

An Evaluation of Car Buying Websites

Availability and presentation of environmental, performance and running cost information across different powertrains.



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Authors: Gloria Esposito, Head of Projects and Patrick Bell, Intern

1 Introduction

The purchase of low carbon cars has a critical role to play in reducing greenhouse gas emissions from road transport, through improved vehicle efficiency and increasing drivetrain electrification. Latest figures from the SMMT reveal an upward trend in manufacturer's fleet average CO₂ emission. Zero tail-pipe emission cars concurrently provide a route lowering road transport emissions that contribute to poor air quality in cities. The introduction of CAZ (England and Wales), LEZ (Scotland) and ULEZ (London) all target the adoption of the cleanest vehicles in order to achieve improvements in roadside NO₂ concentrations. The Government's Road To Zero Strategy emphasises measures to expand the Ultra Low Emission Vehicle market to address both climate change and air quality challenges.

Vehicle performance and environmental information presented to consumers by manufacturers and motoring media, has a critical role in encouraging the purchasing of lower carbon and zero emission cars. This compliments Government policy directed at stimulating consumer behaviour change. Manufacturers are legally required to provide consumers with new car CO₂ emission and MPG figures, at the point of sale to help them identify and choose most efficient car model. The provision of this information (derived from vehicle homologation) is mandated via the car label shown next to a new car at a dealership, in printed brochures and adverts. In the UK, car CO₂ emissions have been aligned with taxation, notably road tax and company car tax, to stimulate behaviour change and purchase of lower carbon cars. More efficient cars offer consumers lower fuel costs, although this is rarely communicated, the car fuel economy label does show annual fuel cost.

The automotive industry has been centred around the internal combustion engine, it is only relatively recently that alternative powertrains have started to compete with the conventional engines. Model choice for battery electric and plug-in hybrids cars are expanding year on year with consumer purchase behaviour slowly growing but still only representing 2% of new car sales. The introduction of battery electric and plug-in hybrid cars has focused consumer information on promoting environmental benefits, notably 'zero emission' at tail-pipe. Vehicle electric range is essential for understanding the suitability of new powertrains for consumer journey needs, therefore typically presented. The advent of new electric powertrains generates different performance and operational data to conventional fossil fuel cars. Furthermore consumers need to be easily convinced of the suitability of an electric vehicle for their journey needs and budget.

Various automotive research identifies the internet as the dominant method for prospective car buyers undertaking their research and choosing a new car. Consumers are increasingly using their mobile phones to search and compare car models. Research carried out by LowCVP (2018) has revealed that manufacturer websites are the most popular with car buyers followed by various independent motoring websites such as Autotrader. The dealer continues to be an influential source of information, and one can assume that dealers' websites also provide a valuable service during the car buying process. An automotive consumer study by Deloitte (2018) found that manufacturer and dealer websites proved more significant in impacting a consumer's decision than salespeople at the dealership.

As most consumers still visit their dealer more than once (Deloitte 2018), a face-to-face conversation is still necessary for the majority of people before purchasing a car. It can however be assumed that websites will often be the first source of information when a consumer decides to enter the car buying process. The internet is in fact exploited along the whole car buying journey from finding information pertain to vehicle specification, performance, price to independent reviews.

The introduction of WLTP will generate more accurate and representative 'official' CO₂ emission and performance data for new cars, across different powertrains. It is imperative that automotive websites consider how this data will be presented to consumers, and encourage the purchase of the most efficient vehicle for their journey needs.

Given the prominent role of the internet in the car buying process, an evaluation of automotive websites has been carried out to examine the presentation of environmental, performance and running cost information for new and used cars. Recommendations for improving digital car buyer information are outlined with the aim of increasing consumer awareness of fuel efficient, lower carbon and ultra low emission cars.

1.2 Aims and objectives

The aim of this report is to evaluate the information available to consumers across a range of different websites that sell and promote cars relevant for helping to choose the most efficient and low emission cars. The overarching objectives of the study are:

- a) To evaluate the presentation, comparability, and ease of accessing information displayed on the internet for car buyers regarding:

CO₂ emissions, fuel economy (MPG), running costs (road tax (VED) company car tax, fuel/electricity cost), electricity consumption and electric range (BEV/PHEV) and air quality (Euro standard)
- b) To explore what information is available to consumers regarding the applicability, performance and functionality of electric, and plug-in hybrid cars.
- c) To evaluate how website sites compare cars and filter data to enable consumers to determine, 'low emission', low carbon cars and the most economic cars.
- d) To make recommendations on what measures could be taken to most improve the provision of web-based information regarding fuel efficient and clean cars.

1.3 Methodology

A total of twenty-seven websites were evaluated in this study. The websites were split into four different categories:

- **Independent websites:** What Car, Parkers, Next Green Car, Auto trader, Motoring UK, Carwow, Green Car Guide
- **Manufacturer websites:** Nissan, BMW, Toyota, Vauxhall, VW, Renault, Tesla, Ford, JLR
- **Dealer websites:** Carcraft, Arnold Clark, Buyacar.co.uk, Cargiant, Perrys, Motorparks
- **Consumer websites:** Which, Consumer Guide Automotive, Honest John, Autocar, Piston Heads.

Each website was reviewed, and a table made for the three different car powertrains; ICE, BEV and PHEV. For each of the three powertrains a brief explanatory text with general observations and recommendations were made for each of the evaluation criteria; presentation, comparability and filters, ease of accessing, and reliability of information. Once the table was completed the 'Red/Amber/Green' (RAG) rating system was used to standardise the ranking of the sources according to how effectively they conveyed information regarding the vehicle features being explored (appendix 1).

When examining information provision regarding 'EV functionalities' for BEV's PHEV's the following were taken into account: location of public charging infrastructure, different types of charger and charge time (standard, fast, rapid), factor influencing electric range, and journey patterns appropriate for electric vehicles.

Each of the four categories of website were then given a final written evaluation on; searching tools and options, CO₂ and air quality, vehicle performance (MPG, energy consumption, electric range), running costs, comparing cars (efficiency, cost, powertrain, environmental), information relating to electric vehicle operation and website innovations. Examples of best practice have been identified.

In addition, more general comparisons were made across all websites on referencing the source of information (NEDC, WLTP or independent study), comparison tools and calculators.

2 Evaluation summary findings

Overall there were broad inconsistencies in availability, presentation and ease of accessing new car performance, environmental and running cost information across different car buying websites. A summary of the data sets examined is shown below for each powertrain in Figures 1,2 and 3, with more detail following.

