energy saving trust

Go Electric!

Wokingham Climate Action Week

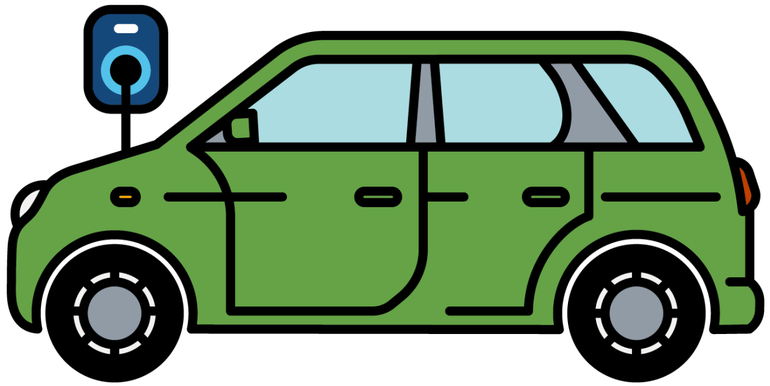
Have you considered switching to an EV yet?

Mark Smith

20/11/24

Agenda

- **Why switch to an EV?**
- **What is an EV?**
- **Charging an EV**
- **Myth busting**
- **Routes to driving EVs**
- **Q&A**



About Energy Saving Trust

- We are an independent organisation working to address the climate emergency
- We provide leadership and expertise to deliver a zero-carbon society
- We work with individuals, businesses, communities and governments to save energy and reduce carbon emissions
- Established in 1992
- Offices in England, Scotland, Wales and Northern Ireland

Our transport team

- Our **Local Government Support Programme** offers advice on EV strategy, procurement and sustainable travel, and our **Fleet Team** advises fleet managers on reducing costs and emissions
- We manage the **Local Electric Vehicle Infrastructure scheme** (LEVI)

Impartial

Independent

Expert

Collaborative

Pragmatic

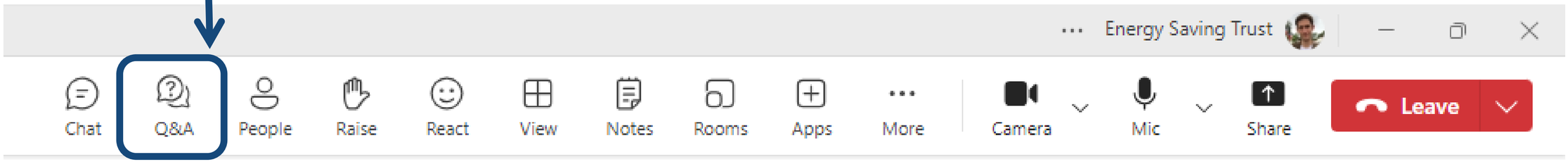
Supportive

Determined

Innovative

Questions

Please add your questions throughout the presentation using the Q&A tab at the top or bottom of your screen



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Have you driven an electric or plug in hybrid vehicle before?

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Are you considering an electric or plug-in hybrid vehicle for your next vehicle?

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What are your biggest concerns about driving an EV?

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Why switch to an EV?

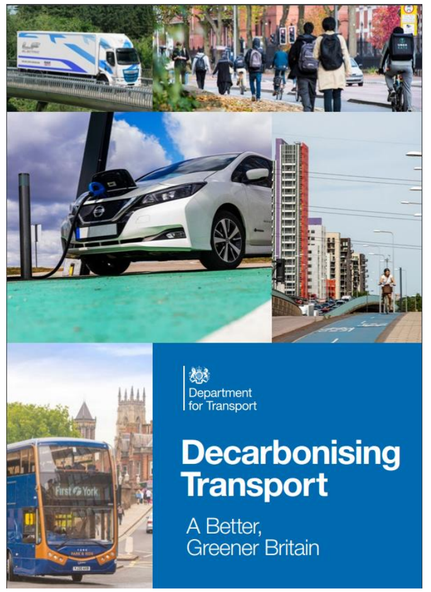
Why the push for electric vehicles?

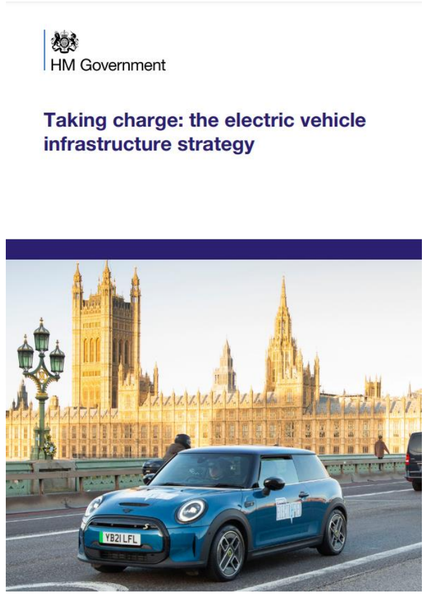
By law, the UK's emissions must be net zero by 2050

UK Government has currently committed to ending the sales of new petrol and diesel cars by 2035*

This is part of a move towards:

