

# ***Accelerating the Shift to Low Carbon Vehicles and Fuels***

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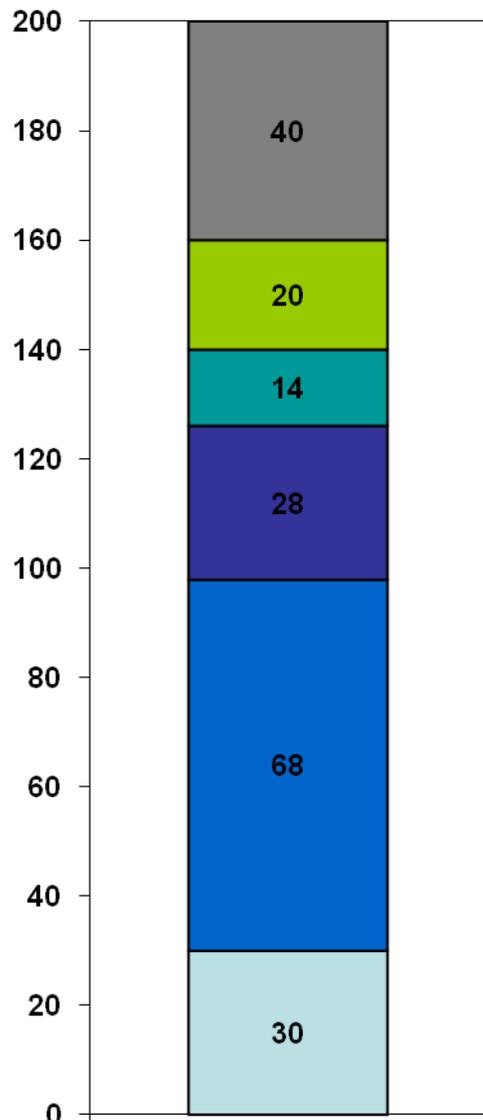
# LowCVP - accelerating a sustainable shift to lower carbon vehicles and fuels

- ❑ Building understanding and consensus regarding the optimal pathways to low carbon road transport.
- ❑ Influencing Government and other decision makers on future policy directions and optimal policy mechanisms.
- ❑ Supporting collaborative initiatives that develop the market for low carbon vehicles and fuels.
- ❑ Helping business, especially SME, benefit from new market opportunities

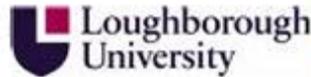


The LowCVP is an independent cross-industry and stakeholder partnership

# Who are our members?



■ Research & env



■ Gov & Public



■ Operator & consumer



■ Energy



■ Auto supplier



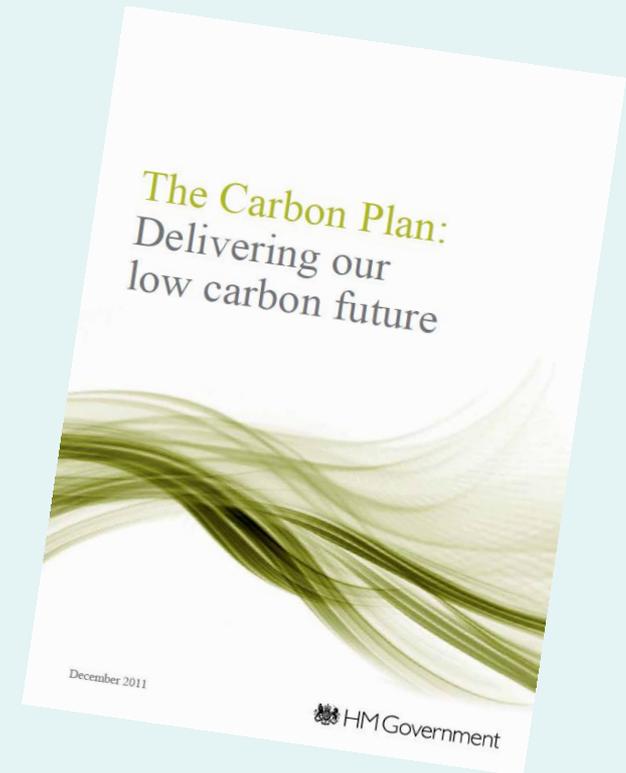
■ Auto manufacturer



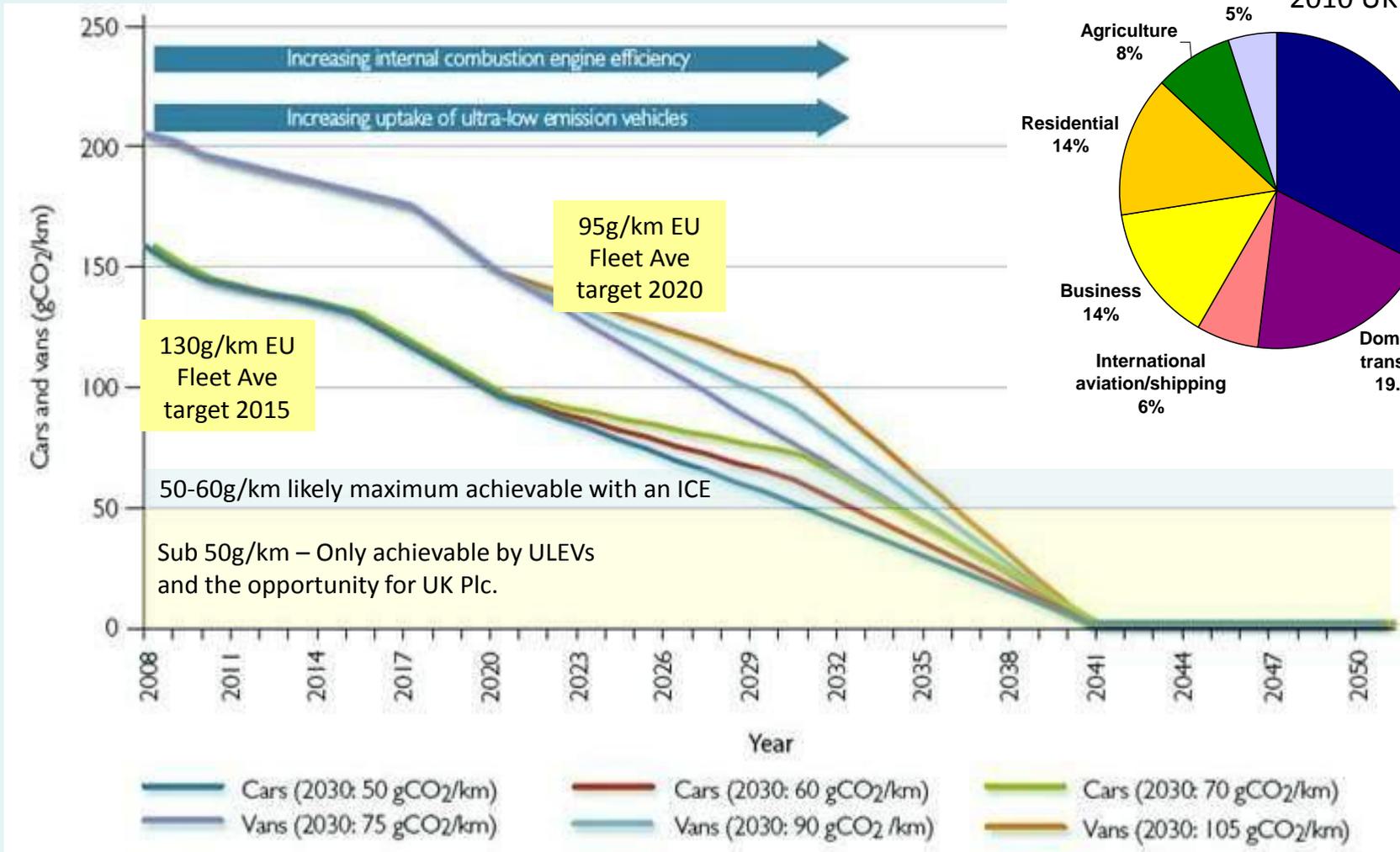
# ***Why do we need low carbon vehicles?***

