White Paper 5

EV Misconceptions

Vehicle Remarketing Association

Written in partnership with
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Plug Life Consulting

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Vehicle Remarketing Association

Introduction

As electric vehicles started to make their way into the mainstream, it was inevitable that myths about them would begin to surface.
While some people use these misconceptions to be dismissive of a new technology that they stubbornly refuse to try, others have genuine questions around the performance, ethics and safety of EVs, are keen to get to the truth of the matter and are open to learning the answers.
This article looks at 10 of the biggest EV misconceptions doing the rounds today - and provides the answers that many prospective EV drivers are looking for.

1. An EV's range is too low for my needs

EV battery tech has come a long way in a very short time. For example, the BMW i3's battery capacity doubled between 2013 and 2019, while the battery remained the exact same physical size. According to EV Database, over 80% of the 222 makes and models of EV available to buy new in the UK today can cover over 200 miles per charge - and over half of those can do 250 miles. If that's not enough, 49 of those EV makes and models will travel over 300 miles per charge. Impressively, those figures are based on EV Database's "real range" which is less than the official WLTP range stated by manufacturers.

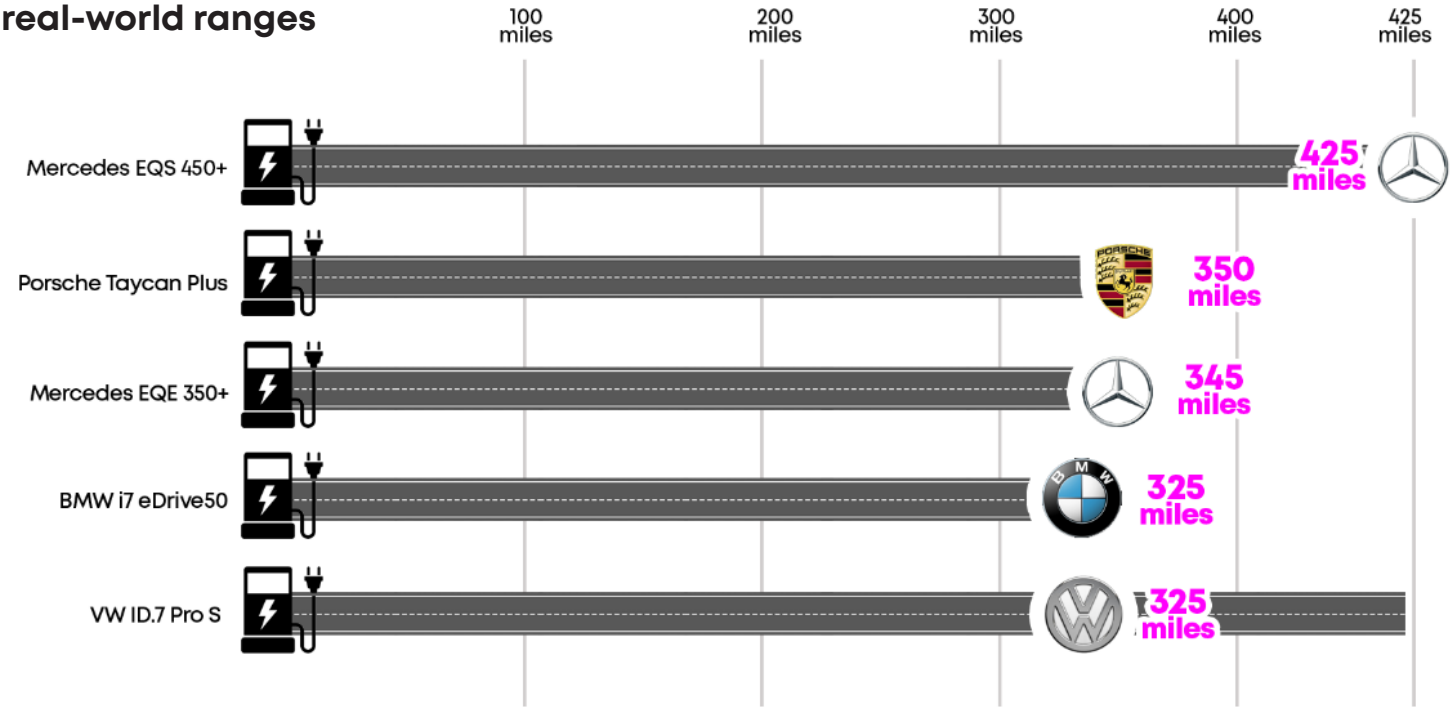
Two hundred miles is about a week and a half's worth of typical UK commuting or three hours of motorway driving without having to plug in. Never mind range anxiety – many people's bladders need them to stop at a service station long before their EV does.

On a shoestring budget? There are plenty of used 200-plus mile EVs out there today, and even decade-old EVs with ranges of between 60-120 miles per charge make surprisingly versatile second or even primary cars.

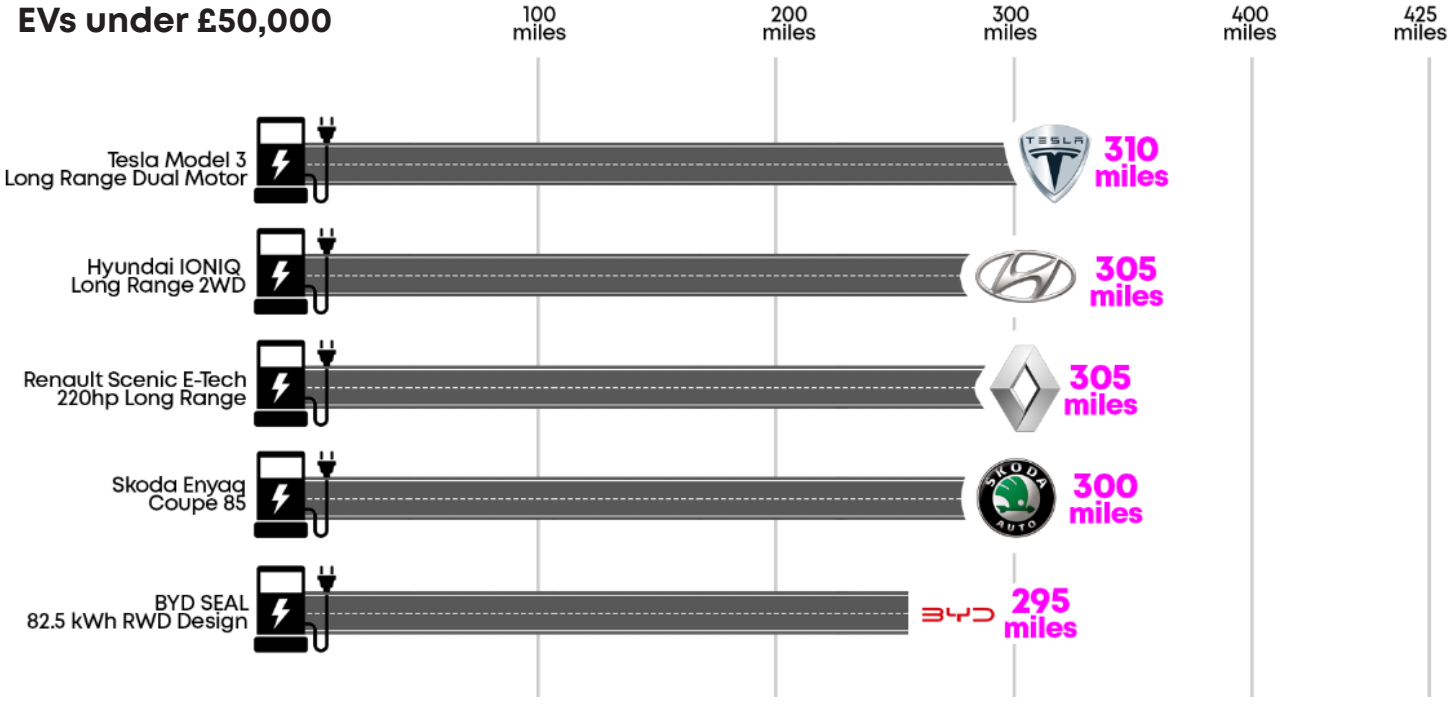
Range in miles	Number of electric vehicles available
200-250	80
250-300	93
300+	49
Total	**222**