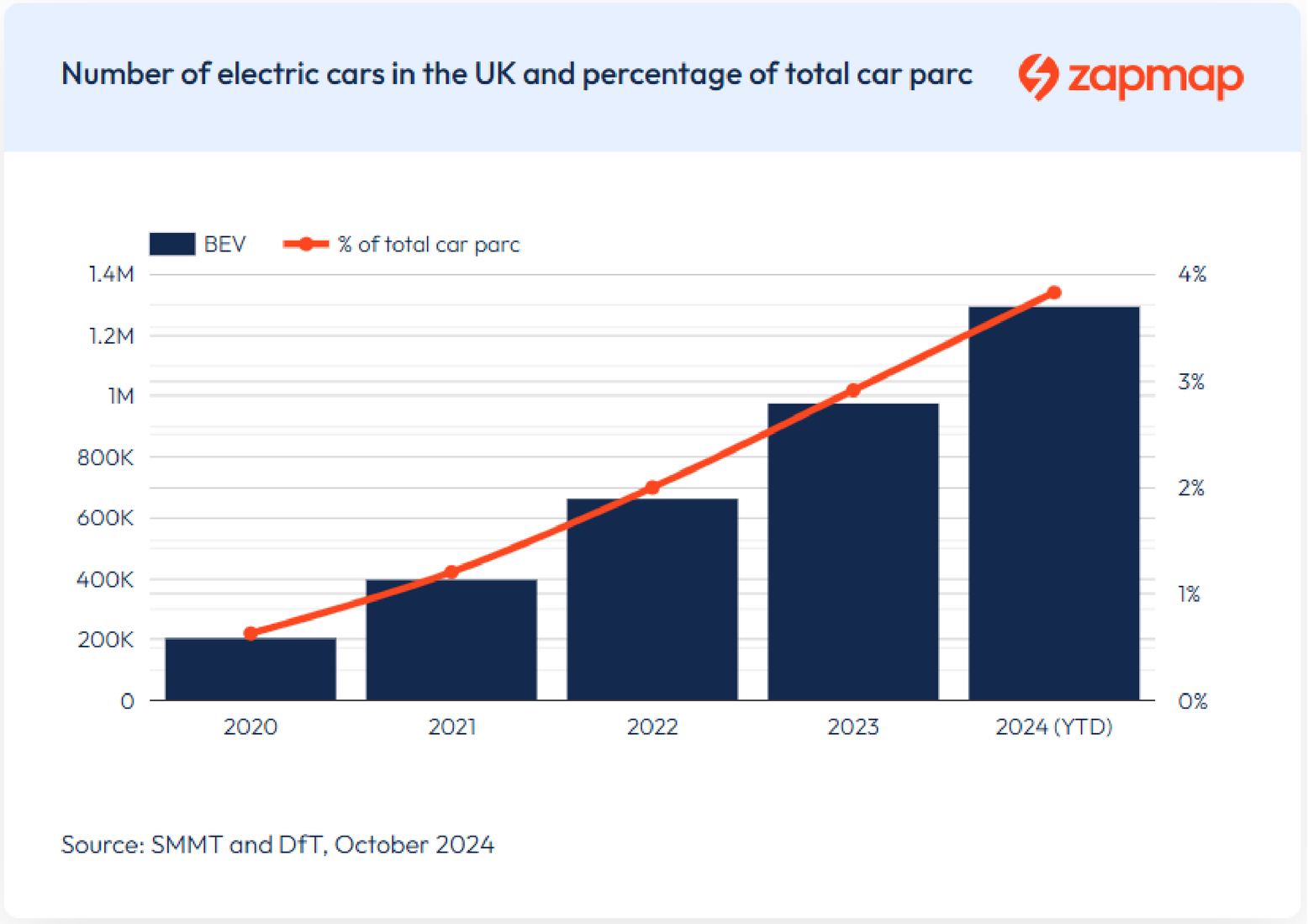
- establishing a carbon-free travel and transport network
- mitigating climate change
- reducing pollution
- growing the green economy





ZEV Mandate	2025	2030	2035
Cars	28%	80%	100%
Vans	16%	70%	100%

How many EVs are there on the roads?



1,299,055 EVs

Source: https://www.zap-map.com/ev-stats/ev-market

What is an electric vehicle?

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When was the first electric car developed?

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1832 – Robert Anderson

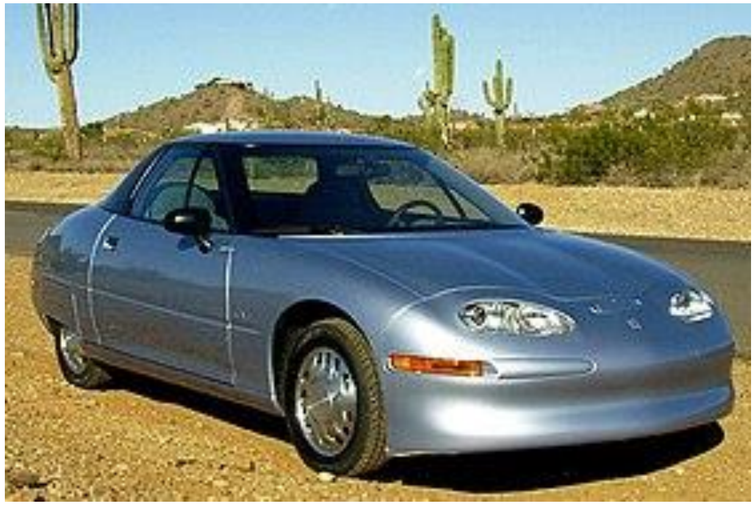
Image from BEC energy

1897 - Hummingbird electric cab

Image from Science museum

1974 – CitiCar SV-48

Image from Autoevolution



1996-1999 – General Motors EV1

Image from Wikipedia

2008 – Tesla Roadster 1st gen

Image from Autoevolution

2010 – Nissan Leaf 1st gen

Image from Nissan

Plug-in vehicles: BEV vs PHEV

Renault Zoe

Hyundai Kona

Tesla Model Y

MG4

Battery electric vehicle (BEV)

- Also known as 100% or pure electric
- Range from 120-300+ miles
- Over 230 BEV models currently on the market
- Significant emission reductions

Hyundai IONIQ PHEV

Mini Countryman PHEV

Kia Sportage PHEV

Plug in hybrid electric vehicle (PHEV)

- Internal combustion engine plus battery
- Electric range 20-50 miles
- 80+ models on the market
- New sales banned from 2035

Other forms of hybrid

Self-charging hybrid

- Also known as full hybrid or HEV
- Can be driven under electric power for short distances/ at low speeds
- Regenerative braking can recharge the battery
- Significant emission reductions
- New sales banned from 2035

