LowC^{VP} Car Buyer Survey:
Improved environmental information for consumers

Research conducted by Ecolane & Sustain on behalf of the Low Carbon Vehicle Partnership

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Dr Nick Banks (Sustain)

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LowC^{VP} Car Buyer Survey: Improved environmental information for consumers

Project commissioned by the Low Carbon Vehicle Partnership

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Appendices 1-5 are included in an accompanying document.

1. Executive summary

The Low Carbon Vehicle Partnership commissioned Ecolane and Sustain to undertake new research to assess the importance of environmental issues at point of purchase, to identify what information relating to the environmental performance of cars is most easily understood by car buyers, and to ascertain consumer preferences for how such information should be presented.[1]

Qualitative consumer data was collected through a series of structured discussions with car buyers who had either recently bought a new or nearly-new car (less than 2 years of age), or were planning to make a purchase in the next 12 months. Six focus groups involving 52 participants were hosted in London, Birmingham and Bristol during February and March 2010. In parallel, a quantitative web-based survey of around 1,000 car buyers was conducted over the same period.[2]

The headline finding of this report is the high importance that new UK car buyers attribute to fuel economy (in terms of 'miles-per-gallon' or 'mpg'); not only as one of the most important car purchase factors, but also as a way of conceptualising a car's environmental impact, and as the preferred element of information which appears on the UK Fuel Economy Label.

When asked what factors were most important when purchasing their current car, results from the survey show that **'fuel economy/running costs', 'size/practicality', and 'vehicle price' are the three factors consumers consider most important during the decision making process.** In the context of car purchasing decisions, fuel economy is primarily perceived by car buyers as a running cost rather than as an environmental proxy – 'cost effective' or 'cheap to run' are phrases often associated with 'fuel economy' and 'miles-per-gallon' or 'mpg'.

The evidence from the survey clearly shows that **factors relating most directly to environmental issues have little influence on purchasing decisions.** When questioned closely, very few consumers acknowledge that environmental performance had been a significant factor in their selection of car. Even in cases where environmental issues are seriously considered by car buyers, lower emissions are often seen as a 'bonus' once the primary objective of lower running costs has been secured.

Recommendation 1: It should be recognised that car drivers are more familiar with fuel economy than other metrics that relate to environmental performance. [However, the authors acknowledge that volumetric measures (such as 'mpg') do not necessarily reflect the carbon intensities of different fuels, or the carbon emissions performance of different vehicle types (e.g. petrol, diesel).]

The survey reveals a tendency among car buyers to 'trade-off' purchase factors against each other. **One finding of particular interest is the *perceived* trade-off between fuel economy and vehicle size** (the two most important factors identified in this survey). This confirms that once a vehicle class has been selected, few car buyers are motivated to search for fuel efficient models as they tend to underestimate the range in fuel economy performance within a vehicle class.

A second common trade-off identified by this survey is between fuel economy (and environmental impact) and vehicle price. Many participants are of the opinion that the more fuel efficient models tend to cost more to buy – either as they involve new technologies (such as petrol-hybrids), or because manufacturers artificially increase the prices of the most fuel-efficient conventional models. This particular issue forms part of a wider perceived trade-off between price versus *environmental*

[1] The project builds on previous research undertaken for LowCVP by The Robert Gordon University, Ecolane and Sustain – From 'mpg paradox' to 'mpg mirage': How car purchasers are missing a trick when choosing new cars. LowCVP, 2008.
[2] Participants were directed to http://online.carbuyersurvey.co.uk and completed the survey online using their own PCs.

performance; consumers tend to believe that the most environmentally-friendly models are technologically more advanced and necessarily cost more to buy.

Although they currently act as a barrier to rational car purchasing decisions, the identification of purchase factor 'trade-offs' can be viewed as an opportunity. By targeting these issues with appropriate educational and marketing material, consumers might be persuaded that they can 'have their cake and eat it' by actively selecting a model with good fuel economy (and/or environmental credential) within the vehicle class they require.

Recommendation 2: Car buyers should be better informed about the large range of fuel economy performance values within each vehicle class and, if possible, the financial implications of buying a 'best in class' car. [However, the authors acknowledge the difficulty in assigning some models to particular vehicle classes.]

When asked what factors could be used to compare the impact of 'two outwardly identical cars', the survey finds that **cars buyers consider 'fuel economy', 'vehicle emissions', and 'fuel type' as the three strongest indicators of environmental impact**. However, the discussions also reveal that the concept of 'fuel economy' is much more familiar to consumers than is the concept of vehicle emissions (including CO_2). In particular, car buyers are consistently more able to benchmark a figure quoted in 'miles-per-gallon' than they are a value of CO_2 emissions.

Regarding the expression of fuel economy using imperial and metric units, **an overwhelming majority of new car buyers favour the use of 'miles-per-gallon' over 'litres/100km'**. While some have no objection to the use of metric units, 'miles-per-gallon' is favoured by the majority for everyday use.

Recommendation 3: With a view to helping consumers understand the link between fuel use and CO_2 emissions, where fuel economy information (in terms of 'mpg') is used to promote environmental issues relating to car use, it should be provided in conjunction with information about vehicle CO_2 emissions.

Throughout the survey, it is apparent that **engine size plays an important role in participants' minds with respect to a vehicle's environmental impact**. Not only do a significant proportion of new car buyers continue to believe that engine size is the key determinant of annual road tax, there is a prevalent view that engine size necessarily correlates with fuel economy.

When questioned about vehicle manufacturing and recycling, some participants do reveal an interest in knowing more about lifecycle issues. **While responses are mixed, a significant minority do appear to be interested in lifecycle information, with the caveat that it should be simply presented.**

Recommendation 4: For a future EU fuel economy label, further research into the most effective lifecycle metrics and formats should be considered, particularly to take into account the lifecycle implications of new technologies such as plug-in hybrid and battery electric vehicles.

One surprising finding is that the 'miles-per-gallon' measure is preferred to its financial equivalent. The group discussions reveal that although running costs (including fuel costs) are generally well received and understood by motorists, **there is a common understanding that fuel costs can be an unreliable measure (of environmental impact, fuel budgets, etc) due to the unpredictable fluctuations in fuel price** at the pump. It is also acknowledged that, as driving style affects real-world fuel economy, official figures of annual fuel costs are only of limited use.

When presented with several options for displaying model 'mpg' information, almost without exception **consumers respond very positively to the colour banded A-M format used on the current UK Fuel Economy Label.** Many participants note its familiarity, while others recognise its equivalent on 'white goods' consumables.

Participants who support the US-style fuel economy label like the fact that it leads clearly with fuel economy, which is displayed in large type and respond positively to the clear language used to describe the three driving conditions. Furthermore, while the term 'combined' is widely understood, **'city' and 'motorway' are much preferred to 'urban' and 'extra-urban'** (as used on the EU label).

Recommendation 5: For a future EU fuel economy label, fuel economy information (in terms of 'mpg') should be made more prominent (through better positioning and larger text-size) than it is on the current UK Fuel Economy Label.

Recommendation 6: For a future EU fuel economy label, the option should be considered to replace the use of the words 'urban' and 'extra-urban' with 'city' and 'motorway' (or similar) as currently stated on the UK Fuel Economy Label.

Although the overall 'usability' scores for both labels are remarkably similar, when questioned about the availability of comparative information shown on the label, few participants are able to give the correct answer for the UK-label – namely that the information is not available. One interpretation of this result is that **the majority of users of the UK label are not clear that the model CO_2 emissions information is presented on an absolute scale rather than relative to cars of a similar size**.

One key aim of the survey was to assess the demand for additional information. Although the responses are varied, in general**, participants respond positively to the possibility of adding 'best in class' information to the EU label**. While there are a range of views about which additional elements are most useful, fuel economy emerges as the most popular 'best in class' comparison metric. However, against the addition of new information is the argument that, **in presenting too much information, there is a danger of 'information overload'**.

Recommendation 7: For a future EU fuel economy label, consideration should be given to adding 'best in class' information (with a focus on 'best in class' fuel economy), while at the same time balancing the possible benefits of doing so with the equally important risk of overloading consumers with too much information.

In addition to the Fuel Economy Labels discussed, the focus group participants responded positively to the use of websites as a source of useful vehicle information – and welcomed the ability to compare information for a number of vehicles. While most participants were positive about the Act On CO_2 website, many participants noted the omission of key information on the results page – namely fuel economy ('mpg') and vehicle price data.

Although far from a statistically robust sample, when the use of a 'QR Code' reader that linked a Fuel Economy Label with model information as shown on the Vehicle Certification Agency website was demonstrated, many of the participants were impressed by the ability to automatically link to online information, in addition to the data already supplied on the label.

Recommendation 8: Further research should be conducted to optimise the data sets provided on official vehicle information websites (e.g. Act On CO_2), and to assess the future potential of using 'hard-links' (e.g. QR Codes) as a consumer tool to link printed with online model information.

2. Introduction

In December 2009, the Low Carbon Vehicle Partnership (LowC^{VP}) commissioned Ecolane and Sustain (plus two academic project partners) to undertake new research to identify the most easily understood information that consumers require relating to the environmental performance of cars. The project was to build on previous research undertaken for LowC^{VP} by The Robert Gordon University, Ecolane and Sustain, headed by Dr Jillian Anable in 2008.[3]

The research objectives included the identification of the vehicle environmental metrics most used by car buyers and their preferences for how such data should be presented. The research findings are intended to be used to inform actions that can be taken to improve the effectiveness of consumer-facing vehicle information in the UK, and also to form part of an evidence base to inform the UK's position in response to the upcoming EC review of the vehicle labelling directive.

Through the use of both a quantitative online survey, and a more qualitative parallel study involving a small number of representative focus groups, the research aimed to address the following questions:

- What criteria (not only environmental) do consumers use to select a shortlist of vehicles that they are interested in buying?
- What environmental metrics are most understood by consumers? – and do the most understood metrics vary according to the type of visual media (posters, printed ads, TV, internet)?
- What ways of illustrating such information are most easily understood by consumers? – and which are the best options for visually communicating/illustrating comparative information about vehicles?
- What level of consumer demand is there for comparative data on the environmental performance of vehicles? – and how and where would consumers prefer comparative data to be displayed?

In addition, the research intended to investigate variations in views by different groups of consumers – by sex, age, income – and assess whether participating consumers look for the same criteria when purchasing a new or used vehicle.

This project was managed and led by Dr Ben Lane of Ecolane Transport Consultancy and Dr Nick Banks of Sustain Environmental Consultancy. Ecolane was the lead partner for the web-based survey (including development of the online survey system) and quantitative analysis, while Sustain led on the focus group surveys and qualitative analysis.

The project team also included two project academic advisors with extensive experience in environmental, transport and attitudinal research: Dr Jillian Anable, Senior Lecturer at the Centre for Transport Research (University of Aberdeen), who provided advice on methodological, analytical and interpretive aspects of the projects. Dr Tim Chatterton, Senior Research Fellow at the Air Quality Management Resource Centre (University of the West of England) also provided input to the survey.

[3] Anable, J, B Lane and N Banks. From 'mpg paradox' to 'mpg mirage': How car purchasers are missing a trick when choosing new cars. Low Carbon Vehicle Partnership, 2008

2.1 Project Context

The research by Anable *et al.* confirmed the findings of previous attitudinal research that carbon emissions and environmental awareness generally have no significant influence on car choice.[4] While environmental issues are important to consumers, other issues (such as vehicle price, comfort, vehicle size, safety) are found to be *more important* to consumers at the point of purchase.

In general, motorists are aware of carbon emissions only in so far as they are linked to Vehicle Excise Duty ('road tax'). Furthermore, motorists generally think of their road tax in terms of annual cost, and few can give the correct band (or CO_2 emissions) for their recently purchased car.

Previous research also suggests that 'fuel economy' (as a metric) is not an effective proxy for environmental impact due to the 'mpg paradox' – although 'mpg' is reported by car buyers as a key decision factor, in reality, little effort is made to compare fuel consumption data during the car-purchase process for the following reasons:[2]

- Car buyers assume a similar 'mpg' for all cars within a class;
- Car buyers have little confidence in published fuel economy data;
- Car buyers believe that improving 'mpg' compromises performance and safety;
- Fuel costs are too complex for consumers to compute (combining 'mpg' and pence per litre to give pence per mile).

It could be argued that, in reaction to the fuel price peaks of 2008 and the on-going 'credit-crunch', UK motorists are now taking account of fuel economy *and* choosing more fuel-efficient cars; as evidenced by the significant shift to smaller lower CO_2 cars.[5] However, the research by Anable *et al.* showed that it is not the fuel economy metric itself which is conceptually driving behaviour. Although car buyers still refer to fuel economy (in terms of 'miles-per-gallon' or equivalent) it is simply the cost to fill up the tank that has instigated the change; hence the 'mpg mirage'.

The research by Anable *et al.* also found that car buyers who are interested in reducing their fuel costs may be 'missing a trick' in their choice of car, as most believe that the only route to better fuel economy is through a smaller car,[6] a new car, or switching to diesel. While this is generally a move in the right direction, there is little awareness of the additional benefits to be gained from 'best in class' comparisons.

The research by Anable *et al.* concluded by recommending that new information, more suited to consumers' requirements and understanding, should be provided to car-buyers to enable them to more readily compare environmental impacts of different cars. This research project, therefore, is a continuation of the work conducted by Anable's research team – with the low effectiveness of current environmental information established (in changing car buying behaviour), this project aims to improve the environmental information available to buyers of new and used vehicles.

[4] Lane B. Car buyer research report: Consumer attitudes to low carbon and fuel-efficient passenger cars. Low Carbon Vehicle Partnership, 2005; Anable, J, B Lane and T Kelay. *Evidence review of attitudes to climate change and travel behaviour.* Department for Transport, 2006.

[5] SMMT, 2008. URL: http://www.smmt.co.uk/articles/article.cfm?articleid=17708; WhatGreenCar. URL: http://www.whatgreencar.com/news-item.php?New-car-CO2-down-by-5-5.

[6] The Anable *et al.* study found that the notion of a 'low carbon car' is generally associated with small cars, which are generally considered to be inferior (higher functional value, lower comfort level). Low carbon cars are often categorised by consumers as products that respondents must reluctantly accept – perhaps denoting that the owner has less wealth and lower social status. Improving the image of fuel-efficient and low carbon cars is a key issue that has yet to be addressed.

3. Methodology

The primary objective of this project was to identify the most easily understood information for consumers relating to the environmental performance of cars. Three second-level aims were to:

1. Ascertain the relative importance of environmental issue at point of purchase;
2. Identify the most readily understood vehicle environmental metrics;
3. Identify the most effective presentation of vehicle environmental information.

In more detail, the second-level objectives were used to generate three sets of research questions:

1. **Relative importance of vehicle environmental information**
   - What key criteria do consumers use to select vehicles that they are interested in buying?
   - What is the relative weight given to environmental issues (CO_2 emissions, 'mpg', etc)?
2. **Most readily understood vehicle environmental metrics**
   - What environmental metrics are most understood by consumers (e.g. vehicle 'mpg', tailpipe gCO_2/km, fuel cost per mile, lifecycle ratings, emissions by weight of vehicle, brand-issues)?
   - Are consumers interested in/aware of life cycle impacts beyond tailpipe CO_2?
   - Do effective metrics vary according to context (e.g. posters, printed ads, TV, Internet)?
3. **Most effective presentation of vehicle environmental information**
   - What method of presenting this information is most easily understood by consumers?
   - What is the most effective format for visually communicating environmental information?
   - What level of consumer requirement is there for absolute and/or comparative data?
   - How and where do consumers prefer absolute/comparative data to be displayed?

The project aimed to answer these research questions for recent and imminent buyers of new and nearly-new cars (up to two years old). All purchases had to have occurred within the previous 12 months, or were expected to be made within the next 12 months (from the survey date). The target sample was chosen to reflect the national demographic for private car ownership in the UK.

The method of data collection used for this research project involved two parallel approaches:

1. **A series of six focus groups of 8-10 individuals conducted in three UK cities;**
2. **An online web-based survey appearing on car websites and through email lists.**

3.1 Focus group survey

The focus group discussion guide is provided in full in Appendix 1.

Six focus groups, each with at least eight participants, were conducted with individuals from the target sample, each lasting two and a half hours in length. Two groups were held in three cities: London, Birmingham and Bristol. In all cases, group discussions were recorded and transcribed in full for later (anonymous) analysis. In return for taking part in the project, each survey participant received a cash reward of £50.

Potential focus group participants were contacted through a network of local fieldwork recruiters and the distribution of printed flyers (in the recruitment areas). Potential participants were invited to register on-line for one or more of the focus groups as arranged. Participants were then contacted by the recruiters and/or project team to check individuals' details and confirm meeting arrangements.

Using a structured discussion guide (see Appendix 1), which included a selection of display options for environmental information, the focus group participants were asked to discuss in detail their

attitudes and knowledge of the following issues: criteria used in selecting vehicles to purchase; criteria used to identify the environmental impact of a car; a range of currently used and possible future environmental metrics; demand for absolute versus comparative vehicle data; options for presenting environmental information (visually and otherwise); and potential for using web-based tools for vehicle comparison.

Adopting the research recommendations of a previous evidence review,[7] the focus group survey design was 'deliberative' – which meant that, while the focus groups were structured using a discussion guide, the conversation was led to a large degree by the participants. The discussions were therefore designed to be semi-structured to allow (and encourage) open conversation between the participants themselves, and between the group and the researcher.

Two short-response 'micro survey' questions were also completed throughout the focus groups at set intervals to take a 'snap-shot' of participants' own attitudes during focus groups – these focused on individuals' knowledge of aspects of the car's performance (fuel economy, CO_2 emissions, etc.) and on their attitudes to the environment.

3.2 Web-based survey

The web-based survey questions are provided in full in Appendix 3.

In parallel with the focus group survey, a web-based survey was conducted of 1,000 car owners who had recently or were about to purchase a car (using the same criteria as already described). Using web-based advertising and email lists,[8] eligible participants were directed to one of two URLs to access the survey using their own computers. Depending on their originating site, participants were directed to either http://live.carbuyersurvey.co.uk or http://online.carbuyersurvey.co.uk.