Reference: ev-database.uk

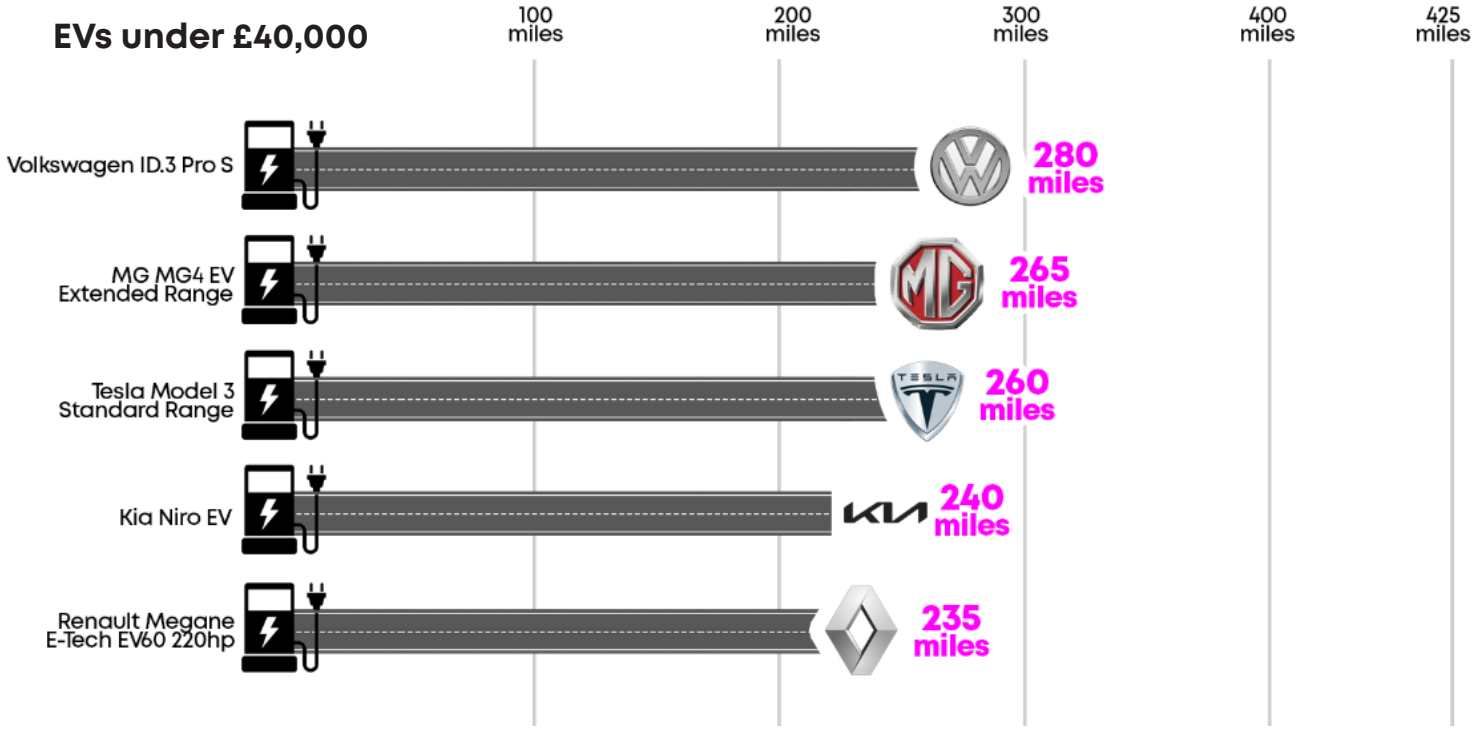
Electric car real-world ranges



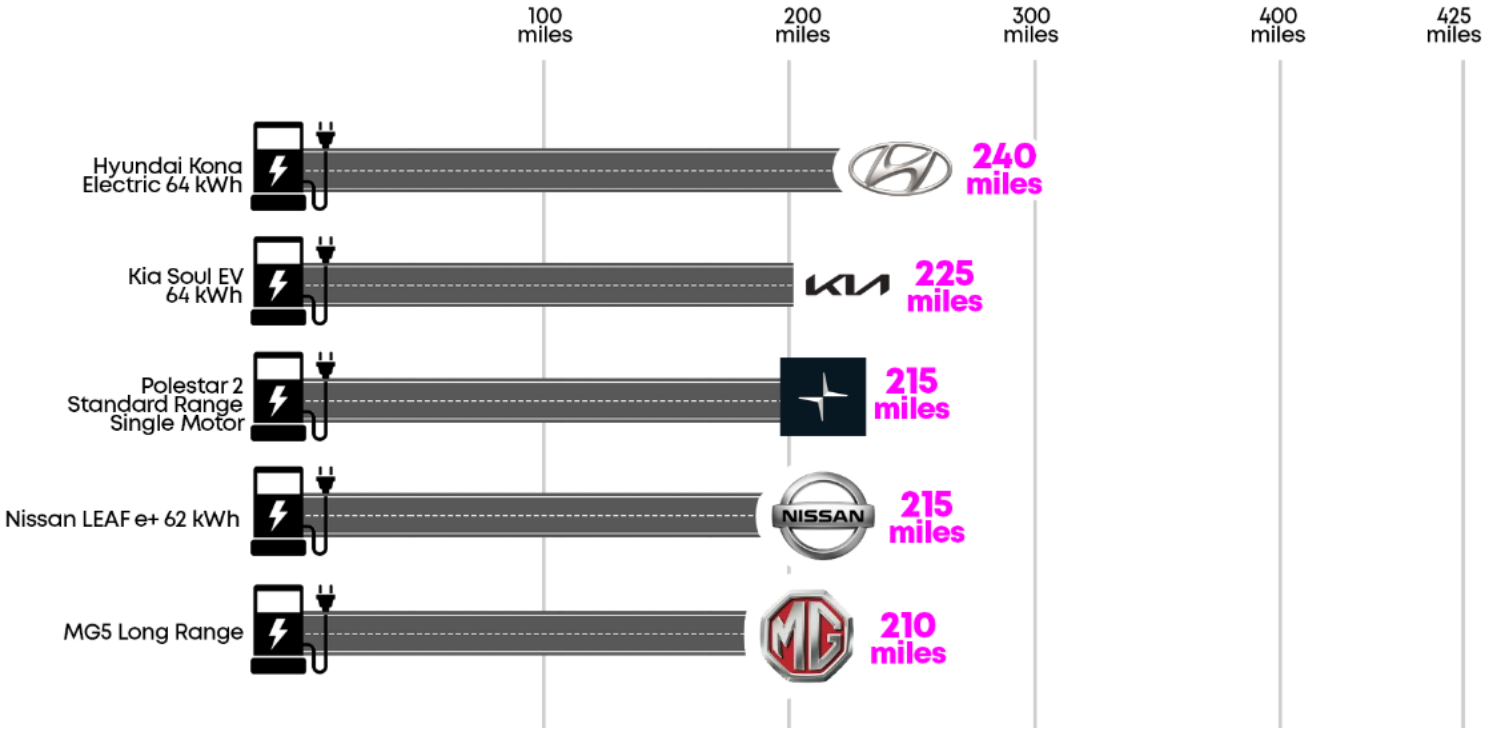
EVs under £50,000



EVs under £40,000



Real-world range of used EVs

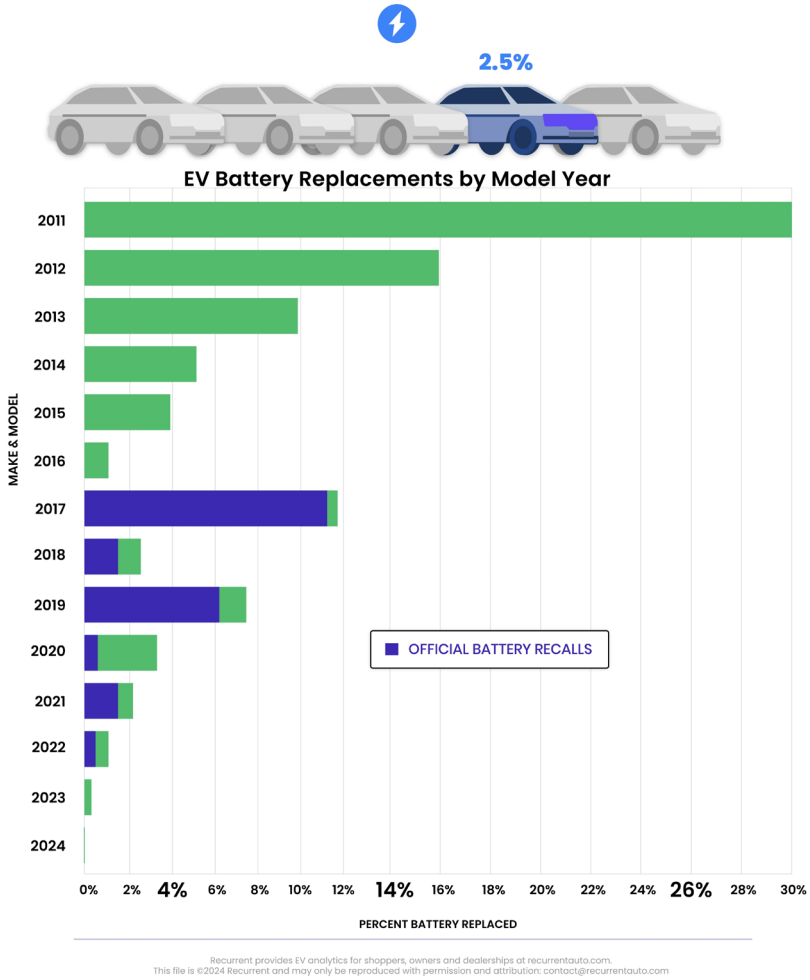


2. EV batteries degrade quickly

The lithium-ion battery in an EV is nothing like the battery in a mobile phone or laptop: the chemistry and cell construction are tweaked for use in EVs, and the cells aren't charged to as high a voltage, with generous voltage buffers helping to reduce degradation and increase lifespan, at the expense of slightly less usable capacity. On top of this, EVs almost always have a thermal management system that removes heat before it starts to degrade the battery.

