Electric Vehicles

Gauging interest among disabled and elderly drivers

April 2016

Transport for London

Contents

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Background and approach

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Background

- TfL is responsible for **improving air quality** and **reducing vehicle emissions** in London. It has a broad range of initiatives and plans to achieve this
- Electric vehicles and plug-in hybrids are some of the cleanest vehicles on the road and TfL supports the promotion, incentives and development of infrastructure for these vehicles, with an ultimate desire to make London the ***electric vehicle capital*** of the world
- Blue badge car drivers have some of the **highest usage of cars** and are most reliant on their vehicles over public transport of any road users in London. TfL have identified the potential benefits of switching blue badge holders away from their vehicles with Internal Combustion Engines (ICE) to electric cars or plug-in hybrids as a way to reduce emissions while blue badge holders get to maintain their routine and comfort
    - A secondary target is older drivers who are also reliant on their cars and have higher usage than the general population
- Having identified the target opportunity, TfL now wants to **explore the current landscape and attitudes of these audiences** through research. And to measure the potential for electric vehicle and plug-in hybrid adoption.

Research objectives

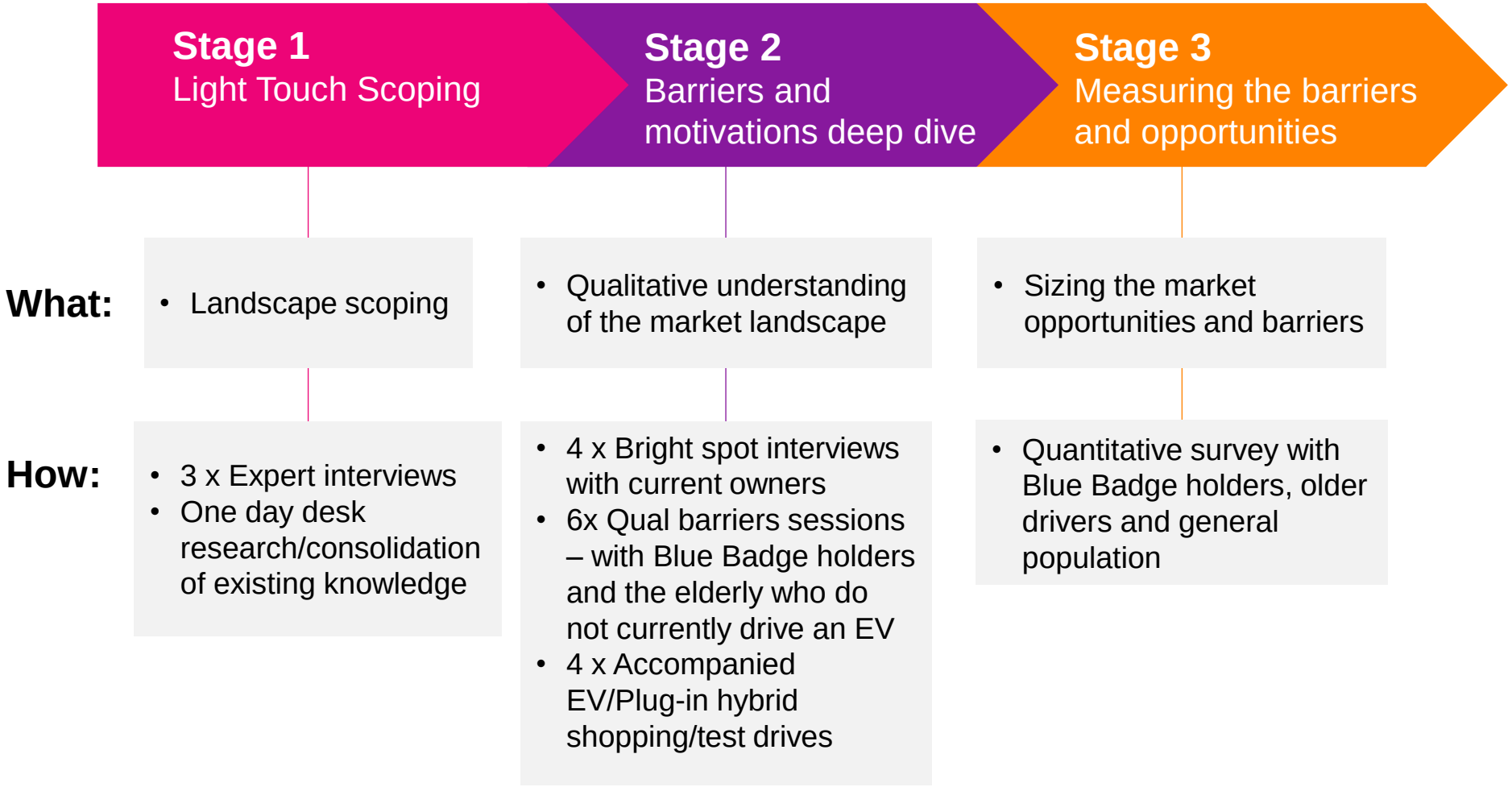
BUSINESS QUESTION

- Are blue badge holders and/or older drivers a viable target for electric vehicles? And if they are, how can TfL encourage and promote the uptake of EVs amongst people with disabilities?

RESEARCH QUESTIONS

- What awareness and attitudes do these audiences hold towards these vehicles currently?
  - What are the motivators and barriers to adoption?
- How do their attitudes compare to the rest of the London population?
- What are the charging requirements of these users specifically at present and how could TfL support these (particularly amongst those without off-street parking)? How might current infrastructure meet or fail to meet their needs?
- What could TfL do to help encourage a switch?
- Explore awareness of the financial and health benefits associated with EVs

Research methodology



Qualitative: depths, groups and accompanied journeys

Specialist interviews

Bright spots

- 4 x Blue badge holders who own PHEV/Hybrids: (*Mitsubishi Outlander 2.0 GX3h; Toyota Yaris Hybrid; Renault ZOE; Honda civic 1.4 Hybrid*)

Expert interviews

- CEO of Disabled Motoring UK (DMUK)
- *Product Manager* (Auris, Avensis, Verso, Prius family and Mirai) Toyota GB
- *Sales Manager* Jemca Bromley Toyota Dealership

Focus groups

Group	Profile	Current car status
Blue Badge Holder	Younger – 25-45	Owner – high usage
Blue Badge Holder for a parent	Age fell out	Owner - less frequent car usage*
Blue Badge Holder	Older – 46+	Owner – high usage
Blue Badge Holder for a partner	Older – 46+	Owner less frequent car usage*
Blue Badge Holder	Family with disabled child	As falls out
Older Driver	65+	Owner – high usage

Quantitative: online survey

Method

- 10 minute online survey with...

