

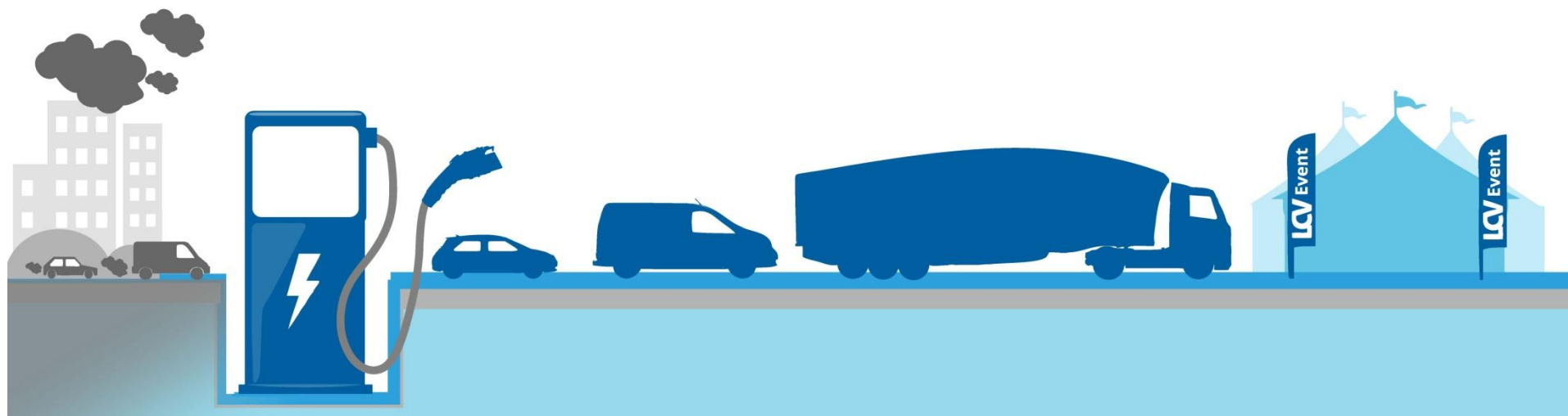
The Context For Low Carbon Vehicles

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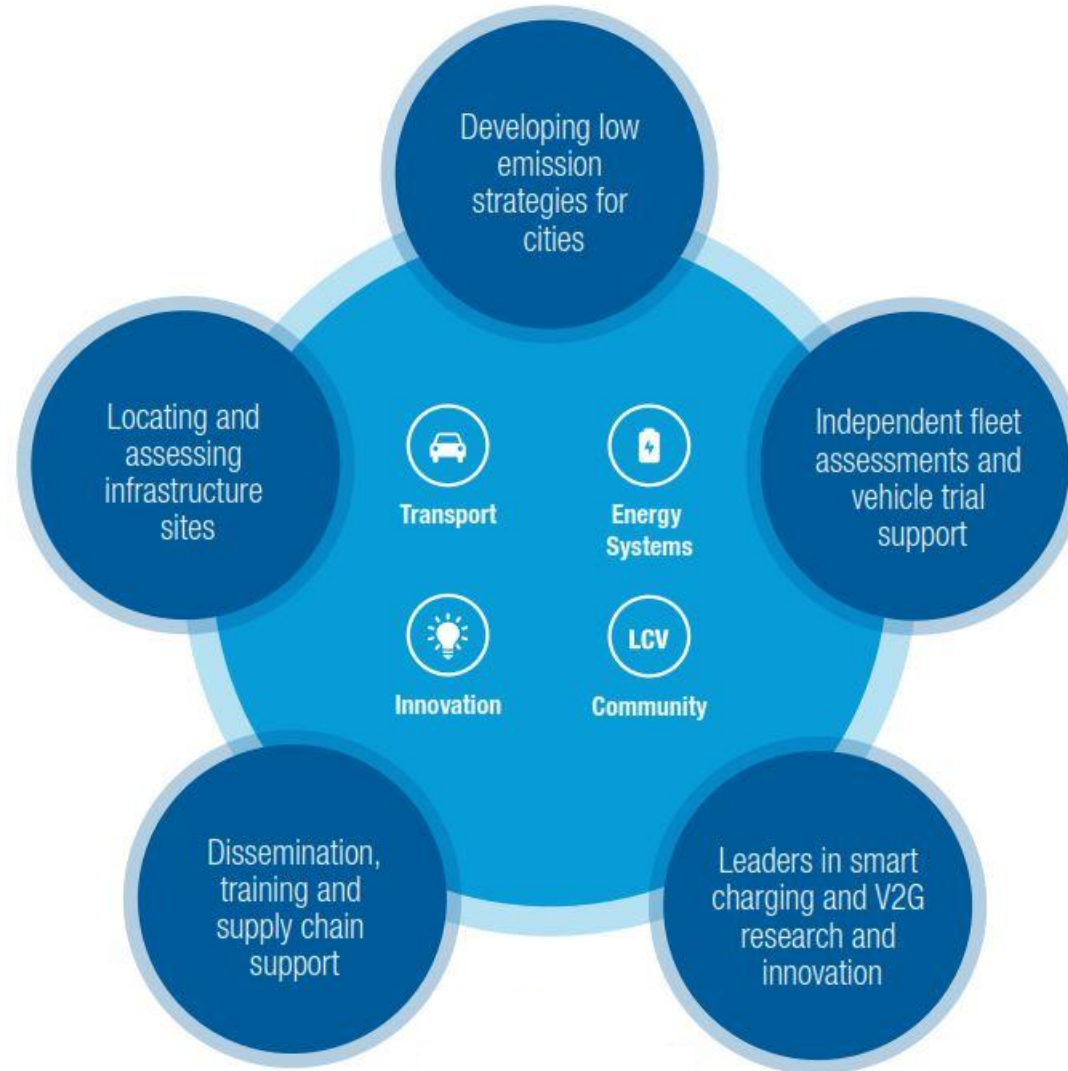


Presentation Objectives

1. Overview of Cenex
2. Why is there so much confusion around Low Emission Vehicles?
3. Types of Vehicles & Fuels
4. ULEV Uptake Forecasts
5. Policy Background
6. Next steps?



Cenex Overview



Reducing Emissions From Transport



Helping clients to assess, evaluate, implement and deliver low emission vehicle and associated infrastructure strategies



Where does the confusion begin?



Where to begin?