The above translates to very long battery lifespans. A study by Recurrent found that across all years and models, outside of big recalls, only 2.5% of battery packs have been replaced. For cars older than 2015, replacement rates are 13%, but under 1% for cars from 2016 and newer.

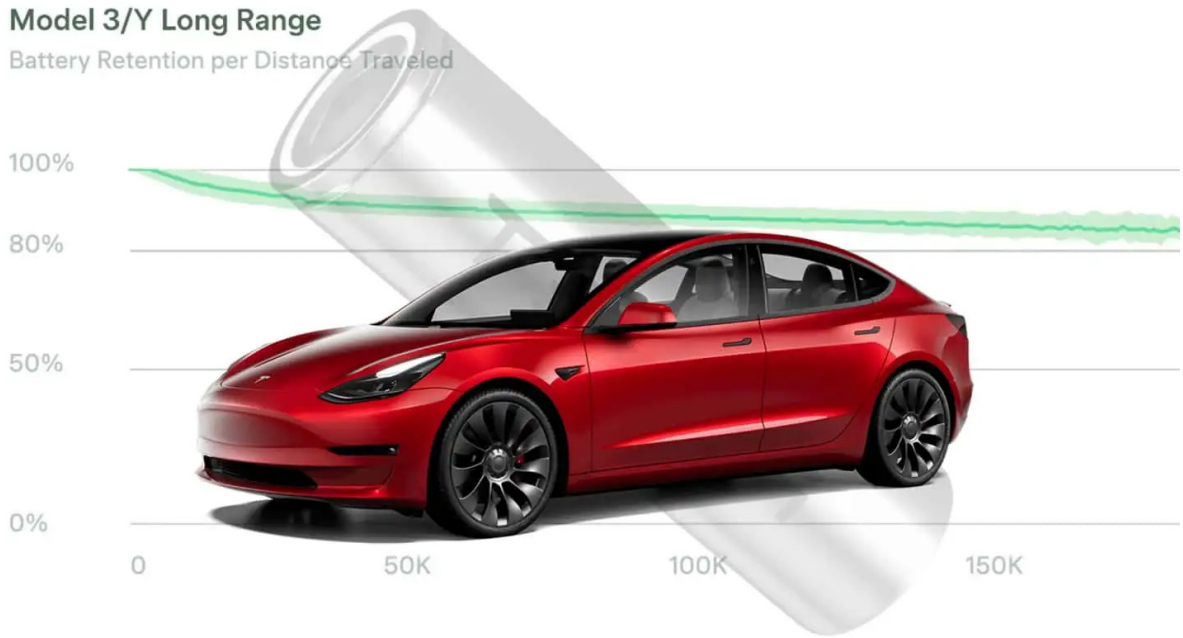
As cell chemistries and battery designs continue to improve, so will the lifespan of modern EV batteries, which are set to last hundreds of thousands of miles and probably outlast the car itself. Expect the replacement rate of later generations of EV batteries to remain lower than their early-2010s predecessors as a result. This is evidenced by generous battery warranties on EVs, which tend to be upwards of eight years or 100,000 miles – manufacturers wouldn't offer these warranties if they thought that their batteries wouldn't comfortably outlast those limits.



