When will EVs become competitive?
A UK perspective

Our Drive to the Future – Electric Vehicle Summit 2018

Dublin, October 24 2018

LowCVP
Low Carbon Vehicle Partnership

Connect | Collaborate | Influence

Managing Director
Andy Eastlake

LowCVP: A unique public-private membership organisation, building evidence and creating robust policies and innovation in the UK

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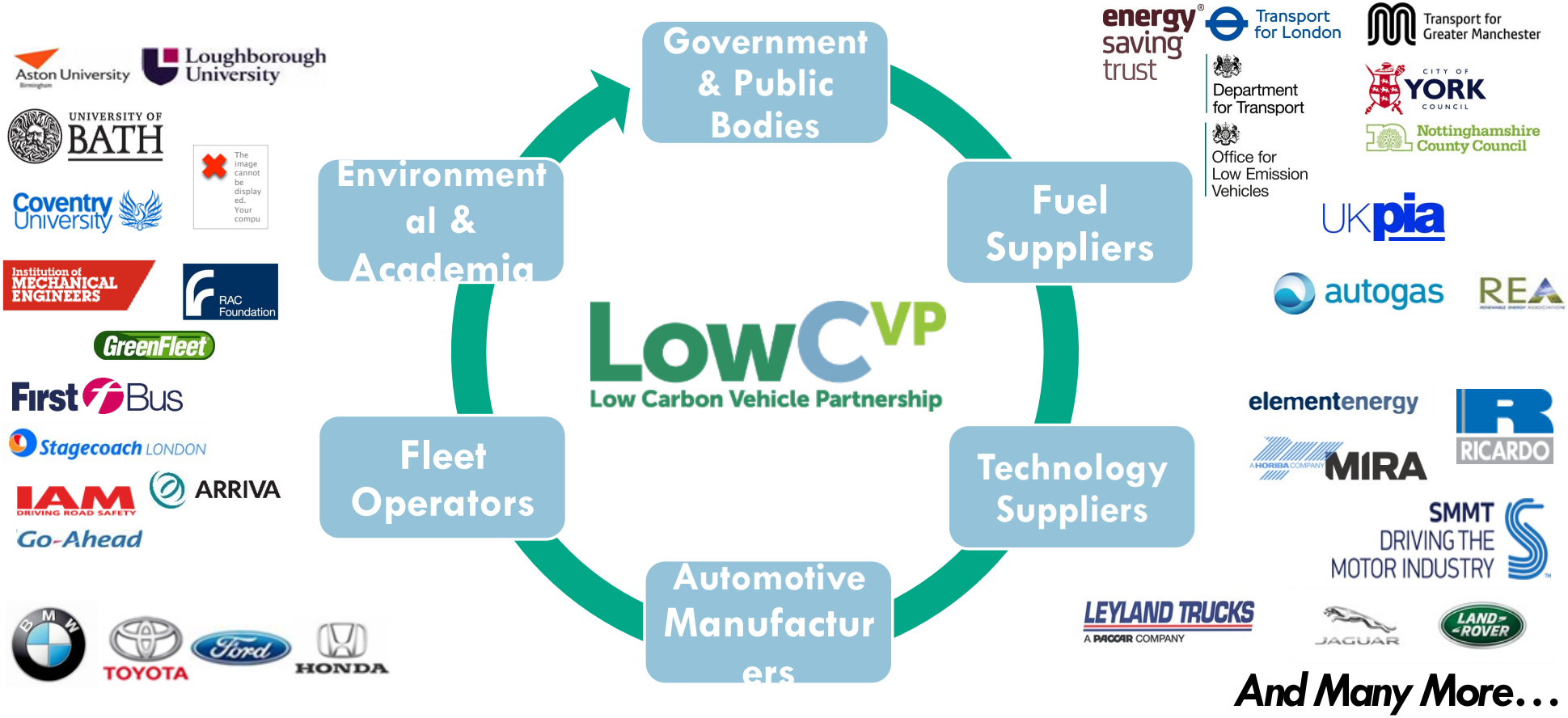

