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An affordable and effective route to decarbonising transport

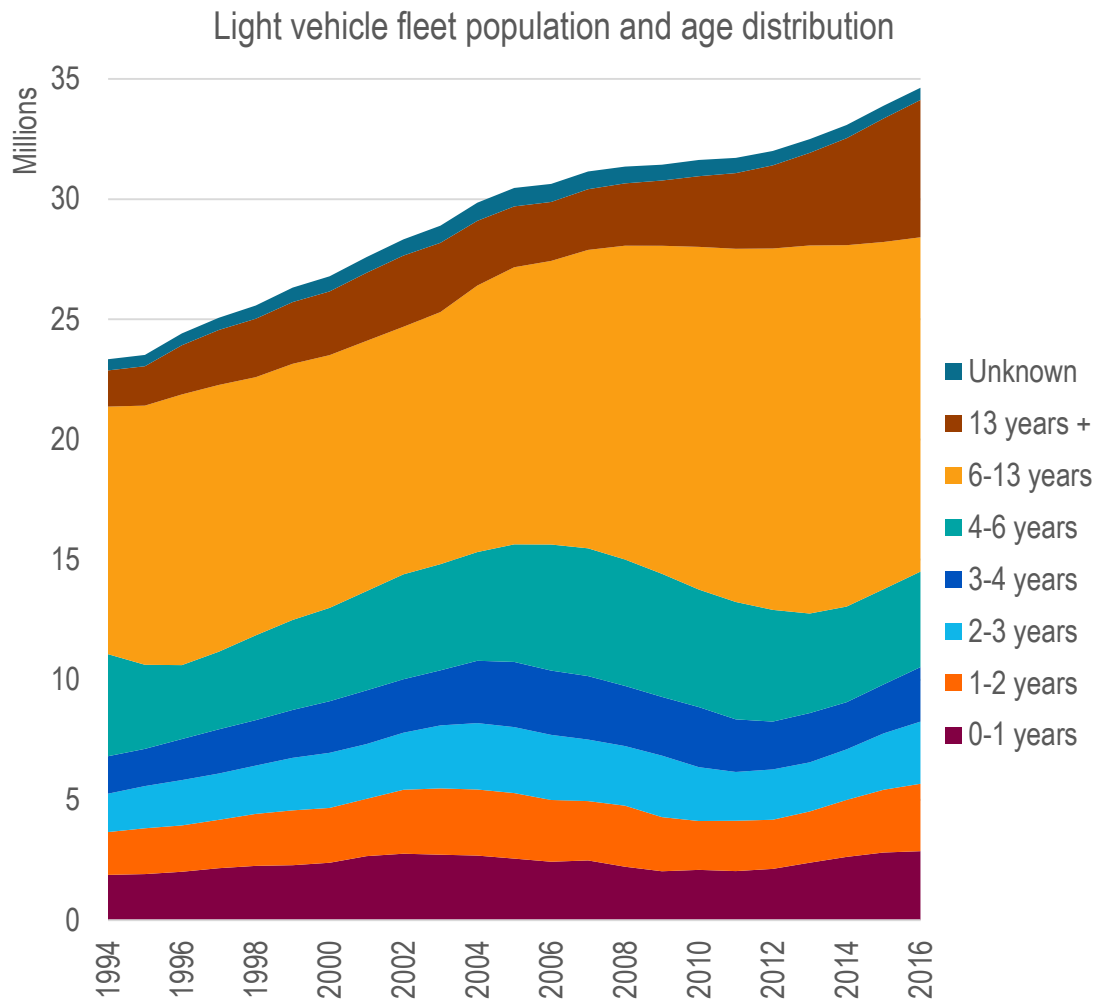
BIEE Energy and Climate Seminar

Wednesday 4th October 2017

Liam Lidstone – Strategy Manager

ETI10 TEN YEARS OF INNOVATION 2007 – 2017

Light Vehicles in the UK



30m

There is a total parc of over 30m cars

42.6%↑

There was a 42.6% increase in the number of vans in the parc (2003 – 2016)

4.6m↑

Between 2003 and 2016 the overall parc grew by 4.6 million cars

13.9yrs*

The average life of a car on the road has now exceeded 13 years

Based on DfT vehicle statistics (2017)

**average car scrappage age in 2015 (SMMT, 2017)*

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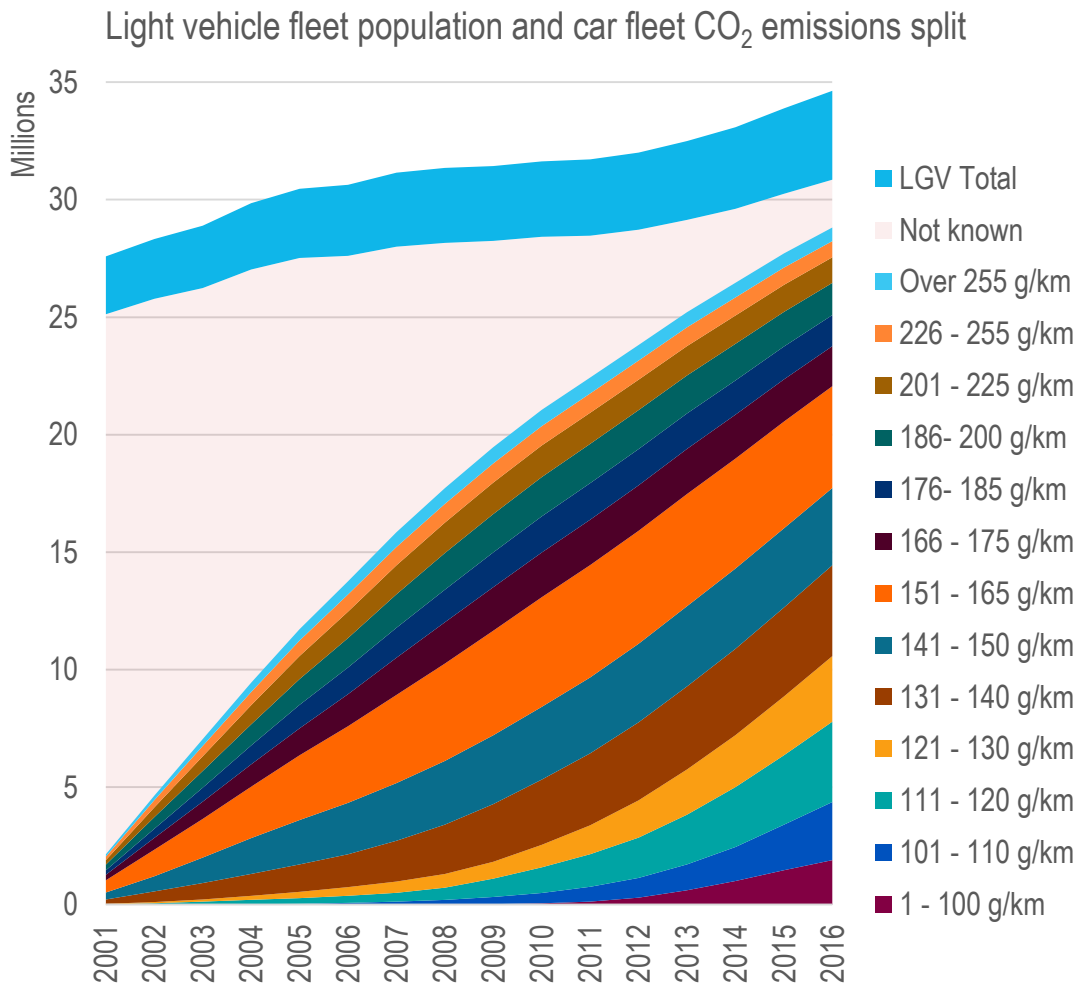


Based on DfT vehicle statistics (2017)

16%

Light vehicles contribute around 16% of CO_2 emissions

5%

The cost in 2050 for a low carbon vehicle system is only about 5% more expensive than a do nothing approach – but transition costs are significant

