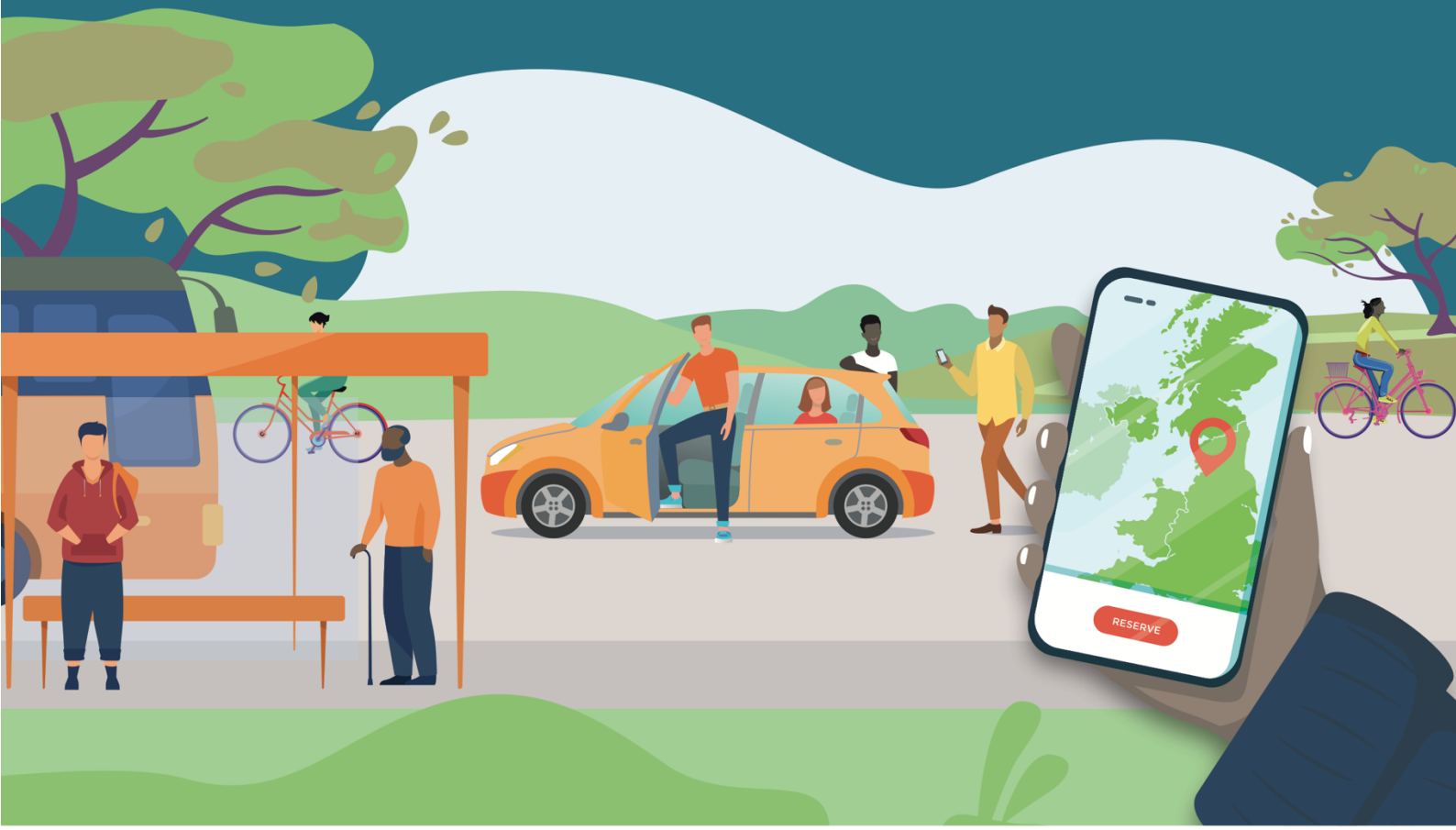
Full Annual Report

Car Club Annual Report Great Britain 2020



Department for Transport

Interreg North Sea Region SHARE-North European Regional Development Fund

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CoMoUK
Car Club Annual Report

Great Britain 2020

KEY FINDINGS

www.como.org.uk

ACTIVE CAR CLUB MEMBERS

229,464
Total members:
634,606

FLEET SIZE

Fleet size:
6,060 car club vehicles in Britain:

575
in Scotland

3,886
in London

1,598
in the rest of England & Wales

AIR QUALITY

LOW EMISSION ZONE

99%
of car club cars are Low Emission Zone and Clean Air Zone compliant

NO_x

89%↓
lower NO_x emissions than the UK average car

PM2.5

72%↓
lower PM2.5 emissions than the UK average car

CARBON SAVINGS

5,500
Car club carbon savings for Great Britain are equivalent to the lifetime CO_2e absorption of around 5500 trees

CAR AGE

1.6 YEARS

1.6YRS
is the average age of car club cars

REDUCING PRIVATE CAR OWNERSHIP

18.5
private cars taken off the road by each car club car in Great Britain

CARBON EMISSIONS

CO_2

26.5%
less emissions for the average car club car compared to the average UK car

COST SAVINGS

20%
of respondents stated that they couldn't afford to own a car, and this was their reason for joining the car club

ELECTRIC CARS

46%
of respondents reported having used an electric vehicle

10%
of the cars are electric. By comparison, less than 1% of cars in the UK are electric vehicles

OVER
80%
were satisfied with the electric car club experience

ONLY
31%
were satisfied with charging points

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2 Foreword

It gives us at CoMoUK great pleasure to present this 2020 car club research. This overall report is published alongside reports covering Scotland, England and Wales outside London and London respectively, all stemming from the same research conducted at the same time in this unique period in our history.

Our thanks to all our stakeholders – and in particular car club users and providers, the Department for Transport and the EU Inter-reg programme Share North – without whom this research would not be possible.

The Covid-19 pandemic has affected all of us far beyond transport, while inevitably shaping the experience and behaviour of British car club users. We expand on that in this report and hope that the post-pandemic momentum is towards public transport and sustainable travel and not away from it.

Yet for me the most important insight is how so many of our key findings are consistent with the many years of research we now have into this sector (our very first foray was in 2002).

That is to say that car clubs:

- take out substantial numbers of private cars (users told us wider availability of car club cars was a critical issue in encouraging them to dispose of car)
- per car emit much less than the UK average car
- are used by far more people per car than private cars, leading to far fewer cars for a population's motorised travel needs
- do not foster car use but rather cut net mileage and are mostly used off-peak
- boost use of public transport and walking and cycling
- provide much more affordable and more sustainable access to electric vehicles than purchase or lease

Based on this evidence, we contend that this set of interlocking virtuous circles are what the future of transport emissions in Britain will need to look like if our national legal limit of net zero greenhouse gas emissions by 2050 at the latest plus our forthcoming legal target of a 78% emissions cut from 1990 levels by 2035 are going to be met.

We cannot let these finding pass without acknowledging that this is a sector without subsidy support, that indeed pays to operate. It has almost no dedicated access to any electric vehicle chargepoints and is not part of strategic transport planning across the country and often not part of that at regional or local levels either. Yet it is delivering sustainable transport on the ground and we see some encouraging signs of policy progress. With the right policy environment it could deliver even more.

We look forward to working with stakeholders across Britain to help create that environment as part of the country's continuing turn towards a range of convenient, attractive and sustainable transport options.

Richard Dilks,

Chief Executive, CoMoUK

3 Introduction to the 2020 report

The research for the CoMoUK Car Club Annual Report was undertaken between 1 November 2019 and 31 October 2020. This research has been created by CoMoUK and has been administered by consultants from Cenex and Revolution9, with input and contributions from car club operators.

The Covid-19 pandemic has significantly altered how we live, work and travel. Personal circumstances have changed for many people and restrictions on movement have had a substantial impact on the car club sector.

4 Methodology

Over the last 14 years, CoMoUK has worked with car club operators to collect a range of data on the characteristics of their members and information on their fleets, as well as surveying car club members about their travel behaviour.

For this report, data was collected from the main national operators (Zipcar, Enterprise Car Club, Ubeeqo, Cowheels and Hiyacar).

The data was collected in four parts:

4.1 Members' survey

A survey was circulated to members of car clubs in Great Britain, which was distributed by the car club operators and promoted on social media. The survey was live from 9 November 2020 to 21 December 2020. Prize draws for free driving credit and vouchers were offered as incentives for completing the survey.

The survey of car club members was completed by 10,245 respondents, which is 5% of active members in Britain. Responses were comprised of 4,987 from England and Wales excluding London, 3,463 from London, and 1,795 from Scotland.

Not all questions were mandatory, or applied to all respondents, so where figures are given as a percentage, these represent the proportion of those who answered the question.

4.2 Operators' survey

Car club operators were requested to provide information about their membership base and utilisation patterns through an operators' survey. Data was provided covering the period from 1 November 2019 to 31 October 2020. This summarised the aggregate data for the membership base and their driving patterns, to identify usage profiles and any changes from either previous years or post-initial lockdown.

4.3 Fleet data analysis

Car club operators provided vehicle registration numbers (VRNs) for the vehicles deployed in the fleet between November 2019 and October 2020 (the analysis period). They also provided the date each vehicle joined the fleet and the date the vehicle left the fleet (if applicable). One operator also provided mileage for each vehicle during the analysis period and the location where each vehicle is usually deployed, although these two fields were optional. Where mileage was not provided, it was derived from the car club operator survey.

The databases from the Driver and Vehicle Licensing and Safety Agencies (DVLA and DVSA) were used along with VRNs to determine information such as make, model, registration year, fuel type, engine Euro standard, and measured CO_2 emissions provided by the manufacturer. The vehicle's safety performance in the European New Car Assessment Programme (NCAP) was established by matching the vehicle's DVLA make, model and year of registration to the NCAP database.

Please refer to the Appendix for more information about how fleet data was analysed.

4.4 Qualitative study

To get a deeper understanding into the factors that influence car club utilisation, and the barriers to increased use, Cenex undertook interviews with a selection of consumers across GB. The

interviews aimed to provide insight into motivations behind modal shift, the triggers and barriers to use, the customer experience and how these are impacted by Covid-19. The interviews covered:

- Experiences in using the vehicles (what works well, what does not)
- Reasons behind travel choices and how access to car club vehicles impact these
- How location, accessibility and other services affect the use of car clubs
- How Covid-19 has affected use and attitude towards car clubs

Interviewees were split into three groups:

- Seven car club users: members of a car club who use it at least once a month
- Seven 'lapsed' users: people who have joined the car club but do not use it or have not used it for a long time
- Six non-users[1]: people who live in areas where access and knowledge of car clubs is high, but they are not members

Interview participants were recruited from a range of geographical locations. When completing the members' survey respondents were asked if they were interested in taking part in further research. 2,835 respondents said they were interested in taking part in further research, of those 172 responded to the follow-up email. The non-users were recruited through contacts, community links and social media. Participants were selected to give a distribution of areas, ages and gender where feasible.

[1] For these participants, the sections of the interview that covered experience of using a car club was not included.

5 Impact of Covid-19

This year the broader market context has changed dramatically with Covid-19 changing work and leisure behaviours. Varying levels of national and regional restrictions have been in place at different times throughout the research period.

5.1 Changes in car club usage in Covid-19 pandemic

Since the start of the Covid-19 pandemic, users are evenly split between those that say usage of car club vehicles has decreased (32%) against those who say it has stayed the same (33%), with 28% increasing use.