The web-based survey started with a brief description of the survey including its terms and conditions. On accepting these, participants were asked to provide details about: their basic demographic information, their current car, information sources they had used when buying their current vehicle, and about their purchasing intentions when buying their next car. The web-based survey, which took around 15 minutes to complete, was conducted during February, March and April 2010. One £250 and three £50 gift voucher prizes were offered as incentives.

The content of the web-based survey shared many elements in common with the focus group discussion guide, but was more oriented to the collection of quantitative data through the use of single- and multiple-response questions. However, open-style responses were also used as these were central to the survey methodology – whereas 'tick-box' style question are more easily analysed, presenting participants with a list of options can affect responses through suggestion. The web-based survey used open-response questions wherever possible to record participants' spontaneous responses using their own words. Responses were then categorised during analysis.

As with the focus group survey, the web-based survey participants were presented with a series of visual elements for their comments and responses. These included mock-ups of the current UK Fuel Economy Label and an anglicised EPA Fuel Economy Label for two typical Ford Focus models. Participants were questioned about their understanding of the labels and the information they contain.

[7] Anable, J, B Lane and T Kelay. *Evidence review of attitudes to climate change and travel behaviour*. Department for Transport, 2006.

[8] The 'web-based survey was advertised using online adverts and email-shots sent from: the Energy Saving Trust, Environmental Transport Association, Society of Motor Manufacturers and Traders, WhatGreenCar and OfferOasis.

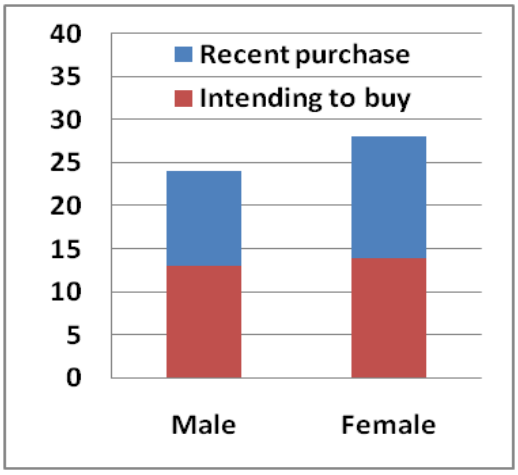
3.3 Survey sample

Within the focus group survey, 52 participants took part in one of the six two-and-a-half hour focus groups hosted in London, Birmingham and Bristol. For the web-based survey sample, participants completed the survey online using their own PCs. Advertised during February, March and April 2010, 987 participants completed the 'live' or 'online' surveys.

For the web-based survey, the number of male participants exceeded the number of female participants by a factor of approximately 1.7 – see Figure 3.1. Compared to the gender profile of UK car buyers, the proportion of male participants was therefore over-represented. For the focus group sample, the number of female participants slightly exceeded the number of male participants – see Figure 3.2. Participants who had recently bought a car and who were intending to buy were both well represented within both samples.

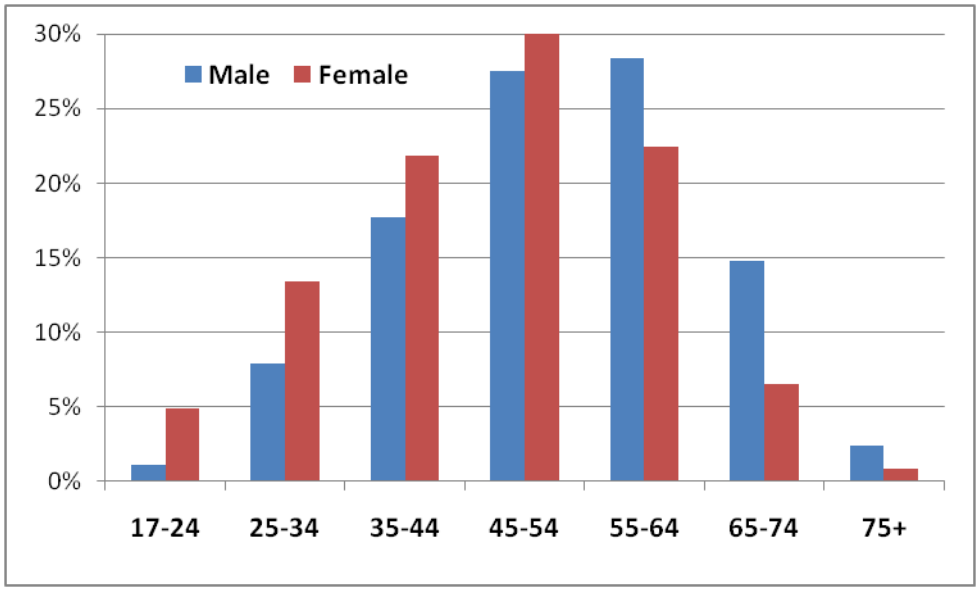
Figure 3.1 Gender profile of web-sample

Figure 3.2 Gender profile of focus groups



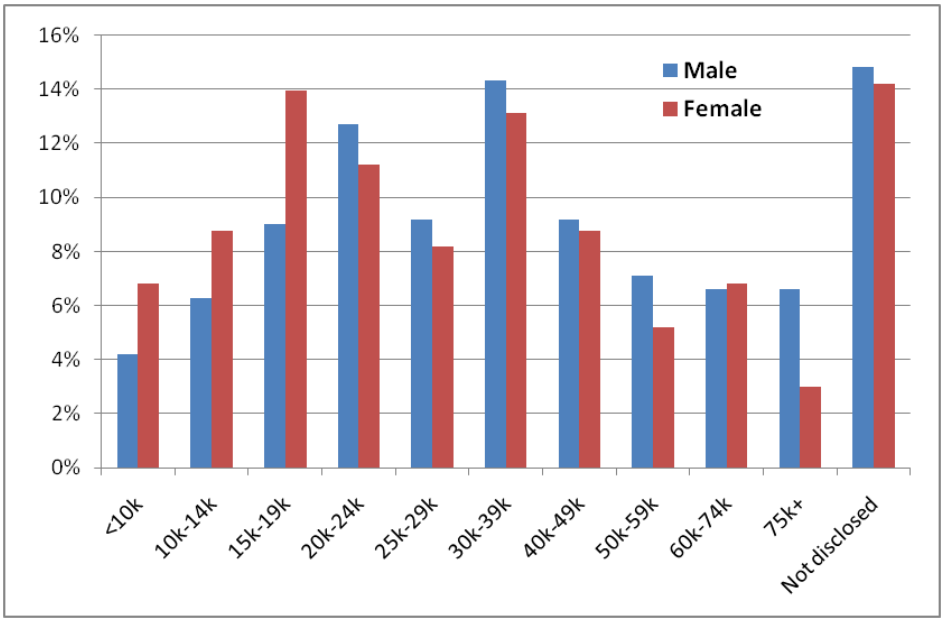
All of the age groups were reasonably well represented in the web-survey sample, with the modal age occurring in the 45-54 year category – see Figure 3.3. The focus groups had a similar distribution (not shown) with the exception of the 65+ age groups which were not represented.

Figure 3.3 Age distribution of web-survey sample by gender



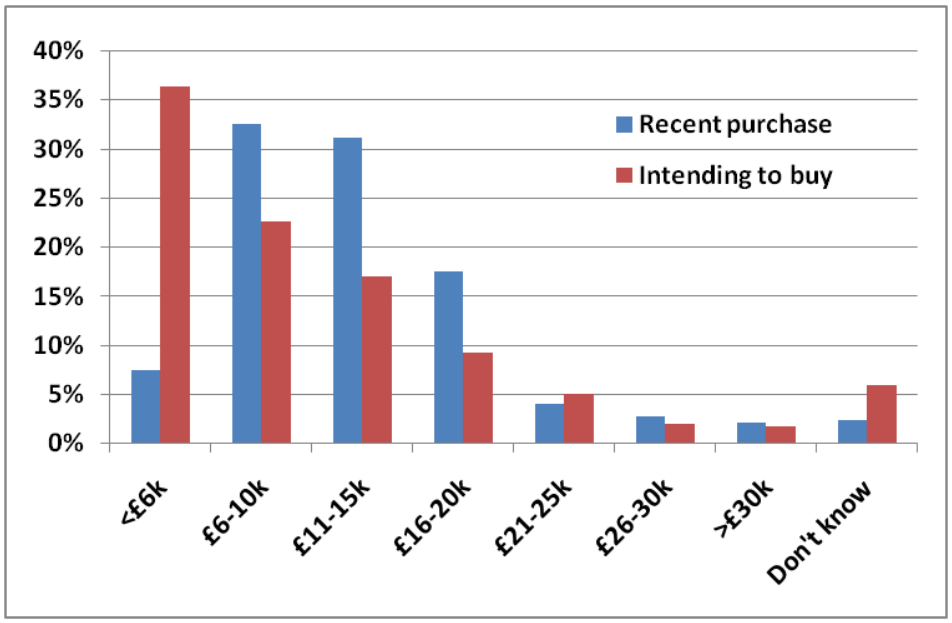
The majority of the web-survey sample were either in full time employment (male: 53%, female: 46%), retired (male: 29%, female: 16%), or in part-time work (male: 7%, female: 17%). As a result, all income groups were reasonably well represented in the web-survey sample – see Figure 3.4. The focus groups had a higher proportion of full-time employees (73%), slightly more in part-time work (17%) and a lower proportion in retirement (8%). The modal income for both samples was in the £30,000-£39,000 category (excluding those who wished not to disclose their income).

Figure 3.4 Income distribution of web-survey sample by gender



In both samples, the majority of participants had acquired their current car through an outright purchase (web 61%, focus groups 67%), with hire purchase (12%, 14%) and personal loans (8%, 12%) also proving popular. As expected, in the web-survey sample, participants who had recently bought a new or nearly-new car had paid substantially more (median car price paid £11-15k) than the 'intenders' who owned older vehicles (median price £6-10k) – see Figure 3.5. The focus group sample showed a similar distribution.

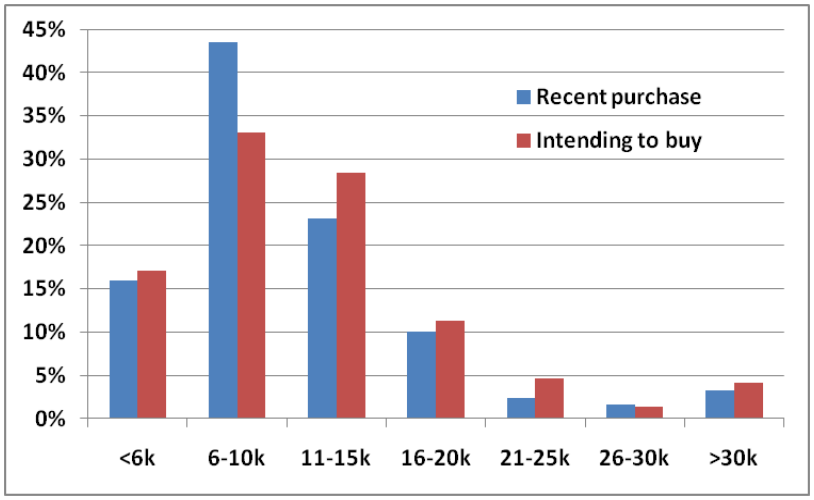
Figure 3.5 Price paid for current car (web-survey sample)



Regarding fuel type of the current cars used by the web-sample, petrol cars accounted for 63% (recent purchases: 59%, older vehicles 66%) and diesel 34% (recent/older: 37%/32%).[9] Alternative fuels and vehicle types only accounted for around 1% of the total sample and 3% of recent purchases (including 12 hybrid, 1 LPG and 1 unknown car type).

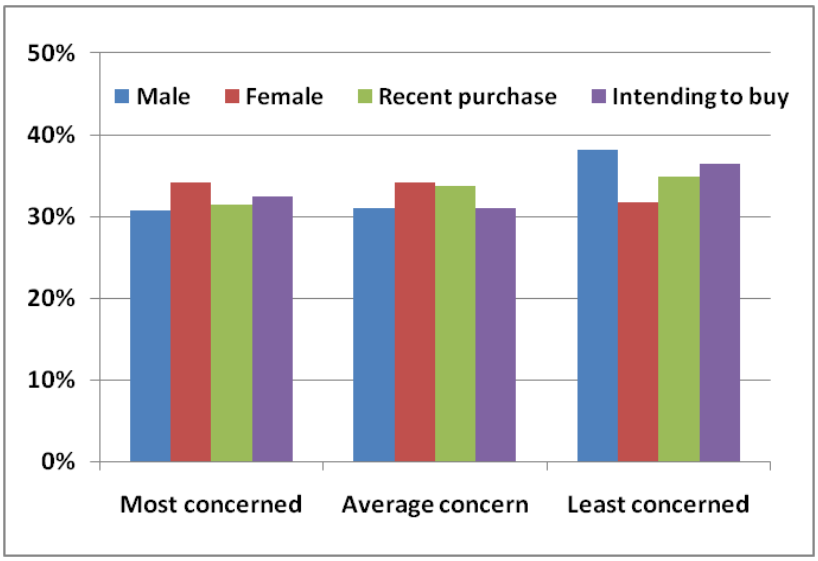
In the web-survey sample, the annual mileage driven by participants varied from below 6k miles per year to over 30k, with a modal annual mileage of 6-10k miles – see Figure 3.6. The counter-intuitive observation that 'recent' car buyers tended to drive slightly less than 'intenders' (who own older vehicles) was a reflection of the larger proportion of male drivers in the 'intender' sample.

Figure 3.6 Annual mileage distribution of web-based survey sample



In addition to the use of demographic parameters, a simple system of attitudinal segmentation was used to place all participants into one of four attitudinal categories ranging from 'most concerned' about environmental issues (and most willing to act to reduce environmental impact), through to the 'least concerned' (and least willing to act). This was achieved through scoring participants' responses to a series of environment-related statements. By adjusting the threshold scores, the web-survey sample was (intentionally) divided into three equal attitudinal groups as shown in Figure 3.7.

Figure 3.7 Percentage breakdown of attitudinal segments within web-survey sample



[9] These figures reasonably reflect the current UK new car market: Vehicle Licensing Statistics (2008) – Petrol 56%, Diesel 43%, Hybrid 1%; Department for Transport, 2009.

4. Survey results

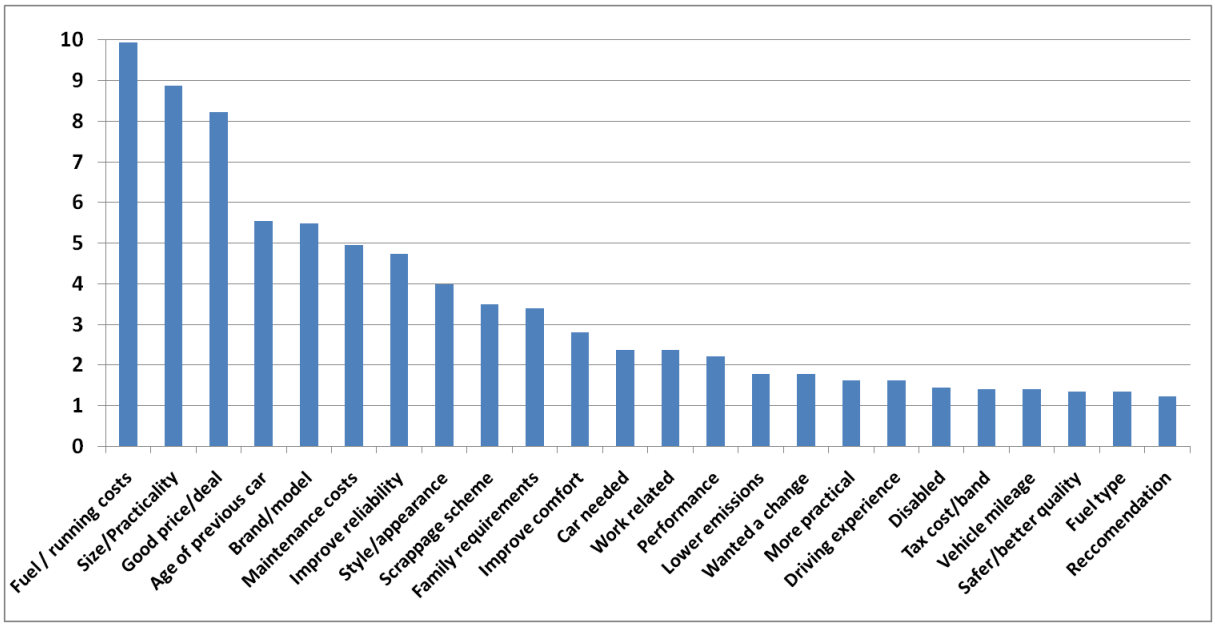
The following results are based on the analysis of 987 web-surveys completed between February and April 2010 (inclusive) and the transcripts of six focus groups involving a total of 52 participants, which were held during February and March 2010 in London, Birmingham and Bristol.

4.1 Factors initiating the decision to buy current car

As one of three short 'warm-up' questions, question 1 in the web-survey asked participants what 'initiated' their decision to buy their current car. Using an open-style response, the results show that, among a large number of motives, **'fuel economy/running costs', 'size/practicality', 'vehicle price/ deal' were the three reasons mentioned most often as 'initiating' participants' decisions to buy a car** (scoring 8+ on a relative 0-10 scale) – see Figure 4.1.[10]

While the issue of 'fuel economy' could be related to environmental impact for some car buyers, 'lower emissions' (including CO_2) and 'tax band/cost' – the two categories of responses relating most directly to environmental issues – were well down the consumer rankings in 15th and 20th place.

Figure 4.1 Factors initiating the decision to buy current car (web-survey)



Participants' attitudinal outlook strongly influenced the rankings given. For those most concerned about, and willing to act on, environmental issues, 'improving fuel/running costs' increased in importance, as do 'lower emissions', which moved up five rankings to 10th place, and 'tax band/cost' which were ranked 18th. For those 'least concerned', the offer of a 'good price/deal' was ranked highest, and 'lower emissions' and 'tax band/cost' issues were mentioned less often being ranked in 29th and 22nd place respectively.

Within the focus groups, the motives discussed gave a different impression of the most important reasons that initiated participants' car purchases, with fewer participants explicitly mentioning fuel economy or running costs as their main motivation. While the issues of 'fuel economy' and 'vehicle size/practicality' came to the fore later in the group discussions, the responses during the initial

[10] Participants' responses were allocated to key categories by the survey team.

section focused on four main motives: a regular car renewal period, a change in lifestyle, a desire for a new model, and as a necessary purchase.