Toyota Prius

Honda Jazz

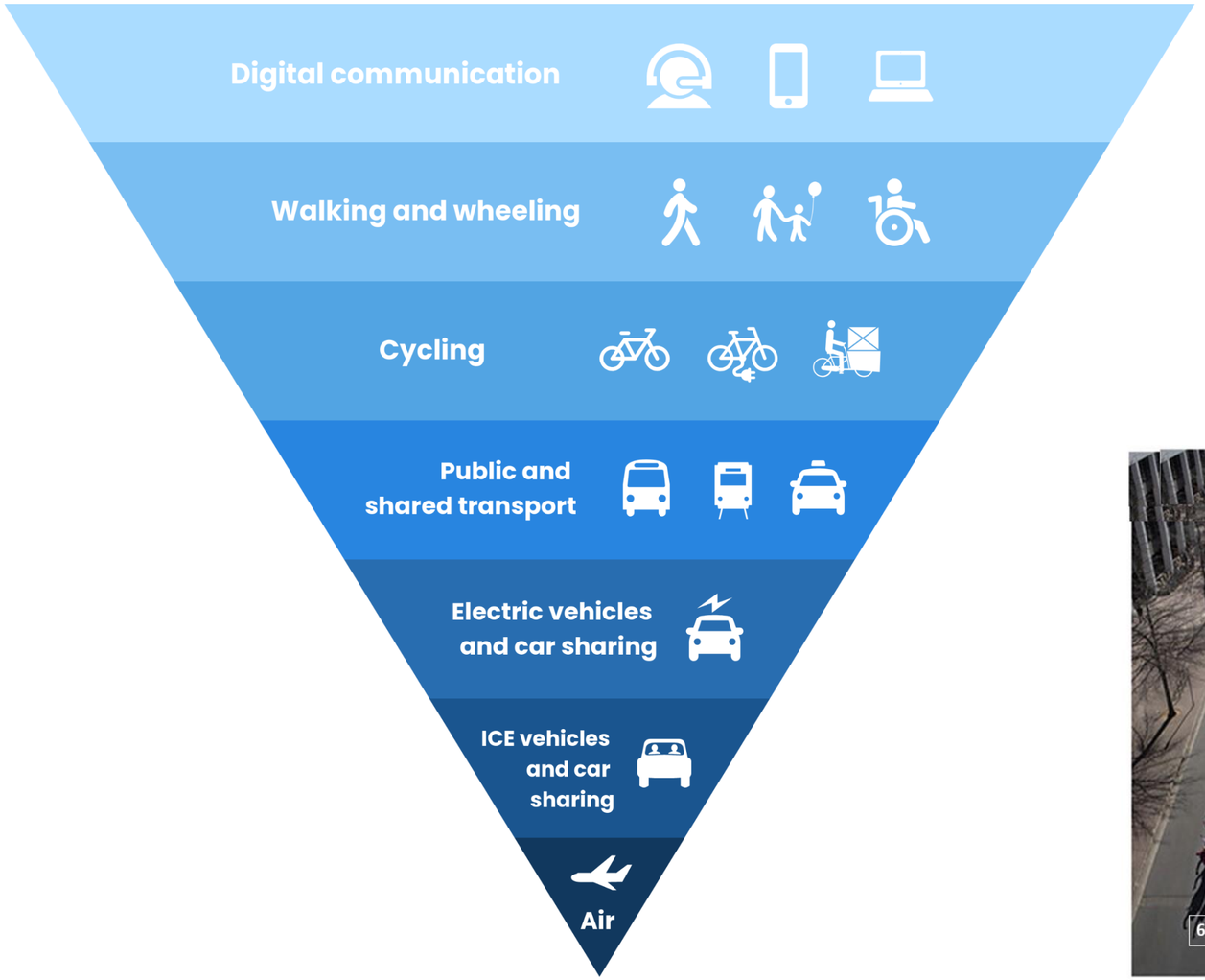
Mild hybrid (MHEV)

- No electric-only range
- Engine provides power, with assistance from small electric motor and battery
- Better fuel efficiency & lower emissions (than ICE)
- Some available with manual gearbox
- New sales banned from 2035

Ford Fiesta mHEV

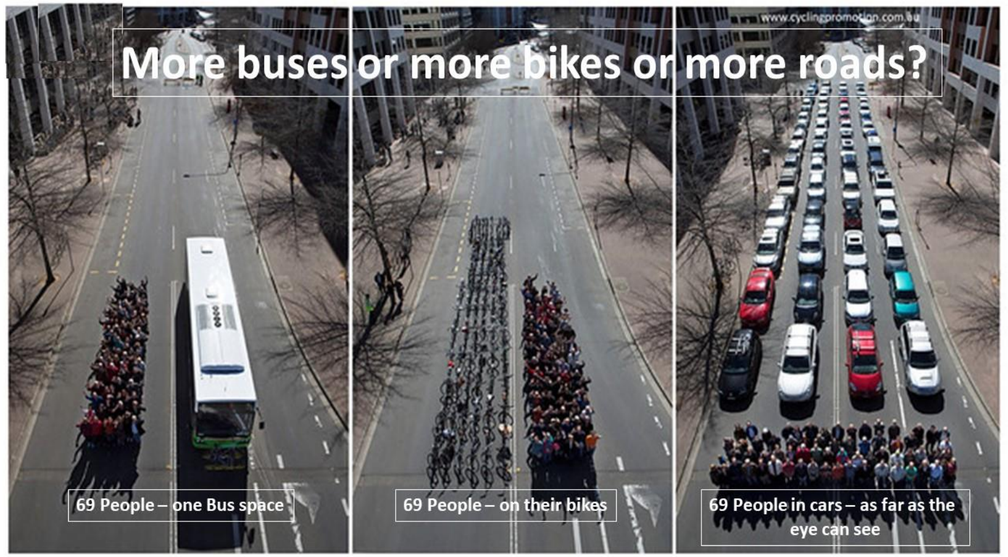
Nissan Qashqai MHEV

The Sustainable Transport Hierarchy



EVs are not a 'silver bullet'

- EVs are low down the sustainable transport hierarchy
- Policies for EVs should complement wider sustainable travel policies



Charging electric vehicles

Jargon Busting: KWh vs kW

kWh = kilowatt hour

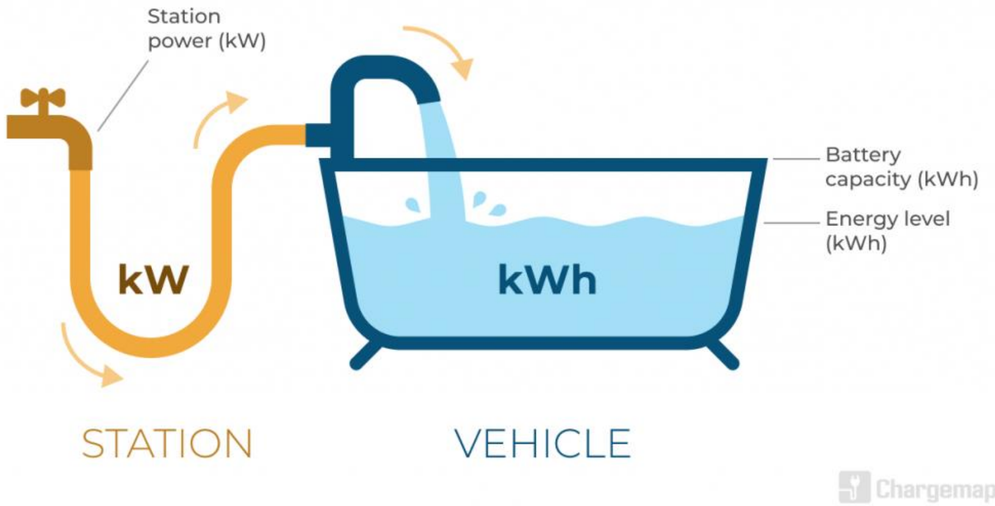
Measure of energy

- the amount of energy that a battery can store
- EV batteries are quoted in kWh
- the bigger the kWh, the longer the car's range
- comparable to fuel tank size in an ICE vehicle