# ***There is growing momentum towards low carbon road transport***

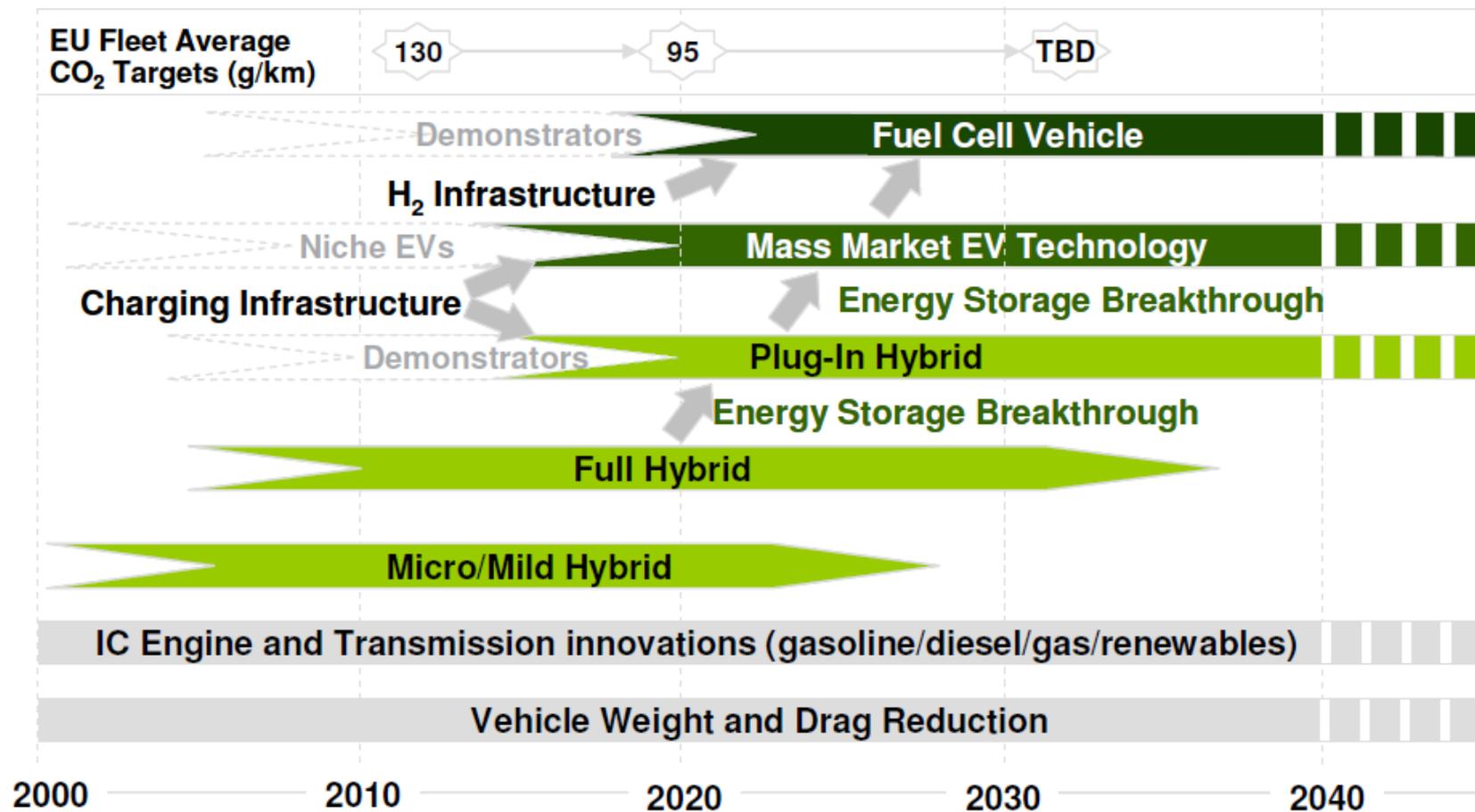
- ❑ UK Government GHG emissions targets  
34% reduction by 2020, 80% 2050
- ❑ EU car and van CO2 emission targets 2020
- ❑ Rising fuel price
- ❑ Fuel security
- ❑ Job creation, stimulating economic growth and developing new supply chains – automotive, battery, infrastructure
- ❑ Compliance with EU air quality targets



# Legislation is driving a reduction in tailpipe CO<sub>2</sub> emissions



# *Electric vehicles are a key technology to decarbonising passenger cars*



Source: Automotive Council

# *How is the UK progressing with developing an EV market?*

- ❑ Strong Government policy framework in place
- ❑ Major OEMs offering electric cars, vans, small trucks
- ❑ EV charging infrastructure being rolled out nationally
- ❑ £725m investment for Nissan Leaf production & battery plant, Sunderland
- ❑ Zero Carbon Futures receives £6.2m fund to develop NE of England as a leader EV deployment & production
- ❑ BMW Mini serves Olympic Games
- ❑ Hertz Car Club offers Nissan Leaf to customers
- ❑ Electric buses operating in three regions
- ❑ EV integration in public and private fleets

***BUT still a niche market - EV less than 1%  
of UK vehicle sales in 2012***



# *The road to 'e'volution faces various challenges*

- ❑ High vehicle purchase cost
- ❑ Negative perceptions by private and fleet users
- ❑ Range 'anxiety'
- ❑ Lack of national charging infrastructure
- ❑ Vehicle residual value
- ❑ Product range
- ❑ Technical standards and interoperability of charging infrastructure
- ❑ Battery disposal - recycling/re-use
- ❑ Competition from other low fuels and technologies over the next two decades