A large number of respondents renewed their car on a regular basis – typically every 3-4 years – often at the point at which the warranty was about to expire, mileage was increasing, and/or there was sense that the car would very quickly lose what value it had remaining.

> *I buy a car every three years. I never have to wait for an MOT, and I'm intending to buy again in September.. [Female, London, Recent]*
>
> *I like one every three or four years. ...they've got a three year warranty on them anyway. And if you buy a service contract, which is about three hundred quid, that's your first three years so coming up to the fourth year, it's going to start costing you money, so I tend to drop it in and start again [Male, Birmingham, Recent]*
>
> *Three years again. It would have been three years one month, actually, on Monday and I wanted to come down an engine size. I'm just sick of petrol costs. I didn't want to go too low, just wanted, you know, some power but... So, I'm trying the 1.4 [Female, Birmingham, Recent]*

For many focus group participants, the impetus to purchase a car was because their existing vehicle no longer met their requirements due to a change in circumstances; for example, the need for something larger (e.g. for children), or smaller (e.g. if children had left home), or have a more symbolic purpose (such as a change in personal status).

> *I had a company car, changed jobs, and I needed a car for work and for socialising, and I've always been used to a four, five door, although I don't probably need that now, I just like to have that [Male, Bristol, Recent]*
>
> *... we downsized from a Fiat Multipla a couple of years ago, and... we're looking to go back to a Fiat Multipla again, because it's just not working having a small car... With the kids, and running them around everywhere, and camping.. [Female, Bristol, Intender]*
>
> *I have three children, and I've got a two-door Mini Cooper. But it's not the family car, it's my car, and, you know, I wanted a fun… I've always wanted a Mini Cooper [Female, Bristol, Recent]*

A smaller number of respondents simply felt that a new car would offer more (and newer) features and were attracted by this. Their existing car had become 'boring' and they fancied a change.

> *I tend to get a bit of itchy feet for no other reason than that I'm just bored with the inside of it and that's the thought process for me. ...they have just launched a new model and I quite like the idea of that... I'm a salesman's dream I am; they can persuade me for anything [Male, Birmingham, Intender]*
>
> *Well, I saw, obviously my car is a Mini, and I saw the car on the road, and I thought, I'd like one of those [Male, London, Recent]*

Necessity also initiated a significant number of purchases in cases where the previous model was nearing or past the end of its life, 'written-off' or had been stolen.

> *... my old car packed up ... and I was thinking, I'm getting a new car... I couldn't qualify for the scrappage because my car couldn't be delivered to the dealership... so took a nearly new car [Male, London, Recent]*
>
> *I've got a Corsa. I bought it because my other car was dying. So, I just looked around and decided that one was... I like that one [Female, Birmingham, Recent]*
>
> *I feel quite foolish... on one of those very cold days I left it warming up... de-icing before work and it was driven off [Male, London, Intender]*

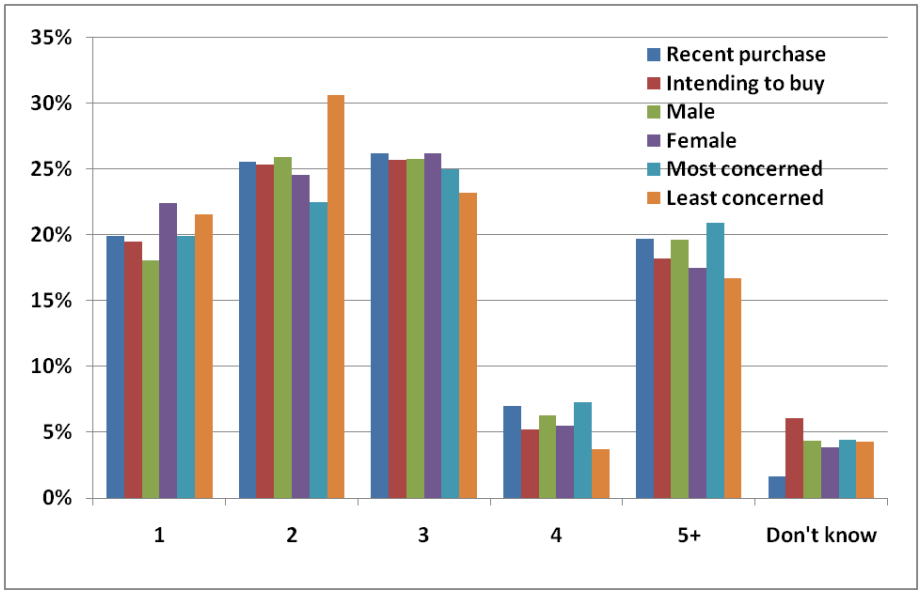
For several purchases made since May 2009, the scrappage scheme was also mentioned as an important motive for replacing an older model with a new car.

> *April last year government said they were going to do the £2,000 scrappage... At the same time, actually, my older car was due for the MOT... So that was the prompt [Male, Bristol, Recent]*
>
> *...I've always loved the shape of the AYGO. I just set my heart on having the AYGO and I went to the scrappage scheme, so obviously I got 2,000 off it... [Female, Birmingham, Recent]*

As one of three 'warm-up' questions, question 2 in the web-survey asked participants how many models they considered when buying their current car – see Figure 4.2. This question also served to check that the majority of participants went through a process of model selection and had not pre-decided the model purchased.

As shown in Figure 4.2, around 80% of participants were considering at least two models, and the modal number of models considered was three. One notable variation between sub-samples is the slightly larger number of models considered by participants most concerned about, and willing to act on, environmental issues, as compared with those 'least concerned'.

Figure 4.2 Number of models considered when buying current car (web-survey)



4.2 Sources of information used to choose current car

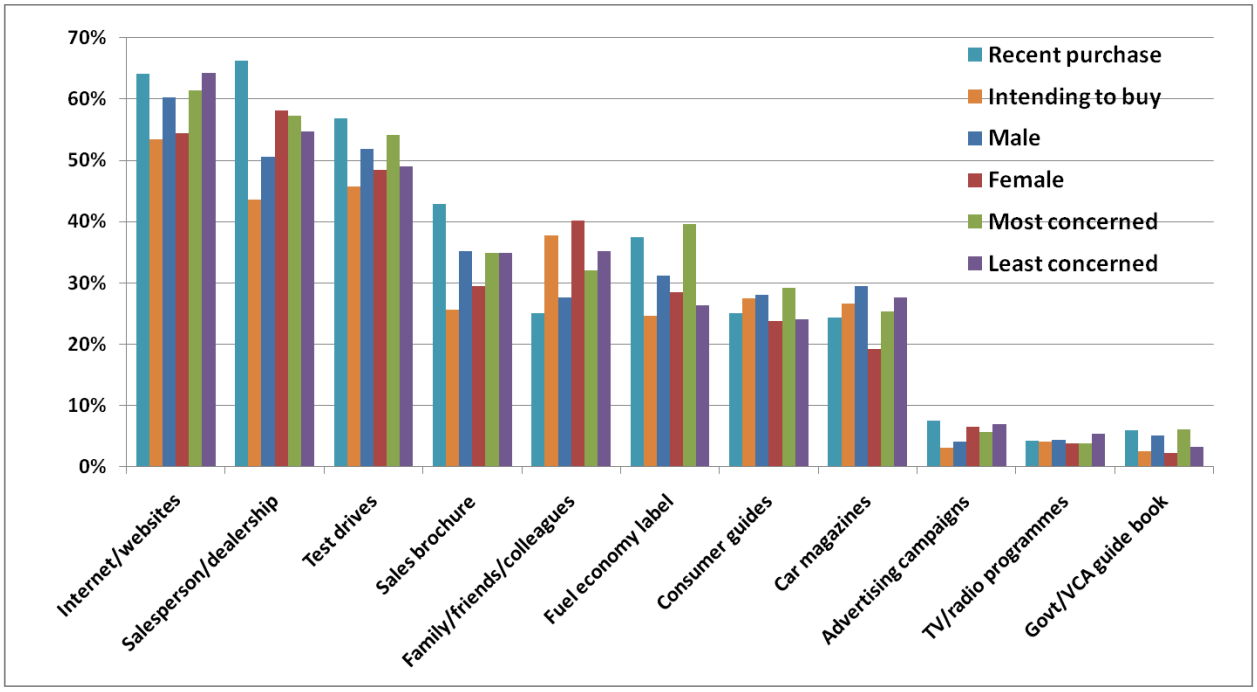
Using a tick-box style response, question 3 in the web-survey asked participants which sources of information they used to help choose their current car. Confirming the findings of previous surveys, automotive websites and the Internet were most mentioned by the web-sample (almost 60%), closely followed by salespersons/dealership and test drives – see Figure 4.3. With respect to off-line sources of environmental information, use of the Fuel Economy Label was noted by around 30% of respondents, while the VCA Guidebook was only mentioned by 4% of the sample.

Analysing the responses from the sub-groups within the larger sample, it is apparent that recent purchasers were more likely to use the Internet, salespersons/dealerships, test-drives and brochures than those intending to buy, who relied more on recommendations from immediate social networks. This presumable reflects the fact that the 'intenders' generally own older models, many of which would have been purchased as 'used cars'.

Women were also more likely to seek advice from family/friends/colleagues, and were less likely to use car magazines than men. Participants 'most concerned' about, and willing to act on, environmental issues, were over 50% more likely to have seen or used a Fuel Economy Label compared with those 'least concerned'.

> *[Q: Would you actually have been able to see the label when you bought your car?] Oh, gosh, yes, very much so. I actually was looking for it... And I wanted [band] 'A'. That's what I went out for because I wanted the best performance and, you know, that sort of thing [Female , Birmingham, Recent]*

Figure 4.3 Sources of information used to choose current car (web-survey)



The focus group discussions also confirmed the importance of the Internet as a source of information at all stages of the car buying process. This was even the case where a choice of model had already been made in which case the Internet would generally be to get details of variants of the basic model and to check prices and availability.

> *I just use the Internet and I see what's... You know, I look at the spec on the internet. I've got sort of an idea in my mind what I'm looking for but then I'll just research on the Internet. ...that's really my main source [Male, Birmingham, Recent]*
>
> *I wanted a newer version of the Mondeo, so basically I knew what model I wanted. I sort of went down to the local dealership, had a look at a car and test drove it and then went back and checked on the Internet. I eventually actually bought it online as I knew exactly what I wanted [Male, London, Recent]*

However, it was clear that the Internet was very rarely used alone with participants reporting a great variety of research sources and tactics. Many used a combination of methods in an iterative process. A typical approach was to start by using the Internet, then go to a showroom to view a particular model 'first hand' (perhaps taking a test drive), and then return to the Internet to find other examples of the car in the locality and to check prices. Consequently the Internet was most often used to generate comparative information, but was rarely sufficient to make the final decision.

> *[Q: And the research? Where did you look?] Internet, and then we actually went into the dealerships. I like to be able to have a look and sit in, and test drive, once I've done my research. I do the comparisons. ... Internet [first], and then go in, yes [Female, London, Recent]*
>
> *I started off on the internet and moved on to the dealership.[Q: And did you know the particular model and make beforehand?] Yes... I talked to a couple of my mates who have got the exact same car so I knew what I was looking for [Female, London, Recent]*
>
> *[Q: Do other people use the internet?] A little bit. Not to decide. For information... The actual final decision, I want to have that test drive and I want to sit in it.. [Female, Birmingham, Recent]*

Many respondents had a fairly clear idea of what they wanted from the outset. Consequently, the search process often served to simply confirm an existing choice rather than narrow down a universe of choices. This basis of the existing choice could be due to previous experience of, or simply a desire for a particular model.

I think I'm really lazy compared to everybody else because I've owned BMW cars for the past ten years. I know that I really, really like them. It'll take something really special to move me away from a BMW. I've found a salesman that I trust, which is unusual. So, I just go and see him and tell him that I want a car and a couple of times I haven't even sat in the car before I buy it [Female, Birmingham, Recent]

...the car I wanted ...was a new model.... So I was probably looking at a bit of a tall order to get a nearly new car, ... I wanted it up to about 12 months old. So every garage I spoke ... said, no you're probably not going to get one. So that's why then I had to get on to the Internet ...so I just kept searching [Female, Bristol, Recent]

When pressed on whether environmental information had been accessed during the search process it was clear that for most of the respondents, environmental information was either not used or not well understood. In particular, only a few recent purchasers were able to recall seeing the Fuel Economy Label in the showroom. Although CO_2 emissions figures were mentioned by a number of respondents, there was no sense in which they were actively used to make comparisons.

[Q: And did you see any information about the emissions of the vehicle in the showroom?] Yes, I think there was like a... like where the big price ticket is, I think there was something on there [Q: Did you look at it? Did you use it at all?] No [Female, Birmingham, Recent]

[Q: And how many of you saw a label?] I'll be honest with you, I did, because I tried looking in the windows and it was stuck on the windows to stop you looking though one side, so I had to go to the back window to see what was inside the car. .. just take it out of the way so I could look in the car [Male, Bristol, Recent]

On any literature you do see the CO_2 emissions on there and I think they should really make more of it because environment issues are important. I mean, this is why I've never had big four-wheel drives [Q: When you've see it in adverts and things, do you read the CO_2 information?] No, I just sort of see it there. You know, when it's a consideration for you, then that would be important. But it's always right down the bottom in the small print.. [Male, Birmingham, Recent]

These findings suggest that, for most car buyers, either environmental information is not an important factor in the search process or that the information is not presented in an engaging way. Both of these issues are explored in the following sections.

4.3 Most important factors in decision making process

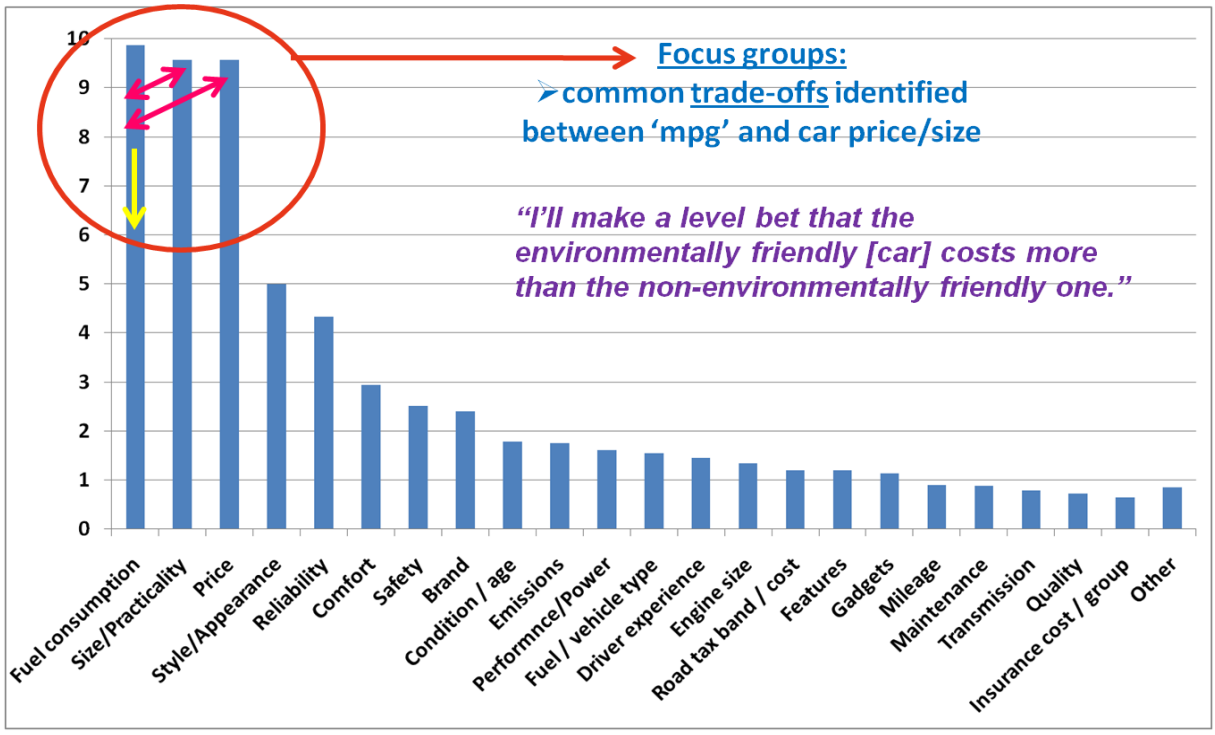
Questions 4 and 5 in the web-survey formed part of the core of the first set of research questions which aimed to assess the 'relative importance of vehicle environmental information'.

When asked 'what factors were important in the decision making process?' when purchasing their current car, results from the web-survey (using an open-style response) show that, in order of importance, **'fuel economy/running costs', 'size/practicality' and 'vehicle price' were the three factors considered most important** (scoring at least 9 on a relative 0-10 scale) – see Figure 4.4.[11]

'Style/appearance' and 'reliability' were ranked in a strong fourth and fifth place (with a relative score of between 4 and 5). 'Comfort', 'safety', 'brand' and other purchase issues were spontaneously mentioned much less frequently, scoring less than 3 on the 0-10 relative scale. 'Vehicle emissions' (including CO_2) and 'road tax band/cost' – the two categories of responses relating most directly to environmental issues – are well down the consumer rankings in 10th and 15th place.

[11] Participants were allowed to offer up to 10 responses, which they then scored on a four-point Likert scales ranging from 'Not important' (0) to 'Overwhelmingly important' (3). Note that these rankings reflect the weighting given to each factor, and that actual responses were allocated to key categories by the survey team.

Figure 4.4 Most important car purchase factors (web-survey)



While the focus groups gave a broadly similar picture of the most important purchase factors, participants' responses add important detail to the findings from the web-survey. First, although 'fuel economy' was mentioned in the group discussions as an important purchase factor, less weight was given to this issue than is found in the quantitative survey. Across the six focus groups, 'fuel economy' (and related factors such as 'fuel costs') ranked as the third most important purchase issue as measured by the number of Post-Its generated during group discussions. This suggests that 'fuel economy' may have been slightly over-ranked in the web-survey (due to method of data collection).

