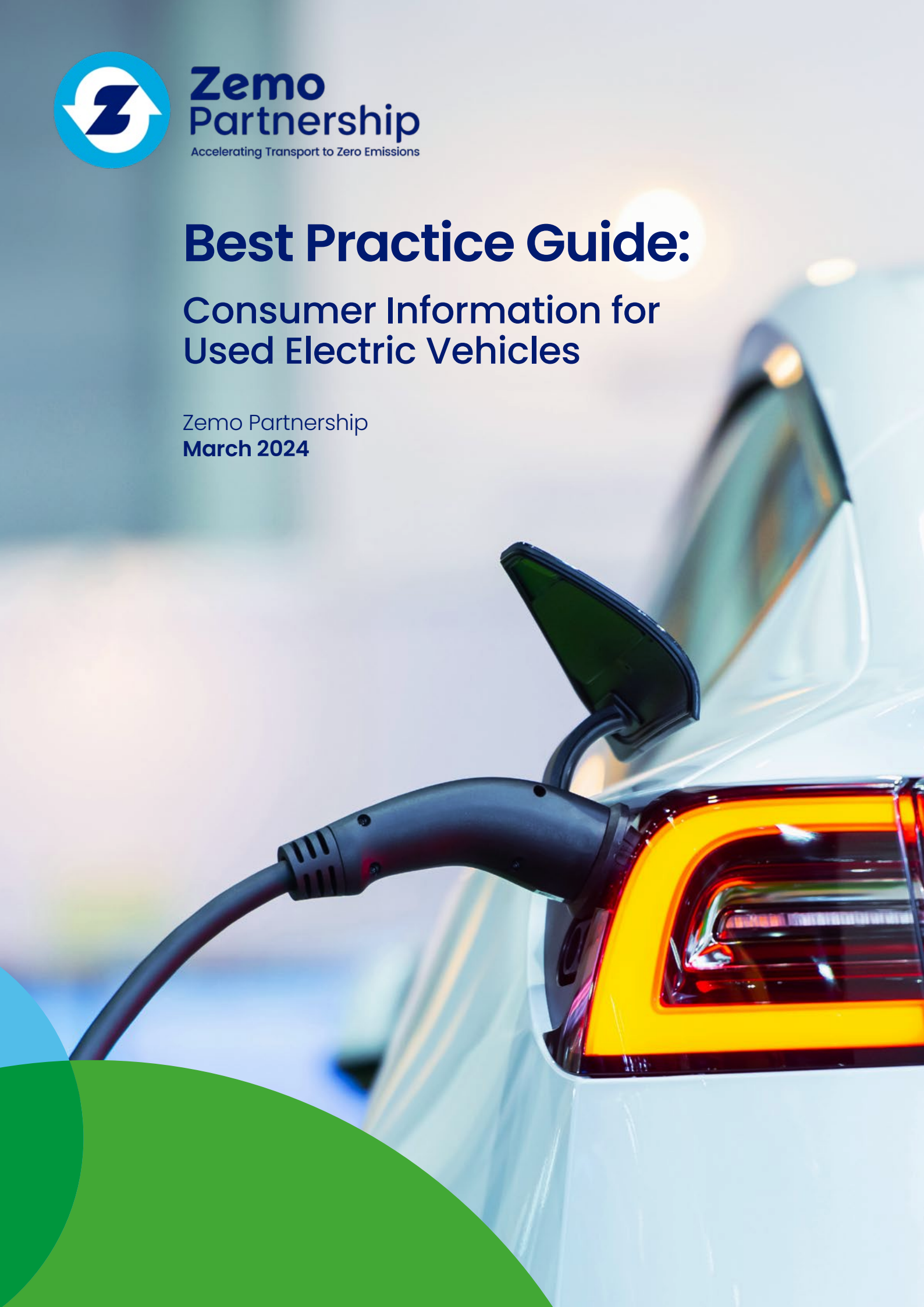
Zemo Partnership
Accelerating Transport to Zero Emissions