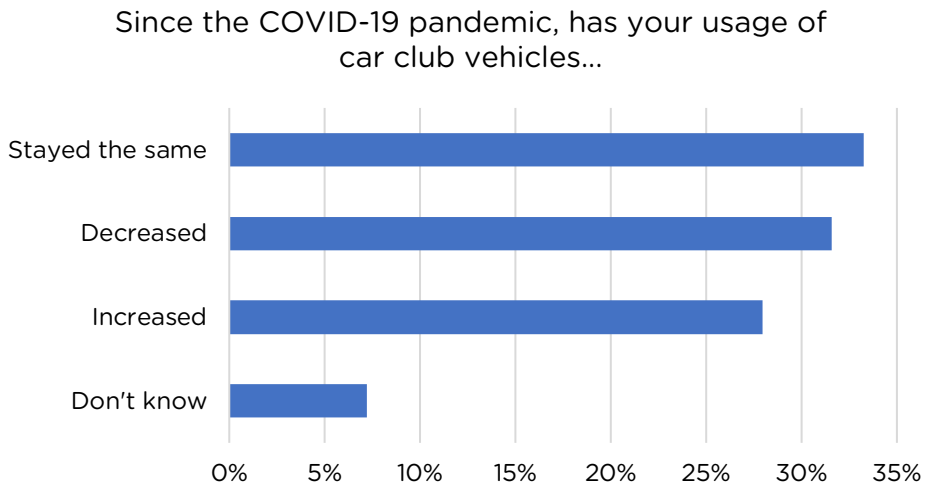


Figure 1: Change in usage of car club vehicles since the COVID-19 pandemic.

Where Covid-19 led to an increase in car club usage, analysis identified eight key underlying reasons, in order from most to least frequently cited:

- Avoidance of public transport
- Reduction in lift sharing
- Financial changes caused by Covid-19
- Increased need to access family members
- Increased leisure time, with lockdown creating a desire to get out of the local neighbourhood
- Moving house meaning additional need for transporting large/bulky/heavy items
- Sale of household/private car
- Increased need for delivery/collection of large items/bigger grocery orders

"At the moment I am avoiding public transport for COVID reasons, but also the journey that I am doing takes much longer on public transport (Bus-Tube-Bus) whereas in a car it is easy and direct." Richard, Richmond.

Where Covid-19 resulted in a decrease in car club usage, analysis identified eight key underlying reasons, in order from most to least frequently cited:

- Travel demands and opportunities reduced because of Covid-19
- Sanitizing and cleaning requirements inconvenient
- Increased time in between bookings reducing availability of cars
- Worries about inadequate cleaning/sanitizing
- Difficulties in booking plus fewer slots and cars, resulting in increased difficulties in finding a car available
- Changes in personal circumstances
- Cost

5.2 Covid-19 impact on past travel choices

The research explored the impact of Covid-19 on travelling habits of car club members. The chart below shows that over 56% of respondents have walked more than three times a week in the last six months, with a further 21% walking once or twice a week.

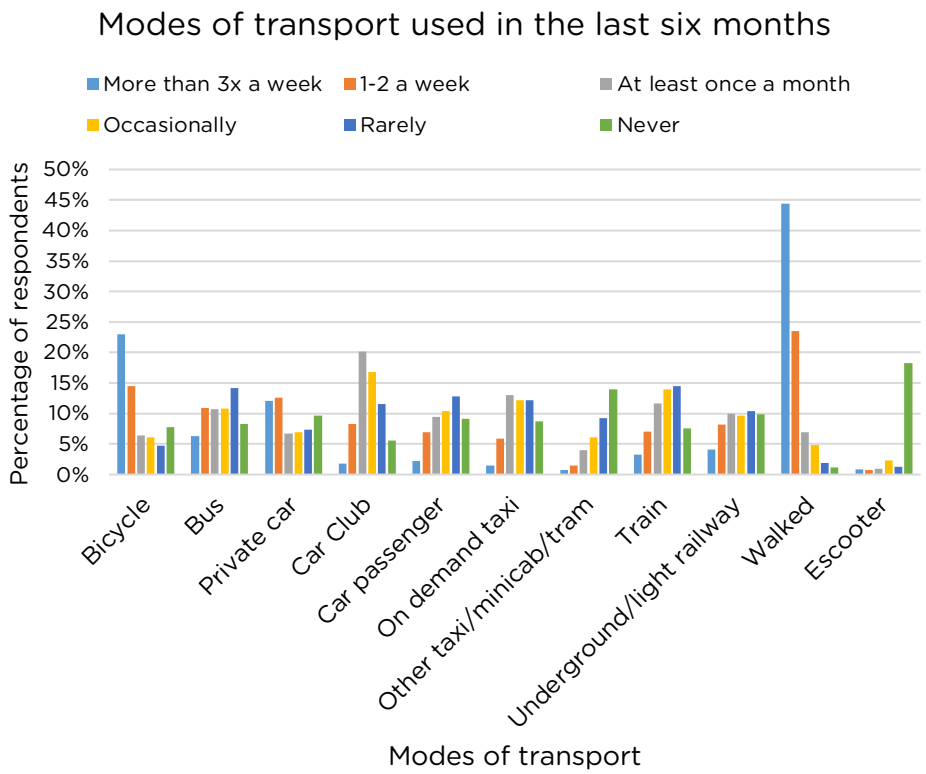


Figure 2: Modes of transport used in the last six months.

When asked about reasons underlying travel choices, 76% reported that their choices were affected by Covid-19, with 37% choosing that option which makes them feel safest to limit their exposure to Covid-19.

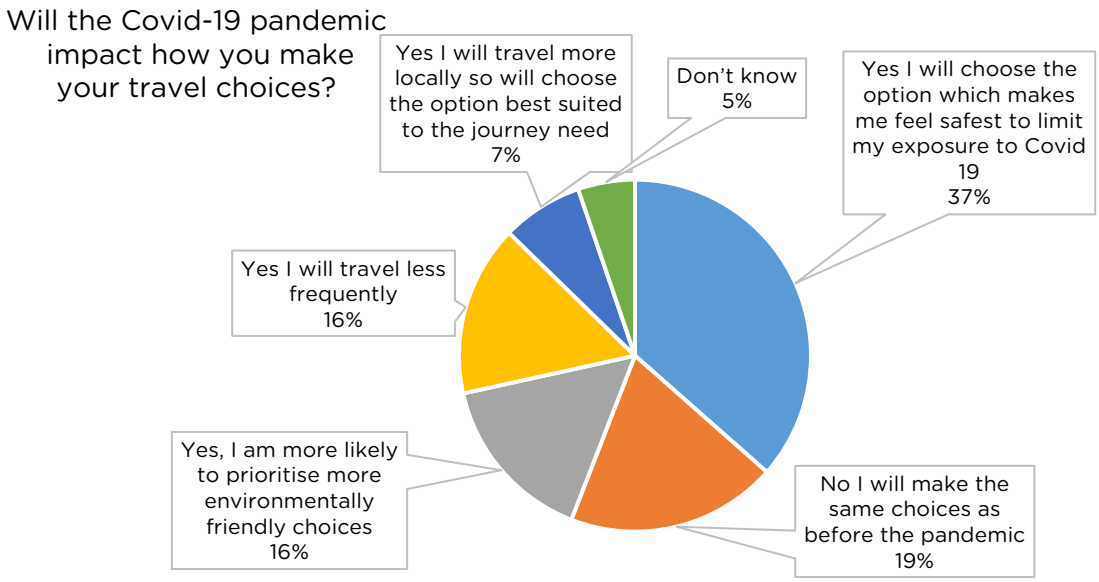


Figure 3: Impact of the COVID-19 pandemic on travel choices.

5.3 Covid-19 impact on future transport choices

Responses gathered on likely future car club usage (shown below) show that 33% expect to use car clubs more frequently, 14% expect to use them less frequently, and 32% expect usage to stay the same.

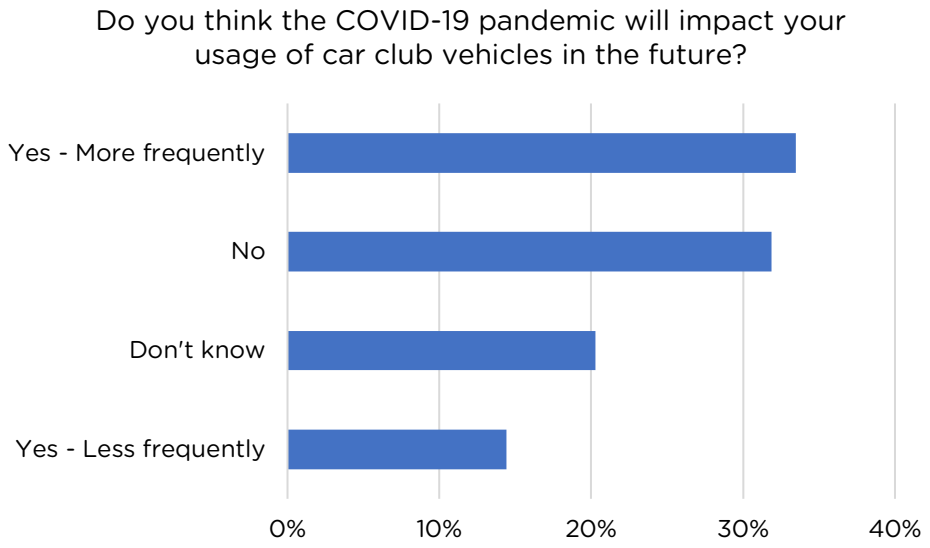


Figure 5: Change in future use of car club vehicles due to the COVID-19 pandemic

5.4 In-depth interviews: impact of Covid-19

5.4.1 Concerns over safety and virus transmission

Most interview participants reported that they were happy to use car clubs and had no concerns over sharing the vehicles with others. Some had increased cleaning the car themselves, many reported doing this at the beginning, but less so now. There was a mix of responses on what they expected from the car club company. The majority stated they do not expect the car to be cleaned after every booking.

Interview participants were more concerned about using public transport in comparison to car clubs, as they felt less in control of the situation. Although they were happy with the measures being taken by public transport providers their concerns related to behaviour of other travellers. Although most of the interviewees reported using public transport, they stated they were trying to avoid it because they felt they should, rather than out of concern for safety.

5.4.2 Impact on travel and future transport choices

Interviewees reported travelling a lot less in general, but they were more likely to use the car club for the trips they were taking. The most frequent types of journeys for which a car club were used were shopping, moving large items/home decorating, caring for family and friends, and leisure/exercise.

Most interviewees were uncertain about future effects, but those that live in large cities expect to be able to return to using public transport. The largest change is for those that expect to continue to work from home more and therefore use public transport less. The non-users who owned cars either worked in a role that required the use of their own car or stated they would still need/want their car for leisure trips and shopping.

6 Members' survey results

This section presents the results of the survey of car club members in GB.

6.1 Length of membership

Just over two thirds of respondents have been members for two years or less with only 14% having been members for more than 5 years.

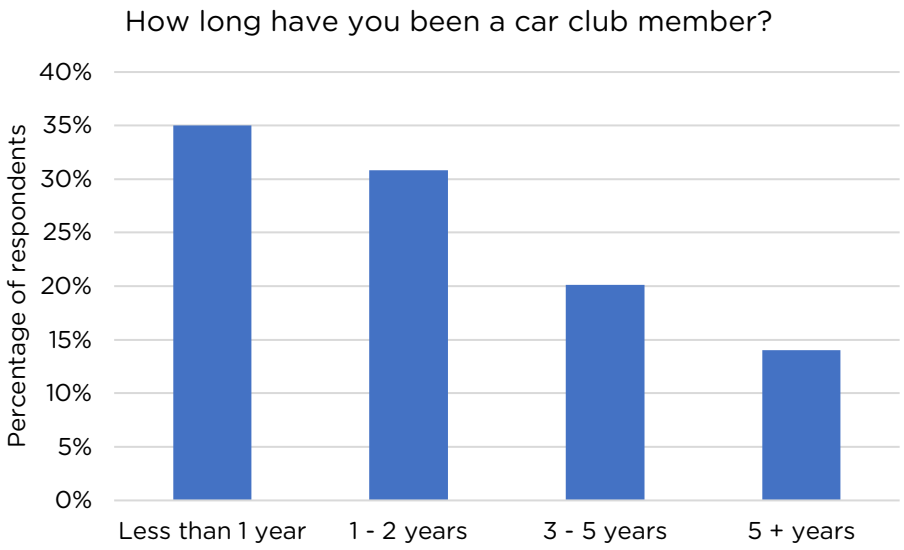


Figure 4: Length of car club membership.

September was the peak month for joining during the last 12 months, with nearly 20% joining during this month. Cars are overwhelmingly the most widely used vehicle (88%) with only 9% of respondents using vans.

6.2 Factors affecting awareness of car clubs

Respondents were asked how they first became aware of car clubs. 28% cited word of mouth while 25% said that they had seen a car club vehicle on the street.