The second issue which emerged from the focus group discussions, is that when 'fuel economy' was mentioned, it was primarily as a running cost rather than as an environmental proxy – 'cost effective' or 'cheap to run' were phrases often associated with 'fuel economy' and 'miles-per-gallon' or 'mpg'.

> *[Q: So 'mpg' is just a sort of a measure of how far you can go on a tank?] Yes. But that comes into costs rather than.. [the environment] [Male, Birmingham, Intender]*
>
> *And then also the running costs, sort of fuel and that sort of things [Male, London, Recent]*
>
> *... cost effective and cheap to run. It was cost effective because it was so cheap to buy and it's cheap to run and good at parking [Female, London, Recent]*
>
> *...I tend not to go very far in my car and it just seemed silly to have a big powerful fuel-guzzling car to just bob about. You know? So, it's just economy, really [Female, Birmingham, Recent]*
>
> *... miles to the gallon but that's back to costs again [Female, Birmingham, Intender]*
>
> *...because it's got this stop-start technology you don't use as much petrol [Female, London, Intender]*

In all the focus groups, vehicle size was mentioned as being a major factor affecting the choice of their (main) new car – 'size' ranked as the most important purchase issue as measured by the number of Post-Its generated during group discussions, and was one of the top three most important factors in five of the six groups. For many participants, size was a common starting point for vehicle selection, and a factor which had priority over other purchase issues. Terms repeatedly mentioned are 'number of seats or doors', 'headroom', 'legroom', 'boot space', 'seat height' and 'physical size' of the vehicle.

I wanted a small car but I didn't want just two doors because I didn't want to be climbing in and out of the back [Female, Birmingham, Recent]

...basically I was looking at the four-door, medium-sized car, enough space and I found with this one a lot of boot space and back space that you could actually move the seats forward and backwards, which gave you extra [Male, London, Recent]

I think the size seems to be the starting point... I want a four-door big one, or I want a small one. It seems to be common that size was the starting point. ... So size, size, size [Male, Bristol, Recent]

As the reason most often given for the importance of vehicle size was the need to carry children, the choice of car was seen to be heavily influenced by life stage. The exception to this was when choosing a second car enabling respondents to choose a model more to their own liking rather than serving the families requirements.

And, again, your family situation comes in as well, doesn't it? ...I know mine's only a little car but my husband's got a Vauxhall, you see, so because he's got the main family car, we use his car for holidays etc. Mine's just like the little potterer about [Female, Birmingham, Recent]

... if you've got kids and then like a partner, then I suppose you have a hatch-back [Male, Bristol, Intender]

... mine's completely the most impractical car to have. I have three children, and I've got a two-door Mini Cooper. But it's not the family car, it's my car, and... I wanted a fun… I've always wanted a Mini Cooper [Female, Bristol, Recent]

I suppose it depends on your circumstances, doesn't it? If you're a single man, whatever it is, I suppose you can get a sporty model [Male, Bristol, Intender]

Although 'vehicle price' ranked as only the fourth most important purchase issue in the focus group discussions (as measured by the number of Post-Its generated), **vehicle price was the determining purchase factor for many participants**. While the issue was not discussed in as much length as some of the other important factors, it was accepted (by the majority of the sample) that having a limited budget effectively ruled out many brands and models.

In terms of order of importance, I would say cost would be the first... only because I'm loathe to buy… to spend money on a car, so it's… so that's the most important thing [Female, London, Intender]

Again, maybe your budget goes in with it as well. Like I had a budget of X amount of thousand pounds I was going to pay for it, and I didn't put it on HP or anything [Male, Bristol, Recent]

Ford didn't have anything at all in my price bracket [Male, Birmingham, Recent]

It was the cheapest car on the road... so I was always conscious that I liked this one, must buy it [Female, London, Recent]

One key price-related issue identified by this survey is that many participants believe the more fuel efficient models tend to cost more to buy – see Section 4.3.1.

In the focus groups, 'style/appearance' ranked as the second most important purchase issue as measured by the number of Post-Its generated during group discussions, and was one of the top three most important factors in five of the six groups. While rarely being the single deciding purchase factor, a car's style and image were very important to most car buyers interviewed – many of the other decision factors often followed if this issue was satisfied.

... my mate's got an Audi A3 so I like the shape and the looks of it, so go for it [Female, London, Recent]

It must be sporty, trendy, small and convertible [Male, London, Recent]

The only car I ever liked, and it's purely because of how it looks, is the Audi A4 [Female, London, Intender]

Yes, that's frivolous, isn't it – that sort of style, looks, good looks, colour [Female, Birmingham, Recent]

I think I'm edging towards the image, style, look of car [Female, Birmingham, Recent]

The importance of this factor can be gauged by its ability (if not deemed satisfactory) to override all other purchase considerations – including fuel economy.

[Q: Is there any factor that overrides everything else?] The first one [factor] I would look at would be looks. But then if you then went to the MPG.... I might change my mind and look at another car first if I liked the look of it.. [Female, Bristol, Intender]

Um, looks, and then running costs [Female, Bristol, Intender]

... a tank that needs to be full with petrol but I know that it looks good. So, I went for the looking good and, yes, I'll stick, you know, 70 quid a week in the old tank [Female, Birmingham, Recent]

And would it['mpg'] influence you in buying a car? Mostly people go for a car for the look of it. You see a car and you like the look of it, regardless of what it is. It wouldn't change your judgement [Female, Bristol, Recent]

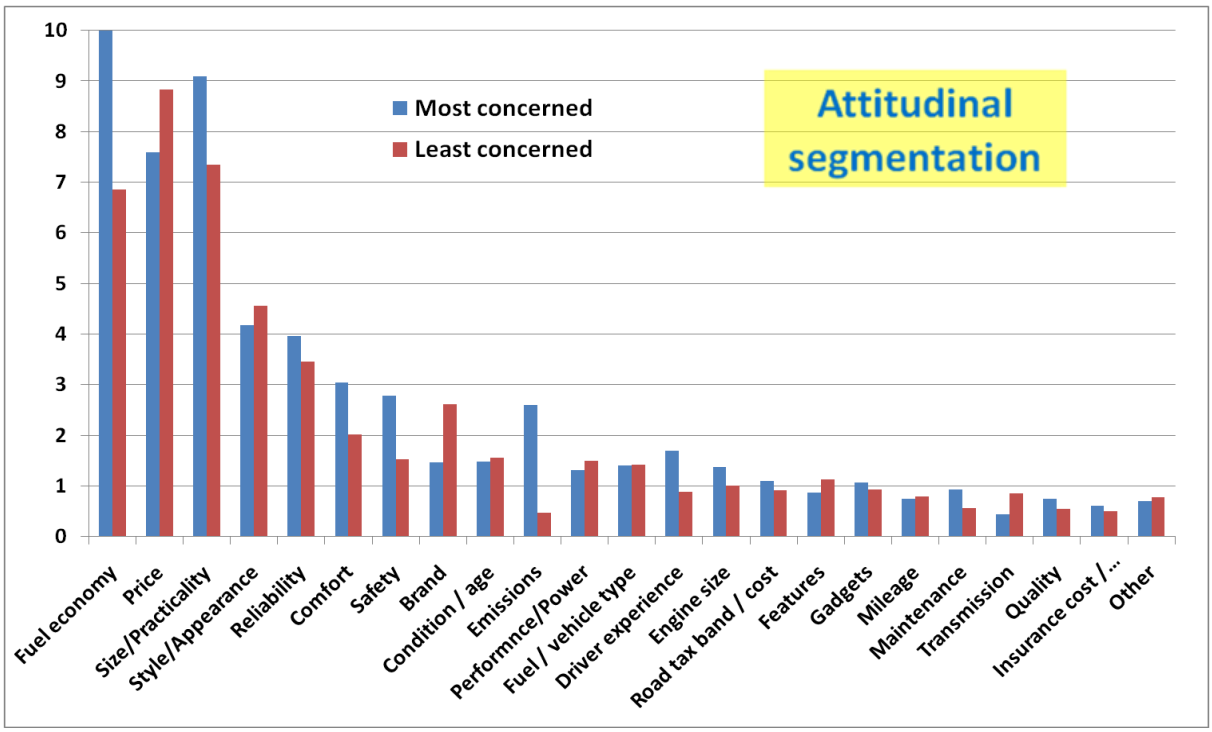
Some participants expressed the view that they could justifiably focus on style as other factors (such safety and reliability) were now 'standard' for new cars. This reasoning was also sometimes used when thinking about the fuel economy.

[Q: You have to like the look of it. What would come after that?] I mean I'm thinking because the newer and that, nowadays safety and reliability wouldn't be my next port of call, because I would expect really that's what you get in new cars nowadays at a standard [Female, Bristol, Intender]

... but most cars nearly new are quite reliable anyway. ...maybe ten, 15 years ago you wouldn't have touched a brand new car because it was unreliable. But I think today, whether you looked at a Peugeot, or a Ford, or a Mazda or a Toyota, I think they're all [reliable] [Female, Bristol, Recent]

Results from the web-survey also showed that a participants' attitudinal outlook influenced their rankings of the most important car purchase factors more than other factors analysed (including gender and recent purchase versus intending to buy). For those 'most concerned' about, and willing to act on, environmental issues, 'fuel economy' and 'size/practicality' increased in relative importance, as did 'vehicle emissions', while 'price' fell in rankings to a lower third place – see Figure 4.5. For those 'least concerned', the order of the highest ranking factors was reversed so that 'price', 'size/practicality' and 'fuel economy' were placed first, second and third respectively. 'Brand' also took on more significance for the 'least concerned' group. That said, 'fuel economy' remained a top priority for all participants whatever their attitudinal outlook.

Figure 4.5 Most important car purchase factors according to attitudinal segment (web-survey)



4.3.1 Perceived factor 'trade-offs'

The focus group discussions also revealed a tendency among car buyers to 'trade-off' purchase factors against each other. **One finding of particular interest is the perceived trade-off between vehicle size and fuel economy (the two most important factors identified in this survey).** This confirms that once a vehicle class has been selected, few car buyers are motivated to search for fuel efficient models as they tend to underestimate the range in fuel economy performance within a vehicle class.

> *Well, the smaller the car, the more eco-friendly it is [Q: And do you think that's always true? Is it the size of the car or the size of the engine?] Well, both, but the size of the engine [Q: Okay, that's interesting because (other participants were saying) the size of the vehicle is linked to its environmental credentials.] Yes, it's linked to the size of the car [Male, London, Recent]*
>
> *…in order to get an economical car that's nippy, that's small, you're going to… you know, you're tucked in a smaller car; you haven't got so much room, it's not going to be as smooth a drive… ride. You know, I said it was fun, it was… but I know the difference, the difference is huge [Q: In your mind, small is the same as economical?] Yes [Q: And less comfortable?] Yes [Female, London, Intender]*

A second common trade-off identified by this survey is between environmental performance (including fuel economy) and vehicle price. Many participants were of the opinion that the more fuel efficient models tend to cost more to buy – either as they involve new technologies (such as petrol-hybrids), or because manufacturers artificially increase the prices of the most fuel-efficient conventional models to compensate for the lower fuel costs that accrue over time. This issue forms part of a wider perceived trade-off between price versus *environmental performance*; consumers tended to believe that the most environmentally-friendly models were technologically more advanced will necessarily cost more to buy.

> *What you said from the start was you've got two cars.... One's environmentally friendly, one's not. They both look the same. I'll make a level bet that the environmentally friendly one costs more than the non-environmentally friendly one [Male, Birmingham, Intender]*
>
> *I'd love to have an environmental conscience when buying a car; I just can't afford it. You know, all these new cars that are coming out with hybrid model and this, that and the other, I'd love one, but it's… the price is prohibitive, and I think it is for a lot of people.. [Female, Bristol, Recent]*
>
> *...there isn't like a Fairtrade [car] as there is with food?.. [Second participant] No, there's no organic cars.. [Q: If there was, do you think it would be more or less expensive?] [Third participant] More expensive, yes, just like organic food is [Female(s), Birmingham, Recent]*
>
> *[Q: What if you had two cars and you really like the look of both of them, and one had a label, which said it was an E, and another had a label which said it was an A?] But then there'd be a difference in price...That's why, it's a luxury [Male, Bristol, Recent]*

Some comments suggested that participants were also unconvinced that any additional capital costs would be sufficiently balanced by lower running costs (such as cheaper 'road tax').

> *...when you look at the price to buy it new it cancels out any kind of saving that you might make. ...if you put, I don't know, insulation in your house and you've save X amount per year, it only takes you two years, say, to make that money back. But when you're paying such a high purchase price it's going to take you ages and ages and ages to get… even though it's only £15 [annual 'road tax'] [Female, Bristol, Recent]*

Many participants also noted the (perceived) trade-offs between environmental impact and other key vehicle features including: driving performance, comfort, build quality, and (predominantly for male car buyer) 'gadgets'.

> *I don't think that there's a car out there that's all-round sort of really powerful and eco-friendly. You'll never get that [Male, Bristol, Intender]*

Because they're a lot lighter car and a lot... what I call a low build quality... I've had a few cars come through me over the years and I've been absolutely flabbergasted on the economy but yet you sit there in a quite basic inside, you know [Male, Birmingham, Intender]

I won't [buy a more environmentally friendly Smart Car] basically, because, you know, there's… there is an element where you're paying for it, you might as well be comfortable [Female, London, Intender]

You won't get the toys on the high... a lot of the big what I call petrol guzzlers. You know, when you get the low consumption cars you don't get the toys on them, so much [Male, Birmingham, Intender]

As was the case with reliability and safety issues, some respondents thought that newer models were (as a result of advances in engineering) more likely to be fuel efficient and have lower emissions. Purchasing new therefore negated the need to actively seek out environmentally friendly models.

If it's eco-friendly, you have the low emissions and stuff like that so if you've got a newer car – I've got a bigger car now – but lower emissions then some of the older models, so you find that probably some of the new cars now probably have lower emissions than say a ten-year-old car that didn't have the technology to make it lower [Male, London, Recent]

...if you compare it to an older car, probably a new large car is probably better for the environment than an older car [Male, London, Intender]

4.4 Importance of environmental issues when buying current car

The evidence from the focus groups confirms the findings of the web-survey that **factors relating most directly to environmental issues have little influence on purchasing decisions (**see Figure 4.4). Of the 52 focus group participants, fewer than four acknowledged that environmental performance had been a significant factor in their vehicle selection. Furthermore, in only one instance was it the dominant choice factor (for a participant intending to buy a Toyota Prius).

Environmentally friendly is the first thing, it really is important to me. ... I feel really guilty driving the car I'm driving; every time I drive my car pollution pumping out of the sides; I just feel like I have to make a change [Female, London, Intender – Toyota Prius]

More often than not, even when environmental issues were of high importance, they continued to be demoted in favour of other competing issues such as price, comfort and performance. This was the case for a second participant intending to purchase a Toyota Prius for environmental reasons, and others in the most environmentally oriented focus group.

I probably wouldn't sacrifice… you know... the car needs to drive fairly well; I wouldn't sacrifice on performance… [Male, London, Intender – Toyota Prius]

Yes, the economy... of the vehicle is very high on my priorities… I'm aware of it [environmental impact], but... if it compromises any of the other things that I want, then it kind of goes… if it's a struggle between the same cost, two cars, one's more environmentally friendly, I'd go for the more environmentally friendly, but [otherwise] not really interested [Male, London, Intender]

More negatively, one of those acknowledging that environmental performance was moderately important even incurred a certain amount of sanction from his peers.

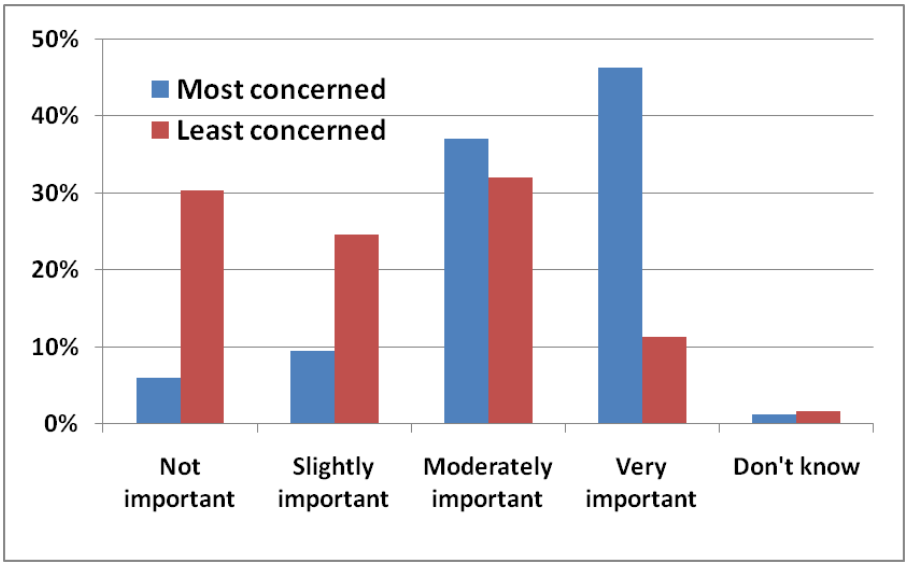
[Q: Thinking about your next car purchase, are any of you thinking about environmental issues at all?] I know it might not show with the car I drive, but I am. And my friends take the Mickey out of me really [Male, Intender]

Although vehicle emissions were of much less importance to car purchasing decisions than fuel economy, several comments suggested that lower emissions were often seen as a 'bonus' once the other purchase priorities had been secured.

... I didn't really consider the eco-friendly too much about the car at all. It was more the price and the running costs. ...when I found out about the lower emissions and you could have cheaper road tax, then that was an added bonus. But I didn't consider it from the start [Male, London, Recent]

Question 6 in the web-survey attempted to assess the extent to which participants thought they had taken environmental issues into account when purchasing their current car. Using a four-point Likert scale ranging from 'not important' to 'very important', on average the sample rated environmental issues as 'moderately important'. As shown in Figure 4.6, there was a clear divide between participants who were classed as 'most concerned' as compared to those 'least concerned' about environmental issues.