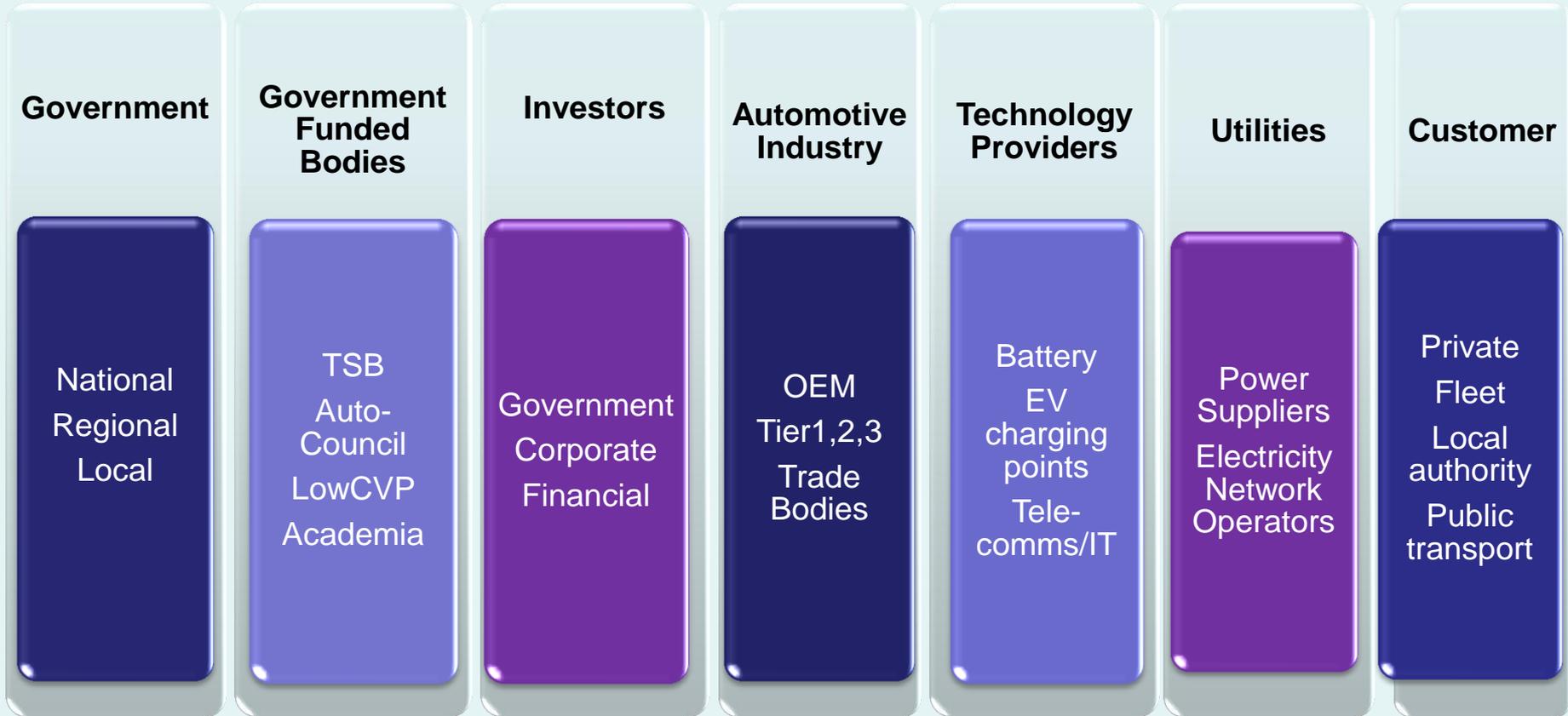


# ***Electric vehicles and the grid have to evolve together***

- ❑ Understanding the impact of growing electricity vehicle market on the grid
  
- ❑ Need for infrastructure & vehicles to relate in new ways
  - E - mobility
  - Intelligent mobility
  
- ❑ Decarbonising the grid is essential for lowering the carbon intensity of EV & strengthening environmental case



# Multiple stakeholders are involved in overcoming barriers and developing the EV market

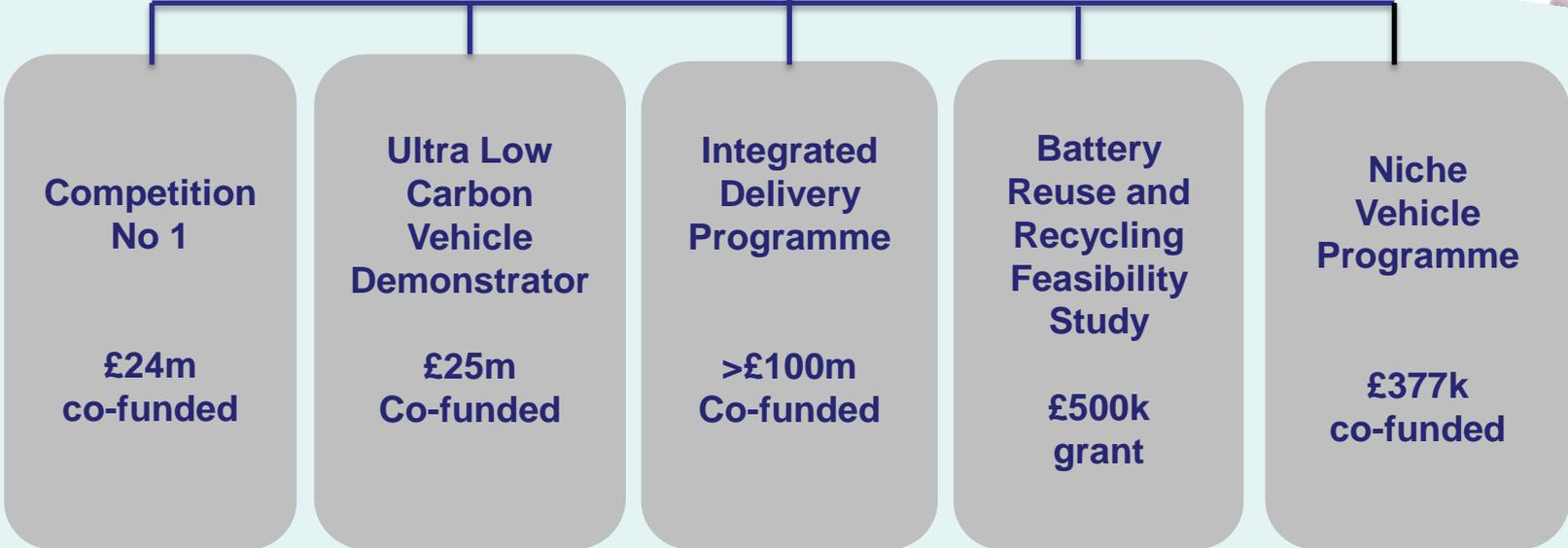


# ***Low carbon vehicle research & development & innovation***

# Spearheading Low Carbon Vehicle R&D



**Low Carbon Vehicle Innovation Platform**  
 Technology Strategy Board  
 11 competitions  
 > £150m in funding & > 500 partners