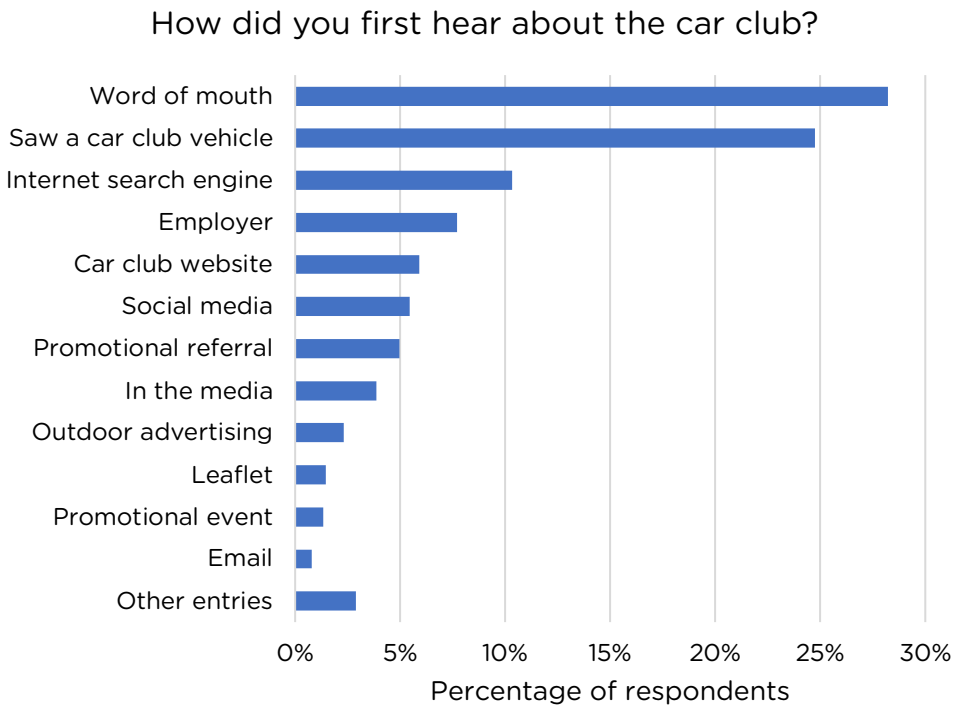


Figure 5: Factors affecting awareness of car clubs.

6.3 Initial membership expectations

Respondents were then asked to identify their initial expectations for car club membership. 45% expected to make regular use of the membership reducing reliance on running a private vehicle. 10% had a one-off specific need - the majority of these were linked to moving to a new house although shopping or day trips were also identified.

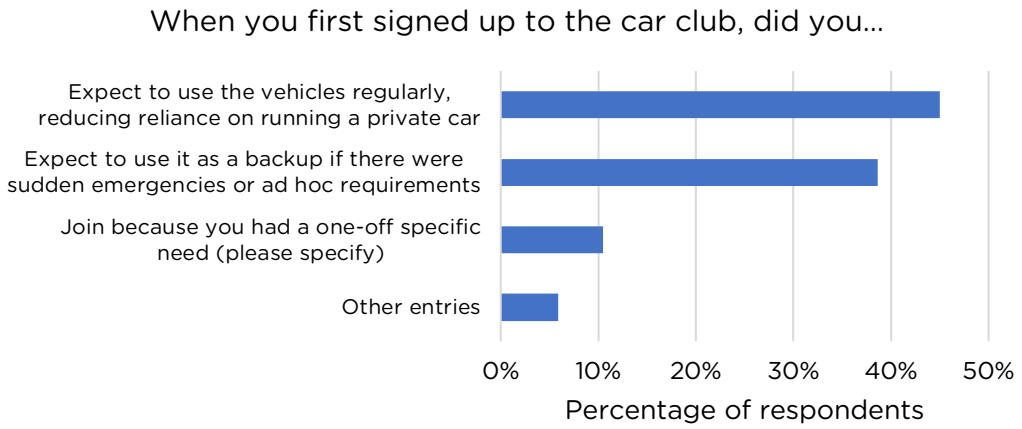


Figure 6: Initial membership expectations.

6.4 Reason for joining a car club

Among respondents who answered a question about owning a car prior to joining a car club, 53% did not own a car prior to joining a car club.

6.4.1 Reasons for joining car club – those who previously owned a car

Respondents were asked to identify the specific reason(s) that prompted them to join the car club with responses split between those who owned a car prior to joining the car club and those who did not. For those who had previously owned a car, reasons identified in the survey are shown in the chart below. Of the choices provided, the highest number of responses was from those who said they joined the car club and sold/disposed of their car (18%). Notably a further 15% chose not to replace a car requiring repair, meaning in total 33% of respondents who had a car reduced their ownership.

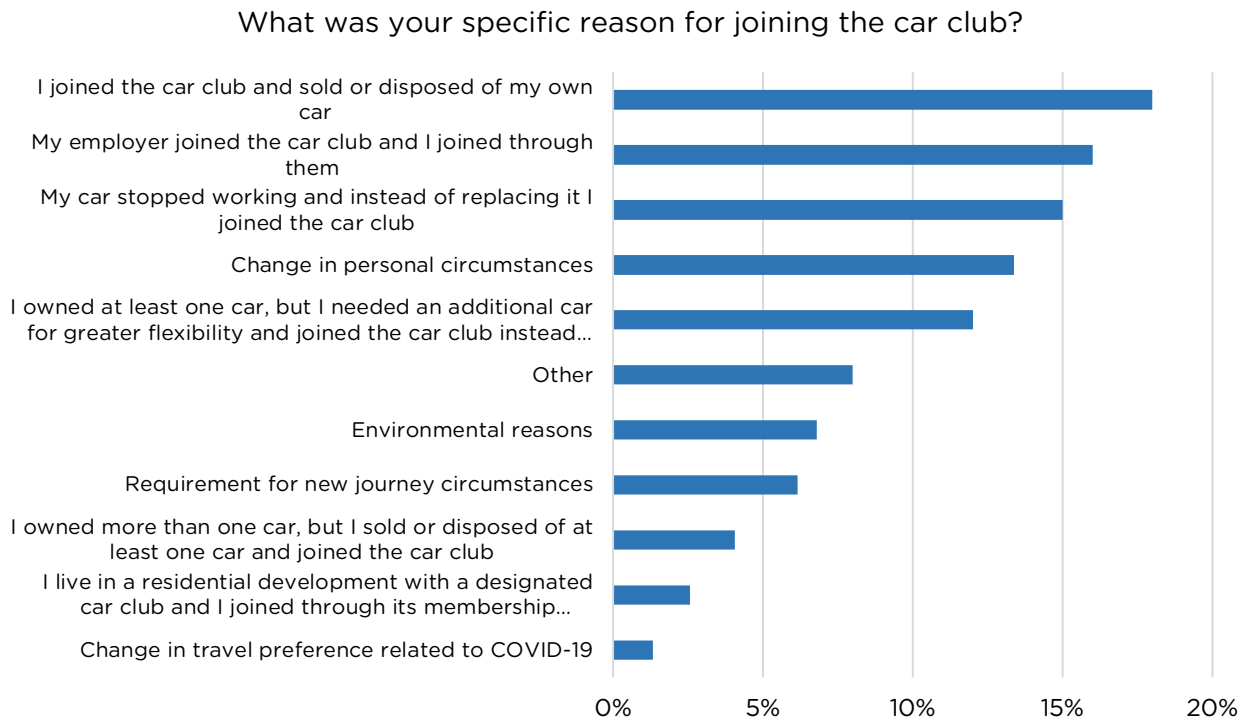


Figure 7: Reasons for joining a car club for those who previously owned a car.

6.4.2 Reasons for joining a car club – those who previously had not owned a car

By contrast, those who had not owned a car prior to joining the car club were more consistent in their motivations for joining the car club, with wanting to gain access to a car being the primary reason for 50% of respondents. A further 20% chose the car club as they could not afford to own or run a private car. Only 16% of respondents cited 'Other'. These responses focused on environmental concerns, need for occasional use of a car and cost considerations.

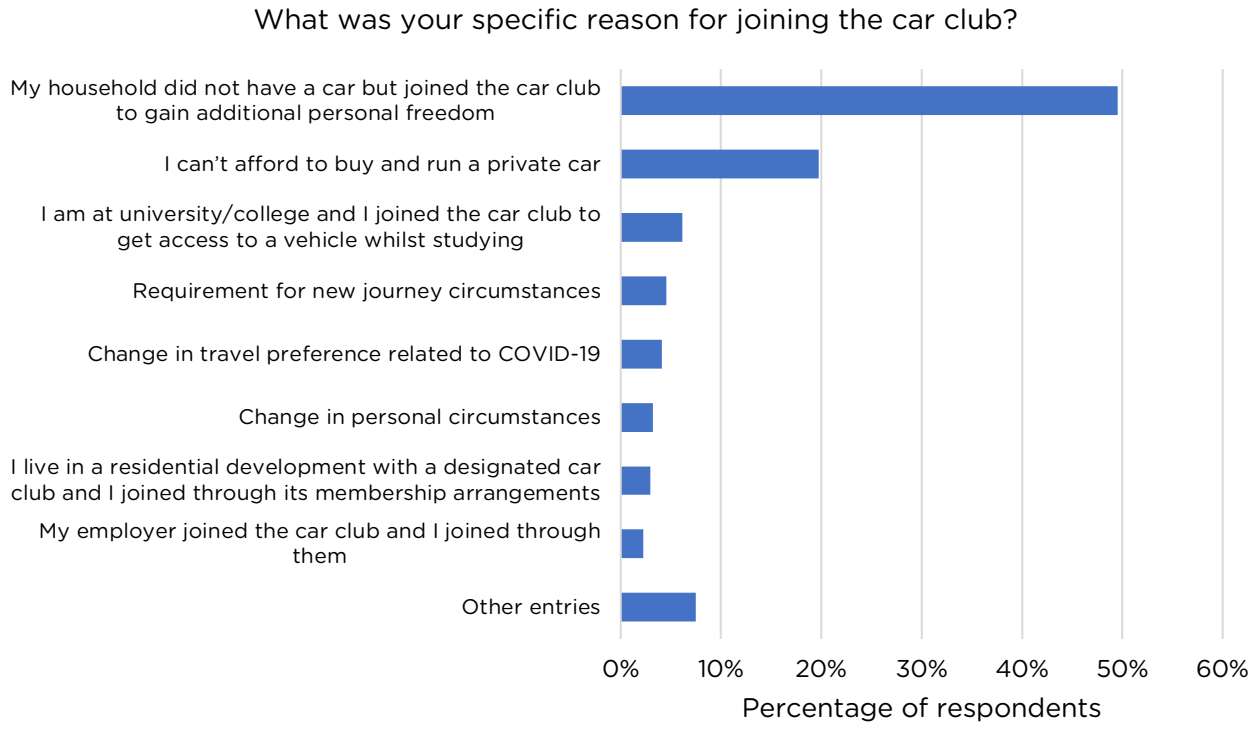


Figure 8: Reasons for joining a car club for those who previously had not owned a car.

6.4.3 Qualitative insights into reasons for joining a car club

Interviewees' reasons for joining a car club can be split into three categories:

- Wanting to dispose of their car: car clubs being an enabling factor that means they can still complete all the journeys they need to through access to a car club vehicle.
- New journey pattern: for example, moving home or changing job, either enabling them to be less dependent on their own vehicle and/or presenting the need to make trips to family/friends that cannot be done with public transport.
- Specific/one-off journey: Need for a vehicle either to travel somewhere or transport something as a one-off. Conversion to a regular car club user can develop if the other two circumstances present themselves.

The main enablers or pull factors identified which will encourage consumers to join a car club are:

- A car club operating with more than one car available nearby. Most users reported being aware of a car club because they saw vehicles on the streets, rather than through marketing or communications.
- Public transport availability and capability – it is unlikely that all journeys would be replaced by a car club. There must be other options available for some journeys.
- Expectation that they will save money when compared to their existing journey choices. For many consumers this comparison is made against public transport rather than private car use. Making subscriptions for public transport and car clubs more joined-up would be an advantage and incentive to many users.
- Journey time and flexibility: among some consumers there is a willingness to accept a higher cost to achieve greater flexibility.