Figure 4.6 Reported importance of environmental issues during car purchase (web-survey)



However, in cases where actual vehicle emissions are known from VRM checks (in around 50% of the sample), analysis revealed only a 7% difference in tailpipe CO_2 between these two groups ('least concerned': 159 g/km; 'most concerned': 148 g/km).[12] This suggests a degree of over-reporting for the 'most concerned' group and supports the notion that, while environmental issues were often important to the consumers surveyed, in the vast majority of cases, they were supplanted by more pressing vehicle purchase priorities.

4.5 Factors used to assess a car's environmental impact

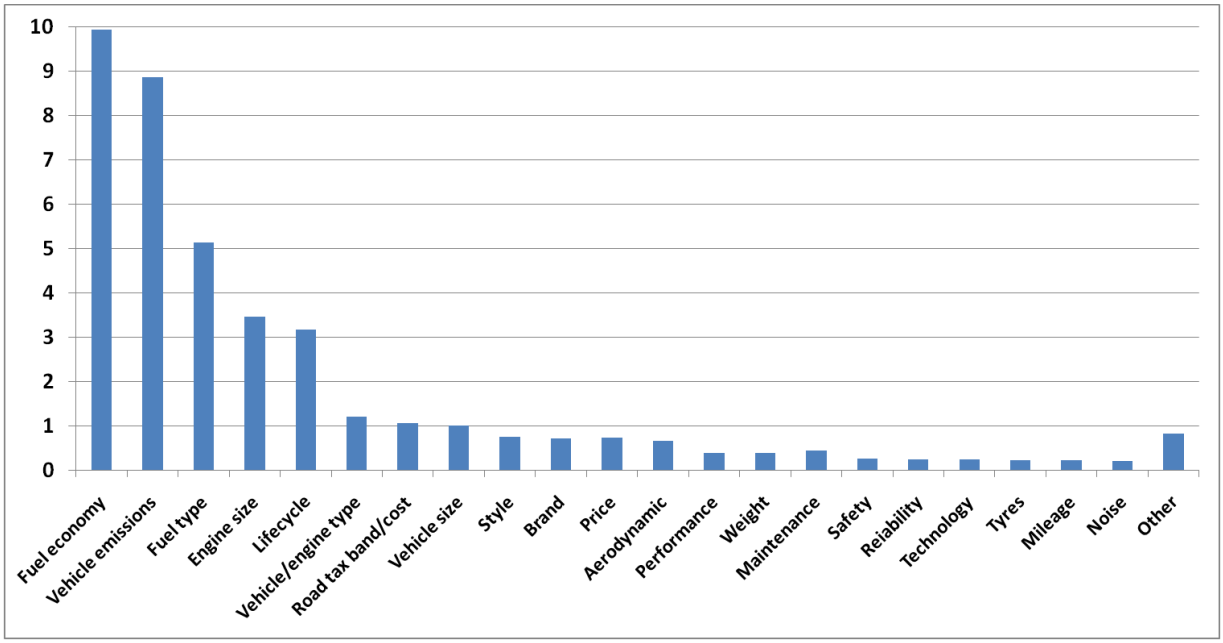
Using several approaches, questions 7 to 9 in the web-survey formed part of the core of the second set of research questions which aimed to identify the 'most readily understood vehicle environmental metrics'.

When asked what factors could be used to compare the impact of 'two outwardly identical cars', results from the web-based survey (using an open-style response) show that **cars buyers in the sample considered 'fuel economy', 'vehicle emissions', and 'fuel type' as the three strongest indicators of environmental impact** (scoring at least 5 on a relative 0-10 scale) – see Figure 4.7.[13]

'Engine size' and 'lifecycle issues' were ranked next in fourth and fifth place with a relative score of between 3 and 4. All other factors (including possible environmentally-related issues: 'road tax band/cost', 'vehicle size', 'brand' and 'weight') were ranked well below the leading four metrics, scoring less than 1.3 on the 0-10 relative scale.

[12] A similar percentage difference exists when only 'recent purchases' are analysed.
[13] Participants were allowed to offer up to 10 responses, which they then scored on a four-point Likert scales ranging from 'Not important' (0) to 'Overwhelmingly important' (3). Note that these rankings reflect the weighting given to each factor, and that actual responses were allocated to key categories by the survey team.

Figure 4.7 Factors used by car buyers to assess a car's environmental impact (web-survey)



While the group discussions that focused on participants' preferred environmental metrics generally supported the findings from the web-survey, the responses suggest a qualitative difference in the way 'fuel economy' and 'emissions' related metrics were understood by car buyers. The discussions reveal that **the concept of 'fuel economy' was much more familiar to consumers than was the concept of vehicle emissions (including CO_2).** In particular, car buyers consistently *reported* being more able to benchmark a figure for 'miles-per-gallon' than they were a value of CO_2 emissions.

Most people understand miles per gallon, don't they? [Male, Bristol, Intender]

Nearly everybody knows that 54.3 is good mileage to the gallon [Female, London, Recent]

My brain switches off automatically at the beginning, when I can't... when I don't understand what those g/kms mean [Female, Birmingham, Recent]

... I wouldn't know necessarily whether the CO_2 emissions were good for that kind of car, or not, without having to go away and look into it [Female, Bristol, Recent]

Obviously none of us knows [about CO_2]. Obviously it's not that important to us because if it was important to us we would know it [Male, Bristol, Intender]

If there's nothing there to compare it [CO_2] with, it means absolutely nothing to the majority of people [Male, Birmingham, Recent]

I wouldn't know 137 grams per kilometre, I wouldn't know if that was good or bad, but I know, roughly, that 54.3 is all right. It's not the worst in the world [Female, Bristol, Recent]

The focus group discussions also showed that **only some participants had an understanding (however simple) of the link between fuel economy and CO_2 emissions** – around half of the sample on the basis of the number of comments. This accords with the finding that at least half of car buyers in the sample viewed 'fuel economy' primarily as a cost proxy rather than an environmental one. It may also be the case that fuel economy was the only available 'handle' on environmental impact for those car buyers unable to benchmark CO_2 or link 'mpg' with emissions.

... obviously the less fuel you're using, the better you're driving the car and the more, the less damage you're doing to the environment [Female, Bristol, Intender]

Because of the banding, my understanding of the banding is the better the MPG, the better emissions you're going to have, which is where you end up with the band of your road tax [Female, Bristol, Recent]

Logically a car that does more to the gallon is more environmentally friendly than the one that does less [Male, Birmingham, Intender]

You could surely have two cars that were exactly the same miles per gallon but one was built with specifications which made it give out lower CO_2 emissions [Female, Bristol, Intender]

...even if it's got low, low-ish miles per [gallon]… I would imagine that doesn't necessarily mean it's good for the carbon emissions.. [Female, Bristol, Intender]

Although 'fuel type' was ranked as the third strongest indicator of environmental impact in both the web-based and focus group surveys, the issue did not form a significant part of the focus group discussions. Few participants spontaneously mentioned alternative fuel types (such as electric or 'gas' cars), with the exception of petrol-hybrids which were mentioned in at least two of the six groups. More often, comments on fuel type centred on the 'pros' and 'cons' of petrol and diesel fuels (e.g. diesel is more often associated with visible 'smoke' and also better fuel economy).

I just know that diesel's not so harmful to the air than petrol but I don't know why [Female, Birmingham AM]

I only think about they're [diesels] doing more to the gallon. ....you use less hydrocarbons and... Well, you're doing more miles to the gallon, so therefore you'll be more... hopefully put less hydrocarbons in, therefore pumping less hydrocarbons.. [Male, Birmingham AM]

As well as ranking 'engine size' as the fourth strongest indicator of environmental impact in the web-survey, throughout the focus group discussions, '**engine size' played an important role in participants' minds with respect to a vehicle's environmental impact**. Not only did a significant proportion of the focus group sample continue to believe that engine size was the key determinant of annual road tax (which is only the case for cars registered before March 2001), there was a prevalent view that engine size necessarily correlated with fuel economy. A common train of thought was that: larger cars require larger engines, larger cars necessarily have poorer fuel economy, and therefore cars with larger engines necessarily have poorer fuel economy. This is a key finding of this survey.

And logically in my mind, the smaller the engine size the more fuel efficient, and the more economical, and the more environmental friendly it is. [Female, Bristol, Recent]

I would say that the smaller engine cars are more environmentally friendly [Female, Bristol, Intender]

[Q: Does VED have any link to environmental impact?] Yes, because isn't it the smaller engines are cheaper? [Female, Birmingham, Intender]

With the BWM I bought the one with the small engine just so that I could still afford to run it [Male, London, Recent]

...well, it's economy... I had a two-litre before and it was just, you know, drinking petrol and, you know… so I just thought I would go for a 1400 or a 1600, yes, maximum sort of thing, yes [Male, London, Intender]

I think I'm right in thinking that the cars that are very low emissions, you get very low tax. I suppose that means smaller engines, does it? [Female, Bristol, Intender]

The 'lifecycle' factors ranked in fourth place include the issues of 'environmental cost to produce', 'recyclability', 'where made', and 'transport of parts'. At several points during the focus group survey, participants were questioned about lifecycle issues to gauge the potential demand for vehicle related lifecycle information. **While responses were mixed, a significant minority did appear to be interested in lifecycle information, with the caveat that it should be simply presented.**

... I would be interested in knowing the sort of percentage of the car that's British, you know, British-sourced componentry or whatever it might be [Male, Birmingham, Recent]

I'd like to be able to think about it [lifecycle issues] and it would be, I think, it would be really nice for people who are going to buy a new car to know a bit more about it [Female, Bristol, Intender]

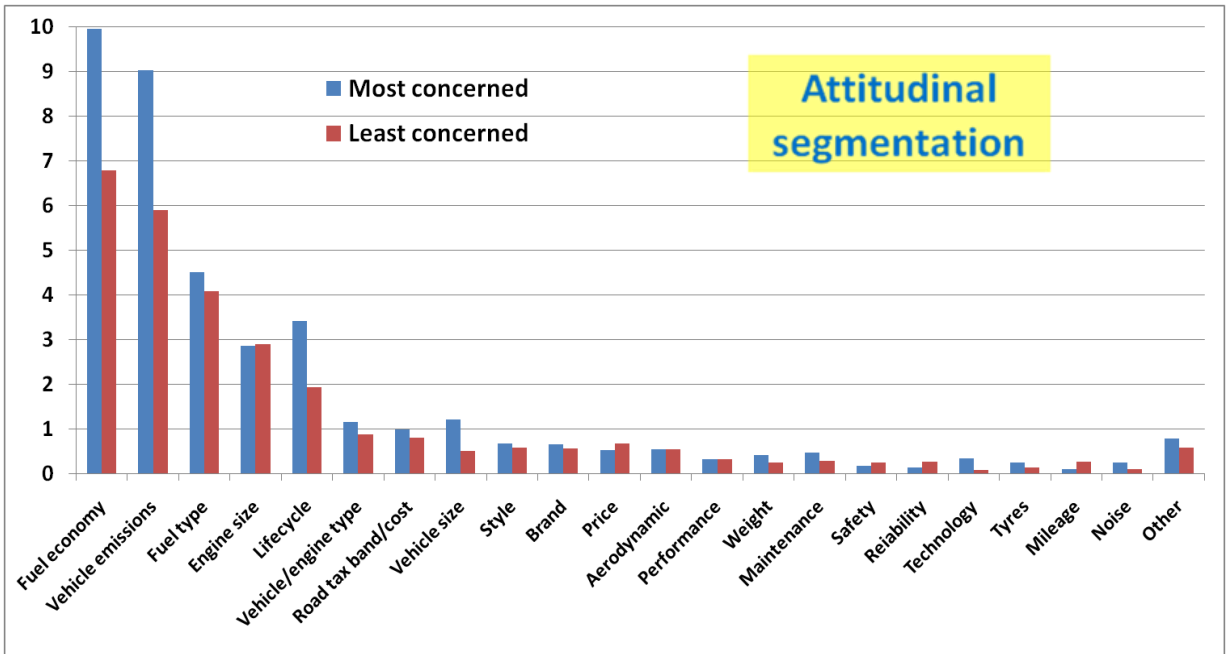
... you've got to get more fuel and where does it come from, it doesn't come locally, does it? You've got to get it from the middle of some sea somewhere or something. And it's got to be transported on other lorries or what have you. So, it's distance, isn't it, I suppose [Female, Birmingham, Recent]

... perhaps China would be considered a big polluter, so you may think, well, I'm not going to buy a car built in China. Also I think you said about the fact that it must be transported halfway across the world and

we were thinking about transport costs... Yes, I mean, there are certain things you might rather not buy from there because I know they've got poor child labour policies or whatever. So, you could transpose that into buying a car [Male, Birmingham, Recent]

[Referring to a hybrid car] I feel that that's a less environmentally friendly car because when that car's ready for scrappage, what are you going to do with all the acid out of the batteries and all that? These are things that come into my head and it's supposed to be environmentally friendly, but it's not really [Male, Birmingham, Intender]

Figure 4.8 Factors used to assess environmental impact according to attitudes (web-survey)

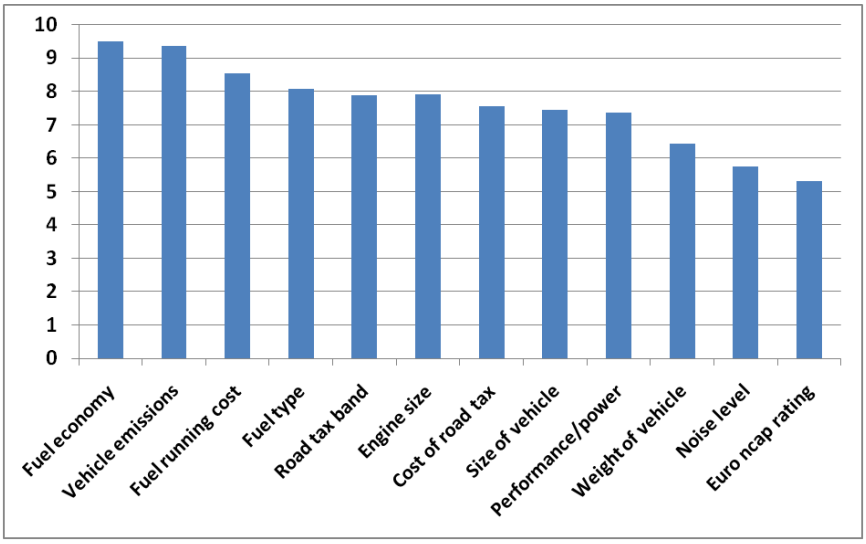


Results from the web-survey also show that a participants' attitudinal outlook influenced their rankings of the factors used to assess a car's environmental impact. For those 'most concerned' about, and willing to act on, environmental issues, 'fuel economy', 'vehicle emissions' and 'lifecycle' issues increased in relative importance, as compared to the 'least concerned' sub-sample – see Figure 4.8. However, for all attitudinal groups, all the factors maintained their relative rankings of importance.

As a check to responses from questions 7 and 8, question 9 of the web-survey continued to explore which vehicle environmental metrics are most used by consumers by presenting participants with a randomised list of 6 (from a possible list of 12) factors, and asked them to "rate each factors ability to indicate a car's environmental impact". As previously, participants scored these on a four-point Likert scale ranging from 'Not an indicator' (0) to 'Strong indicator' (3).

When presented with a randomised list of pre-selected factors and asked to 'rate each factor's ability to indicate a car's environmental impact', the web-survey results show that participants were more inclined to give a higher ranking for a larger set of metrics – see Figure 4.9. However, the results are broadly similar with 'fuel economy', 'vehicle emissions', 'fuel running cost' and 'fuel type' being ranked as the highest four factors that indicate a car's environmental impact. Given the tendency to view fuel economy primarily as a running cost, these results confirm the rankings of the lead metrics as shown in Figure 4.8.

Figure 4.9 Rating of pre-selected factors used to assess a car's environmental impact (web-survey)



4.6 Knowledge about current car's performance

Questions 10 and 11 of the web-based survey also aimed to identify the most common metrics used by consumers to conceptualise a car's environmental impact, but did so using a different approach by asking participants: "What do you know about the official performance of your current car?" The question gave them the opportunity to enter values for the following factors: fuel economy ('mpg' and 'litres/100km'), fuel cost (per year and per mile), engine size (litres), CO_2 (g/km) and road tax (band and annual cost).

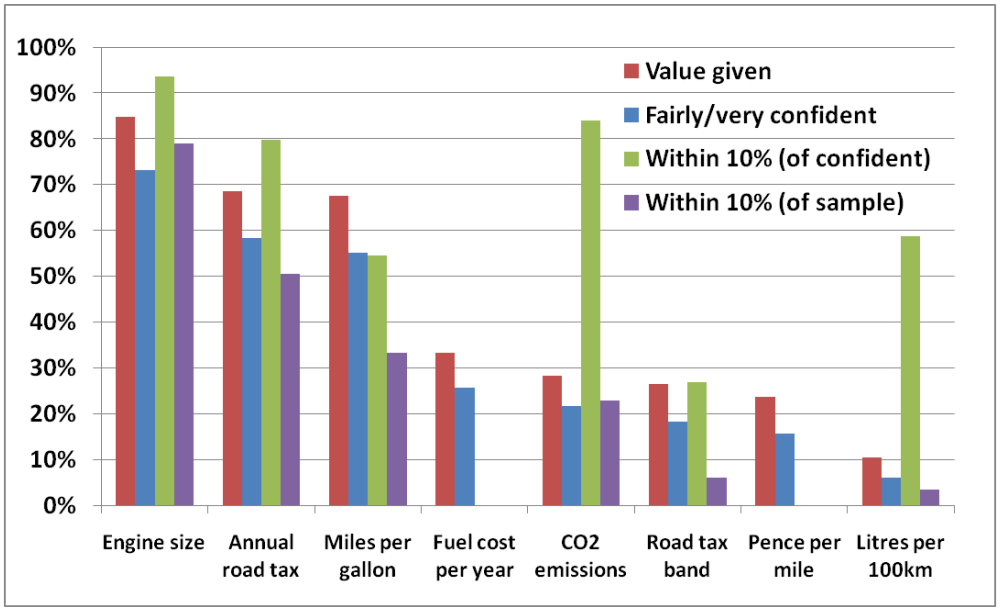
The number of responses (correct or otherwise) for each factor, together with the accuracy with which they were answered (within 10%), was taken to represent the degree to which these factors are 'front of mind' for consumers.[14] It was assumed that, as most car buyers would know the engine size of their car reasonably accurately, the result for 'engine size' was used as a baseline with which to compare the results for the other metrics. The results are shown in Figure 4.10.