**Competition No 1**  
  
£24m co-funded

**Ultra Low Carbon Vehicle Demonstrator**  
  
£25m Co-funded

**Integrated Delivery Programme**  
  
>£100m Co-funded

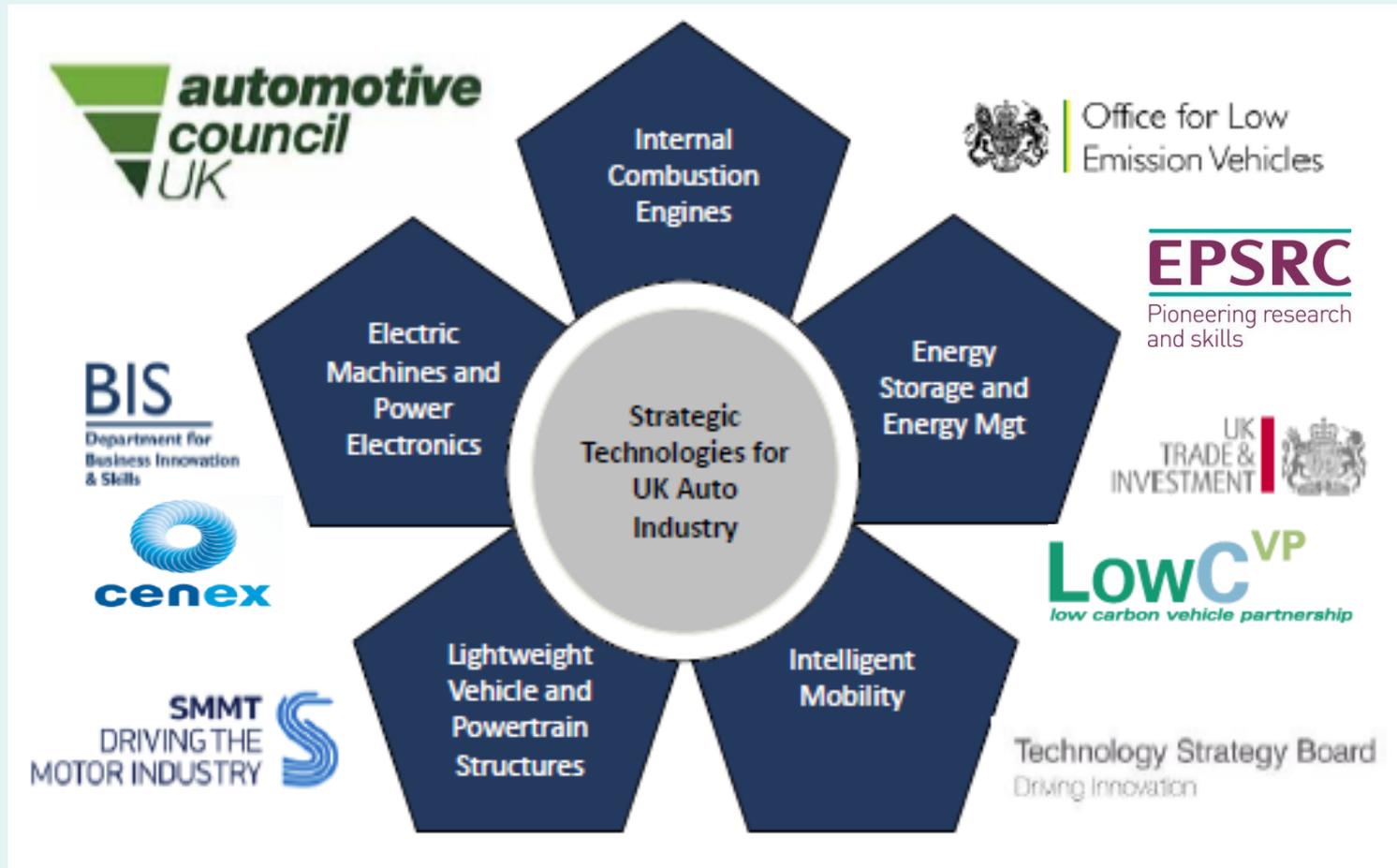
**Battery Reuse and Recycling Feasibility Study**  
  
£500k grant

**Niche Vehicle Programme**  
  
£377k co-funded



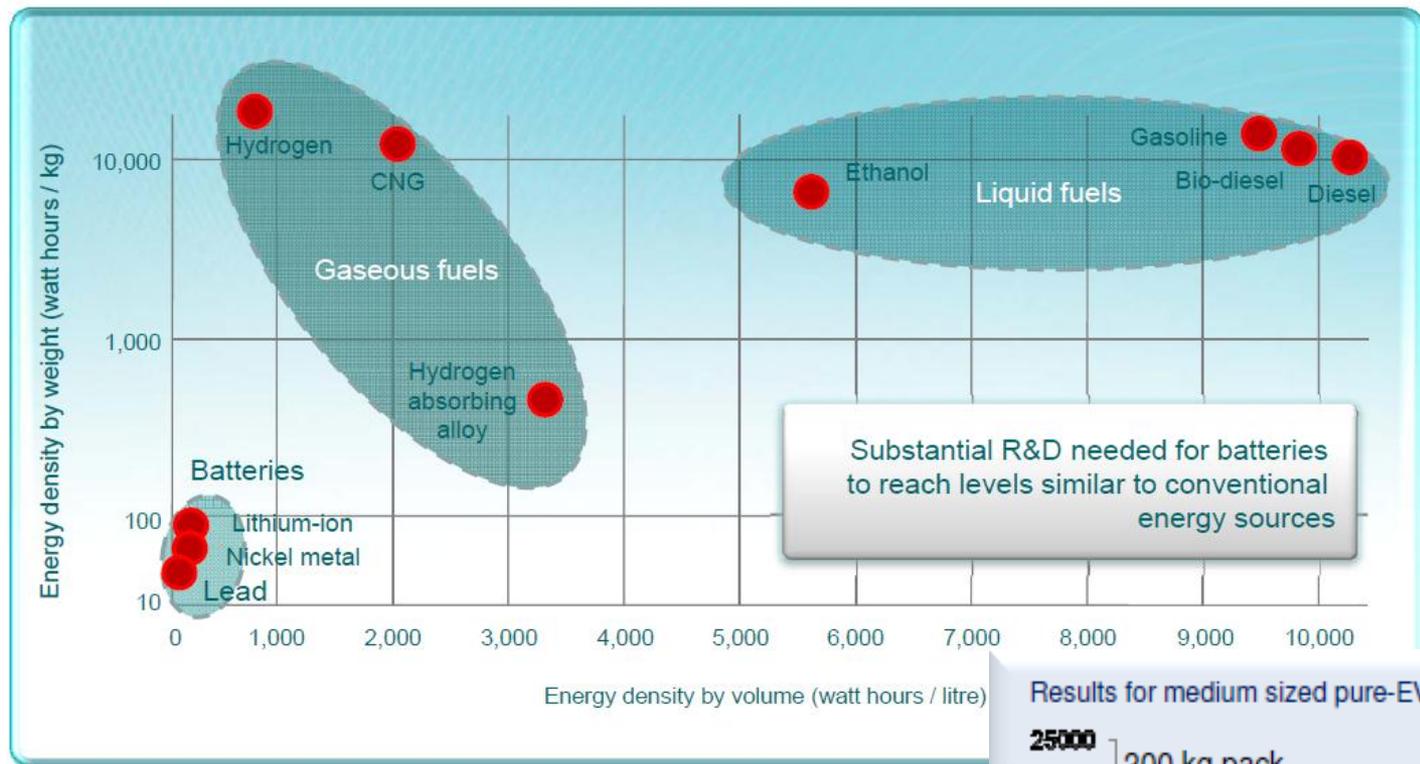
Technology Readiness Levels Covered			
Techno-economic Feasibility	Concept Design	Detailed Design	Validation/ Demonstration

