only plug it in at nine o'clock. I've got a timer to go on at nine and off at seven."* Private EV purchaser

Overnight charging was also preferred by some because it was felt to be more environmentally friendly:

*"Because it's overnight I'm generating far less CO<sub>2</sub> than if I plug in and charge during the day when it requires additional generator capacity, overnight there is spare capacity on the generators, so I can use it without incurring more CO<sub>2</sub> generation."* Private EV purchaser

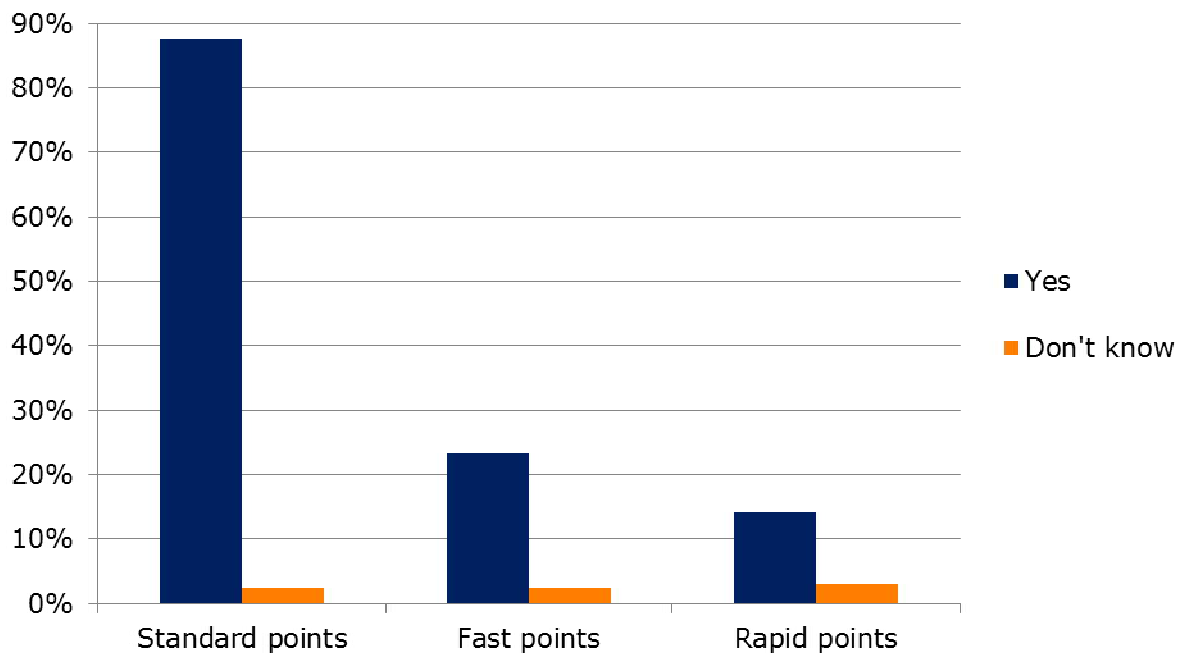
As described in section 5.4.1, respondents had discovered a big difference between the advertised range and the ranges that they could achieve, particular during colder weather. Purchasers reported that they need to charge their vehicles more frequently in colder weather, or that they need to charge for a longer period before embarking on a journey.

*"I was probably expecting to charge it every couple of days, which...in the summer is exactly what I was doing. And now it's got cold, I'm charging it every day. It doesn't need it because...it uses a little bit of power just to keep the car at a decent temperature when it's freezing outside, which makes it more efficient in terms of holding its charge and getting going in the morning."* Private PHEV purchaser

### 6.2.3 Charge point installed at organisational site(s)

Just over two thirds (67%) of organisations had a charge point(s) installed on site. Figure 6-9 shows that the majority (88%) had standard charge points on site; 23% had

fast charge points and 14% had rapid charge points. Just over a quarter (27%) of those with standard charge points also had a fast or rapid charge point.



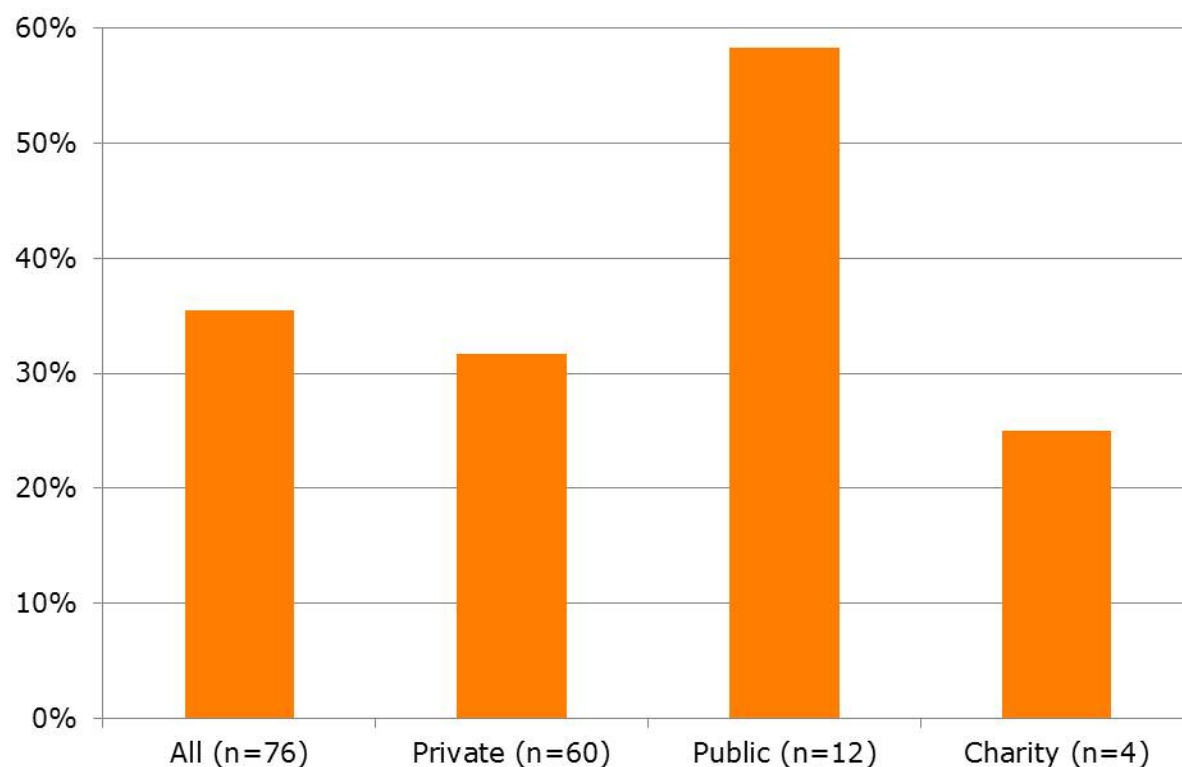
**Figure 6-9. ORGANISATIONS: Charge point types installed on-site (n=163; all who have charge points installed on-site)**

The majority (58%) of these organisations were located in a PiP scheme area. Organisations with faster charge points were more likely to be located in a PiP scheme area (71% of those with a fast charger; 70% of those with a rapid charger).

#### 6.2.4 Charge point funding mechanisms<sup>18</sup>

Organisations with charge points on site and located within a PiP scheme area were asked whether they had received a Grant or financial contribution to help meet the cost of installing on site charge points. Figure 6-10 shows that 36% of respondents from eligible organisations stated that they had received a grant or financial contribution. Public sector organisations were more likely to have done so than private or charity sector organisations (but note the small sample size).

<sup>18</sup> PiP schemes provide matched funding from DfT for the installation of publically-accessible EV charge points. In London, if all members of the public are able to access an organisation's charge point then the organisation may be eligible to receive this funding (SourceLondon, 2013). In the east of the country, small and medium enterprises and local authorities can receive up to 75% funding via Evalu8 towards the installation of (an) EV charge point(s). The majority of these charge points need to be publically accessible (Evalu8, 2012).



**Figure 6-10. Proportion of organisations receiving a Grant of financial contribution to assist with charge point installation, by organisation sector (n=76; all who have charge points installed on-site, are in a PiP scheme area, know whether they received a Grant, and know their organisation sector)**

## 6.3 PiP and other public charge points

### 6.3.1 PiP scheme use and non-use

Approximately half (49%) of the 192 private respondents were members of a scheme giving access to public charge points, and 50% were not. The remaining 1% did not know either way. Taking PiP scheme areas into account, 54% of those living in a PiP scheme area were members of such a scheme, compared to 45% of those not living in a PiP scheme area.

Amongst the 242 organisations that had purchased an EV for employee use, 38% were members of a scheme enabling the vehicles to be charged at public charge points. Taking PiP scheme areas into account, half of those organisations located in a PiP scheme area were members of such a scheme, as were 29% of those not located in a PiP scheme area.

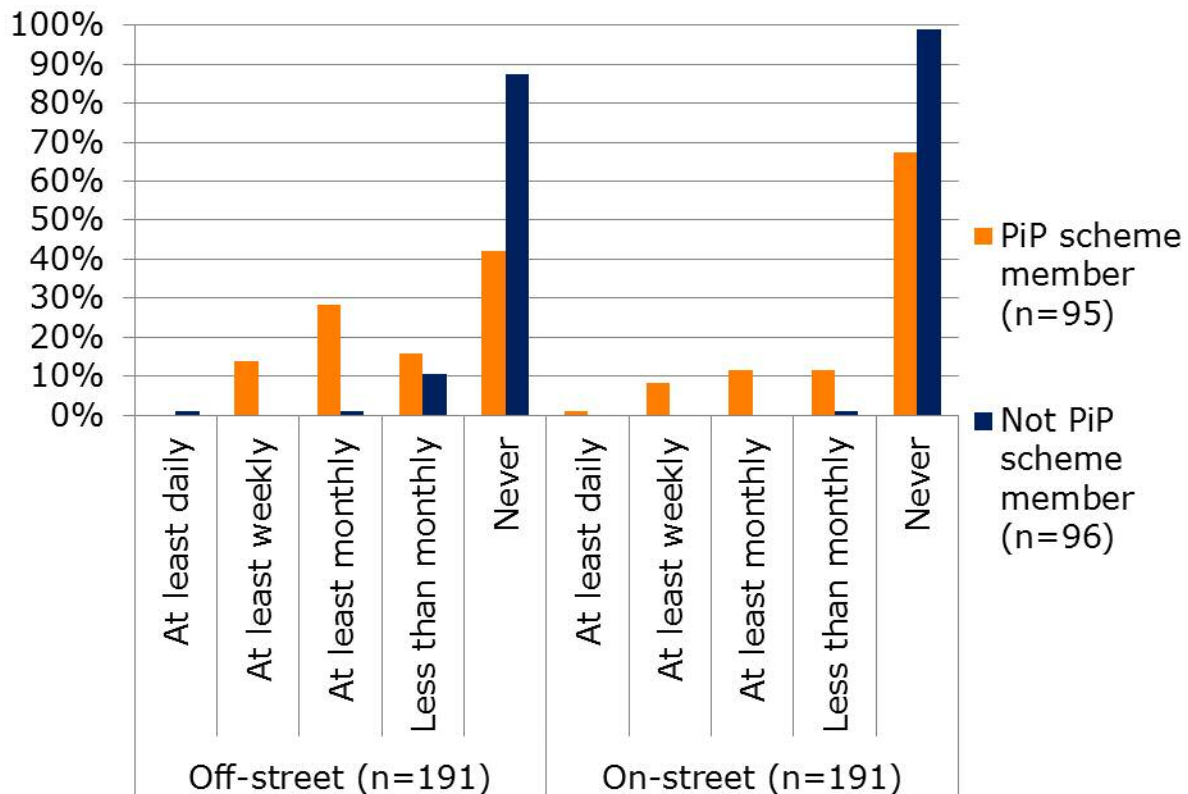
### 6.3.2 Variability in use of public charge points by PiP scheme area

By March 2012, 1,673 of the 3,000 domestic/workplace/public charge points in the UK had been installed via a PiP scheme, of which 60% are publicly accessible<sup>19</sup> according to

<sup>19</sup> The definition of 'publicly accessible' in the AMA report is not known; the definition used in this study is any charge point not in the home or a workplace.

a recent report by AMA Research (2013). It also states that the majority of publicly accessible points are located around the eight PiP scheme areas, “with subsidised products in these areas boosting development and a greater level of marketing and promotion focused on these regions”. Based on this, it might be expected that the use of publicly accessible charge points may be higher in PiP scheme areas compared to non-PiP scheme areas. It was found that usage of on-street and off-street charge points was similar amongst those living within and outside of PiP scheme areas.

Comparing those who are members of a PiP scheme with those who are not (Figure 6-11) reveals that PiP scheme members are more likely to use both on-street and off-street charge points than those who are not members of a PiP scheme. However, it was found that 42% of PiP scheme members had never used an off-street charge point, and 67% had never used an on-street charge point.



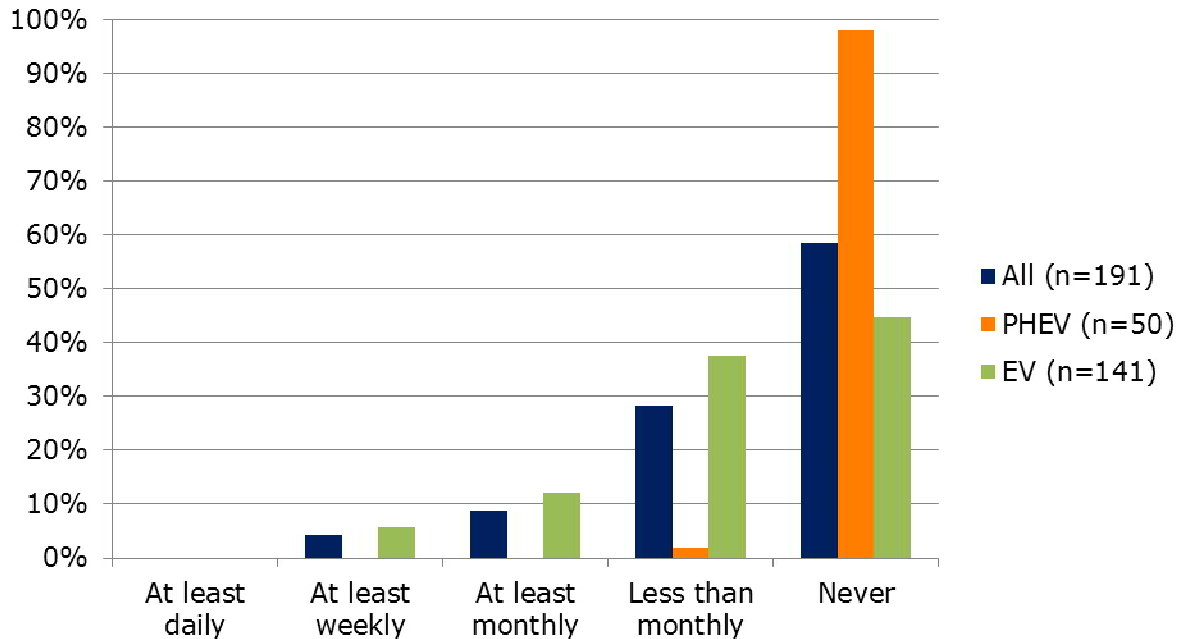
**Figure 6-11. PRIVATE: Proportion of respondents using off-street and on-street charging by PiP scheme membership (n=191; all who knew whether they were members of a PiP scheme)**

### 6.3.3 Use of rapid charge points

Figure 6-12 shows that 59% of private respondents had no experience of using rapid charge points (which charge 80% of the battery in less than half an hour), and that EV owners were much more likely than PHEV owners to have used such a charge point (55% of EV owners had used one, compared to just 2% of PHEV owners). Of those respondents who had made use of a rapid charge point, this tended to be once a month or less frequently.

*"I amongst others was invited to Silverstone to get the new world record, which we got, for the most electric vehicles in one place at one time and they had them*

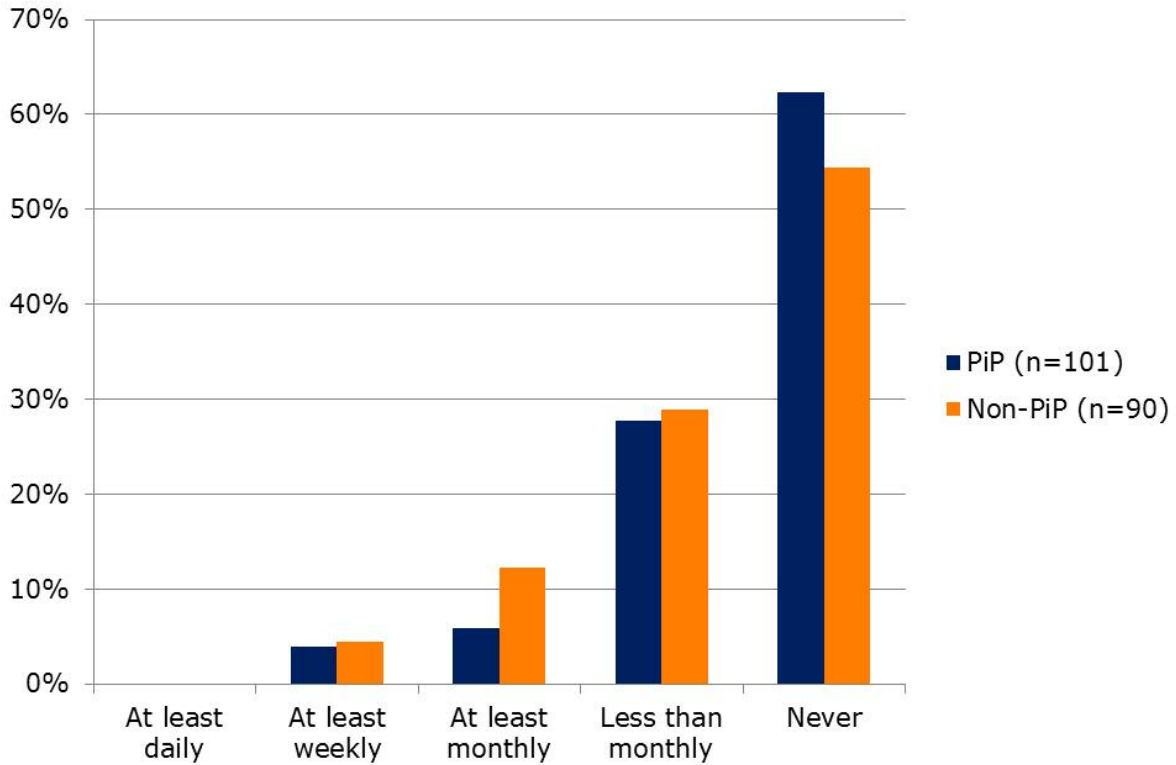
*[rapid charge points] for all the cars there, so I used that, but that was only once.” Private EV purchaser*



**Figure 6-12. PRIVATE: Frequency of use of rapid charge points, by vehicle type (n=191; all who knew frequency of rapid charge point use)**

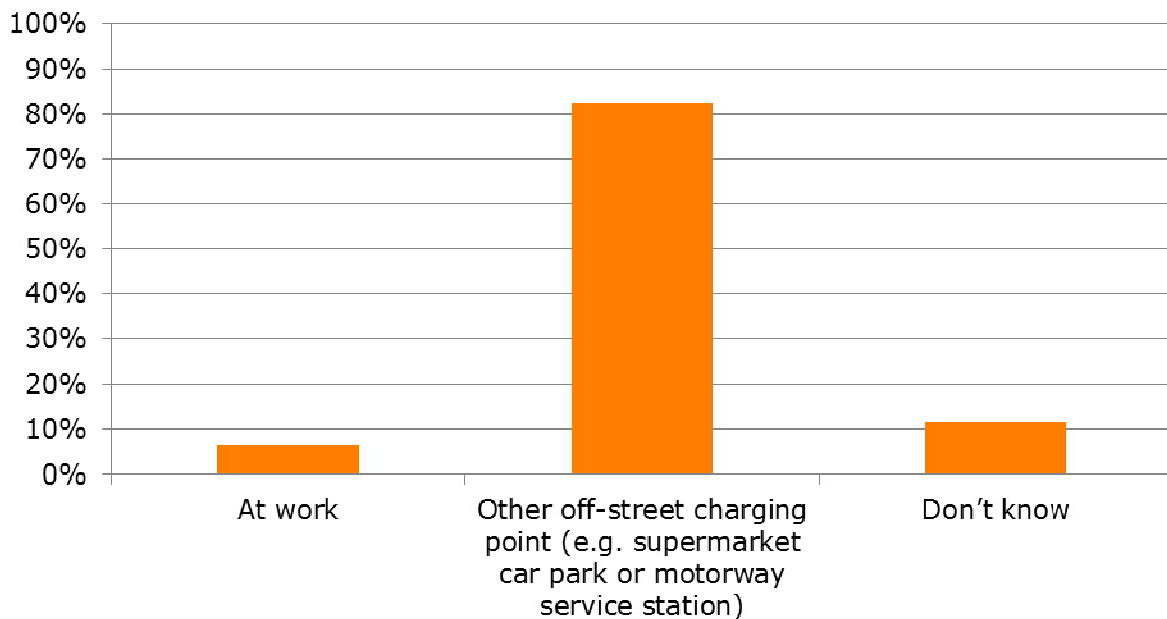
Figure 6-13 shows the frequency of rapid charge point use by whether the respondent was based in a PiP scheme area or not. Whilst 46% of respondents from a non-PiP scheme area had experienced using a rapid charge point, this was the case for only 38% of those from a PiP scheme area. Those who had used a rapid charge point tended to do so infrequently.





**Figure 6-13. PRIVATE: Proportion of respondents who had used a rapid charge point, by PiP area and frequency (n=191; all who knew frequency of rapid charge point use)**

Figure 6-14 shows the location of respondents' nearest charge points. Over 80% of those who had used a rapid charge point stated that their nearest rapid charge point was not at work but at an 'other' off-street charging location, such as a supermarket car park or motorway service station.



**Figure 6-14. PRIVATE: Location of nearest rapid charge point (n=79; all who had used a rapid charge point)**

### 6.3.4 Barriers to use/misperceptions about public charging infrastructure

Barriers to use of public charging infrastructure related to the location of public charge points, a lack of interoperability between providers and limited means of accessing information about charge point locations.

Respondents perceived that charging infrastructure was impractically located and not as widespread as they had expected it to be. A desire for more rapid charge points 'en route' (particularly at motorway service stations) was evident, along with a suggestion that 'destination charging', for example at restaurants and hotels, would be useful:

*"What I would like to be able to do, obviously, is to have more destination charging. So, when I go to places, it would be nice to plug in if I'm stopping there for a while."* Private PHEV purchaser

Participants felt that the various charge point providers had inconsistent arrangements. For example, members of one charge point scheme could not, or did not know whether they could, use charge points belonging to another provider. Respondents also criticised the inconsistency in the cost of membership of the different schemes:

*"One of the problems with charging is that there are so many different firms doing it. I've got a whole fistful of different swipe cards from different firms, and they need to be unified, and they need to be unified in terms of plug. It's no good arriving at a place and then find it's the wrong plug for your car."* Private EV purchaser

Respondents perceived that information about the location of charge points was not always readily available, or up-to-date – generally, respondents stated that they had expected a central directory to exist with the precise location of each charge point so that they could easily find one in a new area, if needed. However, such a directory is not always available to members of the public.