Referring back to the two most highly ranked metrics from questions 7 and 8 (shown in Figure 4.8), **this question confirms the previous findings that 'miles-per-gallon' is a more 'front-of-mind' metric than CO_2** – over the whole sample, around 70% were able to volunteer a figure for 'mpg' compared to only 30% who could quote a value for their car's CO_2 emissions. Although less of a difference, around a third (34%) of the whole sample were able to accurately quote their fuel economy (within 10%) compared to only a quarter (23%) who correctly gave their CO_2 emissions.

This question shows an interesting second-order result – the minority (22%) of participants who were 'very' or 'fairly' confident about knowing their CO_2 emissions (compared to 56% for 'mpg') were more accurate in their knowledge of CO_2 emissions than 'miles-per-gallon (83% compared to 80% for 'mpg'). One interpretation of these results is that, whereas more car buyers have an idea of their car's fuel economy (through daily use), the value is likely to be different from the 'official' combined figure. In contrast, unable to test CO_2 themselves, they either know their car's official CO_2 emissions (accurately) or they don't, in which case they are unable to even 'guesstimate' a value.

[14] Participants' responses were checked with their car's actual official data using the CarweB database based on a car's Vehicle Registration Mark (provided on a voluntary basis by around 50% of sample).

Figure 4.10 Factors which indicate a car's environmental impact (web-survey)



Several other results to this question are of interest. Firstly, although the sample ranked 'road tax band/cost' well below the leading four metrics (scoring less than 1.3 on the 0-10 relative scale), the **car buyers in the sample were over twice as able to volunteer a value for annual road tax *cost* than they were road tax *band*.** This supports the evidence from previous research which finds that vehicle owners think of tax in terms of financial cost rather than in terms of CO_2 emissions or band.[15] Over the whole sample, around 50% were able to accurately quote their annual tax (within 10%) compared to only 5% who correctly gave their road tax band.

This finding is supported by the focus groups discussions. Even when participants were asked for their VED ('road tax') band, they often answered in terms of cost.

> *I don't think any of us knew which letter our cars fell into but we would have an idea of how much tax it was [Male, Birmingham, Recent]*
>
> *I'm not worried about the CO_2 emissions, other than I'm in the cheap tax bracket [Male, Bristol, Intender]*
>
> *[Q: Do you know what road tax band your car is in?] In the lowest one... £35 a year [Female, Birmingham, Recent]*
>
> *[Q: Do you think the road tax band is a measure of environmental impact?] That's money, it's not environmental [Male, Bristol, Recent]*
>
> *[Q: Are you interested in the Road Tax band for your car?] Only what it costs [Female, Birmingham, Intender]*

Secondly, as shown in Figure 4.10, around 35% of the web-survey sample were able to volunteer a value for annual fuel cost – around half of the percentage who were able to quote their car's fuel economy in terms of miles-per-gallon. This suggests that, in contrast to road tax, the 'mpg' measure may be preferred to its financial equivalent – a result which appears to contradict the findings of previous surveys which highlight the general consumer preference of cost metrics.

The transcripts of the focus groups are able to clarify this issue as the use of fuel costs as a metric for a car's environmental impact formed part of the structured discussion. These reveal that **although running costs (including fuel costs) were generally well received and understood by motorists interviewed, there was a common understanding that fuel costs could be an unreliable measure (of environmental impact, fuel budgets, etc) due to the unpredictable fluctuations in fuel price** at

[15] From 'mpg paradox' to 'mpg mirage': How car purchasers are missing a trick when choosing new cars. LowCVP, 2008.

the pump. It was also widely acknowledged that, as driving style affects fuel economy and therefore fuel costs, official figures of annual fuel costs were only of limited use.

[Q: So, if I said, here are two cars, the first one's £1,000 a year, the second was £900 a year, would that be useful information?] Yes. I think that converts the miles per gallons in real figures. You know, you don't tend to think, oh, this car does 25 per gallon, this does 20 per gallon, that's going to cost me XYZ whereas that does [Male, Birmingham, Recent]

Fuel prices fluctuate, so you can't really budget for it. It's not very well indicated because you never know from one day to the next just how much you're going to be paying [Female, Bristol, Recent]

If the dollar fluctuates or there's a shortage, or the government decides to put an extra five per litre on the tax, how can you plan your fuel costs for the next 12 months? It's impossible [Male, Birmingham, Intender]

Several comments also highlighted the lack of trust of using 'official' fuel economy data due to the difference between the way a car is driven under test and the driving styles of individual motorists.

I'm sure when it was tested, and I'm sure they can replicate it with a proper tester. Look at us, can you imagine us all driving the same. I don't think so [Male, Bristol, Recent]

It is going to differ, though, because miles per tank depends how you drive as well so that's not a great measure. If you go round with your foot to the floor all the time, you're not going to get as much as if you take it steady [Male, Bristol, Intender]

These figures that the manufacturers are quoting, are they quoting you doing the correct miles per road? ...What about if you're bombing up and down the motorway and you don't take notice of this, you know, so go into the 80 or 90 bracket, surely that all goes to pot [Female, Birmingham AM]

But there is no relevance to it because whatever the manufacturer's figures are, they're average figures based on what it could do. But I would drive 10,000 miles entirely different to every other person in this room driving 10,000 miles. And it's the manner in which you drive that determines your emissions [Male, Birmingham PM]

The option of having 'fuel cost per mile' information was also discussed as a possible alternative to figures for 'fuel cost per year/month/week' or 'fuel cost per 12,000 miles'. Although far from a majority view, a few participants indicated that a 'per mile' figure would be relatively easy to multiply up to a fuel cost for a particular journey of known length.

[Q: Would anybody be interested in the fuel cost per mile?] Yes, I think I would... because... I can relate to that because you know how many miles you do in, you know, any given time... You know, if you were going up to Scotland three times one particular week, that's not a normal week for you. So, the [fuel cost per week] wouldn't work but the mileage would [Female, Birmingham, Recent]

Lastly, regarding the expression of fuel economy using imperial and metric units, **a clear majority of the focus group sample favoured the use of 'miles-per-gallon' over 'litres/100km'**. While some have no objection to the use of metric units, 'miles-per-gallon' is favoured for everyday use. (However, it should be noted that the small number of participants who were confident in volunteering a litres/ 100km figure were more accurate in their knowledge than were those confident of their 'mpg'.)

100 kilometres and already I'm like don't know what that means. Forget it. Can't be bothered... It doesn't mean anything. I don't know how far 100 kilometres is [Female, Birmingham, Recent]

You see, you've got to convert the old forms of... You convert the kilometres and then you convert the litres and then you've got sort of pints per mile [Female, Birmingham, Recent]

To me this tells me the same as fridges... fridges and freezers, we're used to those now [Male, Birmingham, Intender]

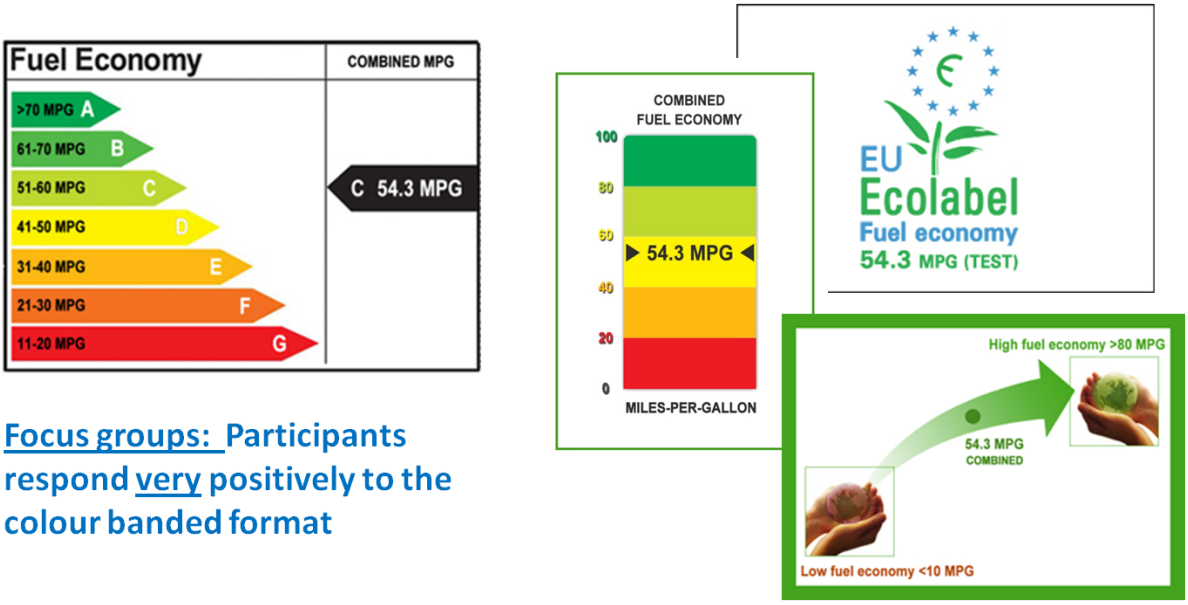
It's MPG, it's miles per… what do they do nowadays. I sort of struggle; I don't know a lot about that, but with litres it's like… gone [Male, Bristol, Recent]

It's strange that your car's in miles and then on the petrol it's in litres.. [Female, Birmingham, Intender]

4.7 Preferences for the presentation of model information

Focus group participants were asked to consider a single element of 'miles-per-gallon' information presented on four display options, each using a design element taken from a UK-style Fuel Economy Label, US-style Fuel Economy Label, EU-style Fuel Efficiency Label, and a (hypothetical) emotive 'Earth label' – see Figure 4.11.

Figure 4.11 'Miles-per-gallon' information presented on four display options (focus group survey)



Almost without exception **the focus group participants responded most positively to the colour banded design as used on the current UK Fuel Economy Label.** Many participants noted its familiarity – while a few remembered seeing the design on a Fuel Economy Label, more recognised its equivalent on either 'white goods' consumables or the new Home Information Packs. In all six groups, the EU flower label and 'Earth label' were not favoured, and few considered the alternative banded display option to be an improvement on the existing A-M design.

> *I think that's why it's good because it's a format that you're used to, so you can kind of relate to it... it's giving you a comparison, isn't it, really? Showing you where you are compared to all the rest. [Female, Birmingham, Recent]*
>
> *It's like user-friendly. You straightaway know what you're looking at.. [Female, Birmingham, Recent]*
>
> *... if you don't know... 54.3, is that good? ...That actually shows you, on the scale [Male, London, recent]*
>
> *The A to G for me, because I can relate to that in terms when I purchase washing machines and fridge freezers, the A to G is great [Female, Bristol, Recent]*
>
> *That looks quite official; that looks, they use that sort of thing on, um, the HIPS [Female, Bristol, Intender]*
>
> *... when you're looking at flats and houses it has this sort of thing on the back and then it tells you what's for the houses, whether it's good or bad. So it'd be handy to keep similar scales... It looks brilliant [Female, London, Intender]*

Focus group participants were then presented with full UK- and US-style Fuel Economy Labels adapted to show all relevant information for an actual (anonymous) UK model (see Appendix 2, and Figure 4.12 for a simplified version as used on the web-survey). Overall, the participants were split over which label they preferred, with each side noting strong points of each label. In support of the UK-style label, participants responded well to its colour coded A-M bands as currently used. Although there was some confusion on what the banding shows (CO_2 emissions), the colour format acted as a strong visual cue and was effective in communicating relative environmental impact.

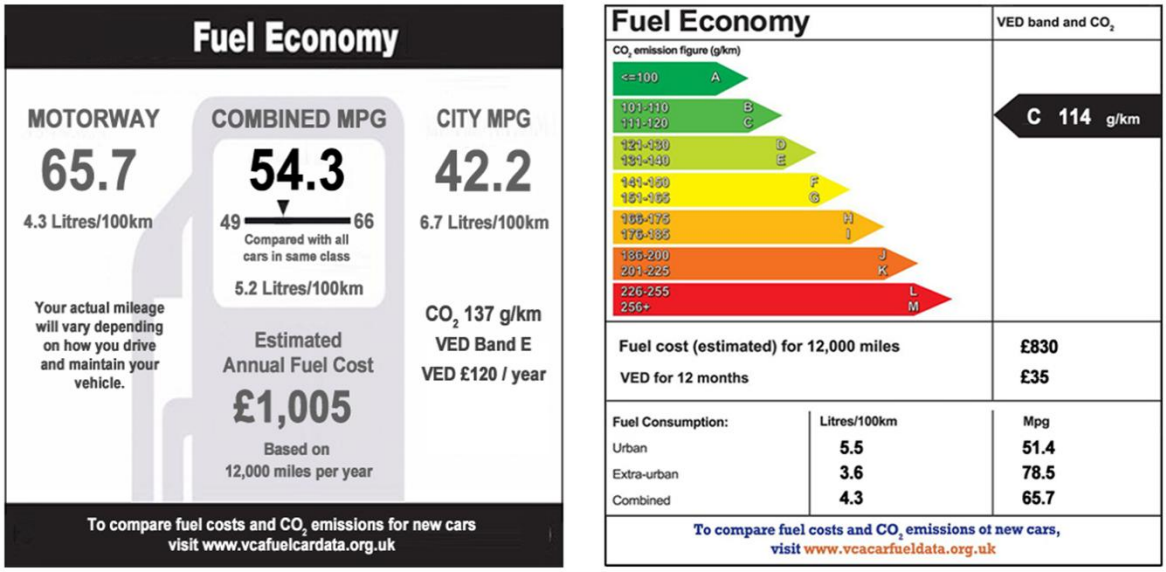
... you know, because we're used to this, we know where we stand with it. It makes sense because we can automatically think, oh, yes, I bought my [unclear] as an A because that was good, so that's telling me where I stand in that order [Female, Birmingham, Recent]

I just think it's a bit more, got a greater visual impact than the black and white. I think the scale works far better in that scale there [referring to US-style label] [Male, Bristol, Intender]

I like the colour scheme: it draws your attention to… rather than the black and white. That's a bit dull [referring to US-style label] [Male, London, Intender]

I like this one, just because it instantly tells me what I would be interested in, like miles per gallon... I do care about the environment but it's not my top concern. That tells me instantly. It sort of stands out, like the estimated fuel costs... [Female, Bristol, Recent]

Figure 4.12 UK- and US-style Fuel Economy Labels adapted for specific UK models (web-survey)



Those who supported of the US-style label liked the fact that it leads with fuel economy, which is displayed in large type. (Although the same information appears on the UK label, it was not noticed by as many participants.) This supports the previous finding that fuel economy (in terms of 'miles-per-gallon') is the preferred measure with which to compare vehicles' environmental performance. Supporters of this label also responded positively to the clear language used to describe the three driving conditions. **While the term 'combined' was generally understood, 'city' and 'motorway' were much preferred to the terms 'urban' and 'extra-urban' as appears on the current UK label.**

I like the way... they're more prominent on that; that the important, key amounts, numbers, are bigger and bolder. And, like you were saying about attention level, I switch off, I automatically just switch off. I saw that [UK label]: oh, God! [Female, London, Intender]

But this I prefer because it... You know, immediately I can look at those ['mpg'] figures and it means something to me immediately [Female, Birmingham, Recent]

Yes, I think so. It's the size of the text and the way that it's just displayed. So, it's catching your eye straightaway [Female, Birmingham, Recent]

There's three simple headings... Very easy, quick... If you've got three of those in a line, three windscreens when you are looking at cars.. [Second male participant: That's all people want to see isn't it, when you're looking for a car?] Not sitting down and analysing lots of figures [Male, Birmingham, Intender]

... it's simple. It's clear. It's precise, and it hasn't got all the different colours to take your attention. You can actually focus on what it's telling you. The other ones are too busy [Female, London, Recent]

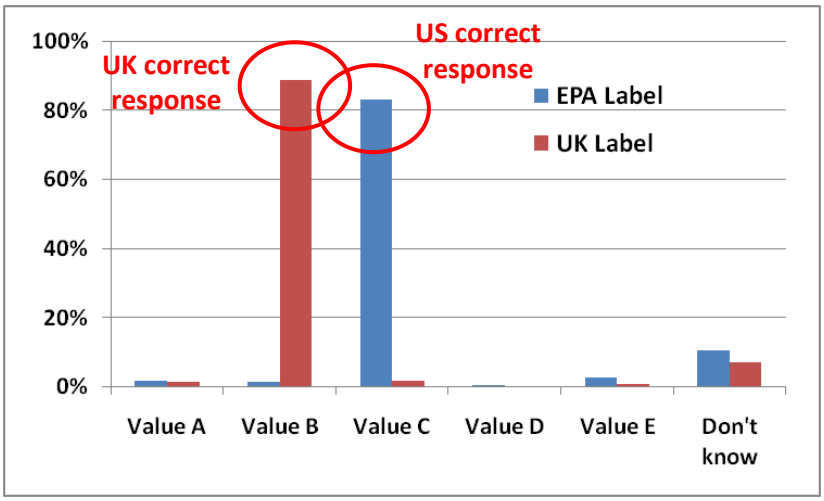
Can you put motorway rather than extra-urban, or put brackets, motorway? [Male, London, Intender]

It's just pretentious words though, isn't it, urban and extra urban? [Female, Bristol, Recent]

Several of the focus group participants spontaneously proposed that a combination of elements from the two labels would provide a better format, using the colour coded A-M banding from the UK label, but leading with fuel economy information in place of the CO_2 emissions. In this scenario, the 'mpg' information would be presented for three driving conditions 'city', 'motorway' and 'combined' and be in large type so it could be viewed from a greater distance.