# *Driving innovation in low carbon vehicles through collaboration and partnership*

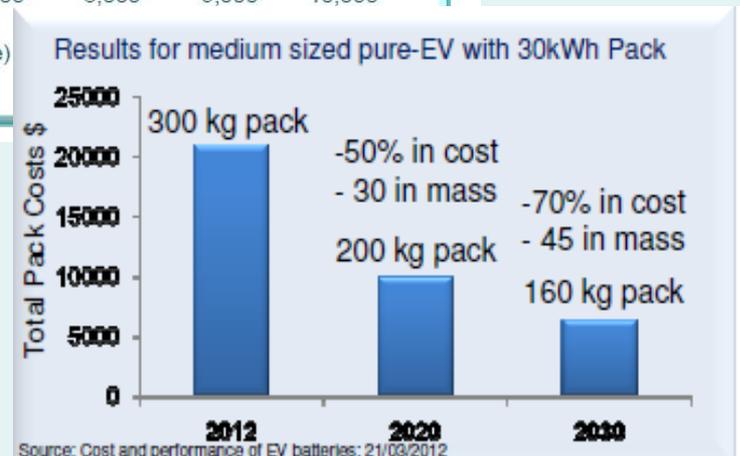


Defined by the Automotive Council Technology Roadmap

# Breakthrough in battery density is required to reduce EV purchase costs and increase range

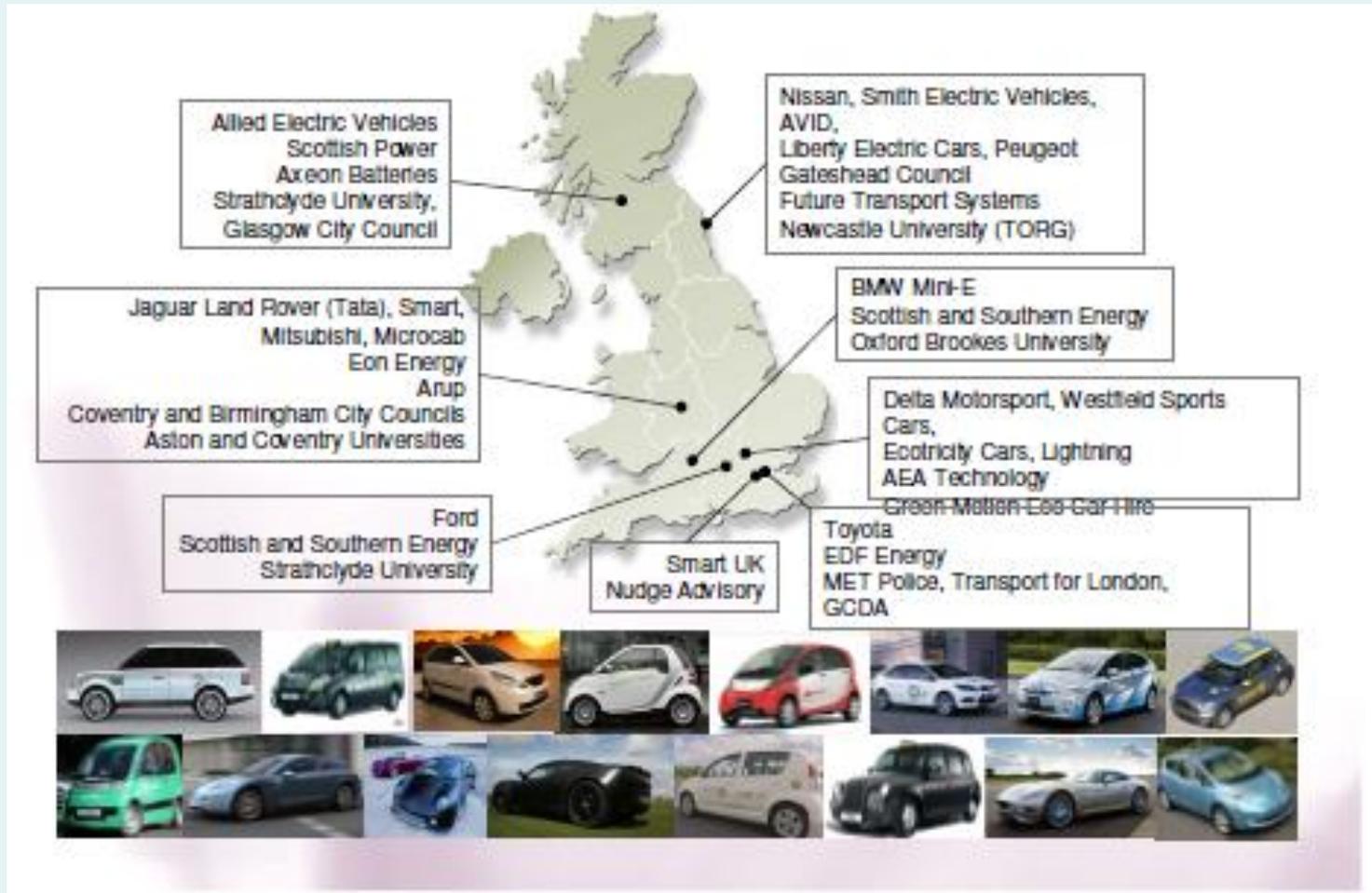


Forecasts indicate battery cost will lower by 50% by 2030, R&D in battery chemistry & management is required