Source: https://www.recurrentauto.com/research/how-long-do-ev-batteries-last

Date: May 2024

Average Tesla Model 3, Model Y battery degradation



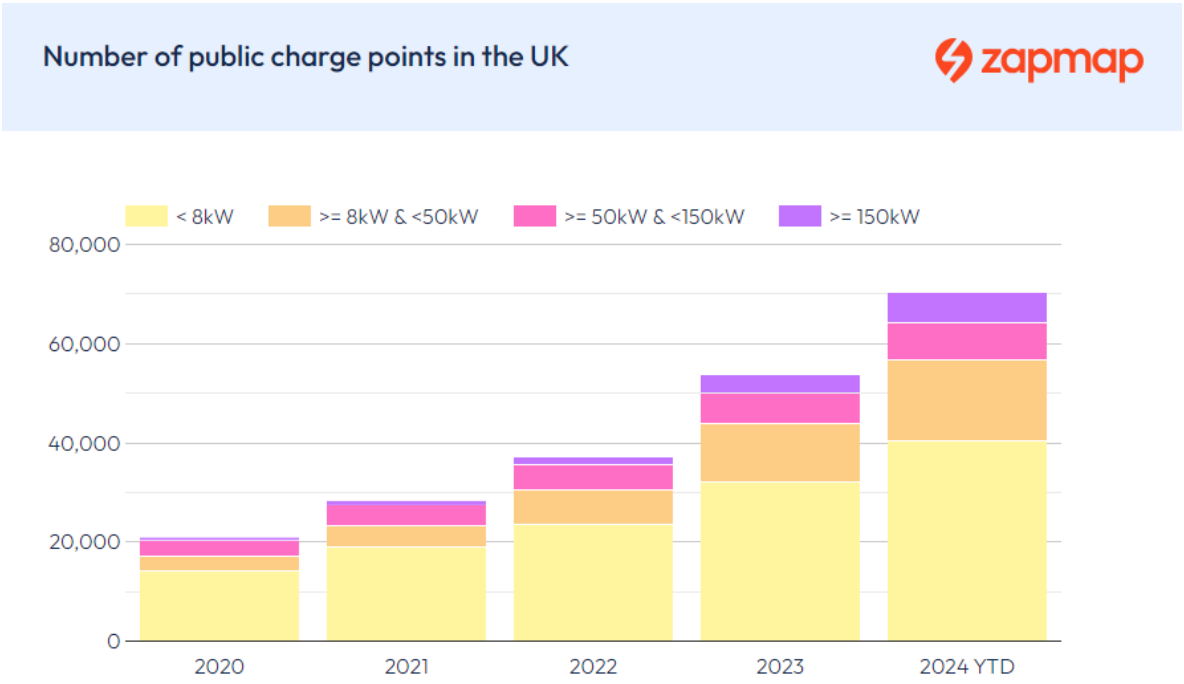
Source: https://insideevs.com/news/723734/tesla-model-3y-battery-capacity-degradation-200000miles/

3. There's nowhere to charge my EV

No driveway? No problem! Have a look on apps like Zap-Map to see where the nearest public charge points are to your home, office, local shops, etc. The UK now has over seven times as many charge points as it has petrol stations, having surpassed 60,000 in April 2024; the UK is fast approaching 70,000 public charge points just six months later.

If there are genuinely no charge points near you and you live in a house without a driveway, the following solutions may be of use to you:

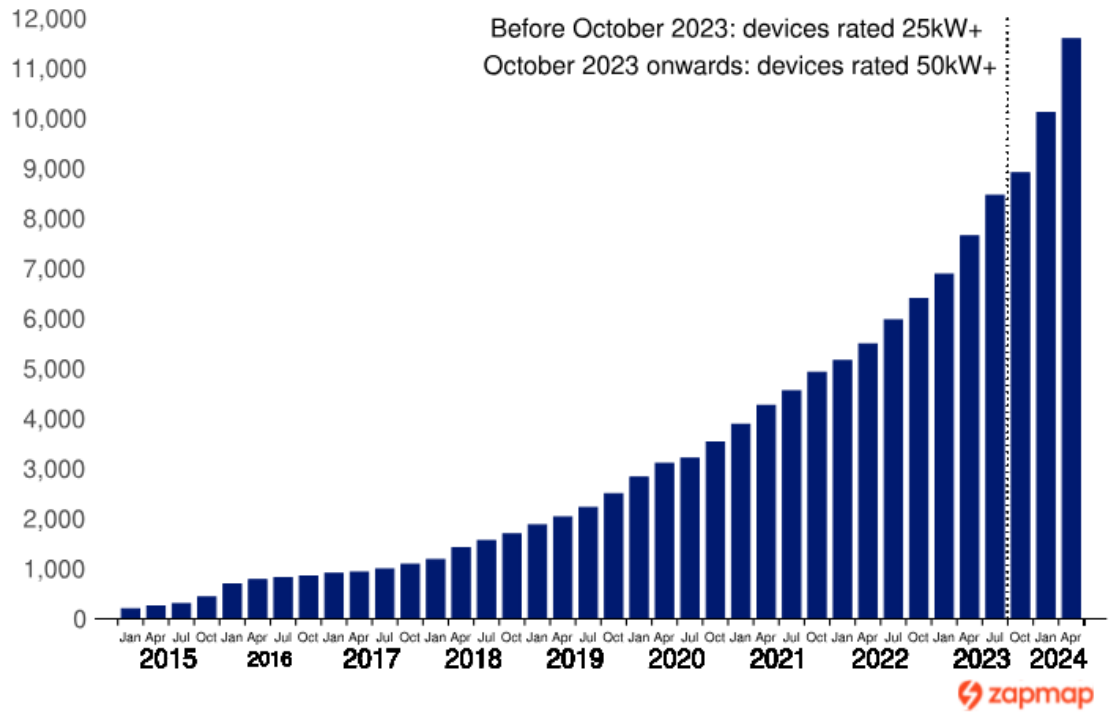
- Charge point sharing platforms like Co-Charger let you book a charging slot on a neighbour's home charge point.
- The Office for Zero Emission Vehicles (OZEV) has an On-Street Residential Chargepoint Scheme that gives local authorities grant funding to install charge points outside or near your home.
- Cross-pavement charging solutions like the Kerbo Charge cable gully and Nodum Charge Bridge let you charge your car from your home electricity supply without creating a trip hazard. You'll need to get your local council on board, but Kerbo Charge and others have already installed cable gullies for many UK local authorities.
- OZEV also has funds available to cover up to 75% of the cost of installing charge points at designated parking bays in blocks of flats, and for landlords to install charge points at rental properties.



Source: https://www.zap-map.com/ev-stats/how-many-charging-points

Date: September 2024

Chart 2: Installed UK public rapid charging or above devices, midnight, 1 of month, since 2015 (table EVCD_03)



Source: https://www.gov.uk/government/statistics/electric-vehicle-public-charging-infrastructure-statistics-april-2024/electric-vehicle-public-charging-infrastructure-statistics-april-2024

4. EVs are much more expensive than petrol or diesel cars

EVs used to command a considerable price premium over petrol and diesel cars but the cost of new models has become much more competitive recently, partly driven by tough competition from new Chinese manufacturers. For example, Vauxhall has made its newly-launched Frontera EV the same price as its petrol version, at £23,495. On top of this, the Auto Express New Car Awards Car of the Year winning Citroen e-C3 is priced at £21,995, while Dacia's Spring starts at just £14,995.

Lease deals on EVs can be made even cheaper by salary sacrifice schemes, which take payment for the lease off your pay-cheque before tax. This in turn means that you have less tax deducted from what you've earned, saving you money compared to being paid your full pay cheque minus tax then paying for a lease out of your bank account. Salary sacrifice has helped EVs to reach price parity for consumers compared with petrol and diesel cars, with EV prices set to get even cheaper thanks to record low battery prices seen this year.

There are also plenty of bargains to be had on the used EV market at the moment. The 250-plus mile range Kia e-Niro is available from around £14,000; the ultra-efficient mark one Hyundai Ioniq from around £9,000; and the dependable 2014-onwards 24 kWh Nissan LEAF from around £4,000 – no wonder used EV sales nearly doubled last year. Some salary sacrifice providers also offer used EVs for extra affordability.