✓ **People living in London and Greater London**
✓ **Drivers**

- Asking about their car, and key priorities when buying a car
- Awareness and experiences of EVs
- Perceptions of EVs
- Motivators and barriers to EV uptake
- The impact of information on EVs

Sample

N=445

Group	Count	Gender	
Representative sample in London *(quotas on age, gender, inner/outer)*	*N*=225	50%	50%
Blue Badge holders *(personally, or on behalf of someone else)*	*N*=109	43%	57%
Elderly people (65+)	*N*=111	36%	64%

Key findings

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Headlines

- Blue Badge holders rely heavily on their cars, making them a potential target for Electric Vehicles. However, they are a **risk averse audience**
- There are some aspects about how some Blue Badge holders drive that make **EVs highly relevant for them** – EVs are easy to drive (automatic), easy to charge and suited to shorter journeys and urban driving
- However Blue Badge holders may resent being **defined by their disability** and suggestion that these factors apply to all disabled drivers would be inappropriate
- The key motivation for considering EVs is **financial**, but this is a weaker incentive for Blue Badge holders who already benefit from financial advantages e.g. exemption from road tax; so there is no clear intuitive link of why EVs would be especially appropriate for Blue Badge holders
- Promoting the benefits of Electric Vehicles to Blue Badge holders, could also highlight the **limitations**
- Electric vehicles are seen as innovative and modern and as the **future of driving** but they are seen as **less reliable**, more niche and **expensive**
- Blue badge holders have unanswered questions about EVs and have particular concerns about **charging** (how to charge, where to charge and how much it costs), **availability** (which manufacturers make them, 2nd hand market and availability on Motability) and **reliability** (battery life and range, where to get them serviced)
- Greater exposure to EVs increases propensity to consider them so increasing knowledge about them and **promoting test drives** is key

Summary: Motivations and barriers for Blue Badge holders

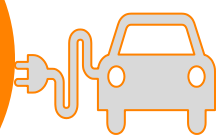
MOTIVATIONS

EVs are the future – green, economical and modern

They feel like a normal car - easy to drive, powerful and sleek

CONSIDERATIONS

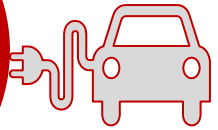
Blue Badge holders aren't that 'different' - Do not marginalise



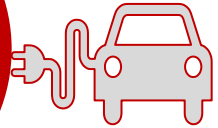
Vehicle selection is limited – Vehicle must meet particular needs

BARRIERS

No specific benefits – The offering for Blue Badge holders is not distinct from other drivers



Concerns about charging and range – lots of unanswered questions



The Blue Badge Experience

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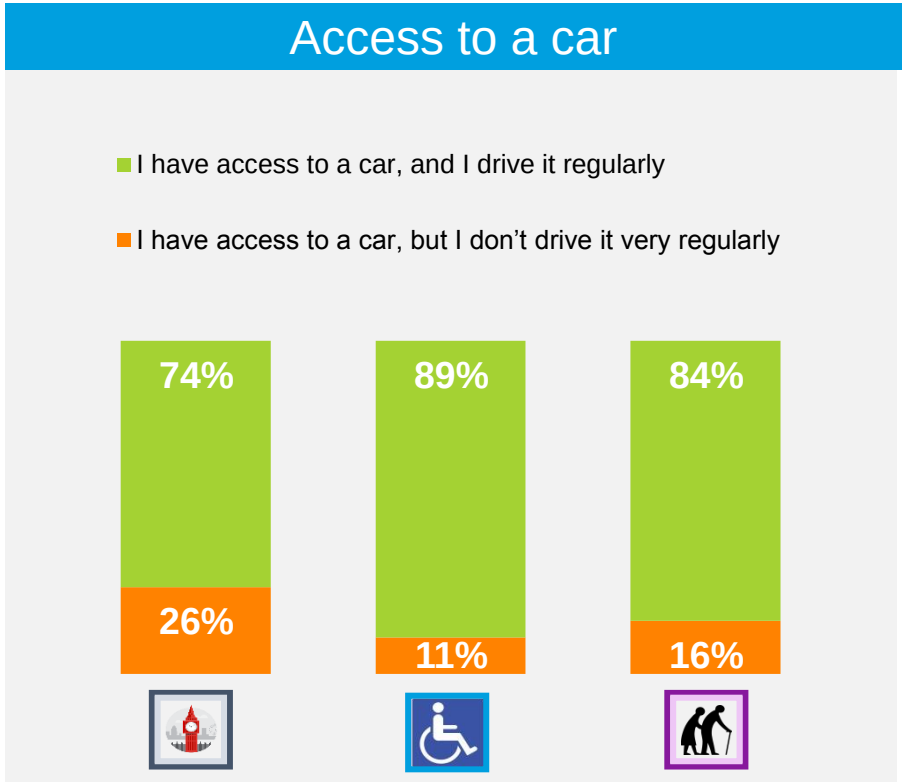
Blue Badge holders heavily rely on access to a car, and this represents freedom and independence – they are a risk averse audience

- Having access to a car (driving or being driven) is **critically important** to their lives both **practically and emotionally**
- This audience is **highly reliant** on their vehicles (especially where public transport is not a viable option) – most drive daily
- Acutely aware of, and sensitised to, anything **potentially going wrong** and disrupting their experiences
- As such, they like to **manage any risks** as much as they can by:
  - Planning journeys (particularly if longer/unfamiliar)
  - Ensuring cars are maintained
- Anything that represents a risk for this audience is **quickly discounted**

I need to make sure the car is reliable. I can't be stranded miles from anywhere

I do some research on parking before I leave if I haven't been somewhere before. If I can park, how far parking is from where I need to get to



SQ6. Which of the following best applies to you? | **Base:** All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]

Blue badge drivers identify some pain points, but there few serious unmet needs; financial concessions are a great benefit

NEGATIVE EXPERIENCES

- Insufficient on-street parking
- Inconsistencies in parking rules across London (lack of clarity re parking regulations)
- Other drivers, people parking in disabled bays and perceived lack of enforcement

Westminster's rules are different to Camden's. Every borough seems to operate differently , which is frustrating

POSITIVE EXPERIENCES

- Few parking restrictions
- Financial concessions
  - No congestion charge
  - No VED

The experience hasn't changed that much. I've few real problems

Current car and priorities

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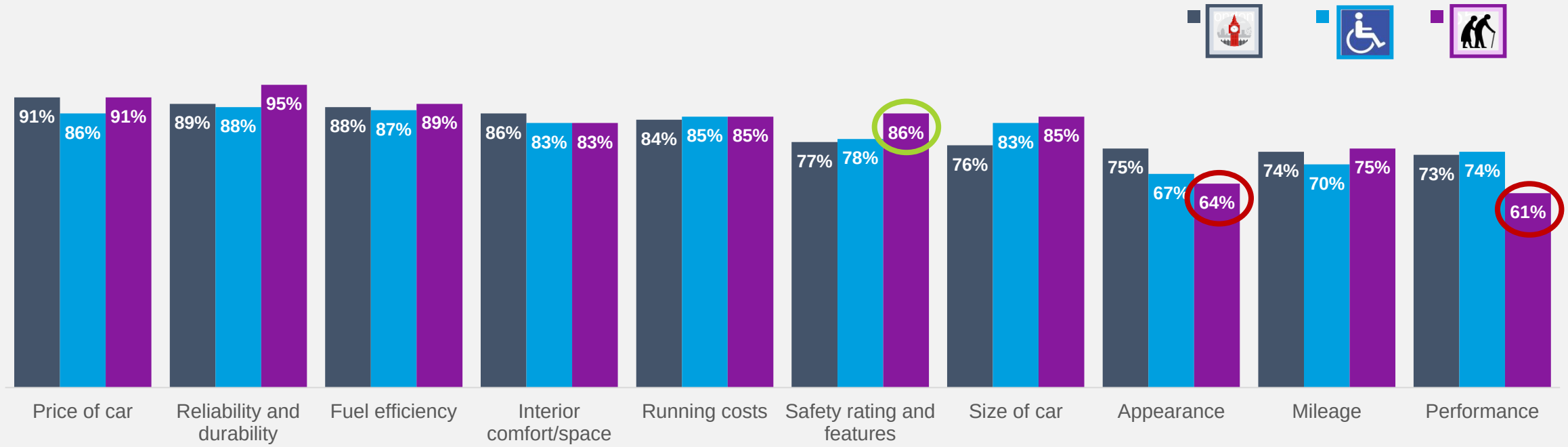
Blue Badge, elderly, and non disabled drivers have consistent top priorities when considering a vehicle: reliability, efficiency and cost