CAZ – Clean Air Zone

Euro IV, V, VI, EEV

ULEV – Ultra Low Emission Vehicle

PiVG – Plug-in Van Grant

PiVC – Plug-in Car Grant

OLEV – Office for Low Emission Vehicles

GUL – Go Ultra Low

EV – Electric Vehicle

PHEV – Plug-In Hybrid Electric Vehicle

CVTF – Clean Vehicle Technology Fund

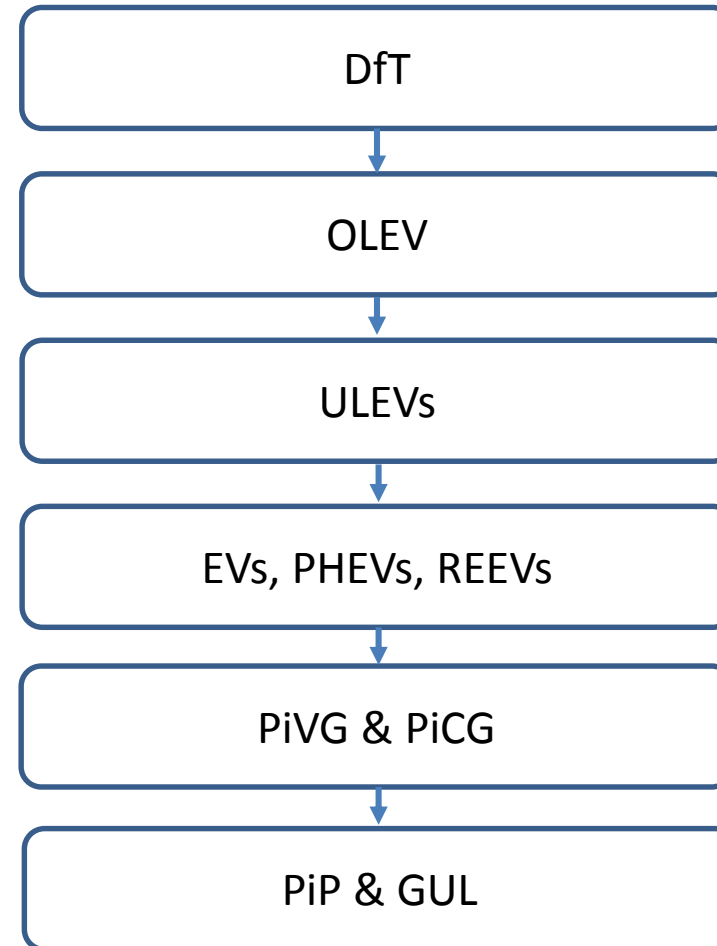
LEZ – Low Emission Zone

RPC – Reduced Pollution Certificate

REEV – Range Extended Electric Vehicle

PiP – Plugged-In Places

Euro 4, 5, 6

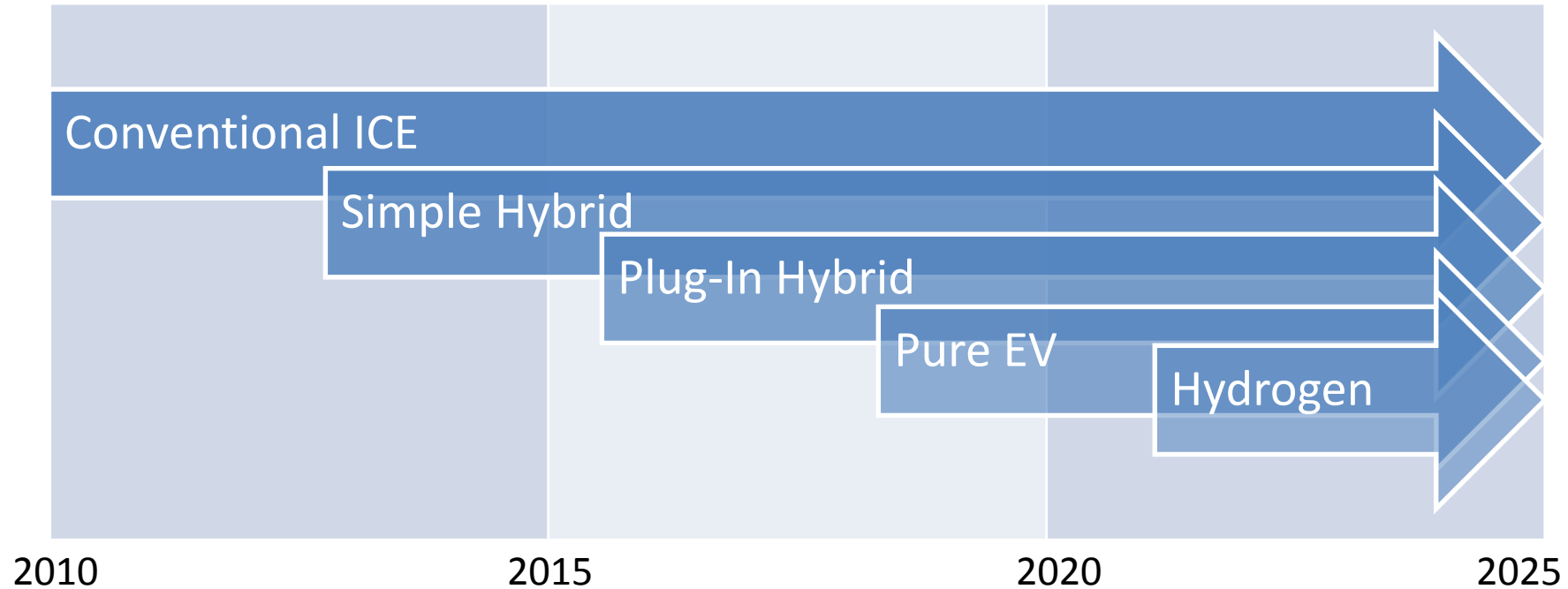


Context for Low Carbon Vehicles



Technology is moving forwards

- General acceptance that there is a need to lower the emissions impact of vehicles