The main triggers or push factors identified which may influence consumers to join a car club are:

- Size and type of car available, particularly for those joining and using the car club for a specific reason (moving to a new house, large object). Consumers in inner cities prefer smaller cars and those in suburban and more rural areas want a larger variety of cars. For some, the opportunity to drive different cars and try out new technology is a big bonus of the car club – particularly the younger interviewees.
- The perceived hassle as well as cost of car ownership can persuade some people to give up their vehicle. Challenges around parking permits and regulations are particularly relevant to users in inner cities.
- Whilst there are few social norms around the use of car clubs, there are social norms in place around the use of cars. For example, the use of a personal vehicle to drive into the city centre is viewed as unusual and unnecessary.

The main barriers that may stop consumers from joining a car club are:

- Social norms around aspiring to own a car are more prevalent in suburban and rural areas, with infrastructure and lifestyles built up around personal car usage meaning there is resistance to alternatives such as car clubs.
- Difficulty in reserving a car when and where it is needed has increased as an issue during Covid-19 as some vehicles were removed from the fleet and the cleaning pledge decreased availability. Providing a substantial amount of driving credits to be used in the first few months appears to be an effective way of encouraging usage and therefore forming a habit.
- Needing to make journeys with younger children is a major barrier to whether someone feels that car club usage is feasible. Specific concerns related to the hassle of taking a car seat, need for greater flexibility, and the need to take more personal items.
- Having a job or lifestyle with a requirement to use a car regularly makes it difficult to rely on a car club. This could potentially be overcome via employers introducing car club membership of pool cars. Evidence from both the interviews suggests that particularly in suburban areas employer led pool car clubs are a significant facilitating factor.

6.5 Use of car clubs

Car club members use the vehicles regularly: 48% reported having used the service in the last 30 days. Only 7% of members have not hired a vehicle at all over the last 12 months.

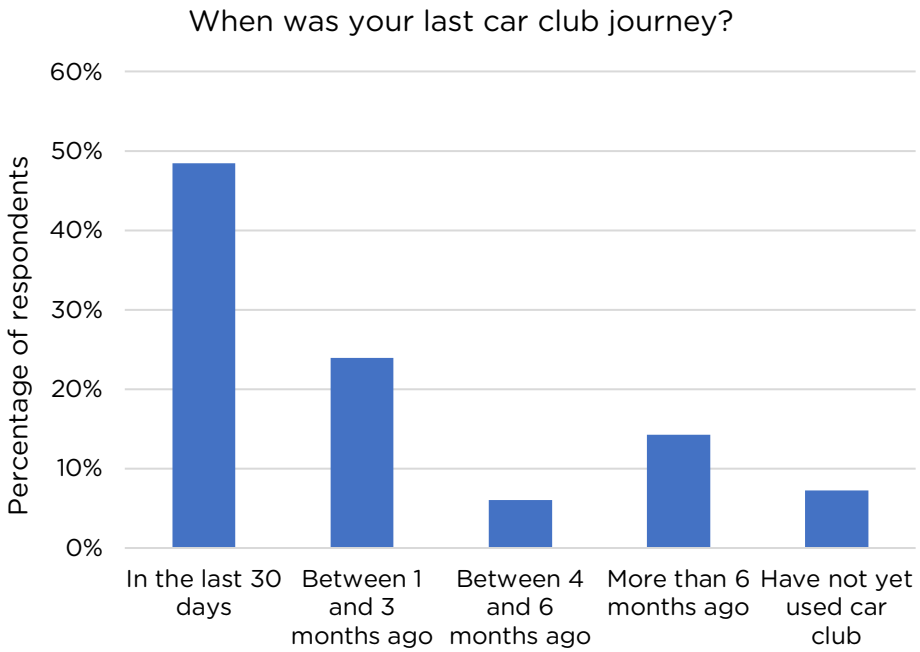


Figure 9: Timing of the last car club journey.

Among respondents who have not used a vehicle in the last six months, Covid-19 has been a significant factor with 38% citing this as the reason for non use. 17% also used other modes for the trips and a further 11% said they only needed the car club as a back up. 9% said the cars were not close enough to them.

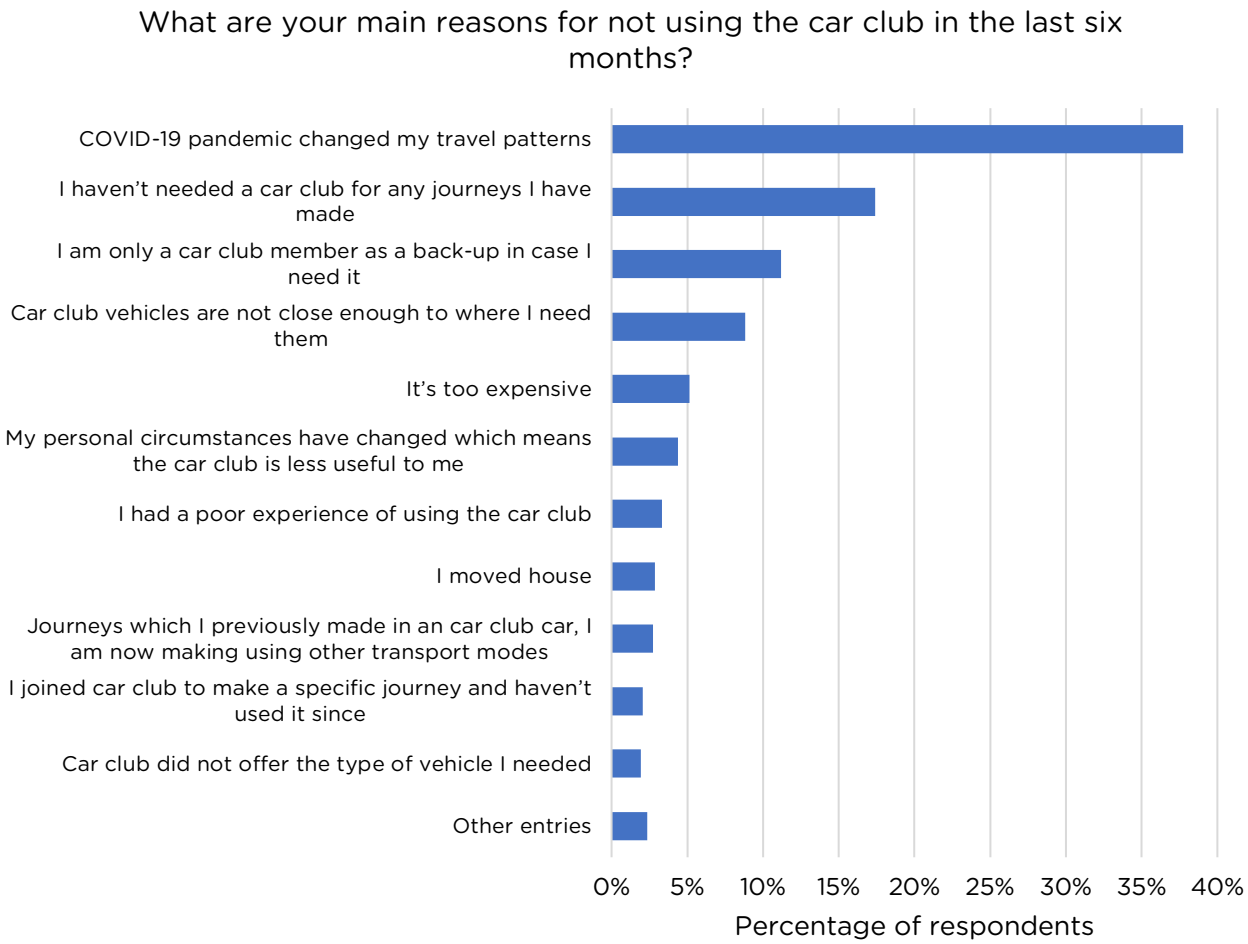


Figure 10: Reasons for not using a car club in the last six months.

6.6 Travel method to collect the car club vehicle

Convenience and proximity are important to respondents as 77% of them walk or jog to pick up their car club vehicle.

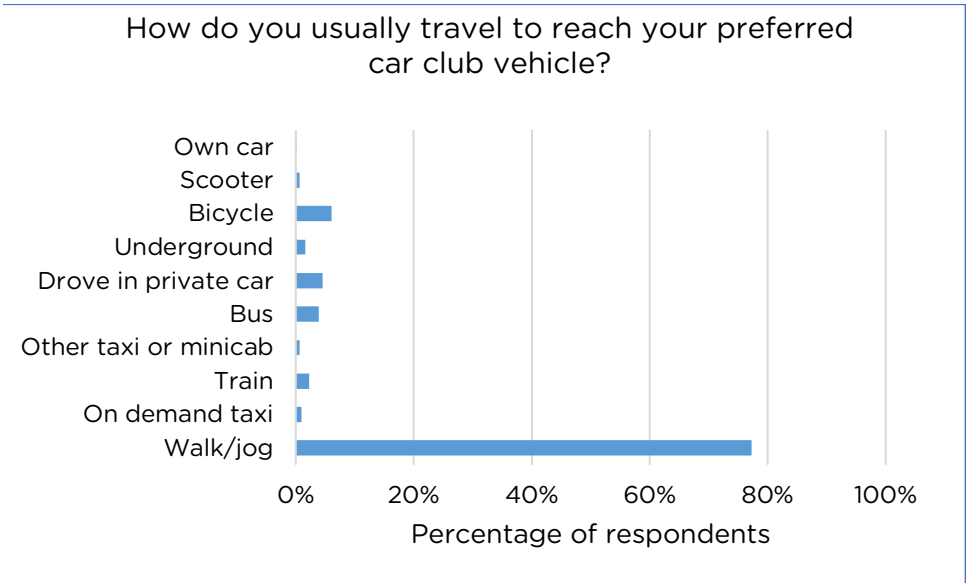


Figure 11: Travel method to reach car club vehicles.

6.7 Car club journey snapshot

6.7.1 Journey purpose

Respondents were asked to reflect on the most recent car club journeys they had undertaken. They were initially asked to identify the purpose of their most recent journey: roughly equal numbers cited leisure, personal business and shopping (23%, 23% and 20% respectively). Only 9% referred to work trips.

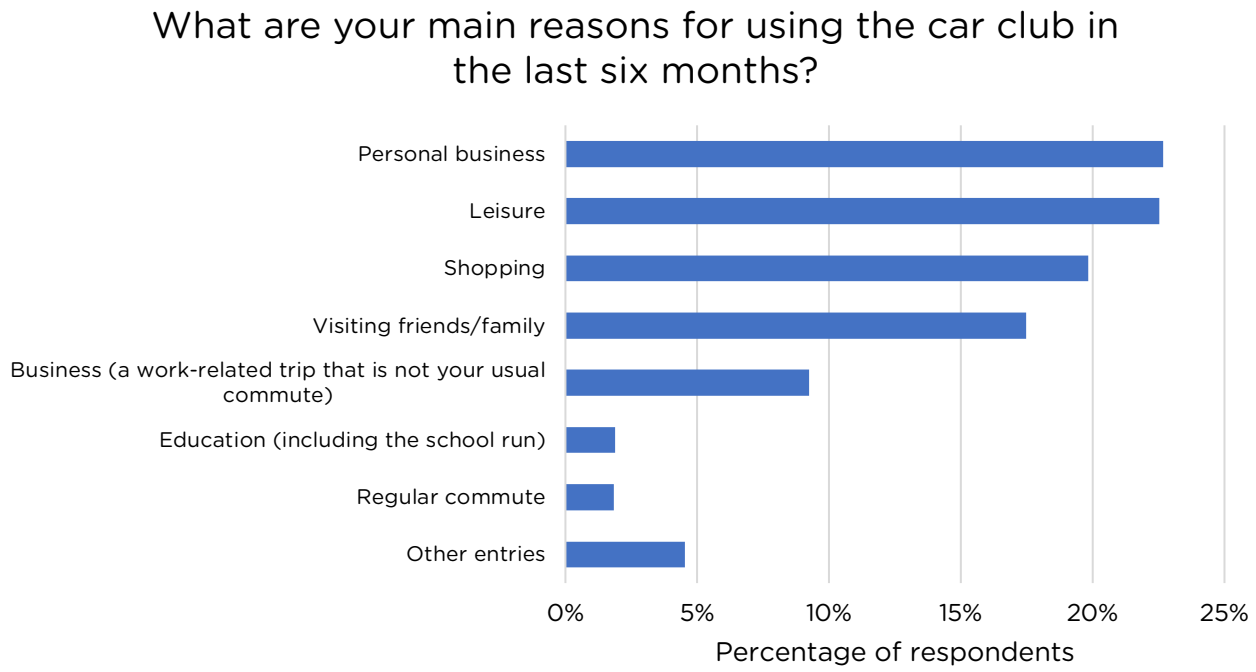


Figure 12: Purpose of car club journeys.