Salary sacrifice EV versus ICE comparison

Based on a driver of DOB: 01/04/1984 (40 year old),
40,000 Salarypassback - 10% VAT recovery - 100% Postcode: KT23 4LD

48 months, 5000 miles - secured supply [1]	Monthly cost (NET cost for EV) [2]	Monthly cost for 5,000 miles/year of fuel/charge [3]	Insurance (monthly) [4]	Maintenance [5]	Breakdown cover [6]	Tyres [7]	Total
MG 4 EV SE [20% tax payer, 40 years old] OEV	£312.10	£8.02	Included	Included	Included	Included	£320.12
Renault Clio 1.0 TCe 90 Techno	£279.97	£51.53	£53.42	£39.33	£14.65	£8.33	£447.23
						Saving:	£127.11

1. ICE quote - leasing.com, lowest upfront cost possible with fair monthly (we don't have upfront cost, non supply, 1 month upfront)
2. (Excluding fuel for both) Excluding insurance, mainteance, servicing, breakdown cover, tyres for ICE example
3. EV Effiency = 0.275 [taken from EV database] MPG = 53.3 [Taken from leasing.com
4. Based on average for insurance group [average from Nimblefins, group from Parkers [insurance group 11]
5. Taken from average car running costs UK - repairs and servicing (472/12)
6. Taken from AA - Roadside assistance, at home, national recovery & onward recovery selected based on the postcode KT23 4LD
7. Assuming one set change (tyres typically last 20k miles), taking the mid-range tyre from Checkatrade. One full set = £400, spread across 48 months

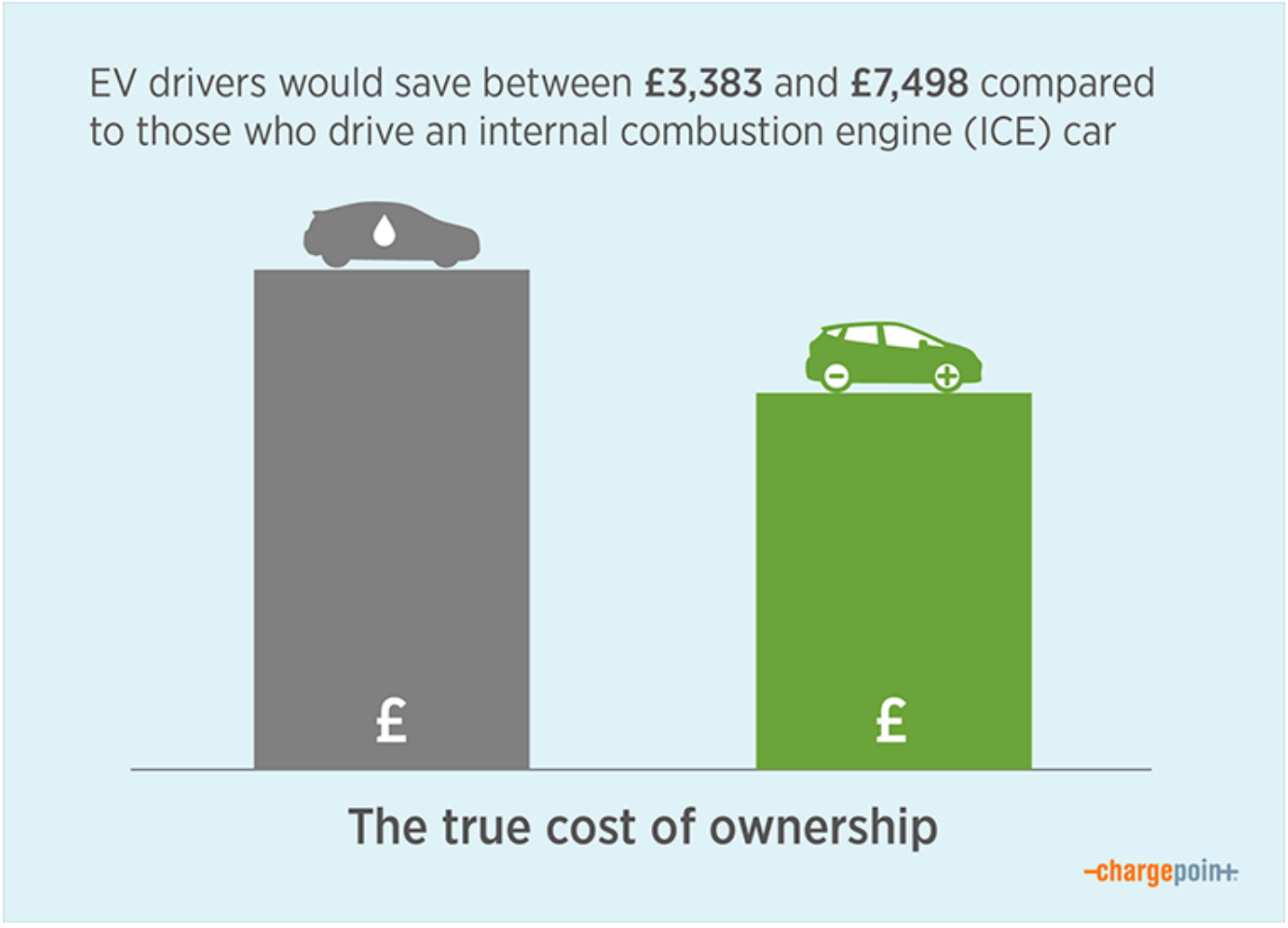
5. EV insurance is too expensive

EV insurance premiums have typically risen recently, just like petrol and diesel cars. Reasons for these increases include:

- Increased repair costs as parts prices rise due to inflation, plus more technology added to vehicles, such as parking sensors
- More incidents of crashes, driven in part by increased numbers of cars on the road compared to during the COVID pandemic
- Increased incidents of theft, in part due to increased use of technology such as keyless entry, which can lead to relay theft

This, combined with the power of many modern makes and models of EV, explains part of the reason why premiums are higher than they used to be, but the good news is that insurance premiums are starting to fall in 2024. You may still find sensibly priced premiums if you shop around for a good deal and pick a car that isn't a top of the range sporty edition.

While an insurance quote for an EV that you're considering buying or leasing may seem unexpectedly high, the cost of the premium should be weighed against the considerable savings that EVs should provide in running and maintenance costs (see myth number nine).



Source: Chargepoint: True cost of ownership
https://www.chargepoint.com/en-gb/blog/bust-ev-cost-ownership-myths-our-new-savings-calculator