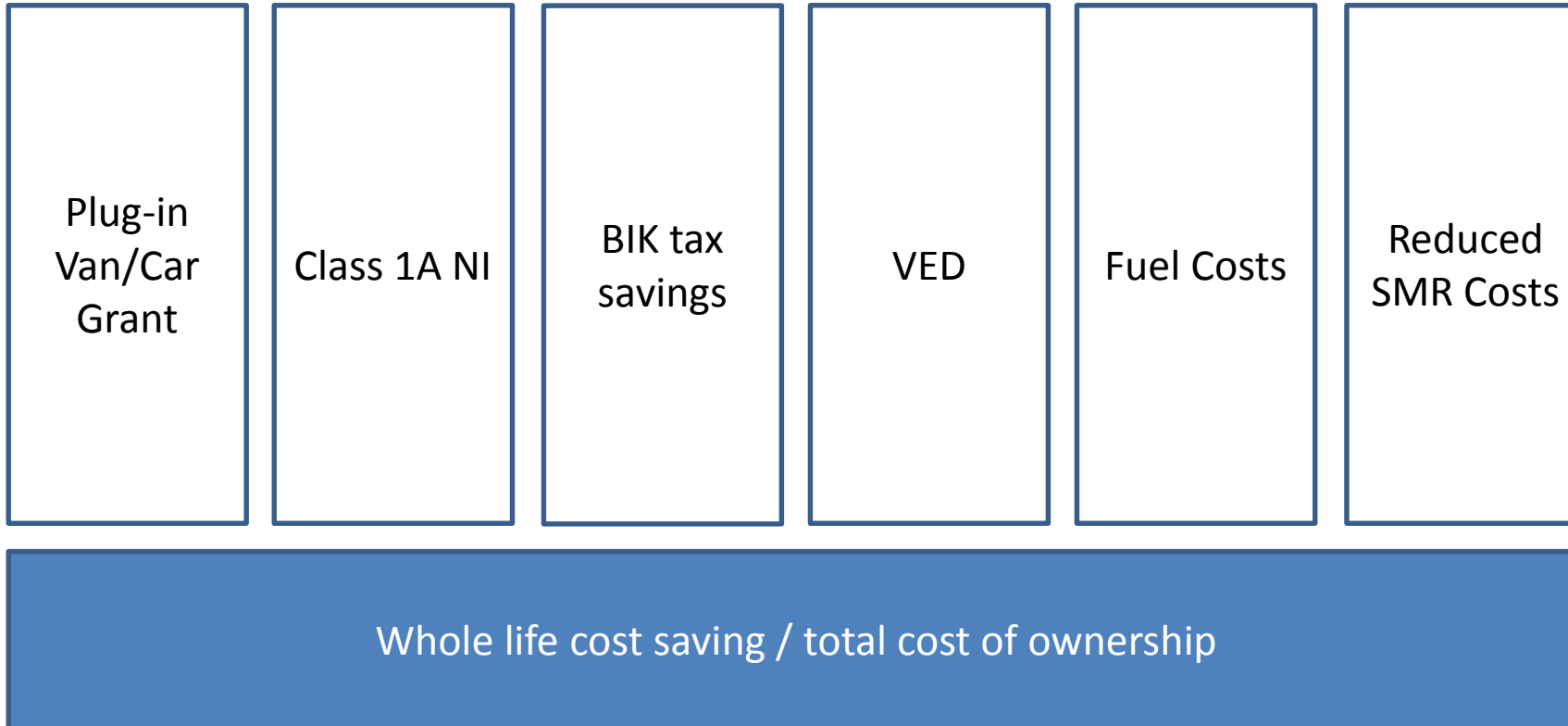


Adapted from [Automotive Council 2013 Roadmaps](#)

New versions were launched at LCV2017 by the APC for specific technology types, available [here](#)



Benefits to the business

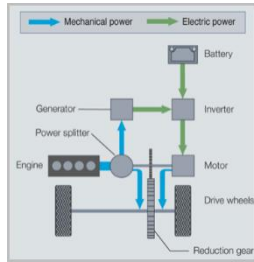


Types of Vehicles & Fuels



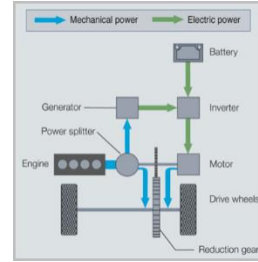
Technology introductions: EV and H₂

Hybrid



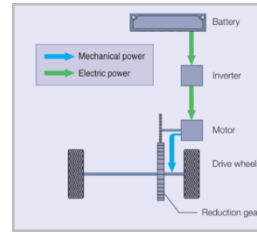
e.g. Toyota Prius

Plug-in Hybrid EV



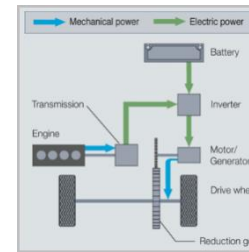
e.g. Toyota Plug-in Prius

Battery EV



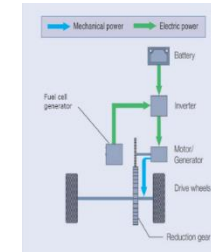
e.g. Nissan Leaf

Range Extended EV



e.g. BMW i3

Hydrogen Fuel Cell



e.g. Hyundai ix35

Context for Low emission vehicles

Cars



Small vans



Large vans



Mid-size trucks



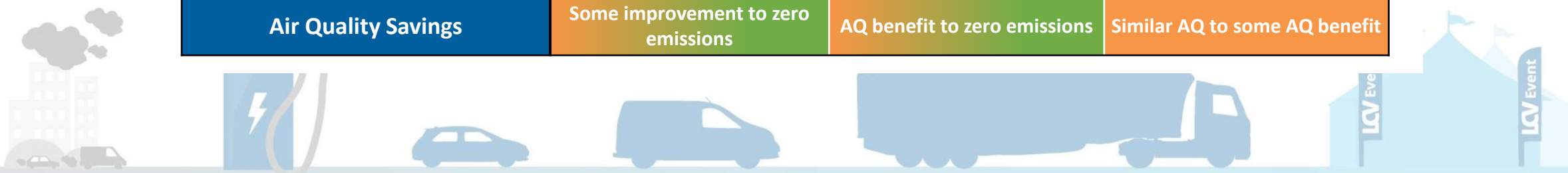
Large trucks



Context for Low Carbon Vehicles

- Battery Electric
- Hybrid Electric
- Plug-in Hybrid
- Range Extended Electric
- ICE LPG
- Hydrogen Fuel Cell/Range Extender/Dual Fuel
- Dedicated CNG
- Diesel & LPG Dual Fuel
- Petrol
- Biodiesel
- Drop-in Fuels

Vehicle Classification	Electric	Gas	Liquid
Tank-to-Wheel CO2 Savings	~20 – 100%	0 to 100%	~15% worse to 100%
Well-to-Wheel CO2 Savings	~20 – 50%	0 to ~85%	~15% worse to ~90%
Air Quality Savings	Some improvement to zero emissions	AQ benefit to zero emissions	Similar AQ to some AQ benefit