kW = kilowatt

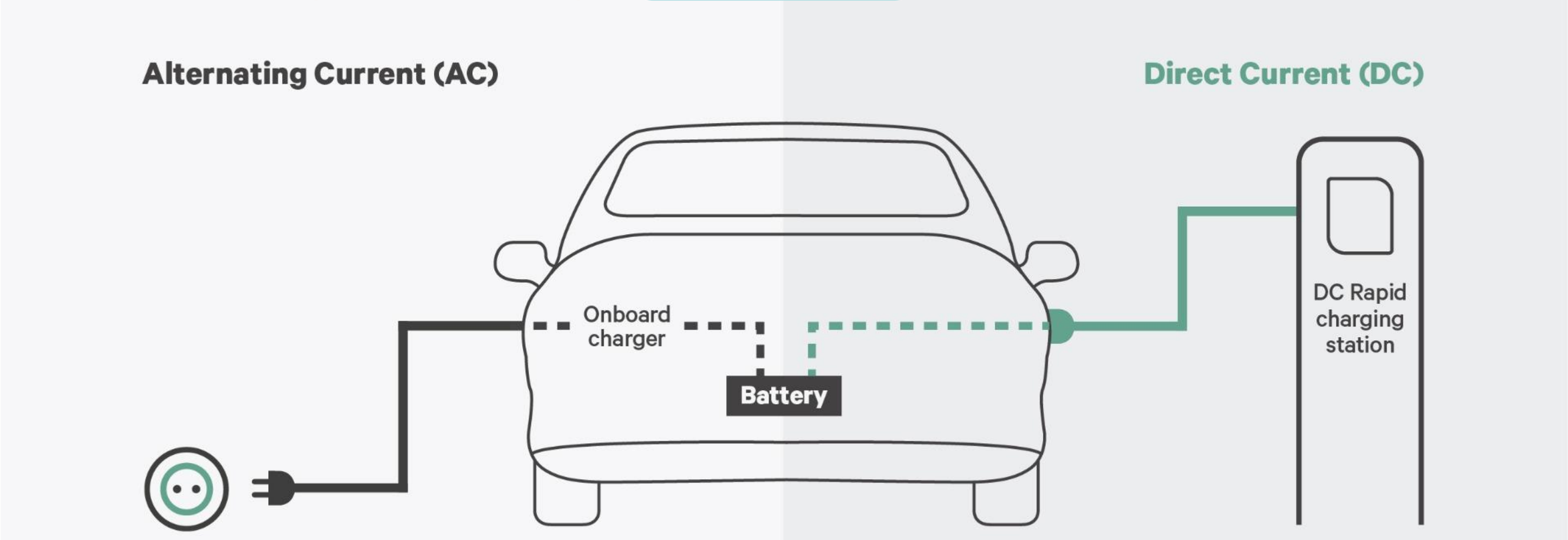
Measure of power

- chargepoints are always rated in kW
- higher kW = faster charge



Jargon Busting: AC vs DC

Slow	Standard	Fast	Rapid	Ultra-rapid
<3.7kW AC	3.7 – <8kW AC	8 – <50kW AC	50 – <150kW DC	150kW+ DC



Picture from Wallbox

Charging types

Slow	Standard	Fast	Rapid	Ultra-rapid
<3.7kW AC	3.7 – <8kW AC	8 – <50kW AC	50 – <150kW DC	150kW+ DC

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How many different charging connectors are there for EVs?

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Socket types

Type 2
Majority of vehicles use this type to charge at home or at public chargepoints which are fast or standard.

CCS (Combined Charging System):

Has become the most common method for DC charging at public rapid or ultra-rapid chargepoints.

Tethered cable, attached to public chargepoint. No need to purchase the cable.

CHAdeMO (CHArge de MOde):

Slowly being phased out. Used for public DC rapid and ultra rapid charging.

CHAdeMO plug

Where available a tethered cable, attached to public chargepoint. No need to purchase separately.

Type 1 (AC, up to 7kW):

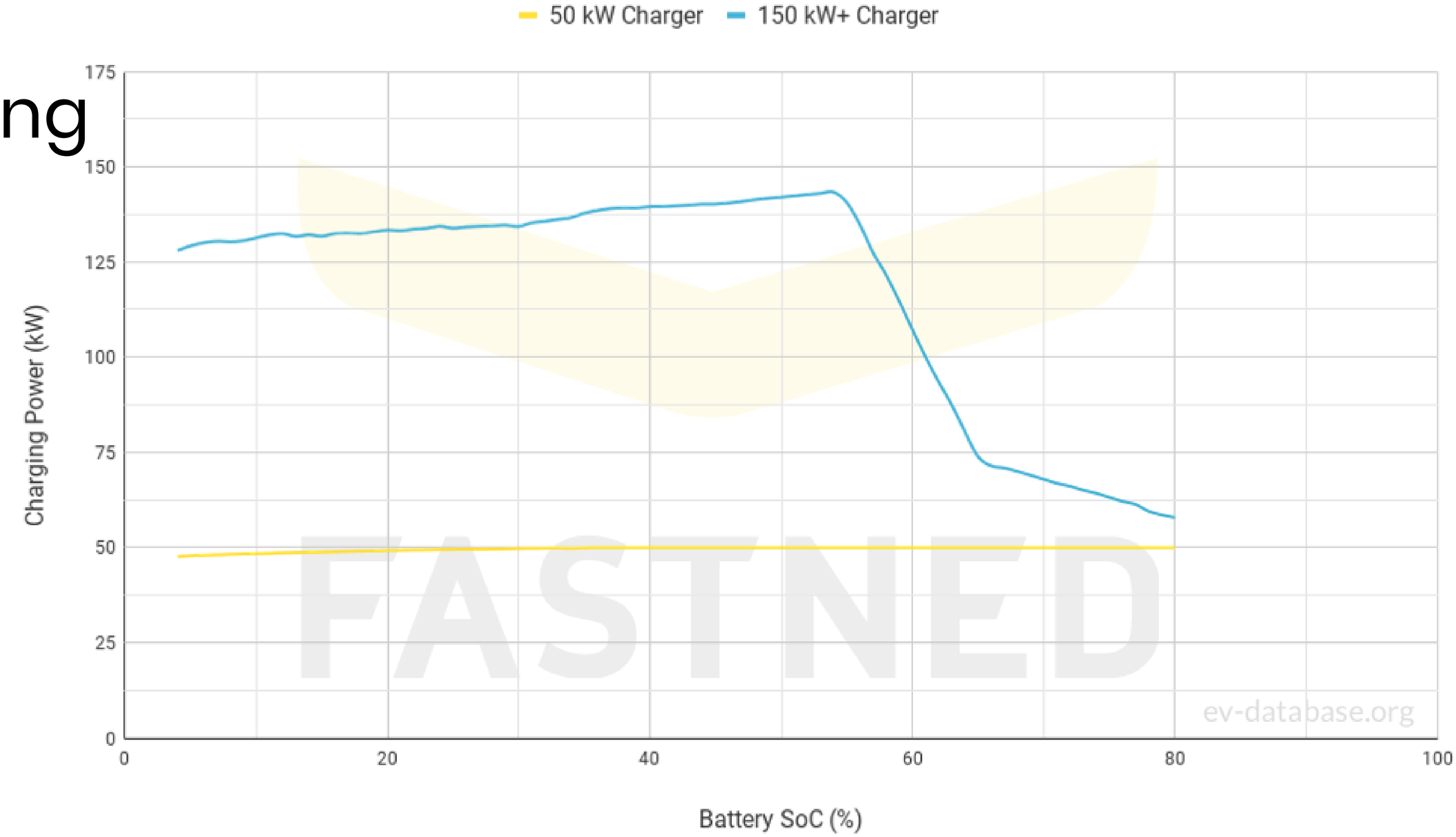
Uncommon, found on some 1st generation BEV and early PHEVs.

