



# Introduction

- Driving EV since 1999.
- EV consultant since 2005.
- Infrastructure project (OLEV)
- Training/support OEM brands.
- EV fleet design.





# Why EV? Low carbon AND cleaner air



- De-carbonisation should be hand-in-hand with improvements
- UK aim for (nearly) all new vehicles to be zero emission by 2040.
- Nowhere more important than in our major cities – and other proposed Clean Air Zones (CAZs)
- According to the CCC, transport is now the UK's biggest emitter of carbon.
- T-charge just introduced in London on top of Congestion Charge.
- Are we just displacing the carbon/emissions problem...

# Recent energy milestones in UK

- 21<sup>st</sup> April: “No coal day” – first time in 130 years.
- 26<sup>th</sup> May: Record solar PV output: 24.3% of grid (8.7GW) at 1pm.
- 7<sup>th</sup> June: First time ever where >50% of UK energy is renewable: wind, solar, hydro and biomass. (50.7%)

Increasingly de-centralised grid.

Increasingly variable generation.

# Renewable Transport Fuels Group

Dealing with the existing fleet / hard-to-change vehicles:

- Bioethanol (E5, E10...)
- CNG / Biomethane (event: 14<sup>th</sup> December, London)
- Alternative liquid fuels (e.g. advanced biodiesels)





# Back to the future...



# EV market





# PHEV (Plug-in Hybrid Electric Vehicle) market



Limited electric range (circa 30 miles).

Benefit-in-Kind savings.

Possibly good fuel economy, depending on duty cycle.



# PHEV (Plug-in Hybrid Electric Vehicle) market

**FleetNews** CAR LAUNCH CALENDAR

Find out more about the vehicles that could be on your future fleet.

[TAKE THE NEXT STEP](#)

## Plug-in hybrid vehicles among the 'highest-polluting' company cars

20/09/2017 in [Fleet Industry News](#)



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Newly-released data from TMC highlights worryingly-high fuel consumption and emissions in real-world driving for hybrid vehicles.

The data has been released as official car registration figures for August show a 47% rise in hybrid car sales compared to last year, and some leasing companies report a 300% increase in

orders for plug-in hybrids.

TMC's real-world driving data shows plug-in hybrid vehicles (PHEVs) to be among the highest-polluting company cars in terms of greenhouse gas emissions during real-world use by corporate fleets.

The analysis has shown that their average CO2 output is 168g/km in day-to-day

### Car running costs

Compare costs of your company cars

Looking to acquire new vehicles? Check how much they'll cost to run with our Car Running Cost calculator.

[Go](#)

### Company car tax calculator

What is your BIK car tax liability?