The quotes below from the survey free text boxes provide further context to these findings:

"I needed a car for work purposes as I don't own a car I can use for work. I needed a car to collect a number of objects from another town. My workplace's car club cars are conveniently located to my office so I booked one. I couldn't have used a courier for this collection due to the nature of the objects, so this was very convenient and cost-effective." Katie, Bristol

"I don't have a car and use the club car to do my shopping. This week I had a few things to get and a few places to shop so the club car is easier and more convenient than walking or using taxi/public transport." Tracey, Aberdeen

"I don't have a car and cannot get finance so hire when needed. I would normally have gone to a normal hire company but car club is more convenient, booking times are great, more cost effective and closer to get to. I don't need a car all the time mostly for my sons football matches and shopping." Gill, Newcastle upon Tyne

"*I use car club for business travel as required by my employer. This replaces the old approach where we used our personal cars for business travel."* John, Fort William

I had shopping to transport, the cost compares favourably with using cabs, and driving myself gives me flexibility to alter my plans as I go along. There is no waiting involved, and I can visit several places efficiently and quickly." Elizabeth, Birmingham

6.7.2 Reasons for choosing a car club for the journey

26% selected the car club for their last journey because there were either no public transport options or the public transport would have taken too long. This rises to 40% when including those requiring a shorter journey time. Carrying luggage or bulky items was 22%. This suggests that

members are choosing the vehicles for journeys where they perceive this to be the best or only option available rather than simply driving preferences.

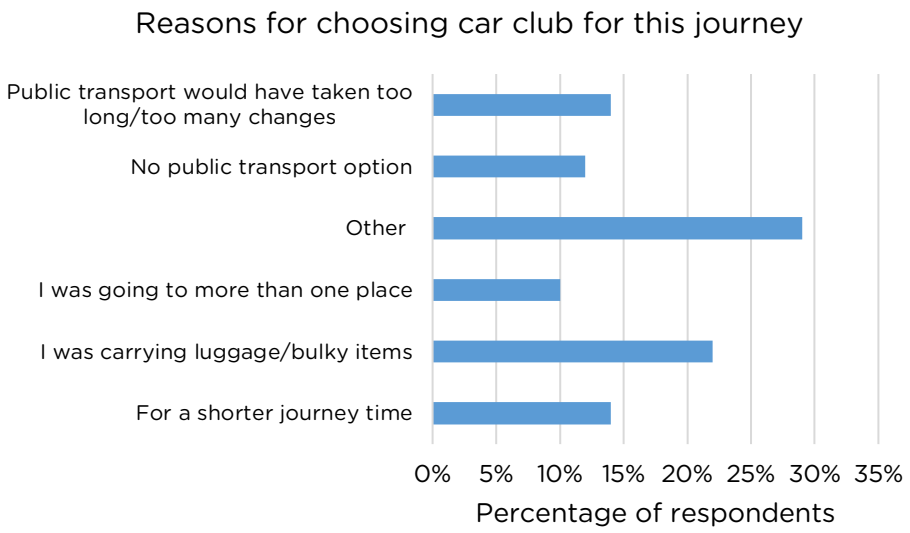


Figure 13: Reasons for choosing a car club for the journey.

There was a variety of specific journey purposes reported in the qualitative interviews, most were related to the transportation of larger items. A reoccurring theme in the way that many users planned and booked their journeys is that they would group together a number of trips all to be taken whilst they had the car, e.g., to visit family and then a DIY shop on the way home.

6.7.3 Travelling with children and other passengers

Children are infrequently passengers with car club users: 85% of journeys had no children. By contrast, nearly two thirds of journeys had one or more adult passenger.

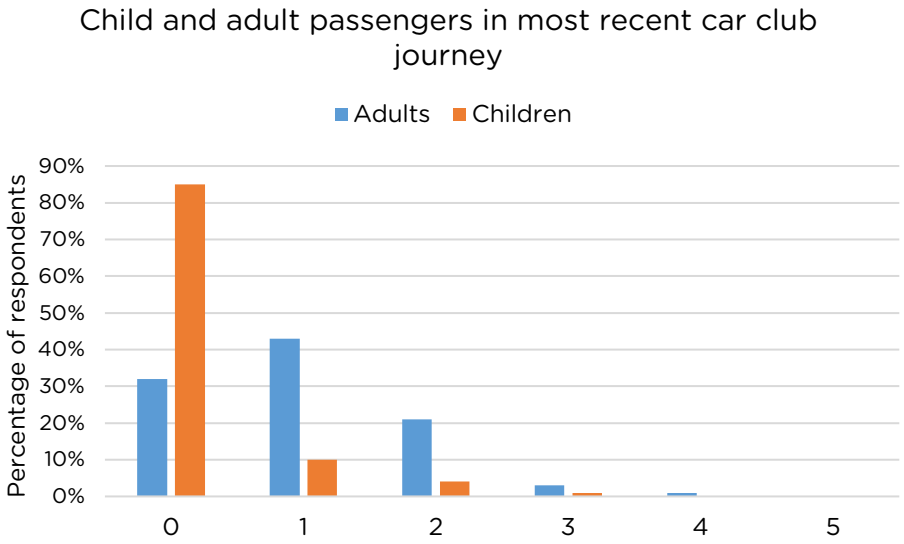


Figure 14: Number of adult and children passengers in the car club journey.

Evidence from the user interviews support this. Children are a major barrier to whether someone feels that car club usage is feasible. Reasons given for why using car clubs with children is difficult included the hassle of taking and fitting a car seat, the complication of having to pick the car up from somewhere other than home, need for greater flexibility/spontaneity, and concern over the need to take more personal items in the car.

6.7.4 Alternatives to using a car club

Respondents were asked to consider the alternatives to using car club vehicles for their most recent journeys. Respondents suggest that very few journeys replace walking/cycling as modes (6%). As the table below shows, there is a reasonably even split between alternative modes of transport such as train, bus and on demand taxi.

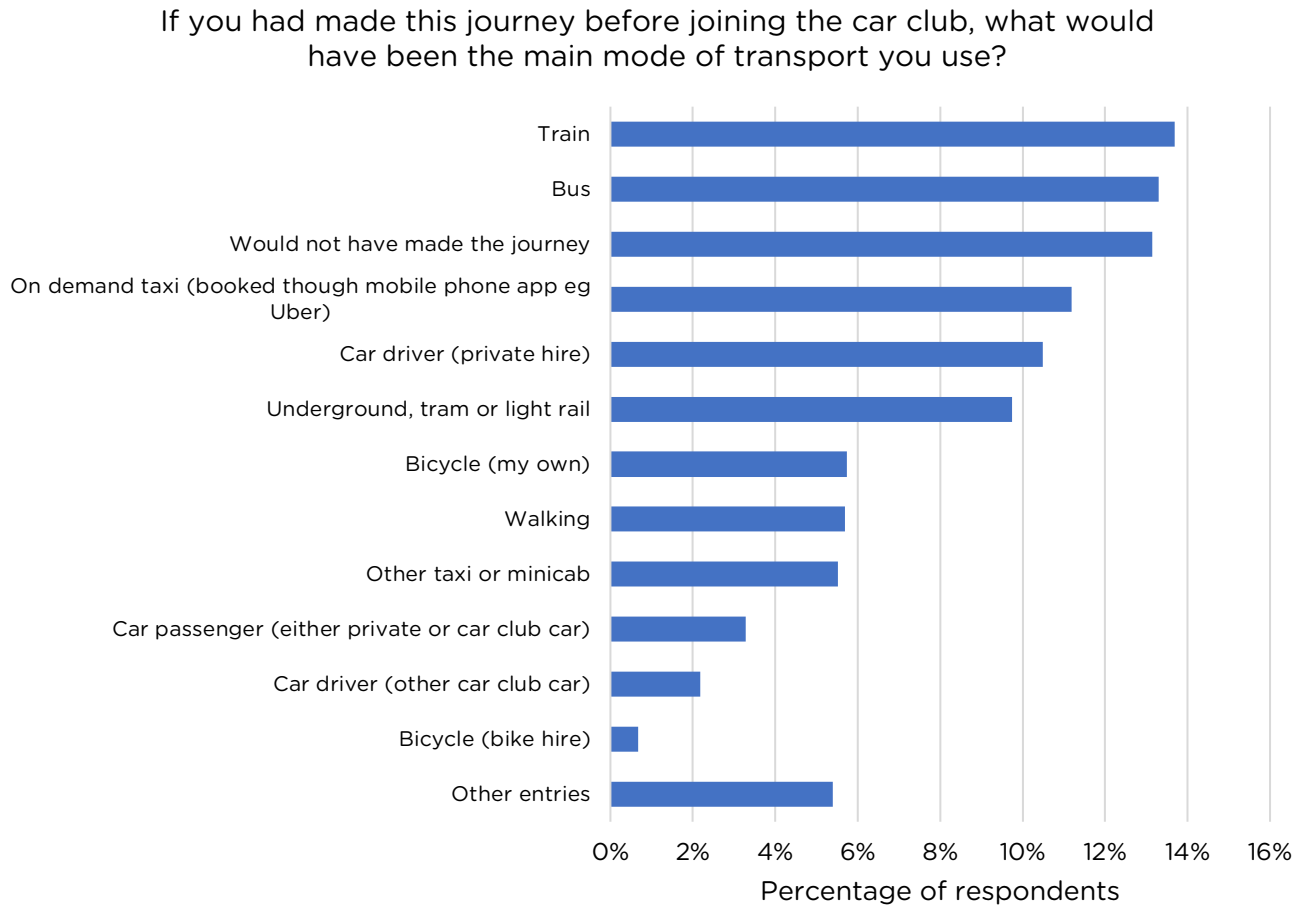


Figure 15: Alternatives to using a car club.

6.7.5 Journey distance

Users most frequently use car clubs for relatively short journeys. For each of the last three journeys completed by respondents, the majority were less than 10 miles.

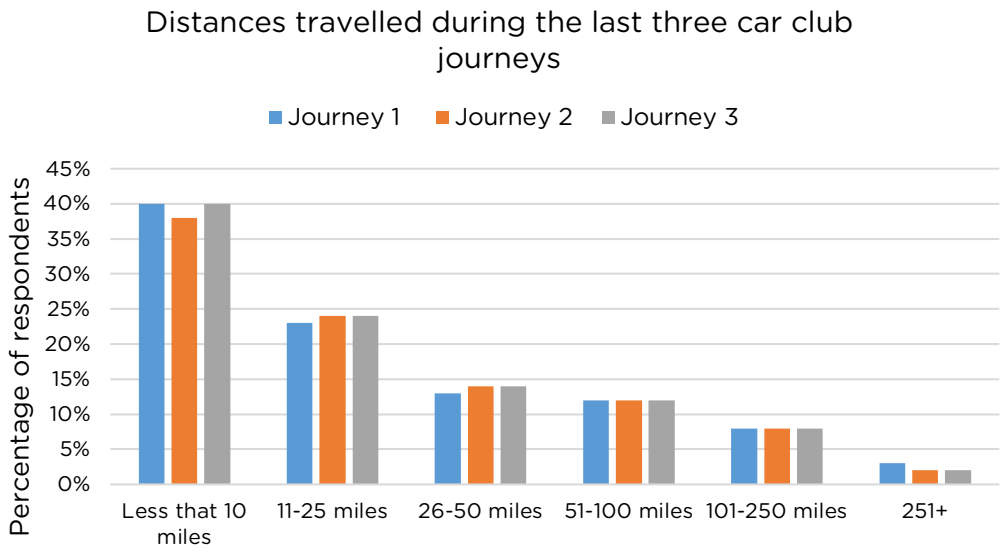


Figure 16: Distances travelled during the last three car club journeys.