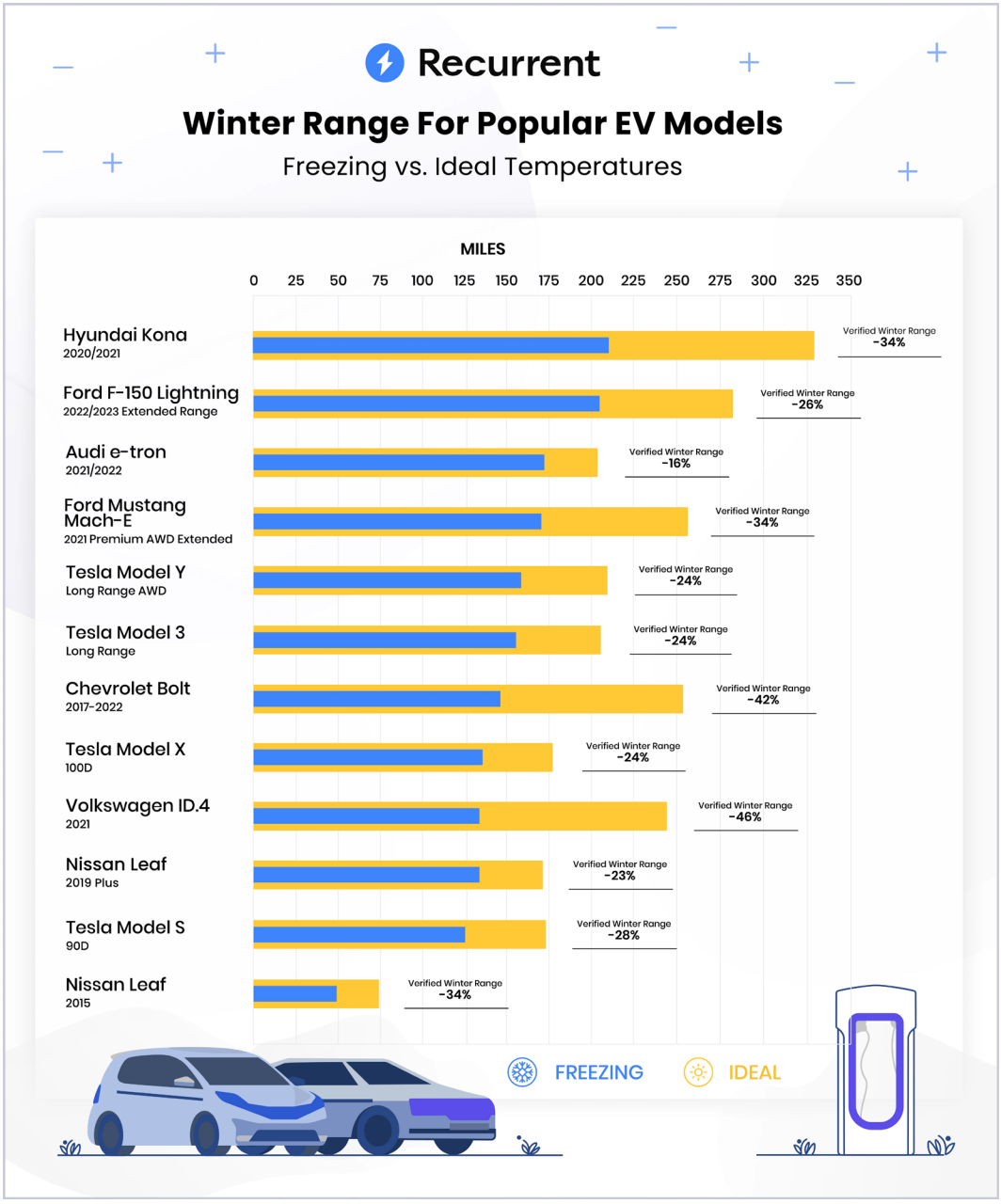
6. EVs lose a lot of range in winter and could run out of power in traffic jams

Lithium-ion batteries do lose some range when cold, as do petrol and diesel cars. For more information on why this happens, see this episode of Plug Life Television https://youtu.be/CY8QN2p9Tk8

However, modern EVs have thermal management systems that help to keep batteries as close to their optimum temperatures as possible, which helps to reduce the amount of range lost.

If EVs lost too much range per charge in cold temperatures, there's no way that they would have reached 90% of the new car market share in Norway this year, no matter how many incentives are thrown at drivers to switch to electric. The Norwegian Automobile Federation conducted a winter range test on 29 makes and models of EV, in temperatures of between 0 and -19 °C, and found that most lost no more than 25% of their official WLTP range. However, when compared to EV Database's year-round "real range," most cars were very close to expectations, with Teslas and MGs generally coming out on top. These findings were broadly echoed by a Fleet News study in the UK.

As for traffic jams, an EV's cabin heater typically draws about 1 or 2 kW, which is at most a tenth of the power that the motor uses to cruise at 60 mph. EV YouTuber Bjørn Nyland tested this by leaving the cabin heater running in a Tesla Model 3 in the middle of a cold Norwegian winter – it took over three days to drain the battery.



Source: EV winter range

Recurrent: https://www.recurrentauto.com/research/winter-ev-range-loss

Date: January 2024

7. EVs catch fire easily

There are many high-profile examples of media coverage where EVs were initially blamed for a fire by journalists, only for the culprit to be revealed to be a petrol or diesel car - the Luton Airport car park fire is a prime example of this.

The truth is that statistics from the Swedish Civil Contingencies Agency and AutoinsuranceEZ show that EVs are between 20 and 60 times less likely to catch fire than petrol or diesel cars, with EV fire incidents decreasing despite the growing number of vehicles on the road.

The battery in an electric vehicle is the most protected part of the car aside from its occupants. Chances of it being physically damaged are slim and advanced battery management systems keep cell voltages, currents and temperatures within their optimum windows. The cells themselves are made to exceptionally high standards, with negligible chances of spontaneous failure. Sadly, some e-bikes, e-scooters and hoverboards can have poorly made batteries or incorrectly specced aftermarket chargers, leading to fires, but these should not be conflated with the meticulously high standards of safety set by electric cars, vans, buses and lorries.

Should an EV's battery be heavily damaged, NMC cells may catch fire, but this would start with the damaged cell and gradually spread to its hundreds of neighbours as they heat up – like a series of small fireworks – rather than being one large, instant fireball like a ruptured fuel tank. Well-designed EV batteries direct venting gases and flames away from the cabin to give occupants plenty of time to escape. New LFP batteries – which many EV manufacturers are adopting – are exceptionally unlikely to catch fire in an accident.

The safety of EV batteries improves with every iteration that makes it onto the road, and new firefighting techniques are being developed that help to extinguish battery fires within minutes, using a third of the amount of water required to put out a petrol equivalent.

GLOBAL ELECTRIC VEHICLE BATTERY FIRES

as of 11th July 2022

EVs are less likely to catch fire than internal combustion vehicles...here's what we know

Why EV FireSafe?

Transport emissions account for:

25%

of global greenhouse gas emissions, which has led to the rapid electrification of vehicles

EV battery fire incidents have led to concerns about emergency responder safety when attending

EV lithium ion traction battery fires

To enhance emergency responder safety, we researched plug-in (BEV & PHEV) passenger electric vehicle battery fires from

2010 - 2022

breaking down our findings here & at evfiresafe.com

How many EV battery fires?

Since 2010, the EV FireSafe research team found:

246

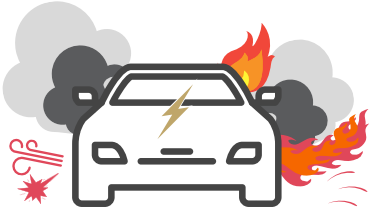
verified* EV traction battery fires globally

+ 27

unverified - from a reliable source, waiting on further info

+ 40

investigating - online rumour, tip off, clickbait



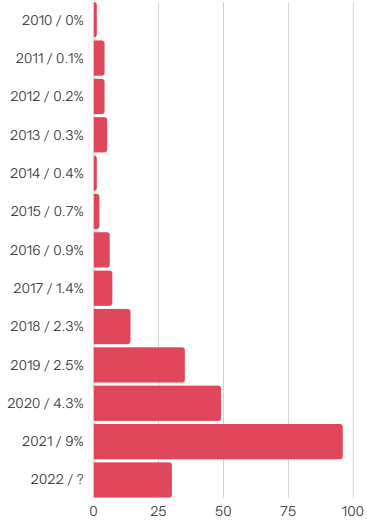
*'In the world of clean energy, few areas are as dynamic as the electric car market. We estimate there are now around **16 million electric cars on the road worldwide**...'*

International Energy Agency, January 2022

*Not exhaustive. From more than one online source, interviews, first hand accounts, videos, images, academic & fire agency reports & online training

When did they occur?