Figure 1: Presentation of data for ICE cars across all websites

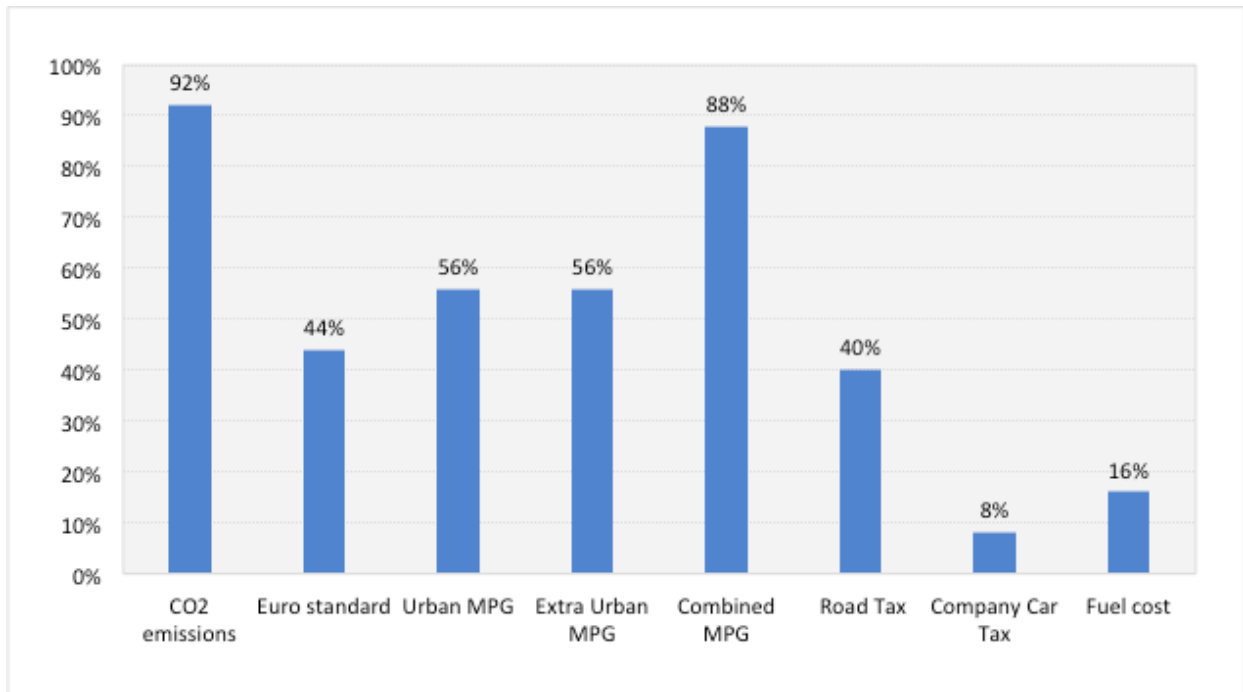


Figure 2: Presentation of data for BEV cars across all websites

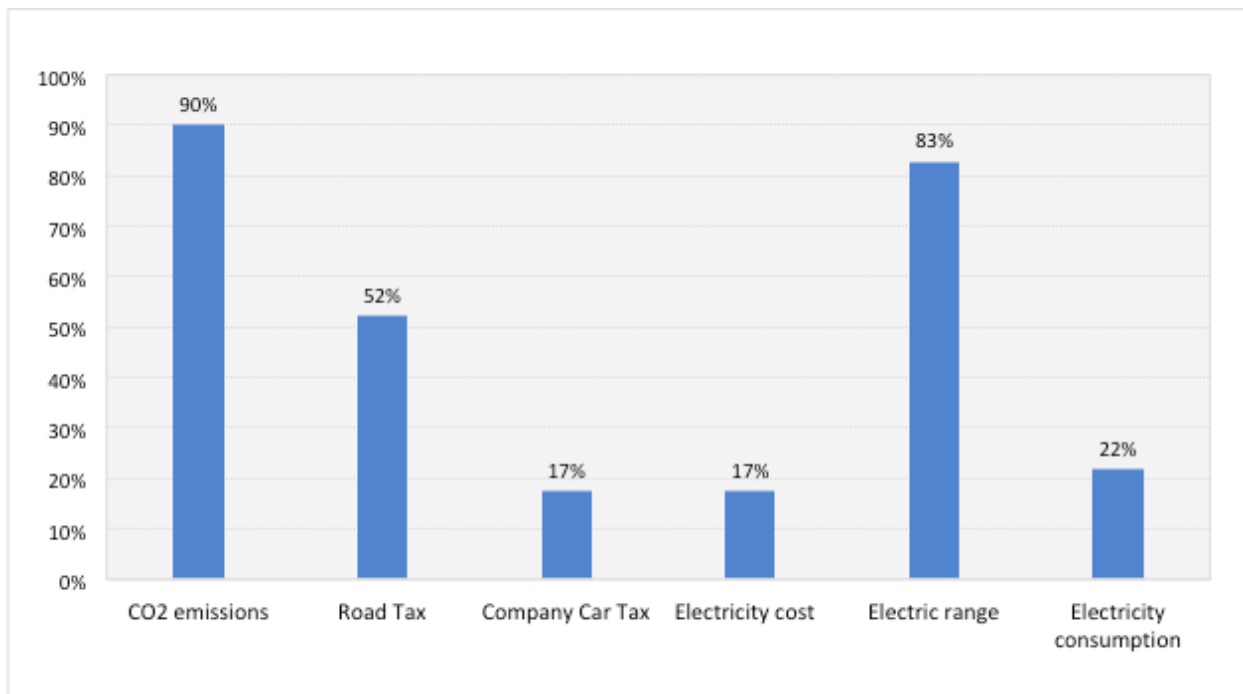
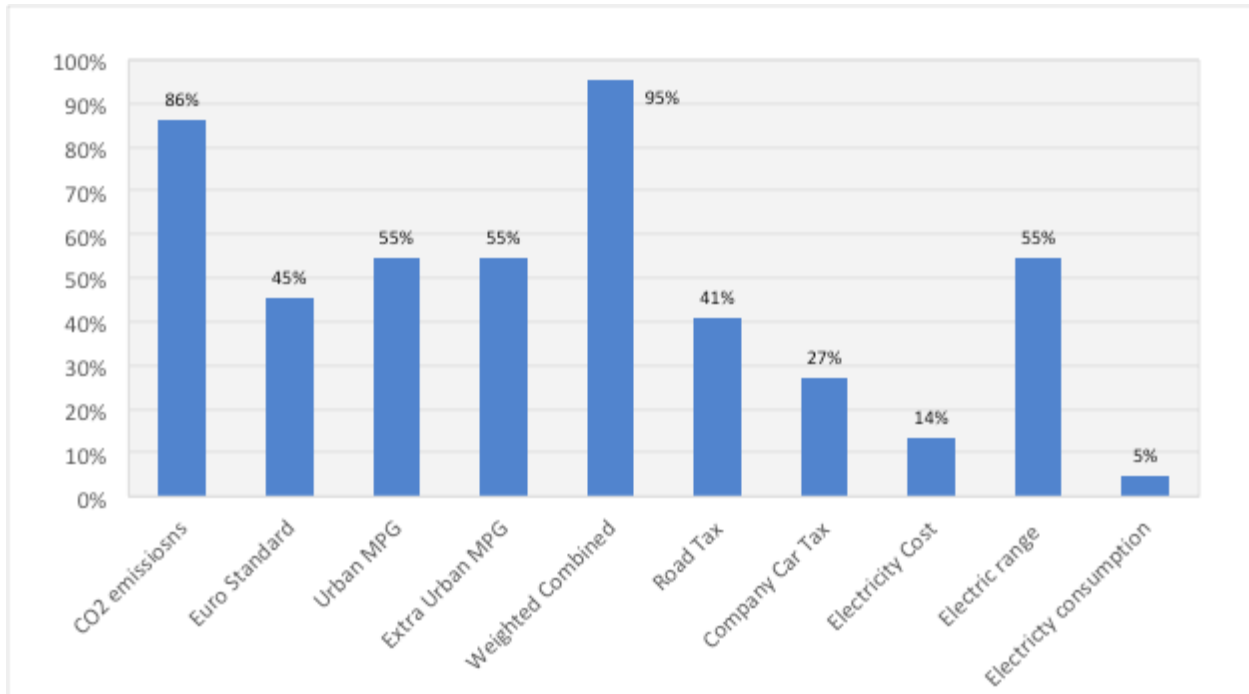