*"And the fact that they are all disjointed, and I just don't understand, because somebody somewhere could just do a database of the postcodes of all the fast chargers, it is just bonkers."* Private EV purchaser

In addition, it was mentioned that charge points can be difficult to locate even if you are in the correct area, particularly in car parks:

*"They're not signposted, so sometimes you will see that there's an EV point in a car park when you come out, because they've put it on the exit, but there's no signposting as to where it is."* Private PHEV purchaser

Malfunctioning charge points had been encountered by certain respondents; user experiences also included charge points which were either in use by another EV, or which had an ICE vehicle parked in the charging bay:

*"It's just getting the information about where the charging points are is the hardest part and also getting information about whether the charging point will work for you or whether it won't. Until you get there it seems to be a bit hit and miss."* Private PHEV purchaser

*"The police usually park in that because it's a free parking bay. And I thought, ooh, it would have been just lovely if I'd come and the police were sitting there."* Private EV purchaser

## 7 The future

### 7.1 The future for our respondents and their EVs

Participants who were involved in the qualitative research strand were asked to describe what they thought the future held for EVs. They were asked to talk about the future for them personally and at a more general level, what they thought could be done to increase the uptake of EVs and who should be responsible. In general, both private and organisational respondents who had purchased EVs were optimistic about the future of their EVs. This optimism was grounded in the perception that although there were limitations (largely centred on range and availability of public charging infrastructure), their EVs seemed to fit with their lifestyle or their organisation's needs well enough that it could commit to the technology.

#### 7.1.1 How long will they keep their EV?

Private respondents and purchasers from smaller organisations generally tended to see the ownership of their EVs as a long-term commitment. Many of the retired respondents felt that the EV they had purchased was likely to be the last vehicle they would purchase owing to their low mileage and their life expectancy.

*"You've got to change your mind-set that if you can have one of these cars, you really have got to keep it for a few years to make it as cost effective as possible... I have no plans at all to get rid of it in the short term, I like it too much."* Private EV purchaser

Respondents were asked whether they would consider purchasing EVs in the future. There was generally a positive response from both private and organisational respondents.

*"Yes I would [buy another EV]...because I just believe in the electric story, I think that's where we've all got to go."* Private EV purchaser

*"We have just renewed our van fleet, we have gone for outright purchase of about 50 vehicles, had there have been an electric commercial van fleet on the market that was tried and tested, we would have gone down that route."* Organisational EV purchaser

Only one private respondent said that he would be looking to sell his EV in the very near future because it had not met his expectations. He explained that his EV did not meet his transport needs (largely as a result of range anxiety) and this resulted in him deciding to sell the vehicle. Below is an extract from the joint interview:

*Interviewer: "How long do you expect to keep your EV for?"*

*Male respondent: "Probably another month."*

*Female respondent: "A couple of weeks."*

*Male respondent: "I'm going to make such a loss on it."*

*Female: "Well that's the other issue. We're going to take a huge loss, investing in something, so why would anyone buy these cars with this huge hit on depreciation?"* Private EV purchasers (joint interview)

As discussed in section 4.5.1, one organisational respondent said that his organisation would not be pursuing their interest in EVs in the future. This decision was based on the

proposed changes to company car tax rates rather than as a result of any vehicle-specific features.

## 7.2 The future for EVs (increasing uptake)

Several key areas for increasing EV uptake were suggested by both private and organisational respondents (including users and dealers). These relate to overcoming the barriers identified in sections 5.4 and 6.3 and can be summarised as follows:

- **Purchase price reduction** - For many respondents, it was felt that purchase price was a fundamental barrier to the uptake of EVs. Typically, comparisons were made between ICE vehicles and EVs and it was felt that the difference in price was too great. Respondents suggested that closer alignment of EV purchase prices with those of ICE vehicles would enable more people to be in a financial position to purchase EVs in the future.
- **Improvements to vehicle technology (batteries and range)** - It was felt that if EVs were available with a higher range (ideally up to 150 miles), they would then become a more feasible transport option for potential purchasers. Respondents thought that it was the responsibility of manufacturers and battery developers to work towards developing this technology.
- **Improvements to charging infrastructure (locations and types of chargers available)** - At the time of this research, charging infrastructure was not important to many respondents when deciding to purchase an EV, but the study found that it became more important post-purchase. This shift in importance was acknowledged by respondents who felt that improvements to the available charging infrastructure might increase EV uptake. Respondents thought that by giving potential purchasers the confidence that publicly available infrastructure could support their transport needs, potential purchasers who were concerned about range would be more likely to consider EVs. One of the specific suggestions to improve the charging infrastructure was to provide destination charging with rapid charge points (i.e. rapid charge points available at destinations such as hotels, restaurants, or at service stations), which would contribute to making EVs more suited to the mass market.
- **Consistency among/between charging infrastructure providers** - A frustration expressed by those respondents who were members of more than one public charging scheme was that each scheme appeared to operate differently and caused them confusion which led to a lack of faith in the schemes. The data suggest that by better aligning or integrating features of public charging schemes (such as registration fees and accessibility), future EV purchasers will be able to have confidence about using public charge points. The Government requires that all charge points installed with the benefit of their funding have "pay as you go" functionality, which should address this somewhat.
- **Provision of accurate directories for public charge points** - It was felt that by providing all EV users with information about the comprehensive directories (currently held by the Government) of public charge points available online (which are underpinned by data from the centralised Government National Chargepoint Registry database), potential purchasers could access information about charge point locations which would give them confidence that the

infrastructure was available, reliable and accessible. Private sector organisations should be encouraged to add the details of their charge points to ensure that these directories remain accurate.

- **Better education and accurate information about EVs** – Both EV purchasers and non-purchasers thought that the information available about EVs at the time of this research was not necessarily accurate or reliable. It was suggested that activities to dispel the myths currently associated with EVs may serve to encourage people to consider EVs in the future. The Government plans to launch a Government or industry communications campaign in the autumn to address this.
- **A desire for reassurance that others have had successful experiences with EVs** – Respondents suggested that the general public might be hesitant to be 'the first' to engage with new technology. As such, they felt that it may be helpful for potential purchasers to be provided with feedback and experiences from users both in a private and organisational context.

## 8 Conclusions

### 8.1 The role of the PiCG in EV take-up

Related to the aim of providing a better understanding of the role of the PiCG in the uptake of EVs, it can be concluded that **the PiCG plays an important role in EV purchase decisions.**

The data gathered in both the quantitative and qualitative research strands suggest that the PiCG is effective in supporting both individuals and organisations in their decision to purchase EVs; it was particularly important for private purchasers and purchasers from smaller organisations for whom financial considerations were key. For others, although not initially aware of the PiCG when first considering an EV, it came as a welcome incentive which supported their decision.

The qualitative data suggest that the 'early adopter' EV purchasers taking part in this research considered that the PiCG amount is sufficient to improve the attainability of an EV.

**A lack of awareness of the PiCG was demonstrated by many non-EV purchasers,** despite many of them fitting the demographic profile of the EV purchaser sample. EV purchasers themselves were not aware of the PiCG website.

### 8.2 The role of the PiP scheme in EV take-up

Related to the aim of providing an assessment of the impacts of the PiP scheme on purchasing, driving and charging behaviour, it can be concluded that **awareness of the PiP scheme itself was varied and unlikely to influence the purchase of a vehicle.**

PiP schemes were considered to be 'very' or 'fairly' important for less than half of both private and organisational respondents in their decision to purchase (an) EV(s). Respondents across all groups demonstrated a lack of awareness of PiP schemes irrespective of whether they lived in a PiP scheme area or not.

For respondents who were aware of the PiP scheme and who had registered as members, **the lack of compatibility between different charge point providers was confusing and frustrating.**

Both private and organisational EV purchasers and users expressed **a desire for there to be a more 'useable' network of public charge points.** It was felt that if charge points could be provided at strategic locations (such as motorway service stations) and destinations (such as hotels or restaurants) where EV users could re-charge quickly (using rapid charge points), this would facilitate EV users in undertaking longer journeys than they were currently able to. However, one concern raised by respondents related to the potential degrading effects of repeated rapid charging on battery performance and life. This remains an unanswered question.

## 8.3 Barriers and motivators to EV purchase

### 8.3.1 Key barriers to EV purchase

**A lack of knowledge about EVs was identified as one of the main barriers to EV take-up.** This related to all aspects of purchasing and using EVs (e.g. purchase costs, running costs, financial incentives, range, variations in vehicle technology, available models, and charging routines and infrastructure).

Many of the non-EV purchasers (both private and organisational) explained that they had not given any consideration to purchasing or leasing an EV as a result of these knowledge gaps.

**Range was identified as another key barrier to EV purchase** (specifically for EVs rather than PHEVs – many PHEV users reported choosing a PHEV over an EV as it alleviates range concerns). Non-EV purchasers were concerned about the range that EVs could offer and EV purchasers acknowledged that their own EV range had presented challenges for them as users, with the achievable range being lower than they had expected at the time of purchase.

**The purchase cost** of EVs was considered to be too high; even with the reduction offered by the PiCG, EVs were often deemed to be unaffordable. By reducing the purchase cost and maintaining the PiCG's current value, it was felt that EVs could be more affordable to potential purchasers.

### 8.3.2 Key motivators to EV purchase

**There were three key reasons for deciding to purchase an EV over an equivalent ICE vehicle:**

- **Fuel savings** offered by using electricity rather than petrol or diesel.
- The opportunity to engage with **new technology**.
- **Environmental factors** – these were key for some EV purchasers, but for others the environmental benefits were a favourable by-product of EV ownership rather than a key driver.

**Test drives were identified as an important step in the decision making process.**

For many of the qualitative respondents, test drives were described as the 'tipping point' in their decision to purchase because this was the point when they were provided with the opportunity to experience the features that set EVs aside from ICE vehicles, and any concerns relating to poor performance of EVs were dispelled.

## 9 Recommendations and future research

Recommendations are made relating to the role of the PiCG and PiP schemes in EV uptake, overcoming the barriers associated with EV purchase and maximising the effectiveness of motivators to purchase. Also presented in this section is a summary of the recommendations for future research.

### 9.1 The role of the PiCG and PiP schemes in EV uptake

Consideration should be given to:

- **Developing a marketing strategy to publicise the PiCG** and resources related to it (e.g. the OLEV website describing the PiCG).
- **Harmonising charging providers and schemes** to make the use of public charge points more appealing and straightforward for current and potential EV users.
- **Improving the public's access to existing centralised directories of public charge points** (currently held by the Government), to provide a definitive source of key information for EV users (including charge point location, whether they are operational and what type of charging they provide – standard, fast or rapid).
- Further **investigation of the potential battery degradation** effects of repeated rapid charging. This is an unanswered question of concern to EV users and relates to the installation of rapid charge points.

### 9.2 Overcoming the barriers associated with EV purchase

Consideration should be given to:

- The opportunities presented by key industry players to **develop a united voice to educate and inform** the public. Knowledge may also be increased through marketing campaigns, working with the media to produce documentaries or television features (perhaps with the support of an 'EV ambassador'), and newspaper or magazine articles. This would help to increase knowledge and dispel the myths surrounding EVs as well as communicating the benefits of EV ownership.
- **Overcoming purchaser concerns about the achievable range of EVs**, by ensuring that manufacturers publish guidance on the limitations of the stated range<sup>20</sup>. In the longer term, this issue may be addressed by improvements to vehicle technology (i.e. improved batteries leading to greater range).

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<sup>20</sup> Current EU test cycles (the results of which determine the advertised EV range) are not necessarily representative of typical journeys (e.g. ancillary equipment such as climate control are not used during the tests and the standardised driving cycle is a simplified model of real driving patterns, which are much more transient).



### 9.3 Maximising the effectiveness of motivators to purchase

Consideration should be given to:

- Ensuring that future marketing campaigns related to EVs **focus on the potential long term cost-savings** related to purchaser return on investment.
- **Providing potential EV purchasers with reassurance from others** who had had successful experiences with EVs, in order to increase confidence in the technology. For example, case studies from EV purchasers who have demonstrated cost-savings could be provided to illustrate the financial benefits associated with EV purchase.
- **Providing potential consumers with the opportunity to adapt to EV technology** and to better appreciate EV capabilities. EV dealerships should encourage potential consumers to undertake test drives to engage with the vehicle and EV technology. This might include extended test drives and well-publicised EV open days.
- **Encouraging manufacturers and dealers to work towards increasing EV uptake in organisations**, improving awareness of EVs and providing an opportunity for organisations to evaluate whether EVs could fit with their transport needs. Manufacturers could loan EVs to fleets which have been identified as being potentially suitable and likely to benefit from replacing ICE vehicles with EVs.

### 9.4 Recommendations supporting ongoing work

The conclusions identified in this research substantiate the work that DfT is undertaking at the time of publication of this report, including:

- **Development of a targeted public infrastructure network**, provided at destinations where it is most likely to be used, and installation of rapid charge points to minimise non-driving time.
- A **detailed evaluation of the PiP scheme** to identify successes as well as areas for improvement so that subsequent grant schemes to improve infrastructure are informed.

### 9.5 Future research

As described in section 2.5, there were a number of methodological considerations relating to the study which can be used to inform the design of future research in this field:

- Some degree of self-selection of participants in studies such as this is unavoidable. Any further research following a similar methodology should seek to increase the representativeness of the sample, for example by using demographic data gathered from purchasers at the point of sale to enable stratification of the sample.

- Deliberative<sup>21</sup> research techniques could be used to further explore the general lack of knowledge and awareness of EVs. Information provision followed by discussion with potential EV purchasers (with a range of knowledge and awareness) to undertake a more detailed exploration of the barriers associated with EV purchase. Based on the outcome of such research (i.e. which barriers could be broken down by information provision), it may be possible to determine which areas should be focused on to improve uptake of EVs.
- When asking similar questions to different respondent groups, future work should aim to improve synergy of survey items between respondent groups.

This innovative research is the largest quantitative and qualitative study of EV purchasers in the UK to date. It utilised a robust and comprehensive methodology in order to produce valid, reliable and informative outputs which will contribute to the shaping of the future EV landscape.

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<sup>21</sup> Deliberative research involves providing detailed information to participants to enable them to develop a good understanding of the issues being discussed (as well as ensuring that all participants have an equal level of understanding). Information may be presented through formal presentations; leaflets and other printed materials as well as briefing sessions describing possible scenarios. Analysis of deliberative research focuses on assessing how views change following exposure to information. Deliberative research can provide policy makers with an understanding of how the public might change their opinion and/or behaviours if provided with relevant information.

## Acknowledgements

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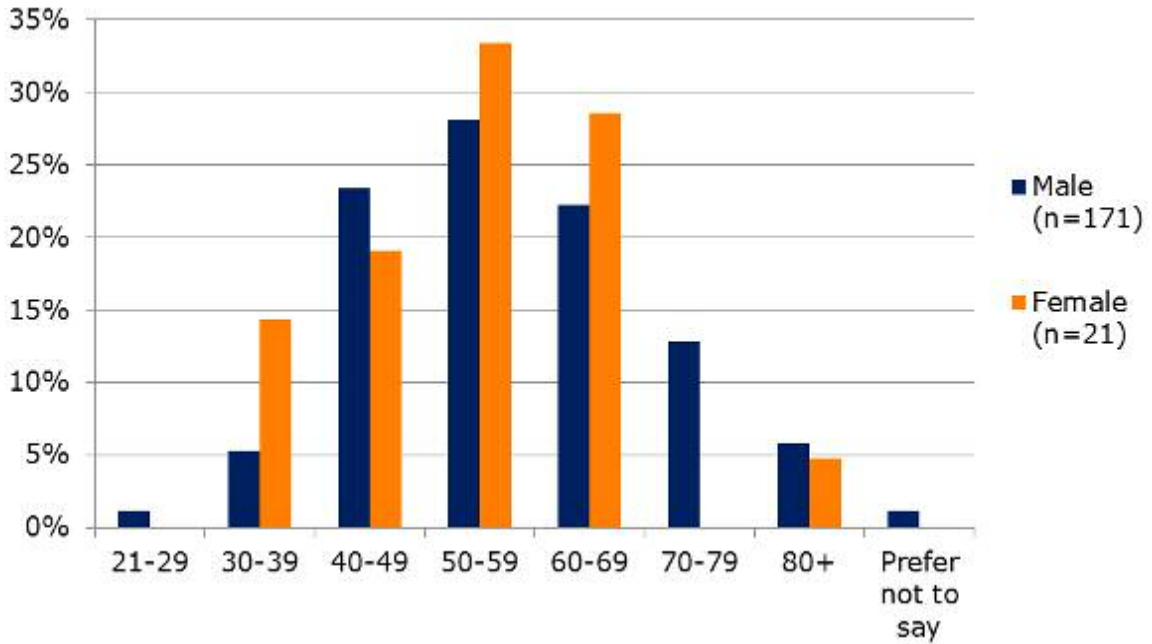
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## Appendix A Topics covered by private and organisational surveys

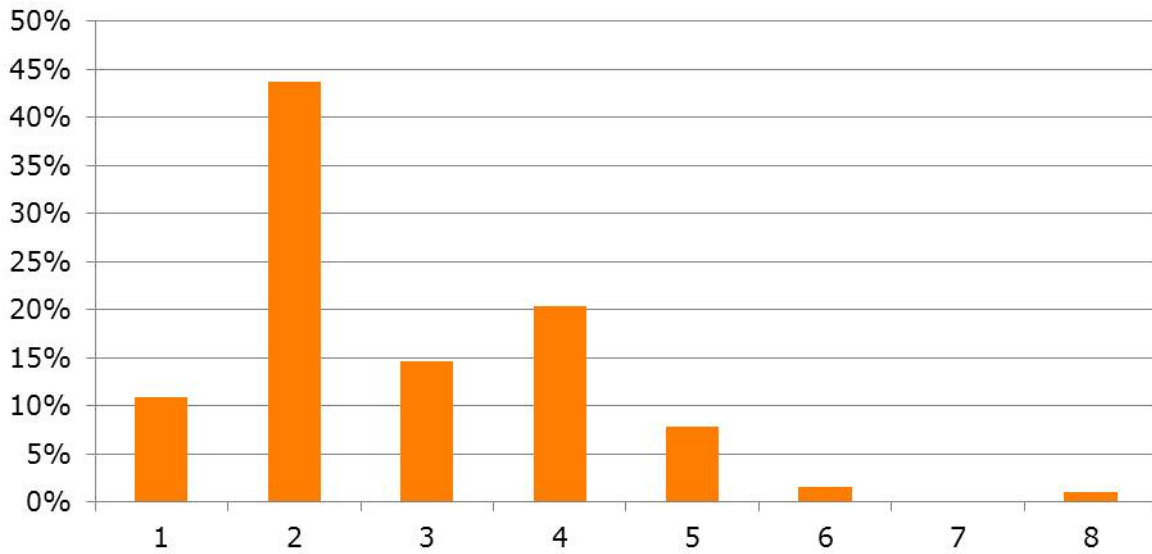
Private survey		Organisational survey	
Q1	Number of cars owned	Q1	Main activity of organisation
Q2	Whether EV is the main household car	Q2	Type of organisation
Q3	Approximate annual mileage of EV	Q3	Number of employees
Q4	Approximate annual mileage of other household car 1/2/3	Q4	Reasons for buying (an) EV(s)
Q5	Reasons for buying an EV	Q5	[If Q4=lease to customers] Number of EVs leased out to customers
Q6	Awareness of PiCG when first considering EV	Q6	[If Q4=lease to customers] Number of EVs/PHEVs
Q7	Importance of PiCG in decision to buy EV	Q7	[If Q4=lease to customers] Type(s) of organisations leased to
Q8	Importance of public charge point availability in decision to buy EV	Q8	[If Q4=lease to customers] Role in deciding to buy EV(s)
Q9	Journey types made in EV in last three months, with journey frequency	Q9	[If Q4=for use by employees] Number of EVs used by employees
Q10	Journeys made on motorways/A roads in last three months, with journey frequency	Q10	[If Q4=for use by employees] Number of EVs used by employees which are pool cars
Q11	Frequency with which EV was not suitable for a journey in last three months	Q11	[If Q4=for use by employees] Number of EVs used by employees which are assigned to an individual
Q12	[Depending on Q11 response] Length of trip for which EV was not suitable	Q12	[If Q10>0] Number of pool cars which are EVs/PHEVs
Q12	[Depending on Q11 response] Mode of transport used for trip for which EV was not suitable	Q13	[If Q11>0] Number of EVs assigned to an individual which are EVs/PHEVs
Q13	Charge point at home specifically for charging EV	Q14	[If Q4=for use by employees and Q10>0] Role in buying pool car(s)
Q14	Member of a scheme giving access to public charge points	Q15	[If Q4=for use by employees and Q11>0] Role in buying EV(s) assigned to an individual
Q15	Charging routine (dependency on battery level for charging)	Q16	[If Q4=for use by employees] Reasons for buying (an) EV(s) for use by employees

Q16	[Depending on Q16 response] Time of day charging generally starts	Q17	Organisational awareness of PiCG when first considering EV(s)
Q17	Frequency of charging, generally	Q18	Importance of PiCG in organisation decision to buy (an) EV(s)
Q18	Frequency of charging at home, at work, off-street, on-street	Q19	Importance of public charge point availability in organisation decision to buy (an) EV(s)
Q19	Use of Economy 7/equivalent tariff	Q19	Importance of public charge point availability in organisation's use of EV(s)
Q20	Frequency of use of rapid charge point	Q20	Organisational membership of a scheme giving access to public charge points
Q21	[Depending on Q21 response] Location of nearest rapid charge point	Q21	Charge points installed on site
Q22	Age	Q22	[If yes to Q21] Grant/financial contribution to install charge point on site
	Gender	Q23	[If yes to Q21] Type of charge point installed on site
Q23	Highest level of education	Q24	[If Q4=for use by employees] Frequency of EV use by employees in last three months
Q24-33	Social grade questions	Q25	[If Q4=for use by employees] Typical EV or PHEV annual mileage
Q34	Length of time in current home	Q26	[If Q4=for use by employees] Typical EV and PHEV annual mileage
Q35	Number of people in household	Q27	Has respondent personally driven the EV
Q36	Number of children in household	Q28	[If Q4=for use by employees] Employees raised range concerns
Q37	Any health issues that make it difficult to go out on foot/use buses/get in or out of a car	Q29	[If Q4=for use by employees] Employees avoided journeys due to range concerns
Q38	Any health issues that make it difficult to ride a bike	Q30	[If Q29=yes] Mode of transport used for trip for which EV was not suitable
Q39	Important factors in buying ICE car/van	Q31	Charity donation choice
Q40	Agreement with statement on cycle paths	Q32	Participation in further research
Q41	Charity donation choice		
Q42	Participation in further research		