Top 10 priorities when considering a vehicle



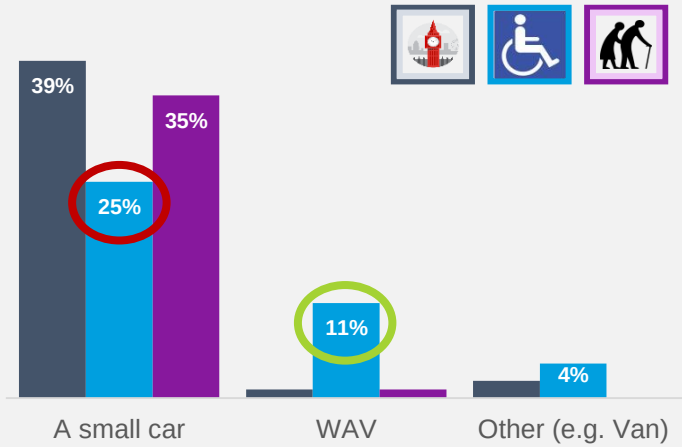
C3. What are/were not your priorities when purchasing a car? | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]

Sig higher/lower than representative London drivers

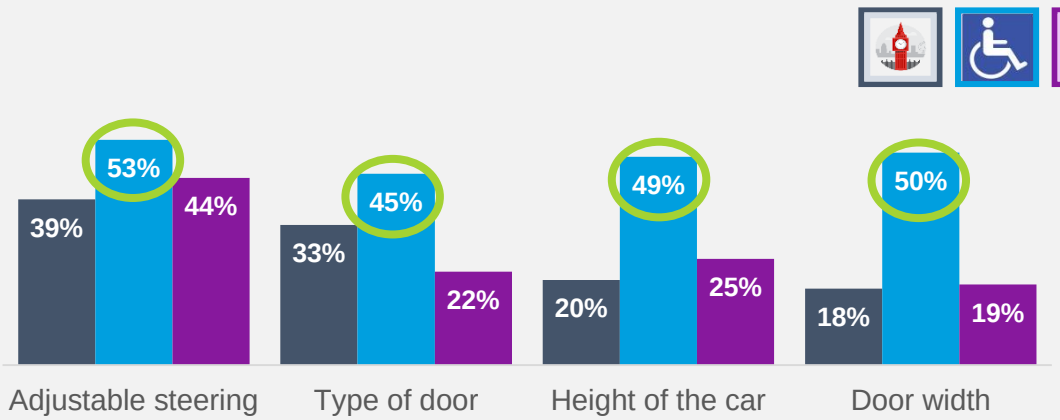
However, for Blue Badge drivers there is less flexibility when considering vehicles; they have more <u>specific needs</u> and requirements

- This audience are acutely aware that (depending on their disability) their **choices for vehicles** that suit their specific needs are far **narrower**
- They are more likely to be driving **larger vehicles** and WAVs
- Need to **consider a broader range of features** when purchasing a vehicle, and more likely than other groups to prioritise:

Current car type



Other priorities for a vehicle



My son is severely autistic. He's uncomfortable if he feels enclosed. We have to have a big car

It's got to be the right height for me top climb into it comfortably

If we cant get the wheelchair into it, we can't use it

C1a. What type of car do you currently drive? | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]
C3. What are/were not your priorities when purchasing a car? | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]

Sig higher/lower than representative London drivers

It is not a one-size-fits-all for Blue Badge drivers; there are a number of specific and personal requirements when considering a vehicle

Average number of priorities

19

17

17

Ideal height for the car?

High off the ground: **32%**
Level: **64%**
Low down: **2%**

There's no such thing as an 'ideal' Blue Badge Car. What works for me wont work for this lady here

The reason I always go for VWs is I know the car interiors (chairs steering wheel configuration) works for me

C3. What are/were not your priorities when purchasing a car? | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]
C5. You mentioned that you prioritised*/* would prioritise the height of the car, could you please tell us what you would consider the ideal height of your car? **Base**: All who prioritise height of car [Blue Badge (n=53)]

Many Blue Badge drivers prefer to lease a vehicle; less risky and makes ownership more affordable

- Many choose to use their **mobility allowance** to **lease vehicles** as this affords them the most convenient way to drive a brand new car
- To this audience, Motability delivers key benefits
  - Makes ownership **affordable** – low monthly payments
  - Provides **peace of mind** – brand new car under warranty; servicing is often included.
  - Affords **flexibility** - easy to change cars with no need to buy or sell & adaptations available to improve driving / travelling experience

Motability

If something goes wrong with the car, I just take it back to the dealership. They sort it all out

I get to change my car for a brand new one every three years.

I need my car adapted for me to drive it. the scheme does it. I cant imagine I'd be driving with out Motability

Perceptions of EVs

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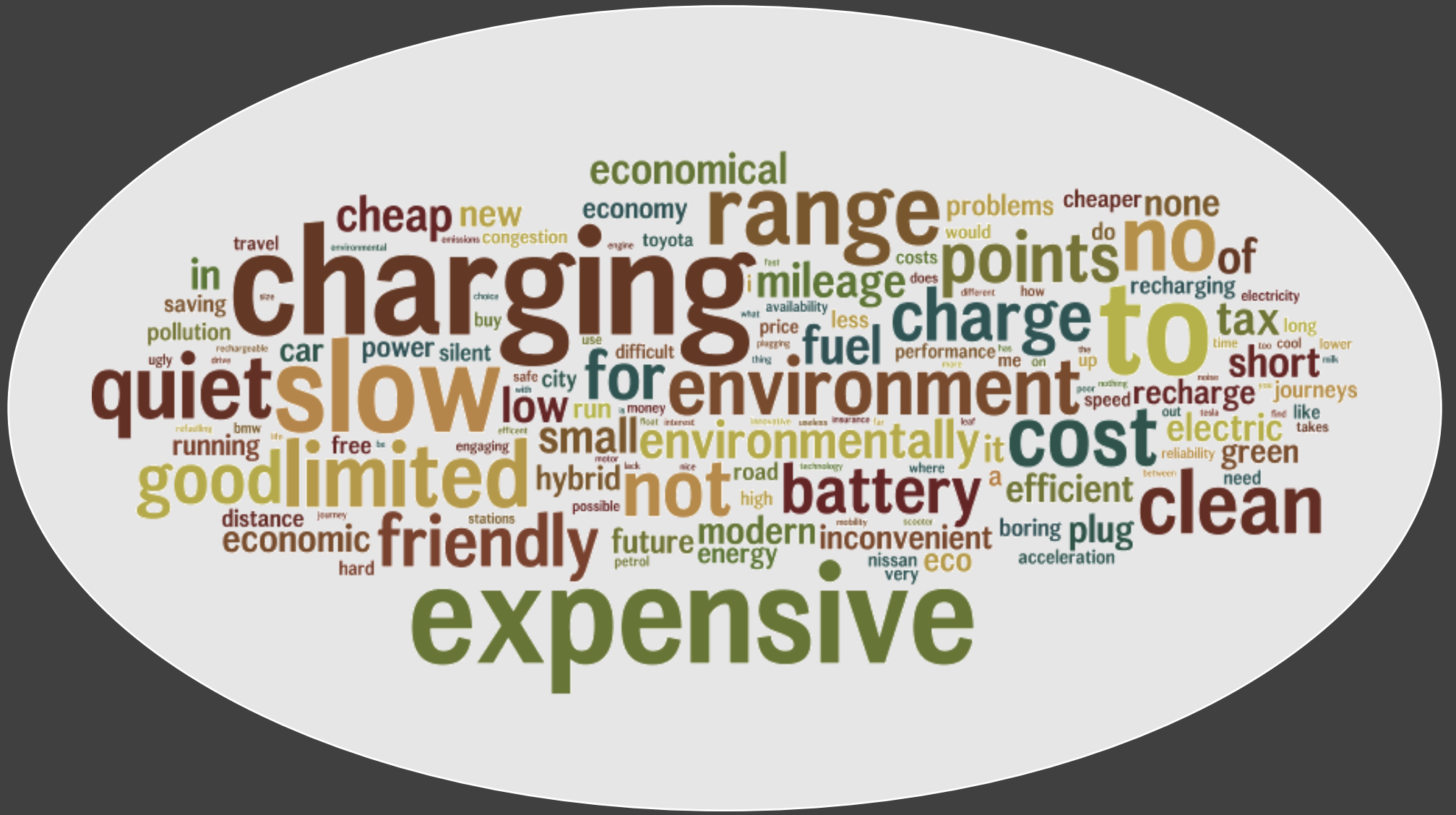
Which words come to mind when you think of an ‘Electric Vehicle’?