Figure 3: Presentation of data for PHEV cars across all websites



2.1 CO₂ emission and air pollution emissions

90% of websites evaluated presented the combined CO₂ emissions figure for ICE and PHEVs. Identifying the CO₂ emission figure for a new car model was found to be generally quicker, and easier, on independent and dealer websites than the majority of manufacture websites evaluated.

In the case of manufacturer websites the prominence of the CO₂ emissions figure for a car model was highly variable, only a few manufactures made the CO₂ emission figure visible on the main car model promotion pages. In the majority of cases a number of clicks were needed to locate CO₂ emission data, and the car configured in order to obtain, the full technical specifications. Download brochures and price lists were available on all manufacturers websites, which listed CO₂ emissions figures for all cars in the model range.

As can be seen in Figures 1 and 3 approximately 40% of the websites evaluated presented a car model's European Emission Standard. There were inconsistencies across all website regarding terminology for Euro 6 with only a few websites referring to Euro 6d Temp or Euro 6c. This makes it difficult for a consumer to identify which new diesel car models are full Euro 6d compliant, and therefore exempt from the first year surcharge on VED. Four websites presented specific air pollution emissions data (*the average consumer is unlikely to make any use of this data as there is no benchmarks to compare the figures against*). One dealer website, Buy A Car, was found to filter used car model based on their 'emissions rating' this was for Euro 5 and 6, this was not available on another website.

2.2 Fuel and energy consumption, electric range

Figures 1 and 3 show that fuel consumption was the most frequently presented as a combined MPG figure, with urban and extra urban MPG less commonly available. For PHEV a high proportion of websites made reference to the 'weighted' combined MPG, this was less common on dealer websites. In the case of manufacturer websites, the prominence and accessibility of fuel consumption figures was highly variable. For example two manufacturers, Toyota and Nissan, prominently presented MPG, with CO₂ emission figures, on individual car model promotional pages. Whereas, for the majority of other manufacturer websites evaluated finding the MPG figure took a number of clicks and often required a car to be built/configured. For all manufacturers websites, a download model range brochure and price list presented MPG figures for all car models.

Electric range was the most common vehicle performance parameter across all websites for BEVs, as can be seen in Figure 2. This was not the case for PHEV, with only 55% of websites evaluated showing electric range; see Figure 3. Electric range was prominently displayed on half of the manufacturer websites reviewed, for the other half it took a number of clicks to find this data. 22% of websites presented electricity consumption for BEV, but only 5% presented a figure for PHEV. Rarely were the weighted combined MPG and combined electricity consumption presented together for PHEVs; Next Green Car and BMW provided the most comprehensive data on PHEV.

A high proportion of independent, dealer and consumer websites did not present the same level of technical specification information for electric cars as they do for ICE. There was general inconsistency in vehicle performance data presented for PHEV and BEV across all websites. Most independent and dealer websites had not adapted their filters and technical specification lists for battery electric and plug-in hybrid cars. It was common to find technical specification tables for BEV with blank fuel economy sections or the word N/A, demonstrating untailored information available for electric vehicle buyers. Surprising electric range for BEVs and PHEVs was rarely presented in technical specifications. Electric range has very limited mention on websites promoting second hand BEV and PHEV. Two of the best independent websites presenting detailed BEV and PHEV data were Next Green Car and Green Car Guide.

Vehicle specification lists on manufacturer websites often lacked information related to the performance of PHEV and BEV, notably electric range and electricity consumption. This information was commonly found in a download brochure from manufacturer websites. Only three manufacturers made electric range prominent and easily accessible on car model promotional pages.

With the exception of manufacturer websites, most websites did not identify the source of CO₂, MPG and electric range information displayed for each car. The most commonly referenced sources are the VCA database or the NEDC test procedure. A few manufacturer websites presented WLTP MPG and electric range figures, however, this was not clearly labelled. In some cases MPG and electric range was obtained from real-world driving, This multitude of different data sources is likely to make comparing vehicle performance potentially misleading and confusing.

2.3 Running costs

Fuel and electricity cost was sparsely presented on car buying websites. As can be seen in Figures 1,2 and 3 only 15% of the websites evaluated provided diesel/petrol cost figures, and only 5% electricity cost figures for BEVs. The websites that did provide running costs figures were found to be inconsistent both with regard to metrics and detail. Autotrader for example used pence per mile to describe BEV electricity costs but then for PHEVs mentions an ambiguous 'low running costs'. Parker's presents annual fuel cost for car model, in the review section, with the price of different fuels clearly identified. Next Green Car and Green Car Guide provided the most detailed breakdown of running costs, presenting a weekly, monthly and annual fuel cost for the users. Green Car Guide enabled consumers to see the total cost of ownership of different car models. Next Green Car allows consumers to specify their mileage to generate a personalised 'cost of fuel' calculated, revealing the lower running costs of electric vehicles compared to an ICEs.