Working together – to build evidence, creating robust policies and innovation and change the market

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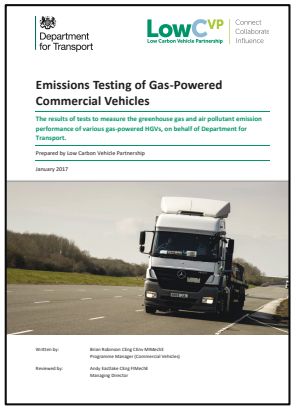
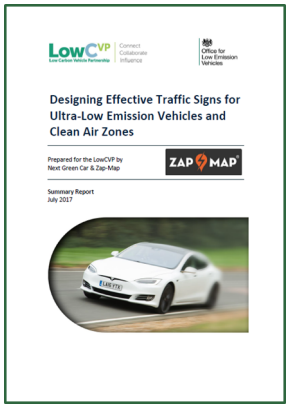
Creating communities with shared goals

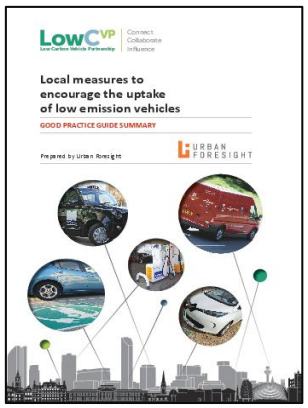
Understanding and evidence based research

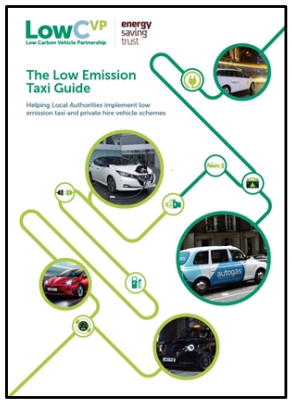
Influencing policy and information

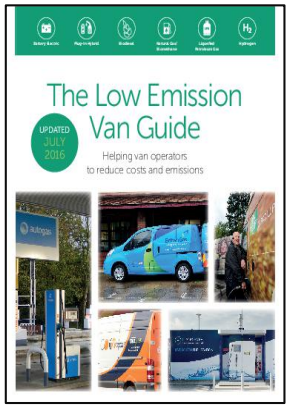
Accelerating the market

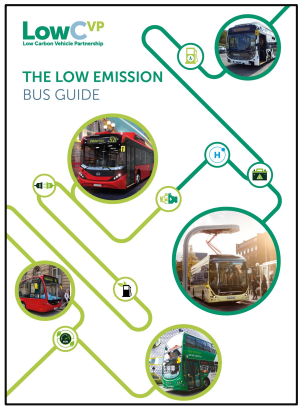












Electric vehicles – a growing sector

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- Increasing sales
- Increasing number of vehicles
- Increasing zero emission range capability
- Increasing benefits/incentives
- Increasing number of charge points
- Increasing opportunities for additional services
- Increasing costs (to govt)
- Increasing stress on electricity grid
- ……..
- Increasing complexity for consumers

Competitive?? – for whom?

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Policy - Governments	People – consumers and fleets	Products – Auto & Energy
Air Quality objectives	Price – Purchase and operation	Production costs and profits
Climate change objectives	Range – utility	Energy supply costs
Energy security	Convenience – charging time & locations	Servicing revenue
Industrial strategy	Maintenance costs	Brand management
Fiscal policy/tax revenue	Desirability	Material availability/cost
Future mobility	CSR and marketing	Design lead times
	Messaging – Media misinformation	Energy system capability

- For many of these aspects EV's are already competitive for some stakeholders, but the tensions in other areas still need further measures applied/solutions found
- The long term future mobility system will inevitably be electrically driven, but who the suppliers and consumers will be is unknown