Electric Vehicles are seen as more ‘innovative’, ‘techy’ and ‘green’ than traditional cars – many consider them to be the future of driving

I always associate electric vehicles with concept cars. Quite futuristic or strange looking

Japan’s cultural approach to technology means that the adoption of alternative fuel vehicles is more accepted there and the government support of the industry means that infrastructure and incentives are more widespread.
Product Manager Toyota GB

The Product Manager at Toyota GB believed that the UK government cutting the new EV subsidies as of March 2016 could be interpreted by manufacturers to suggest the government doesn’t take alternative fuel seriously,

- EVs (and other alternative fuel vehicles) are very much seen and **embraced as the inevitable future** for drivers
- EVs and Hybrids are spontaneously associated with being **innovative and techy**
- They are also seen as being **good for the environment**
  - Perception that uptake of alternative fuel vehicles is **higher in other countries** such as Scandinavia*, the US and Japan
  - These countries are seen as having **more ‘developed attitudes’ to sustainability** and more likely to adopt new technologies

Compared to petrol/diesel cars EVs are…

‘Innovative’

‘Green’

‘Modern’

‘Techy’

‘Economical’

Norway has what is probably the world’s best incentives for Zero Emission Vehicles, and correspondingly the **world’s highest number of electric cars per capita: http://www.evnorway.no/#/history**

A5. Which of the following words/traits do you most associate with each type? | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]

However, there are also some negative associations of ‘expensive’, ‘unreliable’ and ‘inconvenient’ – Hybrids present less of a risk

- There are many **ingrained negative associations** with EVs
  - **Low speed/sluggish** with limited distances
  - **Expensive** to buy
  - Inconvenient in terms of **charging** and for **maintenance**
- In contrast to EVs/PHEVs:
  - Hybrids broadly considered a part of the London vehicular landscape (esp in Central London)
  - Referred to as ‘duel fuel’ - a **basic understanding** of the technology
  - Perception there is a **range** manufacturers
  - **Lower risk** - realistic segue way from conventional fuel powered cars to alternative fuels

Compared to petrol/diesel cars EVs are not…

‘Trusted’

‘Sleek’

‘Convenient’

‘Reliable’

‘Cheap’

I think you’d have to be really into the environment to get one

Slow. Cumbersome. They're getting close but the technologies not quite there yet

A5. Which of the following words/traits do you most associate with each type? | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]

EVs are seen as experimental, and among the risk averse Blue Badge drivers this presents a problem; they are not looking for niche

- There is a general perception that EVs are **not as established as Hybrid** vehicles
- A **niche idea** that appeals to techy early adopters or the 'super green'
- People do not want to be the first to try them – think that once they 'take off' there will be more appeal
    - Blue badge drivers are particularly risk averse and **do not want to 'trial' EVS**, and would rather wait until they can see them working on the roads

Pretty much every Addison Lee is a Prius Hybrid. There are loads of them about. That says to me that they work and there's no questions around the reliability

Proportion of people in the UK you think drive

"0-10%"


76%


62%


95%

They're pretty niche. They're not loads of them about

Compared to Hybrid cars EVs are…	Compared to petrol/diesel cars EVs are not…
'Niche'	'Common'

A5. Which of the following words/traits do you most associate with each type? | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]
A3. And what percentage of the population in the UK do you think drive an electric vehicle?| **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]

Despite strong associations, actual exposure to EVs is limited; there is low awareness and poor understanding of these vehicles

- Understanding and awareness of the technologies are patchy with a lack of clarity regarding
  - **How** they work
  - Which **manufacturers** currently make them
  - How **prevalent** they are in the UK/London
- There is low exposure to EVs – not many people know someone with an EV, or have access to one
  - Exposure to EVs is **highest among the Blue Badge Drivers**
  - Lowest among elderly drivers

You don't see loads parked around London do you?

Current car fuel type

	EV	Hybrid	Plug-in Hybrid	Range extended EV
	3%	2%	1%	0%
	5%	6%	2%	1%
	0%	2%	0%	0%

*How many of the drivers you know drive an electric vehicle?**

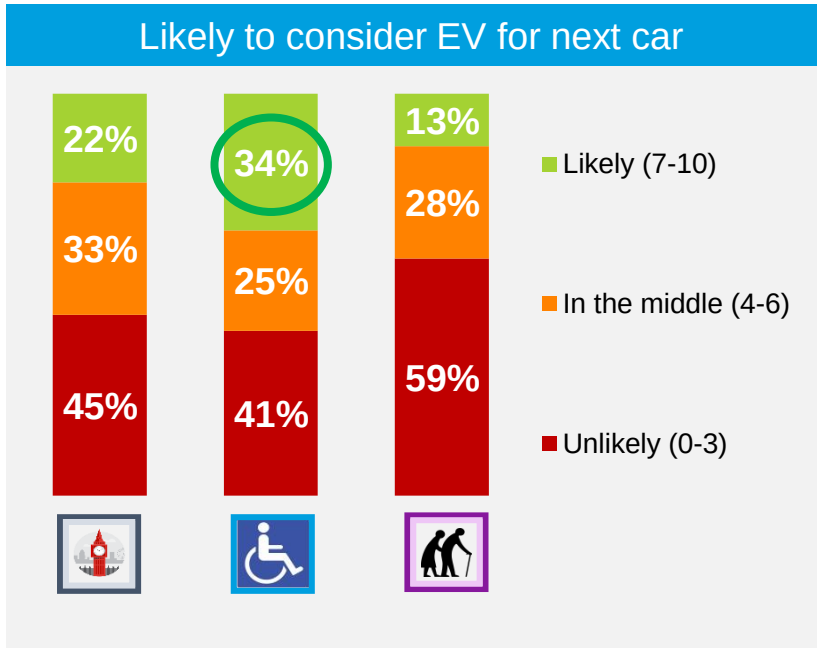
Yes	20%	37%	6%
No	75%	57%	85%
Not sure	5%	6%	9%