Generally manufacturer and dealer websites were found to remain silent on fuel cost for ICE and PHEVs. Whilst manufacturers emphasised running cost savings for BEVs, actual figures were not presented. The exception was Renault who identified a pence mile cost for the Zoe. Price lists on manufacturer websites typically did not present monthly or yearly running cost information such as estimated electricity or fuel cost and VED. Three exceptions were BMW, Ford and Tesla. These companies provided a total cost of ownership tool, allowing consumers to understand a broader range of financial information, and compare across different models.

As can be seen from Figure 1, 2 and 3 approximately 45% of the websites evaluated presented first year VED across all powertrains. This was most prevalent on independent car buying websites than any other group. Half of the manufacturer websites evaluated presented VED figures for a car model alongside CO₂ emissions; however this information was sometimes buried in the download price list rather than shown prominently on car model pages. A third of the dealer websites identified first year VED. The reduced cost of taxation for BEV and PHEV was generally poorly communicated. However, two consumer websites and independent 'green car websites' Next Green Car and Green Car Guide clearly made this apparent. One of the more informative dealers websites was Perry's who had a coloured scale (A-M) for CO₂ emissions (similar to the new/used car label) for each car model clearly showing the tax band colour of the car advertised.

Company car tax was less prevalent on the car buying websites evaluated, with as little as 12% providing this data for a car model. Company car tax was more commonly seen on manufacturer websites. In the case of battery electric vehicles, company car tax over three years was more frequently presented than VED.

Just over 50% out of the website evaluated provide information on the economic merits of electric cars. Dealer websites were found to have the least financial and practical information about electric vehicles. For BEV, the plug-in car grant, lower fuel cost and road tax were the recurring financial benefits mentioned across other websites. Wider financial incentives such the OLEV grant for a home charger, lower maintenance, and local parking charges and free entry to London Congestion Charge Zones were highlighted on a small percentage of websites. Good examples include VW, Nissan, Next Green Car and Green Car Guide. For PHEV the financial advantage of operating more miles in 'electric' mode was not mentioned. For BEV, assumptions behind the electricity cost took some time to find across the majority of websites reviewed. Few websites presented different electricity cost figures for charging electric cars

based on charger type eg over-night at home, fast on-street, rapid service station. Next Green Car and Renault were the exceptions as they allowed consumers to see their journey electricity cost based on different charging regimes. BMW website presents 'ConnectedDrive' a digital service that helps you save money when charging; based on your tariff it will advise you on the cheapest times and locations for charging.

2.4 Comparing cars and identifying the most fuel efficient

The majority of manufacturer websites allow consumers to compare up to three of their brand models with easy to read technical specification tables. Toyota uniquely gives users the option to search cars by CO₂ emissions, combined MPG and model type, explicitly labelling hybrid models in bold. No other manufacturer website evaluated allowed consumers to search for a car model using these parameters. It was apparent that manufacturer websites had no obvious means of identifying to the consumer which cars in the modal range have the lowest CO₂ emissions or the best MPG. The dealer websites reviewed did not offer any kind of car model comparison feature. Three independent websites enabled consumers to compare up to three different makes and models side-by-side.

CO₂, MPG, fuel type and first year VED, were the most common parameters in search tools and filters across independent, consumer and dealer websites. 25% of websites had filters including CO₂ emissions and road tax, allowing an individual to identify the models with lowest CO₂ emissions and road tax. 30% of websites filtered cars models based on their MPG and 20% of their fuel type. This was most prevalent on independent and dealer websites. Only two websites enabled consumers to determine the lowest CO₂ emissions and best MPG car models across the model range. Parkers for example presented the highest and lowest CO₂ and road tax for each car model to demonstrate the variance across the model range. Interesting 'fuel type' had varying categorisation across dealer, consumer and independent websites. In some instances plug-in hybrid and hybrid were grouped together, and in other cases, electric with plug-in hybrid. Autotrader provided the most comprehensive list of powertrains and fuels covering nine options. One potential area of confusion could be between hybrid and plug-in hybrid, separating these powertrains is therefore beneficial.

It was not possible to compare BEV and PHEV models using electric range or energy consumption on any motoring websites. Obviously BEV were omitted from all comparison tools when searching by MPG; this fails to bring the fuel efficiency benefit of BEVs to a car buyer's attention. Introducing a common metric across car buying websites to facilitate comparison electric vehicles with ICE would be advantageous; this could be included as a filter option. Only two websites offered a tool compare ICE with BEV/PHEV based on total cost of ownership.

The majority of websites allowed users to select a category of car to browse, such as SUV, city, executive, and so on. BEVs and PHEVs are often placed in the same category, and frequently identified as a separate category of car. For consumers who are specifically looking for battery electric or plug-in hybrid car grouping them into one 'electric' category it makes finding information quicker on a website. For instance What Car? separates cars into search categories, such as SUV, city, family etc plus 'electric' for BEV and PHEVs. One of the downsides of isolating electric car models from the incumbent ICE is that a consumer fails to consider this powertrain when searching for a car by vehicle segment. This additionally negates to integrate electric car models into the conventional car buying journey, and risks perpetuating perceptions that these vehicles are different. Only Next Green Car allows consumers to search new and used car models by vehicle category and powertrain/fuel type. The website presents

CO₂, emissions running cost plus MPG, miles/kwh and electric range distinctly for different car model. This makes it very easy for consumer to understand and compare, the technical spec and environmental performance of different car makes and models.

10 of the 27 websites looked at provided “top 10” or “top 5” lists for a range of categories including; “lowest CO₂ cars”, “best EVs”, “Lowest Tax”, “London charge-exempt cars”, “most economic” and “best MPG city cars”. These lists help consumers compare different makes and models in line with their personal preferences. They also serve as a useful resource making it quick and easy for a consumer to digest the enormous amount of information that are found on car buying websites.

2.5 Information relating to electric vehicle operation

Overall there were differing levels of information on electric vehicle operation across the websites evaluated. Manufacturer websites, followed by a selection of independent websites were the most informative when it came to electric vehicle operation and infrastructure. Renault, VW, Tesla and Nissan provided the most accessible information on different methods of charging and duration, with explanations of factors that impact electric range. Tesla and JLR websites have innovative interactive features to demonstrate how different conditions (temp/air con), driving profiles and different size alloy wheel impact electric range. Independent websites with the most detailed information about different methods of electric vehicle charging were Autotrader and What Car.