Why are EV's so important
UK GHG emissions: transport emerging as an outlier

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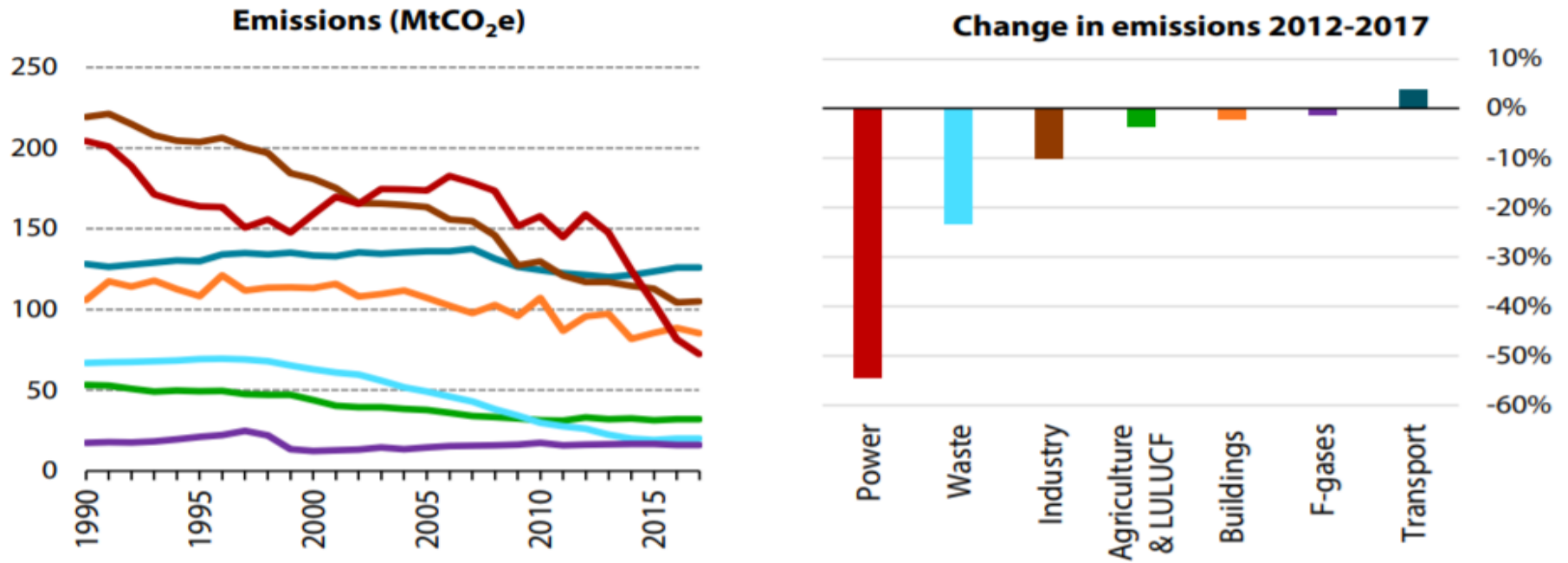
Figure 2. Emissions reductions have been focused in the power and waste sectors



Source: BEIS (2018) *2017 UK Greenhouse Gas Emissions, Provisional Figures*; BEIS (2018) *2016 UK Greenhouse Gas Emissions, Final Figures*.
Notes: The chart on the right-hand side shows changes in sectoral emissions between 2012 and 2017; buildings emissions in this chart are temperature-adjusted. 2017 emissions are provisional estimates and assume no change in non-CO_2 emissions from 2016.

UK government view and strategy

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HM Government

INDUSTRIAL STRATEGY

UK Government's July 2018 strategy sets out long-term ambitions and measures to get there

The Road to Zero
Next steps towards cleaner road transport and delivering our Industrial Strategy

£1.5bn funding over 2015-2021

Climate Change Act

Legal obligation for the UK to reduce GHGs by 80% in 2050 compared to 1990.

Road to Zero

All new cars and vans to be effectively zero emission by 2040.

At least 50%, and as many as 70%, of new car sales and up to 40% of new van sales to be ultra low emission by 2030.

Transition to be industry and consumer led. We will review progress by 2025.