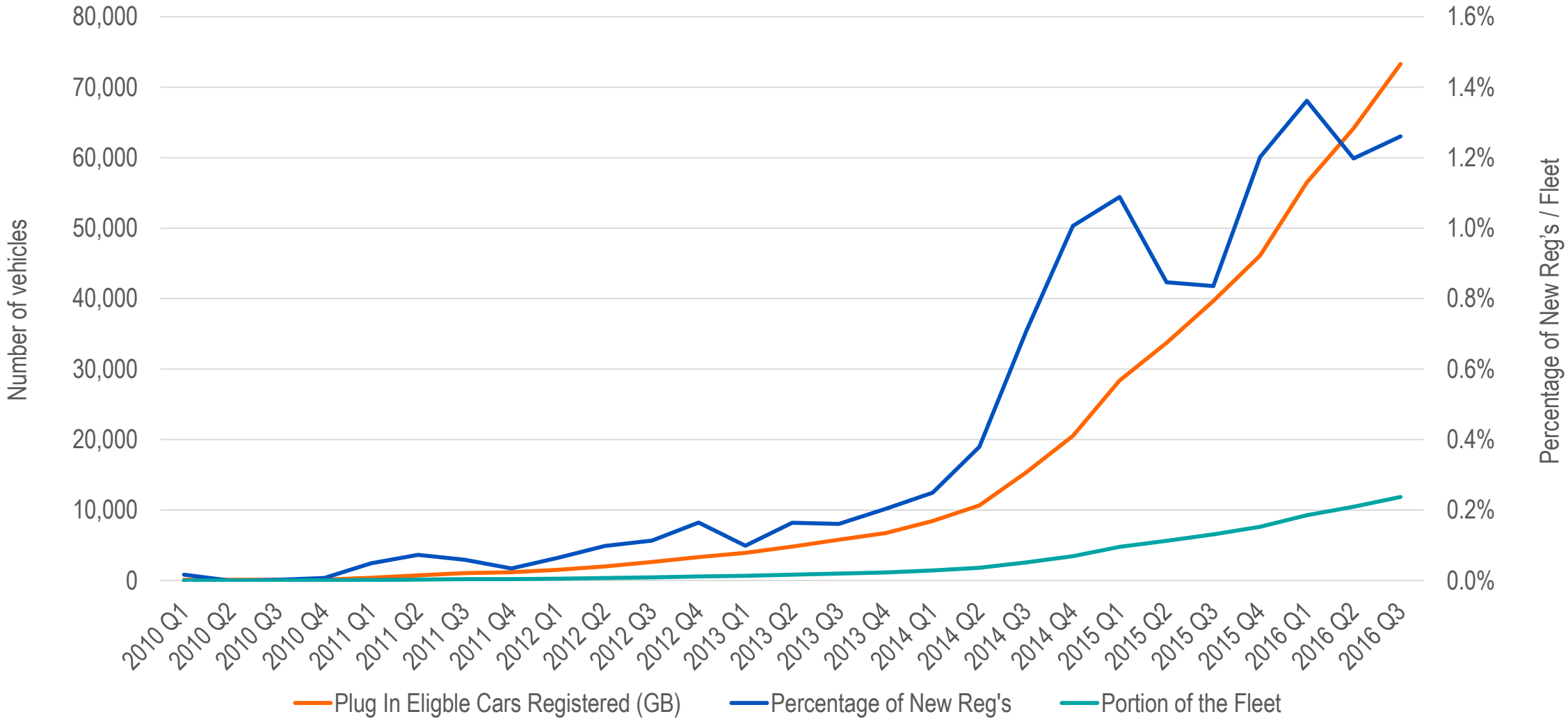
1/3

Only around a third of UK car mileage is in urban areas. Over two thirds of UK mileage is on motorways and major “A” roads

400bn

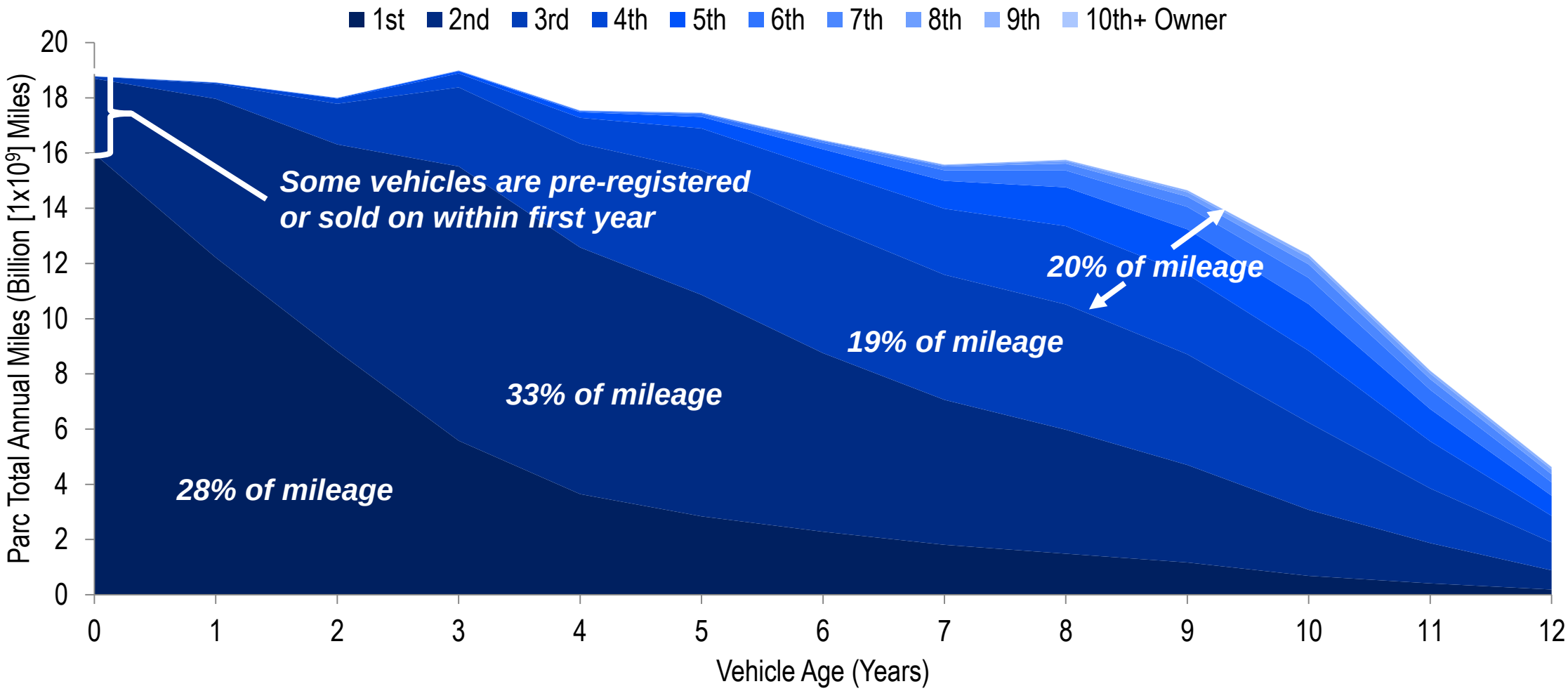
400 billion person-miles are travelled by car each year – 10x more than rail and 20x more than bus/coach