Under half of the websites evaluated provided information on location public electric vehicle charging infrastructure. Independent and consumer websites were more likely to provide a public charge point map and basic information on types and charge duration for different electric car models. Zapmap was often embedded in websites to locate and distinguish between charge points across the UK. Very few websites explained the types of journeys that favour EV driving, or allowed consumer to personalise their journey profile against different powertrains or fuels. Several independent and consumer websites had useful electric car guides such as Next Green Car, Green Car Guide and Honest John. Green Car Guide has a useful short video explaining different powertrains, including EVs, and journeys that suit them. Only one dealer website, Arnold Clarke promoted a ‘where can I charge’ website for electric car drivers.

2.6 Identification of the source of CO₂, MPG and electric range

Most websites were not transparent with identifying the source of CO₂ emission, MPG and electric range information displayed for each car. The most commonly referenced sources are the VCA or NEDC test procedure. A few websites provided independent / ‘real world’ figures for MPG and electric range, in some cases the assumptions behind this data was not clearly explained.

2.7 Ease of accessing vehicle information

Car buying websites were assessed for their ease of accessing information by counting the number of clicks it takes to reach each vehicle feature for ICE. Overall the vehicle feature that required the least number of clicks, and therefore the easiest to find, was the combined MPG. With regards to running costs first year road tax was the quickest figure to source. When looking at the different website categories it was observed that the independent car buying websites were the simplest and quickest to navigate with regards to sourcing environmental, vehicle performance and running cost information. Generally technical specifications for ICE were more accessible and prominent, than BEV and PHEV across the majority of websites.

3 Recommendations for Improving Car Buying Websites

3.1 All Powertrains and Fuels

a) The technical specification of a car model should be tailored to align with its particular powertrain. Currently specification lists are focused on presenting MPG figures for internal combustion engine vehicles, this includes electric cars which is inappropriate. Specification lists and tables should present consistent technical and environmental data for different powertrains. The minimum specification data that should be presented for conventional and electric vehicle powertrain are proposed below.

- Diesel, petrol, hybrid – MPG, CO₂ emissions
- PHEV – Weighted MPG, CO₂ emissions, energy consumption, electric range
- BEV – CO₂ emissions, energy consumption, electric range

The technical specification should be easily accessible for all car models. It should take no more than three clicks to find a car model's technical specification from entering the initial promotional page.

b) There should be transparency in identifying the source of MPG, CO₂ emissions, electricity consumption and electric range figures on car buying websites. Considering the recent introduction of WLTP, it should be clear whether the figures presented has been derived by the NEDC or WLTP testing procedure, or has been derived from independent vehicle emissions testing. This will avoid confusion for the consumer when comparing different car models especially over the next 18 months when there will be a mixture of NEDC and WLTP data in the public domain.

c) Car buying websites should make consumers aware of the most fuel efficient car model in a vehicle segment and model range. This could be achieved by top ten lists eg the most efficient city or family car, or lowest running cost. Another option is to have an icon such as a star to identify the car model in the range which is the most efficient. A filter could also be made available for monthly or annual fuel costs, however, this would require new information to be generated by the majority of websites.

d) The most informative and 'easy to use' websites include a 'key facts' or 'at a glance' box on each car's page, helping the consumer gain a quick insight into the car's specification.

e) Car websites that sort and compare cars on CO₂ emissions should be mindful for the diesel surcharge on first year VED for models that are not full RDE compliant. This losses the value of aligning CO₂ and taxation to identify the lowest emitting diesel car in particular. It would be useful for a consumer to be able to search for new diesel cars, and identify which achieve full RDE compliance (ie which are Euro 6d temp and Euro 6d).

f) Consistency in presenting the European Emission Standard of Euro 6 cars is advocated. The correct terminology is Euro 6d temp, with Euro 6d full coming in next year.

- g) To aid comparing different powertrains with a vehicle segment, and demonstrating running cost benefits, we recommend creating fuel cost calculators where a consumer can choose their journey pattern (city, town, rural, motorway) and enter their own mileage. The outputs being fuel cost/mile and per month. MPG and electricity consumption figure should be based on WLTP cycles. This information should accompany the purchase price or lease cost figures to give a consumer a more holistic understanding of ownership costs.
- h) Consistency in presenting running cost information and where possible showing broader total cost of ownership figure. As a minimum consumers should be presented with
- Technical specifications of a car model (MPG, CO₂, electric range, electricity consumption)
 - Fuel / electricity cost per month
 - First year VED
 - Purchase or leasing price

This list of information will provide a more detailed understanding of total cost of ownership, provide more informative comparisons and help demonstrate the benefits of the most fuel-efficient ICE and electric cars. Clarity on fuel and electricity prices, with assumptions presented, for electric vehicles it should be made clear about where and when the vehicle is charged eg home charging daytime or public fast charger.

- i) More use could be made out of icons for vehicles which are CAZ and ULEZ compliant, this is especially relevant for used cars. Filters could also be adapted to include these parameter to enable consumers to search for compliant models.

3.2 Battery Electric and Plug-in Hybrid

- a) Electric vehicles, BEVs and PHEVs, should provide the correct technical specification for that powertrain i.e. some websites do not accommodate electric vehicle features and simply use the same technical specification for all vehicles. It is confusing and unnecessary to include an MPG or CO₂ emissions section figure for BEVs when these features do not apply to the powertrain.
- b) Searching options and filters should cover all powertrains, and enable comparison between different powertrain. BEVs and PHEVs should be given a distinct search option, rather than grouping them into a single 'Electric vehicle' category. Consideration should be given to search options including a query for electric range and electricity consumption to enable consumer to identify the most energy efficient electric vehicles or those with the longest range.
- c) Car buying website should provide consumers with a link to a recognised public charger map (eg Zapmap), this should be clearly visible and accessible on the promotional page for the car model or at another visible location on a website, perhaps a section dedicated to electric vehicles.
- d) The benefits of electric vehicles should be highlighted on car model promotional pages, these include lower first year road tax, lower maintenance, lower fuel cost, plug-in car grant for BEV, in some cities reducing parking charge, exemption to London Congestion Charge and exemption to Clean Air

Zones/ULEZ which include cars. Dealer websites would in particular merit from highlighting local financial benefits for electric vehicles.

The benefits of charging at night should be recommended, and availability of EV tariffs from energy supplies. We advocate clarity when presenting electricity cost for BEV and PHEV. This should caveat the type or location of charging eg price based on home charging over-night or public rapid charger.