UK Government perspective

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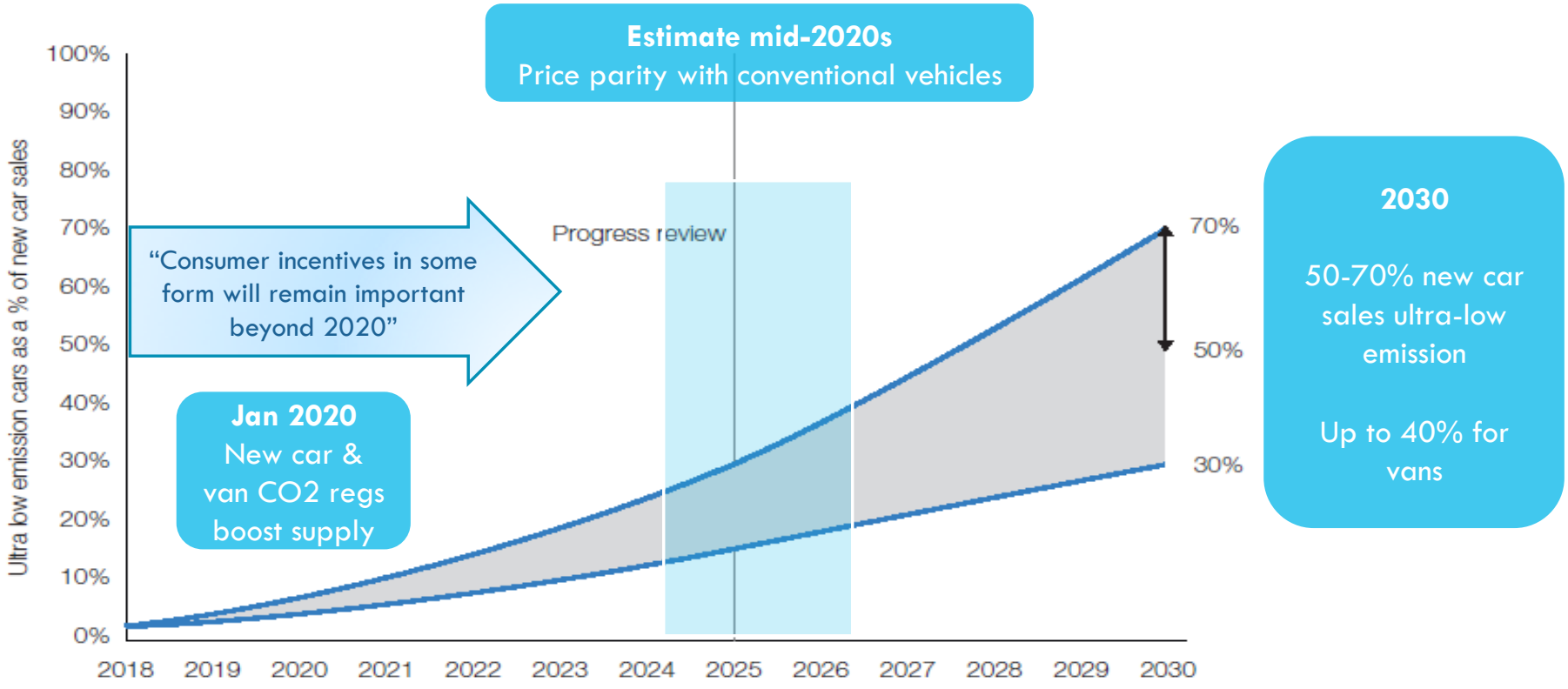