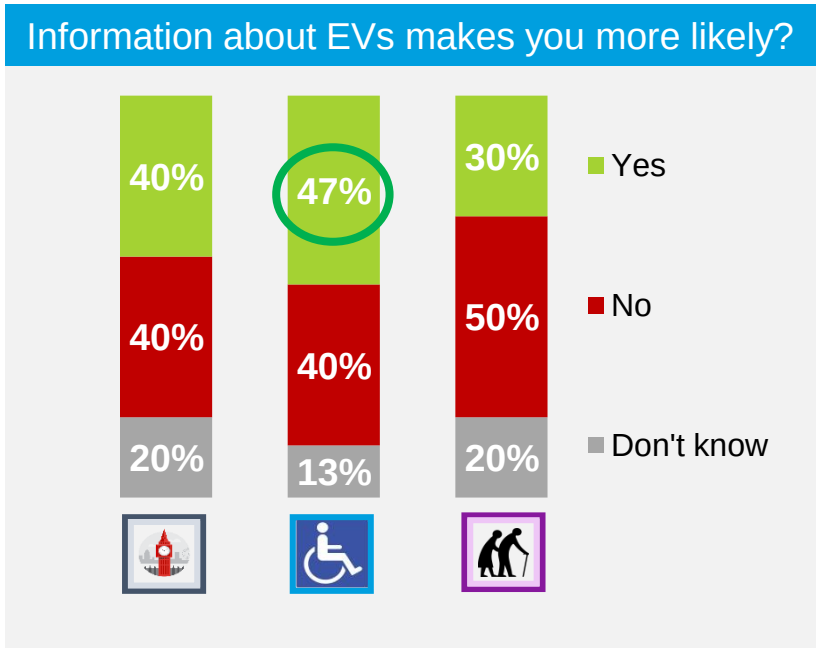
C1b. Which of the following types of vehicle do you currently own | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]
A2. How many of the drivers you know drive an electric vehicle? | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]
*NB: Question was asked before any definitions of what 'electric vehicles' were give. Some may have had mobility scooters in mind

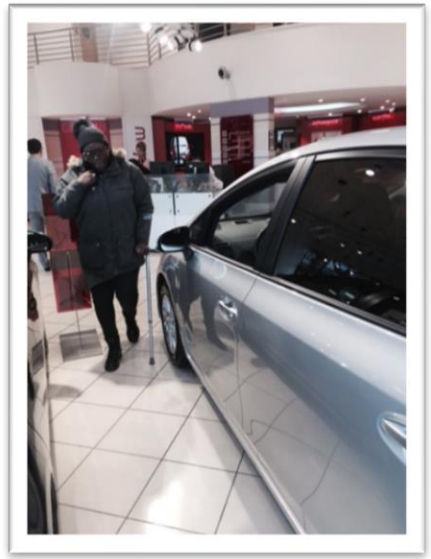
Greater exposure to EVs increases propensity to consider; sharing information or stimulating trial through test drives is key

- The **test drives successfully convinced participants** of the effectiveness of EVs in terms of the 'drive'
  - 'Drives' like a normal car
  - Research reveals that there are a wider range available
- Showing respondents **information about the benefits of EVs** increases likelihood to consider, particularly among Blue Badge drivers

I was pleasantly surprised by the drive. It's just like a normal car.







B1. How likely do you think you would be to consider an Electric or Plug-In hybrid vehicle when purchasing your next vehicle? | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]
B4. Does knowing any of these facts increase your likelihood of buying an Electric or Plug-In hybrid vehicle? | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]

Sig higher/lower than representative London drivers

Motivations and barriers

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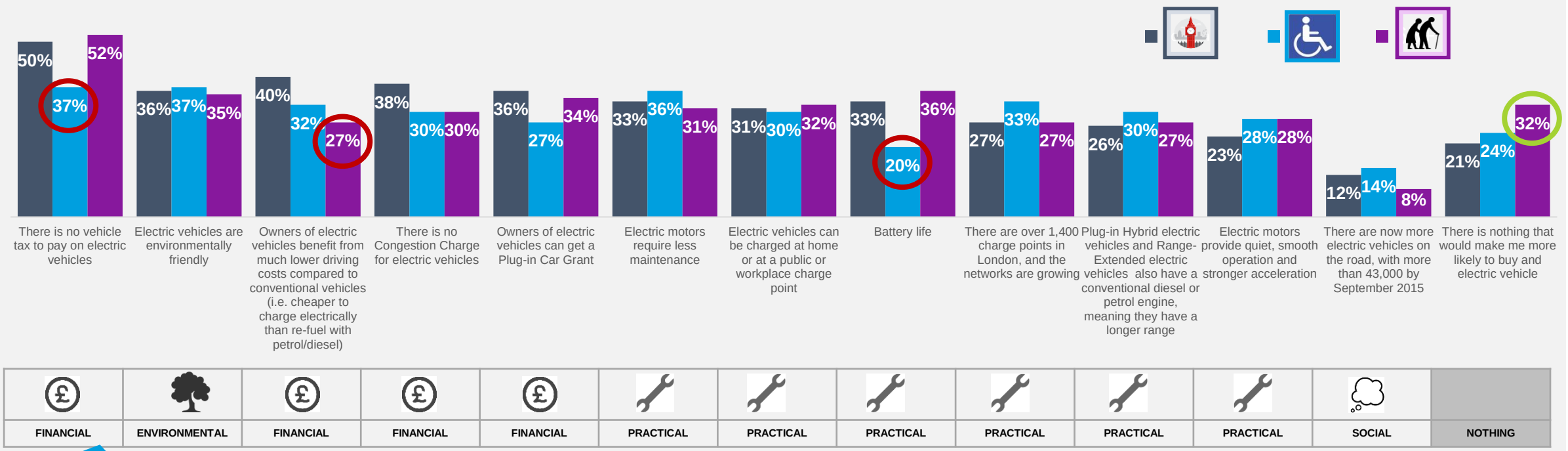
Once presented with information, the key motivation for considering EVs is financial. However, this is a weaker incentive for Blue Badge drivers

Aspects that make you more likely to consider an EV/Plug-in Hybrid (top 13)



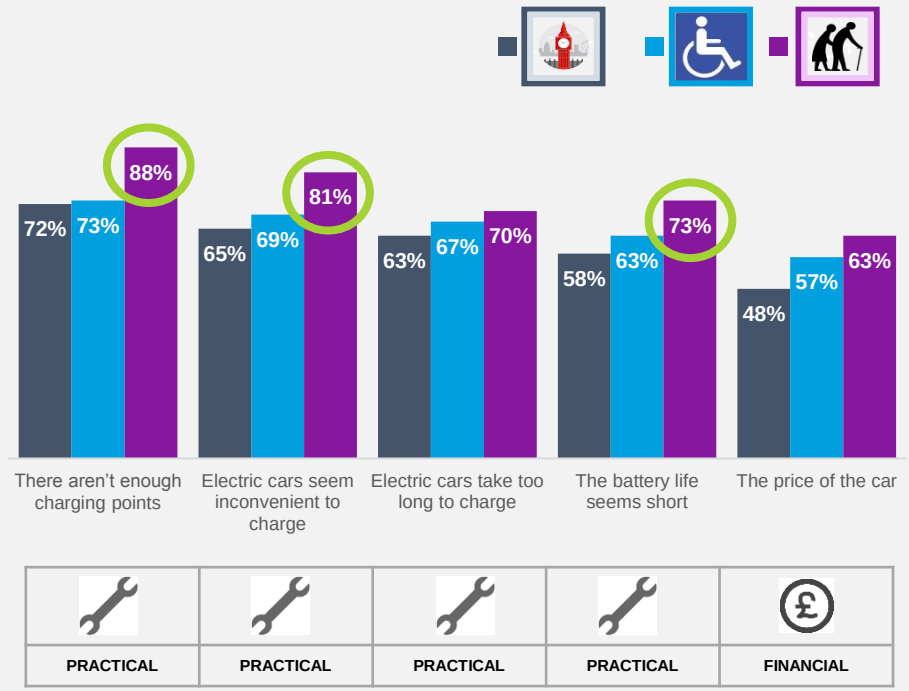
They (EVs) don't really offer me anything extra as a disabled driver. If having a blue badge and owning one meant I could park anywhere I'd consider it

B6. Which of the below aspects would make you more likely to buy an Electric or Plug-In hybrid vehicle? | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]

Sig higher/lower than representative London drivers

Issues relating to charging and battery life are a key concern for all audiences, particularly for Elderly drivers

Aspects that make you not likely to consider an EV/Plug-in Hybrid (top 5)



I still have to drive around [my neighbourhood] to find somewhere to park and charge it. I can't charge one from my house. I can't always park there. And the bay in my road isn't exclusively for me – it's for all disabled drivers

I'm still not sure if I need the charge box or not. The guy in the dealership said I needed one but I thought I could run a cable from the house

Believe they would personally require a modification for charging...