- e) Used vehicles should provide the same information as the equivalent new vehicle, in priority this should be electric range, and can the vehicle rapid charge.

3.3 Presenting WLTP and NEDC data from Jan 2019

- a) It should be made clear to consumers which ‘official’ test procedure the figures presented for CO₂, fuel and electricity consumption, and electric range are based upon. This will avoid confusion and misinterpretation when comparing different car models. This is particular important for both used and new cars. The Government’s transitional timetable for WLTP introduction should be acknowledged - all ‘new’ registered cars start to show WLTP fuel economy, electricity consumption and electric range from Jan 2019. NEDC CO₂ figures will continue to be presented until 5th April then switch to WLTP CO₂ figures.
- b) WLTP and NEDC data should avoid being presented side-by-side. A person could mistakenly think a car tested under WLTP was less efficient, and so more expensive to run than a similar car tested under NEDC.
- c) It should be made clear that the NEDC CO₂ emission value is used for taxation. Consumers should be informed of any changes in taxation (VED/BIK), as a result of the switch to the WLTP CO₂ figure, well in advance of 6th April 2020.
- d) Care must be taken with comparing WLTP MPG, and eventually WLTP CO₂ emissions, due to the impact of optional equipment. This is especially important for website which may compare NEDC and WLTP new and used cars. Like for like comparison should be made. In the case of cars with WLTP data, unless a consumer is permitted to configure a car model choosing their own optional equipment, we recommend comparison tools are based on the base vehicle, without optional equipment. This should be made clear.
- e) Comparison tools and filters, plus tax and fuel calculators, should appropriately use NEDC and WLTP fuel consumption and CO₂ emission figures; taking into consideration both new and used cars. Motoring websites that list cars in categories such as ‘best MPG’, ‘most economical’, ‘lowest CO₂’, ‘best city cars’, should ensure that data used as the basis of these ratings is not a combination of NEDC and WLTP data. Like-for-like comparisons should be adopted. Consideration should be given to regulatory switch dates for taxation and consumer information.
- f) Consumers should be made aware of the impact of optional equipment fitted by the manufacturer on CO₂ and fuel consumption figures, as well as electric range. Presenting a range of values for a particular car model could assist with communicating this in consumer information; if this data is available. This could, for example, show a car model’s base CO₂ emissions (lowest value) and then

with all optional equipment fitted (high value).

- g) Consumers should be presented with fuel consumption and electric energy consumption figures for plug-in hybrid cars, in conjunction with electric range figures. This will help the consumer understand how plug-in hybrids perform under different journey patterns, and enable comparison with other technologies.
- h) The impact of optional equipment and accessories on MPG and CO₂ emissions should be made apparent on car buying websites. It is recommended that car buyer websites present data for the standard car model in a model range, then where configurator are available allow consumers to built their car, and then see the resulting CO₂ emissions.
- i) Recommend the adoption of consumer friendly terminology to match WLTP cycle to journey patterns (see LowCVP WLTP Automotive Industry Guide, 2018) Low – City Journey, Medium – Town Journey, High – Rural/dual carriage Journey, Extra High – Motorway Journey.

Appendix 1 Detailed Evaluation Results

1 Independent Car Buying Websites

What Car, Parkers, Next Green Car, AutoTrader UK, Motoring UK, CarWow, Green Car Guide

Independent automotive websites vary in the breadth and depth of information they provide on each car. The comparison tools available on each website are effective and informative, mainly focused on CO₂ emissions and fuel economy, electric range is less common. Across most sites the technical specifications for BEV and PHEV are the same as ICE which limits consumer understanding on how these vehicles suit their journey needs or performance requirements. Key data omitted includes electric range and energy consumption.

CO₂ and air quality information

50% of websites provided the Euro standard for both ICEs and PHEVs. On average it takes 3.3 clicks to find the Euro standard of an ICE car, which is the more than any other car feature.

All websites presented CO₂ figures for all types of car. 50% of websites compared different ICE models CO₂, but only 17% compared the emissions across both models and makes (*figure 6*). It takes an average of 3.2 clicks to find the CO₂ emissions figure for ICE cars. CO₂ is commonly found as a key figure accompanying each car's main page, or as a figure on comparison pages. What Car has easily compared CO₂ figures across car models. Parkers provides the majority of technical information for each car under 'spec'. NGC breaks down each vehicle's emissions, separating total CO₂ and NOX+PMs into tailpipe, upstream (fuel production) and production emissions. NGC also has an independent rating system that ranks each car. The scoring is from 0-100, with 0 being the greenest possible car, and 100 being the most polluting and accompanies the photo of each car. This 'environmental' rating is not featured on any other car buying website.

MPG, energy consumption, electric range

It takes an average of 2.5 clicks to find the combined MPG figure for ICE vehicles across independent sites. All sites present vehicles combined MPG and electric range (depending on the powertrain). Urban and extra urban MPG figures are much less common across websites with only 50% providing figures for ICE and 33% for PHEV.

As with CO₂, MPG is also a common figure to find in bold, accompanying each car's photo and/or multiple times throughout the websites. What Car's True MPG calculator is an easy-to-use and personalized comparison to the official MPG figures for each car. The types of roads (urban to motorway), levels of congestion (low to high), and driving style (eco to quickly) can be altered along a scale, in addition to entering the weekly, monthly or annual mileage of the consumer to calculate the true MPG of the car. For the selected car and driving style the true MPG, Govt. claimed MPG, CO₂ and fuel cost per week and mile are displayed. This is an effective way of personalizing a search to find the perfect car.

83% of independent websites present electric range for PHEV, with 100% for BEV. This is typically sourced easily. Electricity consumption figures are rarely presented, the exception being Next Green Car. NGC offers the best presentation, and accessibility of car model technical specifications.

Running cost information

It takes 3.0 clicks to find the VED for ICE vehicles across independent sites, which is more than any other car buying website category. First year road tax is presented on 80% of independent websites. NGC is the only site that provides company car tax. 40% of websites present fuel cost (per month or per mile), well presented examples include What Car's True MPG and NGC fuel cost calculators. Electricity consumption and cost are less commonly provided for BEV and PHEV, only 15% of websites makes this information available. VED is often provided but mostly as a single figure, not separated into years. NGC make it easy to view and compare tax costs over multiple years. Under full spec Parkers provides VED, and monthly company car tax for a basic and higher rate. Motoring UK provides the road tax standard rate and first year rate.