Plug-in vehicle sales



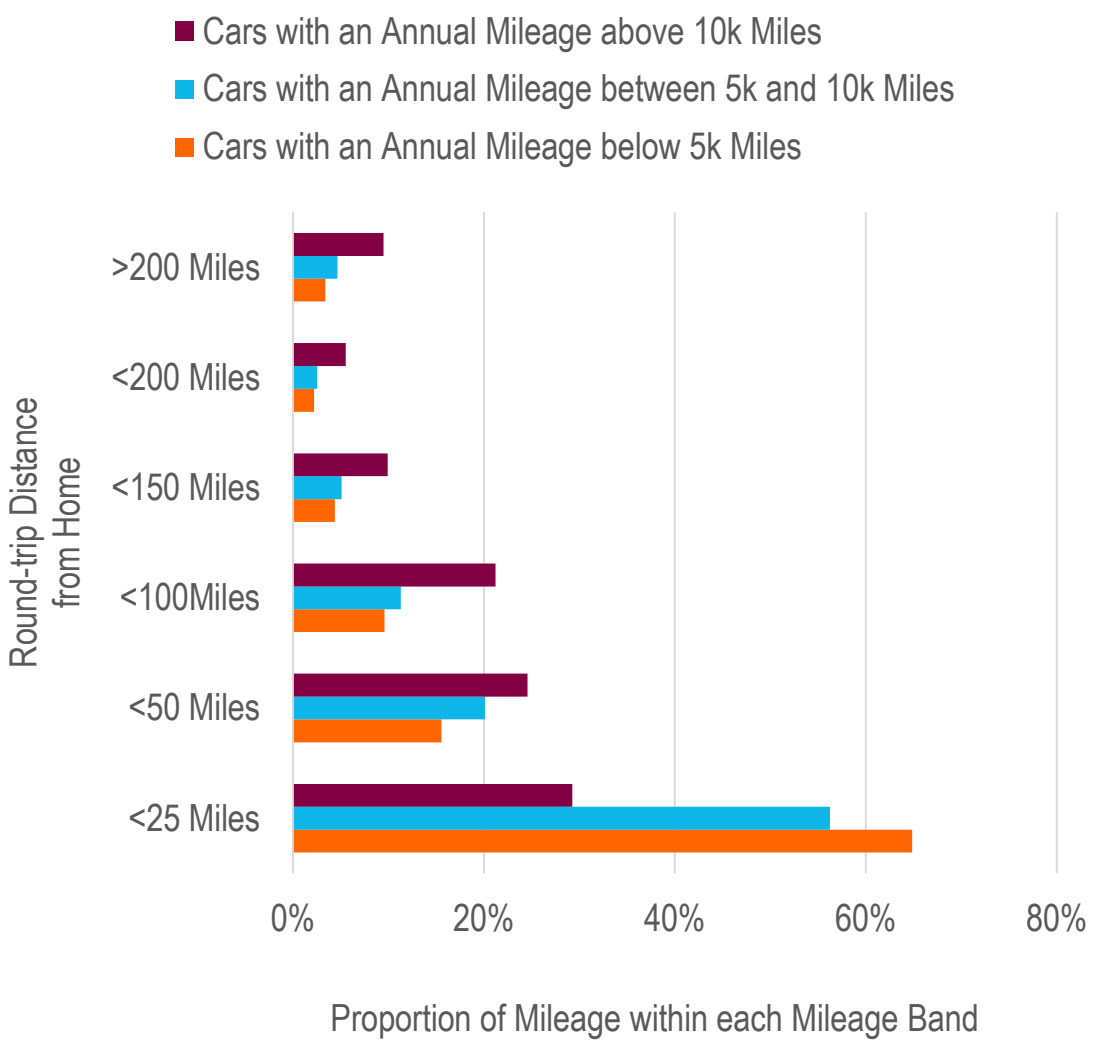
Based on DfT vehicle statistics (2017)