Yes	5%	5%	9%
No	56%	60%	47%
Not sure	38%	36%	44%

B3. Which of the following reasons reflect why you would not be likely to buy an Electric or Plug-In hybrid vehicle | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]
I3. When a user charges their Electric or Plug-In hybrid vehicle (this can be at home, or at public charge-points), they must **insert the electric pump into the vehicle socket**. Would you personally require any modifications to the current charging mechanisms in order to use an Electric Vehicle? | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]

Sig higher/lower than representative London drivers

All audiences, particularly Blue Badge drivers, still have unanswered questions about EVs

- For a risk averse audience EVs **feel too far removed from what they are comfortable with** and they need reassuring they can still deliver against their needs.
- Key unanswered questions:

Charging

- How to charge (equipment is needed; how long does it take)?
- Where to charge? –limited charge points? Lack of infrastructure?
- How much does it cost to charge?

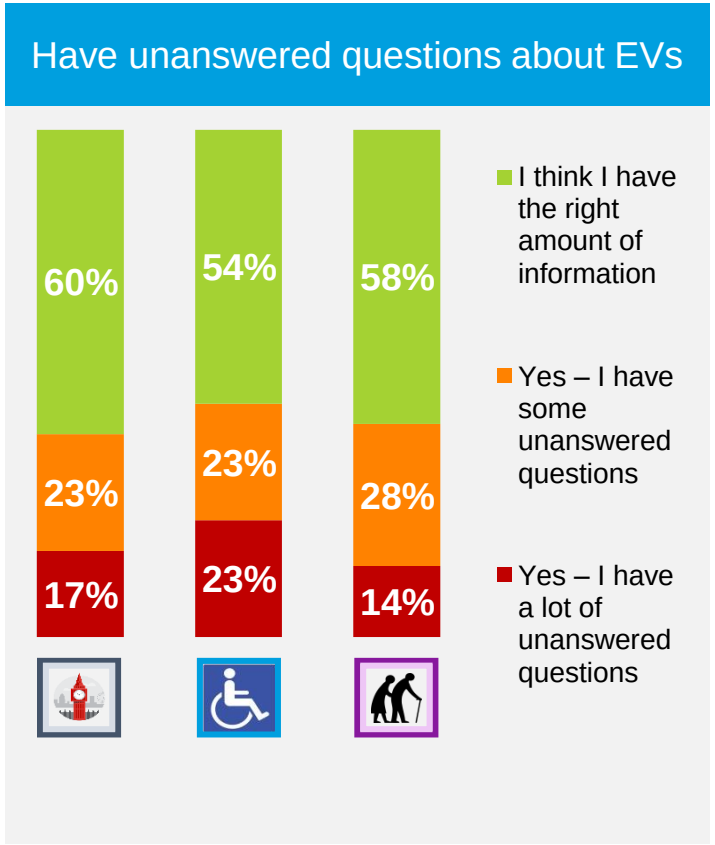
Availability

- Which manufacturers make them – how wide is the choice?
- How much are they?
- Is there a 2nd hand market?

Particularly key

Reliability

- How far do they go?
- Where do you go to have them serviced/repaired?
- How long does a battery last for?



B7. Do you think you would need any more information about Electric or Plug-In hybrid vehicles before you could make a decision as to whether you might be likely to consider purchasing one in the future?| **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]

Sig higher/lower than representative London drivers

Currently there's no intuitive link between EVs and Blue Badge holders

- Once a clearer understanding of how EVs might meet their specific needs is established there still remains no obvious rationale as to why they are relevant to a Blue Badge audience

- Beyond the potential money saving (on fuel) and environmental considerations, Blue Badge holders feel that driving an EV/PHEV offers them no fundamental additional advantages beyond what a Blue Badge affords

- Critically there are also key practical barriers to disabled drivers uptake of EVs namely:
  - **The limited choice of vehicles on Motability**
  - **The fact that paying for a standard vehicle with 0% deposit and disability allowance is far more cost effective than the Motability options**

- The suitability of EVs cars for disabled drivers was not a factor in driving 'Bright spots' interest. Motivations for trial included:
  - **Fuel economy**
  - **Wanting to be 'greener'**
  - **An interest in the technology**

They (EVs) don't really offer me anything extra as a disabled driver. If having a blue badge and owning one meant I could park anywhere I'd consider it

I don't think these (EV) are any more relevant to me as a driver than to an non disabled driver.

I looked at a Hybrid purely for cost efficiency. If I found a petrol engine that was just as cheap, I'd switch back to be honest

Bright spot

There is potential to closer link EVs with disabled drivers

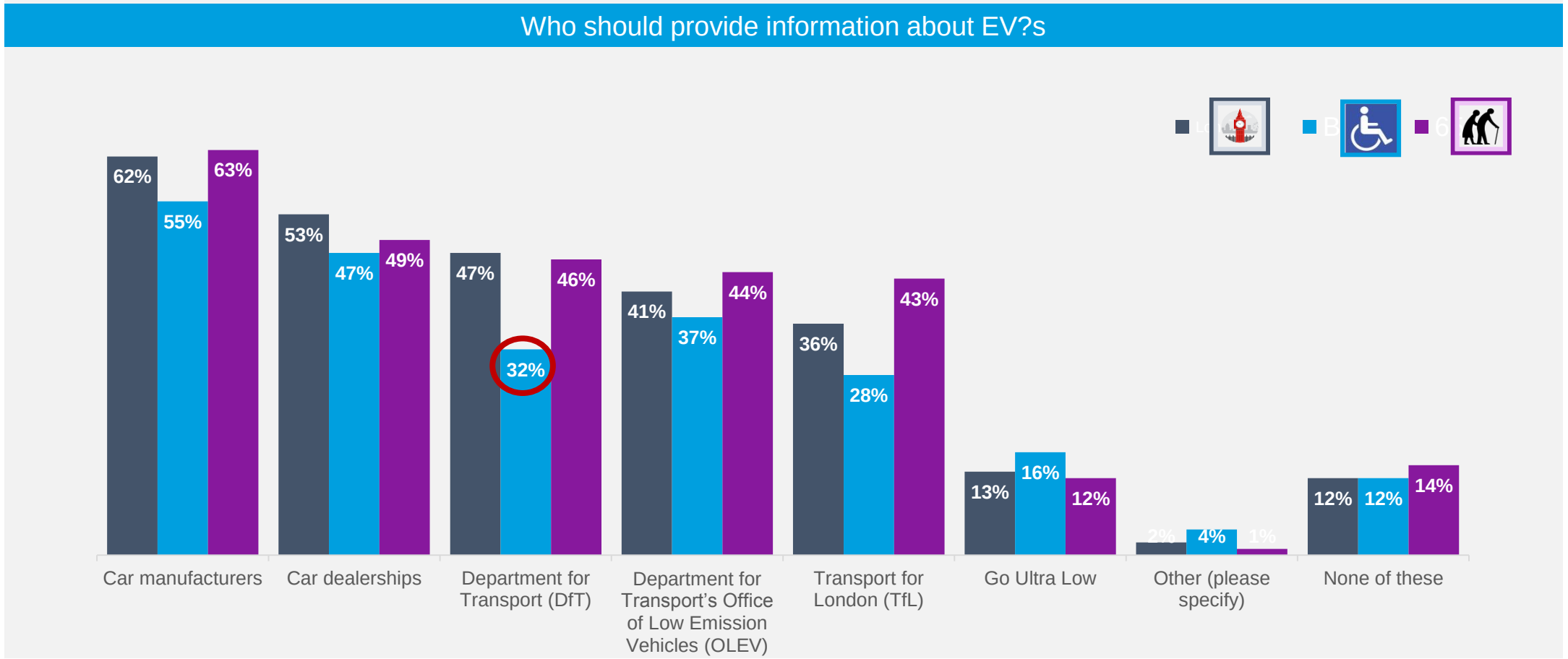
- Based on *how* some Blue Badge owners drive, there are some links that can be leveraged to make **EVs relevant and relatable to this audience** and their experiences, namely EVs are
  - Easy to drive (all automatics)
  - Easy to charge (easier to plug in than to use a petrol pump)
  - Suited for urban driving (shorter city based journeys)