6.7.6 Journey duration

Figures for length of hire reflect these journey distances; 61% of all journeys taken was for four hours or less. 22% overall hired for less than an hour.

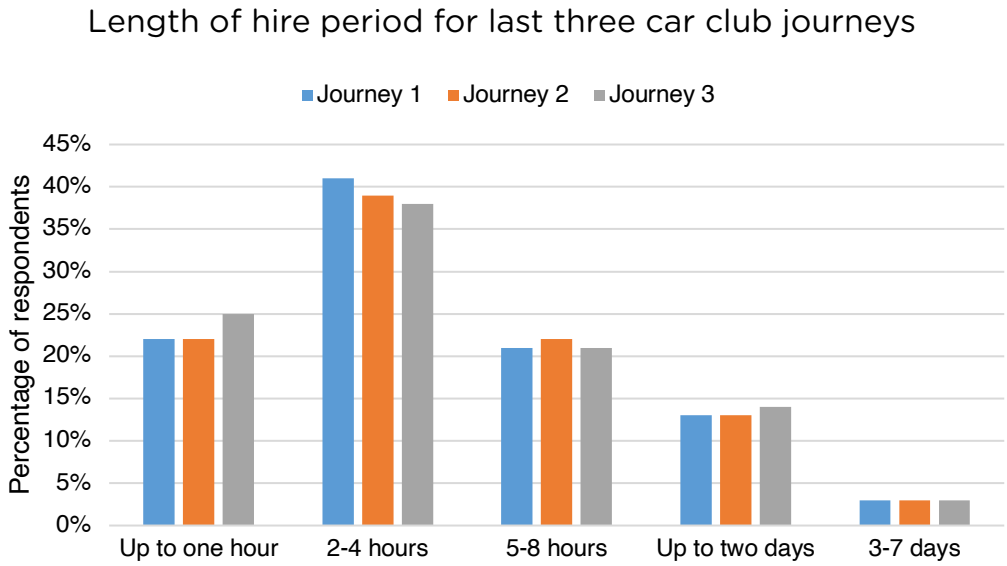


Figure 17: Length of hire period for the last three car club journeys.

6.8 Levels of satisfaction with the car club

6.8.1 Different factors and level of importance

Respondents were asked how easy they had found joining the car club, booking and driving a vehicle. As the chart below shows, 83% found these processes to be very easy or quite easy; fewer than 2% found them very difficult.

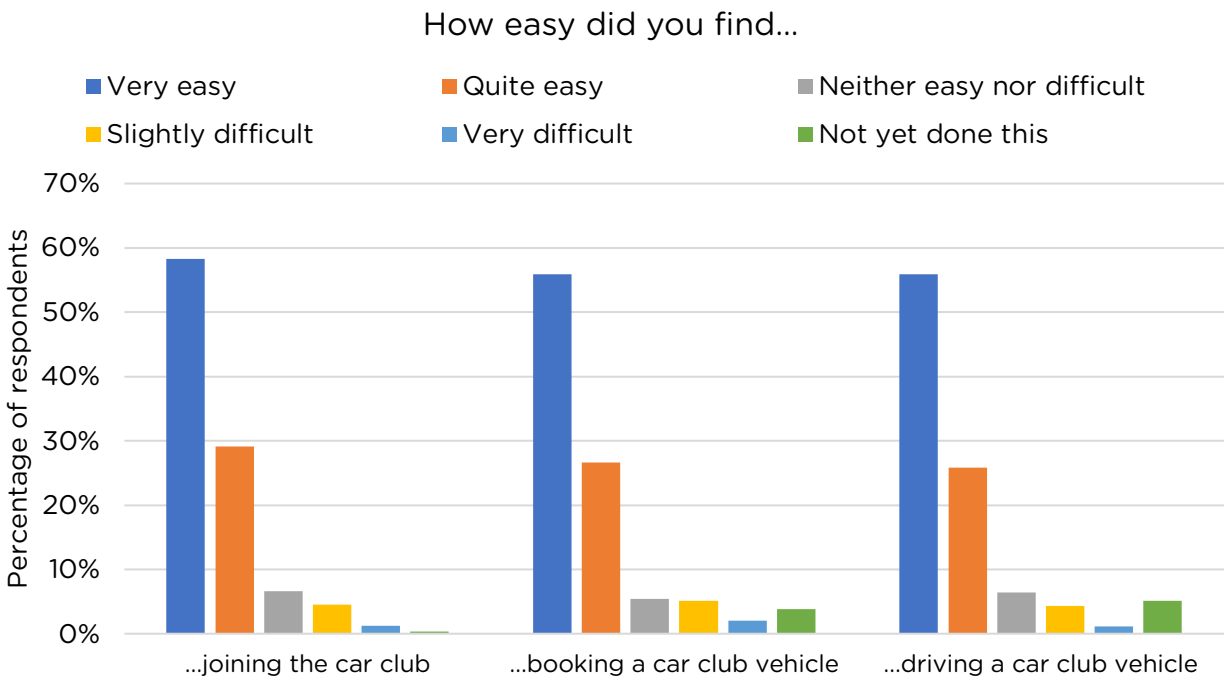


Figure 18: Different factors and level of importance.

6.8.2 Maximum acceptable travel time to a car club vehicle

Members want access to vehicles to be close and convenient: 56% want access to be within a 10-minute walk with only 6% accepting a journey time of up to 20 minutes.

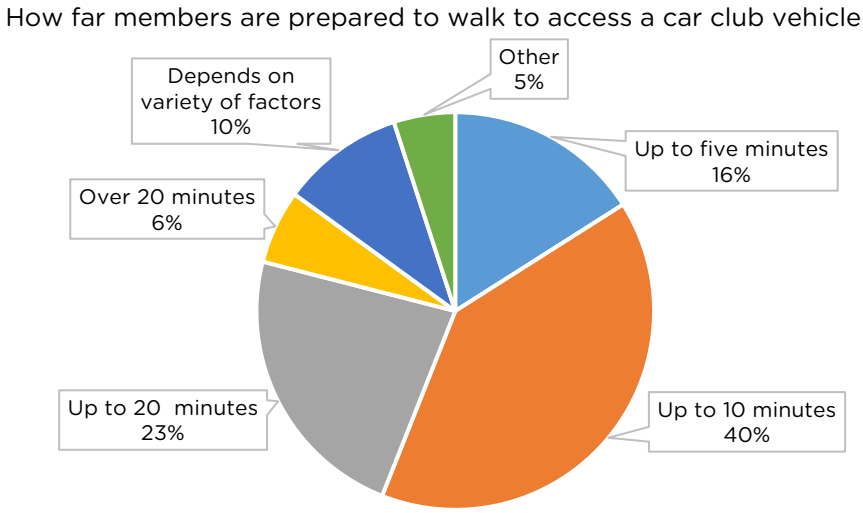


Figure 19: Maximum acceptable walking time to a car club vehicle.

The quotes below from the survey provide further context to these findings:

"Booking was easy, I saw the available slots and picked what I needed. I went to the location, waited few minutes, another user came with the Van, parked and I took it. The only issue is that I had to ride 40min by bike to get to the location of the Van, because I live in Welling and the van was near Blackwall tunnel. I wish you could expand to other areas, maybe have few car/vans on the same location where Enterprise is or nearby." Marcelo, Welling, Greater London

"I do not own a car and usually I use the train for most journeys but due to covid we are not being encouraged to do this so in order to visit my mother I have to go by car until its safer to go on train." Willa, Cambridge

6.8.3 Satisfaction levels

Car club members reported that they were generally satisfied or very satisfied with facilities provided, as shown in the table below. Quality and maintenance condition of the vehicles (75%), proximity of vehicles and customer service (both 74%) obtained highest satisfaction ratings. Considering responses to other questions, the lowest satisfaction scores for Covid-19 safety measures (56%) may be a combination of cases of lower availability of vehicles to accommodate new cleaning regimes and concerns over cleanliness.

Table 1: Satisfaction levels for different criteria.

	% of respondents who are satisfied/very satisfied with...
The quality and maintenance condition of the vehicles	75
The proximity of Car Club vehicles to where you live	74
Customer service	74
Information about the vehicles	71
The cleanliness of the vehicles	70
The availability of Car Club vehicles when you need them	67
Administration and backup	67
Choice of vehicles	65
Covid-19 safety measures put in place	56

These overall levels of satisfaction are reflected in responses to the question, 'Would you recommend car clubs to a friend?' with 82% agreeing that they would (only 2% said definitely not).

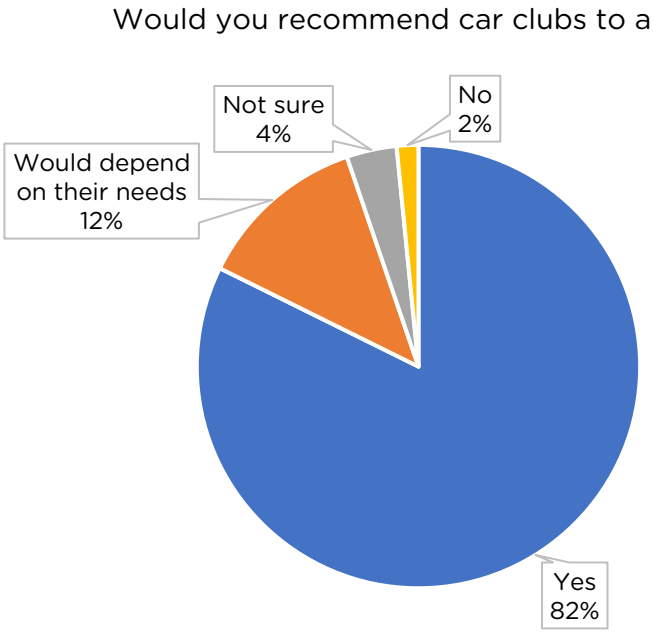


Figure 20: Proportion of respondents who would recommend car clubs to a friend.

6.8.4 Importance of service-related factors

Respondents were asked to consider how essential they regard particular factors.

Table 2: Importance of service-related factors.

	% of respondents who view these factors as essential
Vehicle available for collection close to home/work	70
Guaranteed maintenance of the vehicle	68
Effective customer support at all times	59
Competitive price in comparison to other clubs	57
Cleanliness of the vehicle	57
Guaranteed sanitisation of the vehicle between usages	47
Choice of different power sources (electric vs petrol vs diesel)	23
Choice of different size/power vehicles	23
Choice of different vehicle brands	13
Availability of child car seats	8

The most critical factor members are looking for is proximity of the vehicle for collection (70% said this was essential) with guaranteed maintenance seen as essential by 68%.

The interviews found that size and type of car are important factors for car club members, particularly for those joining and using the car club for a specific reason (moving to a new house, moving a large object). Having vans and larger vehicles available on the fleet is important to provide that option when needed and helps to bring in new users, who may then go on to use the car club more regularly. There was a difference in preference for the size of car, those in the inner city preferring smaller cars and those in suburban areas wanting a larger variety of cars. For some, the opportunity to drive different cars and try out new technology is a big bonus of the car club, particularly among younger consumers.

6.8.5 Impact of pickup/collection approaches

The process for returning the vehicle would seem to be less critical than availability of vehicles for collection. Respondents were more likely to regard differing options as desirable rather than essential with some saying this is only one factor of several factors to be considered.

Table 3: Impact of pickup and collection approaches.

% of respondents who consider these options to be...	Pick up and drop off in the same 'car club only' bay	Pick up and drop off in the same neighbourhood	Pick up and drop off in different streets (one-way trips)
Essential	27	27	29
Desirable	29	35	32
One to be considered	13	13	15

6.8.6 Factors causing dissatisfaction with car club

A small number of respondents identified factors causing dissatisfaction in the survey. The key themes were:

- Problems with dirt, cleanliness and sanitisation – most comments relate to specific uncleanliness and dirt rather than higher expectations post Covid-19
- Problems with bookings including technical issues with vehicles – mix between sign up

and perceived complexity of booking process and cars unavailable or unable to access the vehicle when they arrived for their booking
- Customer service – inability to get through to customer service team or unable to resolve issues or complaints when they did get through
- (Perceived) unjustified accusations of damaging the car or traffic offences

6.8.7 Customer experience from interviews

Echoing the members survey, availability and distance were the key concerns, some participants stated that the locations were more important than the time of the journey and that this should be better reflected in the booking process.