EV Projections



Electric cars and consumer demand



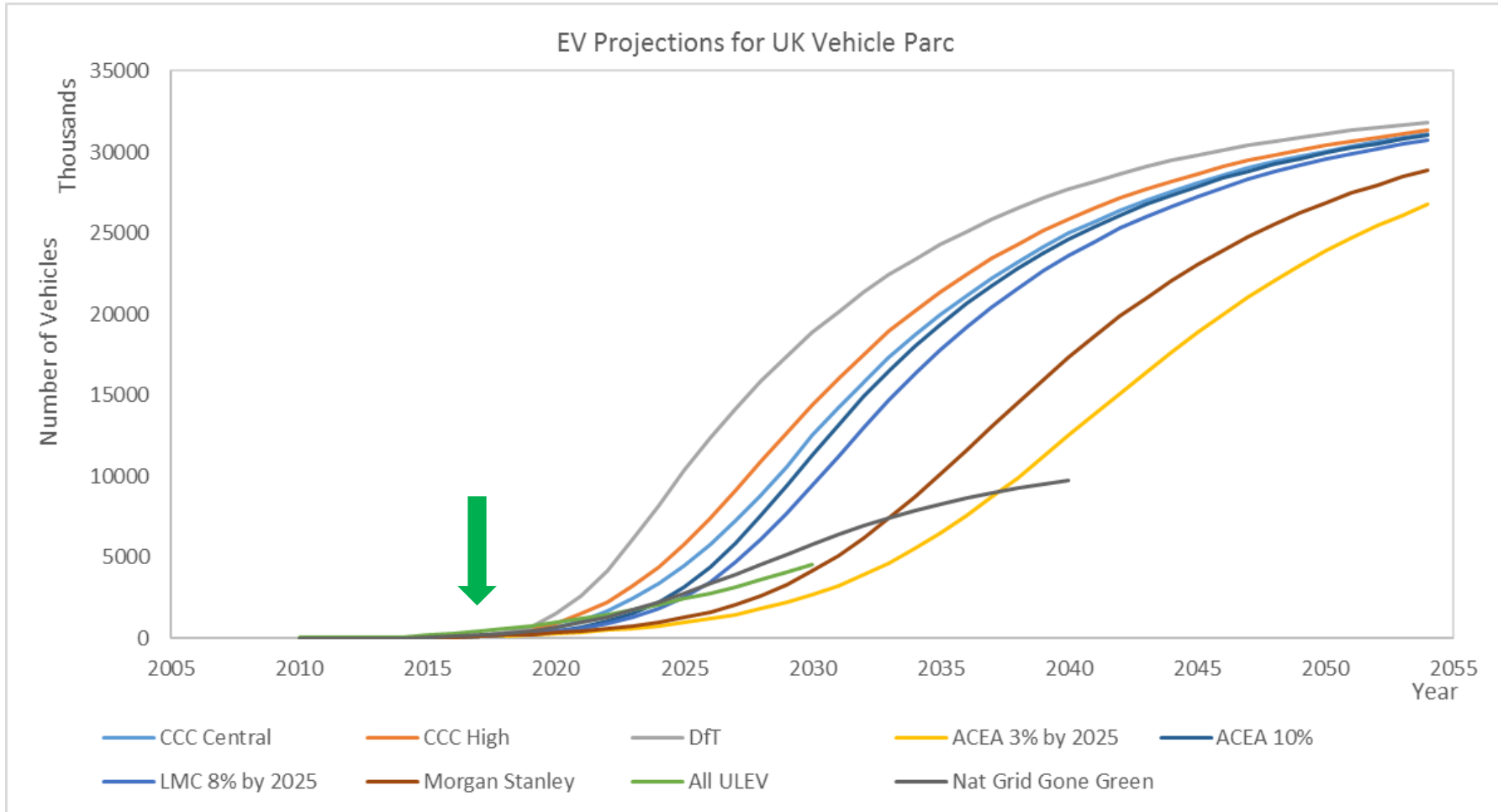
Electric cars and consumer demand

Tesla Model 3

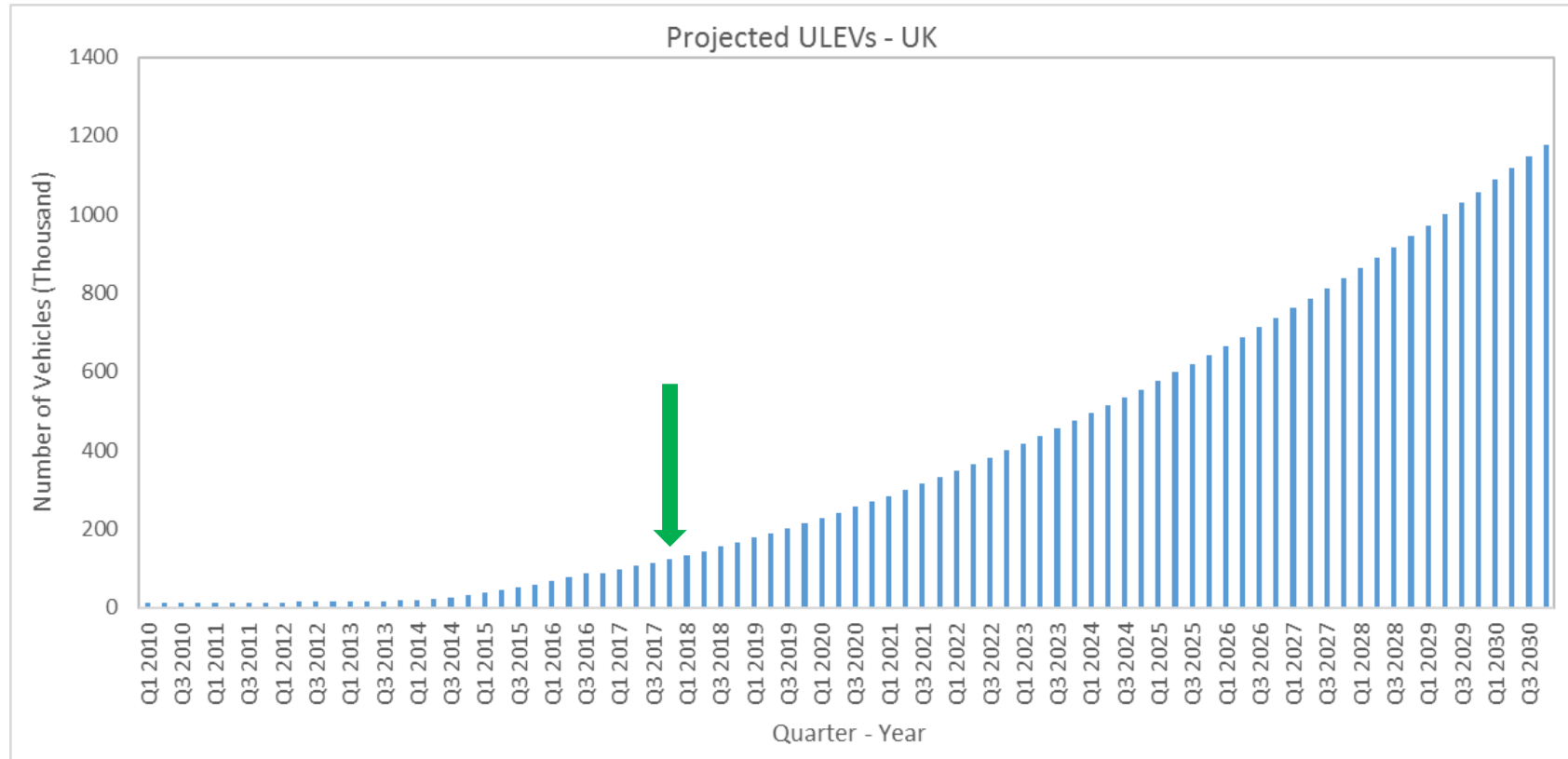
373,000 pre-orders with \$1,000/£1,000 deposit paid