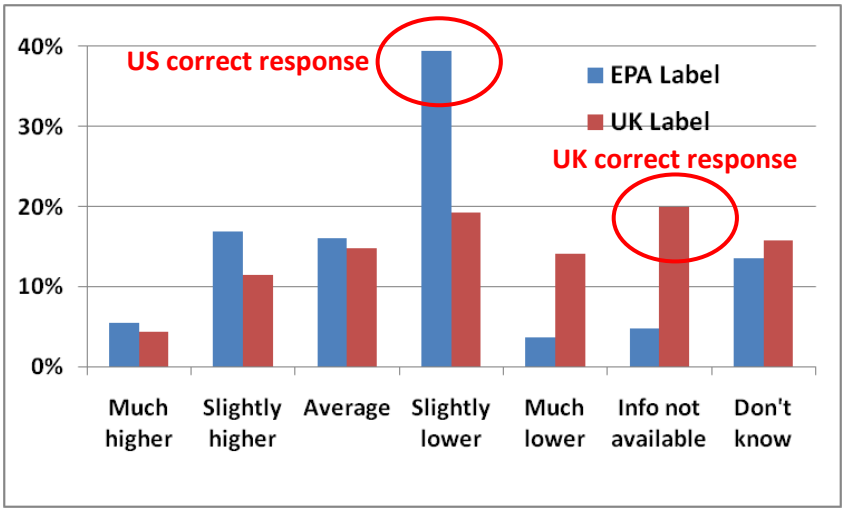
Questions 12 to 15 of the web-survey were also used to test consumers' ability to use the UK- and US-style fuel economy labels. Web-survey participants were first asked to lookup CO_2 values for two models using the respective labels – see Figure 4.12. The sample completed this simple task with a high level of accuracy (>80%), suggesting that the vast majority of the sample was able to accurately access the correct information – see Figure 4.13.

Figure 4.13 CO_2 look-up task for UK- and US-style fuel economy labels (web-survey)



Participants were then asked a more difficult question: "How does the fuel economy of this car [shown on the label] compare with the fuel economy of other cars in the same class?" As shown in Figure 4.14, whereas 39% of the sample was able to select the correct response for the US-style label, only 20% gave the correct answer for the UK-label, namely that the information was not available on the label. One interpretation of this result is that **the majority of users of the UK label are not clear that the model CO_2 emissions information is relative to an absolute scale rather than relative to cars of a similar size** (i.e. in the same class).

Figure 4.14 Model comparison task for UK- and US-style fuel economy labels (web-survey)



The web-based survey then asked participants to identify which sections of the UK- and the US-style labels they found most informative. Participants were able to select one or several parts of each label using an 'A' to 'E' key – see Figures 4.15 and 4.16.

The results show that, for the US-style label, participants reported finding area 'B' (Combined 'mpg' and relative within class information) most informative, with 'E' in second place (CO_2, VED band and annual VED cost). For the UK label, participants reported finding area 'E' (Urban, extra-urban and combined 'mpg' information) most informative, with 'A' in second place (CO_2 and VED band displayed within A to M colour banded context).

Figure 4.15 Most informative sections of US-style fuel economy label (web-survey)

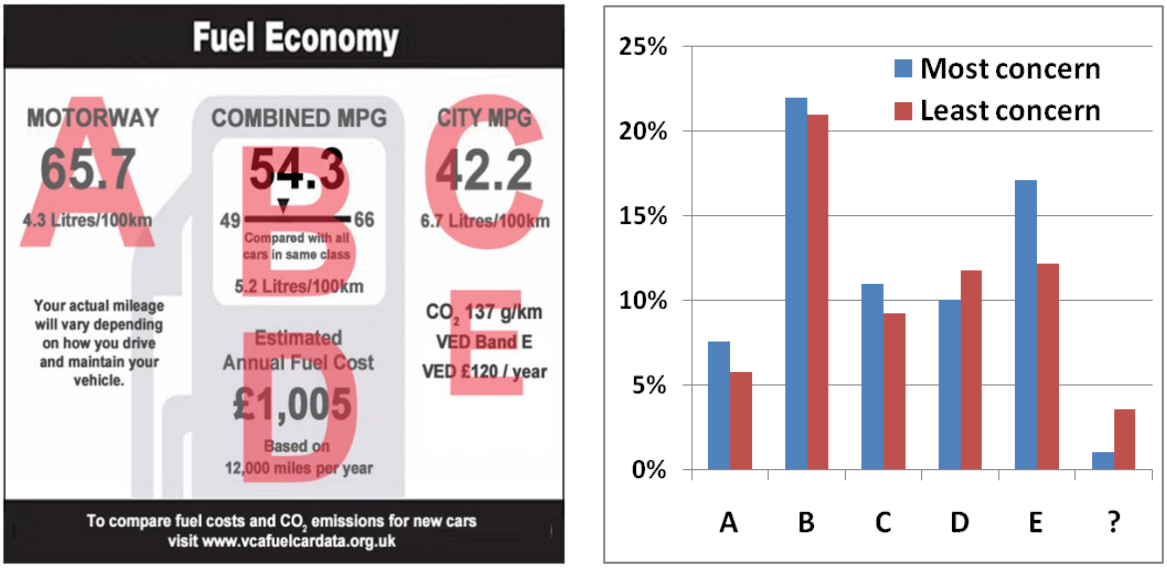
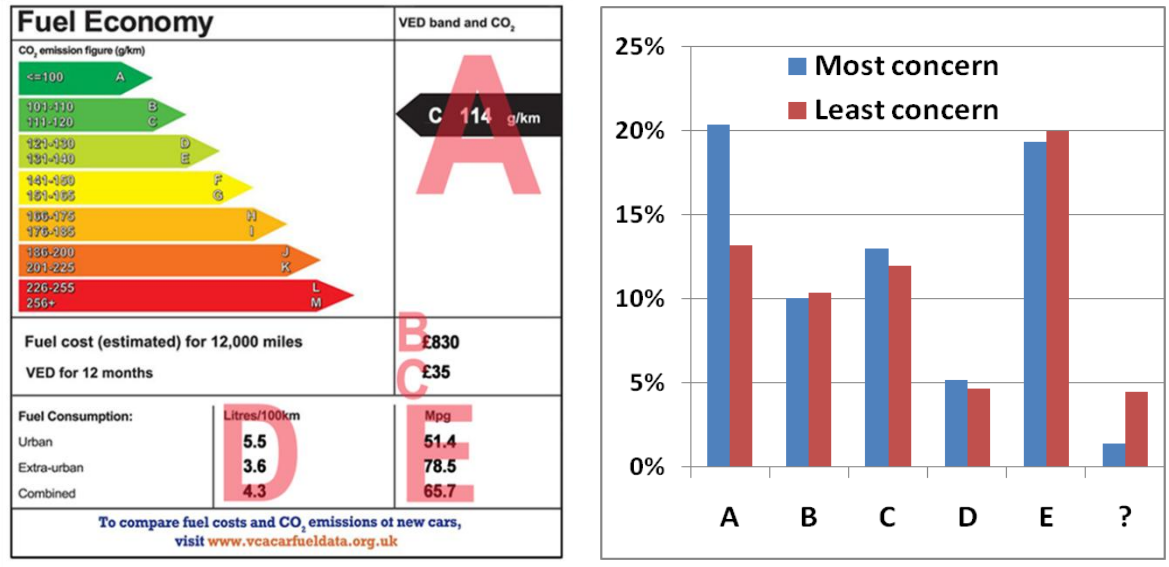


Figure 4.16 Most informative sections of UK-style fuel economy label (web-survey)

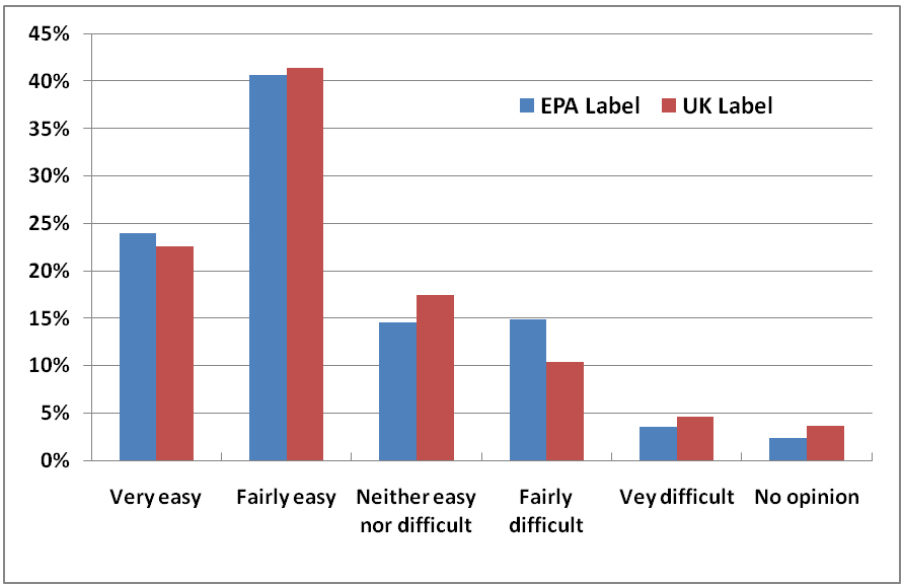


Analysing results for the extreme attitudinal sub-samples assessed by the survey ('most' versus 'least' concerned and willing to act on environmental issues), Figures 4.15 and 4.16 show that 'fuel economy' is the most popular informational element for both labels across all attitudinal types.

In the second part of questions 13 and 15, web-survey participants were also asked to rate the ease or difficulty of using the labels on a five-point Likert scale. Interestingly, the overall scores for both

labels are remarkably similar – see Figure 4.17. However, the issues which arose during the focus group discussions (described above) suggest that each label has elements which are well received; the focus group findings are likely, therefore, to provide more insight than is provided by the quantitative survey alone.

Figure 4.17 Participants views on 'ease of use' of car label (web-survey)



4.8 Demand for additional information on labels

One key issue addressed in the focus groups was to assess the demand for additional information including, in particular, the addition of 'best in class' model information for inclusion on the UK Fuel Economy Label. To test this, participants were presented with an amended UK Fuel Economy Label (showing comparisons with a 'best-in-vehicle-class' model) and a Swiss-style Fuel Efficiency Label (showing comparisons with models of similar mass) – both modified for a UK context using UK data (see Appendix 3).

Although the responses are varied, in general**, participants responded positively to the possibility of adding 'best in class' information to the UK Fuel Economy Label**. While there were a range of views about which additional elements are most useful (best- and worst-in-class CO_2 emissions displayed within A to M colour banded context; best in class fuel cost for 12,000 miles and annual VED cost; and best in class fuel economy information), 'fuel economy' emerged as the marginal favourite within the focus group sample.

> *When you're buying a car, you would look at this and think oh I would, there must be other cars I, you know, maybe I should be looking at other cars because this one's not particularly high on the scale of, you know, I could get a better MPG further up the scale [Female, Bristol, Intender]*
>
> *... you've got, on a scale of all cars, across the board, and then there's a smaller scale to show you where it is between your cars of similar size, and I guess then you can make a decision with that [Male, London, Recent]*
>
> *When I'm talking to dealers... you know, so which would you say compared with, you know, the Ford Focus or Fiesta or something. What's your equivalent to it? And that's what took me to the Corsa... So, for me that bit of information in that sheet would be excellent. [Female, Birmingham, Recent]*
>
> *If I'm buying a big car I want to see like for like on that. American style [Male, Birmingham, Intender]*

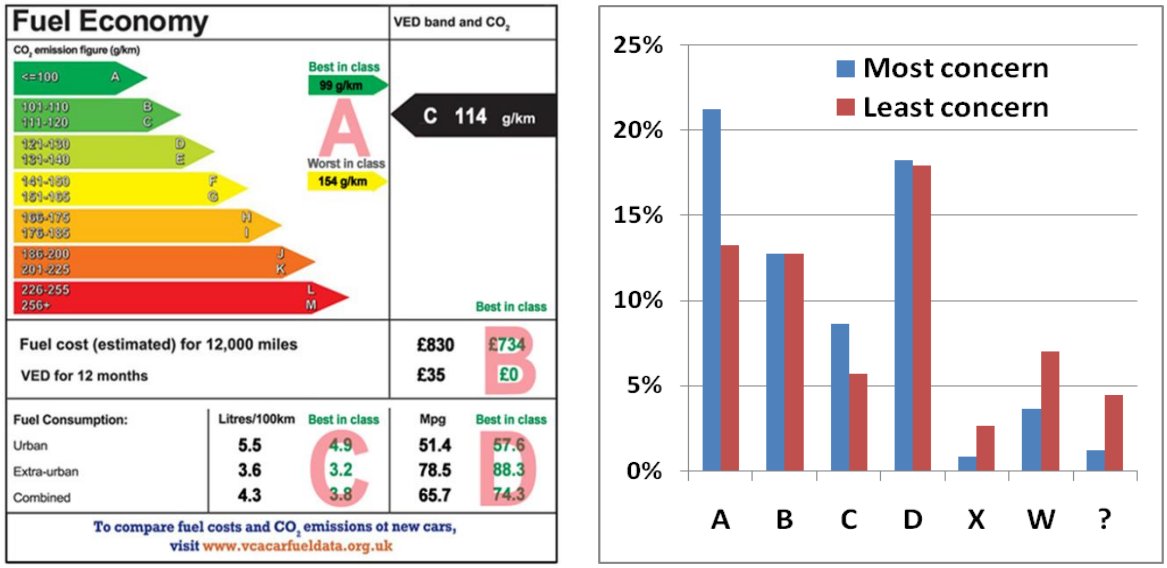
The related issue regarding the low level of knowledge about the typical range of fuel economies within any vehicle class (reported by several previous surveys) is highlighted by one comment in particular.

> *... if you were looking at that [UK label with best in class information], you'd think, really, there are cars with that disparity. I can't believe that there are similar cars with that disparity in mileage. Obviously I can't believe that. I find it very difficult to believe, so... But that would make me think. I'd think, blimey. You know, if somebody showed me that and showed me the one up here with similar cars down there, then that might make me think about it, but again, nothing to do with green issues [Male, Bristol, Recent]*

While stimulating some initial interest, the Swiss-style label (which compares models with a similar mass) was not well received, the main reason being the tendency of the car buyers surveyed to seek models of a particular size defined (in most cases) as those models within a vehicle class (e.g. supermini).

> *But you tend to buy your car in a bracket, don't you? You want a big car or you want a little car [Female, Birmingham, Recent]*
>
> *I'd only be interested on the same sort of size car that I was going to get [Female, Bristol, Recent]*
>
> *It could point at completely different types of cars. And you might be looking at a sports car, but it's a saloon car of the same weight, and performance and everything like that is completely different [Male, London, Recent]*
>
> *If they were the same weight, would that be fair in your view? Not really. You're talking about someone looking for a five door saloon or a family car and you're talking about someone looking for a two-seater... so what's the point in having that comparison? Because they weigh the same? [Male, London, Recent]*

Figure 4.18 Participants views on most informative comparative information (web-survey)



Web-survey participants were also asked (in question 16) to consider additional information for use on the UK fuel economy label. Participants were able to select one or several parts of each label using an 'A' to 'D', 'None', 'Without' and 'No opinion' responses (see Figure 4.18).

The results show that, for the 'D' (best in class fuel economy information) and 'A' (best- and worst-in-class CO_2 emissions displayed within A to M colour banded context). Option 'C' (best in class fuel cost for 12,000 miles and annual VED cost) also scored well in third place. Given the findings from the focus groups, it seems likely that Option 'D' scored well due to the familiarly of 'mpg' and its use as the preferred environmental metric, and option 'A' scored highly due to the popular reception of the colour-coded A-M design element.

Analysing results for the extreme attitudinal sub-samples assessed by the survey ('most' versus 'least' concerned and willing to act on environmental issues), Figures 4.18 shows (once again) that 'fuel economy' is the most popular informational element for both labels across all attitudinal types.

One important argument against the addition of new information on Fuel Economy Label that emerged spontaneously in several focus groups was that, **in presenting too much information, there is a danger of 'information overload'**. Although no quantitative figures are available, it is likely that, on the basis of the focus group discussions, for every car buyer who would find additional 'best in class' information useful, another would find the level of information excessive and 'switch off'. One possible solution (proposed by participants) was to simplify the basic design of the label, using the survey findings as already described.

There's just too much information there, so I'm starting to switch off [Female, Birmingham, Recent]

If it gets too complicated then we possibly wouldn't, you know... I would say this is... there's quite a lot of information on there. Um, if you go too much, you know, we'd almost think, right, shut down and we'll ignore that.. [Female, Bristol, Intender]

Because there's less to read and when you're having to take all these other things into consideration, I want less. Less is more to me [Female, Birmingham, Recent]

4.9 Responses to environmental information on websites

In the final stages of the focus group discussions, participants were shown two live websites: the official Government Act On CO_2 website (http://Act On CO2.direct.gov.uk) and the Travelfootprint website (www.travelfootprint.org) which is owned by the London Borough of Camden. On each website, models were selected and the participants were questioned about the format of the results.

In general, the focus group sample responded positively to the use of these websites as a source of useful vehicle information – and confirmed the use of the Internet in general as an invaluable and widely used resource. They also welcomed the ability to compare information for a number of vehicles, in contrast to the Fuel Economy Labels which are usually considered in isolation.

You've got to be wanting to find this information out before you start but if you are wanting to find it, it's excellent [Female, Birmingham, Recent]

It's easy to do that in your lunch hour sitting at your desk. Having your sandwich you could just easily do that as... without having to wander around the garages and all that sort of thing. It's something you could easily get hold of quickly [Female, Birmingham, Recent]

So if you've got your comparison up and you've got it at the bottom and it's giving me top ten and they fit on the one page, I will be swayed to look elsewhere where I may not have done [Female, London, Recent]

I think this is a really good idea. I like the fact that there is so much… I'm not an information person normally, but I think in this how, you know, you've got your… obviously your research is there, it's done for you, you've got your comparisons or comparables, you're already there [Female, London, Intender]

Although most participants were positive about the Act On CO_2 website, criticism of the site centred on the brand itself (some participants were 'turned-off' by the campaign) and the omission of key information on the results page – namely fuel economy ('mpg') and vehicle price data.