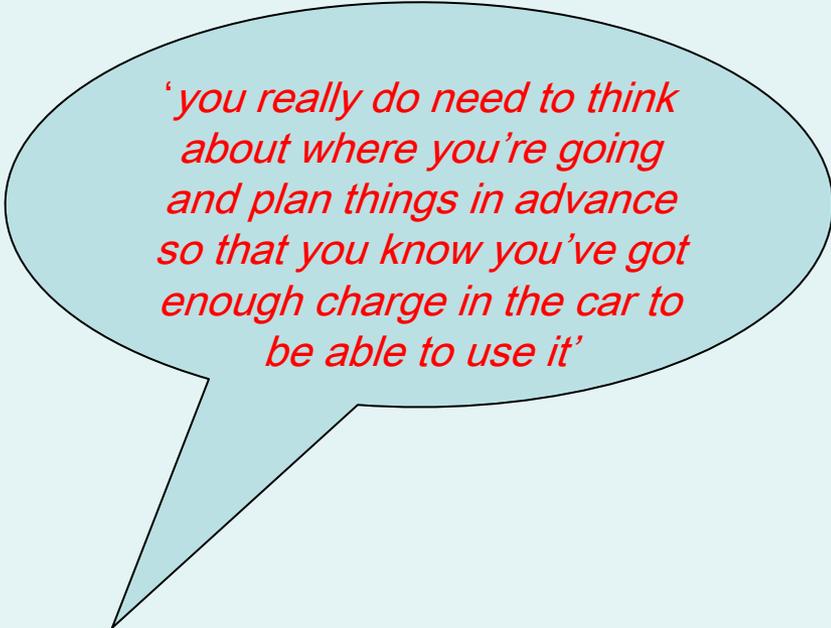
# TSB - Ultra Low Carbon Demonstrator Project

To understand customer perceptions and concerns using 340 demonstrations vehicles



# ***Study Conclusion***

- ❑ The typical usage of the trial vehicles aligns to the national data
- ❑ Users learn and adapt to the vehicles and charging routines quickly
- ❑ Charging becomes less frequent as drivers learn about the car's range
- ❑ The low noise is not seen by most to pose a danger to others
- ❑ There are very few who felt less safe using an EV



*'you really do need to think about where you're going and plan things in advance so that you know you've got enough charge in the car to be able to use it'*

*Demonstrations are important to break down negative perceptions and provide early adopters with re-assurance of EV reliability and practicality.*

# *LowCVP helps innovative SME enter the low carbon technology vehicle*

- ❑ Running Technology Challenge competition for last 3 years
- ❑ 'Meet the Investor' event - in partnership Price Waterhouse Cooper and SMMT
- ❑ Facilitates an Innovation Working Group of 100 members
- ❑ Successful in raising the profile of SMEs involved in the low carbon vehicle supply chain



***Policies and initiatives to  
progress the low carbon  
vehicle market***

# Low Carbon Vehicle Policy



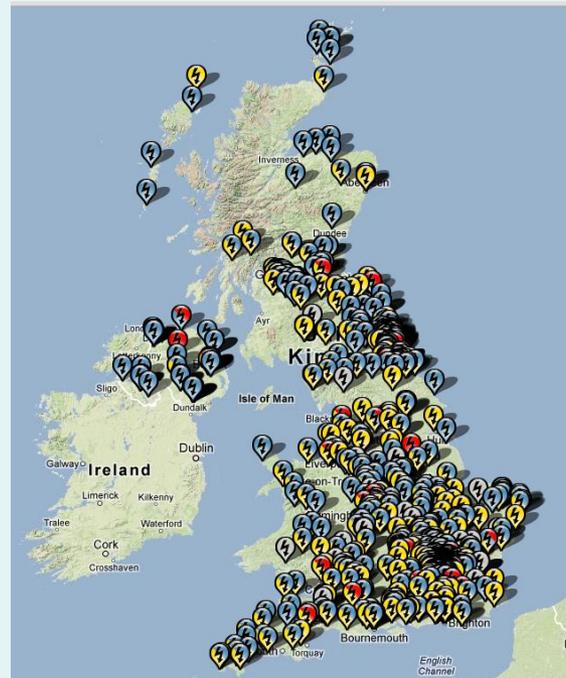
## Plugged in Grants

- £300m+
- Plug-in Car - £5K
- Plug-in Van - £8K
- Confirmed to 2015

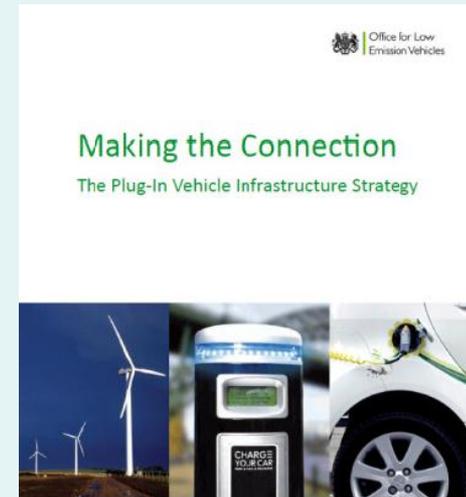


## Plugged in Places

- Up to £30m
- 8 consortia
- Different models & infrastructure
- 2500 installed



## Plug-in Vehicle Infrastructure Strategy



- Public accessible recharging
- Workplace recharging
- Recharging at home, overnight

# ***Low Carbon Vehicle Policy Activities***

## ***Cross-departmental collaboration***

### **R&D**



- Low carbon vehicle innovation platform
- Low carbon van procurement programme
- Low carbon truck trial

### **Fiscal Measures**



- Vehicle exercise duty exempt
- Enhanced Capital Allowances
- Zero company car tax (BIK)
- Green Bus Fund



**Regional/Local** – London Congestion Charge, Low Emission Zones, free parking, planning policy, air quality and carbon management plans



### **Supply Chain**

- Supporting the development & strengthening of UK-based supply chains for ultra-low emission vehicles
- Maximising business opportunities for the UK automotive sector





## ***UK's leading PiPs initiative***

- ❑ Plugged-in Places network for NE England, launched 2010, engaged with over 65 public-private partners
- ❑ 600 charging points – standard and quick
- ❑ First 'open source' network of public charging networks. Charge Your Car live status map
- ❑ Introduced UK 1<sup>st</sup> 'back office' system
- ❑ One of several partners involved in producing IET 'Code of Practice for electric vehicle charging equipment installation'
- ❑ Examining impact of domestic EV charging on the grid



# Private Infrastructure Investment

- ❑ Chagemaster 'POLAR': National plug-in vehicle charging network – supermarkets, homes, public car parks, railways, airports, motorway services.
  - Partnership with Telefonica to enable communication between charge point & customer via mobile.
  - Partnership with British Gas offering home EV charging units
  
- ❑ Charge Your Car entered joint venture with Elektromotive - created first 'pay-as-you-go' network; locate charge point and pay using mobile phone