In general, all car club users interviewed were positive about their experiences with using the car club. Some reported instances of accidents or other problems; however, nearly all were happy with how they had been resolved. There appeared to be a lack of understanding on some of the rules for customers. For example, many were unaware of where they could and could not park, some were unaware that you could use the same car club elsewhere in GB, all but two of the car club members in London were unsure of how to use the one-way system, and nearly all interviewees were unaware of any cleaning pledges.

There were some examples of how the structure of car club membership and payments do not necessarily help those on low incomes. The uncertainty of what the final cost would be was a concern and they wished to have the ability to preload their account, so that funds were available when the journey needed to be taken. Linking with other travel passes would be beneficial, particularly for those members in large cities who used many forms of public and shared transport. Non-users and some lapsed users reported that already paying for a travel pass meant they were unhappy having to pay for a car club membership and cost of hire as well.

6.9 Car ownership and disposal

6.9.1 Car ownership prior to joining a car club

Prior to joining a car club 49% of users owned at least one household car.

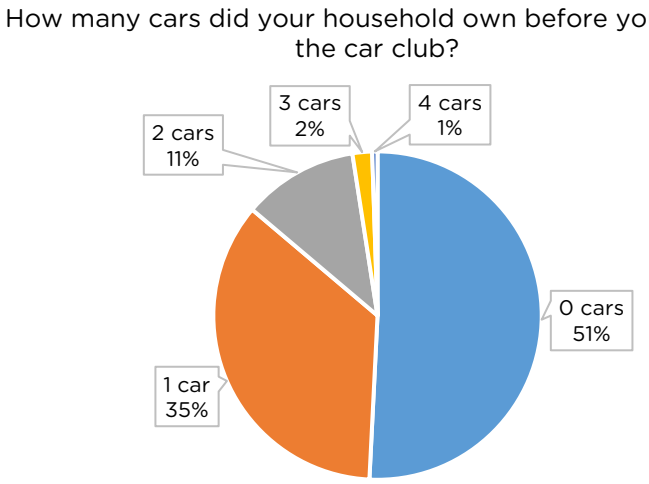


Figure 21: Number of cars owned before joining the car club.

For 71% of users, joining a car club had not resulted in any change in car ownership. 21% had one car fewer than when they joined a car club. Extrapolated across the whole private user membership base, this would equate to 54,163 fewer vehicles on the road since users joined the car club.

Those that disposed of a car were asked about the age of this vehicle and, as the figures (below) show, 30% of cars disposed of were at least ten years old.

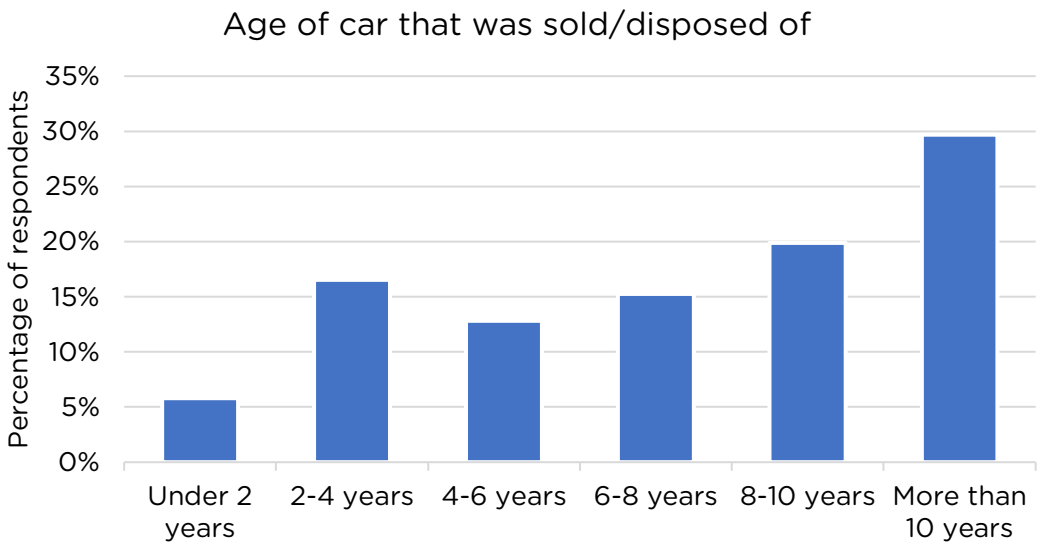


Figure 22: Age of car that was disposed of.

6.9.2 Average mileage of vehicle prior to disposal

In the 12 months prior to disposing of the car, 39% had driven fewer than 5,000 miles, 33% had driven between 5,001-10,000 miles. Only 18% had driven more than 15,000 miles.

6.9.3 Factors influencing the decision to dispose of a car

Where cars had been sold/disposed of, car club membership was the primary reason (referred to by 24% of respondents who had disposed of a car). Costs (21%) and insufficient usage of the private vehicle (19%) were also significant factors in encouraging respondents to dispose/sell cars.

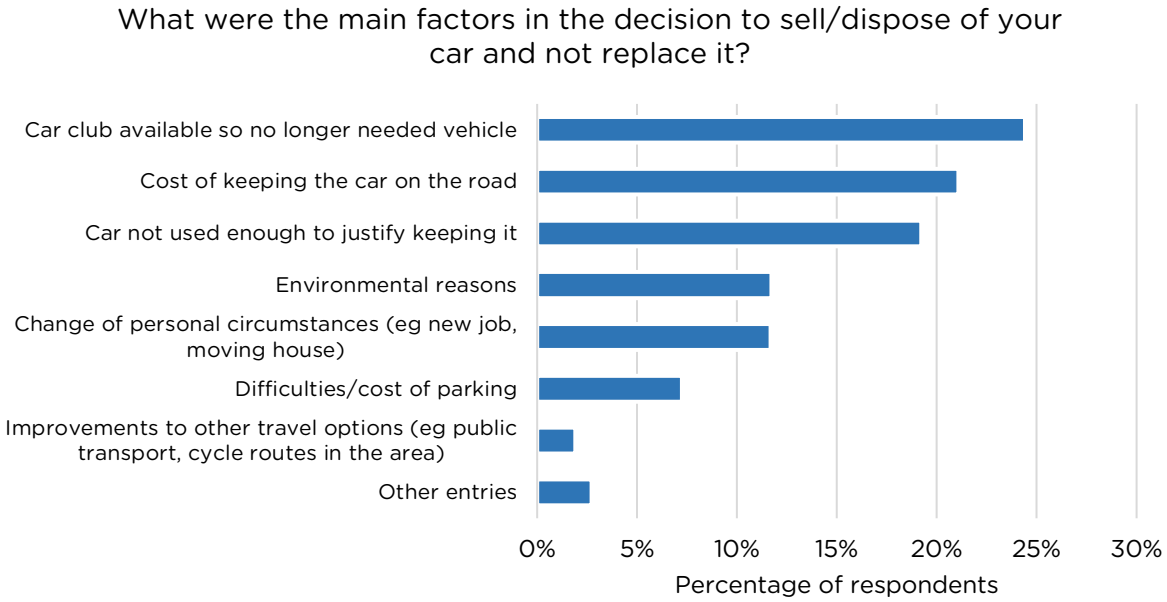


Figure 23: Reasons for deciding to dispose of a car and not replace it.

6.9.4 Factors which encourage disposal of a car

Respondents were asked to identify what factors, if any, might encourage selling or disposing of a car: critical issues were cheaper prices and wider availability for car club vehicles. Of the available options, cheaper prices (19%) and wider availability of vehicles (16%) were ranked highest.

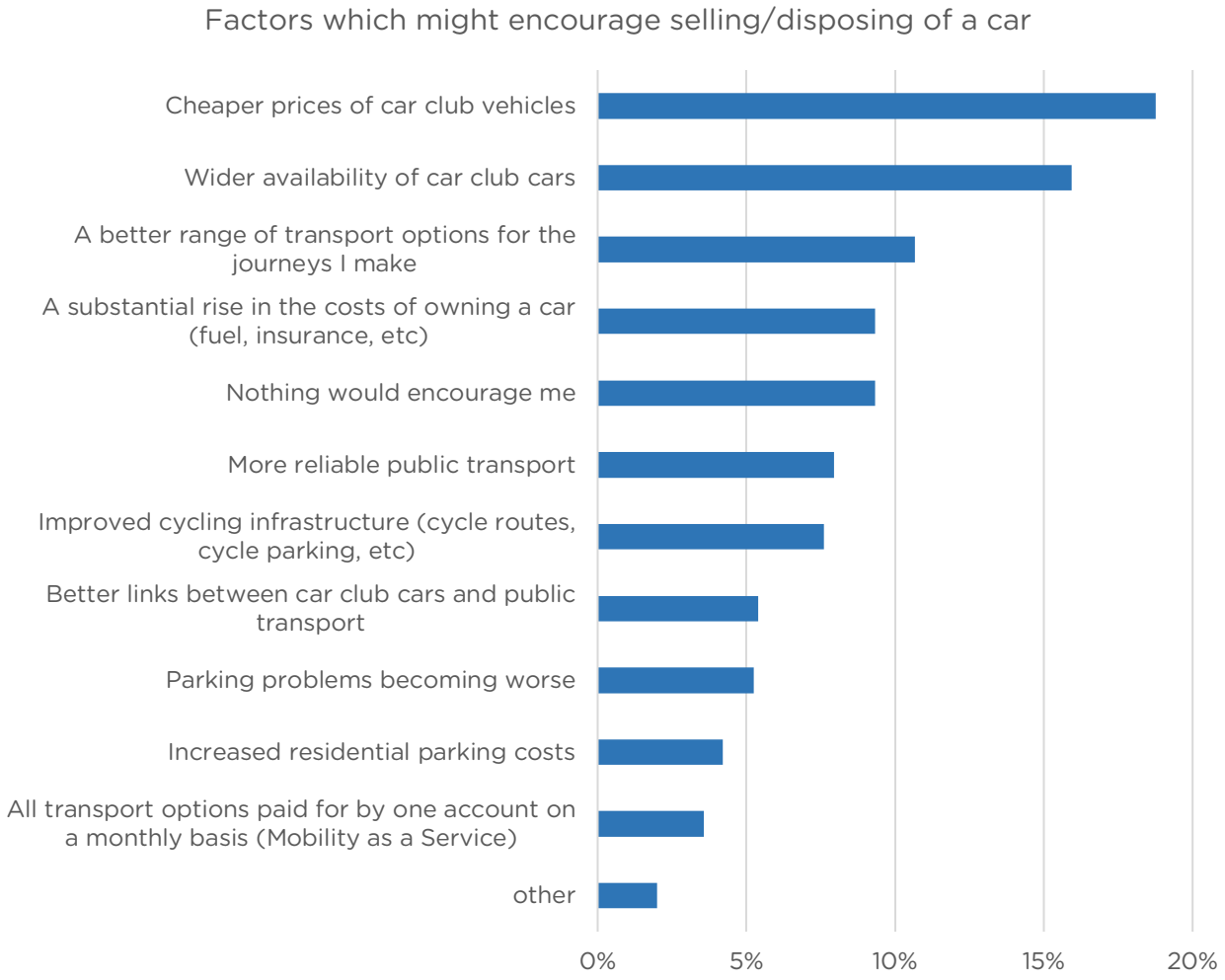


Figure 24: Factors which encourage disposal of a car.

6.9.5 Future car ownership

Findings suggest that car club membership has an impact on likely car purchasing: 22% of respondents said that they would definitely have bought a private/additional car if they had not had car club membership.