UK EV Projections

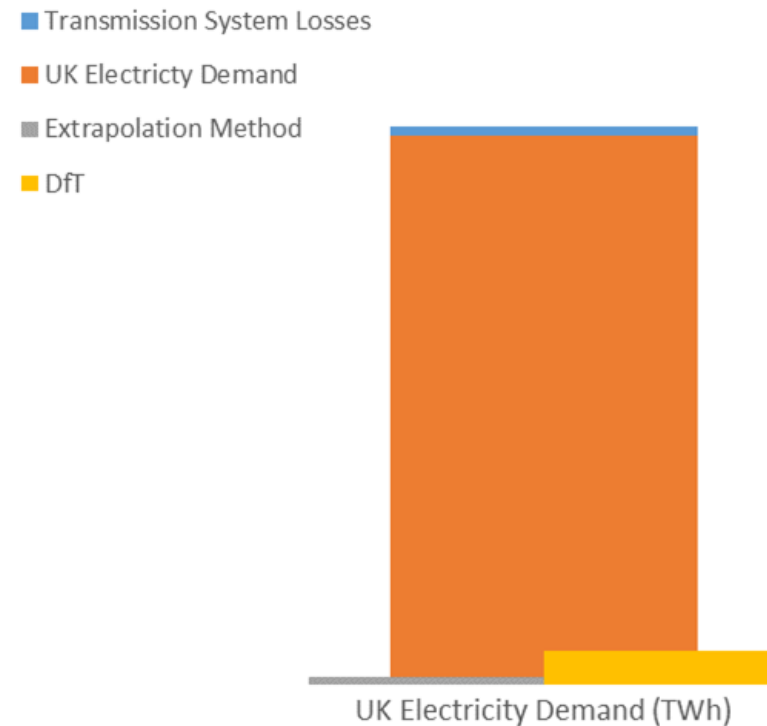


Projections based on current growth rates



EV Projections – What does this mean nationally?

- This equates to an annual electricity increase by 2030 of nearly 70 TWh for the DfT calculated figure, and only 4.6 TWh for the extrapolated method.
- This represents between 21% and just 1.2% of annual UK electricity demand.
- To put that into context:
 - Transmission System Losses for FY 2015-2016 were 1.9%.
 - Renewables account for ~25% of total generation in 2015.
- Nationally this is not really an issue; it's at the local network where we see issues