- This said, there are risks in building links between EVs and Blue Badge holders based on their experiences:
  - Blue Badge holders may **resent being defined** through their disabilities
  - **Blanket application** of these factors to <u>all</u> disabled drivers is likely to be seen as inappropriate
- It will be crucial that any links made are done so **delicately** and without **causing offense**

With my arthritis, using the pumps at garages is tricky. Plugging in to charge the Mitsubishi is much easier for me.
Bright spot

They seem suited to 'city drives' more than motorway drives. I suppose I do make more of the shorter trips on a daily basis

Agreement across groups that car manufacturers and dealerships should be sharing information about EVs



I2. Who do you think should be providing information about Electric or Plug-In hybrid vehicles | **Base**: All respondents [London Rep (n=225), Blue Badge (n=109), 65+ (n=111)]

Sig higher/lower than representative London drivers

Opportunities exist to inform and develop the EV/PHEV narrative

While there is no current link between Blue badge holders and EVs there are opportunities to help create these. TfL can help set the conversation/language around EVs and PHEVs

Engaging the Blue Badge audience

1. An opportunity to reach this community directly and raise awareness and relevance of EVs
2. Include Motability and DMUK in discourse and use these organisations as a conduit to reach this audience

I think the EV manufacturers could get involved in things like The Big Event [UK's largest display of vehicles available through the Motability] and show how cars can fit the needs of drivers .

CEO DMUK

Demystifying and removing 'risk'

1. TfL can work with industry to help demystify the tech and language – '*plug in and go'*
2. Draw parallels between the EV experience and conventional vehicles
3. Promote leasing as means to trial with 'safety net' (repairs; warranty covered via leasing agreement)

Develop EV infrastructure

1. TfL to help shape the narrative on:
   i. Centralising the infrastructure with more charge points across the capital
   ii. Social policy i.e . new builds to include bays and points
   iii. The design of bays

Normalising EVs

1. Hybrid adoption as 1st step to EV/PHEV trial
2. Creating a new frame of reference of how to use and drive EVs – *'your home/charge point as petrol station'*
3. Encouraging the development of 2nd hand EV market

For a blue badge audience to transition to a new experience needs them to make a leap that is intuitive and rational and not a leap of faith

Thank you

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Transport for London

Appendices

Transport for London

Appendix A – Quant stim

Transport for London

Information on EVs shown:

Electric vehicle batteries

Most Electric Vehicles (EVs) have a lithium-ion battery. Lithium ion batteries have a longer life span than most other practical batteries

Charge points

Over 1,400 charging points have now been installed across the London

The battery can be charged at home, or at a public (e.g. in train stations, supermarkets, shopping centres or on-street) charge point.

Types of vehicle available

Cars, vans and motorbikes are available. There are three types of EV:

A 'pure electric vehicle' - runs solely on the battery. Typically, this type of electric vehicle has a range of 90-130 miles on a full battery, although the newer models have ever greater ranges.

Plug-in Hybrid electric vehicles (PHEVs) and Range-Extended electric vehicles (RE-EVs) – also have a conventional diesel or petrol engine, meaning they have a longer range than with a battery alone

Number of electric vehicles

New registrations of plug-in cars increased from 3,500 in 2013 to more than 43,000 by the end of September 2015

Energy and performance efficiency

Electric vehicles convert about 59%–62% of the electrical energy from the grid to power at the wheels—conventional vehicles only convert about 17%–21% of the energy

Electric vehicles are environmentally friendly and have zero emission at the tailpipe.

Performance benefits - electric motors provide quiet, smooth operation and stronger acceleration and require less maintenance.

Cost

Owners of electric vehicles benefit from much lower fuel costs compared to conventional vehicles

Owners of electric vehicles can get a Plug-in Car Grant of 35% off the cost of a car (up to £5,000) and a Plug-in Van Grant of up to 20% off the cost of a van (up to £8,000).

Currently there is no vehicle tax to pay on electric vehicles

There is no Congestion Charge for electric vehicles

The cost of charging an electric vehicle is variable depending on the charge point provider, and the type of charge (standard versus rapid) – with some providers you pay a yearly subscription fee (around £20) with others you pay per charge (around £1 per standard charge).

Appendix B – Qual stim

Transport for London

About Electric Vehicles (EVs)

- Most Electric Vehicles (EVs) have a lithium-ion battery.
  - Lithium ion batteries have a longer life span than most other practical batteries.
- The battery can be charged at home or at a public or workplace charge point.
  - Around 1000 charge points have now been installed across the London

- Cars, vans and motorbikes are available. There are three types of EV:
  - A **'pure EV'** (runs solely on the battery. Typically, this type of EV has a range of 90-130 miles on a full battery
  - **Plug-in Hybrid EVs** (PHEVs) and **Range-Extended EVs** (RE-EVs) – they also have a **conventional diesel or petrol engine**, meaning they have a longer range than with a battery alone.

- New registrations of plug-in cars increased from 3,500 in 2013 to more than **43,000** by the end of September 2015.

Benefits of owning an EV

- Owners of electric vehicles benefit from much lower fuel costs compared to conventional vehicles

- Currently there is no VED (vehicle tax) to pay on EV

- There is no Congestion Charge for EVs

- Other benefits of EVs:
  - **Energy efficient.** Electric vehicles convert about 59%–62% of the electrical energy from the grid to power at the wheels—conventional vehicles only convert about 17%–21% of the energy
  - **Environmentally friendly.** EVs emit no pollutants,
  - **Performance benefits.** Electric motors provide quiet, smooth operation and stronger acceleration and require less maintenance than ICEs.
  - **Reduce energy dependence**. Electricity is a domestic energy source.

Government grants

- The UK Government offers a
  - Plug-in Car Grant of **35% off the cost of a car** (up to £5,000)
  - and a Plug-in Van Grant of up to 20% off the cost of a van (up to £8,000).

The ‘cost’ is the full purchase price you pay for the basic vehicle - including number plates, vehicle excise duty and VAT. It doesn’t include delivery charges, the first registration fee or any optional extras

Cars eligible for the Govt grant include…..

- *Audi A3 e-tron*
- *BMW i3*
- *BMW i8*
- *BYD e6*
- *Citroen CZero*
- *Ford Focus Electric*
- *Kia Soul EV*
- *Mercedes-Benz B-Class Electric Drive*
- *Mercedes-Benz C350 e*
- *Mercedes-Benz S500 Hybrid*
- *Mitsubishi iMiEV*
- *Mitsubishi Outlander*
- *Nissan e-NV200 5-seater and 7-seater*
- *Nissan LEAF*
- *Peugeot iON*
- *Porsche Panamera S E-Hybrid*
- *Renault Fluence*
- *Renault ZOE*
- *Smart fortwo electric drive*
- *Tesla Model S*
- *Toyota Mirai*
- *Toyota Prius Plug-in*
- *Vauxhall Ampera*
- *Volkswagen e-up!*
- *Volkswagen e-Golf*
- *Volkswagen Golf GTE*
- *Volvo V60 D6 Twin Engine*
- *Volvo XC90 T8 Twin Engine*

An inevitable transition

- A number of global factors are combining to create momentum in the move to ULEVs:

- Global sales of electric vehicles doubled between 2011 and 2012.