Approximate charging times

Vehicle		
Model	**Battery kWh (useable)**	**Onboard charger (kw)**
Hyundai Inster	42 (39)	11
MG4	51 (50.8)	6.6
MG4 Long Range	64 (61.7)	6.6
Peugeot e-2008	50 (46.3)	7.4

* Charge time for standard & fast chargers calculated using the lower of chargepoint power **or** onboard charger power for each vehicle
** Charge time for ultra rapid calculated using max charge power possible for each vehicle (shown in brackets)
Vehicle data from ev-database.org/uk

The charging curve



Finding a chargepoint

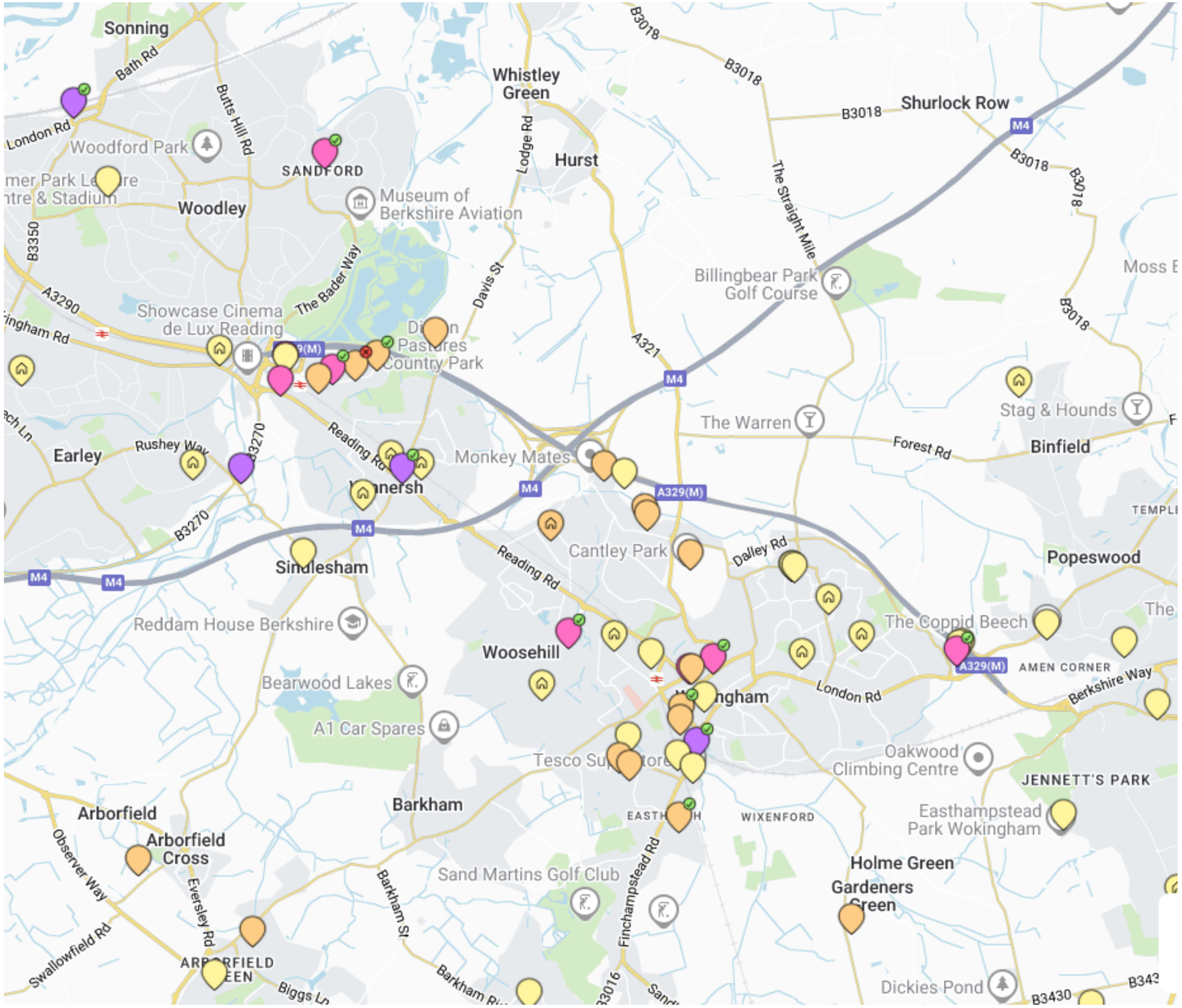
Power

- Rapid — greater than 25kW
- Fast — from 7kW to 22kW
- Slow — from 3kW to 6kW
- Unknown

Status

- Available
- Charging
- Out of service
- Unknown status

ZAP MAP™



EV myths

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What is the average range of a new EV?

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Myth: EVs can't drive very far

Range of small EVs (£19,000-£26,000) **100-160 miles**

- Dacia Spring (25kWh) 100 miles
- Hyundai Inster (39kWh) 155 miles
- Renault 5 E-Tech (40kWh) 155 miles
- Citroen e-C3 (44kWh) 160 miles
- Fiat Grande Panda (44kWh) 160 miles

Range of medium EVs (£26,000-£28,500) **145-185 miles**

- Nissan Leaf (39kWh) 145 miles
- BYD Dolphin (44kWh) 160 miles
- MG4 (51kWh) 185 miles

Range of SUV style EVs (£29,000-£33,500) **165-215 miles**

- MG ZS EV (49kWh) 165 miles
- Peugeot e-2008 (50kWh) 165 miles
- Skoda Elroq (52kWh) 195 miles
- Kia EV3 (55kWh) 200 miles
- Omoda e5 (61kWh) 215 miles

- *Vauxhall Frontera (44kWh)* *155 miles*

Average range of a new EV?