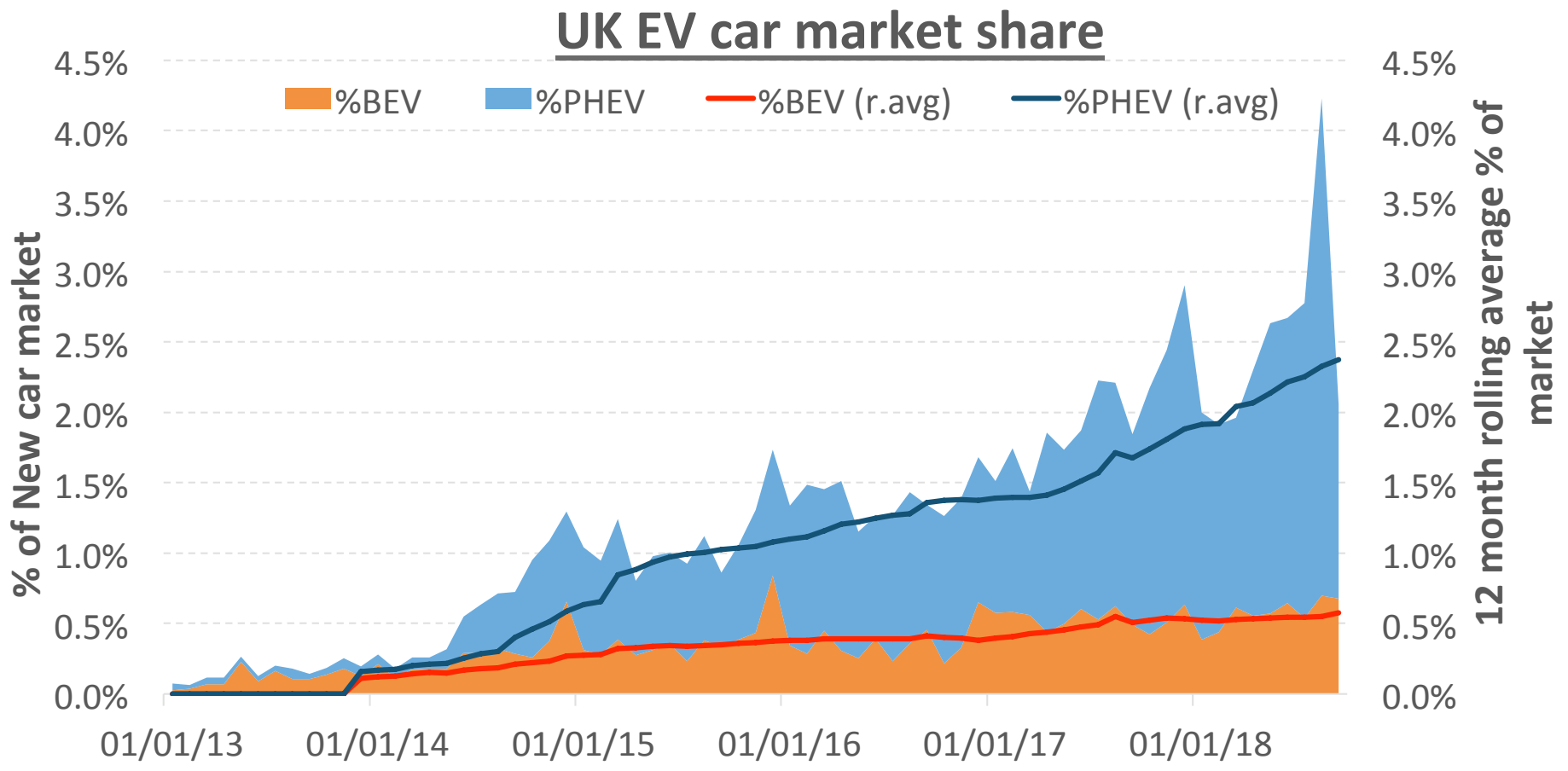
UK govt have set out a timetable to 2030