Best Practice Guide:

Consumer Information for Used Electric Vehicles

Zemo Partnership
March 2024



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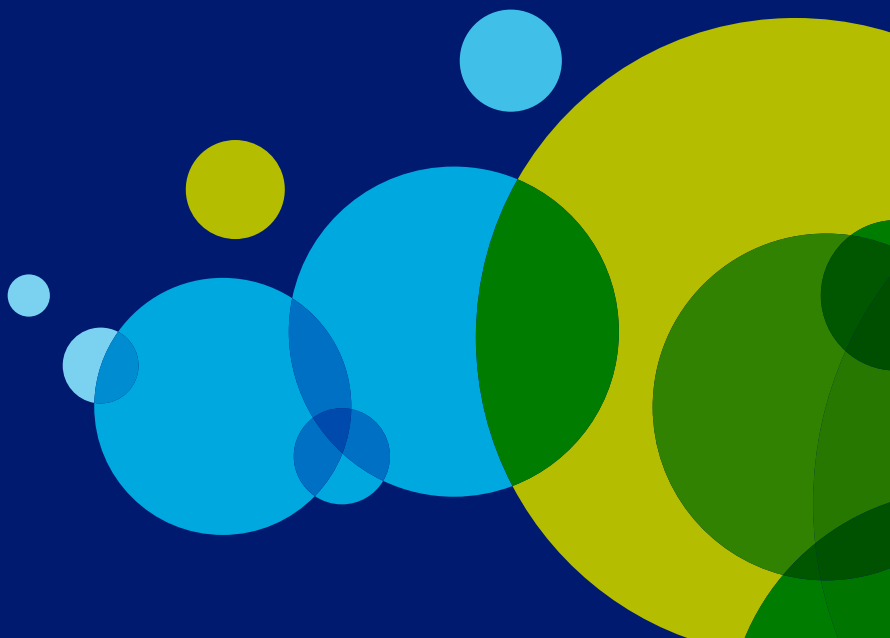


Summary

Key Data Items	Unit of Measurement
Range Informs consumers on the maximum distance a vehicle can travel on a full electric charge.	Miles
Electricity Consumption Serves as a miles per gallon equivalent for electric cars, informing on the vehicle's efficiency, aiding in estimating charging costs, and facilitating comparisons between models.	Miles/kWh
Battery Capacity Aids consumers in comparing energy storage across EVs.	kWh
Battery Warranty Provides consumers with confidence in the performance and longevity of the EV's battery.	Expiry Date
Tailpipe Emission/Access Standards Provides assurance of the vehicle's compliance with zone emission/access standards.	N/A
Vehicle Excise Duty Informs consumers on the additional costs associated with electric vehicles which are due to vary considerably from April 2025.	£ (GBP)

Additional Data Items	Unit of Measurement
Battery State of Health (SoH) There is currently work underway to establish an international standard for reporting battery SoH. In the interim, it is recommended to use the manufacturer's battery warranty, which ensures a set SoH retention over specific years, as a metric.	N/A
Maximum Charging Rate Indicates the maximum power a vehicle can receive from a charger, assisting consumers in selecting the most appropriate chargers to plug into.	kW
Minimum Charge Time (10 – 80%, using a DC charger) Provides consumers with an estimate of their vehicle's potential charging speed at high-powered chargers.	Hours, minutes
Maximum Charge Time (0 – 100%, using a 7.4kW, AC charger) Informs consumers of the estimated duration needed for a full charge on a typical home charger.	Hours, minutes

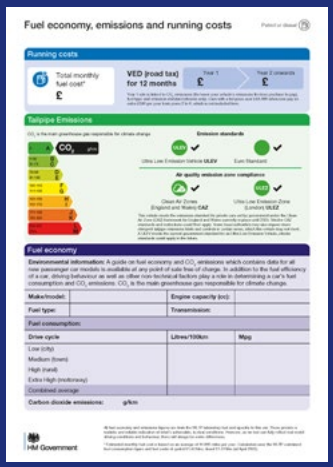
Introduction

Used car buyers are now faced with more information and options than ever before, from a range of powertrains to different testing cycles and requirements. For this reason, it is critical that core information is communicated to consumers clearly and consistently.