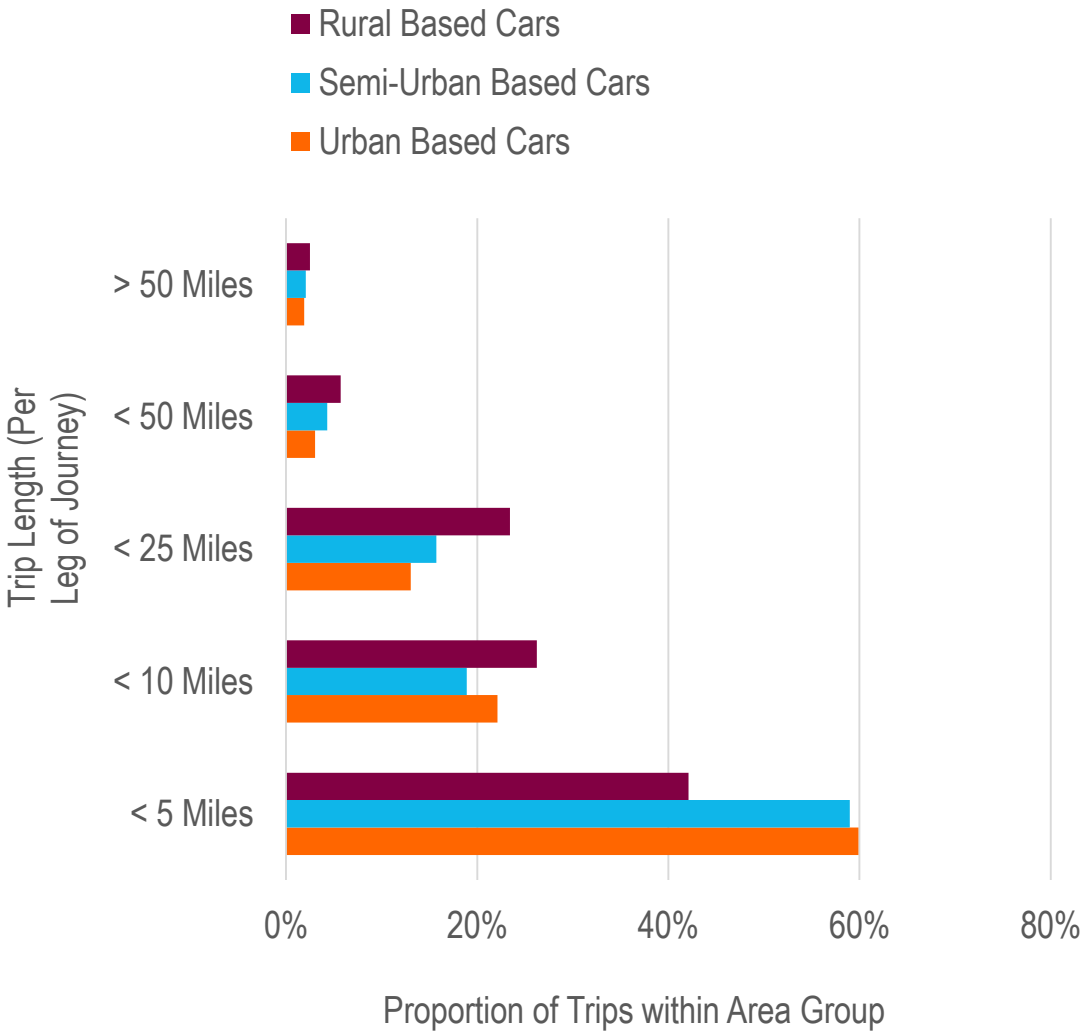
Vehicle life



Compiled using NTS data

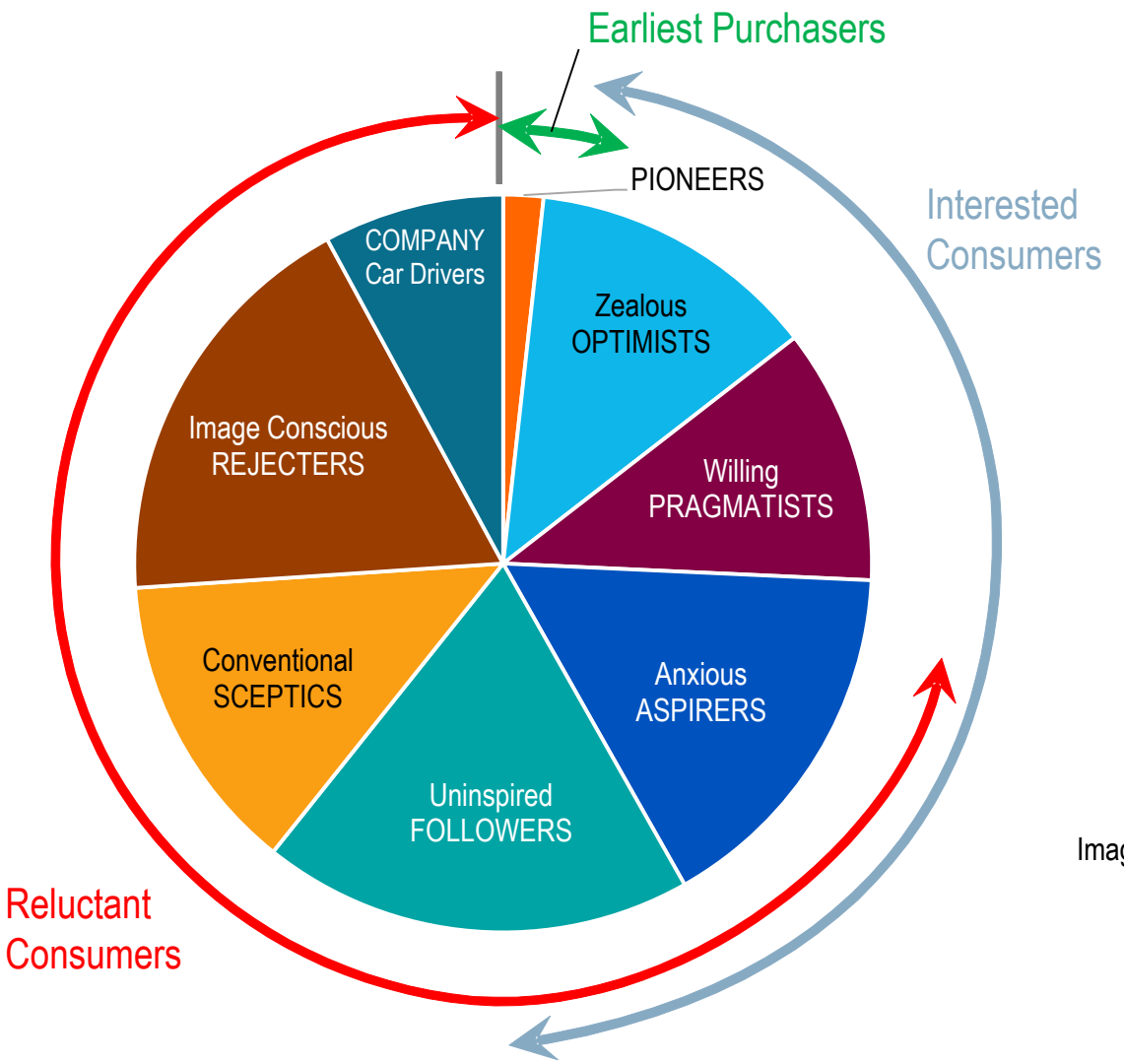
Vehicle usage

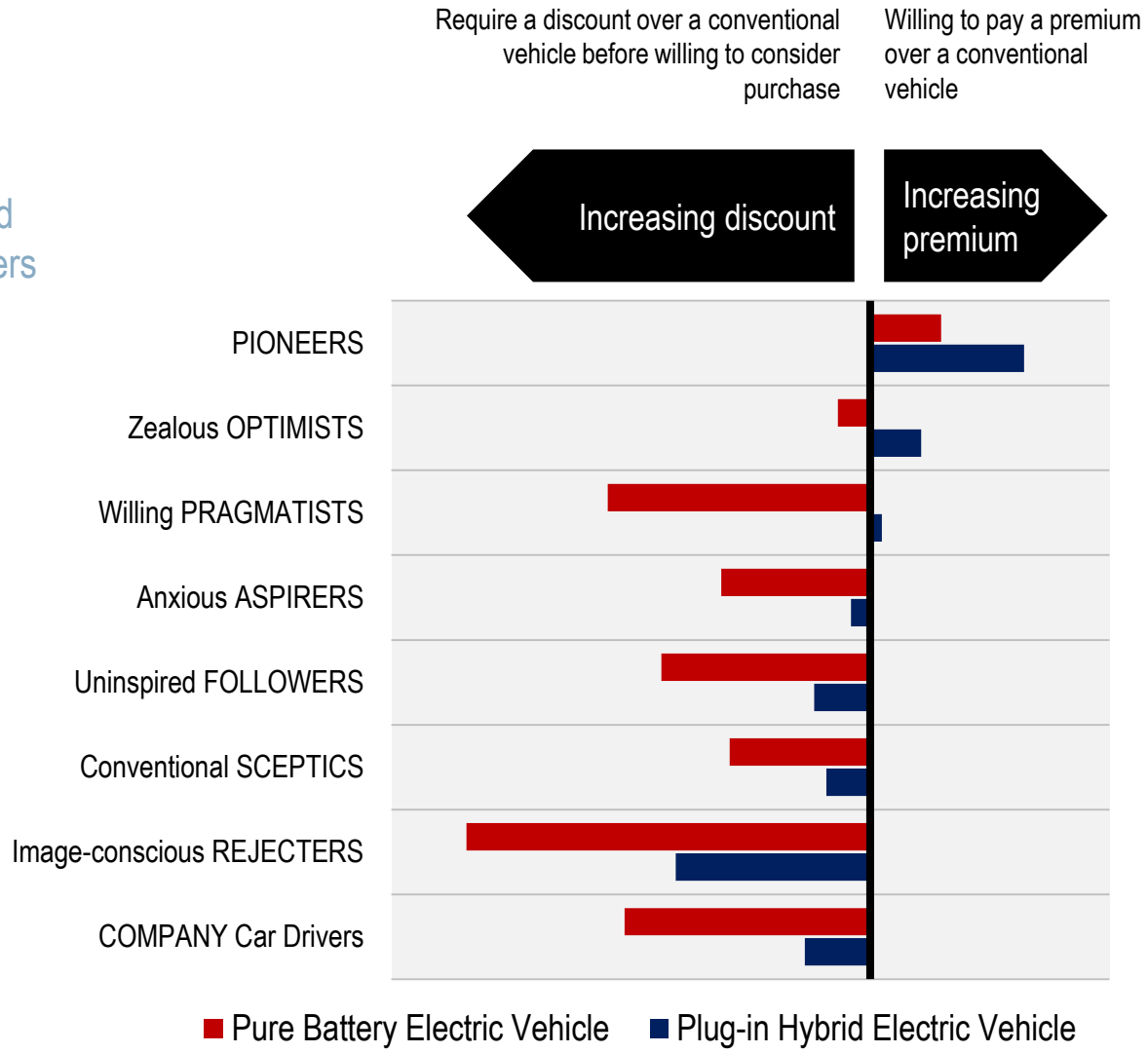




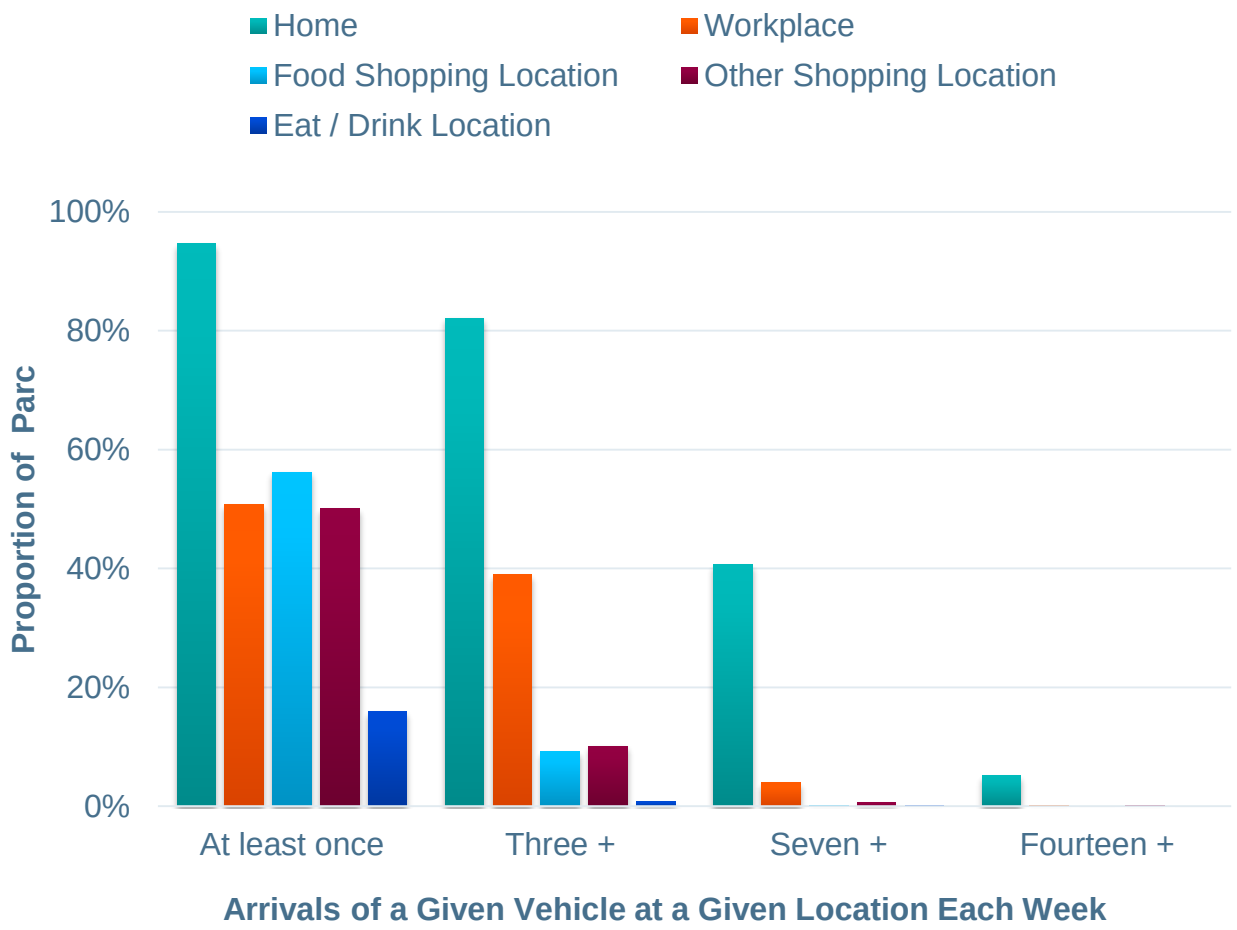
Compiled using NTS data

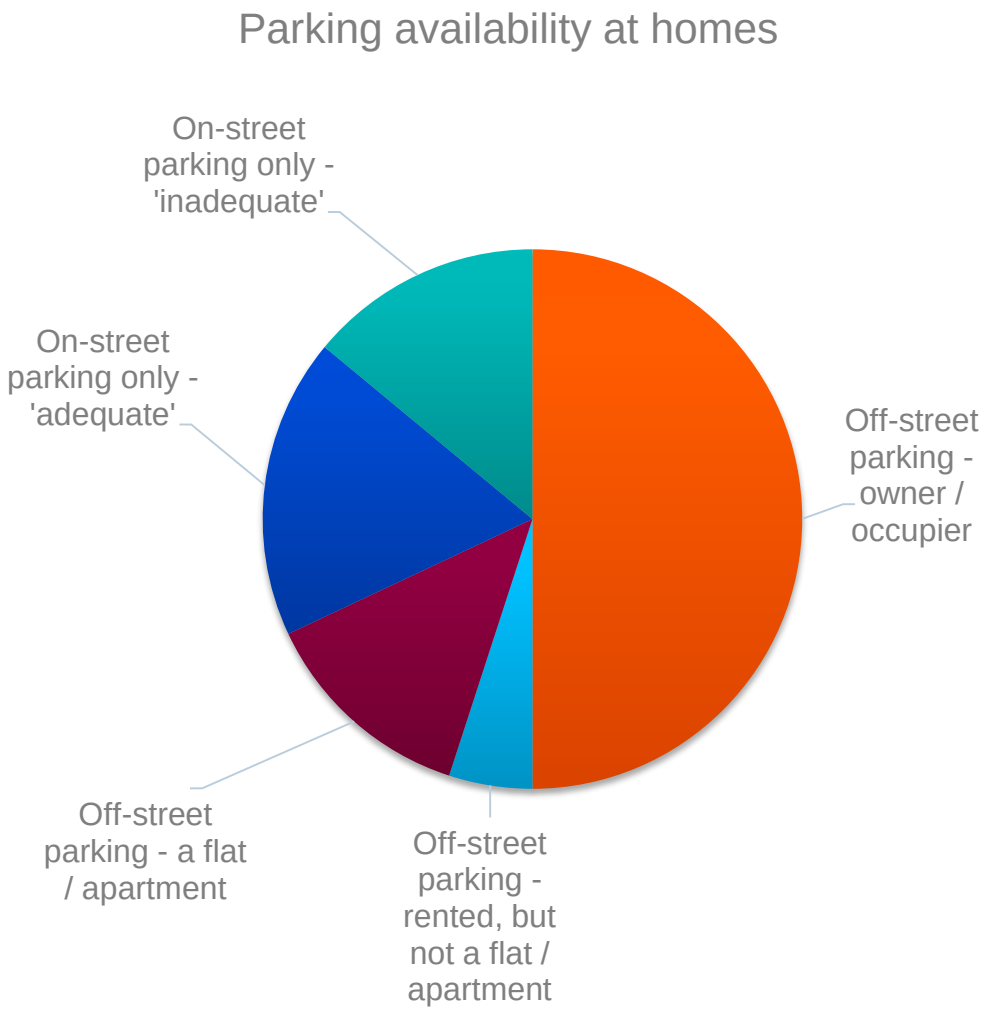
Consumer attitudes to plug-in vehicles





Where to support charging