The UK auto industry

- The UK automotive sector represents 7% of manufacturing output and 5.3% of manufacturing employment.
- The UK is now the fourth largest automotive producer in Europe, £11.2 billion to the UK economy.
- 80% of this production is exported and total production is expected to rise to over 2 million by 2017.
- The move to ULEVs is a huge strategic opportunity for the UK auto sector to position itself at the forefront of technologies that could dominate for decades to come, bringing jobs and economic growth.

Common myths about ULEVs

1 "Electric cars are slow"
Electric motors develop maximum torque from zero revs. In plain english this means they are very quick off the mark. Performance car manufacturers such as McLaren are increasingly using electric motors alongside petrol engines in their cars.

2 "They pollute as much as petrol/diesel cars"
All cars will generate pollution in their manufacture, use and disposal. But electric motors are much, much more energy efficient than internal combustion engines. Even with today's UK grid energy generation mix an electric vehicle is better for the environment than one burning fossil fuels.

3 "They will never be mass market"
Every major car manufacturer has plans to bring an ULEV to market over the next few years. There is a consensus in the UK auto industry that electrification (be it in battery-electric, hybrid, or fuel cell form) will increasingly be the way we power our cars in the future.

4 "There is nowhere to charge ULEVs"
Around 10,000 chargepoints have now been installed across the UK. In London there are more chargepoints than petrol stations. But all the evidence still suggests people will typically charge at home at night or at work.

Office for Low Emission Vehicles

Driving the Future Today

A strategy for ultra low emission vehicles in the UK

The Government's strategy for ultra low emission vehicles (ULEVs), published in September 2013, sets out:

- Government's unprecedented long-term commitment to speeding the transition to low emission motoring in the UK;
- The once in a lifetime jobs and growth opportunities that this change could deliver;
- Why the automotive industry acknowledges that the move to new ways of powering vehicles is inevitable;
- Government's goal of seeing every car on the UK's roads effectively zero emission by 2050 to hit our Carbon Plan targets;
- The wider benefits from this change – cleaner quieter towns and cities, improved air quality and energy security;
- The scale of our investment in this agenda: £400m to 2015, a further £500m to 2020 + over £1bn joint industry / Government funding for an Advanced Propulsion Centre.

Key commitments

Keeping the existing **plug-in vehicle grants** until at least May 2015.

Launching a **call for evidence** to inform the £500m 2015-2020 package of support.

Jointly developing a **consumer communications campaign** with industry.

Working with the UK Automotive Council to **strengthen the UK ULEV supply chain** and maximise the benefits of the Advanced Propulsion and Energy Storage centres.

Updating Government Buying Standards to deliver higher public sector ULEV uptake.

Continuing to fund the **£37m national chargepoint infrastructure** package.

Working with industry on an **initial network of circa 65 hydrogen refuelling stations**.

Maintaining a **strong, clear and lasting set of tax incentives** for the purchase of ULEVs.

Clarifying the tax position for ULEVs with HMRC.

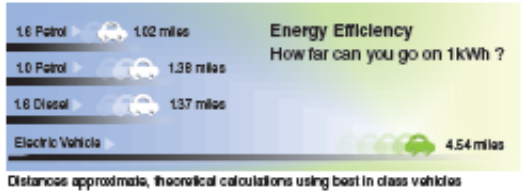
Supporting **ambitious but realistic EU new vehicle emissions targets**.

Offering a **prize of up to £10m to develop long-life battery technology** for the next generation of ULEVs.

Continuing to require the national rollout of **smart meters into homes by** 2020.

Benefits for ULEV drivers

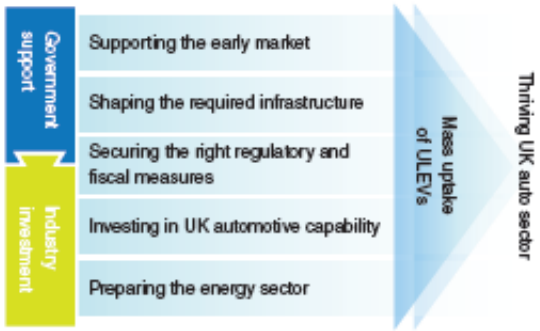
- **Plug-in grants of up to £5,000 and £8,000** for eligible cars and vans;
- ULEVs **exempt from Vehicle Excise Duty**;
- ULEVs **zero rated for company car tax;**



Distances approximate, theoretical calculations using best in class vehicles

- Energy costs will depend on the tariff but could be less than 3p per mile for an electric vehicle or **100 miles of motoring for less than £3**. **Maintenance costs** can be lower too.
- Up to £1,000 grant available for **domestic chargepoint installation**.

The UK's strategic approach



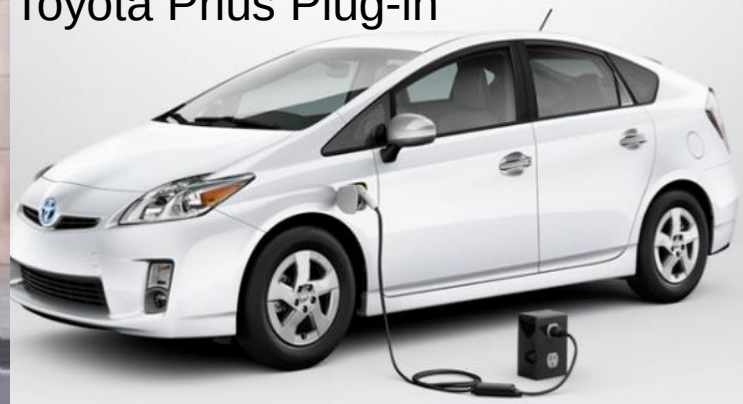
Golf GTE Plug-in hybrid

Renault Zoe 100% electric

BMW i3 100% electric

Nissan e-NV200 Combi 100% electric

Toyota Prius Plug-in



Nissan LEAF 100% electric

Resources explored using iPad

Source London - the London-wide electric vehicle charge point network	https://www.sourcelondon.net/
Online Brochure for Nissan LEAF	http://www.nissan.co.uk/GB/en/vehicle/electric-vehicles/leaf.html?&cid=psmwoL2HqRJ_dc&cid=psmwoL2HqRJ_dc
Online Brochure for Prius	https://www.toyota.co.uk/new-cars/prius/index.json
Online Brochure for Renault Zoe	https://www.renault.co.uk/vehicles/new-vehicles/zoe.html?&utm_source=Google&utm_medium=cpc&utm_campaign=Local-All-GS-UK-P-Defensive-ZOE-Main_&utm_term=renault%20zoe&ORIGIN=cpc&CAMPAIGN=google_Local-All-GS-UK-P-Defensive-ZOE-Main&gclid=CIeN7a_yv8kCFUH4wgodKGgKSQ
(US) ad for BMW i3	https://www.youtube.com/watch?v=U1jwWwJ-Mxc
Diff b/w petrol/diesel/EV	https://www.youtube.com/user/GoUltraLow
Zap Map - covering all aspects of charging points and electric vehicles	https://www.zap-map.com/
Next green car –Electric Car Buying guide	http://www.nextgreencar.com/electric-cars/buying-guide/