# ***Progress through partnership – LowCVP helps kick start UK low carbon bus market***

- ❑ Developed the Low Carbon Emission Bus Certification scheme for UK Government
- ❑ Influenced Government fiscal incentives - Green Bus Fund
- ❑ Monitoring the low carbon bus market – 855 low carbon buses
  
- ❑ How was this achieved?
  - Identifying the challenges and solutions
  - Sharing experience and knowledge between stakeholders
  - Facilitating partnership between Government, bus manufacturers and operators



# LowCVP helps influence consumers through strengthening the car fuel economy label

- ❑ Led the introduction of the car fuel economy label in partnership with automotive industry (2005)
- ❑ Undertook research to examine consumer understanding of alternative label designs for ICE, EV and PHEV
  - Consumers confused by EV metrics (kwh/km)
  - Consumers require range data
  - Interested in pp/mile for compare running cost
  - Require information on charging locations
- ❑ Worked with DfT, OLEV, VCA & OEMs to develop EV & PHEV fuel economy labels inline with changes to Passenger Car Regulations

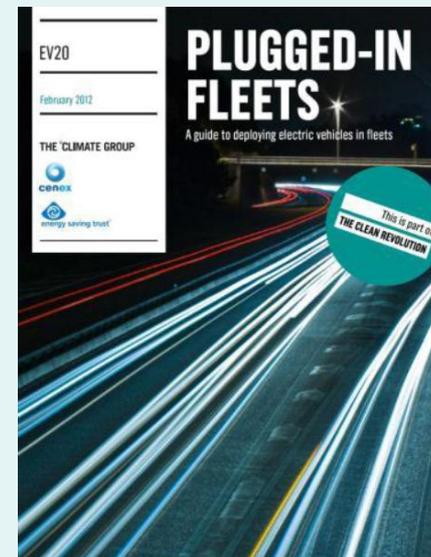
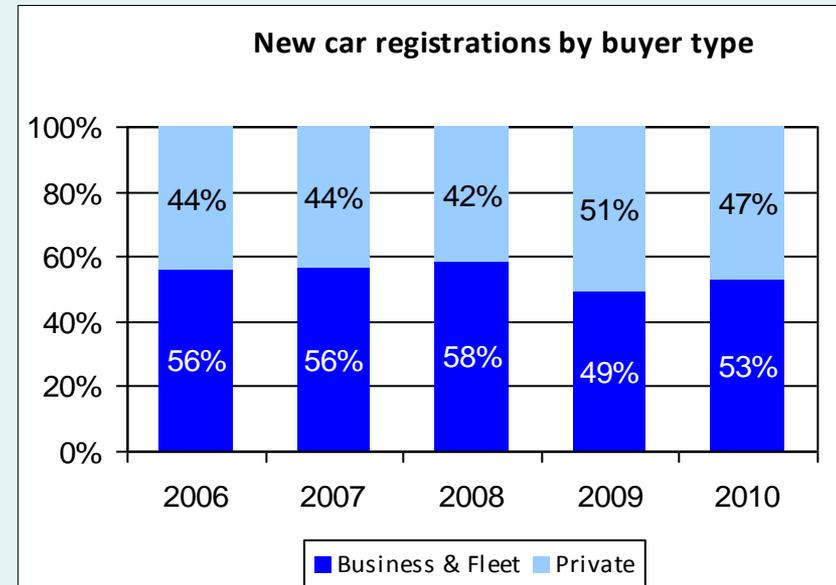
Fuel Economy		VED band and CO <sub>2</sub>
CO <sub>2</sub> emission figure (g/km) 		<b>A</b> 0 g/km <sup>(1)</sup>
Electricity cost (estimated) for 12,000 miles A guide price for comparison purposes is calculated using the combined drive cycle (town centre and motorway) and electricity price. Cost is recalculated annually. Unit price as at March 2012: electricity 13.7p/kWh.		Annual energy cost <b>£458</b> <sup>(2)</sup>
VED for 12 months Vehicle Excise Duty (VED) or road tax varies according to the CO <sub>2</sub> emissions and fuel type of the vehicle.		1st year rate <b>£0</b> <sup>(3)</sup>
Electric energy consumption: <b>3.6</b> Miles/kWh <sup>(4)</sup>		Standard rate <b>£0</b> <sup>(5)</sup>
Electric range: <b>109</b> Miles <sup>(6)</sup>		
<b>Environmental Information</b> A guide on fuel economy and CO <sub>2</sub> emissions which contains data for all new passenger car models is available at any point of sale free of charge. In addition to the fuel efficiency of a car, driving behaviour as well as other non-technical factors play a role in determining a car's fuel consumption and CO <sub>2</sub> emissions. CO <sub>2</sub> is the main greenhouse gas responsible for global warming.		
Make/Model NISSAN Leaf	Engine Capacity (cc): N/A	
Fuel Type: Electricity <sup>(7)</sup>	Transmission: N/A	
Fuel Consumption Drive Cycle	Litres/100km <sup>(8)</sup>	Mpg <sup>(9)</sup>
Urban	N/A	N/A
Extra-urban	N/A	N/A
Combined	N/A	N/A
Carbon dioxide emissions (g/km): <b>0</b> Important note: Some specifications of this make/model may have lower CO <sub>2</sub> emissions than this. Check with your dealer.		
<small>                     (1) A new 1st year VED rate will be applied to cars registered for the first time (scheme effective from April 2016).                      (2) The standard 12 month VED rate for all registered cars in this band is shown for the purposes of comparison. Note, figures quoted reflect the current rate only, and may be subject to change in the future.                      (3) Please note that figures quoted are obtained under specific test conditions, they may not be achieved under 'real world' driving conditions. However, the figures serve as a means of comparing models of a similar type.                      (4) A list of electric vehicle charging points is available here: <a href="http://dtkgurfurling.co.uk/">http://dtkgurfurling.co.uk/</a>.                      (5) Not available for electric cars.                 </small>		
Department for Transport		To compare fuel costs and CO <sub>2</sub> emissions of new cars, visit <a href="http://carfueldata.direct.gov.uk">http://carfueldata.direct.gov.uk</a>

*Product labeling informs consumers about environmental performance and helps them make better choices*

# Fleets have a key role in developing the EV market

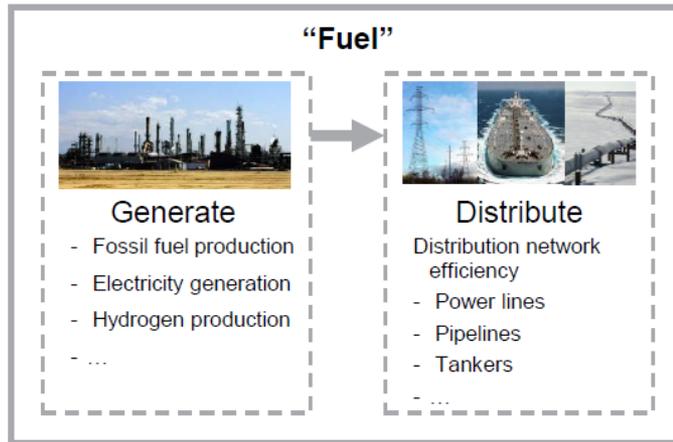
## Plug-in Fleets Initiative

- ❑ 20 business received tailored guidance by the Energy Saving Trust consultants on integrating plug in vehicles into their fleet.
- ❑ Energy Savings Trust, EDF Energy and Route Monkey funded by DfT and TfL.
- ❑ Demonstrated how plug-in vehicles can work practically and achieve cost benefits in business fleets
- ❑ Plug-in Fleets Initiative – Charging Forward report published 22 January 2013. More work to come.