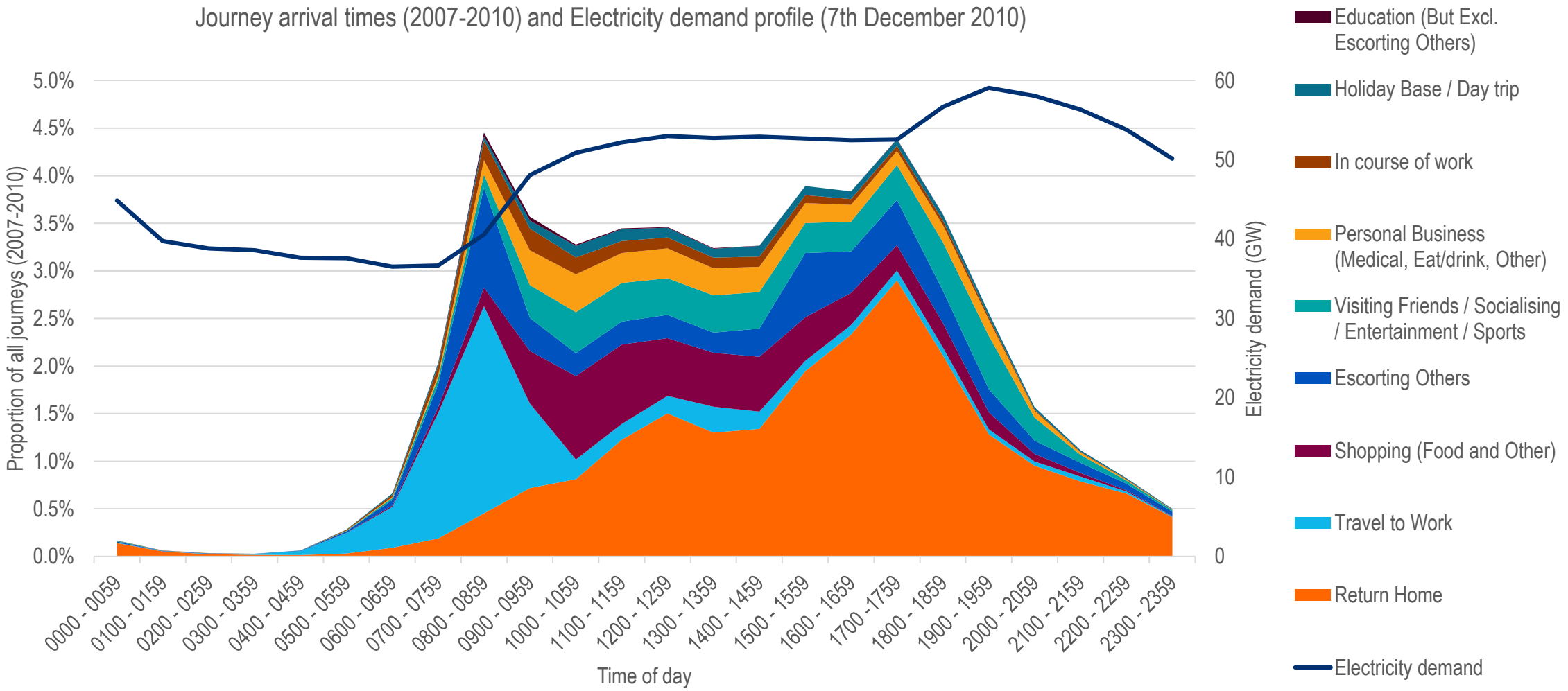




Compiled using NTS data

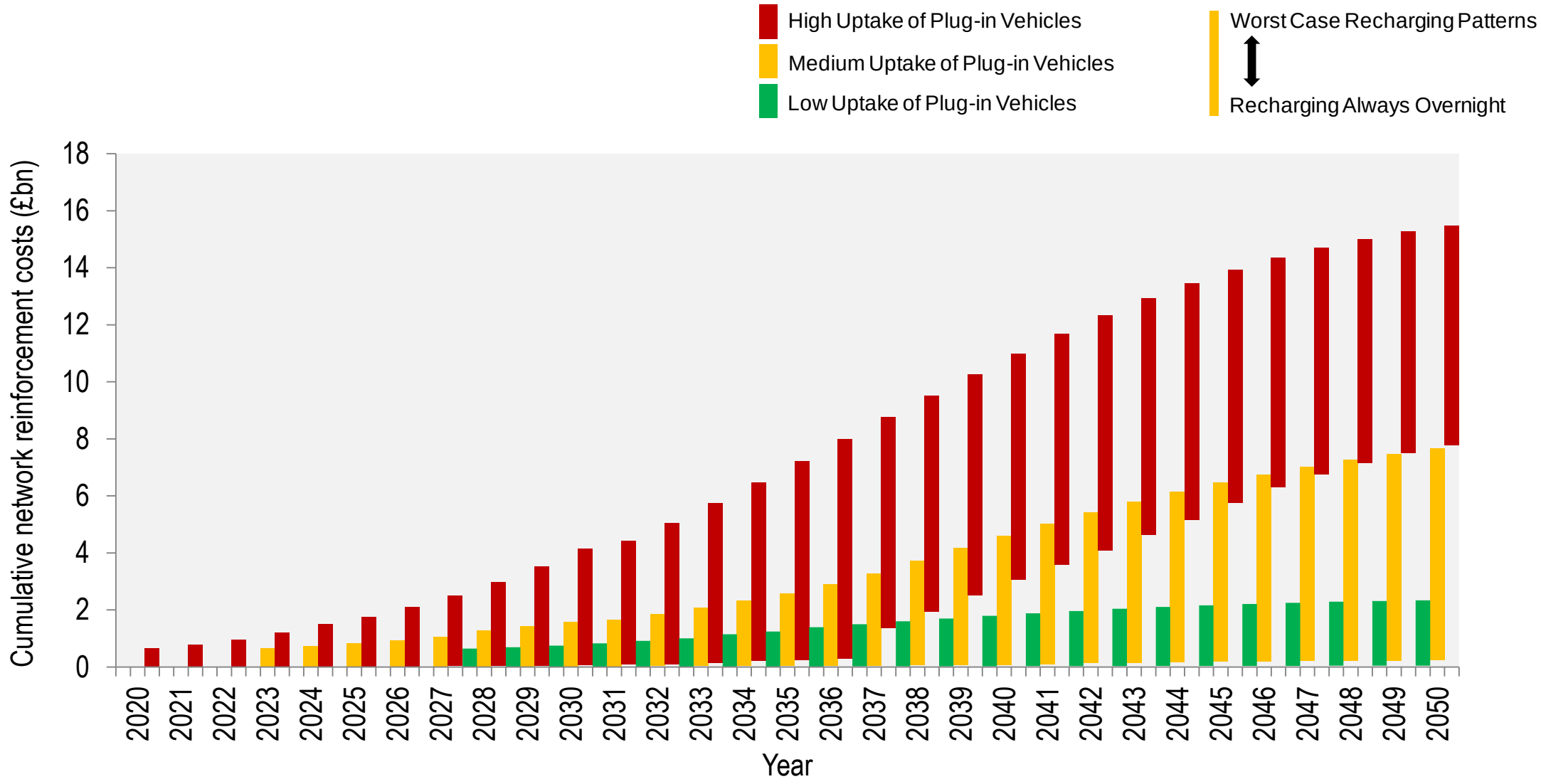
Based on DCLG data

Meeting vehicle charging requirements



Compiled using NTS and UKERC data

Network reinforcement costs



Published report

ETI analysis examining how to decarbonise “light vehicles” securely, sustainably and affordably was published in 2013, highlighting:

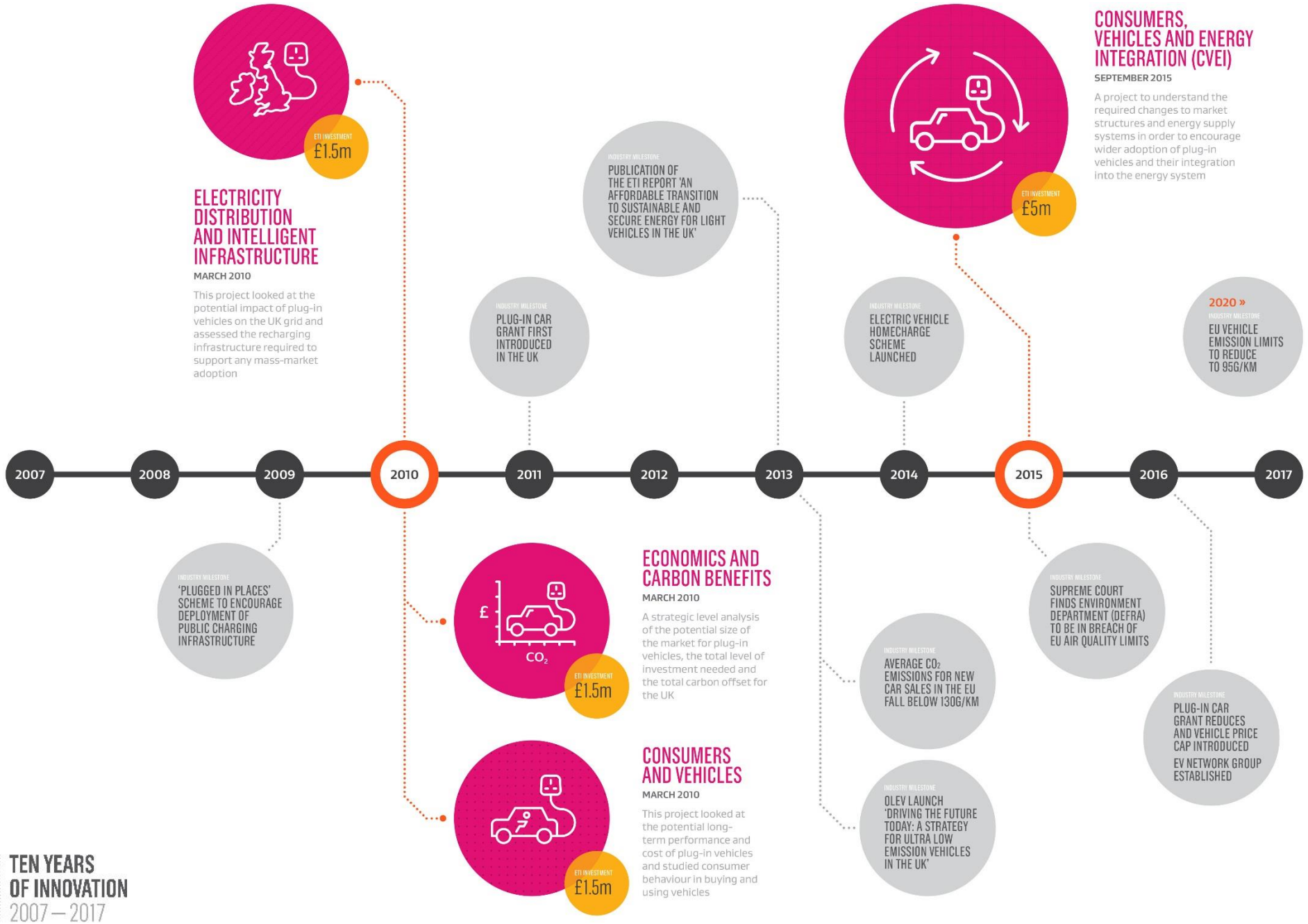
- Electrification (PHEVs and BEVs) as the least risk, least cost evolutionary path
- Where to support charging and the interactions with the energy system
- The importance of considering how to transition the fleet as a whole
- The need for a cohesive market and policy framework