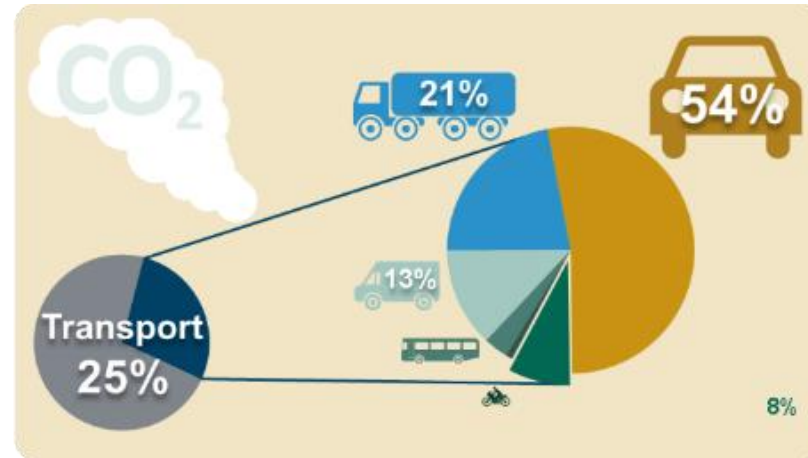
Policy Background



Context for Low emission vehicle drivers



Inward Investment



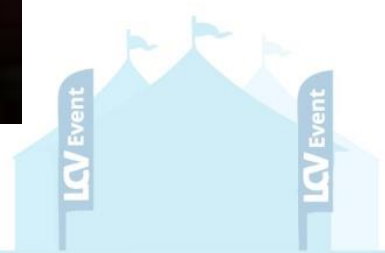
Carbon



Air Quality

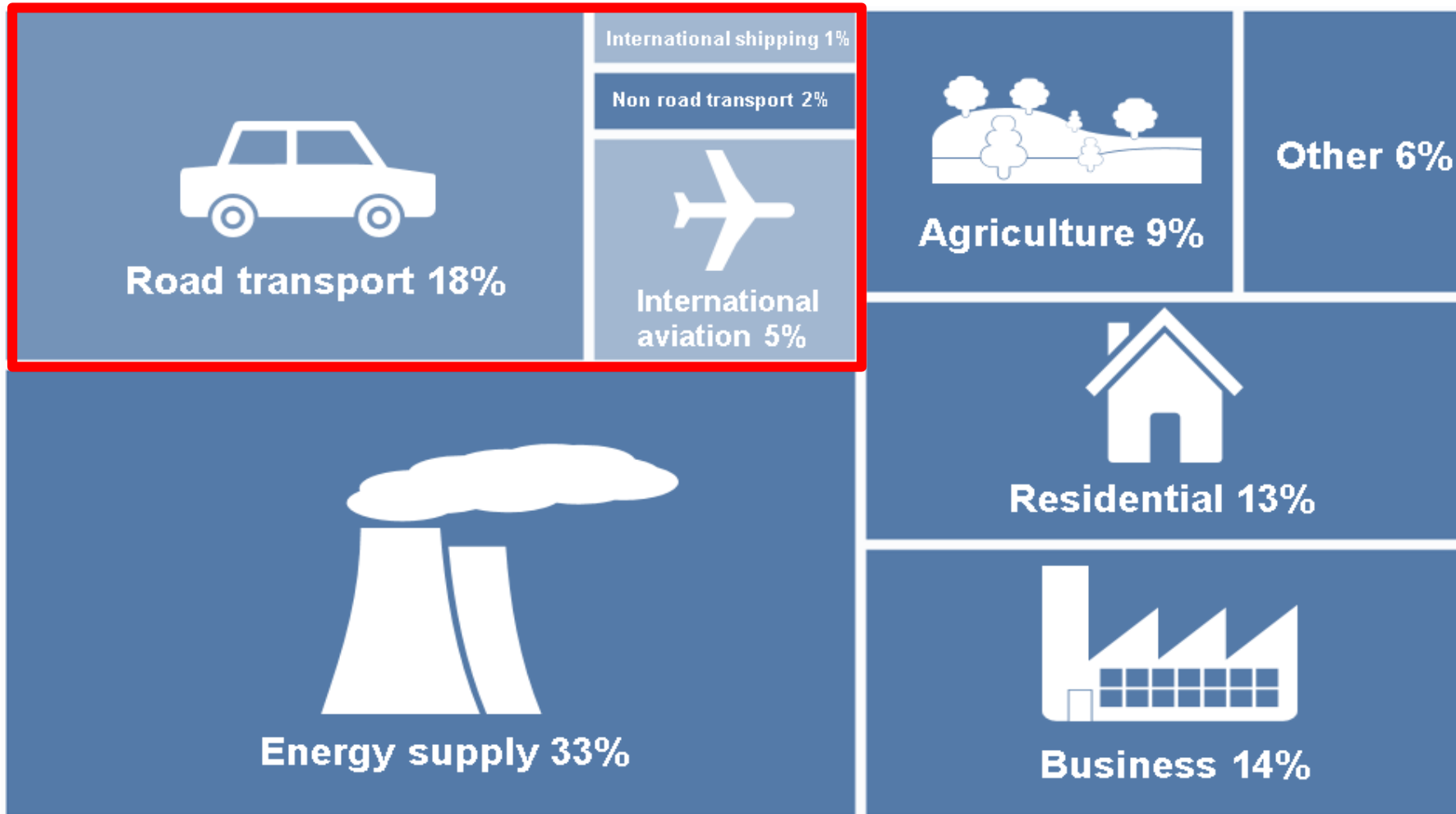


Energy Security



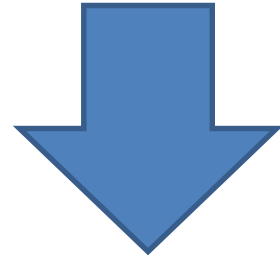
Climate Change

25%+ of UK total GHG emissions come from transport ... up from 15% in 1990



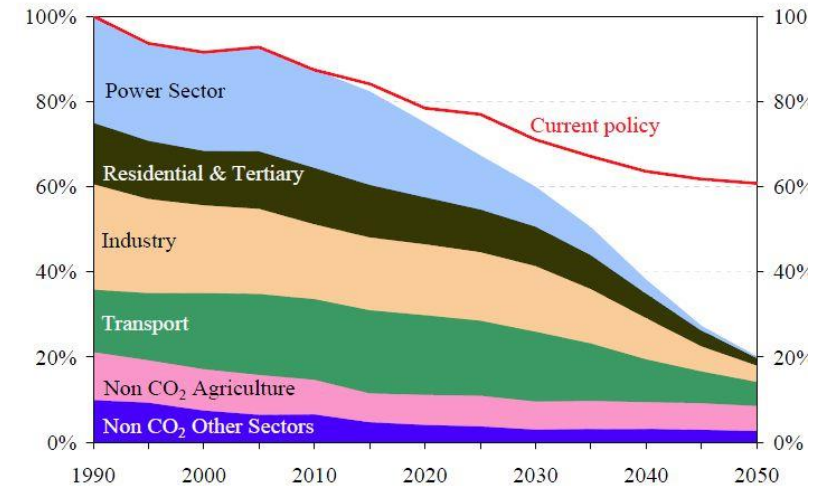
CO₂ regulation and policy actions

- The **EU Climate Change Act** was passed in 2008 and commits the UK to reducing emissions by at least 80% in 2050 from 1990 levels.



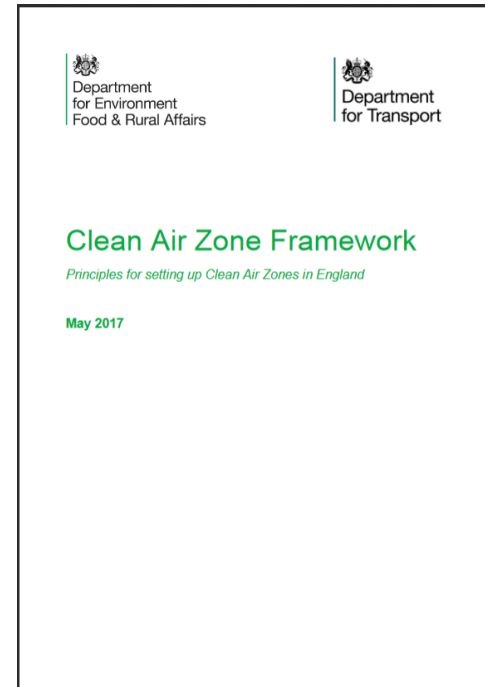
- **EU New Car and Van CO₂ regulation** sets targets for EU wide CO₂ emission reduction (g/km).
- **Euro VII (HGV)** emission limits likely to target CO₂ emissions
- **Domestic Policy**
 - UK Transport CO₂ Reduction Initiatives
 - OLEV - GoUltraLow (£500m 2015 – 2020)
 - Taxation
 - Biofuel blending
 -