236 miles

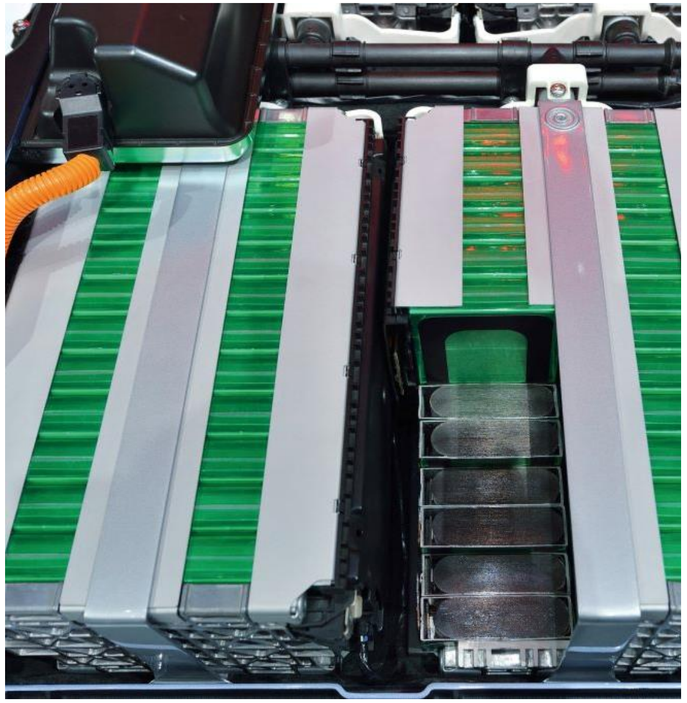
Longest range EV?

425 miles

Price ranges from: https://www.nimblefins.co.uk/cheap-car-insurance/average-cost-cars-uk

Question: What about the batteries, will I have to keep replacing it?

(short) Answer: no



- Estimates of battery degradation are around 1-2% per year
- Manufacturers warranties cover battery performance and degradation
- End of life EV batteries can be used for energy storage
- Growing industry focused on battery repurposing and recycling
- Manufacturers are increasingly cautious about their supply chains
- Manufacturers are starting to introduce new battery technology e.g. Tesla – cobalt free and BYD sodium ion

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What is better for the environment?

Document title

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Question: Is it better for the environment to run an older petrol car or switch to an EV?

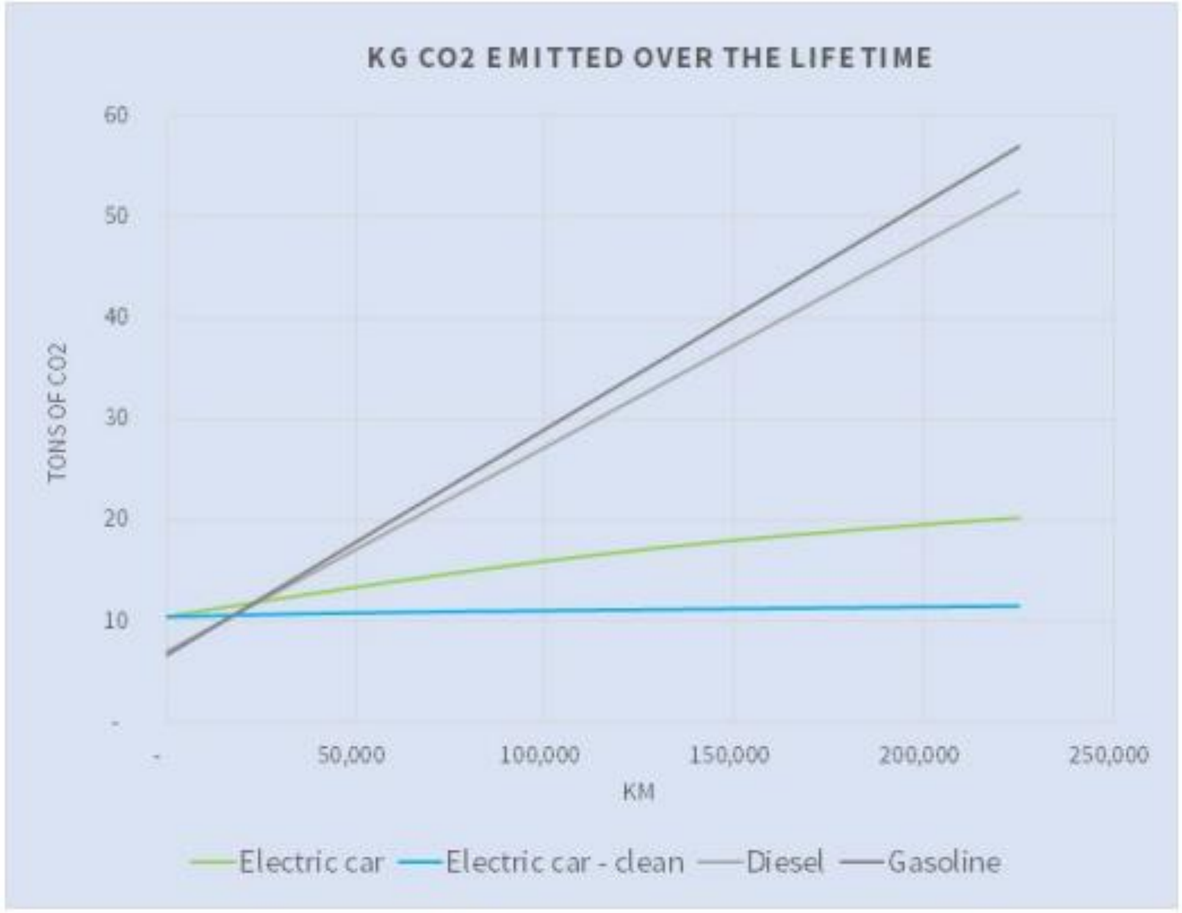


Figure 6: Evolution of lifetime CO_2 emissions of an average and clean EV

For electric cars with:

- a battery produced on clean electricity, and
- running on clean electricity

Carbon debt would be paid back after less than one year of driving (about 13,000 km).

As renewable electricity generation increases, emissions from manufacture and refuelling will fall.

The RAC have found that EVs emit less brake dust than ICE vehicles due to regenerative braking.

Graphs from Transport & Environment research

Question: Can the grid cope?

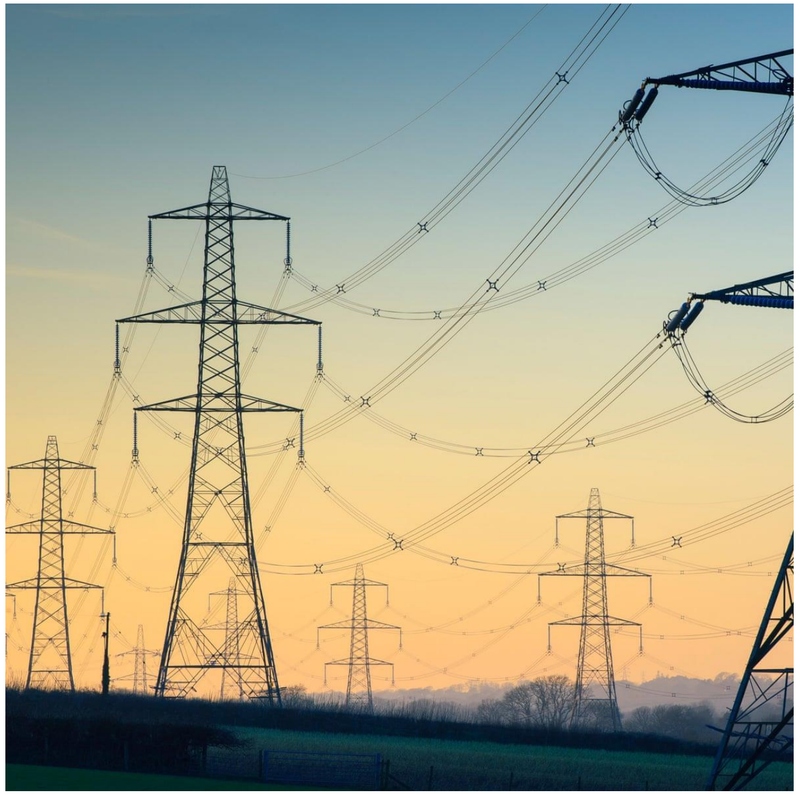
Answer: yes, but…

It’s important to remember everyone won’t switch to EVs overnight it will be gradual.