The work also highlighted that, in decarbonising cars and vans, there are major challenges around:

- Meeting user energy supply requirements, whilst managing energy capacity constraints
- Implementing intelligent vehicle charging without compromising vehicle utility
- Developing greater understanding as to where and to what extent to invest in network reinforcement
- Understanding the opportunity for integrating liquid and electric “fuel” supply systems for vehicles, and utilising the capability of the liquid fuel system

Available at: http://www.eti.co.uk/library/ldv-an-affordable-transition-to-sustainable-and-secure-energy-from-light-vehicles-in-the-uk

Or search for: ***ETI transport transition*** or ***ETI light vehicles report***



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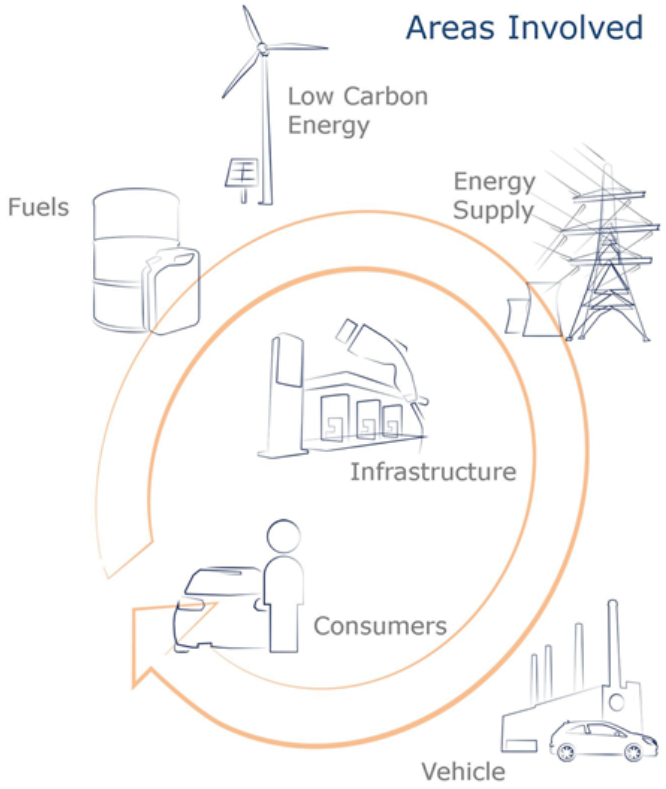
Consumers, Vehicles and Energy Integration (CVEI) project



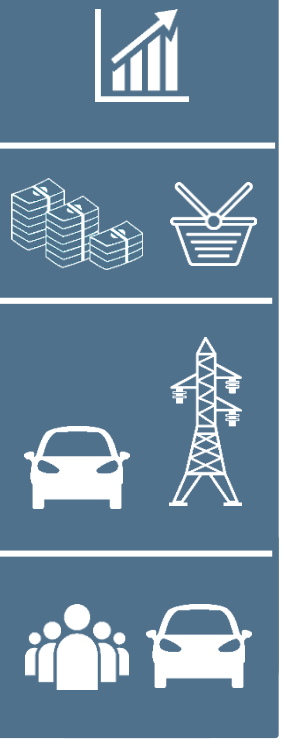
- **£5m, 2.5 year project** to address the challenges involved in transitioning to a secure and sustainable low carbon vehicle fleet
- Aims to understand changes to market structures and energy supply systems to support high deployment of plug-in vehicles, the technical implications of any changes and how people might respond to them
- It will examine how tighter *integration* of vehicles with the energy supply system can benefit:
  - vehicle users
  - vehicle manufacturers
  - organisations throughout the energy supply chain
- The outputs are being made available to:
  - help inform UK and European government policy
  - help shape energy and automotive industry products

The project is in two stages

Stage 1

Detailed design & analysis to characterise:

- Market, policy and regulatory frameworks
- Business models and customer offerings
- Integrated vehicle and infrastructure systems and technologies for electricity and liquid fuel / hydrogen
- Consumer and fleet attitudes to adoption and usage behaviours