In the used electric vehicle (EV) market, the information presented to consumers is inconsistent across the range of observed used EV adverts. For example, the same vehicle type searched on multiple websites can return various vehicle range and charging figures, leaving the consumer unsure of which source of information is reliable. In part, this may be due to data errors which can stem from either human input error or, the more rectifiable reason, from a lack of understanding of what each set of data means. For example, the Worldwide Harmonised Light Vehicle Test Procedure (WLTP) 'City Range' may be inputted where the 'Combined Range' is the most appropriate. As we transition to a focus on battery electric vehicles (BEVs), many used car dealers are not yet fully equipped with the necessary understanding of the vehicles, and their charging requirements, to market BEVs effectively and comprehensively.

Zemo Partnership has produced this Best Practice Guide to support those who sell or assist in the selling of used EVs, both online and in person. Through the guide, used car dealers will be provided with direction on what information should be included for electric cars (excluding vans) and the reason why they should include it, to provide consistency and clarity across the consumer's used EV purchase journey.

In the new car market, much of this information can be found on the 'Environmental Car Label'[1], produced by the Vehicle Certification Agency (VCA), which is legally mandated to be displayed in new car showrooms. In the used EV space, this best practice provides voluntary guidance on what information should be included, aiming to provide clear, consistent, comparable and accurate car buyer information to encourage purchase consideration of used electric vehicles.



[1] https://www.vehicle-certification-agency.gov.uk/download-publication/2603/VCA062-Environmental-labels-2023-Guidance-for-Industry-Revision-2/

Key Data Items

Range

Information that should be included:

- The declared WLTP **combined** range figure and, where available, the declared WLTP **city** range figure.
  - Where the WLTP range figures are unavailable and the vehicle is greater than five years old, refer to the New European Driving Cycle (NEDC) figure.
- The test procedure: WLTP, or if unavailable, NEDC.
- Unit of miles.
- A disclaimer that a vehicle's actual range may vary from the declared figure, which is based on new car performance under test conditions, and will fluctuate according to various factors including journey types (e.g. city to motorway), weather, driving conditions, usage history, battery state of health (see page 11) and driving style.

Why is this piece of data important for the consumer?

Stating the range can give consumers an estimate of how far the vehicle could travel on a full electric charge, averaged across various journey types and, importantly, it allows them to compare vehicles consistently. By specifying the test procedure (WLTP) and cycle (combined and, where available, city), consumers can understand why there may be different quoted range figures and make more informed decisions.

A closer look:

Context

To contextualise the range figure, the most current average annual mileage may be a useful figure to be aware of and provide to consumers. According to data from the National Travel Survey, amongst residents of England, there was an average annual mileage of 6,600 in 2022[2]. From the same data table, private cars had an average annual mileage of 6,500 and company cars had an average annual mileage of 12,700. Similarly, it may be useful to note that the average distance travelled across all modes of transport, per person per year was 5,373 miles in 2022 and therefore, just over 100 miles per week[3]. Having a realistic understanding of the mileage actually travelled will enable potential purchasers to consider the real charging needs of an EV.

[2] https://assets.publishing.service.gov.uk/media/64e8c590691aa3000da56e3c/nts0901.ods.

[3] https://www.gov.uk/government/statistical-data-sets/nts01-average-number-of-trips-made-and-distance-travelled

WLTP:
This is the test procedure that came into effect in 2019. WLTP testing gives a more accurate range figure than its predecessor, NEDC. It is therefore strongly advised that WLTP figures are used where available. There are two official WLTP electric range figures to be aware of:

- 'WLTP **combined** electric range' is an average across all four WLTP test cycles ('low'= city driving; 'medium'= town; 'high'= rural; 'extra high'= motorway) and is the range to quote.
- 'WLTP **city** electric range', only uses the low (city) and medium (town) test cycles and may be quoted in addition to the combined range, if clearly labelled as such.