The Fleet News car

### Newsletters

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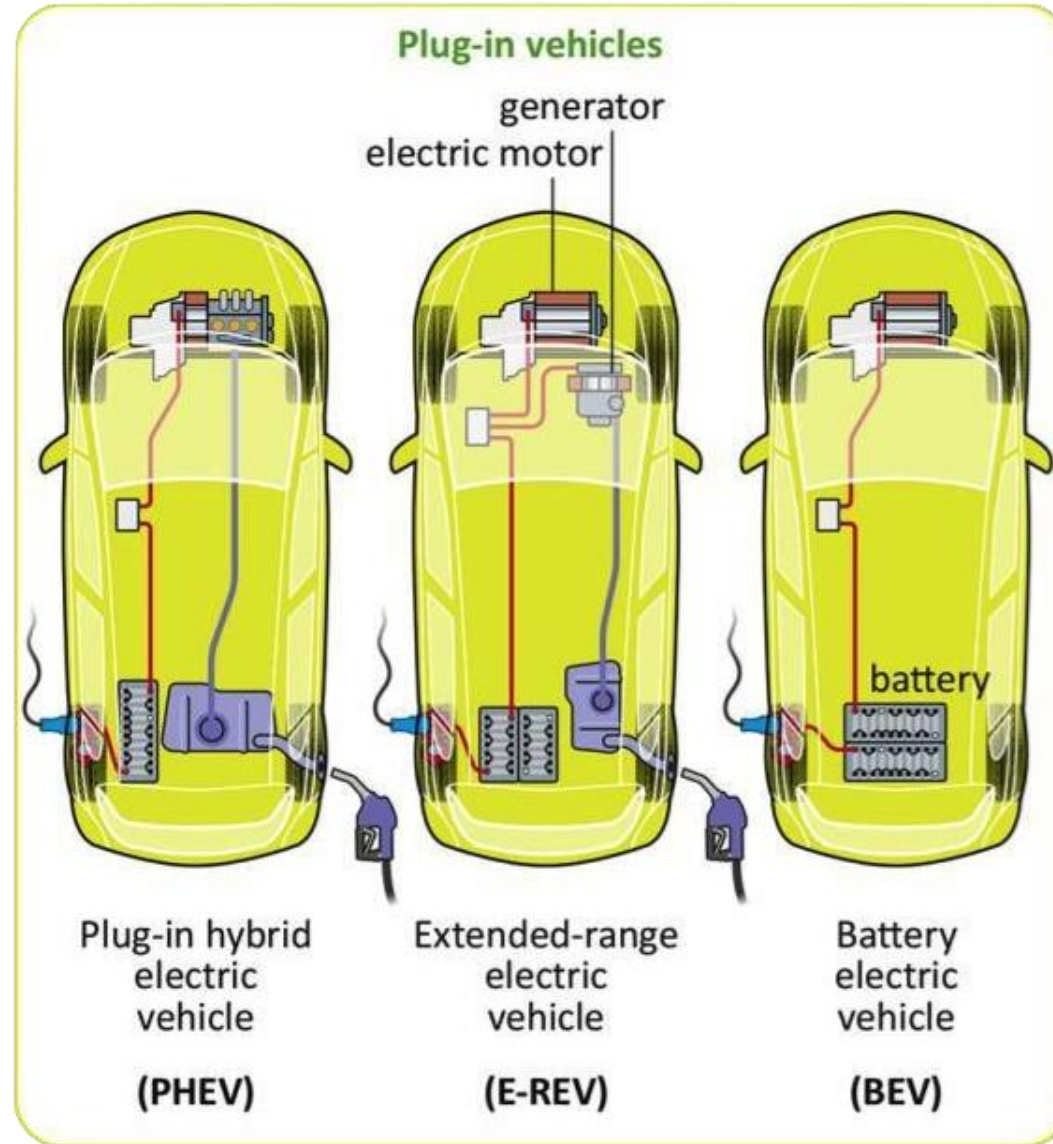
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# Differences in technology – ‘ULEV’





# Future ULEV improvement – BIK proposals

Car	Appropriate percentage
<b>Car with CO2 emissions figure of 0</b>	2%
<b>Car with CO2 emissions figure of 1 - 50</b>	
Car with electric range figure of 130 miles or more	2%
Car with electric range figure of 70 - 129	5%
Car with electric range figure of 40 - 69	8%
Car with electric range figure of 30 - 39	12%
Car with electric range figure of less than 30	14%
<b>Car with CO2 emissions figure of 51 - 54</b>	15%
<b>Car with CO2 emissions figure of 55 - 59</b>	16%
<b>Car with CO2 emissions figure of 60 - 64</b>	17%
<b>Car with CO2 emissions figure of 65 - 69</b>	18%
<b>Car with CO2 emissions figure of 70 - 74</b>	19%

# Case Study 1: NHS – Renault ZOE fleet



£525k Cap Ex

15x Renault ZOE

22kW AC charging

Repaid Cap Ex in 3 years

12 nurses salaries annually



# Charging EVs – highway

Strategic network of Rapid Charging

Currently: 50kW

Near-term: 150kW

Longer-term: 350kW



Referenced in Automated & Electric Vehicles Bill

Local grid issues to support multiple high power connections:  
requiring energy storage and/or on-site renewables?



