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

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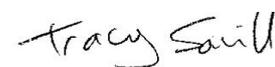
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## Contents amendment record

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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

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<sup>1</sup> See full report 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 the full report.

<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).

either sell or lease (n=13). Private (n=30) and organisational (n=12) non-EV purchasers were also interviewed.

## **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 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.

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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).