With the growth in renewable energy the energy will be adequate to meet the future energy demand. Constantly upgrading the network.

The nation’s peak demand has fallen by 16% since 2002 due to improvements in energy efficiency.

We can spread out the demand by incentivising smarter charging habits.



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What is the most efficient fuel source for driving?

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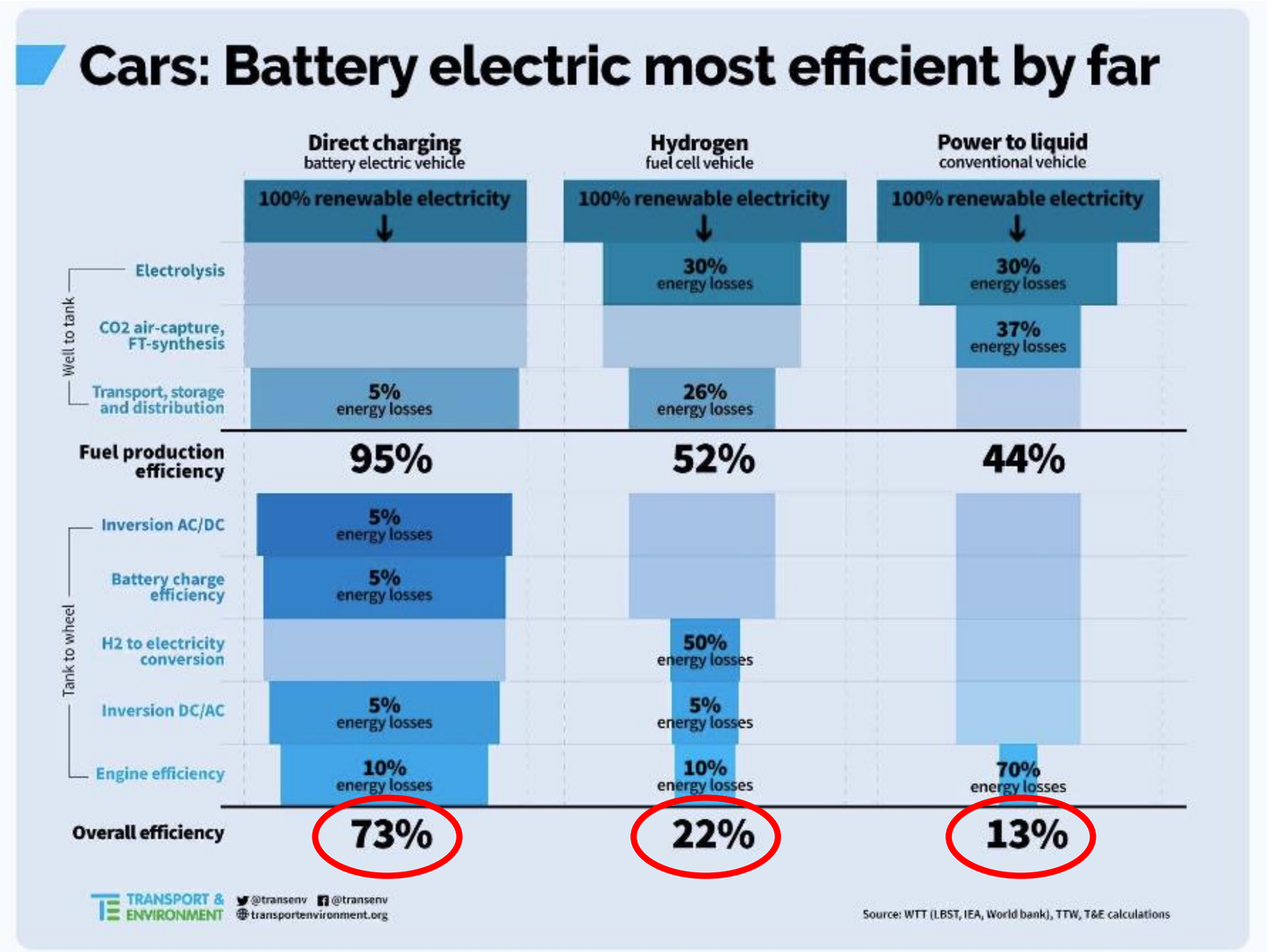
Question: What about Hydrogen?