# Charging EVs – MSA/TRSA





# World class exemplars



12 Nissan LEAF + 1 e-NV200  
3 vehicles retired at 165,000 miles.

# Commercial Electric Vehicles

October 2017: 115,000 ULEV registrations.  
Currently <5% Light Commercials (LCVs)

Ford Transit 'Range Extender' trial (20 vehicles)

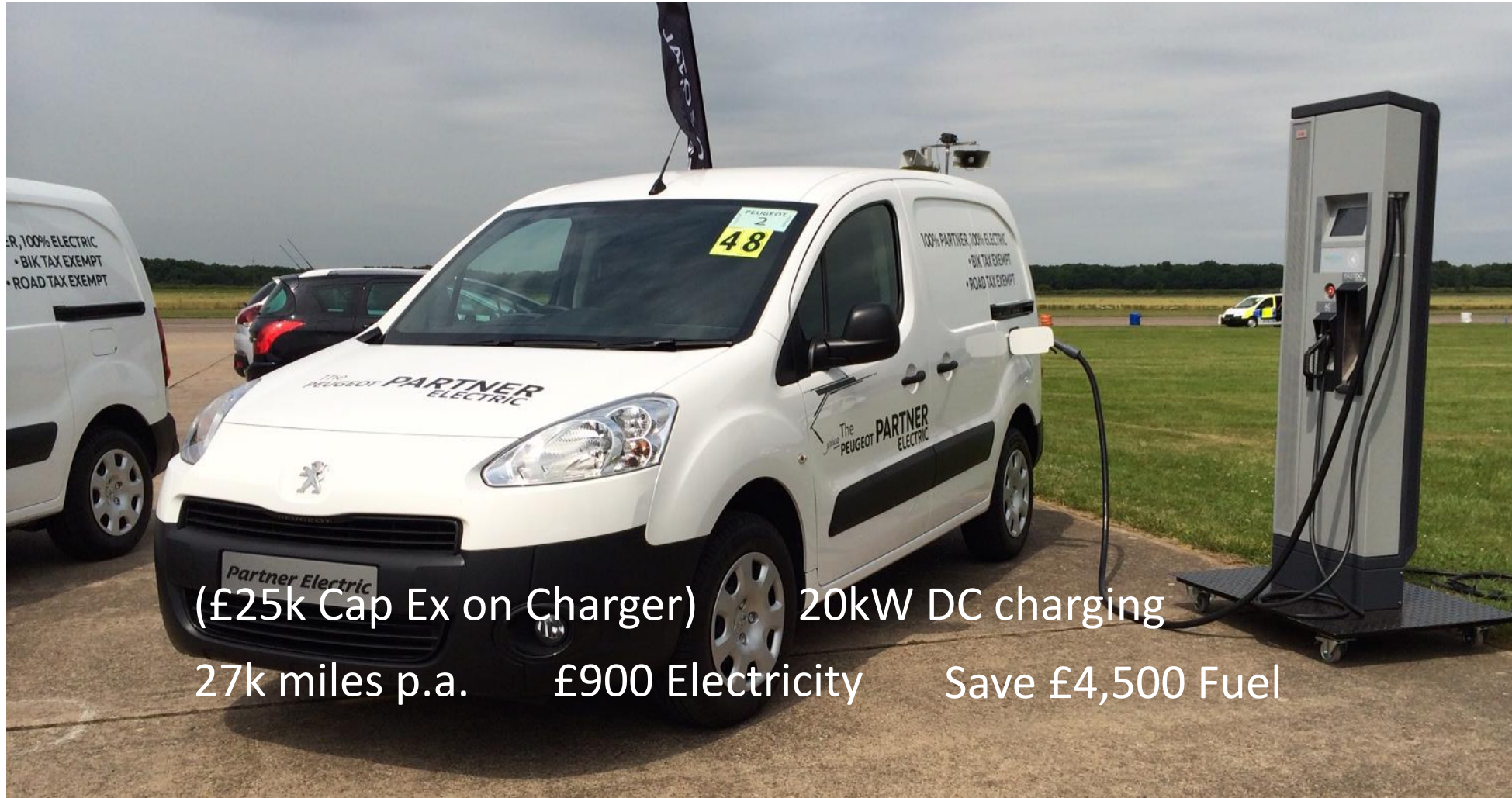
'Full EV' is improving with better batteries:

- Better range: 120+ real-world miles.
- Larger EV vans (factory produced models)
- Good option for vans and smaller trucks if duty cycle known.
- Rapid Charge capability to extend daily range.