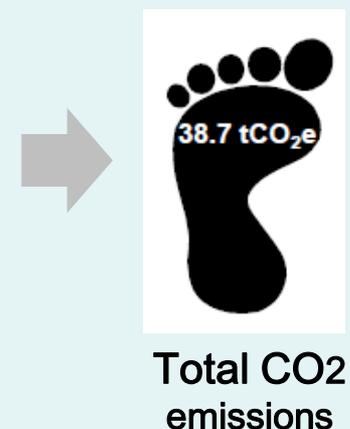
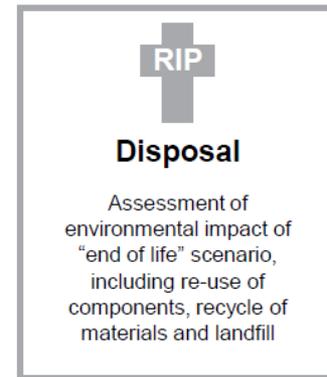
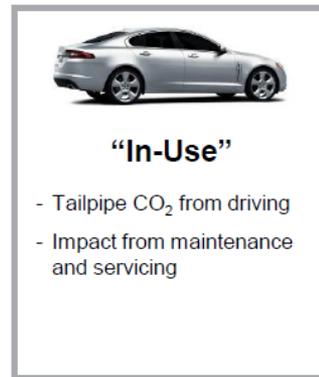


***Are electric vehicle truly  
zero emission?***

# LowCVP moves to a life-cycle CO2 vehicle footprint

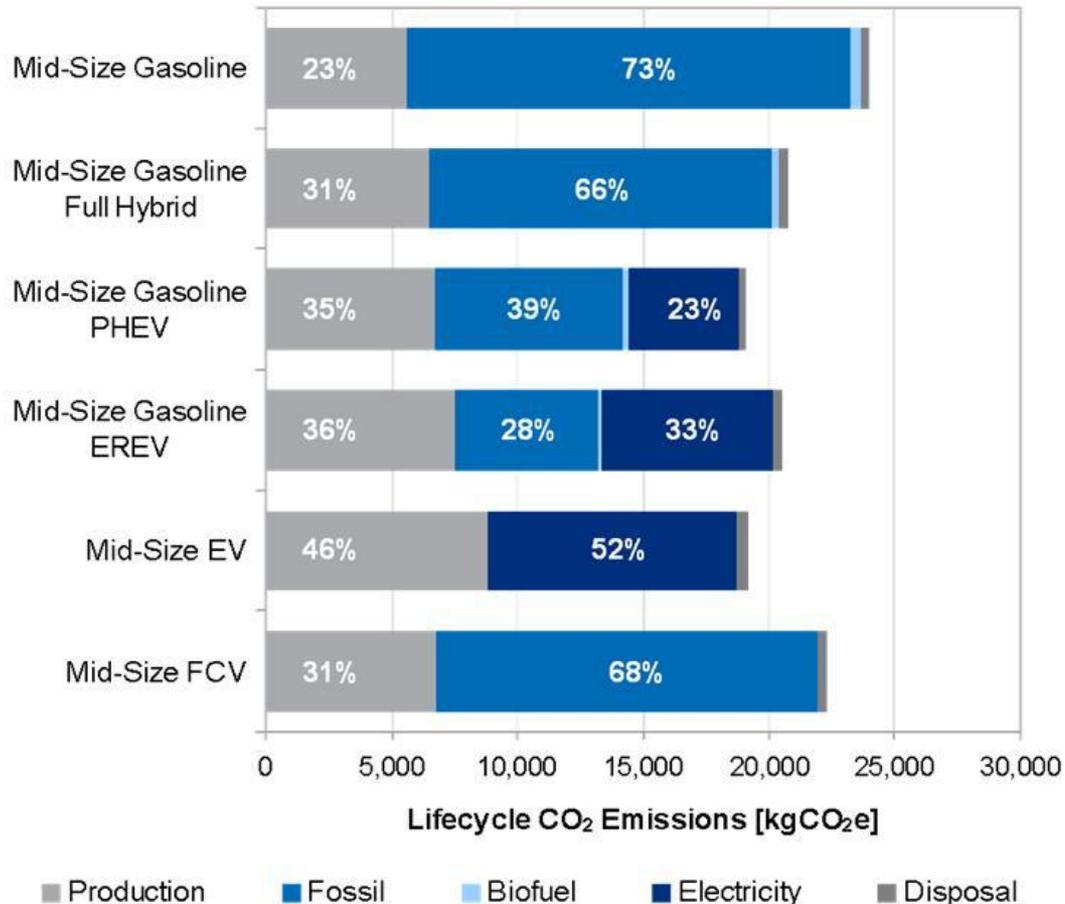


- ❑ Tailpipe CO2 metric has limitations e.g. EV zero emission
- ❑ Life cycle assessment provides a more robust measure of the carbon impact of vehicle



# ***Lifecycle CO<sub>2</sub> accounting is required to more robustly compare different technologies***

**Comparison of lifecycle CO<sub>2</sub> vehicle emissions**



- ❑ Electric powertrains have lower life-cycle CO<sub>2</sub> emission, however embedded CO<sub>2</sub> emissions from production are more significant
- ❑ Vehicle production phase of electric vehicles dominated by battery manufacturing
- ❑ Decarbonising the electricity grid is essential for lowering the carbon intensity of the 'use phase' of EVs
- ❑ A life cycle philosophy is required to ensure future vehicles truly are low carbon

# *To Conclude*

- ❑ Government policy - strong lever to 'kick-start' the EV market
- ❑ Many different stakeholders exist in an emerging market, partnership and collaboration is essential
- ❑ Opportunities to develop novel business models across the value chain to support infrastructure & reduce total cost of ownership
- ❑ R&D investment - key role in innovation & overcoming technology barriers
- ❑ Sharing experience and knowledge - demonstrate what works
- ❑ Consumer education - essential to change perceptions & encourage demand
- ❑ Long-term vision - accounting for lifecycle CO<sub>2</sub> impacts, developing a decarbonised & smart grid, integration of technologies



# ***Thank You***

The Low Carbon Vehicle Partnership

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