By year & EV global market share:



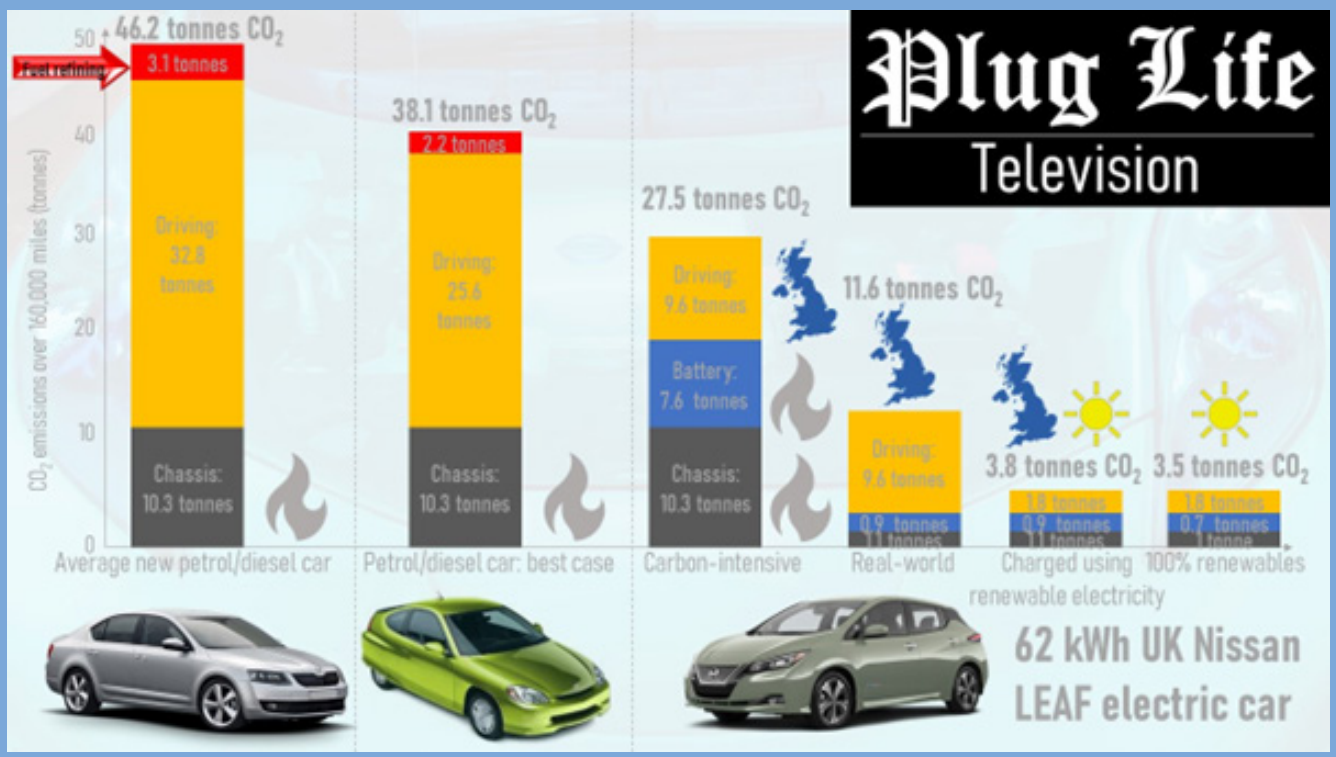
Source: EV FireSafe

https://www.evfiresafe.com/_files/ugd/8b9ad1_6fa2d5ae7ffd46e69b91d84d4de2f6c8.pdf

Date: 2022

8. EVs are ultimately more polluting than petrol cars

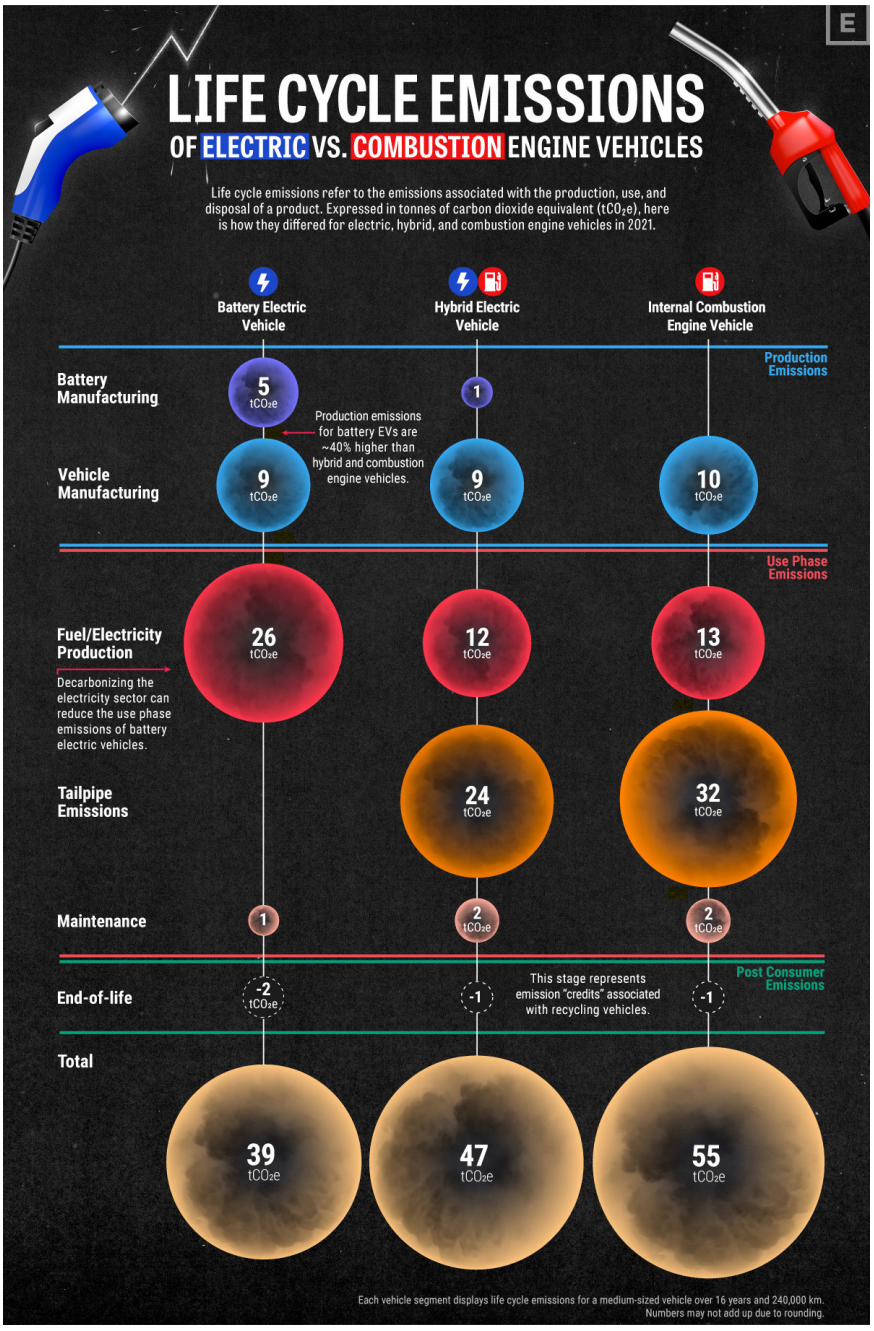
Pollution from cars takes many forms. Starting with CO2, and the claim that the amount released during the manufacturing of the car and battery vastly outweighs any tailpipe savings over their lifespan, countless studies continue to show that EVs deliver substantial CO2 reductions over their lifespan. Even Volvo's notoriously pessimistic electric-vs-petrol XC40 study from a few years ago shows that an EV breaks even with a petrol car within at most 16% of the predicted 300,000 mile lifespan of a modern battery. For more information on how much CO2 an EV can save vs a petrol or diesel car, see this episode of Plug Life Television: https://youtu.be/O1MeR6vOcv0