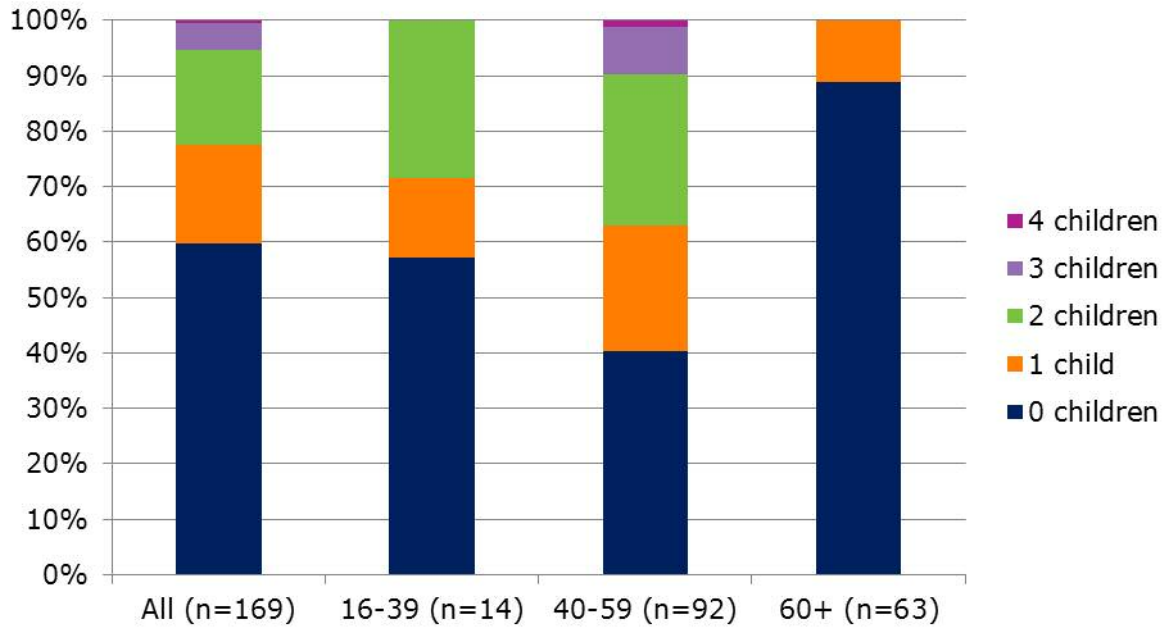
## Appendix B Respondent sample graphs



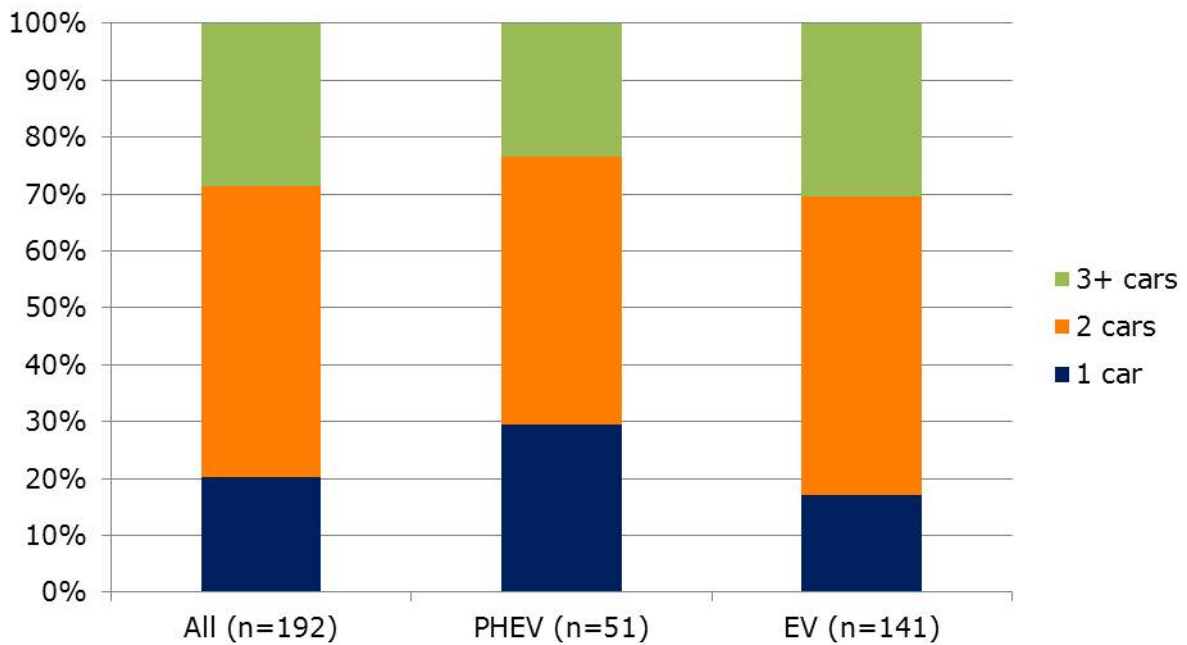
**Figure B-1. PRIVATE: Age and gender of respondents (n=192)**



**Figure B-2. PRIVATE: Number of household members (n=192)**

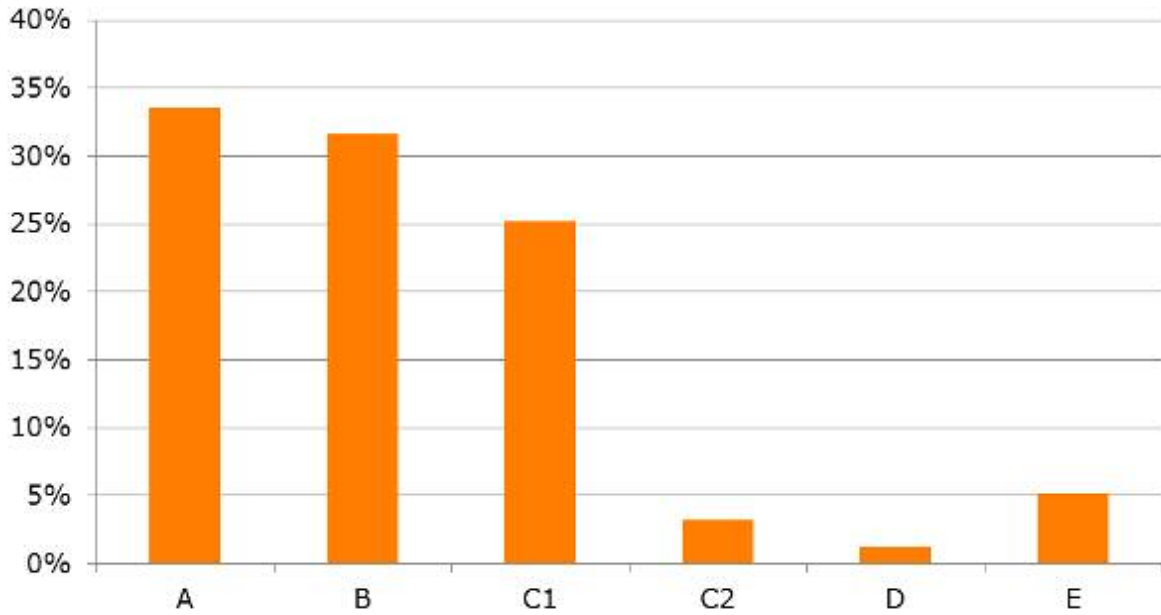


**Figure B-3. PRIVATE: Number of children aged 16 or less, by respondent age (n=169; all households of two or more members who gave their age)**

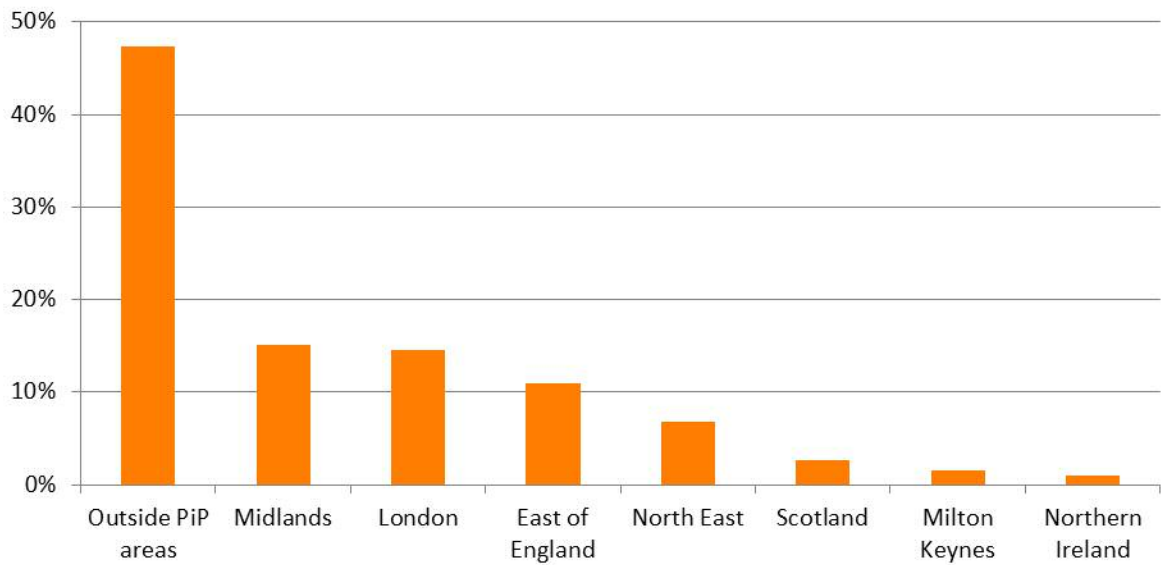


**Figure B-4. PRIVATE: Number of household vehicles, by type of EV**

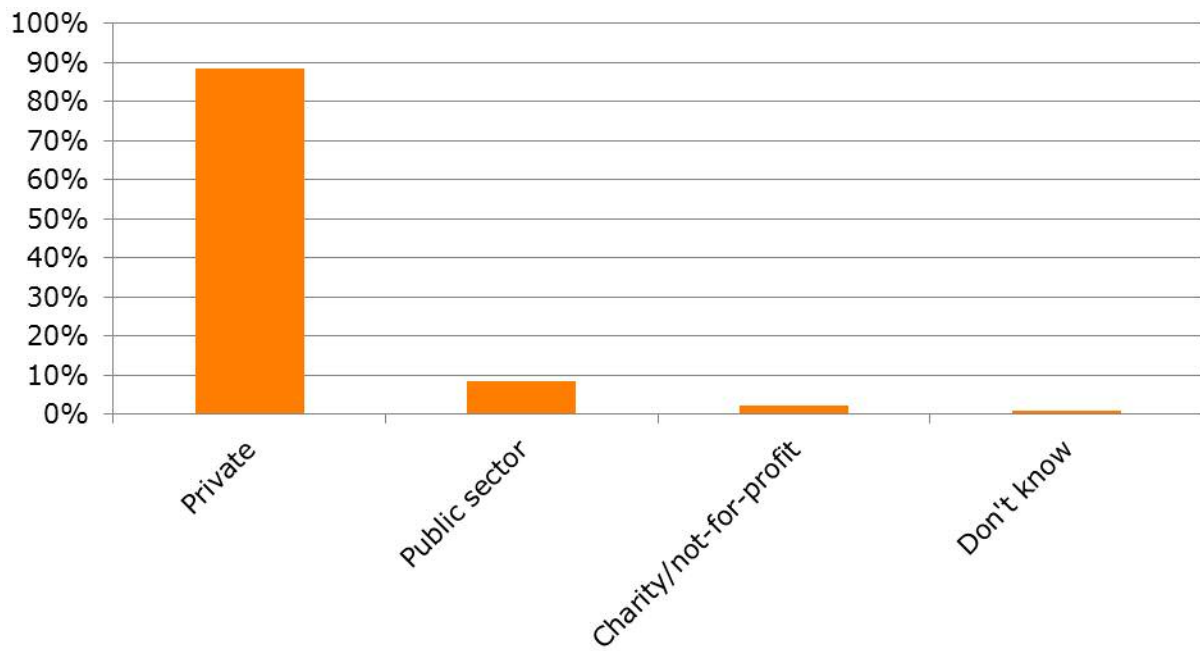




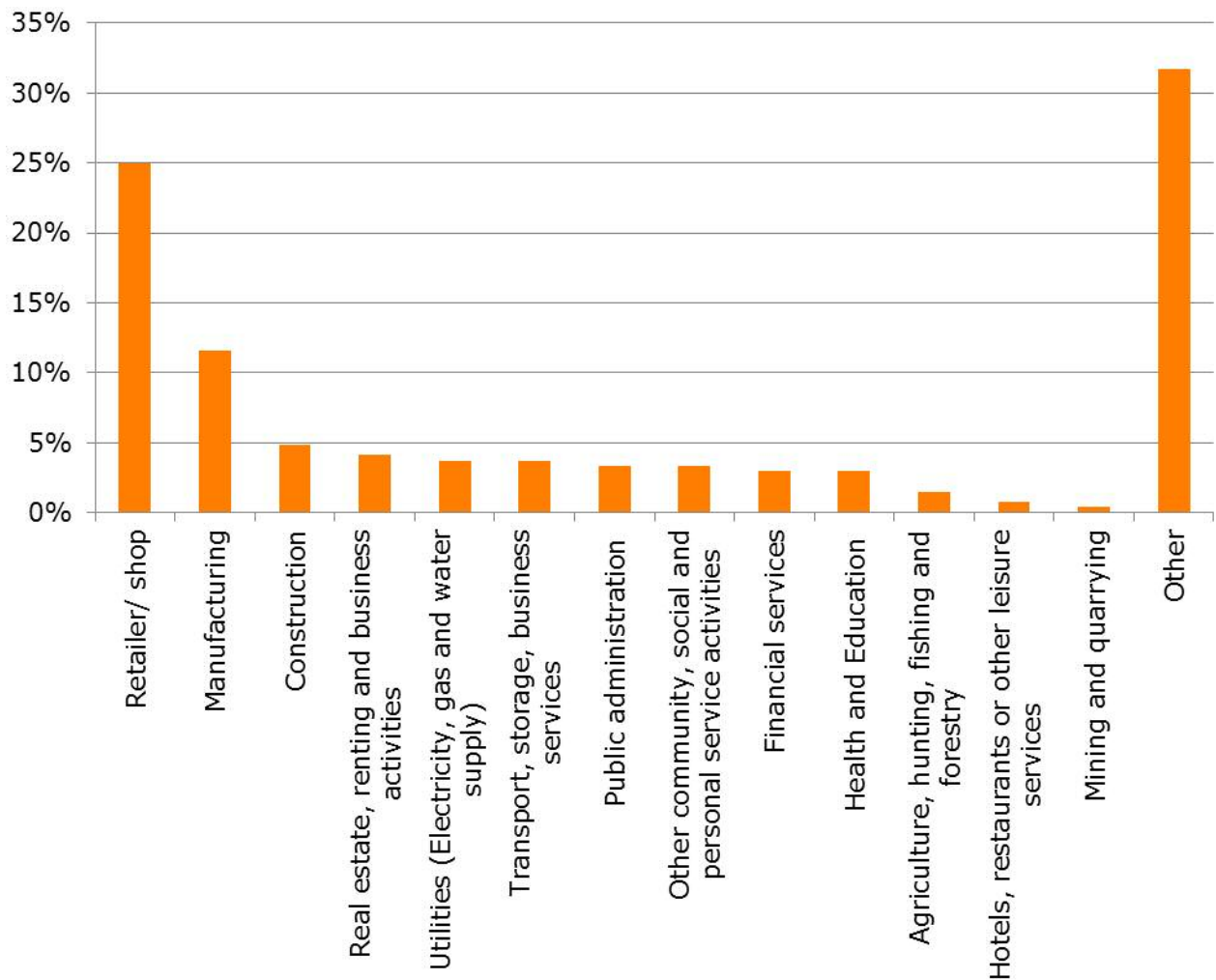
**Figure B-5. PRIVATE: Social grade of respondents (n=155; all telephone respondents)**



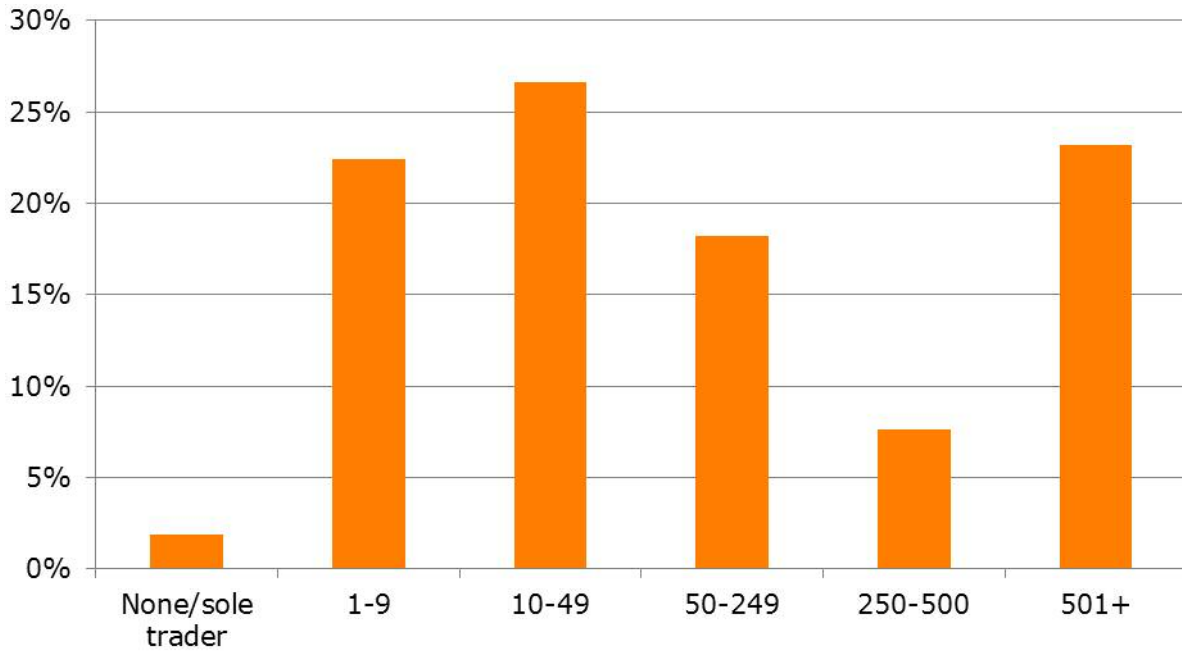
**Figure B-6. PRIVATE: Respondent PiP scheme areas (n=192)**



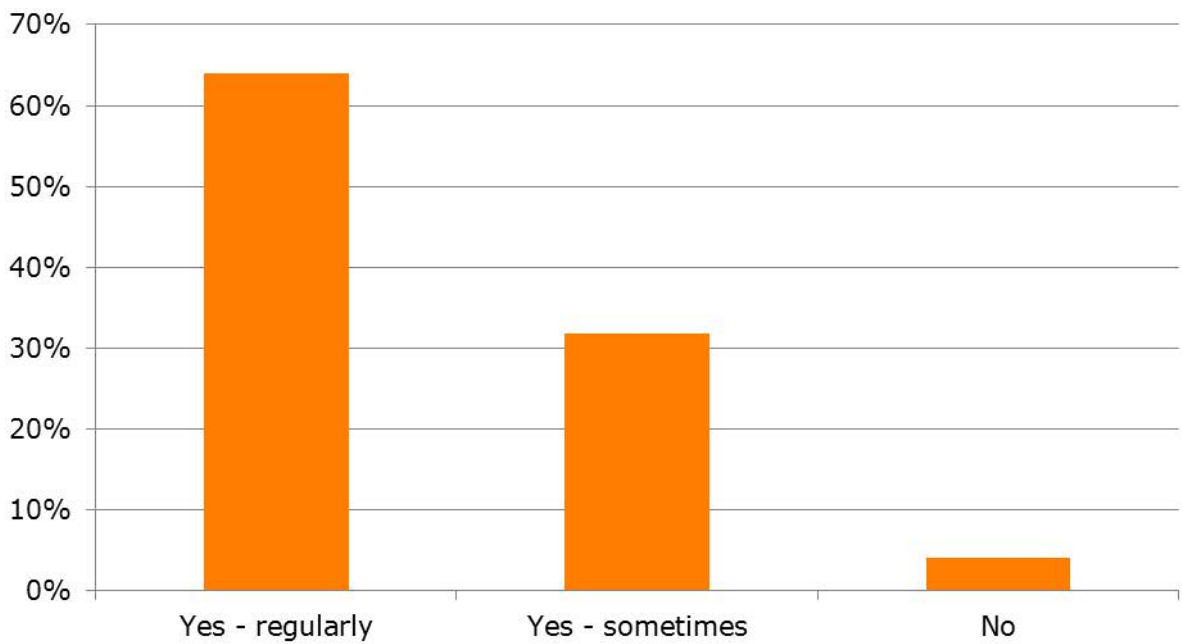
**Figure B-7. ORGANISATIONS: Type of organisation (n=329)**



**Figure B-8. ORGANISATIONS: Activities of participating organisations (excluding dealers) (n=268)**



**Figure B-9. ORGANISATIONS: Number of employees excluding dealerships (n=263)**



**Figure B-10. ORGANISATIONS: Respondents who had personally driven the EV (n=242)**

## Appendix C Private quantitative survey

### Blue: CAWI script

### Red: CATI script

Good morning/afternoon/evening, my name is ..., and I am calling on behalf of TNS-BMRB, an independent social research company. We are carrying out a telephone survey for the Department for Transport, or DfT about electric cars, and you should have recently received a letter informing you about the research.

According to DfT records, you recently bought a **< TEXT SUBSTITUTION BASED ON SAMPLE – plug-in hybrid electric car/ electric car>** and received the government Plug-in Car Grant (PiCG). We are interested in exploring your views and experiences of buying and using an electric car. As a thank-you for taking part, we will be donating £10 to a charity of your choice (NSPCC, RSPCA or Friends of the Earth).

IF NECESSARY: The interview should take around 15 minutes. It will be conducted in accordance with the rules of the Market Research Society. We guarantee that all your answers will be kept confidential. The Department for Transport will not be able to identify any individual or business from their answers.

### INITIAL OUTCOME PRE SCREENER

Yes – CONTINUE

No, but want to take part – MAKE APPOINTMENT OR GENERAL CALLBACK

No, don't want to take part – CLOSE AND CODE AS REFUSED

Don't recall letter/ need reassurance – RESEND LETTER IF NECESSARY

Soft refusal (i.e. too busy) – SEND EMAIL WITH LINK

Plus usual list of other outcome codes (e.g. wrong number)

### EMAIL SCREEN

If you are too busy to take part over the phone, the survey is also available to complete online. Would you be able to give me your email address and I can send you a link?

#### IF WE HAVE EMAIL ADDRESS ON THE SAMPLE:

Can I email you a link?

Yes

No – SOFT REFUSAL

#### IF YES AT PREVIOUS QUESTION:

Can I just double-check your email address is [EMAIL ADDRESS FROM SAMPLE]?

Yes

No – ENTER CORRECT EMAIL ADDRESS

IF WE DON'T HAVE EMAIL ADDRESS ON THE SAMPLE:

Would you be able to give me your email address and I can send you a link?

Enter email

Refused – SOFT REFUSAL

Enter email

Refused

Thank you for agreeing to take part in this research. We are interested in exploring your views and experiences of buying and using an electric car. As a thank-you for taking part, we will be donating £10 to a charity of your choice (NSPCC, RSPCA or Friends of the Earth).