# Case Study 2: Peugeot parts delivery



(£25k Cap Ex on Charger) 20kW DC charging  
27k miles p.a. £900 Electricity Save £4,500 Fuel

# Total Cost of Ownership

- Longer operating lifetime on fleet vehicles anyway
- Strong warranties
- e.g. 8 year lifetime  
ICE: fuel+servicing+RFL  
same as purchase cost  
EV: lower TCO overall.
- Potentially lower project cost including charging infrastructure





# Long-range EVs

A new generation of EVs is coming:



40-60 kWh will be the norm on new vehicles: 200+ mile range will appeal to more motorists than ever.

Daily use maybe less than 20% of total capability?

# Long-range EVs



180 miles

30 mile commute



M

T

W

T

F



# Long-range EVs



180 miles

30 mile commute



M

T

W

T

F

# Long-range EVs



180 miles

30 mile commute



M

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W

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F



# Long-range EVs



180 miles

30 mile commute



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# Long-range EVs



180 miles

30 mile commute



M

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# Long-range EVs



180 miles



30 mile commute



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# Long-range EVs



30 mile commute





# EVs, Renewables & Energy Storage

Energy Storage sector developing quickly (all scales)

EVs as the storage:

- Micro/embedded systems: homes and businesses
- \*Demand Side Reduction / \*Demand Turn Up / time-shifting
- Vehicle-to-X (X=Home | Building | Grid)

(\*National Grid consultation on Balancing Services)

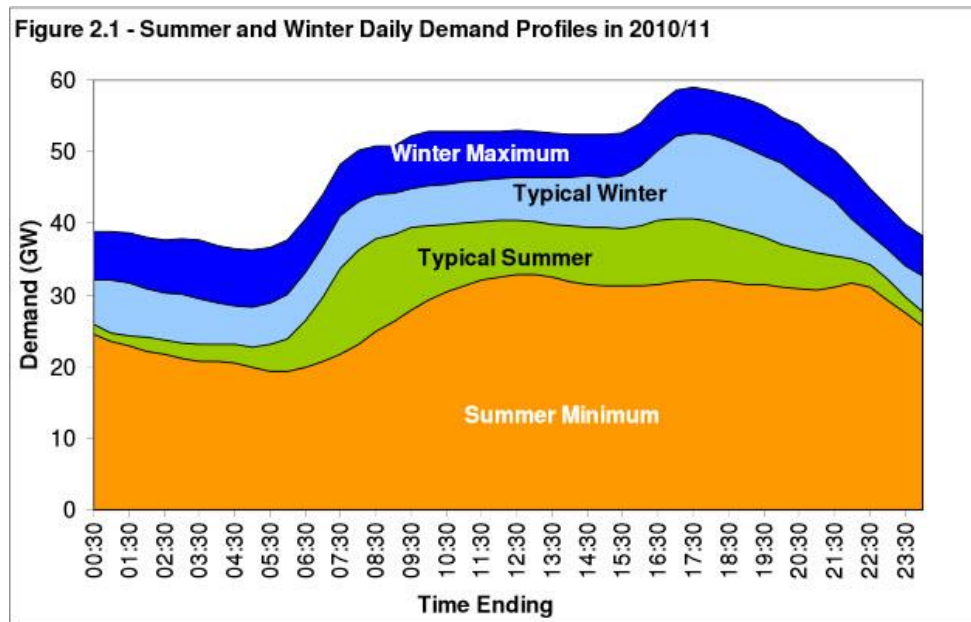
# Charging EVs

Issues with local grid (customer side of transformer)

- Electric Avenue / Electric Nation projects

DNO's grid in an area of clustering (11kV/33kV)

Overall energy supply and demand nationally







# THANK YOU

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