More information on the WLTP can be found on the Zemo Website[4]

NEDC:
NEDC is the former test procedure that came into existence in 1992 and provided just one published figure that was a combination of two test cycles. The test cycle and associated procedure have become outdated and no longer represent real, individual day-to-day driving behaviour. It is therefore suggested NEDC is only used when WLTP is unavailable and that comparisons between NEDC and WLTP are avoided.

Disclaimer:
It is important to include appropriate disclaimers to ensure that the consumer is not misled. The following suggested text echoes the text used in the VCA Environmental Car Label:

'This tells you roughly how far you might be able to drive on a full electric charge, averaged across various journey types (city to motorway). Whilst achievable in ideal conditions 'real world' day-to-day journeys are never the same and are affected by many external factors meaning your individual electric range may well be different.'

It is suggested that a disclaimer referencing usage history and battery state of health (see page 11) is also noted as factors that may affect range.

[4] https://www.zemo.org.uk/work-with-us/cars/info/know-your-car/wltp-fuel-economy.htm

Electricity Consumption

Information that should be included:

- The declared rated WLTP electricity consumption figure.
- The test procedure: WLTP, or if unavailable, NEDC.
- Unit of miles/kWh.
- A disclaimer that a vehicle's actual energy consumption may vary from the declared rate, which is based on new car performance under test conditions, and will fluctuate according to various factors including journey types (e.g. city to motorway), weather, driving conditions, usage history, and driving style.

Why is this piece of data important for the consumer?

The electricity consumption figure provides consumers with a metric akin to the traditional miles per gallon (MPG) metric used for petrol and diesel cars. Much like MPG, knowing the energy consumption allows consumers to gauge the efficiency of their vehicle, thus aiding in estimating charging costs and helping to make comparisons between different models.

It is important that the rated electricity consumption figure is therefore used in any calculations estimating a vehicle's running costs; as per the VCA guidance for the new car environmental label[5] noted in Annex I.

Battery Capacity

Information that should be included:

- The declared **useable** capacity figure.
- Unit of energy capacity (kWh).

Optional information:

- The declared **nominal** (also known as **installed**) capacity figure.

Why is this piece of data important for the consumer?

Including information on useable battery capacity will allow consumers to more easily compare the amount of available energy stored in the battery of each EV. Specifying whether the figure is 'useable' or 'nominal' capacity aids understanding why there might be two different capacity figures for the same vehicle.

[5] https://www.vehicle-certification-agency.gov.uk/publication/environmental-labels-2022-guidance-for-industry/

A closer look:
The two types of battery capacity are as follows:

Nominal (also known as Installed)
Nominal or installed capacity refers to the total capacity of the battery hardware when new, as stated in the manufacturer's specifications.

Useable
Useable capacity refers to the amount of energy available to be used to drive and is therefore the more helpful metric for the consumer. Typically, this is around 90% of the nominal capacity but varies across manufacturers. Useable capacity is restricted in this way to protect the battery from rapid degradation.

Battery Warranty

Information that should be included:
- The battery warranty expiry date.
- The warranty statement.

Why is this piece of data important for consumers?
Battery warranties can offer consumers assurance regarding the performance and longevity of the battery and, therefore, the lifespan of the EV. Warranties increase consumers' confidence in their EV battery by offering a commitment from the manufacturers that alleviates concerns over potentially expensive replacements.

A closer look:
Notably, a vehicle warranty is separate to a battery warranty. The vehicle warranty generally covers the entire electric vehicle, including its various components and systems, such as the motor, electronics, and other non-battery parts. It assures the consumer that the vehicle will be free from defects or issues within a specified time or mileage limit.

On the other hand, the battery warranty specifically focuses on the electric vehicle's battery. It outlines the coverage for potential issues related to battery performance, capacity, and durability. Some manufacturers' battery warranty may have a separate duration or mileage limit from the overall EV warranty, and it addresses concerns unique to the battery.