Please use the arrow buttons to navigate your way through the survey. If you have any questions, or problems as you are going through the survey, please contact our helpline on **Freephone 0800 0155655** (please note, calls from mobile telephones may be charged, please consult your network provider for details) or e-mail us at [electric.cars@tns-online.com](mailto:electric.cars@tns-online.com)

## **PURCHASE AND USE OF THE CAR**

**To start off with, I'd like to begin by asking you some questions about the cars your household owns or has regular use of and specifically what factors encouraged you to buy an electric car.**

**1. In total, how many cars does your household own or have regular use of at present?**

**INTERVIEWER: exclude cars that are declared SORN (i.e. that have no tax or MOT)**

**IF NECESSARY: That is including your < TEXT SUBSTITUTION BASED ON SAMPLE plug-in hybrid electric car/ electric car >**

1 (ie the electric car)

2

3 or more

### **IF MORE THAN 1 VEHICLE AT Q1**

**2. Is the <plug-in hybrid electric car/electric car> the main household car, that is the one that is driven most frequently in a normal week?**

Yes

No

Don't know

**3. I would like to get a figure for the approximate annual mileage of your <plug-in hybrid electric car/electric car>. Can you please estimate for me the total miles the vehicle has been driven in the last 12 months?**

**INTERVIEWER: PROMPT IF NECESSARY. IF NOT SURE:** Please give me your best estimate.

**If you purchased the vehicle less than a year ago, please enter your expected mileage**

**IF VEHICLE ACQUIRED LESS THAN A YEAR AGO - OBTAIN EXPECTED MILEAGE.**

**IF NIL ENTER 0.**

0	7000-8999
1-499	9000-11999
500-999	12000-14999
1000-1999	15000-17999
2000-2999	18000-20999
3000-3999	21000-29999
4000-4999	30,000 or more
5000-6999	<b>Don't know</b>

**ASK IF QUESTION 1 = 2 OR MORE:**

**4. I would now like to get a figure for the approximate annual mileage of the other vehicles in your household. Can you please estimate for me the total miles that (ADD IF Q1=3 or MORE <each of>) the other car(s) in your household have been driven in the last 12 months?**

**INTERVIEWER: PROMPT IF NECESSARY. IF NOT SURE:** Please give me your best estimate. REPEAT FOR EACH ADDITIONAL VEHICLE (UP TO THREE CARS)

**If you purchased the vehicle less than a year ago, please enter your expected mileage**

**OBTAIN EXPECTED MILEAGE IF VEHICLES ACQUIRED LESS THAN A YEAR AGO. IF NIL ENTER 0.**

0	
1-499	7000-8999
500-999	9000-11999
1000-1999	12000-14999
2000-2999	15000-17999
3000-3999	18000-20999
4000-4999	21000-29999
5000-6999	30000 or more

**Don't know****OTHER VEHICLE TWO**

0	
1-499	7000-8999
500-999	9000-11999
1000-1999	12000-14999
2000-2999	15000-17999
3000-3999	18000-20999
4000-4999	21000-29999
5000-6999	>30000

**Don't know****Not applicable****OTHER VEHICLE THREE**

0	
1-499	7000-8999
500-999	9000-11999
1000-1999	12000-14999
2000-2999	15000-17999
3000-3999	18000-20999
4000-4999	21000-29999
5000-6999	>30000

**Don't know****Not applicable**

**ASK ALL**

- 5. What were the reasons why you decided to buy a <plug-in hybrid electric car/electric car>, rather than a car powered solely by petrol or diesel?**

**INTERVIEWER: DO NOT PROMPT OR PROBE – ASK “ANY MORE?” UNTIL NO MORE ANSWERS. CODE CLOSEST FOR ALL THAT APPLY**

Government Plug-In Car Grant / electric car Grant / Grant (any mention)

London congestion charge; No road tax/vehicle excise duty (VED)

To save money on fuel; petrol/diesel is expensive

Availability of public charging points / Plugged in Places

Electric cars better for the environment/greener

Climate change/global warming/CO2 emissions

Oil dependency/to reduce dependency on oil

Traffic pollution/air quality/traffic pollution bad for people’s health

Noise; electric cars quieter; petrol/diesel cars noisier

Like new technology; electric cars new/exciting/fun

More options of electric cars became available

Other

Don’t know

**ASK ALL**

- 6. When you first considered buying a new car were you aware of the Government Plug-in Car Grant?**

Yes

No

Don’t know

**ASK ALL**

- 7. How important was the Government Plug-In Car Grant in your decision to buy a <plug-in hybrid electric car/electric car>. Was it... **READ OUT** ...?**

Very important

Fairly important

Not very important

Not at all important

**ASK ALL**

- 8. How important was the availability of public charging points in your decision to buy a <plug-in hybrid electric car/electric car>. Was it ... **READ OUT**?**

Very important

Fairly important



Not very important

Not at all important

**9. I'd now like to talk about how you use your electric car. Thinking about the last three months, which of the following types of journey have you made in your <plug-in hybrid electric vehicle/electric vehicle>. **READ OUT CODE ALL THAT APPLY****

Driving to or from work, including dropping other members of your household at work **INTERVIEWER: INCLUDE VOLUNTARY WORK**

Business trips or driving as part of your working day

Taking members of the household to a school, college or other place of education (if not part of your regular commute to work)

Food or grocery shopping including going to the supermarket

Visiting friends or relatives

A holiday or day trip

Other leisure activities (e.g. going to the cinema or out for dinner)

Other personal journeys for example trips to the doctor or hairdresser

**ASK Q9a and 9b FOR EACH TYPE OF JOURNEY MADE IN LAST 3 MONTH**

**9a. So, thinking about <INSERT JOURNEY TYPE> how often do you use your <plug-in hybrid electric vehicle/electric vehicle> for this type of journey? Do you use it .... **PROMPT IF NECESSARY****

**INTERVIEWER: DO NOT ASK DRIVING TO OR FROM WORK OR BUSINESS TRIPS IF RESPONDENT HAS INDICATED THEY DO NOT WORK**

At least once a day

Less than once a day, but at least 3 times a week

Once or twice a week

Less than once a week but more than twice a month

Once or twice a month

Less than once a month

DO NOT READ OUT: Don't know

**9b. Thinking about the MOST RECENT trip for [TYPE OF TRIP UNDERTAKEN AT Q9] in your <plug-in hybrid electric vehicle/electric vehicle>, roughly what was the total distance of the journey? That is for the round trip. IF NECESSARY: By 'round trip' I mean there and back.**

INTERVIEWER: **DO NOT ASK DRIVING TO OR FROM WORK OR BUSINESS TRIPS IF RESPONDENT HAS INDICATED THEY DO NOT WORK**

IF NOT SURE: Your best estimate will do.

[ENTER DISTANCE IN MILES]

Don't know

**10. And again, thinking about the last three months, how often have you used your <plug-in hybrid electric car/electric car> on the following types of road? **PROMPT IF NECESSARY****

**IF ROAD TYPE USED IN LAST 3 MONTHS**

	<p>READ OUT OPTIONS</p> <ol style="list-style-type: none"> <li>1. At least once a day</li> <li>2. Less than once a day, but at least 3 times a week</li> <li>3. Once or twice a week</li> <li>4. Less than once a week but more than twice a month</li> <li>5. Once or twice a month</li> <li>6. Less than once a month but at least once in the last three months</li> <li>7. Not at all (in the last three months)</li> </ol>
Motorways	
Major A-roads	

**11. Thinking about the last three months, how often have you used a different vehicle or mode of transport because you felt your <plug-in hybrid electric car/electric car> was not suitable for a journey? **PROMPT IF NECESSARY****

At least once a day

Less than once a day, but at least 3 times a week

Once or twice a week

Less than once a week but more than twice a month

Once or twice a month

Less than once a month but at least once in the last three months

Not at all (in the last three months) – GO TO Q14

DO NOT READ OUT: Don't know

**ASK Q12-13 IF USED DIFFERENT VEHICLE/MODE OF TRANSPORT IN LAST THREE MONTHS (OTHERS GOTO Q14)**

**12.a. And thinking only about the last time you felt your <plug-in hybrid electric car/electric car> was not suitable for a journey, how far was the journey in miles as a round trip? **IF NECESSARY**: Please think about your most recent such journey**

**IF NOT SURE** Your best estimate will be fine.

Please tell me the distance in miles.

Don't know

**b. And again, thinking only about the last time you felt your <plug-in hybrid electric car/electric car> was not suitable for a journey, what mode of transport did you use to complete that journey?**

**INTERVIEWER: READ OUT / PROBE AS NECESSARY**

**CODE ONE ONLY**

Privately-owned petrol or diesel car (e.g. another household car or a friend's car)

Hire-car

Taxi or mini-cab

Car from a car club (e.g. Zipcar)

Motorbike, moped or scooter

Bus

Long distance coach

Tube/metro/light rail/tram

Railway train

Other

## CHARGING THE CAR

**I'd now like to talk briefly about charging your car.**

**The next section will focus on how you charge your car**

**13. Do you have a charging point installed at your home specifically for charging your <plug-in hybrid/ electric car>?**

- Yes
- No

**14. Are you a member of a scheme that gives you access to public charging points?**

- Yes
- No
- Don't know

**15. Which of the following statements best describes how you charge your <plug-in hybrid electric car/electric car>?**

**READ OUT – CODE ONE ONLY**

1. I recharge routinely regardless of battery level
2. It depends on the battery level, I only charge when it gets low
3. Mixture of both

**IF Q15 = 1 OR 3, ASK:**

**16. When you routinely recharge your <plug-in hybrid electric car/electric car>, what time of day do you usually START to charge it?**

**INTERVIEWER: PROMPT AS NECESSARY / PROBE AS NECESSARY.**

**SINGLE CODE ONLY**

- Between 9am and 5pm
- Between 5pm and 9pm
- Between 9pm and 9am
- Varies too much to say
- Don't know

**ASK ALL**

**17. How frequently do you usually charge your <plug-in hybrid electric car/electric car>? **PROMPT IF NECESSARY****

- At least once a day
- Less than once a day, but at least 3 times a week
- Once or twice a week
- Less than once a week but more than twice a month
- Once or twice a month
- Less than once a month
- Don't know

**18. How frequently do you usually charge your <plug-in hybrid electric car/electric car> in the following locations? **PROMPT IF NECESSARY****

	At least once a day Less than once a day, but at least 3 times a week Once or twice a week Less than once a week but more than twice a month Once or twice a month Less than once a month Never Don't know
a) At home	
b) At work	
c) At another off-street charging point (e.g. supermarket car park or motorway service station)	
d) At an On-street charging point	

**IF CHARGE AT HOME the answer to 18a is 1 TO 6, ASK:**

**19. Do you use 'economy 7' or another 'time of day' tariff when charging at home? (please note: economy 7 is a tariff which provides cheap off-peak electricity during the night)**

- Yes
- No
- Don't know

**ASK ALL**

**20. How frequently do you use a rapid charging point? That is, a charging point that recharges 80% of your car's battery in less than half an hour.**

**PROMPT IF NECESSARY**

At least once a day

Less than once a day, but at least 3 times a week

Once or twice a week

Less than once a week but more than twice a month

Once or twice a month

Less than once a month but have used one at least once

Not at all

**DO NOT READ OUT:** Don't know

**IF USE RAPID CHARGING POINT**

**21. Where is your nearest rapid charging point?**

**INTERVIEWER – DO NOT PROMPT. DO NOT ENCOURAGE RESPONDENT TO GUESS. IF RESPONDENT DOES NOT KNOW, CODE AS DK.**

At work

Other off-street charging point (e.g. supermarket car park or motorway service station)

On-street charging point

Don't know

**DEMOGRAPHIC QUESTIONS**

**To finish I have a few questions about you. This is to make sure we get a range of opinions from different types of people...**

**22. How old were you on your last birthday? Were you... READ OUT AND CODE**

**FIRST THAT APPLIES**

16-20

50-59

21-29

60-69

30-39

70-79

40-49

80+

Prefer not to say

**23. Interviewer: Code gender**

**Are you..?**

**Male**

**Female**

**24. Please can you tell me what your highest level of education is? Is it**

**a...**

**INTERVIEWER: IF THE RESPONDENT'S HIGHEST QUALIFICATION IS NOT LISTED, ASK THEM TO SELECT THE CODE THEY THINK IS THE CLOSEST EQUIVALENT.**

If your highest qualification is not listed, please select the code you think is the closest equivalent.

**READ OUT AND CODE FIRST THAT APPLIES.**

- 1 University Higher Degree (e.g. MSc; PhD)
- 2 First degree level qualification (e.g. BA; BSc) including foundation degrees; PGCE
- 3 Diploma in higher education; HNC; HND; Nursing or Teaching qualification (excluding PGCE)
- 4 A level; AS level; NVQ level 3; GNVQ Advanced; or equivalent
- 5 GCSE grade A\* - C; O level; CSE grade 1; NVQ level 2; GNVQ intermediate; or equivalent
- 6 GCSE grade D - G; CSE below grade 1; NVQ level 1; GNVQ Foundation level; or equivalent
- Y None of the above
- Z Refuse

**25. Which member of your household is the Chief Income Earner, that is the person with the largest income whether from employment, pensions, state benefits, investments or any other sources?**

**Respondent** You

**Respondent's spouse/partner** Your spouse/ partner

Other

**26. What is the working status of Chief Income Earner (CIE)?**

- Employed
- Self Employed
- Not working, dependent on state benefit
- Not working, other income
- Retired

**27.(IF SELECT 3, 4 OR 5 AT Q26) Please can you tell me which of the following apply?**

**IF SELECT 5 ONLY SHOW OPTIONS 1 and 2**

- Retired gets pension from previous job
- Retired, receiving state pension only
- Unemployed 6 months or less
- Sick - still receiving pay or statutory pay from job
- Widow\widower receiving pension from partner's previous job
- Divorced\separated receiving maintenance from ex-partner
- Full time student
- Not working - with private means
- Unemployed more than 6 months
- Only receive income support
- Receiving Disability Living Allowance
- Don't know
- Refused

**ASK IF 1 OR 2 SELECTED AT Q26a OR 1 at Q26b. If 1 at Q26a = is/ works, if 1 at Q26b=was /worked**

**28.What type <is/ was> the type of firm where the Chief Income Earner works/ worked?**

OPEN ENDED

**ASK IF 1 OR 2 SELECTED AT Q26a or b. If 1 at Q26a= is, if 1 at Q26b=was**

**29.What <is/was> the type of job actually done by the Chief Income Earner?**

OPEN ENDED

**ASK IF 1 OR 2 SELECTED AT Q26a or b. If 1 at Q26a= is, if 1 at Q26b=was**

**30.What <is/was> the title, rank, grade, etc. of the Chief Income Earner?**

OPEN ENDED

**ASK IF 1 OR 2 SELECTED AT Q26a or b. If 1 at Q26a= is, if 1 at Q26b=was**

**31.How many staff <is/was> Chief Income Earner responsible for?**

OPEN ENDED



**ASK ALL**

**32. Does the Chief Income Earner have any qualifications?**

(SUCH AS APPRENTICESHIPS, PROFESSIONAL QUALIFICATIONS, UNIVERSITY DEGREES, DIPLOMAS ETC.)

Yes

No

**(If Yes at Q32)**

**33. ENTER QUALIFICATIONS**

OPEN ENDED

**34. ENTER ANY OTHER RELEVANT DETAILS TO ASSIST CLASSIFICATION OF OCCUPATION AND INDUSTRY. IF NO FURTHER DETAILS PRESS "OK"**

OPEN ENDED

**Interviewer: Code Social Grade**

A

B

C1

C2

D

E

**35. How long have you lived in your current home? Is it... READ OUT AND CODE FIRST THAT APPLIES**

Up to 1 year

More than 1 year, up to 2 years

More than 2 years, up to 5 years

More than 5 years, up to 10 years

More than 10 years, up to 20 years

More than 20 years

DO NOT READ OUT: Don't know

DO NOT READ OUT: Refused

**36. Including yourself, how many people live your household?**

\_\_\_\_(Enter number. Range 1-20)

IF MORE THAN 1

**37. And how many of these are children aged 16 years or less?**

\_\_\_ (Enter number. Range 0-20)

**38. Do you have any disability or other long standing health problem that makes it difficult for you to do any of the following... READ OUT...**

**NOTE: INTERVIEWER CODE ALL THAT APPLY.**

**INCLUDE PROBLEMS DUE TO OLD AGE**

Go out on foot

Use local buses

Get in or out of a car

None of these

**39. Do you have any disability or other long standing health problem that makes it or would make it difficult or impossible for you to ride a bicycle? This includes problems due to old age.**

**IF RESPONDENT SAYS YES, PROBE FOR WHETHER IT WOULD BE DIFFICULT OR IMPOSSIBLE FOR THE RESPONDENT TO RIDE A BICYCLE**

CODE ONE ONLY

Yes – impossible

Yes – difficult

No

Don't know

**40. I'm going to read out a list of factors that some people may think are important when buying a car or van.**

**Below are a list of factors that some people may think are important when buying a car or van.**

Please tell me which are important **to you** when buying a new car or van? **READ OUT**

**INTERVIEWER: IF NECESSARY CLARIFY THAT TALKING ABOUT ANY CAR/VAN NOT JUST ELECTRIC VEHICLE**

**CODE ALL THAT APPLY. PROBE [ANYTHING ELSE?]**

Comfort

Costs including purchase and running costs, resale value, tax and insurance

Small engine

Large engine

Environmentally friendly / low CO2 Emissions

Image of brand / brand preference

Image of model / model preference

Interior space/functionality/boot size

Reliability

Safety

Speed/performance

Style/design

Features such as sat nav CD player; music system; power steering etc Other

[WRITE IN]

Don't know

**41. Finally, how much do you agree or disagree with the following statement?**

READ OUT: I would cycle (more) if there were more dedicated cycle paths

Definitely agree

Tend to agree

Neither agree nor disagree

Tend to disagree

Definitely disagree

Don't know

Not applicable

**42. As a 'thank you' for taking part we're making a £10 donation to charity for every interview we complete. Which of these charities would you like us to donate to for your interview?**

NSPCC (National Society for the Prevention of Cruelty to Children)

RSPCA (Royal Society for the Prevention of Cruelty to Animals)

Friends of the Earth

**43. Thank you for your time today. Would you be willing to take part in further research about your experience of using an electric car in the future?**

**(If necessary)** We are interested in gaining more in depth views about your experiences of using an electric car.

The interview would be conducted in person in your home or in another convenient location.

An interviewer would contact you to arrange a convenient date and time.

We will only be talking to some people in detail so you may not be called again

The interview would take about 45 minutes and there would be a further financial incentive for taking part.

Yes

No

**Thank you very much for your time today**

## Appendix D Organisational quantitative survey

**CATI ONLY : RED**

**CAWI ONLY BLUE**

FOR BUSINESSES WHERE WE DO NOT HAVE A CONTACT NAME, WE WILL NEED TO IDENTIFY THE MOST APPROPRIATE RESPONDENT I.E. THE PERSON RESPONSIBLE FOR PURCHASING AND/OR MANAGING CARS FOR THE BUSINESS.

IN ORGANISATIONS WITH A LARGER FLEET OF CARS, THIS IS LIKELY TO BE THE FLEET MANAGER OR EQUIVALENT; IN ORGANISATIONS WITH SMALLER FLEETS, IT IS LIKELY TO BE THE FINANCE OR OPERATIONS MANAGER WHO MIGHT HAVE THESE RESPONSIBILITIES.

Good morning/afternoon/evening, my name is ..., and I am calling on behalf of TNS-BMRB, an independent social research company. We are carrying out a survey for the Department for Transport about electric cars and you should have recently received a letter informing you about the research.

According to our records you recently bought a **<make><model>** for your organisation and received the government Plug-in Car Grant (PiCG). We are interested in exploring your views and experiences of buying and **either using or leasing out** an electric car or plug in hybrid electric car. As a thank-you for taking part, we will be donating £10 to a charity of your choice (NSPCC, RSPCA or Friends of the Earth).

IF NECESSARY: Even if you do not use the car yourself we would be interested in speaking to you.

INTERVIEWER NOTE: THEY MAY HAVE ALSO BOUGHT OTHER MAKES AND/OR MODELS BUT THIS IS THE MOST RECENT ONE ON OUR RECORDS.

IF NECESSARY: The interview should take around 10 minutes. It will be conducted in accordance with the rules of the Market Research Society. We guarantee that all your answers will be kept confidential. The Department for Transport will not be able to identify any individual or organisation from their answers.

### **INITIAL OUTCOME PRE SCREENER**

Yes – CONTINUE

No, but want to take part – MAKE APPOINTMENT OR GENERAL CALLBACK

No, don't want to take part – CLOSE AND CODE AS REFUSED

Don't recall letter/ need reassurance – RESEND LETTER IF NECESSARY

Not in charge of purchasing (referral)

Soft refusal (i.e. too busy) – SEND EMAIL WITH LINK

Plus usual list of other outcome codes (e.g. wrong number)

### **EMAIL SCREEN**

**If you prefer, this short survey is also available to complete online**

**IF WE HAVE EMAIL ADDRESS ON THE SAMPLE:**

**Can I email you a link?**

**Yes**

**No – SOFT REFUSAL**

**IF YES AT PREVIOUS QUESTION:**

**Can I just double-check your email address is [EMAIL ADDRESS FROM SAMPLE]?**

**Yes**

**No – ENTER CORRECT EMAIL ADDRESS**

**IF WE DON'T HAVE EMAIL ADDRESS ON THE SAMPLE:**

**Would you be able to give me your email address and I can send you a link?**

**Enter email**

**Refused – SOFT REFUSAL**

**Enter email**

**Refused**

Thank you for agreeing to take part in this research. We are interested in exploring your organisation's views and experiences of buying and using an electric car. As a thank-you for taking part, we will be donating £10 to a charity of your choice (NSPCC, RSPCA or Friends of the Earth).

Please use the arrow buttons to navigate your way through the survey. If you have any questions, or problems as you are going through the survey, please contact our helpline on Freephone 0800 0155655 (please note, calls from mobile telephones may be

charged, please consult your network provider for details) or e-mail us at [electric.cars@tns-online.com](mailto:electric.cars@tns-online.com)

## ABOUT YOUR ORGANISATION

The first few questions relate to your organisation

We'd like to start by asking a few questions about your organisation.

### 1. What is the main activity of your organisation?

#### INTERVIEWER: CODE MOST APPLICABLE

#### Please select the most applicable

Agriculture, hunting, fishing and forestry

Mining and quarrying

Manufacturing

Utilities (Electricity, gas and water supply)

Construction

Retailer/ shop

Hotels, restaurants or other leisure services

Financial services

Transport, storage, business services

Financial services

Real estate, renting and business activities

Public administration

Health and Education

Other community, social and personal service activities

Other

Don't know

#### INTERVIEWER CODE OR ASK AS APPROPRIATE:

### 2. And is this a..**READ OUT**

Private organisation

Public sector organisation

Charity or not-for-profit organisation

DO NOT READ OUT: Don't know

### 3. Approximately how many employees in the UK does the organisation you work for have in total?

**IF SAY MORE THAN ONE SITE:** If your organisation has more than one site, this is the total number of employees across all sites in the UK for your organisation

**IF NOT SURE: Please give me your best estimate**

Please provide your best estimate

[SINGLE CODE] [READ OUT]

No employees or sole trader

1-9 employees

10-49 employees

50-249 employees

250 to 500 employees

501 or more

DO NOT READ OUT: Don't know

**4. Has your organisation bought electric or plug in hybrid electric cars for any of the following purposes ...:**

**READ OUT, CODE YES/NO/DK FOR EACH**

**Yes**

**No**

**Don't know**

a) To be used by your organisation's employees to make trips as part of their work, for example to make business trips, visit customers or suppliers, or deliver goods or escort people

b) To be used as display or demonstration models (e.g. in car showrooms) or to be sold onto customers

c) To be leased out to your customers

**If Yes at Q4b ONLY go to Q30**

**IF QUESTION 4 ITEM c) = YES, ASK:**

**5. In total, how many cars does your organisation lease out to customers in the UK at the moment?**

**RECORD NUMBER**

**INTERVIEWER: IF DON'T KNOW, ENCOURAGE ESTIMATE**

**Please give me your best estimate**

Please provide your best estimate

\_\_\_\_\_ (Range 0-99,999)

Don't know

**IF QUESTION 4 ITEM c) = YES, AND Q5 >0, ASK:**

**6. And how many of these are electric or plug in hybrid electric cars?**

**INTERVIEWER: IF DON'T KNOW, ENCOURAGE ESTIMATE**



**Please give me your best estimate**

Please provide your best estimate

**IF NECESSARY:**

*An Electric car is powered only by a battery which is charged by plugging it into the electric grid. There is no petrol or diesel engine.*

*A plug-in hybrid electric car is like a conventional hybrid electric car with both a petrol/ diesel engine and an electric motor. BUT, the battery is larger and can be charged by plugging it in to the electric grid. Plug-in hybrid electric cars also cover a range-extended electric vehicle (REEV).*

Total number of cars: <from Q5>

Electric cars: \_\_\_\_

Plug in hybrid electric cars: \_\_\_\_

If you aren't sure how many of each, please give me a total number

Total number of electric/plug in hybrid electric cars: \_\_\_\_

Don't know

RANGE 0- answer at Q5

**WRITE IN NUMBER**

RANGE: 0-ANSWER AT Q5

CAN ONLY ANSWER TOTAL OR SPILT

**THROUGHOUT Q7 – 8 FILTER <electric &/or plug-in hybrid electric cars>**

**DEPENDING ON ANSWER AT Q6 –**

**IF >0 for Electric cars and 0 for Plug in hybrid: electric cars**

**IF >0 for plug in hybrid and 0 for electric cars: plug in hybrid cars**

**IF >0 for both or >0 for total number: electric and plug in hybrid electric cars**

**IF QUESTION 4 ITEM c) = YES AND Q6 >0 ASK:**

**7. Thinking about the <electric &/or plug-in hybrid electric cars> that you lease to customers- are these customers mainly... **READ OUT CODE ONE ONLY****

Organisations

Individuals

A mix of both

**DO NOT READ OUT:** Don't know

**IF QUESTION 4 ITEM c) = YES AND Q6 >0, ASK:**

**8. [ALL] What was your role in deciding to buy <electric &/or plug-in hybrid**

**electric cars> to lease to your customers? Were you personally the..READ  
OUT CODE ONE ONLY**

Sole decision maker (I alone decided which car to buy)