Source: Plug Life Television: https://www.pluglifetelevision.co.uk

Recent claims about EV tyre and brake wear being worse than petrol and diesel cars have been disproven. EVs wear through their brakes much more slowly than petrol cars because of regenerative braking, resulting in brakes that are 2.5 times longer lived than in petrol cars. Fleet managers and EV drivers repeatedly report that the tyre lifespan of EVs is broadly equal to that of their petrol and diesel predecessors. Combined with the elimination of exhaust emissions, cities have already seen an improvement in their air quality caused by drivers switching to EVs.

As for raw material extraction, not only is this decarbonising but it's getting more efficient, such as the move from water-intensive lithium evaporation ponds to direct lithium extraction, which has the potential to supply fresh water to drought-prone areas.



Source: Visualcapitalist.com

https://elements.visualcapitalist.com/life-cycle-emissions-of-electric-hybrid-and-combustion-engine-vehicles/

Date: June 2023

9. EVs cost more to run and maintain than petrol cars

To bust this myth, let's consider an electric crossover that does 3 miles per kWh versus a petrol crossover that does 45 mpg using petrol that costs £1.47 per litre.

The petrol crossover costs 14.9 pence per mile to run.

What about the EV?

From October 2024, UK domestic electricity prices are capped at 24.5 pence per kWh. Therefore, using a standard electricity tariff, the electric crossover costs 8.2 pence per mile to run. If you have an off-peak electricity tariff that gives you cheaper electricity overnight – such as Octopus Go's 8.5 pence per kWh – that running cost is reduced to 2.8 pence per mile. If you have solar panels, and time the charging of your car right, you can charge for free.

Electricity would need to be over 44.7 pence per kWh for the EV to be more expensive. Now, that's the case at many public rapid chargers at the moment but these typically make up a tiny fraction of the average EV driver's charging sessions, such as when charging en route to a holiday in Cornwall or the Highlands. Therefore, any additional cost of rapid charging is a drop in the ocean compared to the savings made by charging your EV on other charge points the rest of the time, such as at home.

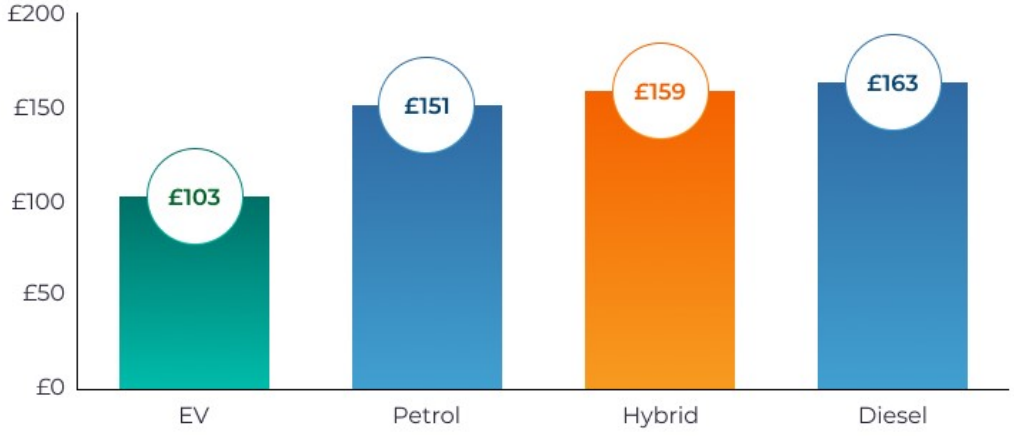
Fuel source	Cost per mile	Cost over a year (8,000 miles)	Saving versus petrol
Petrol	14.9p	£1,192	N/A
Electricity (standard tariff)	8.2p	£653	£539
Electricity (off-peak tariff)	2.8p	£227	£965

As for maintenance, EVs are mechanically very simple machines, so don't have much that can go wrong with them – no clutch, no timing belt, no exhaust gas regulator, etc. This is reflected in cheaper service costs. For example, Nissan's EV servicing starts from £179, while the petrol equivalent starts from £239 and diesels are even more expensive, starting from £269.

ICE vs EV vs HYBRID

Comparing the cost of servicing by fuel type

The average cost to service each vehicle fuel type in the UK



Source: BookMyGarage

https://bookmygarage.com/blog/servicing-costs-by-fuel-type-ev-cheaper-than-ice/

Date: February 2023

10. Drivers can lose control of their EVs, and their vehicles run away with them

Some of the more bizarre headlines lately have involved a couple of individuals claiming that their EV developed a mind of its own and refused to come to a halt. The stories in question concerned an MG ZS EV that allegedly went on an unexpected low-speed adventure and a Jaguar I-PACE that allegedly developed a mind of its own on the motorway and required the police to bring it to a standstill.

It's a fitting indication of the likely level of credibility behind these stories that a police officer was apparently able to quickly bring the MG back under control, and the I-PACE driver was promptly arrested for dangerous driving and causing a public nuisance.

There is nothing about an electric car's brakes or accelerator pedal that is more inclined to go haywire than in a petrol or diesel car.

All cars – petrol, diesel and electric – are developed to stringent automotive standards, with backup systems in place for important features like the brakes in case something goes wrong. If there was a serious issue with any vehicle at all that caused the driver to lose control, there would be a swift recall of the affected models. For example, Tesla recalls that have been in the news recently have not required the car to be brought back to the dealership – simple over-the-air updates have fixed the issues.

Vehicle Remarketing Association

The Vehicle Remarketing Association exists to promote networking and provide essential briefings for companies who work in the handling, selling, inspection, transportation and management of used vehicles.

We aim to help our members – who together process more than 1.5 million cars, vans and trucks every year – to forge new and productive links as well as share good practices to help them prosper in a rapidly changing and challenging environment.

The VRA creates a crucial environment where industry issues are addressed by the sector's leading experts in a collegiate and constructive manner. As a result of this successful approach, the Association has expanded by 25% since 2020.

The key objectives of the VRA are:

- To create better awareness of the activities of professional remarketing
- To raise standards and generate an accepted best practice across the industry for key disciplines like vehicle inspection
- To provide a much needed voice to represent the sector in the trade and consumer media on issues which affect remarketing suppliers and customers
- To provide an effective focal point through which major matters concerning those involved in remarketing can be addressed
- To raise the profile and professionalism of the industry to ensure recruiting good quality people becomes much easier
- To generate views and opinions of the industry for use in lobbying for the greater good of the remarketing sector
- To create a forum where members can network, exchange views, debate key topics and share best practice

For more information contact:

info@thevra.co.uk

www.thevra.co.uk

*All costs and figures in this document are correct at the time of publication.