Tailpipe Emission/Access Standards

Information that should be included:

- State that the BEV is compliant with the following standards:
  - Ultra-low emission vehicles (ULEV).
  - Zero Tailpipe Emissions Vehicles (ZEV).
  - Ultra Low Emission Zone (ULEZ) – London.
  - Clean Air Zone (CAZ) – England and Wales.
  - Low Emission Zone (LEZ) – Scotland.
- The date that these standards are applicable for.
- A disclaimer that stricter standards could apply in the future but are at present set under the Clean Air Zone framework for England and Wales currently in place until 2025.

Why is this piece of data important for the consumer?

For many consumers, emission standards are a confusing landscape and many are unaware of whether their vehicle can be driven in certain zones. All fully electric vehicles are compliant with these standards, so making this as simple for the consumer as possible is helpful in giving them peace of mind that they will not be charged for entering a zone with their EV.

A closer look:

The standards listed mirror the requirements laid out in the VCA guidance[6] to ensure consistency. The guidance contains the following disclaimer:

'This vehicle meets the emissions standard for private cars set by government under the Clean Air Zone (CAZ) framework for England and Wales currently in place until 2025. Stricter CAZ standards and restrictions could then apply. Some local authorities may also impose more significant controls in certain areas. A ULEV meets the current government standard for an Ultra Low Emission Vehicle[7], stricter standards could apply in the future'

It is important to note that some areas require drivers to register for discounts and exemptions (such as congestion charge discount) to the emission zones.

[6] https://www.vehicle-certification-agency.gov.uk/download-publication/2603/VCA062-Environmental-labels-2023-Guidance-for-Industry-Revision-2/

[7] https://www.vehicle-certification-agency.gov.uk/fuel-consumption-co2/fuel-consumption-guide/zero-and-ultra-low-emission-vehicles-ulevs/

Vehicle Excise Duty (Road Tax) First and Second Year

Information that should be included:

- Whether or not they will have to pay:
  - VED Year 1.
  - VED Year 2 onwards.
  - Expensive car supplement.
- How much each of these charges are in GBP (£).

Why is this piece of data important for the consumer?

It is important for consumers to understand the additional costs that will come with their electric vehicle as these can be different from petrol/diesel car costs. VED rates for EVs are particularly relevant to the consumer as this charge will vary significantly in the upcoming years. As it stands at time of publication, EVs are exempt from VED until 2025, with subsequent rates contingent upon when the car was registered.

A closer look:

Vehicle Excise Duty is an annual payment or tax that applies to 'all non-exempt "mechanically propelled vehicles" used or kept on public roads, as legislated in the Vehicle Excise and Registration Act 1994, as amended'[7].

The expensive car supplement requires that cars with a list price above £40,000 pay a surcharge.

Until 2025, electric vehicles are exempt from the expensive car supplement and VED. However, thereafter, electric vehicles, depending on when they are registered, will be liable for a lower rate of VED than petrol/diesel equivalent cars. From the second year of registration, they will be charged a standard VED rate. EVs will also be subject to the expensive car supplement for the first five years, following the first year of registration.

[7] https://commonslibrary.parliament.uk/research-briefings/cbp-9690/

Additional Data Items

Battery State of Health

Currently, there is no standardised way of reporting battery state of health (SoH). However, it is worth noting that there is work underway to develop an agreed upon international standard which will likely be the most consistent way of reporting battery state of health in the future.

In the absence of a uniform approach, it is advised that battery warranties, which guarantee that a battery will retain a set percentage of its SoH for a certain number of years, are referred to instead.

In the UK, it is useful to note that for manufacturers to contribute to their legislated Zero Emission Vehicle targets, all EVs sold in the UK from January 2024 must offer a minimum of 70% of original battery capacity after eight years or 160,000 km (100,000 mi) in service.