Main decision maker (I had the main say, but took others' views into account)

Joint decision maker (I had equal say in which car to buy)

Secondary decision maker (I had some influence, but someone else had the main say)

No role/influence (I had no say in which car was bought)

**DO NOT READ OUT:** Don't know

**NOTE FOR QUAL RECRUITING – DON'T RECRUIT ANYONE SAYING 5/6 HERE  
IF Q4 ITEM a) = YES, ASK:**

**9. In total, how many cars does the organisation own which are used by employees to make trips as part of their work?**

**RECORD NUMBER**

**INTERVIEWER: IF DON'T KNOW, ENCOURAGE ESTIMATE**

**Please give me your best estimate**

Please provide your best estimate

\_\_\_\_\_ (Range 0-99,999)

Don't know

**IF Q4 ITEM a) = YES and Q9 >0 ASK:**

**10. Of these, how many are pool cars?**

**IF NECESSARY:**

Pool cars must meet the following conditions:  
used by more than one employee

not normally kept at employees' homes

usually used only for business journeys

**RECORD NUMBER AND CODE TO RANGE**

**INTERVIEWER: IF DON'T KNOW, ENCOURAGE ESTIMATE**

**Please give me your best estimate**

Please provide your best estimate

**Total number of cars: <from Q9> \_\_\_\_\_ (RANGE 0-ANSWER AT Q9)**

Don't know

**IF Q4 ITEM a) = YES, and Q9 >0 ASK**

**11. And how many are assigned to a specific individual?****RECORD NUMBER AND CODE TO RANGE****INTERVIEWER: IF DON'T KNOW, ENCOURAGE ESTIMATE****Please give me your best estimate**

Please provide your best estimate

**Total number of cars: <from Q9> \_\_\_\_\_ RANGE 0-ANSWER AT Q9**

Don't know

**CHECK-Q10+Q11 = / <Q9****IF Q4 ITEM a) = YES AND Q10 > 0, ASK:****12. Thinking about the <number from Q10> POOL cars that are used by employees to make trips as part of their work, how many are electric or plug in hybrid electric cars?****INTERVIEWER: IF DON'T KNOW, ENCOURAGE ESTIMATE.****Please give me your best estimate**

Please provide your best estimate

**IF NECESSARY:***An Electric car is powered only by a battery which is charged by plugging it into the electric grid. There is no petrol or diesel engine.**A plug-in hybrid electric car is like a conventional hybrid electric car with both a petrol/ diesel engine and an electric motor. BUT, the battery is larger and can be charged by plugging it in to the electric grid. Plug-in hybrid electric cars also cover a range-extended electric vehicle (REEV).*

Electric cars: \_\_\_\_

Plug in hybrid electric cars: \_\_\_\_

If you aren't sure how many of each, please give me a total number

Total number of electric/plug in hybrid electric cars: \_\_\_\_

Don't know

**RECORD NUMBER****RANGE 0-ANSWER AT Q10****IF Q4 ITEM a) = YES AND Q11 > 0, ASK:****13. Thinking about the <number from Q11> cars which are assigned to a specific individual, how many are electric or plug in hybrid electric cars?****INTERVIEWER: IF DON'T KNOW, ENCOURAGE ESTIMATE.**

**Please give me your best estimate**

Please provide your best estimate

**IF NECESSARY:**

*An Electric car is powered only by a battery which is charged by plugging it into the electric grid. There is no petrol or diesel engine.*

*A plug-in hybrid electric car is like a conventional hybrid electric car with both a petrol/ diesel engine and an electric motor. BUT, the battery is larger and can be charged by plugging it in to the electric grid. Plug-in hybrid electric cars also cover a range-extended electric vehicle (REEV).*

Electric cars: \_\_\_\_

Plug in hybrid electric cars: \_\_\_\_

If you aren't sure how many of each, please give me a total number

Total number of electric/plug in hybrid electric cars: \_\_\_\_

Don't know

**RECORD NUMBER**

**RANGE 0-ANSWER AT Q11**

**SINGLE VEHICLE TYPE ONLY**

The rest of this survey is about the <electric or plug-in hybrid electric cars> your organisation has for its own use, which are used by your employees to make trips as part of their work, for example to make business trips, visit customers or suppliers, or transport goods or escort people.

**BOTH VEHICLE TYPES**

The rest of this survey is about the electric and plug-in hybrid electric cars your organisation has for its own use, which are used by your employees to make trips as part of their work, for example to make business trips, visit customers or suppliers, or transport goods or escort people. This includes cars which are either pure electric or plug-in hybrid vehicles. For some questions we may ask you about one type of vehicle only; that is, either the electric cars only or the plug-in hybrid electric cars only. This will be stated clearly in the question when this is the case. All other questions refer to all plug-in electric vehicles that your organisation uses.

**Q14 FILTER <electric &/or plug-in hybrid electric cars> DEPENDING ON ANSWER AT Q12 –**

**IF >0 for Electric cars and 0 for Plug in hybrid: electric cars**

**IF >0 for plug in hybrid and 0 for electric cars: plug in hybrid cars**

**IF >0 for both or >0 for total number: electric and plug in hybrid electric cars**

**IF Q4 ITEM a) = YES AND Q12 > 0 or DK, ASK:**

**14.[ALL] What was your role in deciding to buy (an) <electric &/or plug-in hybrid electric car> as a POOL car(s) for use by employees to make trips as part of their work? Were you personally the... READ OUT CODE**

Sole decision maker (I alone decided which car to buy)

Main decision maker (I had the main say, but took others' views into account)

Joint decision maker (I had equal say in which car to buy)

Secondary decision maker (I had some influence, but someone else had the main say)

No role/influence (I had no say in which car was bought)

**DO NOT READ OUT:** Don't know

**Q15 FILTER <electric &/or plug-in hybrid electric cars> DEPENDING ON ANSWER AT Q13 –**

**IF >0 for Electric cars and 0 for Plug in hybrid: electric cars**

**IF >0 for plug in hybrid and 0 for electric cars: plug in hybrid cars**

**IF >0 for both or >0 for total number: electric and plug in hybrid electric cars**

**IF Q4 ITEM a) = YES AND Q13 > 0 or DK, ASK:**

**15.[ALL] What was your role in deciding to buy (an) <electric &/or plug-in hybrid electric car(s)>for use BY SPECIFIC INDIVIDUAL EMPLOYEES to make trips as part of their work? Were you personally the...READ OUT CODE**

Sole decision maker (I alone decided which car to buy)

Main decision maker (I had the main say, but took others' views into account)

Joint decision maker (I had equal say in which car to buy)

Secondary decision maker (I had some influence, but someone else had the main say)

No role/influence (I had no say in which car was bought)

**DO NOT READ OUT:** Don't know

**NOTE FOR QUAL RECRUITING – DON'T RECRUIT ANYONE SAYING 5/6 HERE Q16-END FILTER <electric &/or plug-in hybrid electric cars> DEPENDING ON ANSWER AT Q12 +14 –**

**IF SUM Q12+14>0 for Electric cars and 0 for Plug in hybrid: electric cars**

**IF >0 for plug in hybrid and 0 for electric cars: plug in hybrid cars**

**IF >0 for both or >0 for total number: electric and plug in hybrid electric cars**

**NOT ASKED IN ONLINE VERSION**

**IF Q4 ITEM a) = YES AND (Q14 = 1 TO 4) OR (Q15 = 1 TO 4), ASK:**

- 16. Thinking about the <electric &/or plug-in hybrid electric cars> [IF SUM(Q12+Q13) = 1= car/ IF SUM(Q12+Q13) = TWO OR MORE OR DON'T KNOW: cars] that your organisation has bought for its employees to use to make trips as part of their work, what were the reasons why your organisation decided to buy them rather than petrol or diesel cars? INTERVIEWER: DO NOT PROMPT OR PROBE – ASK “ANYMORE” UNTIL NO MORE ANSWERS. CODE CLOSEST FOR ALL THAT APPLY**

Government Plug-In Car Grant / electric car Grant / Grant (any mention)  
 London congestion charge;  
 Tax benefits or incentives (including road tax or vehicle excise duty (VED), Company Car Tax, Capital Allowances etc.)  
 To save money on fuel; petrol/diesel is expensive  
 Availability of public charging points / Plugged in Places  
 Electric cars better for the environment/greener/corporate social responsibility  
 Climate change/global warming/CO2 emissions  
 Oil dependency/to reduce dependency on oil  
 Traffic pollution/air quality/traffic pollution bad for people's health  
 Like new technology; electric cars new/exciting/fun/ innovative  
 Trial/ demonstrate/ test suitability of vehicles  
 To meet corporate targets/ regulations/ good practice/ business opportunities  
 Other  
 Don't know

**IF Q4b ITEM a) = YES, AND ((Q14 = 1 TO 4) OR (Q15 = 1 TO 4)), ASK:**

- 17. Was your organisation aware of the Government Plug-in Car Grant at the point when it first decided to buy <electric &/or plug-in hybrid electric cars>?**

Yes  
 No  
 Don't know

**IF Q4 ITEM a) = YES AND ((Q14 = 1 TO 4) OR (Q15 = 1 TO 4)), ASK:**

- 18. How important was the Government Plug-In Car Grant in your organisation's decision to buy an <electric &/or plug-in hybrid electric cars> for use by its employees to make trips? Was it **READ OUT**...?**

Very important  
 Fairly important

Not very important

Not at all important

**DO NOT READ OUT:** Don't know

**IF Q4 ITEM a) = YES AND ((Q14 = 1 TO 4) OR (Q15 = 1 TO 4)), ASK:**

**19. How important was the availability of public charging points in your organisation's decision to buy <electric &/or plug-in hybrid electric cars> for use by its employees to make trips? **INTERVIEW PROMPT: IF NECESSARY: How important was it in your decision to buy the car. Was it... READ OUT?****

Very important

Fairly important

Not very important

Not at all important

**DO NOT READ OUT** Don't know

**IF Q4 ITEM a) = YES AND ((Q14 = 1 TO 4) OR (Q15 = 1 TO 4)), ASK:**

**19b. How important is the availability of public charging points to your organisation's use of <electric &/or plug-in hybrid electric cars> now? Is it... **READ OUT****

Very important

Fairly important

Not very important

Not at all important

**DO NOT READ OUT** Don't know

**IF Q4 ITEM a) = YES, ASK:**

**20. As far as you are aware, is your organisation a member of a scheme that enables its <electric &/or plug-in hybrid electric cars> to be charged using public charging points?**

Yes

No

Don't know

**IF Q4 ITEM a) = YES, ASK:**

**21. Does your organisation have any charging points installed at any of its sites specifically for charging its <electric &/or plug-in hybrid electric cars>?**

Yes

No

Don't know

**IF Q4 ITEM a) = YES, AND Q21 = YES, AND RESPONDENT ADDRESS IS WITHIN A PIPS AREA (BASED ON SAMPLE DATA), ASK:**

**22. Did your organisation receive a Grant or financial contribution to help it meet the cost of installing charging points on its premises?**

Yes

No

Don't know

**IF Q4 ITEM a) = YES, AND Q21 = YES, ASK:**

**23. Which of the following types of charging points are installed at any of your sites? READ OUT. CODE YES/NO/DK for each.**

Yes

No

Don't know

- a. 'Standard' points, which use a 3 to 7 kilowatt supply and take 6 to 8 hours for a full charge
- b. 'Fast' points, which use a 20 to 25 kilowatt supply and take 3 to 4 hours for a full charge
- c. 'Rapid' points, which use a 43 plus kilowatt supply and typically provide 80 per cent charge in 30 mins

**IF Q4 ITEM a) = YES, ASK:**

**24. In the last three months, how frequently would you say your organisation's <electric &/or plug-in hybrid electric cars> have typically been used by employees to make trips? READ OUT ONE CODE ONLY**

At least once a day

Less than once a day, but at least 3 times a week

Once or twice a week

Less than once a week but more than twice a month

Once or twice a month

Less than once a month but at least once

Not at all (in the last three months)

Varies too much to say

**DO NOT READ OUT:** Don't know

**IF Q4 ITEM a) = YES, ASK:**

**If have only one type of vehicle (EV or PHEV)**

**25. I would like to get an approximate figure for the annual mileage of a 'typical'**



**<electric or plug-in hybrid electric cars> used by your employees to make trips. Can you please estimate for me the total miles that such a vehicle has typically been driven in the last 12 months?**

**Please estimate the annual mileage of a 'typical' <electric or plug-in hybrid electric cars> used by your employees, that is, the total miles that such a vehicle has typically been driven in the last 12 months.**

**INTERVIEWER: PROMPT IF NECESSARY. IF NOT SURE:**

**Please give me your best estimate**

Please provide your best estimate

**IF VEHICLE(S) ACQUIRED LESS THAN A YEAR AGO - OBTAIN EXPECTED TYPICAL MILEAGE. IF NIL ENTER 0.**

- 0
- 1 to 2,499
- 2,500 to 4,999
- 5,000 to 8,999
- 9,000 to 11,999
- 12,000 to 14,999
- 15,000 to 19,999
- 20,000 or more
- Varies too much to say
- Don't know

**If have both types of vehicle at Q12 + 13 ask 26a and b**

**26a. I would like to get an approximate figure for the annual mileage of a 'typical' plug-in hybrid electric car used by your employees to make trips. Can you please estimate for me the total miles that such a vehicle has typically been driven in the last 12 months?**

**Please estimate the annual mileage of a 'typical' plug in hybrid electric car used by your employees, that is, the total miles that such a vehicle has typically been driven in the last 12 months.**

**INTERVIEWER: PROMPT IF NECESSARY. IF NOT SURE:**

**Please give me your best estimate**

Please provide your best estimate

**IF VEHICLE(S) ACQUIRED LESS THAN A YEAR AGO - OBTAIN EXPECTED TYPICAL MILEAGE. IF NIL ENTER 0.**

- 0
- 1 to 2,499
- 2,500 to 4,999

- 5,000 to 8,999
- 9,000 to 11,999
- 12,000 to 14,999
- 15,000 to 19,999
- 20,000 or more
- Varies too much to say
- Don't know

**26b. I would like to get an approximate figure for the annual mileage of a 'typical' electric car used by your employees to make trips. Can you please estimate for me the total miles that such a vehicle has typically been driven in the last 12 months?**

Please estimate the annual mileage of a 'typical' electric car used by your employees, that is, the total miles that such a vehicle has typically been driven in the last 12 months.

**INTERVIEWER: PROMPT IF NECESSARY. IF NOT SURE:**

**Please give me your best estimate**

Please provide your best estimate

**IF VEHICLE(S) ACQUIRED LESS THAN A YEAR AGO - OBTAIN EXPECTED TYPICAL MILEAGE. IF NIL ENTER 0.**

- 0
- 1 to 2,499
- 2,500 to 4,999
- 5,000 to 8,999
- 9,000 to 11,999
- 12,000 to 14,999
- 15,000 to 19,999
- 20,000 or more
- Varies too much to say
- Don't know

**IF Q4 ITEM a) = YES, ASK:**

**26. Have you personally driven <electric &/or plug-in hybrid electric cars> that are owned by your organisation? IF SUM(Q12+Q13) = ONE: Have you personally driven the <electric or plug in hybrid electric car> that is owned by your organisation?**

**INTERVIEWER – IF YES, PROBE FOR HOW OFTEN AND CODE APPROPRIATELY**

Yes – regularly

Yes – sometimes

No - never

Don't know

**ONLY ASK IF HAVE ELECTRIC CAR AT Q12/13**

**IF Q4 ITEM a) = YES, ASK:**

**27. Have <INSERT IF YES AT Q26 you or other> employees ever raised concerns about making journeys in your organisation's electric cars because of worries about the distance being too far for the car's range?**

Yes

No

Don't know

**ONLY ASK IF HAVE ELECTRIC CAR AT Q12/13**

**IF Q4 ITEM a) = YES, ASK:**

**28. And have <INSERT IF YES AT Q26 you or other> employees ever actually avoided making journeys in your organisation's electric cars because of worries about the distance being too far for the car's range?**

Yes

No

Don't know

**ONLY ASK IF HAVE ELECTRIC CAR AT Q12/13**

**IF Q28 = YES, ASK:**

**29. Thinking about the last occasion that you are aware of where an employee used a different vehicle or mode of transport because of concerns about the range of your electric cars, what mode of transport did they use to complete their journey?** For journeys using more than one type of transport, please indicate the main type. **INTERVIEWER: READ OUT / PROBE AS NECESSARY**

**CODE ONE ONLY**

Privately or organisation-owned petrol or diesel car (e.g. a different car owned by your organisation or their own personal household car)

Hire-car

Taxi or mini-cab

Car from a car club (e.g. Zipcar)

Motorbike, moped or scooter

Bus

Long distance coach  
Tube/metro/light rail/tram  
Railway train  
Other  
Don't know

**[ALL] FINAL QUESTIONS**

**29. Thank you for your time today. As a 'thank you' for taking part we're making a £10 donation to charity for every interview we complete. Which of these charities would you like us to donate to for your interview?**

NSPCC (National Society for the Prevention of Cruelty to Children)  
RSPCA (Royal Society for the Prevention of Cruelty to Animals)  
Friends of the Earth

**30. Would you be willing to take part in further research on this subject in the future?**

(If necessary) We are interested in gaining more in depth views about your experiences of using (an) **<electric &/or plug-in hybrid electric cars>**.

The interview would be conducted over in person at your premises.

An interviewer would contact you to arrange a convenient date and time.

We will only be talking to some people in detail so you may not be contacted again.

The interview would take 30-40 minutes and there would be a further financial incentive for taking part.

Yes

No

**IF YES AT Q32**

What is the best phone number to contact you on to discuss taking part in this research?  
Your details will only be used to contact you with regards to this study.

**IF YES AT Q32**

And what is the best email address to contact you on?

Your details will only be used to contact you with regards to this study.

**TEXT BOX**

**Thank you very much for your time today**

## Appendix E Private EV purchasers qualitative topic guide (single and couple respondents)

***Note to interviewers: Interviewer instructions will be presented throughout this guide in bold italic font.***

We are carrying out this study on behalf of the Department for Transport (DfT). The aim of this research is to find out people's motivations, views and experiences of buying and using electric cars, in order to understand how different schemes can be improved and promoted to new users in the future. We will be asking you questions about your perceptions and understanding of Electric Cars (from here on we'll call these EVs – electric vehicles). The discussion we have today will enable us to develop a timeline of your experience of buying and using EVs– we will explore your original expectations and thoughts about electric cars, your early experiences of buying and using the vehicle, what lessons you've learned and what your thoughts for the future are.

We expect this interview to last approximately one hour (couples – 1hour 15 minutes). There are no right or wrong answers, so please be as honest as you can. It is ok if you feel that you can't or don't want to answer some of the questions.

We would like to record the interview with your permission. This will avoid me having to scribble everything down as you speak. We will only use this recording to help with writing our report on the research. Once we have transcribed the audio recording, the audio files will be destroyed. You will not be personally identifiable within any reports published as part of this study. Are you happy to proceed?

***If a couple are being interviewed (because they were both involved in the decision to purchase an EV) then explain that you would like to cover parts of the interview separately. Start the interview with both person A and B.***

***If participant agrees, switch on recorder and tell them that you have done so.***

### **A. Background**

We understand that you have a <insert make and model of EV from quantitative data>, <if more than one car> and that you also have <INSERT NUMBER OF OTHER CARS> is that correct?

1. Just to understand a bit of background about your (family's) car use, I'd like to explore who uses each car, how often they're used and what they're used for? Shall we start with the EV...<follow up with each additional car>
2. How would you say where you live, work and your lifestyle affects how you travel on a day to day basis?
  - ***If either interviewee is retired, how have your travel patterns changed since you retired, how does this compare to when you were working?***

***These questions are a high level overview of the car usage as a conversation starter; EV use will be explored in more depth in Section C.***

## B. Purchasing your EV

**Cover this section with person A and B separately**

**Interviewers: use responses to quantitative survey to prompt discussion here. The subsequent sections of this topic guide will enable us to talk through the following time periods: 1. Pre-purchase 2. Point of Purchase 3. Experience of EVs 4. Thoughts for the future.**

**Questions 3-8 are related to the 'Pre-Purchase' time period**

*We'd like to plot a timeline relating to your purchasing decision stages in choosing an EV. So for this part of the interview, we'll be asking you to describe the events, decisions, processes and feelings that you went through when deciding to purchase your EV.*

3. When did you first start considering buying an EV and why? Were you interested in buying an EV specifically, or simply a new car (whether EV or not)?
  - *When did you first hear about EVs, how?*
4. What happened next?
  - *What factors were influential? Which were most important to you, why?*
  - *What did you do? Test drive, research, go to car shows?*
  - *Who did you talk to? Friends, family, colleagues, manufacturers?*
  - *What research did you do? Which sources did you get your information from (consumer websites/manufacturers/green websites/online car magazines/reviews)? What sort of information did you find and how useful was it? Was there any additional information that you would have found useful?*
  - *Anything else?*
5. Who was involved in the decision to purchase an EV?
  - **If more than one person:**
    - *What was your initial position (for or against the idea)? What about the other people involved?*
    - *Would you consider yourself to be the main decision maker when buying this car? If no, who was?*
    - *What were the perceived advantages and disadvantages of getting an EV? (**For disadvantages/challenges**) how were these overcome?*
    - *What are your views now compared with your initial thoughts?*

**Interviewer: Only ask this question to the person who answered the quantitative survey**

6. According to the answers you gave in the telephone/online survey, <INSERT ALL REASONS FROM QUANTITATIVE SURVEY> for purchasing an EV, can you please expand on each of these and why these were important?
7. Were there any other factors that influenced your decision to purchase an EV?
  - **Financial aspects:** *Prompts - availability of PiCGs, congestion charges, tax benefits, reduction in fuel costs*
  - **Convenience:** *home charging infrastructure, local public charging infrastructure, general availability of infrastructure*
  - **Environment:** *climate change, pollution/air quality issues*
  - **Vehicle aspects:** *comfort, size, vehicle performance*
  - **Any others?**
8. Of the factors you've talked through, are there any that were more influential than others in your decision to purchase EV(s) or were they similarly important? Are there

any that were essential (i.e. you would not have purchased if they had not been in place)?

**Questions 9-12 are related to the 'Point of Purchase' time period**

*I'd now like to ask you some questions about the actual purchase of the car.*

9. We understand that your EV cost £<INSERT COST OF EV>. What were your thoughts on the price of the vehicle?
- *What were your initial thoughts about the affordability of the car?*
  - *Have your thoughts on the price of the vehicle changed in the time that you've had it? If so, how?*
  - *Are you happy to talk to us about how you are financing the cost of purchasing your EV?*
    - *Monthly payments*
    - *Some combination of deposit/payments*
    - *Outright*
    - *Did you consider leasing the vehicle? Why/ why not?*

**Person A and B together from this point on**

**C. Plug-in Car Grant**

10. How did you hear about the Plug-in Car Grant scheme?
- *When did you hear about it?*
  - *When in the decision making process was this?*
  - *Did you use the Plug-in Car Grant website? If so, how useful was it?*
11. To what extent did the Grant influence your decision to purchase an EV? How?
- *Did other incentives play any role in your decision - e.g. the lack of congestion charge, no tax?*
  - *What did you think about the size of the Grant you received? Was it appropriate?*
  - *Would you have purchased your EV without the Grant?*
12. Do you feel that the PiCG is an effective approach for the Government to encourage people to begin to purchase and use EVs?
- *Why/why not?*
  - *Was it effective for you?*
  - *Would it be effective for others?*

**D. Using your EV**

**Questions 13-37 cover the 'Experience of EVs' time period**

*In this section, we'll be asking you about how you've made use of your EV.*

13. Before we talk through the specifics, can you tell me briefly what your overall experience/impression is of owning and using an EV?
14. What are your experiences of the general day to day costs of running your EV?
- *How do these compare to your experiences of the running costs of a conventional vehicle – charging vs. fuel?*
  - *Have you had to have any work done on your EV? If yes, how have the maintenance and repair costs compared to conventional vehicles?*
15. Before you drove an EV, what were your expectations about how it would feel to drive an EV? Did you think that it would feel different from a conventional vehicle? If so, how? Were your expectations right?