Figure 1: EU GHG emissions towards an 80% domestic reduction (100% =1990)

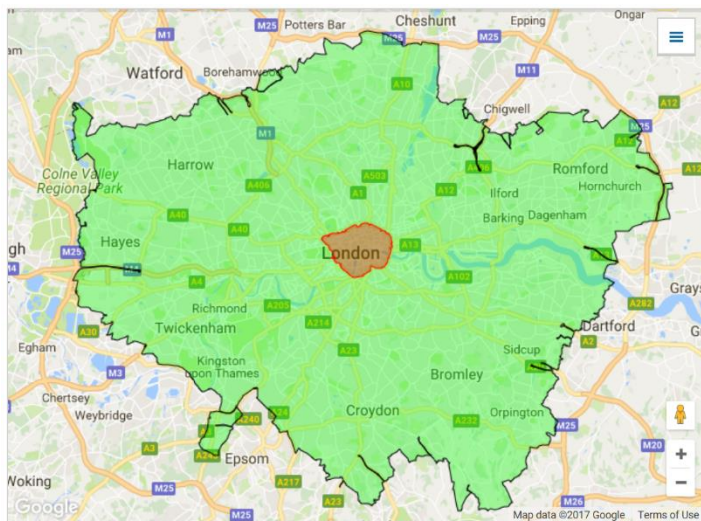


Clean air zones

- There are over 650 AQMAs in the UK
- CAZ Framework released in 2016
- A CAZ's primary function is to reduce NO_x (Nitrogen Oxides) levels
- Euro 6/VI diesel is good enough to meet minimum compliance for now
- The framework describes the principles by which CAZs should be set up and run. '**ultra-low emission vehicles with a significant zero emission range will never be charged for entering or moving through a CAZ**', '**One of the aims of Clean Air Zones is to support the transition to ULEVs (Ultra Low Emission Vehicles)**'
- The CAZ framework instructs authorities to explore all non-charging methods before justifying the use of a charging zone. Five English cities have been **mandated to create a CAZ by 2020; they are Leeds, Derby, Nottingham, Birmingham & Southampton. The Draft UK Air Quality Plan also identifies a far.**
- 15 zones which are required to develop a CAZ plan by March 2018, and a further seven required to develop a local action plan due to NO₂ exceedances on just one stretch of road.



London specific schemes



- Plans to introduce a first full CAZ in London are already at an advanced stage.
- The table below shows the current schemes and charges.
- TfL have proposed that the ULEZ could expand out to the LEZ area for HGVs (Heavy Goods Vehicles), coaches & buses by 2020, and expand to the north & south circular roads for all vehicles by 2021.

Map area	Scheme	Implementation date	Day/time of operation	Applicable vehicle types ¹	Minimum emissions standard ²	Out-of-standard charge (daily)
	LEZ	Current	24/7	Heavy duty diesel (no cars or motorcycles)	Euro IV	<3.5t = £100 ≥3.5t = £200
	CCZ	Current	Mon-Fri, 0700-1800	All except 2 wheel vehicles, taxis, PHVs (Private Hire Vehicles) & passenger vehicles with >8 seats	Cars & light commercial - <75g/km of CO ₂	£11.50
	T-charge	23 rd Oct 2017	Mon-Fri, 0700-1800	All except 2 wheel vehicles, taxis & PHVs	Trikes/quads - Euro 3; Cars & light commercial - Euro 4; HGV, coaches, buses - Euro IV	£10
	ULEZ (CAZ)	Sep 2020 (consultation on April 2019)	24/7	All (Class D)	Motorbikes (inc. trikes & quads)- Euro 3; Cars & light commercial - Euro 4 (petrol), Euro 6 (diesel) HGV, coaches, buses - Euro VI	£12.50 £100

¹ Zone exemptions in many cases also include vehicles such as emergency services, MoD, recovery/breakdown services, NHS, historic & showman vehicles. Further details on exemptions for each zone can be found on the Transport for London website (<https://tfl.gov.uk/>).

² Categories of vehicles are general approximations. For specific list & conditions, please see Transport for London website (<https://tfl.gov.uk/>) & EU vehicle emission standards

Ban fossil fuels!

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Norway to 'completely ban petrol powered cars by 2025'

'What an amazingly awesome country', Elon Musk tweeted in response to the plan

Jess Staufenberg | Saturday 4 June 2016 | 264 comments

f t 118K shares



Oxford

Oxford aims for world's first zero emissions zone with petrol car ban

Council plans to start phasing out polluting vehicles including taxis, cars and buses from city centre area in 2020



2016/04/01

Several European Countries to Follow Norway's Lead, Ban Fuel-Powered Cars

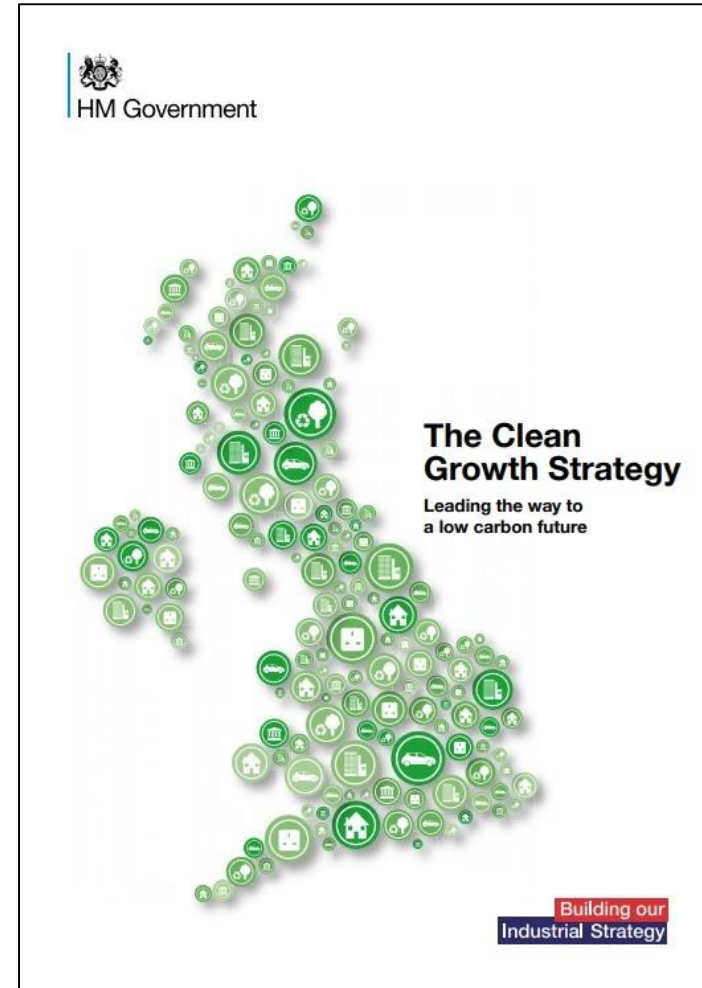
Following plans by the government of Norway to ban cars fueled by petrol or diesel by 2025, several other countries in Europe are formulating similar programs to phase out fuel-powered transportation. Moreover, sources close to the European Parliament say that once multiple member states pass such a ban as is expected later this year, the European Union will attempt to enforce these rules throughout its territory.