Stage 2

Test and validate solutions and assess responses

Experimental field trials with mainstream consumers

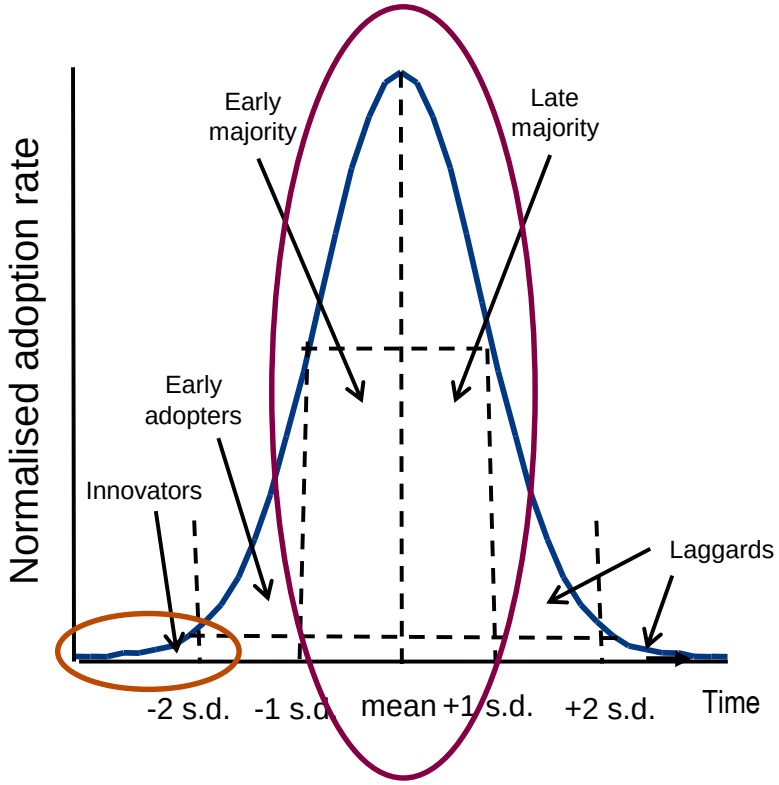
Case studies with fleets

Updates to analytical tools

Consumer adoption: understanding the mass-market

Early stages of adoption

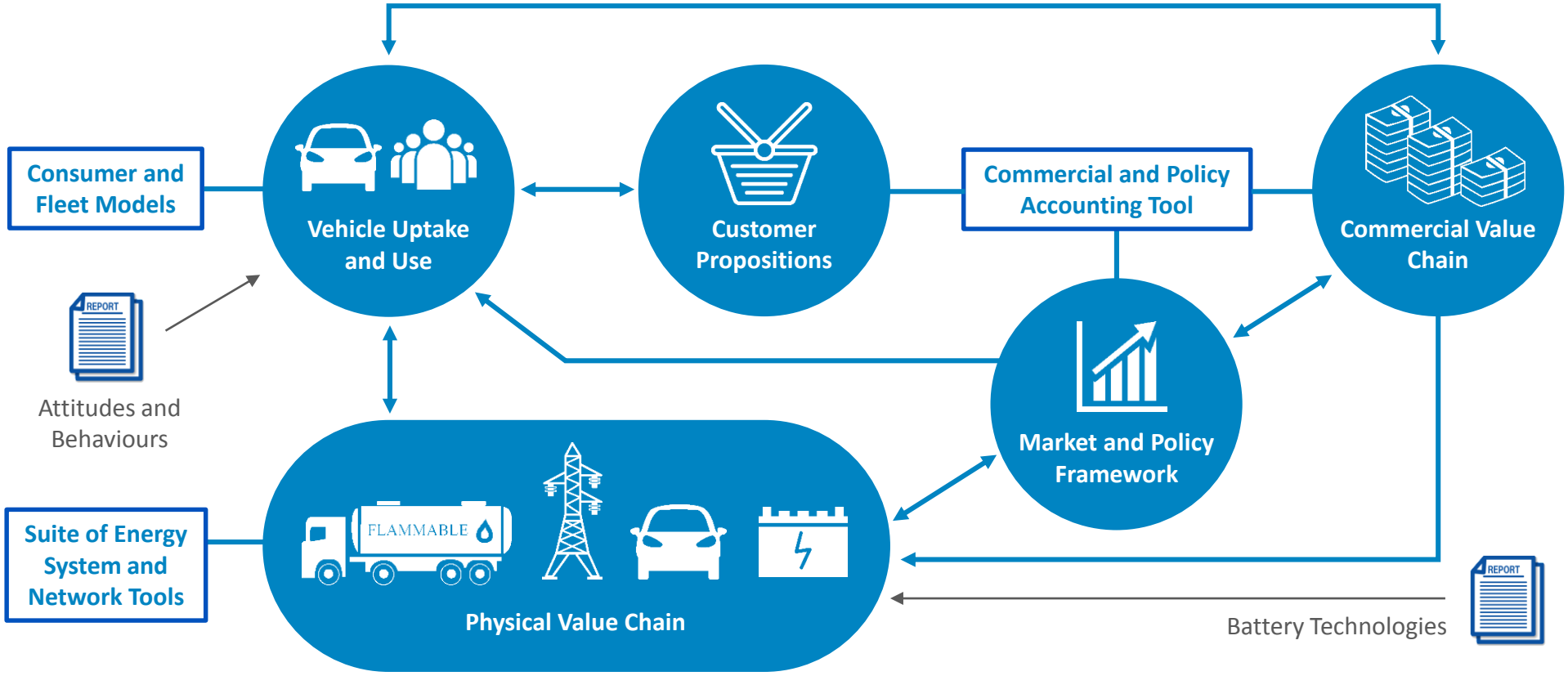
- Users with access to EVs are still classed as ‘Innovators’ (i.e. very early stage of adoption)
- To date, trials have been conducted using only Innovators
- Low numbers of consumers
- Attitudes and behaviours are not representative of the majority of users



Future majority ‘Mass-market’ consumers

- Much larger numbers of users
- These will significantly influence the energy system
- Very different motivations, attitudes and behaviours to those of Innovators
- Unlikely currently to use or own a plug-in vehicle
- Do not generally have specific motivations for early adoption of plug-in vehicles
- Less likely to adapt behaviour (e.g. to accept managed charging) to meet needs of the vehicle or energy system

Outputs – Modelling capability

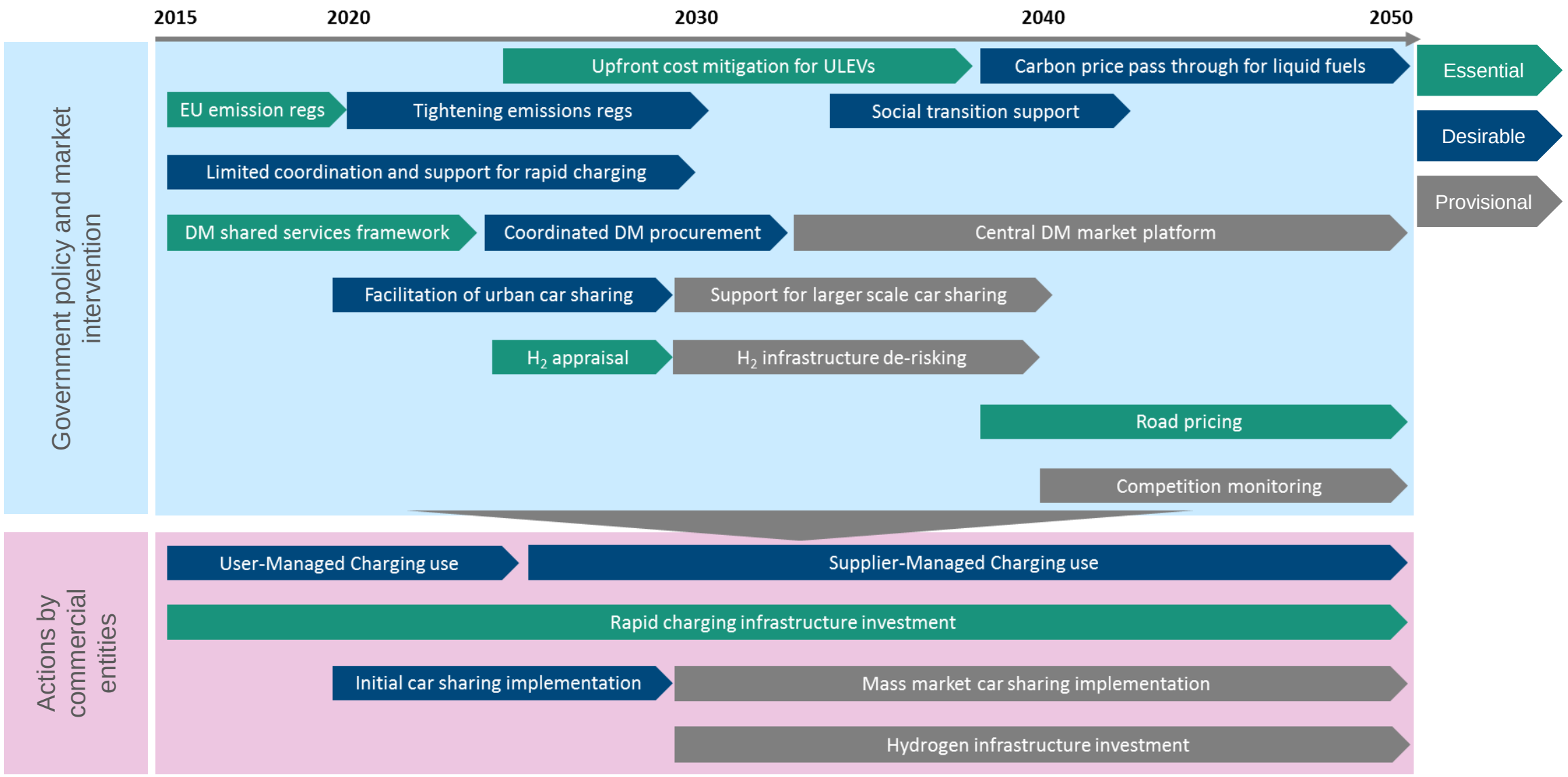


A combined set of modelling tools have been developed to provide an ***integrated, holistic*** means of quantifying and qualitatively assessing the impacts on and from *infrastructure*, *consumers, vehicle uptake and use, policy measures* and *commercial models* across the system

Interim findings

- Reducing the upfront cost of ULEVs is a crucial driver of uptake in the near to medium term
- ULEV uptake can lead to a sizeable drop in net transport-related Government revenues
- A moderate uptake of ULEVs can be expected even with limited Government intervention but this does not result in the lowest Government revenue gap
- Rapid charging development is a priority to enable sufficient deployment for the medium term
- Infrastructure entities likely to be loss-making in the near to medium term but would appear profitable in the long term
- Successful demand management reduces balancing and network costs – must be tested with mainstream consumers

Roadmap for efficient ULEV uptake and use



Trials will deliver further robust evidence

Charging Behaviour Trial

- Assess response to different tariff propositions – user-managed (ToU tariff) versus supplier-managed charging
- 240 consumers, 2 months with a vehicle, (parallel) BEV and PHEV trials
- Data on use and charging with additional questionnaires and choice experiments

Vehicle Uptake Trial

- To enhance understanding of adoption of EVs
- 200 consumers, given 4 days with each of 3 vehicles in turn (BEV, PHEV, ICE)
- Additional questionnaires and choice experiments (with reduced 'psychological distance')

BEV

PHEV

ICE

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