16. Did you have any worries or concerns about using an EV? What were they? How were these overcome?
17. Can you describe the first journey you took in your new EV? Do you remember how long it was, where you went and how you felt?
18. When you first got the car, what did you like about using your EV? What didn't you like? Has this changed over time?
19. How do you use your EV in relation to other vehicles in your household?
- *Is it used as your (or your household's) main car?*
  - *How often do you drive it compared to the other vehicles in your household?*
20. What sort of journeys do you make in the vehicle?
- *Describe regular journeys – purpose?*
  - *Describe less frequent journeys*
  - *What types of road do you typically use?*
  - *How often do you use the car to transport passengers?*
  - *Tell me about the distance you travel in your EV. What is the typical length of a shorter journey? How about a longer journey?*
  - *Have your travel patterns/choices changed since getting an EV? If so, how and why? Do you drive more or less often than before? Do you use public transport more or less often or the same as you did before getting an EV? Do you walk and/or cycle more or less often or the same as you did before getting an EV?*
  - ***If interviewee describes changes to travel choices/patterns please ask: do you think that these changes would have occurred if you had not purchased an EV?***
21. Does the EV meet your personal transport needs? What about the needs of your family?
- *Why? Why not?*
  - *Personal - Are there any journeys that you personally would not make in your EV / you'd feel unsure about making in your EV? What types? Why?*
  - *Family - Are there any journeys that your family would not make in your EV / your family would feel unsure about making in your EV? Who in your family feels unsure (adults / children / gender)? What types? Why? Would you have made these journeys in a fuel-based vehicle?*
  - ***If considered unsuitable for certain journeys, what are the main concerns?***
    - *Range – the distance the car can travel when fully charged. Does this vary seasonally?*
    - *Battery/charge level – how much the battery was charged at the time*
    - *Lack of charging points on the route(s) travelled/at the destination*
    - *Lack of parking at the destination/parking cost/parking (any mention)*
    - *Too far to drive/too much traffic/driving stressful/did not want to drive*
    - *Any other reason?*
22. What have you learned about EVs since you purchased yours?
- *Has it been what you expected?*
  - *Has anything been better than expected?*
23. Have you faced any barriers or difficulties as an EV owner?
- *If yes, what challenges/frustrations have you faced?*
  - *How have you overcome these?*



24. What do you think your EV says about you, if anything?
- *Do these attributes fit with how you see yourself?*
  - *What do you think other drivers think of you when they see you driving your EV?*
  - *What do your friends/neighbours think? What about your family?*

### **E. Charging your EV**

*Now we'd like to talk about charging your vehicle. We would like you to tell us what you thought about charging before you got the vehicle and whether your experience of charging has changed over time.*

25. What were your expectations about charging an EV before you purchased one? Did you have any concerns/worries about charging it? What were they?
26. Can you describe your early charging experiences? How did they compare to your pre-purchase expectations?
27. What types of charge point do you use?
28. How often do you charge your EV?
- *What time of day/night do you typically charge your EV?*
29. Where do you charge your EV?

**Interviewers – after asking question 29 ONLY ask following prompts IF the interviewee offers the bold responses**

- **If home** – *how does this work, what arrangements do you have set up? Did you install a charging point at home purely for charging your EV? Was it subsidised? If so, by whom? Do you have any special tariff(s) for your electricity supply (e.g. Economy 7/cheaper off-peak rates)? Have you installed solar panels?*
- **If work** – *what arrangements are in place to facilitate charging at work?*
- **If public charging points** - *what is your experience of them?*

**Interviewers - ask ALL interviewees:**

- *Is there anywhere that you'd like to be able to charge the car but currently can't?*
  - *What do you know about the different types of chargers available? What type of charger do you use (standard, fast, rapid<sup>22</sup>)? How suitable is this for your needs? Have you tried any of the other charger types?*
30. What do you now know about charging that you were not aware of before you bought your car?

### **F. Plugged in Places**

*For this part of the interview, we will focus on publicly available charging facilities and/or charging at work.*

---

<sup>22</sup> *If you need to describe, please explain using these descriptions:*

**Standard charge = 5 - 8 hours**

**Fast charge = 3 - 4 hours**

**Rapid charge = under 30 minutes**

31. Do you feel that there are adequate publicly accessible charging facilities other than those at your home or workplace?
- *If no, what would you like to see change?*
32. Does the availability of publicly accessible charging infrastructure impact on the use of your EV? *If so, how?*
33. With regard to the charge points in your area:
- *Did you know about them before purchasing your vehicle?*
  - *Are the charge points in your area easily accessible/well located?*
  - *Are the right types of charge points available?*
  - *How easy or difficult are the charge points to use?*
  - *Are there any charge points that you choose not to use or avoid (in terms of type, location)? If so, why?*
  - *Have you experienced any barriers to charging? E.g. charge points being unavailable/in use, being difficult to locate or there not being enough charge points in the 'right' places?*
  - *Did the availability of charging points affect your decision to purchase?*
34. **From your telephone interview/online survey**, we are aware that you are a member of one or more public charging schemes. Can you please tell us a bit about the schemes?
- *How many schemes are you a member of?*
  - *What are they called?*
    - *How do you use them?*
    - *What are the advantages and drawbacks of using the scheme(s)?*
    - *What do you think of the charges for using the scheme(s)?*
35. Did the <INSERT SCHEME NAME> programme influence your decision to purchase an EV? How?

#### **EV users living in PiPs areas**

36. **If interviewee doesn't mention local PIPs in questions 28-31, then ask:** Are you aware of the <Plugged in Places> Scheme?
- **If yes:**
    - *What do you know about the scheme – when and how did you find out about it?*
    - *Are you part of it? (If yes is this as a private member or through work)*
    - *How do you make use of the scheme?*
    - *What are the advantages and drawbacks of using the scheme?*
    - *What do you think of the charges for using the scheme?*

### **G. Summary of thoughts on EVs**

#### **Questions 37-40 cover the 'Future of EVs' time period**

37. What else needs to be done to increase uptake and use of EVs?
- Who do you think should be responsible for this? **Interviewers - please explore ALL of the following and ask what role each has?**
    - *Government*
    - *local authorities*
    - *manufacturers*
    - *PiPs*
    - *Dealers*
    - *The media*
    - *Any others?*

38. How long do you expect to keep your EV for?

39. Do you think that you would buy an EV again?

- *If no, why?*
- *If yes, why?*

40. Is there anything else that you would like to add about EVs, the PiCG or PIPs?

***Please read out the following questions BEFORE switching off the recorders***

The Department for Transport is interested in using anonymous quotations from research participants in its communications material related to the Grant. Do you consent to the Department using your anonymous quotations for this purpose? Officials at the Department for Transport are interested in undertaking further discussion with EV users for the purposes of developing policy related to EVs. Do you consent to your contact details being passed to the Department for this purpose?

***Thank you for your time***

## Appendix F Private non-EV purchasers qualitative topic guide (single and couple respondents)

**Note to interviewers:** Interviewer instructions will be presented throughout this guide in bold italic font.

We are carrying out this study on behalf of the Department for Transport (DfT). The aim of this research is to find out about people's views and experiences of buying a new car. We will ask you about your experience of purchasing a new vehicle and the motivations behind your choice of car. We will also ask you some questions about your perceptions and understanding of electric vehicles.

We expect this interview to last approximately one hour (couples – 1hour 15 minutes). There are no right or wrong answers, so please be as honest as you can. It is ok if you feel that you can't or don't want to answer some of the questions.

We would like to record the interview with your permission. This will avoid me having to scribble everything down as you speak. We will only use this recording to help with writing our report on the research. Once we have transcribed the audio recording, the audio files will be destroyed. You will not be personally identifiable within any reports published as part of this study. Are you happy to proceed?

**If a couple are being interviewed (because they were both involved in the decision to purchase an electric vehicle) then explain that you would like to cover parts of the interview separately. Start the interview with both person A and B. If participant agrees, switch on recorder and tell them that you have done so.**

### A. Background

1. We understand that you purchased a brand new car after October 2010, is that correct?
  - *Is this still your current car?*
  - *Is it your main car (that is the one that is driven most frequently in a normal week)?*
2. How many cars do you have in your household?
3. Just to understand a bit of background about your (household's) car use, I'd like to explore who uses each car, how often they're used and what they're used for? Shall we start with the <Make and Model of vehicle>...<follow up with each additional car>
4. How would you say where you live, work and your lifestyle affects how you travel on a day to day basis?
  - ***If interviewee(s) have children at home:*** *does having children have an impact?*
  - ***If either interviewee is retired,*** *how have your travel patterns changed since you retired, how does this compare to when you were working?*
5. In terms of your lifestyle and travel patterns, what would be your ideal car and why?

**These questions are a high level overview of the car usage as a conversation starter.**

***If speaking to a couple, cover this section with each person separately***

**The subsequent sections of this topic guide will enable us to talk through the following time periods:**

**A. Car purchasing/ownership history**

**B. Pre-purchase**

**C. Point of Purchase**

**D. Experience of the car**

**E. Thoughts for the future**

**B. Car purchasing/ownership history**

6. How long have you been a car owner for?
  - Prior to your most recent car purchase, have you purchased a new car before?
    - *If yes, have you always bought new cars? why?*
    - *If no, why did you choose to buy a new car when you purchased your most recent car?*
7. What types of car have you purchased historically?
  - *Prompt for: size, type of car, fuel source (petrol or diesel)*
8. What did you use your previous car(s) for?
  - *Prompt for: commuting, leisure, transporting children, etc.*
9. Has what you look for in a car changed over time? If so, how? Why?
  - *Prompt for: cost of fuel, changes in personal circumstances (lifestyle, children, fewer constraints, different amounts of disposable income), recession, different types of cars available.*

**C. Pre-Purchase**

*We'd like to plot a timeline relating to your purchasing decision stages in choosing the <Make and Model of car>. So for this part of the interview, we'll be asking you to describe the events, decisions, processes and feelings that you went through when deciding to purchase your car.*

10. When did you first start considering buying your most recent brand new car and why? What were you looking for initially?
11. What happened next?
  - *What did you do? Test drive, research, go to car shows?*
  - *Who did you talk to? Friends, family, colleagues, manufacturers?*
  - *What research did you do? Which sources did you get your information from (consumer websites/manufacturers/green websites/online car magazines/reviews)? What sort of information did you find and how useful was it? Was there any additional information that you would have found useful?*
  - *Anything else?*
12. Did you purchase a petrol or a diesel car? Why?
  - *Did you consider <the opposite fuel source> Why, why not?*
  - *What are the advantages and disadvantages of these two fuel sources?*
  - *Have your views about this changed since you purchased your most recent car?*

## D. Point of Purchase

13. Who was involved in the decision to purchase the car?

- **If more than one person:**
  - *What was your initial position (for or against the idea)? What about the other people involved?*
  - *Would you consider yourself to be the main decision maker when buying this car? If no, who was?*
  - *What were the perceived advantages and disadvantages of getting the car? (**For disadvantages/challenges:** how were these overcome?)*
  - *What are your views now compared with your initial thoughts?*

14. I'd like to provide you with some cards, each of which represents a vehicle feature. I'd like you to place the cards into one of these three piles according to whether they're high, medium or low priorities to you when purchasing a vehicle. When you've done this, I'll ask you to expand on some of your reasons for which were important to you and why?

1. *Comfort*
  2. *Costs – what elements of cost? Prompt for: purchase/running/resale value/tax/insurance*
  3. *Engine size – small vs. large*
  4. *Fuel type – petrol, diesel, LPG, electric vehicles*
  5. *Environmentally friendly/low CO2 Emissions- Probe for what they interpret this to mean (i.e. in terms of general climate change vs. local factors like air quality)*
  6. *Image of brand / brand preference*
  7. *Image of model / model preference*
  8. *Interior space/functionality/boot size*
  9. *Reliability*
  10. *Safety*
  11. *Speed/performance,*
  12. *Style/design*
  13. *Features – sat nav; CD player; music system; power steering etc. (all features mentioned)*
- *Anything else?*

15. I'd now like to ask you a couple of questions specific to the roles of cost and car size in your car purchasing:

- **Cost:** *when in the process did you set a budget for the new vehicle purchase? Prompt for whether they had a budget in mind before exploring the market or after*
- **Size:** *how would you describe the size of your vehicle (**If respondent is unsure, use the SMMT list provided to prompt**<sup>23</sup>)?*
  - *Why did you purchase a vehicle of that size?*
  - *What factors influenced this decision?*
  - *Have you previously purchased different sized vehicles? (If yes) what were your reasons for these purchases?*

16. Did you consider an alternatively fuelled vehicle (e.g. Electric, LPG) or a hybrid vehicle?

- **If yes:** *what information did you consider and why? Did any of this information discourage you?*
- **If no:** *were there any reasons for this, if yes, what were they?*

<sup>23</sup> Mini (e.g. Smart), Supermini (e.g. Nissan Micra), Lower Medium (e.g. Renault Megane), Upper Medium (e.g. Ford Mondeo), Executive (e.g. BMW 5 series), Luxury Saloon (e.g. Rolls-Royce), Specialist Sports (e.g. Porsche 911), Dual Purpose (e.g. Range Rover) or Multi-purpose Vehicle (MPV) (e.g. Vauxhall Zafira)

### **Person A and B together from this point on**

#### **E. Experience of the car**

*In this section, we will be asking you about how you have made use of your car.*

17. Before we talk through the specifics, can you tell me briefly what your overall experience/impression of owning and using your car has been?
18. What are your experiences of the general day to day costs of running your car?
  - *What are your thoughts on fuel costs?*
  - *What about maintenance costs?*
  - *How do these compare to what you think you could achieve with other cars on the market?*
  - *Are you happy with the current running costs of your car?*
19. How do you use your car in relation to other vehicles in your household?
  - *Is it used as your (or your household's) main car?*
  - *How often do you drive it compared to the other vehicles in your household?*
20. What sort of journeys do you make in the vehicle?
  - *Describe regular journeys – purpose?*
  - *Describe less frequent journeys*
  - *What types of road do you typically use? How often do you drive on motorways and major roads (e.g. in a typical month)? What are your reasons for using these roads? Commuting, work-related driving, visiting family, holidays, anything else?*
  - *How often do you use the car to transport passengers?*
  - *Tell me about the distance you travel in your car. What is the typical length of a shorter journey? How about a longer journey?*
  - *Have your travel patterns/choices changed since getting your car? If so, how and why? Do you drive more or less often than before?*
  - ***If interviewee describes changes to travel choices/patterns please ask: do you think that these changes would have occurred if you had not purchased your car?***
21. Does the car meet all of your personal transport needs? What about the needs of your family?
  - *Why? Why not?*
  - *Personal - Are there any journeys that you personally would not make in your car? What types? Why?*
  - *Family - Are there any journeys that your family would not make in your car? Who in your family feels unsure (adults / children / gender)? What types? Why?*

## F. Thoughts for the future

Now we would like to ask you about your thoughts for the future in terms of car purchasing.

22. When do you think you will replace your most recently purchased car?
23. What will you look for in your next car?
- Do you foresee any lifestyle changes that will have an impact on your next vehicle choice? Retirement, employment, family, etc.
  - Would you consider an electric vehicle or hybrid vehicle? Why/Why not?
24. What do you know about electric vehicles?
- Do you know the difference between an Electric Vehicle and a Plug-in Hybrid Electric Vehicle?
  - Where did you gather this information from? Media (TV, newspapers, magazines), friends/family, other (where?)
  - Can you name any models of electric vehicles available on the market? If yes, which? What do you know about them? Cost, vehicle range, anything else?
25. What, if anything, do you know about how to recharge an electric vehicle?
- How long does it take?
  - How much does it cost?
  - Are you aware of the different types of chargers available (standard, fast, rapid<sup>24</sup>)?
26. Do you have a garage or private parking near a plug point at your home? Do you think you could regularly charge an electric vehicle at home if you owned one?
27. Have you ever driven an electric vehicle?
- Have you ever been in an electric vehicle?  
**If yes:** What was it like?  
**If no:** What do you think it would be like to drive an electric vehicle?
28. What do you think are the advantages and disadvantages of electric vehicles compared to petrol/diesel vehicles?
29. What do you think an electric vehicle says about its owner?
- Have you seen an electric vehicle on the road? If yes, what do you think when you see someone driving one?
  - Could you ever see yourself driving an electric vehicle?
  - What do you think your family, friends and neighbours would think if you bought an electric vehicle?
30. What are the barriers to purchasing an electric vehicle for you personally? **Only use prompts if necessary:** Purchase cost, range, charging, driving experience
- How do you think these barriers could be overcome? **IF respondent describes use of charging points as being a barrier**, please ask how might investment in charging infrastructure help to overcome this barrier?
  - Who should be responsible for reducing barriers to purchasing electric vehicles (e.g. Government, local authorities, manufacturers, dealers, the media, others?)?

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<sup>24</sup>If you need to describe, please explain using these descriptions:

Standard charge = 5 - 8 hours    Fast charge = 3 - 4 hours    Rapid charge = under 30 minutes



31. Are you aware of any Government backed schemes to encourage people to purchase electric vehicles?

- **If not mentioned:** Have you heard of the Plug-in Car Grant (PiCG)?
  - How and when did you hear about the Plug-in Car Grant?
  - What do you know about the Grant?
  - Do you think it's an effective way for the government to encourage uptake of electric vehicles?
- **If not mentioned:** Are you aware that if you buy an electric vehicle, you don't have to pay road tax (vehicle excise duty)? What do you think about this as an incentive?
- **If not mentioned:** Did you know that if you drive an electric vehicle into London you are exempt from the congestion charge? What do you think about this as an incentive?

#### ICE users living in PiPs areas

32. **If interviewee doesn't mention local PiPs in question 29, then ask:** Are you aware of the <Plugged-in Places>Scheme?

#### If yes:

- What do you know about the scheme – when and how did you find out about it?
- Have you noticed charging points in your area?

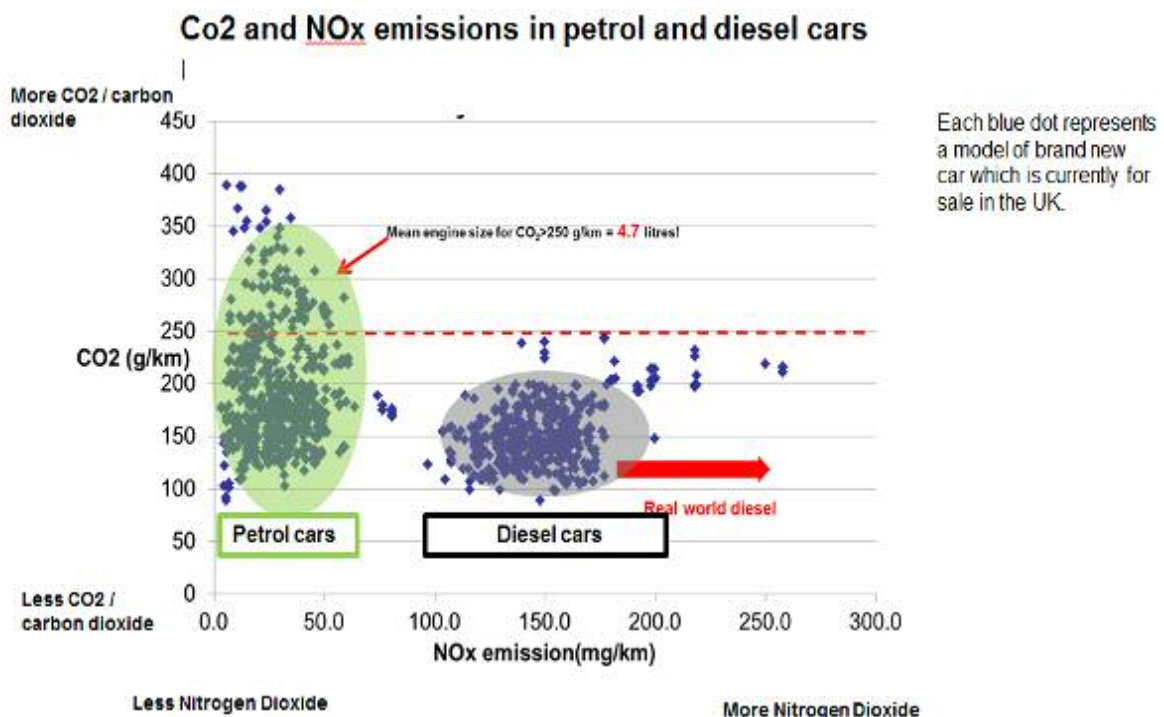
#### If no:

<PiPs description to be entered here>

- Would being based in an area with a scheme like this have any influence on whether you would purchase an electric vehicle or not in the future?

33. What (other) factors would encourage you to purchase an electric vehicle?

34. For the final question, I'd like to return to the issue of petrol versus diesel cars, I would like to show you a Chart which comes from the work of Professor Martin Williams at Kings College London. **INTERVIEWER TO TALK THROUGH INFORMATION BELOW BEFORE ASKING QUESTIONS**



Just to talk you through what the Chart is showing [POINT AS NECESSARY]:

- Each of the blue dots represents a model of brand new car which is currently for sale in the UK.
- The chart has two scales, up and down (vertical) and left to right (horizontal):
  - In terms of the up and down scale, this shows the amount of carbon dioxide or CO<sub>2</sub> produced by the car. So cars towards the top produce more carbon dioxide, and cars towards the bottom produce less carbon dioxide. Carbon dioxide is the Greenhouse Gas which traps heat in the Earth's atmosphere and risks contributing to climate change caused by humans.
  - The left to right scale shows the amount of mono-nitrogen oxides (NO<sub>2</sub>), including Nitrogen Dioxide, produced by the car. So cars towards the left produce less nitrogen dioxide, and cars towards the right produce more nitrogen dioxide. Nitrogen dioxide is a major contributor to air pollution, which in 2008 was estimated to have contributed to the equivalent of 29,000 premature deaths in the UK. The average loss of life was 6 months, although the actual amount varies between individuals, from a few days to many years.
- You can see two 'clumps' of blue dots. The left-hand clump is made up of petrol car models, while the right-hand clump is made up of diesel car models.
- While some petrol cars do produce higher carbon dioxide emissions (above the dotted red line), the average (or 'mean') engine size for these car models is 4.7 litres, making them very large cars indeed. The vast majority of petrol car models fall below the red line, and produce similar amounts of CO<sub>2</sub> to their diesel equivalents. However, the diesel models nearly all produce considerably more NO<sub>2</sub>, which is why they form a 'clump' some way to the right of the petrol 'clump'.

**Interviewer to ask the following questions after the explanation:**

- *Does the chart make sense or is it confusing?*
- *Do you have any questions about it?*
- *Were you aware of this information before?*
- *What do you think about this?*
- *Would this information effect how you would approach car purchasing in the future?*

**Please read out the following question BEFORE switching off the recorders**

The Department for Transport is interested in using anonymous quotations from research participants in its communications material related to the Grant. Do you consent to the Department using your anonymous quotations for this purpose?

***Thank you for your time***

## Appendix G Organisational EV purchasers qualitative topic guide

**Note to interviewers:** *Interviewer instructions will be presented throughout this guide in bold italic font.*

We are carrying out this study on behalf of the Department for Transport (DfT). The aim of this research is to find out the motivations, views and experiences of organisations when buying and using electric cars, in order to understand how different schemes can be improved and promoted to new users in the future. We will be asking you questions about your perceptions and understanding of electric cars (from here on we'll call these EVs – electric vehicles). The discussion we have today will enable us to develop a timeline of your experience of buying and using EVs - we will explore your original expectations and thoughts about electric cars, your organisation's early experiences of buying and using the vehicle (s), what lessons you've learned and what your thoughts for the future are.