Comparing cars (efficiency, cost, powertrain, environmental)

Fuel type and technology, MPG/electric range and CO₂ emissions are most frequently compared across makes and models. Little comparison was made between different cars overall environmental impact. The comparison tools for most of the sites are easy to use and find. NGC has the easiest and most informative comparison tools and calculators for road tax, company tax, fuel cost, MPG and emissions. Motoring UK's comparison tool allows users to, in depth, compare different cars, however this is the only way to view a cars technical specification.

The Green Car Guide has an informative comparison tool, allowing up to three cars to be compared by their combined MPG, CO₂, running cost and VED.

Searching tools and options

Search options include new and used cars by manufacturer, car category (SUV, City, Estate etc) and deals, as well as top 10's and true MPG calculator comparisons. It is often difficult to choose BEVs or PHEVs when browsing car makes, which is the case for What Car. Some sites (Parkers for example) have a single search option for 'electric/hybrid' vehicles. NGC, unlike other websites, separates all fuel and technology types into separate search options. Autotrader allows users to search cars by fuel consumption, CO₂ emissions, annual tax and keywords.

Information relating to electric vehicle operation

Websites often lack information regarding electric vehicles as the features and technical specifications do not change for different powertrains and therefore no information that is specific to EVs can be provided. As part of What Car's True MPG calculator tool there is also an EV charging point locator, which is very user friendly and distinguishes each charge point by its charging speed. Often the technical specifications across cars on the same site are inconsistent. Some BEVs and PHEVs may present electric range and cost, but others may not.

Parkers provide a comprehensive guide to charging an electric car and breaks down different charging methods, such as super and rapid charges. NGC devotes whole pages to charge point maps (Zap Map), EV connector types, charging at home, work or on the network and OLEV grants. Autotrader includes little bits of information on EV's but they are often embedded in written reviews and so are difficult to find. Carwow provides information on the kW, percentage of charge and time it takes when using type 1, 2, 3 and 4 charging points. NGC and Green Car Guide provide the most extensive information on different types of electric chargers, duration of charging and location of national charge points. NGC hosts Zapmap which provides a wealth of information on electric car charging.

2 Manufacturer Websites

Nissan, BMW, Toyota, Vauxhall, VW, Renault, Tesla, Ford, Jaguar Land Rover

Most manufacturer websites are easily navigated however the ease of accessing CO₂, MPG and electric range data is highly variable. Manufacturers with electric vehicle models make it easy to find such cars, as they are commonly grouped as a separate category. Manufacturer websites often provide links or options to request a brochure for each of their cars, in which technical information is given in full detail. It can be difficult to find running cost information, often requiring a lot of clicks to reach the page with the information.

CO₂ and air quality information

Manufacturing websites, in comparison to other car buyer sites, do not make it easy to find CO₂ emissions and air quality information.

40% of websites provide the Euro standard for ICEs and PHEVs, but only 20% compare the Euro standard across models. For manufacturing websites, it takes on average 4.3 clicks to find the Euro standard of an ICE car, which is the highest recorded for any vehicle feature.

All sites provide both ICE and PHEV CO₂ emissions with most presenting the figure in bold on the main page of each car, as well as being found numerous times across the website. Nearly 80% of sites compared either models or models and makes CO₂ for ICEs. Many manufacturer websites also provide a breakdown of all car pollutants. CO₂ emissions can often be searched using the filter bars on the sites.

MPG, energy consumption, electric range

It takes 2.9 clicks to find the combined MPG across manufacturing sites, the highest number compared to other categories of website. MPG and electric range are the main figures presented alongside each vehicle across manufacturer websites. Combined MPG is the most commonly referenced, with the figure found in bold and at the top of each car's main page, or within the technical specification. With ICE and PHEV vehicles, the presence of more detailed fuel efficiency figures such as urban and extra urban MPG are not as common as combined MPG, but if one is present then so will the other. Urban and extra urban MPG figures are relatively well represented across manufacturer websites compared to other categories of website. Surprisingly electric range figures for BEV and PHEV take longer than anticipated to find on manufacturers websites, taking more than three clicks. Exceptions are Nissan and Toyota. For PHEV and BEV electricity consumption values are rarely presented, a few manufacturers do, however, present them in their download brochure.

Running cost information

Few websites show running cost information on VED, company car tax or fuel cost. Company car tax is more commonly presented by VED. A few manufactures highlight lowest fuel costs for BEV, but do not provide electricity running cost figures. BMW provide information but only on request when using their 'igenius' chat tool. Volkswagen is the only manufacturer website that presents and compares VED across different models. BMW, Ford and Tesla have informative total cost of ownership tools which include fuel and road tax.

Comparing cars (efficiency, cost, powertrain, environmental)

Unlike most independent automotive websites, there are fewer manufacturer sites that have comparison tools. When comparison is possible it is usually restricted to models. The BMW comparison tool/site is user friendly, and compares all the relevant emissions and fuel economy information across all BMW models and other makes. Nissan allows users to compare cars with different sized batteries. Toyota has a very friendly and easy to use comparison tool which compares up to three Toyota models efficiency (urban, extra and combined), emissions (including CO and NOx), hybrid vehicle battery type and capacity, and Euro standard. Volkswagen is the only manufacturer website that presents and compares VED across models. BMW, Tesla and Ford offer more detailed cost comparator tools.

Searching tools and options

Nissan and Volkswagen have a separate electric car search link in its main drop-down menu. Nissan has a 'Zero emissions while driving' label that accompanies BEVs, making it easy to search for and distinguish from ICEs. For those manufacturers that have electric vehicles, BEV and PHEV are often easily searched for in the drop-down menus. Toyota gives users the option to search cars by CO₂ emissions, fuel consumption (combined MPG) and model type, among other filters, explicitly labelling electric or hybrid vehicles in bold.

Information relating to electric vehicle operation

Most sites provide a link to Zap Map and outline the different ways to charge an electric vehicle, highlighting the speed at which each charge point will charge the electric vehicles battery. Nissan's EV ANALYTICS displays energy consumption and regeneration, state of charge, remaining energy, capacity levels and distance-to-empty in an easy to read format. Nissan also gives advise on how to make the most of each charge, such as minimizing rapid acceleration, as well as energy storage solutions, EV subsidies, and charging infrastructure. Toyota provides Information on home, work and destination charge points. BMW 'ConnectedDrive' is a digital service that helps you save when charging; based on your tariff it will advise you on the cheapest times and locations for charging. Renault have a charging time calculator that allows you to work out how long the battery will last using the different types of charges, recommendation for home charging installation, and break-down of connector type and the speed at which the battery will charge for each. JLR clearly distinguish their hybrid vehicles electric range from fuel economy. JLR also provides 'PHEV features' which outline charging durations and methods, and money saving tactics.