EVs: Uptake to date - increasing new vehicle market share



Source: SMMT data, LowCVP analysis

ULEVs: Are we on track for CO2 increasing new car share, offset by switch from diesel

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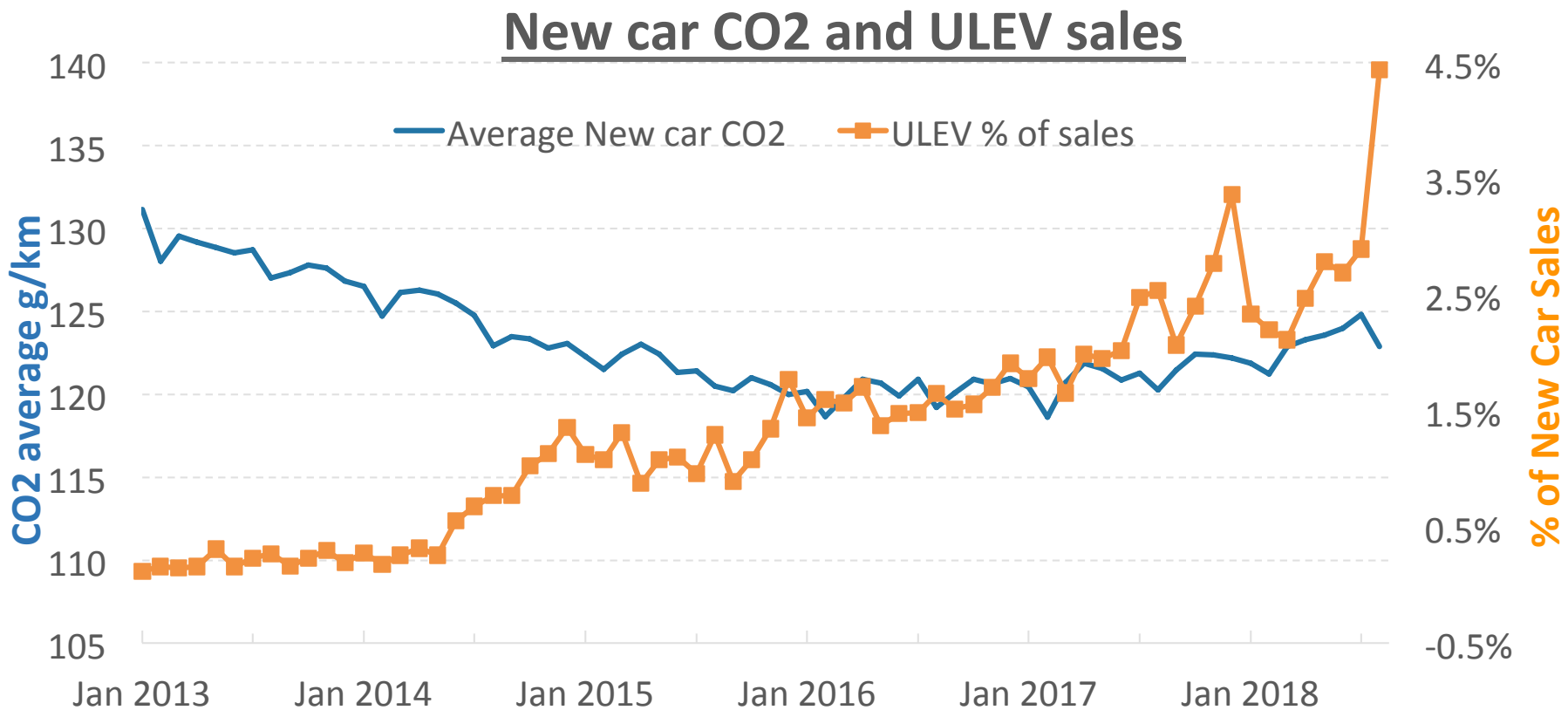
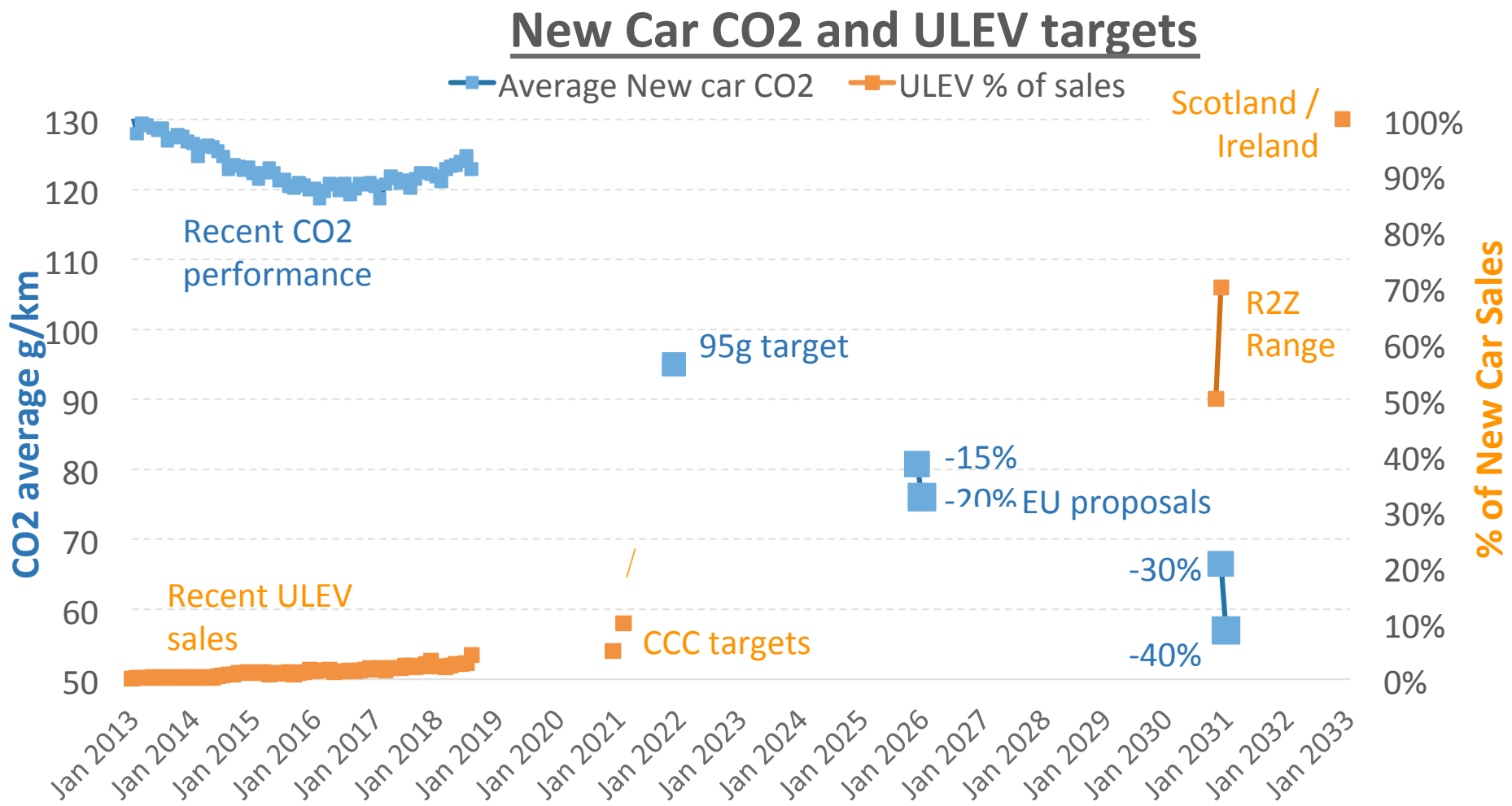