We expect this interview to last approximately one hour. There are no right or wrong answers, so please be as honest as you can. It is ok if you feel that you can't or don't want to answer some of the questions.

We would like to record the interview with your permission. This will avoid me having to scribble everything down as you speak. We will only use this recording to help with writing the report. Once we have transcribed the audio recording, the audio files will be destroyed. You and your organisation will not be identifiable within any reports published as part of this study. Are you happy to proceed?

**If participant agrees, switch on recorder and tell them that you have done so.**

### A. Background

1. Can you give us some background on your organisation?
  - *the nature of the organisation,*
  - *how many staff work for the organisation,*
  - *What your role entails?*
2. In addition to your xxx electric cars, do you have any other EVs in the fleet (e.g. vans)?
3. Do you drive, or have you driven an EV?
4. Can you describe the parking arrangements at your place of work?
  - *Have you installed any charging points?*
  - *Do your organisation's vehicle users have dedicated parking spaces/areas at work?*
5. How are organisation's cars allocated to staff? Who qualifies? Are staff allocated a car or can they choose one? Who controls what choice the individual has? What do staff think about using an EV?
6. Does your organisation use pool cars?
  - *If so, how are they allocated, who uses them? What do staff think about using an EV pool car?*
7. Please describe the different types of work-related journeys taken by members of your organisation?
  - *Describe regular journeys*
  - *Describe less frequent journeys*

- *Tell me about the distance staff travel in EV(s). What is the typical length of a shorter journey? How about a longer journey?*
- *Are the journeys taken in EVs similar or different to those taken in conventional fuel-powered cars?*

## **B. Purchasing your organisation's EV(s)**

*We'd like to plot a timeline relating to your organisation's purchasing decisions when choosing an EV. So for this part of the interview, we'll be asking you to describe the events, decisions, processes and thoughts that your organisation went through when deciding to purchase its EV(s).*

***Interviewers: use responses to quantitative survey to prompt discussion here. The subsequent sections of this topic guide will enable us to talk through the following time periods: 1. Pre-purchase 2. Point of Purchase 3. Experience of EVs 4 Thoughts for the future.***

***Questions 8-13 are related to the 'Pre-Purchase' time period***

8. Who was involved in the decision to introduce EVs to the fleet? Were you involved?
- *What was your initial position (for or against the idea)? What about the other people involved?*

***Interviewers: Please be aware of the response to question 7 and ask the questions in consideration of the interviewee's level of involvement in the decision making process.***

9. Do you know when your organisation first started considering introducing EV(s) to its fleet and why?
- *Was the organisation looking for new cars generally or (an) EV(s) specifically, why?*
10. What do you think the motivation behind adopting (an) EV(s) into your fleet was? Why?
11. What happened next?
- *What factors influenced this? Which were most important to your organisation, why?*
  - *What did you do? Test drive, research, go to car shows, seek advice from other organisations?*
  - *Who did you talk to? Colleagues, manufacturers, friends, family, other - who?*
  - *What research did you do? Which sources did you get your information from (consumer websites/manufacturers/green websites/online car magazines/reviews)? What sort of information did you find and how useful was it? Was there any additional information that you would have found useful?*
  - *What were the perceived advantages and disadvantages about getting an EV prior to purchasing? (For disadvantages/challenges) How were these overcome?*
12. ***Only ask if interviewee drives an EV (as identified in Q3)...*** Before you drove an EV, what were your expectations about how it would feel to drive an EV?
- *Did you think that it would feel different from a conventional vehicle? If so, how?*
13. ***If interviewee does not drive an EV...*** What feedback have you had from the drivers of EVs in your fleet?
- *What were their expectations about how it would feel to drive one?*

- *Did they think it would feel different from a conventional vehicle, how?*

**Note to Interviewer - questions 14-18 are related to the 'Point of Purchase' time period**

14. What do you think the main reasons for your organisation purchasing an EV were?
- **Financial aspects:** *Prompts - availability of PiCGs, congestion charges, tax benefits, reduction in fuel costs*
    - *What role did the cost of the vehicle play in your decision to purchase?*
  - **Convenience:** *local public charging infrastructure, general availability of infrastructure*
  - **Environment:** *climate change, pollution/air quality issues*
  - **Vehicle aspects:** *comfort, size, vehicle performance*
  - **Any others?**
15. Of the factors you've talked through, are there any that were more influential than others in your organisation's decision to purchase EV(s)? Are there any that were essential (i.e. you would not have purchased if they had not been in place)?
16. We understand that your EV(s) cost £<INSERT COST OF EV>. What were your thoughts on the price of the vehicle?
- Have your thoughts on the price of the vehicle changed in the time that you've had it/them? If so, how?
  - Are you happy to talk to us about how your organisation is financing the cost of purchasing your EV(s)?
    - *Monthly payments*
    - *Some combination of deposit/payments*
    - *Outright*
    - *Did you consider leasing the vehicle? Why, why not?*

**C. Plug-in Car Grant**

17. How did you hear about the PiCG scheme?
- *When did you hear about it?*
  - *When in the decision making process was this?*
  - *Did you use the Plug-in Car Grant website? If so, how useful was it?*
18. Did the Grant contribute to your decision to purchase an EV? How?
- *Did other incentives play any role in your decision to purchase an EV, if so which?*
  - *What did you think about the size of the Grant your organisation received? Was it appropriate?*
  - *Would your organisation have purchased its EV(s) without the Grant?*
19. Do you feel that the PiCG is an effective approach for the Government to encourage organisations to begin to purchase and use EVs?
- *Why/why not?*
  - *Was it effective for your organisation?*
  - *Would it be effective for other organisations?*

**D. Using your organisation's EV(s)**

**Questions 19-37 cover the 'Experience of EVs' time period**

*In this section, we'll be asking you about how your organisation has made use of the EV(s) in the fleet.*

20. Before the vehicle(s) arrived into your fleet, what did you perceive the advantages and disadvantages about EVs to be?
  - *For disadvantages, How were these overcome?*
21. What are your experiences of the general day to day costs of running EV(s)?
  - *How do these compare to your experiences of conventional vehicle running costs – charging vs. fuel?*
  - *Have you had to have any work done on the EVs? If so, how have the repair/service costs compared?*
22. How do you make use of the EV(s) in your fleet?
  - *Who uses them?*
  - *Are they used as a pool car, for example? Do you have non-EV pool cars? How do you select which is used for a particular journey?*
  - *Are they used as perk cars (cars only for one individual's use as an organisation car)? Do you know how these vehicles are used?*
23. How well do/does the EV(s) meet your organisation's transport needs?
  - *Are there any journeys you or your organisation's staff would not make in the EV / you'd feel unsure about making in the EV? What types? Why?*
  - *If considered unsuitable for certain journeys, what are the main concerns?*
    - *Range – the distance the car can travel when fully charged - does this vary seasonally?*
    - *Battery/charge level – how much the battery was charged at the time*
    - *Lack of charging points on the route(s) travelled/at the destination*
    - *Lack of parking at the destination/parking cost/parking (any mention)*
    - *Too far to drive/too much traffic/driving stressful/did not want to drive*
    - *Any other reason?*
24. What were your perceptions of the range of EVs before your organisation purchased one?
  - *How does this compare to the reality? Better, worse, how? Why?*
25. What have you learned about the use of EVs since your organisation purchased one/some?
  - *Has it been what you expected?*
  - *Has anything been better than expected?*
  - *What lessons have you learned?*
26. What does your organisation do to encourage or enable use of EVs among its employees?
  - *Training? What type?*
  - *Dedicated parking?*
  - *On-site charging?*
  - *Anything else?*
27. Could you do anything further to increase use of EVs within your organisation?
28. What do you think users' perceive the advantages and disadvantages of using EVs to be?
  - ***For disadvantages, what do you think could be done (by you or others) to alleviate these?***

29. Has your organisation faced any barriers or difficulties as an EV owner?
- *What challenges/frustrations has your organisation faced?*
  - *How have these been overcome?*
30. What do you think the use of EV(s) says about your organisation?
- *What do think other drivers think of your organisation when they see employees driving an EV(s)? Do you use any liveries or advertising to promote use of EVs*
  - *What do your customers, competitors, senior management think?*

### **E. Charging your organisation's EV(s)**

*Now we'd like to talk about charging your vehicle(s). We would like you to tell us what you thought about charging before you got the vehicle(s) and whether your experience of charging has changed over time.*

31. What were your expectations about charging an EV before your organisation adopted them into the fleet? Did you have any concerns/worries about charging them? What were they?
32. Where is/are the EV(s) charged?
- *Work, employees' homes or public charging points (if use public charging, what is your experience of them)? If work, what charging arrangements do you have in place? If applicable: Are the arrangements different for pool cars and those assigned to individual users?*
  - *Is there anywhere that you'd like to be able to charge the car(s) but currently can't?*
  - *How often are the EV(s) charged?*
  - *What time of day/night are the EVs typically charged?*
  - *What do you know about the different types of chargers available? What type of charger(s) do you use (standard, fast, rapid<sup>25</sup>)?, How suitable is this for your needs? Have you tried any other charger types?*
33. Can you describe your early charging experiences? How did the reality of charging compare to your pre-purchase expectations?
- *Do you now know anything about charging that you were not aware of before you introduced an EV(s) into your fleet? If yes, what?*

### **F. Plugged-in Places**

34. Do you feel that there are adequate public charging facilities in the area in which your organisation is based?
- *If no, what would you like to see change?*
  - *How would the changes work?*
35. How does the availability of public charging infrastructure impact on the use of your EV?
36. With regard to the charge points in your area:
- *Did you know about them before introducing EV(s) to your fleet?*
  - *Are the charge points in your area easily accessible/well located?*
  - *Are the 'right' types of charge points available (e.g. rapid charge points)?*
  - *Are there any charge points that your employees choose not to use or avoid (in terms of type, location) and, if so, why?*
  - *What barriers to charging have you experienced? E.g. charge points being unavailable/in use, being difficult to locate or there not being enough charge points in the 'right' places?*

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*If you need to describe, please explain using these descriptions: Standard charge = 5 - 8 hours  
3 - 4 hours      Rapid charge = under 30 minutes*

*Fast charge =*

37. **From your telephone interview/online survey**, we are aware that your organisation is a member of a public charging scheme. Can you please tell us a bit about the scheme?

- What is it called?
- How does your organisation use it?
- What are the advantages and drawbacks of using the scheme?
- What do you think of the charges for using the scheme?

#### **EV users living in PiPs areas**

38. **If interviewee doesn't mention local PIPS in qs 33-36, then ask:** Are you aware of the <UPDATE WITH LOCAL SCHEME NAME>Scheme?

- **If yes:**
  - What do you know about the scheme – when and how did you find out about it?
  - Are you part of it (is this as a private member or through work)?
  - How do you make use of the scheme?
  - What are the advantages and drawbacks of using the scheme?
  - What do you think of the charges for using the scheme?

39. Did the <INSERT NAME> programme influence your decision to purchase an EV? How?

#### **G. Summary of thoughts on EVs**

##### **Questions 39-42 cover the 'Future of EVs' time period**

40. What else needs to be done to increase the uptake and use of EVs?

- Who do you think should be responsible for this? **Interviewers - please explore ALL of the following and ask what role each has?**
  - Government
  - Local Authorities
  - Manufacturers
  - PiPs
  - Any others?

41. How long do you expect to keep your EV(s) in the fleet for?

42. Would you buy EVs for your fleet again?

- If yes, why?
- If no, why?

43. Is there anything else that you would like to add about EVs, the PiCG or PIPs?

#### **Please read out the following questions BEFORE switching off the recorders**

The Department for Transport is interested in using anonymous quotations from research participants in its communications material related to the Grant. Do you consent to the Department using your anonymous quotations for this purpose?

Officials at the Department for Transport are interested in undertaking further discussion with EV users for the purposes of developing policy related to EVs. Do you consent to your contact details being passed to the Department for this purpose?

**Thank you for your time**



## Appendix H Organisational EV users qualitative topic guide

***Note to interviewers: Interviewer instructions will be presented throughout this guide in bold italic font.***

We are carrying out this study on behalf of the Department for Transport (DfT). The aim of this research is to find out the motivations, views and experiences of organisations and their employees when buying and using electric cars, in order to understand how different schemes can be improved and promoted to new users in the future. We will be asking you questions about your perceptions and understanding of electric cars (from here on we'll call these EVs – electric vehicles). The discussion we have today will enable us to develop a timeline of your experience of using EVs - we will explore your original expectations and thoughts about electric cars, your organisation's early experiences of using the vehicle (s), what lessons you've learned and what your thoughts for the future are.

We expect this interview to last approximately forty-five minutes. There are no right or wrong answers, so please be as honest as you can. It is ok if you feel that you can't or don't want to answer some of the questions.

We would like to record the interview with your permission. This will avoid me having to scribble everything down as you speak. We will only use this recording to help with writing the report. Once we have transcribed the audio recording, the audio files will be destroyed. You and your organisation will not be personally identifiable within any reports published as part of this study. Are you happy to proceed?

***If participant agrees, switch on recorder and tell them that you have done so.***

### **A. Background**

1. Can you give us some background on your organisation?
  - *The nature of the organisation and what it does*
  - *How many staff work for the organisation?*
  - *What your role entails?*
  
2. What kind of driving do you do for work?
  - *What kind of roads do you drive on for work?*
  - *How many days a week do you drive for work?*
  - *How many hours a day do you drive for work?*
  
3. Do you have a company car, use a pool car, use your own car or a mix of these?
  - *If pool car/mix – what vehicles are available to choose from?*
  - *How do you choose which vehicles to use? – availability/journey length/journey type*

## B. Pre-drive thoughts about EVs

### Questions 4-7 cover the 'pre-use' time period

4. What did you think about EVs prior to using one?
  - *Did you think that it would differ from a conventional vehicle? If so, how?*
5. Did you have any worries or concerns about using an EV?
  - *What were they? How were they overcome?*
6. When you first got into an EV, what did you like most about using it? What did you like least? Has this changed over time?
7. Can you describe the first journey you took in an EV? Do you remember how long it was, where you went and how you felt?

## C. Using an EV

### Questions 8-14 cover the 'Experience of EVs' time period

*In this section, we'll be asking you about how you've made use of your company's EV.*

8. How do you use the EV(s) in relation to other vehicles you have access to?
  - *How often do you drive it compared to other vehicles?*
  - *How regularly (days/week) do you use it?*
9. What sort of journeys do you make in the vehicle?
  - *Describe regular journeys – purpose?*
  - *Describe less frequent journeys*
  - *What types of road do you use?*
  - *How often do you use the car to transport passengers?*
  - *Please think about the journeys that are made regularly in the organisation's EV. On average, what would you say is a typical journey length? (Please give your nearest estimate)?*
10. Does the EV you use meet your organisation's transport needs?
  - *Why? Why not?*
  - *Suitable for all journey types?*
  - *Suitable for some journey types but not others (explore which)?*
  - *If considered unsuitable for certain journeys, what are the main concerns?*
    - *Range – the distance the car can travel when fully charged*
    - *Battery/charge level – how much the battery was charged at the time*
    - *Lack of charging points on the route(s) travelled/at the destination*
    - *Lack of parking at the destination/parking cost/parking (any mention)*
    - *Too far to drive/too much traffic/driving stressful/did not want to drive*
    - *Interior space; boot size; having to transport bulky items/too many people*
    - *Reliability*
    - *Comfort*
    - *Safety*
    - *Speed/performance*
    - *Style/design/image*

11. Have you learned anything about the use of EVs since you started using one for work? If so, what?
  - *Have you faced any barriers or difficulties?*
  - *How have you overcome these?*
  - *What lessons have you learned?*
12. What do you think the EV says about your organisation, if anything?
  - a. *Do these attributes fit with how you see your organisation?*
13. What do you think driving the EV says about you, if anything?
  - a. *Do these attributes fit with how you see yourself/your organisation?*
  - b. *What do you think other drivers think of you when they see you driving an EV?*
    - i. *What do your colleagues/competitors think?*
    - ii. *Your friends/neighbours?*
    - iii. *What about your family?*
14. Before you drove an EV, what were your expectations about how it would feel to drive one? Did you think that it would feel different from a conventional vehicle? If so, how? Were your expectations right?

#### **D. Plug-in Car Grant**

15. Are you aware of the Plug-in car Grant (PiCG) scheme?

##### **If yes:**

16. How did you hear about the PiCG scheme?
  - *When did you hear about it?*
  - *What are your thoughts about the PiCG scheme?*

**If no:** "The PiCG is a Grant of 25%, up to a maximum of £5,000 towards the cost of a new ultra-low emission car from a qualifying list. The car can be electric, plug-in hybrid electric, or hydrogen"

##### **Ask both:**

17. Do you feel that the PiCG is an effective approach for the Government to encourage organisations to begin to purchase and use EVs?
  - *Why/why not?*
  - *Was it effective for your organisation?*
  - *Would it be effective for other organisations?*

#### **E. Charging an EV**

*Now we'd like to talk about charging the vehicle. We would like you to tell us what you thought about charging before you used the vehicle and whether your experience of charging has changed over time.*

18. Have you had any experience of charging the EV?
  - *What are your thoughts about it?*

##### **If yes** ask 19-22:

19. What were your expectations about charging an EV before you used one? Did you have any concerns/worries about charging it? What were they?
20. Can you describe your early charging experiences? How did it compare to your pre-use expectations?

21. How often do you charge the EV?
- *What time of day/night do you typically charge your EV?*

22. Where do you typically charge the EV?

**Interviewers – after asking question 22 ONLY ask the following prompts IF the interviewee offers the bold responses**

- **If work** – *what arrangements are in place to facilitate charging at work?*
- **If public charging points** - *what is your experience of them?*
- **If home** – *how does this work, what arrangements do you have set up? Does your work pay you for the electricity used?*
- **If frequently charge at home** - *Have you installed a charging point at home purely for charging your EV? Was it subsidised? If so, by whom? Do you have any special tariff(s) for your electricity supply (e.g. Economy 7/cheaper off-peak rates)? Have you installed solar panels?*

**Interviewers - ask ALL interviewees:**

- *Is there anywhere that you'd like to be able to charge the car but currently can't?*
- *What do you know about the different types of chargers available? What type of charger do you use (standard, fast, rapid), how suitable is this for your needs? Have you tried any of the other charger types?*

23. What do you now know about charging that you were not aware of before you used the car?

## F. Plugged in Places

*For this part of the interview, we will focus on publicly available charging facilities and/or charging at work.*

24. Do you feel that there are adequate public charging facilities in your area?
- *If no, what would you like to see change?*
  - *Who should be responsible for making changes?*
  - *How would the changes work?*
25. How does the availability of public charging infrastructure impact on your use of the EV or whether or not you choose to use the EV?
26. With regard to the charge points in your area:
- *Did you know about them before using an EV?*
  - *Are the charge points in your area easily accessible/well located?*
  - *How easy or difficult are the charge points to use?*
  - *Are there any charge points that you choose not to use or avoid (in terms of type, location) and, if so, why?*
  - *What barriers to charging have you experienced? E.g. charge points being unavailable/in use, being difficult to locate or there not being enough charge points in the 'right' places?*
  - *Did the availability of charging points affect your decision to purchase?*

**27. From your telephone interview, we are aware that your company is a member of a public charging scheme. Can you please tell us a bit about the scheme?**

- *What is it called?*
- *How do you use it?*
- *What are the advantages and drawbacks of using the scheme?*
- *What do you think of the charges for using the scheme?*

**EV users living in PiPs areas**

28. **If interviewee doesn't mention local PIPS in q24-27, then ask:** Are you aware of the <Plugged in Places> Scheme?

- **If yes:**
  - *What do you know about the scheme – when and how did you find out about it?*
  - *Are you part of it (is this as a private member or through work)?*
  - *How do you make use of the scheme?*
  - *What are the advantages and drawbacks of using the scheme?*
  - *What do you think of the charges for using the scheme?*

**G. Summary of thoughts on EVs**

29. Would you consider buying an EV for personal use?

- *If yes, why?*
- *If no, why?*

30. What do you think could be done to increase the uptake and use of EVs in organisations like yours?

- *Who do you think should be responsible for this? Government/local authorities/ manufacturers/PIPs/service providers?*

Is there anything else that you would like to add about EVs, the PiCG or PIPs?

The Department for Transport is interested in gathering anonymous quotations to use in published material related to the Plug-in Car Grant and Plugged-in Places programme. Do you consent to the Department using your anonymous quotations, if they appear in the report of this research?

Officials at the Department for Transport are interested in undertaking further discussion with EV users for the purposes of developing policy related to EVs. Do you consent to your contact details being passed to the Department for this purpose?

**Thank you for your time**

## Appendix I Organisations who sell or lease EVs qualitative topic guide

**Note to interviewers:** *Interviewer instructions will be presented throughout this guide in bold italic font.*

We are carrying out this study on behalf of the Department for Transport (DfT). The aim of this research is to find out the motivations, views and experiences of organisations when buying and using electric cars, in order to understand how different schemes can be improved and promoted to new users in the future. We will be asking you questions about your perceptions and understanding of electric cars (from here on we'll call these EVs – electric vehicles). The discussion we have today will enable us to develop a timeline of your experience of buying, selling, leasing and using EVs - we will explore your original expectations and thoughts about electric cars, your organisation's early experiences of buying, selling, leasing and using the vehicle (s), what lessons you've learned and what your thoughts for the future are.

We expect this interview to last approximately 45 minutes. There are no right or wrong answers, so please be as honest as you can. It is ok if you feel that you can't or don't want to answer some of the questions.

We would like to record the interview with your permission. This will avoid me having to scribble everything down as you speak. We will only use this recording to help with writing the report. Once we have transcribed the audio recording, the audio files will be destroyed. You and your organisation will not be identifiable within any reports published as part of this study. Are you happy to proceed?

***If participant agrees, switch on recorder and tell them that you have done so.***

### A. Background

1. Can you give us some background on your organisation?
  - *The nature of the organisation, do you sell and/or lease EVs?*
  - *How many sales have been made in the last year? How many EVs are leased out at the moment?*
  - *What does your role entail?*
2. In addition to the electric cars, do you rent/sell any other EVs (e.g. vans)?
3. Do you drive, or have you driven an EV?
  - *What do you think about them?*
  - *What do you like/dislike?*

### B. Purchasing your organisation's EV(s)

*We'd like to plot a timeline relating to your organisation's purchasing decisions when choosing an EV to sell/lease. For this part of the interview, we'll be asking you to describe the events, decisions, processes and thoughts that your organisation went through when deciding to purchase its EV(s).*

***Interviewers: use responses to quantitative survey to prompt discussion here.***

***The subsequent sections of this topic guide will enable us to talk through the following time periods: 1. Pre-purchase 2. Point of Purchase 3. Experience of EVs and 4. Thoughts for the future.***

**Questions 4-12 are related to the 'Pre-Purchase' time period**

4. Who was involved in the decision to introduce EVs to sell/lease? Were you involved?
- *What was your initial position (for or against the idea)? What about the other people involved?*

**Interviewers: Please be aware of the response to question 4 and ask the questions in consideration of the interviewee's level of involvement in the decision making process.**

5. Do you know when your organisation first started considering introducing EV(s) to sell/lease and why?
- *Was the organisation looking for new cars generally or (an) EV(s) specifically? Why?*
6. What do you think the motivation behind adopting (an) EV(s) into your fleet for sale/lease was? Why?
7. What happened next?
- *What factors influenced this? Which were most important to your organisation? Why?*
  - *What were your perceptions of the market when you decided to adopt (an) EV(s) into your fleet for sale/lease? Were you confident that you would be able to sell/lease the vehicle? Why/why not?*
  - *What did you do? Test drive, research, go to car shows, seek advice from other organisations?*
  - *Who did you talk to? Colleagues, manufacturers, friends, family, other - who?*
  - *What research did you do? Which sources did you get your information from (consumer websites/manufacturers/green websites/online car magazines/reviews)? What sort of information did you find and how useful was it? Was there any additional information that you would have found useful?*
  - *What were the perceived advantages and disadvantages about getting an EV(s) for sale/lease prior to purchasing? (For disadvantages/challenges) How were these overcome?*
8. **Only ask if interviewee has driven an EV (as identified in Q3)...** Before you drove an EV, what were your expectations about how it would feel to drive an EV?
- *Did you think that it would feel different from a conventional vehicle? If so, how?*

**Note to Interviewer - questions 9-12 are related to the 'Point of Purchase' time period**

9. What do you think the main reasons for your organisation having an EV available for customers to buy/lease were?
10. Of the factors you've talked through, are there any that were more influential than others in your organisation's decision to purchase EV(s) to sell/lease? Are there any that were essential (i.e. you would not have purchased EVs to sell/lease or your customers would not have opted to buy/lease if they had not been in place)?