Volkswagen provides a link to Pod Point for e-up charge point installations and has extensive information on different method of EV charging. Tesla's website enables consumers to understand the impact of various parameter on electric range and provides information on the super charger network.

3 Dealer Websites

Carcraft, Arnold Clark, Buyacar.co.uk, Cargiant, Perrys, Motorparks

Dealer websites generally place CO₂ emissions and fuel efficiency information under the technical specifications for each car variant, this is quick to find. Technical specifications related to BEV and PHEV fail to present electric range or electricity consumption, the data fields are the same as ICE.

CO₂ and air quality information:

80% of dealer websites present the Euro standard and CO₂ emissions figures for ICE and PHEV vehicles, which is a much more than other website categories. It takes 3.3 clicks on average across dealer sites to find cars Euro standard and 3.2 clicks to find CO₂ emissions. Several websites, including Motorparks and Car Giant, provide HC, HC+NO_x, NO_x emissions data for each car, found under technical specification.

MPG, energy consumption, electric range

It takes 2.4 clicks to find the combined MPG across dealer sites, with some websites also present urban and extra urban MPG. 80% of websites present combined MPG, this is easily to locate. There is a lack of technical data related to BEV and PHEV, in particular no account of electric range. Electric range is only presented on 40% of dealers websites for BEV, and completely missing for PHEV. Electricity consumption figures are not presented.

Running cost information

It requires 2.3 clicks to find VED across dealer sites, with this figure presented for all powertrains on 60% of websites. Car Giant presents each cars' tax band as well as the exact payment. 'Running cost' is a feature of a car that can be compared on Car Giants comparison tool, however this is simply split in 'low' or 'high'. Fuel cost figures are generally scores on dealer websites.

Comparing cars (efficiency, running cost, powertrain, environmental)

Dealer websites are the least useful for comparing cars based on fuel efficiency, running cost and environmental information. The key parameter used for comparing cars is CO₂ emissions. Out of the three powertrains, ICE vehicle features were the most comparable. Car Giant's comparison tool allows up to five cars to be compared, which is the more than any other website.

Searching tools and options

Generally it was difficult to search for BEV or PHEV cars on dealer websites only a few have filters based on fuel/technology. Buyacar has symbols to help users recognize different vehicle fuel and technology types. CO₂ and road tax were the most commonly search criteria on dealer websites. Uniquely Arnold Clarke enables car buyers to filter by Euro Standard (Euro 5 and above).

Information relating to electric vehicle operation

Overall there is very little information on EV charging and operation across dealer websites. Dealer websites prioritise information related to vehicles with combustion engines. Arnold Clarke offers the most extensive information and presents a map of public chargers, no other dealer website has this feature.

4 Consumer Websites

Which, Consumer Guide Automotive, Honest John, Autocar, Piston Heads

The consumer websites evaluated were much more specific in the information they provide for car models, however this was limited regarding environmental, running and vehicle fuel/energy performance. Often technical specifications do not include detailed information, just the minimum amount of information.

CO₂ and air quality information

Consumer websites require the least number of clicks to find CO₂ emissions at just 2.2, however this provided more difficult to find for PHEV. None of the consumer websites analysed provided the Euro standard for ICE and PHEV car.

MPG, energy consumption, electric range

On average it takes 2.2 clicks to find the combined MPG figure across consumer sites, the least number of clicks compared to other sites. Most consumer websites provided combined MPG for ICEs and PHEVs, but very few include urban and extra urban mpg figures. Consumer Guide Automotive used a confusing 'MPGe' to describe electric range and EPA city/EPA hwy for ICE and PHEV fuel efficiency figures. Honest John's fuel cost calculator provided an official and real MPG figure to compare.

Electric range was the most commonly found vehicle feature across consumer websites for BEVs, but only 60% of consumer websites provide the electric range for PHEVs. Electricity consumption was not presented on consumer websites for PHEV or BEV.

Running cost information

Running cost information is very much focused on first year road tax. 50% the consumer websites provide VED for ICE and BEVs, with only 33% provided VED for PHEVs. It took on average 2 clicks to reach the VED on consumer sites.

Generally, fuel cost figures for ICE and PHEV have limited presence on consumer websites, electricity cost is more commonly shown on 33% of websites. Honest John's fuel cost calculator was quite unique and allowed comparison of two cars based on annual VED, fuel cost per 10 000 miles and identifies the cheapest vehicle by fuel cost, London congestion charge and by 'real world' MPG.

Comparing cars (efficiency, cost, powertrain, environmental)

Consumer websites provided limited options for comparing costs based on CO₂, MPG or running cost. Honest John's fuel cost calculator was the only real comparison tool available. In comparison Consumer Guide Automotive, PistonHeads and Autocar offer no form of comparison between different vehicles and their features.

Searching tools and options

When trying to access information on WHICH website, the user has to either be a member already or sign up to the site to gain further access. Consumer Guide Automotive gives a range of car categories to choose from including 'Hybrid' and 'Electric/Green Car'. Other sites, such as Piston Heads have limited search bar filters and make it difficult to separate BEV and PHEV searches.

Information relating to electric vehicle operation

/consumer websites were found to provide limited EV related information. Honest John's website however provided comprehensive advice on buying an electric car with articles and lists on the typical cost to buy and lease EVs, 'How long will the battery last?' and 'What is the range of an electric car?.'

5 Further analysis

Identification of the source of CO₂, MPG and electric range

Most websites were not transparent with identifying the source of CO₂, MPG and electric range information displayed for each car. The most commonly referenced sources are the VCA or NEDC test procedure. A lot of websites figures for CO₂, MPG or electric range matched that of the VCA's. A few websites provided independent / 'real world' figures for MPG and electric range, in some cases the assumptions behind this data was not clearly explained.

Ease of access and speed of finding vehicle information

Car buying websites were assessed for their ease of accessing information by counting the number of clicks it takes to reach each vehicle feature for ICE. Overall, across all websites the vehicle feature that requires the least number of clicks, and therefore the easiest to find, is the combined MPG at 2.5 clicks. When looking at the different website categories more closely it was observed that the independent car buying websites make it easiest to find ICE features, with an average of 2.1 clicks to find all five features, compared to 3.4 for manufacturer websites. Individual websites such as Nissan, Ford and NGC stand out as websites with the most accessible vehicle information, requiring 1 click to find CO₂, combined MPG and electric range. NGC is also the only website to require 2 clicks to find a car's euro standard and VED. Overall access to running cost figures took the longest time.