In Sweden, the office of Åsa Romson, minister for the environment and co-spokesperson for the Green Party, released a statement saying that a ban on the internal combustion engine is a necessary step to reduce pollution and carbon emissions. In Sweden, only about 3% of electricity production comes from fossil fuels, and plans made by the Persson cabinet in 2005, Making Sweden an Oil-Free Society, already call for a phaseout of the use of oil for heating. The Löfven cabinet has nowhere else to cut in its program to make Sweden carbon neutral by 2050. The Social Democrats' Green Party, which is part of the coalition government, has also called for a ban on petrol and diesel cars by 2025.

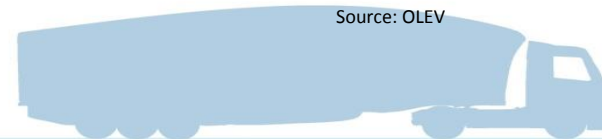
Clean Growth Strategy

Many initiatives and priorities have been announced, building on the earlier announcement to end the sale of new conventional petrol and diesel cars and vans by 2040. Key priorities include:

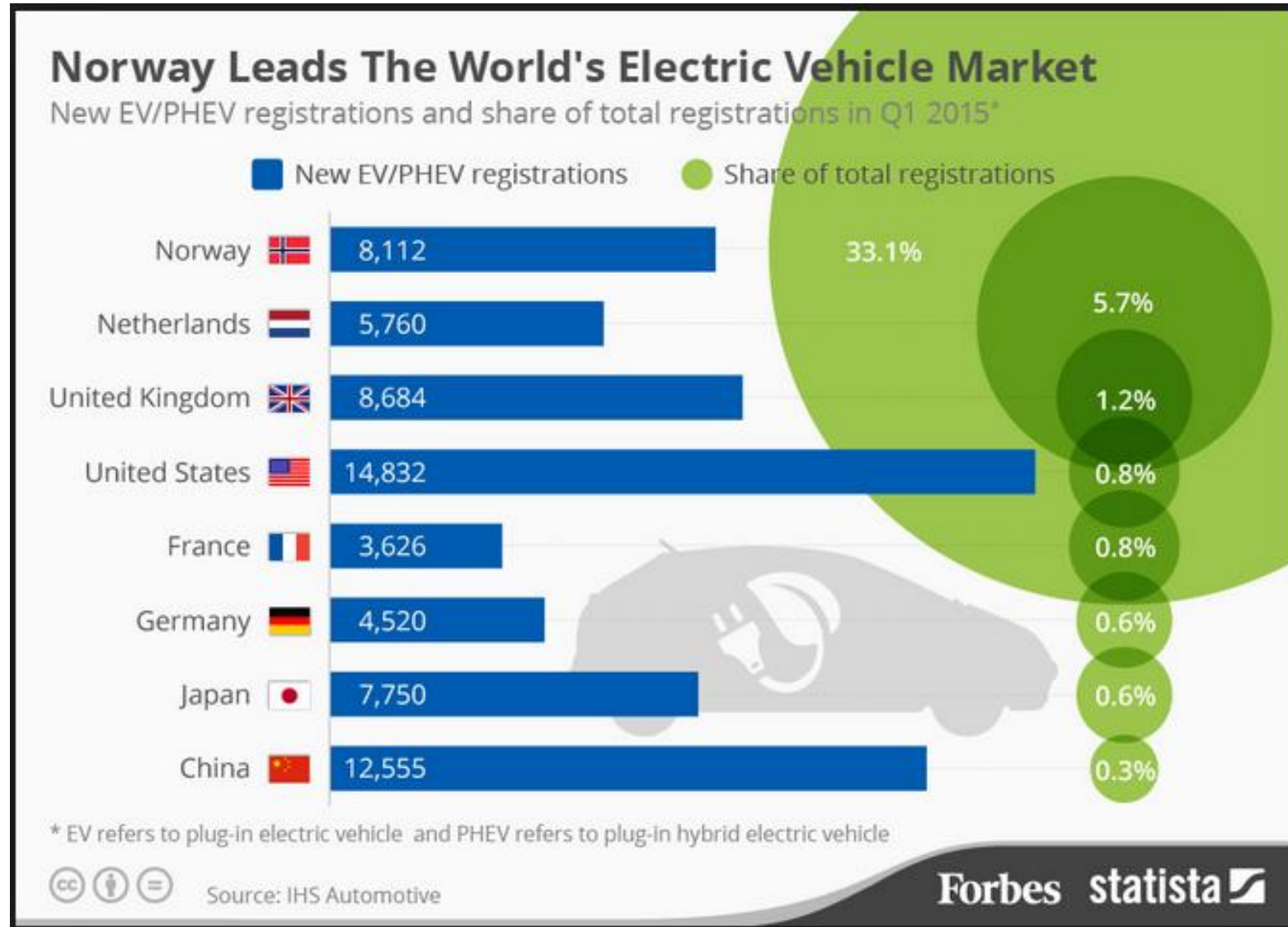
- Spending **£1 billion** supporting the take-up of ULEVs
- Creating a world-leading **national charge point network** (by investing an additional £80 million, alongside £15 million from Highways England)
- Moving the focus to **smart charging**
- Accelerating the uptake of low emission **taxis and buses** in Cities
- Shifting freight strategy from road to rail with zero-emission **last-mile delivery** models
- Allocating research funding to place the UK at the forefront of low carbon innovation, including **Connected & Autonomous Vehicle** research.



Source: OLEV



UK Commitment & Collaboration



Are there any questions?



Thank you for listening

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