Maximum Charging Rate

Information that should be included, where available:

- The maximum charging power accepted by the vehicle.
- Unit in kW.
- A disclaimer that maximum charging rate will depend on a variety of factors.

Why is this piece of data important for consumers?

By clearly stating the vehicle's maximum charge rate, the consumer can more easily select the charger with a compatible charging rate for their vehicle. Importantly, with different prices for different charging rates, this information can ensure the driver is not paying a premium for a higher charging power they cannot benefit from using.

A closer look:

By understanding a vehicle's maximum charging rate, consumers can make more informed choices on which charger to use; optimise energy consumption and charging cost; and minimise the strain on the battery. For instance, if a car can only handle a charge rate of up to 60 kW but is plugged into a public 100 kW charger, the battery will not be charged any faster, but the cost of the charge event may increase. Additionally, this mismatch may block access to higher-powered chargers for those who can benefit from them.

Where possible, it is important to also include a disclaimer that the actual charging power will depend on a variety of factors such as the temperature and state of charge of the battery.

Minimum Charge Time (10 – 80%, using a DC charger)

Information that should be included, where available:

- Specify the power rating of the DC charger.
- Beginning state of charge and end state of charge, expressed as a percentage i.e. 10% to 80%.
- Estimated time taken to deliver this charge in hours and minutes.
- A disclaimer that charge time can vary according to battery condition, the type of chargepoint used and other external factors.

Why is this piece of data important for consumers?

Knowing the minimum charge time will allow consumers to have an idea of how quickly their vehicle could charge under ideal conditions during an en-route stop at a high-powered charger.

A closer look:

Charge time can be impacted by a variety of factors such as the outside temperature, the chargepoint being used, power supply and the condition of the battery. It is important for consumers to know that the optimum approach for a high-power charging event is to not start below 10% and to stop at around 80% charge. This approach will help to limit battery degradation. Additionally, the power (charge speed) will reduce significantly above this level (around 80% state of charge).

It is important to note that this metric is not mandated and consequently, there is no standard method of testing it for used EVs. Data, where available, should be defined as 'indicative'.

Maximum Charge Time (0 – 100%, using a 7.4kW, AC charger)

Information that should be included, where available:

- Time it will take the battery to charge from 0% to 100% using a 7.4kW AC charger.
- Unit of time in hours and minutes.
- How the figure was calculated.
- A disclaimer that time can vary according to external factors, battery condition and chargepoint used.

Why is this piece of data important for consumers?

Knowing the estimated maximum charge time will prepare consumers for how long they could expect to wait for their vehicle to be fully charged on a typical home charger, for instance, when charging overnight.

A closer look:

To preserve battery health, consumers should be encouraged to use a low-power AC charger for day-to-day use.

They should also be made aware that charge time can be impacted by a variety of factors such as the outside temperature, the chargepoint being used, power supply and the condition of the battery. It is also important to note that this metric is not mandated and consequently, there is no standard method of testing it for used EVs. Data, where available, should be defined as 'indicative'.

Annex I: Calculation of Running Costs

While new cars, as per the VCA guidance[8], use a standard figure of 10,000 miles per annum and an annually updated fuel price to give a monthly running cost, this was deemed as being less appropriate for the used car market, given the lower average mileage of used cars and the highly variable cost of electricity.

Many websites present a calculated pence per mile running cost figure, which can be a useful metric for consumers for budgeting and for comparison between cars including petrol and diesel. Whilst this is not a required piece of information, if a pence per mile figure is to be given in the used car market, it is important to transparently state how the figure is calculated. A close approximation of running costs can be estimated using the declared rated electricity consumption (kWh/km converted to miles by multiplying by 1.6093) and the stated electricity price per unit (pence per kWh). Calculating costs based on the declared battery capacity may lead to erroneous figures and underestimate the true costs to the consumer.

[8] https://www.vehicle-certification-agency.gov.uk/download-publication/2603/VCA062-Environmental-labels-2023-Guidance-for-Industry-Revision-2/

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