11. Can you briefly describe why your organisation chose to sell/lease the specific models of electric vehicle(s) it does? How do you think these vehicles compare with other makes and models of EV on the market?
12. We understand that the EV(s) that you sell/lease cost £<INSERT COST OF EV> to purchase. What were your thoughts on the price of the vehicle?
  - Have your thoughts on the price of the vehicle changed in the time that you've sought to sell/lease them? If so, how?
  - Are you happy to talk to us about how your organisation is financing the cost of purchasing the EV(s) that you sell/lease?
    - *Monthly payments*
    - *Some combination of deposit/payments*
    - *Outright*
    - *Did you consider leasing the vehicle? Why, why not?*
  - How about your customers, are you happy to talk to us about how they are financing the cost of purchasing/leasing the EV(s) that you have sold/leased to them?
    - *Some purchased, some leased?*
    - *Monthly payments*
    - *Some combination of deposit/payments*
    - *Outright*
    - *Did those that purchased consider leasing the vehicle? Why, why not?*

### **G. Plug-in Car Grant**

13. Did the Grant contribute to your decision to purchase (an) EV(s) to sell/lease? How?
  - *Did other incentives play any role in your decision to purchase an EV, if so which?*
  - *What did you think about the size of the Grant your organisation received? Was it appropriate?*
  - *Would your organisation have purchased its EV(s) without the Grant? Would your customers?*
14. Did the Grant contribute to your customers' decisions to buy/lease? How?
15. Do you feel that the PiCG is an effective approach for the Government to encourage organisations to begin to purchase and use EVs?
  - *Why/why not?*
  - *Was it effective for your organisation?*
  - *Would it be effective for other organisations?*

### **H. Your customers' EV(s)**

#### **Questions 16-28 cover the 'Experience of EVs' time period**

*In this section, we'll be asking you about the purchasing behaviour of your customers and how you interact and engage with them during that time.*

16. Prior to entering into a purchase or lease, what sorts of questions do your (potential) customers ask you to inform their decision?
  - *What advice do they seek? Price? Range? Finance plans? Resale values? Batteries?*
17. What do you think are the main reasons for customers buying/leasing an EV?



- **Financial aspects:** Prompts - availability of PiCGs, congestion charges, tax benefits, reduction in fuel costs
  - What role did the cost of the vehicle play in their decision to purchase?
- **Convenience:** local public charging infrastructure, general availability of infrastructure
- **Environment:** climate change, pollution/air quality issues
- **Vehicle aspects:** comfort, size, vehicle performance
- **Any others?**

18. When you've sold or leased EVs/ PHEVs, how much contact do you have with the buyer/lesser?

- Have you had any feedback about the purchase/leasing costs?
- Have you had any feedback from the drivers that you've sold/leased EVs to, or from colleagues who drive them?
- What were their expectations about how it would feel to drive one?
- Did they think it would feel different from a conventional vehicle? How?

**If limited contact with the customer, skip to question 28**

**If regular/occasional contact with the customer, ask questions 19 onwards**

19. What do your customers use the EVs for?

- Pool cars, company cars, or a combination?

20. What sort of journeys do they make?

21. Do you know what charging arrangements your customers have in place?

- Work, home, public charging?

22. What were your customers' perceptions of the range of EVs before purchasing/leasing one?

- How does this compare to the reality? Better or worse? Why?

23. What have you learned about selling/leasing EVs since your organisation purchased one/some?

- Has it been what you expected?
- Has any particular aspect been better or worse than expected?

24. Could you do anything further to increase use of EVs within your customer base?

25. What do you think the use of EV(s) says about organisations that buy or lease them?

- What do you think other drivers think of your customers' organisations when they see employees driving EV(s)?
- Do your customers use any liveries or advertising to promote the use of EVs?
- What do your customers', competitors, customers and senior management think them using EVs?

26. What do you think users perceive the advantages and disadvantages of using EVs to be?

- For disadvantages, what do you think could be done (by you or others) to alleviate these?

## **E. Summary of thoughts on EVs**

**Questions 27-30 cover the 'Thoughts for the Future' time period**

27. What else needs to be done to increase the uptake and use of EVs?
- Who do you think should be responsible for this? **Interviewers - please explore ALL of the following and ask what role each has?**
    - Government
    - Local Authorities
    - Manufacturers
    - PiPs
    - Any others?
28. How long do you expect to sell/lease the EV(s) that you currently have?
29. Would you buy EVs with a view to selling/leasing them again?
- *If yes, why?*
  - *If no, why?*
30. Is there anything else that you would like to add about EVs or the PiCG?

**Please read out the following questions BEFORE switching off the recorders**

The Department for Transport is interested in using anonymous quotations from research participants in its communications material related to the Grant. Do you consent to the Department using your anonymous quotations for this purpose?

Officials at the Department for Transport are interested in undertaking further discussion with EV users for the purposes of developing policy related to EVs. Do you consent to your contact details being passed to the Department for this purpose?

**Thank you for your time**

## Appendix J Organisational non-EV purchasers qualitative topic guide

**Note to interviewers:** *Interviewer instructions will be presented throughout this guide in bold italic font.*

We are carrying out this study on behalf of the Department for Transport (DfT). The aim of this research is to find out the motivations, views and experiences of organisations when buying cars. We will ask you about your experience of purchasing a new vehicle and the motivations behind your choice of car. We will also ask you some questions about your perceptions and understanding of electric vehicles.

We expect this interview to last approximately one hour. There are no right or wrong answers, so please be as honest as you can. It is ok if you feel that you can't or don't want to answer some of the questions.

We would like to record the interview with your permission. This will avoid me having to scribble everything down as you speak. We will only use this recording to help with writing the report. Once we have transcribed the audio recording, the audio files will be destroyed. You and your organisation will not be identifiable within any reports published as part of this study. Are you happy to proceed?

***If participant agrees, switch on recorder and tell them that you have done so.***

### A. Background

1. Can you give us some background on your organisation?
  - *the nature of the organisation (core business activities/purpose)?*
  - *how many staff work for the organisation?*
  - *what your role entails?*
2. How does your organisation assign cars to staff?
  - *Are the cars assigned to a specific individual? **If yes**, how are they allocated, who uses them, are staff allocated a car or can they choose one? Who controls what choice the individual has?*
  - *Does your organisation use pool cars? **If yes**, how are they allocated, who uses them? Are staff allocated a pool car or can they choose one?*
3. Can you describe the parking arrangements at your place of work?
  - *How many parking spaces are available?*
  - *Are there any constraints on these (e.g. not enough)? How are parking spaces allocated?*
  - *Do you offer priority spaces, e.g. for those who car-share?*
  - *Do company vehicle users have dedicated parking spaces/areas at work?*
4. Please describe the different types of work-related journeys taken by members of your organisation?
  - *Describe regular journeys*
  - *Describe less frequent journeys*
  - *Tell me about the distance staff travel. What is the typical length of a shorter journey? How about a longer journey?*
  - *Do you have specific vehicles for particular journeys?*

*We'd like to plot a timeline relating to your organisation's purchasing decisions when choosing a car. So for this part of the interview, we'll be asking you to describe the*

*events, decisions, processes and thoughts that your organisation went through when deciding to purchase the cars.*

**Subsequent sections of this topic guide will enable us to talk through the following time periods:**

- A. Car purchasing and ownership history**
- B. Pre-purchase**
- C. Point of Purchase**
- D. Experience of the cars**
- E. Thoughts for the future**

## **B. Car purchasing and ownership history**

*In this part of the interview, I would like to explore your organisation's car purchasing/ownership history. I'll be asking you to tell me about the previous vehicles that have been purchased by your organisation.*

5. How long have you worked for the organisation?  
**(Dependent on how long they've worked for the organisation, they may not be able to answer all/any of questions 6-9)**
6. When did your organisation first invest in cars for business use/ leasing? *Why was this?*
7. What types of car have been purchased by the organisation in the past?
  - *Were they petrol or diesel vehicles?*
  - *How many vehicles have been purchased?*
  - *Were they all from the same manufacturer or a range?*
8. For what purposes were the cars used?
9. Have you noticed a change in the types of cars being added to your organisation's fleet in the last five years? *Prompt for: types of car, size of car, engine type (petrol/diesel)*
  - *If yes, what do you think the reasons for the changes to your organisation's fleet have been? Prompt for: fuel costs, different business activities, economic climate, new cars on the market.*

## **C. Pre-purchase**

*We'd like to plot a timeline relating to your purchasing decision stages in choosing the <Make and Model of car(s)>. So for this part of the interview, we'll be asking you to describe the events, decisions, processes and feelings that you went through when deciding to purchase your car.*

10. Your organisation has purchased (a) new car/s for its fleet since October 2010, is that right? Can you confirm what this (these) car(s) are?
11. When did you first start considering buying a brand new car and why? What were you looking for initially?
12. Who was involved in the decision to introduce this/these car(s) to the fleet? Were you involved?
  - *What was your initial position (for or against the idea)? What about the other people involved?*

**Interviewers: Please be aware of the response to question 14 and ask the questions in consideration of the interviewee's level of involvement in the decision making process.**

13. What do you think the initial motivation behind adding this/these cars into your fleet was? Why?
- *Changes to the organisation's car renewal policy?*
  - *Other reasons, which?*
14. What happened next?
- *What did you do? Test drive, research, go to car shows, seek advice from other organisations?*
  - *Who did you talk to? Colleagues, manufacturers, friends, family, other - who?*
  - *What research did you do? Which sources did you get your information from (consumer websites/manufacturers/green websites/online car magazines/reviews)? What sort of information did you find and how useful was it? Was there any additional information that you would have found useful?*
  - *What were the perceived advantages and disadvantages about getting this/these cars prior to purchasing?*
15. Did you purchase (a) petrol or diesel car(s)? Why?
- *Did you consider <the opposite fuel source> Why, why not?*
  - *What do you think about the two different fuel sources in general?*
  - *Have your views about this changed since you purchased your most recent car?*

#### **D. Point of Purchase**

16. For this part of the interview, I'll need you to have a pen and paper handy, please draw three large boxes on your piece of paper (large enough to write in). I'm going to read out some vehicle features and I'd like you to put them into one of the boxes depending how important this feature is to you when buying new vehicles for your organisation. Please label the first box high, the second box medium and the third box low, these will represent where the features sit in your priorities. **Interviewer to read through the list below and then prompt for any other important features:**
- a. *Comfort*
  - b. *Costs – what elements of cost? Prompt for: purchase/running/resale value/tax/insurance*
  - c. *Engine size – small vs. large*
  - d. *Fuel type – petrol, diesel, LPG, electric vehicles*
  - e. *Environmentally friendly/low CO2 Emissions- Probe for what they interpret this to mean (i.e. in terms of general climate change vs. local factors like air quality)*
  - f. *Image of brand / brand preference*
  - g. *Image of model / model preference*
  - h. *Interior space/functionality/boot size*
  - i. *Reliability*
  - j. *Safety*
  - k. *Speed/performance,*
  - l. *Style/design*
  - m. *Features – sat nav; CD player; music system; power steering etc. (all features mentioned)*
    - *Anything else?*

**Interviewer to explore the high priority features, using the above prompts if necessary**

17. What would you describe as being your organisation's top **three** most important factors when purchasing a new car? Can you please talk us through them in order of importance:
- *Number 1: what made this **most** important for you?*
  - *Number 2: why was this important?*
  - *Number 3: why was this important?*
18. What were your thoughts on the purchase or lease price of the vehicle(s)? Did the price represent value for money?
- Have your thoughts on the price of the vehicle changed in the time that you've had it/them? If so, how?
  - Are you happy to talk to us about how your organisation financed the cost of purchasing its car(s)?
    - *Monthly payments*
    - *Some combination of deposit/payments*
    - *Outright*

**E. Experience of the car**

*In this section, we'll be asking you about how your organisation has made use of the car(s) in the fleet.*

19. What are your experiences of the general day to day costs of running the car(s)?
- *What are your thoughts on fuel costs?*
  - *What about maintenance costs?*
  - *How do these compare to what you think you could achieve with other cars on the market?*
  - *Are you happy with the current running costs of your car?*
20. How do you make use of the car(s) in your fleet currently? ***This is about current use rather than previous use as in Section A.***
- *Who uses them?*
  - *Are they used as a pool car, for example?*
  - *Do you know how these vehicles are used? Are they used as perk cars (cars only for one individual's use as an organisation car)?*
21. How well do/does the car(s) meet your organisation's transport needs?
- *Are there any journeys you or your organisation's staff would not make in the car? If so, why?*
  - *If considered unsuitable for certain journeys, what are the main concerns?*
  - *What feedback (if any) have you had from your employees in relation to the cars your organisation owns/leases?*

## F. Thoughts for the future

Now we would like to ask you about your thoughts on any cars you may purchase or lease in the future.

22. In an ideal world, what would your fleet look like in 5 years' time?
  - *In reality, what do you think your fleet will look like in 5 years' time?*
  - *What factors will influence this (for example, economy, technology, business success, etc.*
23. When do you think your organisation will replace the current car(s) in its fleet?
24. What aspects will your organisation look for in your next car(s)?
  - *Have these changed over time? If so, in what way and why?*
  - *Would your organisation consider an electric vehicle or hybrid vehicle? Why/Why not?*
25. What, if anything, do you and your organisation know about electric vehicles?
  - *Where did you gather this information from? Media (TV, newspapers, magazines), friends/family, other (where?)*
  - *Can you name any models of electric vehicles available on the market? If yes, which? What do you know about them? Cost, vehicle range, anything else?*
26. What do you know about how to recharge an electric vehicle?
  - *How long does it take?*
  - *How much does it cost?*
  - *Are you aware of the different types of chargers available (standard, fast, rapid<sup>26</sup>)?*
27. What potential is there for the installation of infrastructure (e.g. charging points) for use by electric company cars or private cars?
28. Have you ever driven an electric vehicle?
  - *Have you ever been in an electric vehicle?*

**If yes:** *What was it like?*

**If no:** *What do you think it would be like to drive electric vehicles?*
29. To what extent do you think electric vehicles could meet your organisation's mobility needs?
30. What do you think are the advantages and disadvantages of electric vehicles compared to petrol/diesel vehicles?
31. What do you think an electric vehicle says about its owner?
  - *What do other drivers think when they see someone driving an electric vehicle?*
  - *How do you think staff at your organisation would feel about driving (an) electric vehicles(s)?*
  - *What do you think your customers would think if your organisation bought (an) electric vehicle(s)?*

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<sup>26</sup> If you need to describe, please explain using these descriptions:

Standard charge = 5 - 8 hours

Fast charge = 3 - 4 hours

Rapid charge = under 30 minutes

32. What are the barriers to purchasing an electric vehicle for your organisation?  
**Only use prompts if necessary:** *Purchase cost, range, charging, driving experience, residual value, government policy continuing in its current form.*
- *Of these barriers, are there any that would prevent your organisation from purchasing them?*
  - *How do you think these barriers could be overcome?*
  - *Who should be responsible for reducing barriers to purchasing electric vehicles (e.g. Government, local authorities, manufacturers, dealers, the media, others?)?*
33. Are you aware of any Government backed schemes to encourage consumers to purchase electric vehicles?
- **If not mentioned:** *Have you heard of the Plug-in Car Grant (PiCG)?*
    - a. *How and when did you hear about the Plug-in Car Grant?*
    - b. *What do you know about the Grant?*
    - c. *Do you think it's an effective way for the government to encourage uptake of electric vehicles?*
  - **If not mentioned:** *Are you aware that under the current system of Company Car Tax, low- and ultra-low carbon vehicles are rewarded with lower Benefit In Kind rates? Battery electric cars are zero-BIK rated. Conventional hybrids also receive a reduced BIK rate as a result of their lower CO<sub>2</sub> emission. What do you think about this as an incentive?*

#### ICE organisations based in PiPs areas

34. **If interviewee doesn't mention local PiPs in question 33, then ask:** Are you aware of the <Plug-in Places>Scheme?

#### If yes:

- *What do you know about the scheme – when and how did you find out about it?*
- *Have you noticed charging points in your area?*

#### If no:

<PiPs description to be entered here>

- *Would being based in an area with a scheme like this have any influence on whether your organisation would purchase an electric vehicle or not in the future?*

35. What (other) factors would encourage you to purchase an electric vehicle?

**Please read out the following question BEFORE switching off the recorders**

The Department for Transport is interested in using anonymous quotations from research participants in its communications material related to the Grant. Do you consent to the Department using your anonymous quotations for this purpose?

**Thank you for your time**



## Appendix K Respondent profiles (sample and achieved)

Variable	Profile of private individuals (from sample)	Profile of private individuals (interviewed)	Profile of organisations (from sample)	Profile of organisations (interviewed)
<b>Quarter car purchased</b>				
Q4	0%	+1%	2%	0%
Q5	39%	0%	20%	+1%
Q6	16%	-1%	18%	-2%
Q7	6%	-2%	11%	-2%
Q8	3%	0%	6%	0%
Q9	8%	-1%	21%	+2%
Q10	28%	+3%	22%	+2%
<b>Rurality</b>				
Hamlet	9%	0%	5%	+1%
Town and Fringe	18%	-9%	9%	0%
Urban - London	47%	-30%	12%	-4%
Urban - Other	16%	+30%	64%	+4%
Village	1%	+17%	8%	+1%
Other	1%	0%	2%	-1%
<b>Business size</b>				
Small	-	-	54%	-1%
Medium	-	-	21%	-1%
Large	-	-	25%	+1%
<b>Model purchased*</b>				
Ampera	20%	+2%	14%	+1%
CZero	0%	+1%	2%	0%
iMiEV	-	-	24%	+2%
Fluence ZE	1%	+1%	-	-
iOn	1%	0%	7%	-2%
Leaf	65%	0%	50%	-1%
Volt	4%	0%	3%	3%

Variable	Profile of private individuals (from sample)	Profile of private individuals (interviewed)	Profile of organisations (from sample)	Profile of organisations (interviewed)
<b>PiPs Region</b>				
<b>East of England</b>	11%	0%	10%	+1%
<b>London</b>	21%	-6%	14%	-4%
<b>Midland</b>	15%	0%	19%	+2%
<b>Milton Keynes</b>	2%	0%	1%	0%
<b>North East</b>	6%	+1%	6%	0%
<b>Northern Ireland</b>	2%	-1%	1%	0%
<b>Scotland</b>	2%	+1%	6%	0%
<b>Outside PiPs areas</b>	43%	+4%	43%	0%
<b>Type of Car</b>				
<b>Electric</b>	75%	-2%	84%	-2%
<b>Plug-in Electric</b>	<b>Hybrid</b> 25%	+2%	16%	+2%

## Appendix L Replicating the segmentation model: Golden Questions and allocation algorithm

### Golden Questions

The Golden Questions, identified by statisticians at TNS-BMRB during DfT's Climate Change and Transport Choices research, were used to define the six car owning segments among the private individuals. The methodology used to calculate these segments is described below.

Table 9-1 summarises the Golden Questions asked in the private individuals survey.

**Table 9-1. Golden Questions for replicating car-owning segments**

<b>Step 1: Define car owners</b>
<b>Pre defined for this survey as all respondents had recently purchased an electric car</b>
<b>Step 2: Apply algorithm (using categories below)</b>
<b>Q35_2 and Q36 - Mobility / disability issues (combined from 2 questions)</b>
1=Respondent has no mobility or disability issues
2=Respondent has a disability or long standing health problem that makes it difficult (but not impossible) to ride a bicycle but no problems going out on foot, or use local buses, or get in or out of a car
3=Respondent has a disability or long standing health problem that makes it difficult to go out on foot, or use local buses, or get in or out of a car, or makes it impossible to ride a bicycle
<b>Q23 - Age of respondent</b>
1=16-20
2=21-29
3=30-39
4=40-49
5=50-59
6=60-69
7=70+
<b>Q24 - Highest level of education from pre-coded list</b>
5=University first degree or above
4=Diploma / A levels or equivalent
3=GCSE A-C or equivalent
2=GCSE D-E or equivalent
1=No qualifications listed at question

continued...

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**Q1 - How many vehicles does your household own or have continuous use of at present?**

1=No car

2=1 car

3=2 cars

4=3+ cars

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**Q37 - Whether Speed / performance is important when buying a car or van**

1=Yes

0=No

---

**Social - social grade**

6=A

5=B

4=C1

3=C2

2=D

1=E

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**Q34 - Years lived in current home**

1=Up to 1 year

2=More than 1, to 2 years

3=More than 2, to 5 years

4=More than 5, to 10 years

5=More than 10, to 20 years

6=More than 20

---

**Q37 - Whether or not style/design is important to you when buying a car or van?**

1=Yes

0=No

---

**Q38 - Agreement with: I would cycle (more) if there were more dedicated cycle paths**

1=Definitely disagree

2=Tend to slightly

3=Neither agree nor disagree

4=Tend to agree

5=Definitely agree

---

**Q3/4- Miles driven per year**

1=0

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- 2=1-499  
 3=500-999  
 4=1,000-1,999  
 5=2,000-2,999  
 6=3,000-3,999  
 7=4,000-4,999  
 8=5,000-6,999  
 9=7,000-8,999  
 10=9,000-11,999  
 11=12,000-14,999  
 12=15,000-17,999  
 13=18,000-20,999  
 14=21,000-29,999  
 15=30,000 or more

### Allocation algorithm / weighting coefficients

**Table 9-2** provides the weighting coefficients used in determining segment membership. Membership was determined on a respondent by respondent basis in four steps:

- The respondent's answer to each of the Golden Questions was multiplied by the relevant weighting coefficient – this was done for each of the segments / columns in the table
- The products for each question were summed, generating a single total score for each respondent for each column in the table
- The relevant 'constant' was subtracted from each of the column totals
- The respondent was allocated to the segment / column which they scored highest against once the constant had been subtracted

**Table 9-2. Weighting coefficients for car-owners**

Variables	Coefficients for 6 Segments					
	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6
Q35_2/Q36 - Mobility / disability issues (combined from 2 questions)	31.6949	10.9014	11.7357	12.2171	11.0467	11.1493
Q23 - Age of respondent	4.76361	2.25679	4.43519	4.81527	3.04875	3.12341
Q24 - Highest level of education from pre-coded list	1.61234	2.46750	1.21981	2.82662	3.08955	2.49465
Q1 - How many vehicles does your household own or have	6.84815	7.00689	7.17285	7.40678	7.67473	10.3673
						1

Coefficients for 6 Segments						
Variables	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6
continuous use of at present?						
Q37 - Whether Speed / performance is important when buying a car or van	0.85221	0.60548	1.08672	1.52037	0.44677	5.04625
Social - social grade	2.57846	2.12591	2.05020	3.10691	3.10564	2.81858
Q34 - Years lived in current home	2.08327	1.19514	2.05797	2.30350	1.63197	1.67484
Q37 - Whether or not style/design is important to you when buying a car or van?	0.53561	0.43243	0.42176	0.29506	0.02409	3.37571
Q38 - Agreement with: I would cycle (more) if there were more dedicated cycle paths	2.05982	1.61760	1.36296	1.75761	1.18885	1.53030
Q3/4 - Miles personally driven per year	0.29543	0.35912	0.44257	0.43462	0.58981	0.56081
	-	-	-	-	-	-
<b>Constant (subtracted from total)</b>	<b>85.385 68</b>	<b>29.834 90</b>	<b>40.044 20</b>	<b>54.194 50</b>	<b>42.447 67</b>	<b>50.177 48</b>