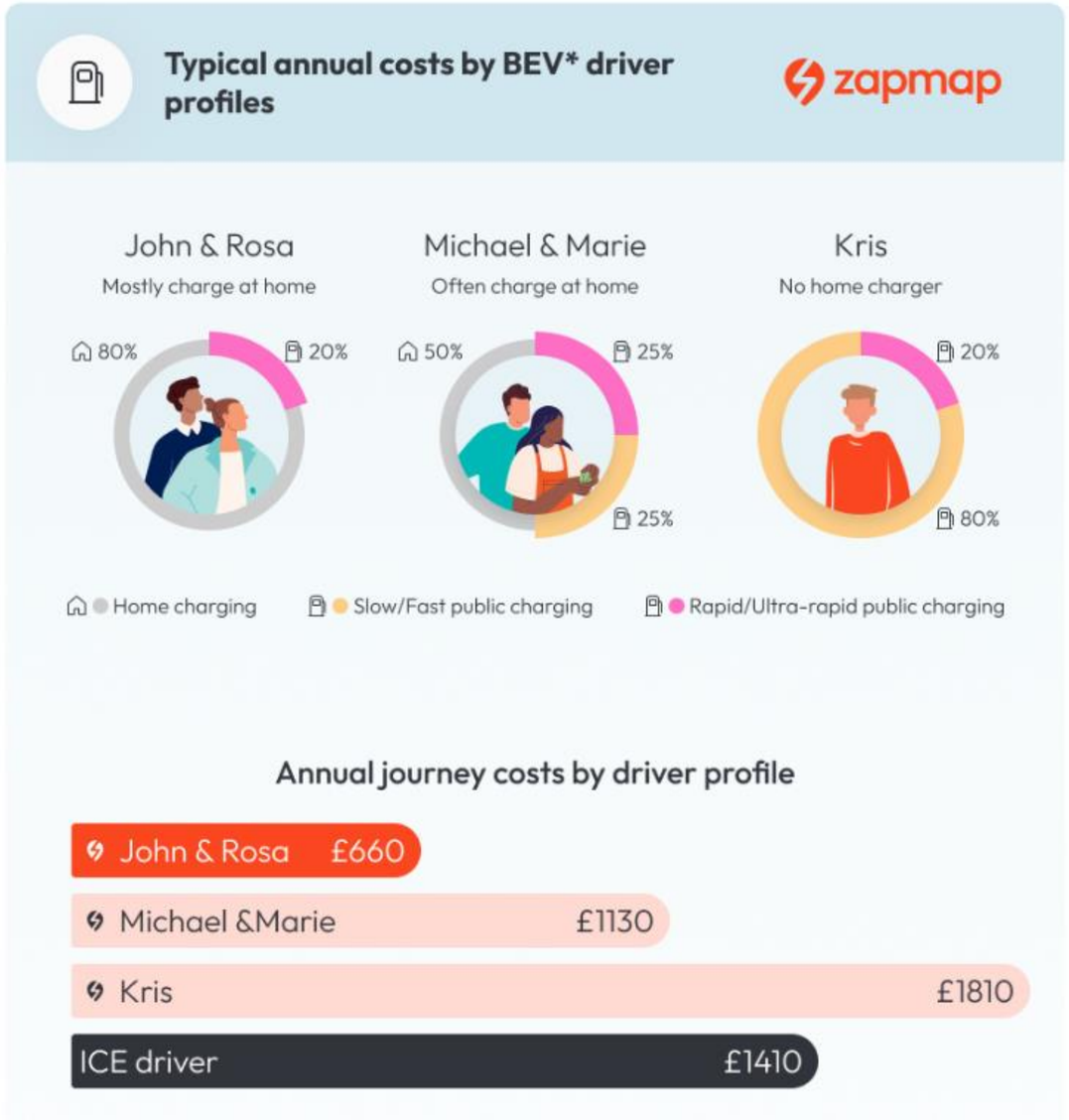
Answer: Hydrogen has its place in a zero-emission future

- Comparison of EV with hydrogen and ICE
- Cost
- Availability of hydrogen
- Green hydrogen
- Non-road mobile machinery
- Other applications without a grid connection

Question: which costs more to run?

*As of April 2025, all EVs (registered from April 2017 onwards) will be required to pay vehicle excise duty at standard rate – currently £190/ year.

EVs registered from April 2025 with a list price of over £40,000 will also need to pay the Expensive Car Supplement for 5 years from year 2. This is currently £410/ year.



Calculated based on 10,000 miles per year.

November 2024 average UK petrol price 135.1p/litre (RAC Fuel Watch).

Pence per kWh electricity unit cost from OFGEM price cap 24.5p/kWh (assuming all charging at home).

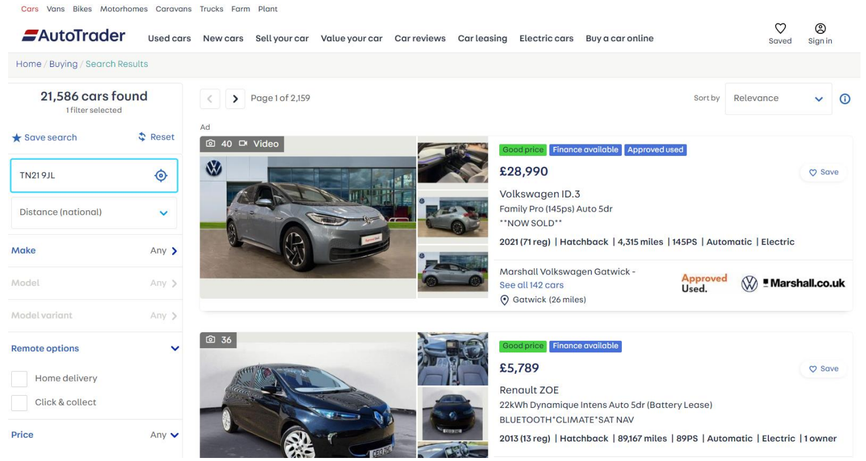
Does not include insurance and VED, servicing/maintenance costs.

Making the switch to EV

At the dealer (new or used)

Look for an EV Approved retailer

- Sales and aftersales staff will be properly trained in all things EV
- Provide accurate info on details such as warranties
- Correct facilities and equipment to service EVs
- On-site charging provision
- Opportunity to test drive EVs (extended test-drives often available)



Considerations if buying used

- Increasing knowledge and number of EV specialist dealerships
- 1,000,000+ plug-in vehicles on the road in the UK
- Check specification – older models often have smaller battery sizes
- Check charging cables provided
- Check for battery lease

Alternative options

Finance, leasing and subscription

- Lease companies are increasingly understanding the reduced risk due to lower maintenance costs
- Subscription services are similar to leases, but often on much shorter, more flexible terms, with options to change vehicles more often

Salary Sacrifice

- Requires a regulated third-party provider
- Need to earn above minimum wage (after salary sacrifice) and be a UK resident
- No deposit required. Monthly fee includes maintenance, insurance, servicing

Car club membership or car hire

- Opportunity to ‘try before you buy’?
- Multiple options in many areas with a range of EVs available

Q+A

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Go Electric! post survey

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Glossary

Source: https://pod-point.com/guides/driver/ev-dictionary

Battery Electric Vehicle (BEV)	A car that runs purely on electric power, stored in an on-board battery that is charged from mains electricity (typically at a dedicated chargepoint)
ICE	Internal combustion engine vehicle using either petrol or diesel
Plug-in hybrid electric vehicle (PHEV)	A car with a combination of a traditional internal combustion engine and a rechargeable battery, allowing for either electric driving or extended range from a combination of petrol engine and electric motor
Plug-in vehicle (PiV)	A blanket term for any vehicle with a plug socket, including BEVs and PHEVs
Ultra Low Emission Vehicle (ULEV)	A car that has official tailpipe carbon dioxide emissions of less than 75g/km and is therefore eligible for grants and benefits from the UK government
Self-Charging/ Mild Hybrid vehicle	A small battery is charged through regenerative braking, but the car's power comes from petrol, and the electric motor can only power the car for short periods at low speeds
Kilowatt	A measure of one thousand Watts of electrical power
Kilowatt hour (kWh)	A unit of energy equivalent to the energy transferred in one hour by one thousand Watts of power (1 kilowatt hour is typically 3-4 miles of range in a BEV)
Smart charging	A catch-all term for a series of functions that a Wi-Fi connected chargepoint can do and most commonly means shifting charging away from periods of high grid demand or low supply to periods of low demand or high grid supply