A, I wouldn't have thought of looking on this website for that kind of information, and, B, because of the ads they've got on TV that cover all kinds of CO_2 things, that would have turned me off from looking at this site at all [Female, Bristol, Recent]

The price is missing though, isn't it from the [unclear]? [Male, Bristol, Recent]

But I think [if it included] MPG, it would be better used, you know, people... because that it is important information [Female, Bristol, Intender]

It is helpful, but then it comes down to price, at the end of the day [Female, Bristol, Recent]

I suppose I can't see the miles per gallon [Female, Birmingham, Recent]

Is there somewhere that says, ah, but does it come in pink? So the ridiculous think is that you could save 462 quid but then it doesn't come in pink or it doesn't have a CD player, or it doesn't look as nice when you drive as something else. It's irrelevant [Male, Birmingham, Intender]

The Travelfootprint website, which displays purely environmental information in a visual format, was also well received and participants responded positively to the simplicity of the results page. However, most noted that, as the site did not also present basic fuel economy, price and vehicle size information , it was less useful than the more standard online resources.

I think that's more striking, on the screen is more striking than the coloured bands... It's just simpler. It's just two dots, 60, 40. I can see the difference. I don't have to look at the band [Male, Bristol, Recent]

I'm interested in loads of information, and there it is, simple. Look at it, look away, I've got the information [Male, Bristol, Recent]

I just like the clarity of it. I think it's very simple... I just think it's nice, clear, quick, very presentable [Male, Birmingham, Recent]

That's interesting, yes. That's visually an easier way to understand it [Male, Birmingham, Intender]

One general issue highlighted by the discussions about the Travelfootprint site support the findings regarding lifecycle information – namely that more complex scientific information has to be communicated as simply as possible to the consumer, if it is to be widely understood.

The more information available to us, you know, we will be more confident in the choice we make in buying a car, but it does have to be really easy for the vast majority of us to look at it and know almost immediately what we're looking at. You know, if it's very complicated then we won't look at it and won't use it [Female, Bristol, Intender]

I think the information needs to be short, simple but to the point. Not too overloaded. You've got your information but it's made quite clear. Short and simple [Female, Birmingham, Intender]

In the final minutes of the focus group sessions, facilitators demonstrated the use of a 'QR Code' reader[16] to link a Fuel Economy Label with model information as shown on the Vehicle Certification Agency website (see Appendix 4). By pointing the camera of a browser enabled mobile phone at a unique QR Code on a mock-up of a Fuel Economy Label, the phone's browser was automatically directed to the relevant model information page on the VCA website. Although far from a statistically robust sample, many of the participants were impressed by the ability to automatically link to online information, in addition to the data already supplied on the label.

I think it's the future. Realistically, that's the future. But, you know, that... it's good because our technological future we're going into, that works well with how we go [Female, Bristol, Recent]

Absolutely amazing. I think that's fabulous.. [Female, Birmingham, Recent]

I've seen that. I think on smart stamps that you get through Royal Mail, you can put on stamps and they've got that sort of similar image on there. No, that's very good [Male, Birmingham, Recent]

I like the gadget, I'm not sure whether I'd use it. I like the idea of the app and I can see further applications for that app. That sort of makes my mind doesn't it? [Male, Birmingham, Intender]

[16] Users with a camera phone equipped with a QR Code application can scan the image of the QR Code causing the phone's browser to launch and redirect to the programmed URL. This act of linking from physical world objects is known as a 'hard-link' or physical world hyperlinks. For more information, visit: http://en.wikipedia.org/wiki/QR_Code.

5. Discussion of results

The headline finding of this report is the high importance that new UK car buyers attribute to fuel economy (in terms of 'miles-per-gallon' or 'mpg'); not only as one of the most important car purchase factors, but also as a way of conceptualising a car's environmental impact, and as the preferred element of information which appears on the UK Fuel Economy Label.

When asked what factors were most important when purchasing their current car, results from the survey show that **'fuel economy/running costs', 'size/practicality', and 'vehicle price' are the three factors consumers consider most important during the decision making process.** 'Road tax band/cost' and 'vehicle emissions' (including CO_2) – the two categories of responses relating most directly to environmental issues – have little direct influence on car choice.

In the context of car purchasing decisions, fuel economy is primarily perceived by car buyers as a running cost rather than as an environmental proxy – 'cost effective' or 'cheap to run' are phrases often associated with 'fuel economy' and 'miles-per-gallon' or 'mpg'. While 'fuel economy' is sometimes understood to have a link with environmental impact, this survey estimates that this is only the case for at most half of UK car buyers.

While 'size/practicality' and 'vehicle price' are well known to be headline car purchase factors, the high web-survey ranking given to 'fuel economy' is a slightly unexpected result given a recent survey (conducted in 2009) which ranked this purchase factor in fifth place.[17] The higher ranking of 'fuel economy' by car buyers in this survey could be a result of the different method of data collection (open- versus tick-box style response), or be a reflection of the continuing 'credit crunch' which has significantly shifted car purchase patterns during the last 18 months.

The evidence from both the web- and focus groups surveys clearly shows that **factors relating most directly to environmental issues have little influence on purchasing decisions.** When questioned closely, very few consumers acknowledge that environmental performance had been a significant factor in their selection of vehicle. Even in cases where environmental issues are seriously considered by car buyers, lower emissions are often seen as a 'bonus' once the primary objective of lower running costs has been secured.

Recommendation 1: It should be recognised that car drivers are more familiar with fuel economy than other metrics that relate to environmental performance. [However, the authors acknowledge that volumetric measures (such as 'mpg') do not necessarily reflect the carbon intensities of different fuels, or the carbon emissions performance of different vehicle types (e.g. petrol, diesel).]

5.1 Importance of purchase factor 'trade-offs'

The survey reveals a tendency among car buyers to 'trade-off' purchase factors against each other. For the majority of the survey participants, selecting a car with relatively good environmental performance and/or fuel efficiency would (in their minds) necessitate compromising non-environmental aspects of vehicle performance and require an increase in capital costs.

One finding of particular interest is the *perceived* trade-off between fuel economy and vehicle size (the two most important factors identified in this survey). This confirms that once a vehicle class has

[17] LowCVP Car Buyer Attitude Survey, GfK Automotive, May 2009.

been selected, few car buyers are motivated to search for fuel efficient models as they tend to underestimate the range in fuel economy performance within a vehicle class.

A second common trade-off identified by this survey is between fuel economy (and environmental impact) and vehicle price. Many participants are of the opinion that the more fuel efficient models tend to cost more to buy – either as they involve new technologies (such as petrol-hybrids), or because manufacturers artificially increase the prices of the most fuel-efficient conventional models in response to demand, or to compensate for the lower fuel costs that accrue over time. This particular issue forms part of a wider perceived trade-off between price versus *environmental performance*; consumers tend to believe that the most environmentally-friendly models are technologically more advanced and necessarily cost more to buy.

Although they currently act as a barrier to rational car purchasing decisions, the identification of purchase factor 'trade-offs' can be viewed as an opportunity. By targeting these issues with appropriate educational and marketing material, consumers might be persuaded that they can 'have their cake and eat it' by actively selecting a model with good fuel economy (and/or environmental credential) within the vehicle class they require. The wider publication of 'best in class' information (on the Fuel Economy Label and elsewhere) could be one way that this might be achieved.

Recommendation 2: Car buyers should be better informed about the large range of fuel economy performance values within each vehicle class and, if possible, the financial implications of buying a 'best in class' car. [However, the authors acknowledge the difficulty in assigning some models to particular vehicle classes.]

5.2 Consumer conceptualisation of environmental impact

When asked what factors could be used to compare the impact of 'two outwardly identical cars', the survey finds that **cars buyers consider 'fuel economy', 'vehicle emissions', and 'fuel type' as the three strongest indicators of environmental impact**. 'Engine size' and 'lifecycle issues' are also use to some degree, while other factors (including 'road tax band/cost', 'vehicle size', 'brand' and 'weight') are ranked well below the leading three metrics.

When participants were asked to quote official performance information for their current cars, **'miles-per-gallon' also proves to be a more 'front-of-mind' metric than CO_2** – more than twice the number of participants are able to volunteer a figure for 'mpg' than a value for their car's CO_2 emissions, and around 50% more are able to accurately quote their fuel economy as compared to those who can correctly give their CO_2 emissions.

The survey also reveals a qualitative difference in the way 'fuel economy' and 'emissions' related metrics are understood by car buyers. The discussions reveal that **the concept of 'fuel economy' is much more familiar to consumers than is the concept of vehicle emissions (including CO_2).** In particular, car buyers are consistently more able to benchmark a figure quoted in 'miles-per-gallon' than they are a value of CO_2 emissions.

The discussions also show that **only around half of participants have an understanding (however simple) of the link between fuel economy and CO_2 emissions**. This confirms the finding that at least half of car buyers view 'fuel economy' primarily as a cost proxy rather than an environmental one. It may also be the case that fuel economy is the only available 'handle' on environmental impact for those car buyers unable benchmark CO_2 or link 'mpg' with emissions.

Regarding the expression of fuel economy using imperial and metric units, **an overwhelming majority of new car buyers favour the use of 'miles-per-gallon' over 'litres/100km'**. While some have no objection to the use of metric units, 'miles-per-gallon' is favoured by the majority for everyday use.

Throughout the survey, it is apparent that **engine size plays an important role in participants' minds with respect to a vehicle's environmental impact**. Not only do a significant proportion of new car buyers continue to believe that engine size is the key determinant of annual road tax, there is a prevalent view that engine size necessarily correlates with fuel economy. A common train of thought is as follows: larger cars require larger engines, larger cars necessarily have poorer fuel economy, and therefore cars with larger engines necessarily have poorer fuel economy.

When questioned about vehicle manufacturing and recycling, some participants do reveal an interest in knowing more about lifecycle issues. **While responses are mixed, a significant minority do appear to be interested in lifecycle information, with the caveat that it should be simply presented.** Specific issues of consumer concern include the environmental impact (and locality) of production, materials recyclability, and the transport of products from the point of production to the consumer.

Although the sample ranks 'road tax band/cost' well below the leading four metrics, it is interesting to note that **car buyers are over twice as able to volunteer a value for annual road tax *cost* than they are road tax *band*.** Moreover, whereas around 50% of participants are able to accurately quote their annual tax (within 10%), only 5% can correctly give their road tax band. This supports the evidence from previous research which finds that vehicle owners think of tax in terms of financial cost rather than in terms of CO_2 emissions or band.

One surprising finding from the survey is that, in contrast to road tax, the 'miles-per-gallon' measure may be preferred to its financial equivalent (e.g. fuel cost per 12,000 miles). The group discussion reveal that although running costs (including fuel costs) are generally well received and understood by motorists, **there is a common understanding that fuel costs can be an unreliable measure (of environmental impact, fuel budgets, etc) due to the unpredictable fluctuations in fuel price** at the pump. It is also widely acknowledged that, as driving style affects real-world fuel economy, official figures of annual fuel costs are only of limited use.

Recommendation 3: With a view to helping consumers understand the link between fuel use and CO_2 emissions, where fuel economy information (in terms of 'mpg') is used to promote environmental issues relating to car use, it should be provided in conjunction with information about vehicle CO_2 emissions.

Recommendation 4: For a future EU fuel economy label, further research into the most effective lifecycle metrics and formats should be considered, particularly to take into account the lifecycle implications of new technologies such as plug-in hybrid and battery electric vehicles.

5.3 Improving the presentation of environmental information

When presented with several options for displaying model 'mpg' information, almost without exception **consumers respond very positively to the colour banded A-M format used on the current UK Fuel Economy Label.** Many participants note its familiarity, while others recognise its equivalent on either 'white goods' consumables or the new Home Information Packs. After its widespread use for more than a decade, the format has achieved an almost 'brand' status, and the design is an important visual cue that environmental information is being presented.

However, when presented with UK- and US-style fuel economy labels for the same model, the car buyers surveyed are split over which label they prefer, with each side noting strong points of each label. Although there is some confusion on what the VED banding shows (CO_2 emissions), participants who support the UK-style label respond well to its colour coded A-M bands as currently used. **Those who support the US-style fuel economy label like the fact that it leads clearly with fuel economy, which is displayed in large type.**

Recommendation 5: For a future EU fuel economy label, fuel economy information (in terms of 'mpg') should be made more prominent (through better positioning and larger text-size) than it is on the current UK Fuel Economy Label.

This supports the previous finding that fuel economy (in terms of 'miles-per-gallon') is the preferred measure with which to compare vehicles' environmental performance. Supporters of the US-style label also respond positively to the clear language used to describe the three driving conditions. Furthermore, **while the term 'combined' is generally understood, 'city' and 'motorway' are much preferred to 'urban' and 'extra-urban' as appears on the UK label.**

Recommendation 6: For a future EU fuel economy label, the option should be considered to replace the use of the words 'urban' and 'extra-urban' with 'city' and 'motorway' (or similar) as currently stated on the UK Fuel Economy Label.

When tested on their ability to use the UK and US-style fuel economy labels, participants generally complete simple lookup tasks with a high level of accuracy. The overall 'usability' scores for both labels are also generally positive and remarkably similar, supporting the finding that each label has elements which are well received. However, when questioned about the availability of comparative information shown on the label, few participants are able to give the correct answer for the UK-label, namely that the information is not available. One interpretation of this result is that **the majority of users of the UK label are not clear that the model CO_2 emissions information is presented on an absolute scale rather than relative to cars of a similar size** (i.e. in the same class).

One key aim of the survey was to assess the demand for additional environmentally-related information including, in particular, the addition of 'best in class' model information. Although the responses are varied, in general**, participants respond positively to the possibility of adding 'best in class' information to the EU label**.[18] While there are a range of views about which additional elements are most useful (best- and worst-in-class CO_2 emissions displayed within A to M colour banded context; best in class fuel cost for 12,000 miles and annual VED cost; and best in class fuel economy information), fuel economy emerges as the most popular 'best in class' comparison metric.

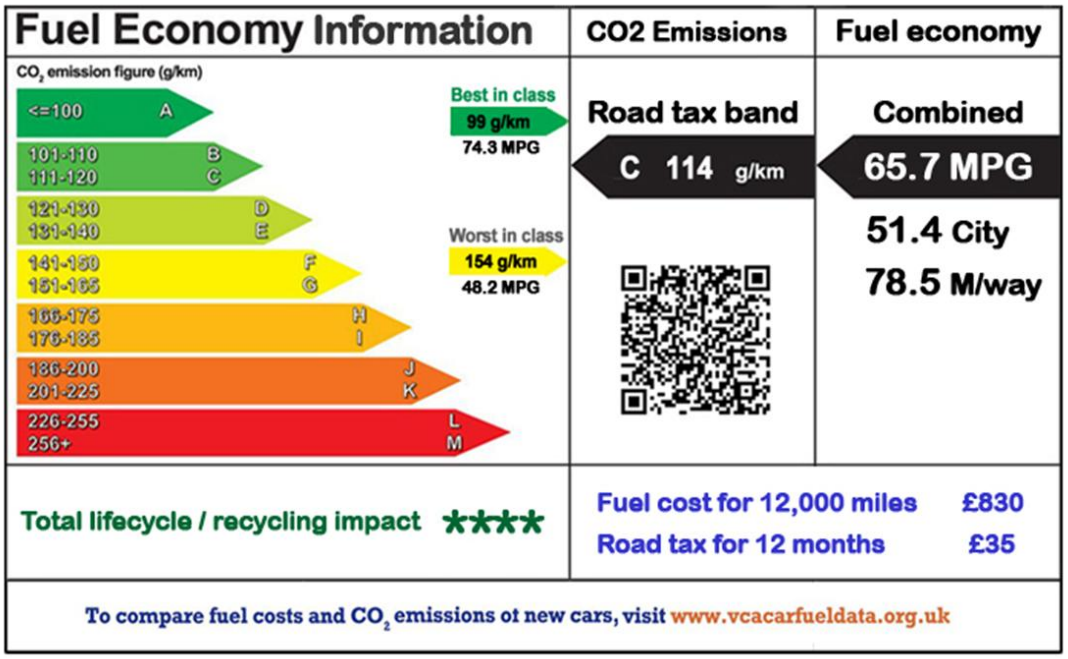
However, one important argument against the addition of new information on the Fuel Economy Label that emerged spontaneously in several focus groups is that, **in presenting too much information, there is a danger of 'information overload'**. Although no quantitative figures are available, it is likely that, for every car buyer who would find additional 'best in class' information informative, another would find the level of information excessive and 'switch off'.

Recommendation 7: For a future EU fuel economy label, consideration should be given to adding 'best in class' information (with a focus on 'best in class' fuel economy), while at the same time balancing the possible benefits of doing so with the equally important risk of overloading consumers with too much information.

[18] While stimulating some initial interest, the Swiss-style label (which compares models with a similar mass) was not well received, the main reason being the tendency of car buyers to seek models of a particular size defined as those models within a vehicle class (e.g. supermini).

Several of the focus group participants spontaneously proposed that a combination of elements from the two labels would provide a better format, using the colour coded A-M banding from the UK label, but leading with fuel economy information in place of, or alongside, the CO_2 emissions. In this scenario, the 'mpg' information would be presented for three driving conditions 'city', 'motorway' and 'combined' and be in large type so it could be viewed from a greater distance. Taking this approach to its conclusion, and based purely on the findings of this survey, the *implication* is that the UK Fuel Economy Label could be improved (from the consumer's perspective), possibly taking the form as shown in Figure 5.1

Figure 5.1 Speculative future mock-up of the UK Fuel Economy Label (as based on survey findings)



In addition to the Fuel Economy Labels discussed, the focus group participants responded positively to the use of websites as a source of useful vehicle information – and confirmed the use of the Internet in general as an invaluable and widely used resource. They also welcomed the ability to compare information for a number of vehicles, in contrast to the Fuel Economy Labels which are usually considered in isolation.

Although most participants were positive about the Act On CO_2 website, many participants noted the omission of key information on the results page – namely fuel economy ('mpg') and vehicle price data –and implied that they would have found the site of significantly more use had this information been present. While the Travelfootprint website, which displays purely environmental information in a visual format, was also well received, participants noted that, as the site did not also present basic fuel economy, price and vehicle size information, it was less useful than the more standard online resources.

Although far from a statistically robust sample, when the use of a 'QR Code' reader that linked a Fuel Economy Label with model information as shown on the Vehicle Certification Agency website was demonstrated, many of the participants were impressed by the ability to automatically link to online information, in addition to the data already supplied on the label.

Recommendation 8: Further research should be conducted to optimise the data sets provided on official vehicle information websites (e.g. Act On CO_2), and to assess the future potential of using 'hard-links' (e.g. QR Codes) as a consumer tool to link printed with online model information.