Source: DfT VEH0150

CO2 targets: the step-change required



Source: DfT VEH0150

Consumer views: quite entrenched

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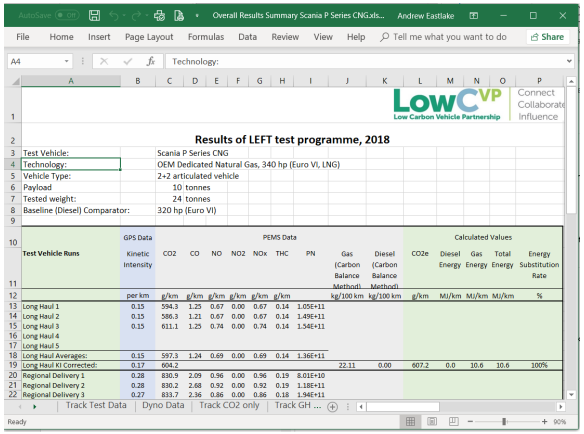
To what extent would you say that each of the following factors/issues would act as a barrier to you purchasing an EV? *(% concerned)*

	JAN 2016	JUL 2017	JUN 2018
High purchase price	82%	83%	83%
Availability of public charging point	81%	84%	80%
Lack of rapid charge on motorways	–	–	79%
Time to offset higher purchase price vs lower running costs	68%	66%	69%
Concerns re: battery durability	65%	69%	68%

Source: AA research. Updated July 2018

Consumers aren't always rational

- Don't all buy cars using a spreadsheet
- Use cars in very different ways
- Value convenience
- Love a bargain (grant)
- Are bombarded with mixed media messages
- Like to find reasons not to change



Results of LEFT test programme, 2018

Test Vehicle:	Scania P Series CNG
Technology:	OEM Dedicated Natural Gas, 340 hp (Euro VI, LNG)
Vehicle Type:	2+2 articulated vehicle
Payload	10 tonnes
Tested weight:	24 tonnes
Baseline (Diesel) Comparator:	320 hp (Euro VI)

Test Vehicle Runs	GPS Data: Kinetic Intensity	PEMS Data: CO2	CO	NO	NO2	NOx	THC	PN	Gas (Carbon Balance Method)	Diesel (Carbon Balance Method)	Calculated Values: CO2e	Diesel Energy	Gas Energy	Total Energy	Energy Substitution Rate
	per km	g/km	g/km	g/km	g/km	g/km	g/km		kg/100 km	kg/100 km	g/km	MJ/km	MJ/km	MJ/km	%
Long Haul 1	0.15	594.3	1.25	0.67	0.00	0.67	0.14	1.05E+11							
Long Haul 2	0.15	586.3	1.21	0.67	0.00	0.67	0.14	1.49E+11							
Long Haul 3	0.15	611.1	1.25	0.74	0.00	0.74	0.14	1.54E+11							
Long Haul 4															
Long Haul 5															
Long Haul Averages:	0.15	597.3	1.24	0.69	0.00	0.69	0.14	1.36E+11							
Long Haul KI Corrected:	0.17	604.2							22.11	0.00	607.2	0.0	10.6	10.6	100%
Regional Delivery 1	0.28	830.9	2.09	0.96	0.00	0.96	0.19	8.01E+10							
Regional Delivery 2	0.28	830.2	2.68	0.92	0.00	0.92	0.19	1.18E+11							
Regional Delivery 3	0.27	833.7	2.36	0.86	0.00	0.86	0.18	1.94E+11							

Google Maps now shows electric car charging stations

Electric car prices to soar as axe falls on green subsidies

Pressure on Philip Hammond for extra money to save grants for low-emission vehicles

Another Study Argues Electric Cars Are Bad for the Environment. It's Demonstrably False

Are EVs bad? Only if you cherry-pick data, rely on discredited projections, and ignore CO2, write RMI analysts.

LYNN DANIELS EDWARD J. KLOCK-MCCOOK

JULY 18, 2018

Key success stories and applications

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When will EV's be competitive?

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- EV's are competitive now…. For increasing numbers of users, uses and objectives!
- Challenges remain across all areas of Product, Policy and People
- Charging is one of the biggest perceived barriers, and benefits!!
- High fuel use and local applications (Taxi, Bus, City centre van operation)
- Plug in hybrids, can operate "effectively zero emissions" if plugged in and used appropriately
- Complementary incentives and policies are critical to touch as many "hot buttons" for consumers and users as possible

- Communication and Collaboration.
- Common terminology, Common information, Common policy, Common Sense

Key trends helping shape our future direction

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Regulation
Tailpipe & renewable content, potentially moving to full life cycle.

Connected & autonomous
Potential transformative technologies. Significant potential impact on carbon emissions.

Energy system
Increased renewable energy, system efficiency, new markets & services.

Air quality control
Increase in local regulation via city access.

Mobility as a service
Transport system efficiency. Move from ownership to user.

Join us and help make the change

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The Electric Vehicle Energy Taskforce has been formed at the request of Government to make suggestions to Government and Industry on 'how to ensure the GB energy system is ready for and able to facilitate and exploit the mass take up of electric vehicles?'