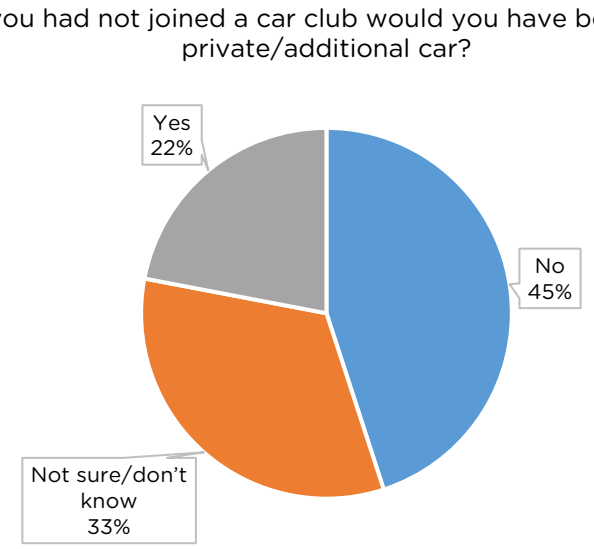


Figure 25: Impact of car club membership on purchasing a car.

Thinking about future plans, it would seem that car club membership affects possible purchases – 48% say it is less likely that they will buy a car/additional car in the next few years as a result of car club membership.

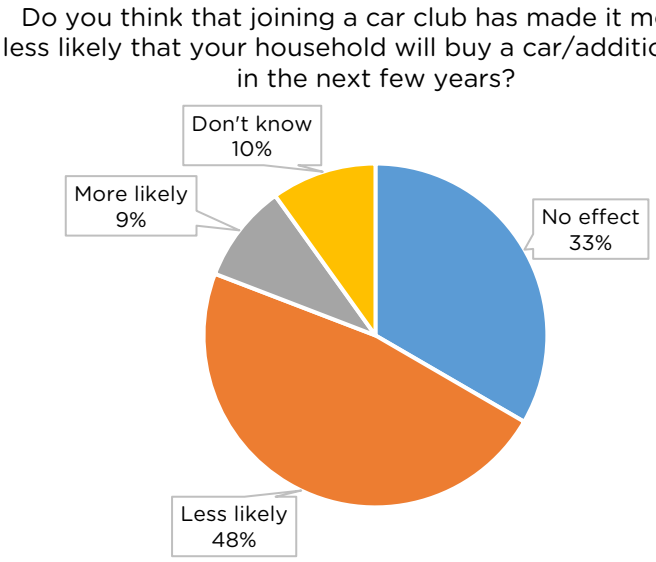


Figure 26: Impact of car club membership on future plans to buy a car.

Most respondents do not think car club membership will directly affect their decision to dispose of a car in the next few years: 70% think it will have no effect on whether they will sell or dispose of an existing household vehicle. This is broadly in line with the disposal rates of existing members highlighted above. It seems needing to sell a car (often for financial reasons) or not replace it if it is broken down is a higher driver to force a disposal decision, but the car club provides the reassurance of availability of a car when needed as part of a new transport mix.

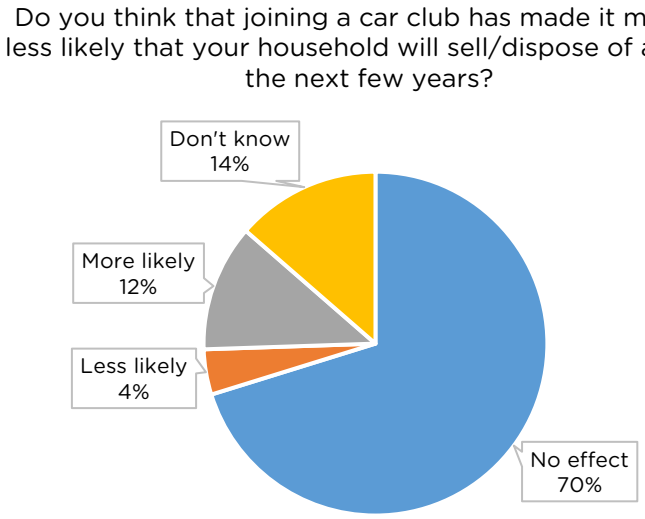


Figure 27: Impact of car club membership on future plans to dispose of a car.

Based on the number of respondents who have either disposed of or not bought a car because of the car club, we estimate that each car club vehicle in the GB replaces 18.5[2] private cars. The estimated total number of cars removed from the road is 99,355.

The cars replaced per car club vehicle takes the sum of the net value of the change in car ownership (based on the question relating to change in number of vehicles per household) and the number of respondents who said they would have bought a car had the car club not been available. Then the figure is scaled up based on the number of survey response as a proportion of active members (229,464[3]) then divided by the number of car club cars in the region.

6.9.6 Qualitative insights: car ownership and modal shift

The close link between car club usage and other modes of transport is key. None of the regular or lapsed users interviewed used car clubs as their main form of transport. Most users will commute using public transport or active travel and use car clubs as a supplementary form of transport for shopping, trips out of the city or that require too many changes on public transport.

The regular users that were interviewed all stated that prior to joining a car club they rarely used their own vehicle and travelled mostly by public transport. Car clubs can often be a helpful factor in making the decision to dispose of a car, and for some make it more likely to push intention to action. Most said that the journeys they took with a car club did not replace active travel or public transport; instead, they replaced car trips or allowed them to take journeys that would not otherwise have been possible. The member survey corresponds with this, with 44% saying that their last car club journey would have taken place using a car (either privately owned or rented/borrowed from elsewhere) if there was not a car club[4].

Environmental considerations played little role in any of the interviewees' decisions on how to travel. There is some evidence to suggest it may influence longer-term decision making (such as purchasing of an EV) but the impact is less than other factors such as ease of use, availability, and cost.

Evidence from the interviews suggests that for car club membership to make sense there must be a car club operating with at least one car available nearby. Responses from the survey show acceptable distance to the car vary depending on location, although it must be a comparable distance to other transport options. Most interviewees and survey respondents reported being aware of a car club because they saw vehicles on the streets, rather than through marketing or

[2] Rounded to one decimal place.

[3] Active members are those who have hired at least once in the year.

[4] Figures in the table below are for the whole of GB.

communications. Interviewees all reported cost savings against car ownership (some as high as £1,000 in a year). The cost of car ownership and the savings available by using a car club are most likely to influence decision making when vehicle purchase is being considered, rather than for drivers who already own a vehicle. An additional factor in the cost of car clubs is that some non-users (particularly those in the cities) reported weighing up the extra cost of the car club against what they already paid for public transport. This meant that they felt it was not something they could afford or were happy to pay extra for.

Instead of cost, the perceived 'hassle' of car ownership is a much larger factor in why people decide to give up their vehicle. Parking was reported as a particularly crucial factor in inner-city areas. One of the perceived benefits of using car clubs was no longer having to worry about parking regulations and permits.

6.10 Electric vehicles

46% of all respondents reported having used an electric vehicle (EV). This is higher than the proportion of car club fleets which are EVs – one explanation may be that members are deliberately selecting an EV when other options are available. This could also be explained by survey respondents considering hybrid vehicles when answering the question. Analysis of questions provided below suggest that may be the case.

6.10.1 Reasons for selecting an electric vehicle

Reasons for selecting EVs are varied, with curiosity to try the most frequently cited (23%) and desire to be environmentally friendly second (21%). 18% claimed they had an EV as their closest and a notable 16% chose it as a preference because they like driving electric vehicles. Under 'Other' options, cost was cited by many respondents as they did not have to pay for petrol and/or mileage charges.

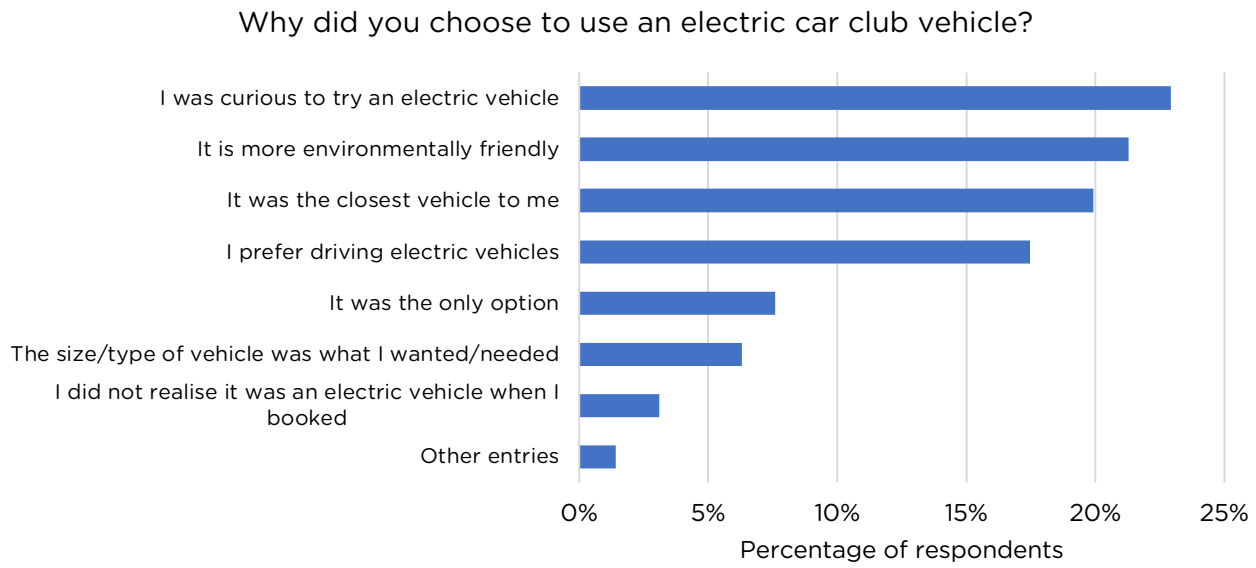


Figure 28: Reasons for choosing to use an electric car.

6.10.2 Satisfaction with electric vehicles

There was a high level of satisfaction with electric vehicles – 83% or more of all respondents were satisfied with the experience, comfort and performance of the electric vehicle. Experience with charging points showed much lower satisfaction (31% satisfied): qualitative feedback suggests more education on their use and greater reliability of the chargepoints is required.

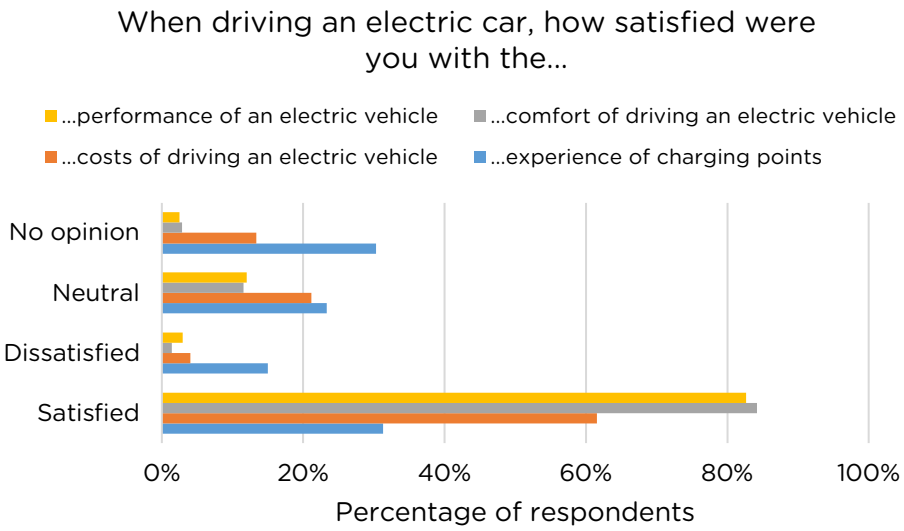


Figure 29: Satisfaction with electric vehicles.

Qualitative analysis showed that negative comments about EVs were focused almost entirely on issues relating to charging. There were problems with trying to utilise bookings when so many cars were left without being fully charged, plus concerns about the range that could be achieved on the charge available, and difficulties in finding charging points. Additionally, lack of instructions and difficulty in dealing with the cable also caused problems. Some felt that costs were excessive compared with traditional cars.

Despite these challenges, respondents view EVs more optimistically: 60% of survey respondents say that they have become more positive about electric vehicles in the last 12 months.

6.10.3 Profile of survey respondents

Respondents are predominantly from England (48% from England (excluding London), 34% from London) with 18% based in Scotland. 57% place themselves in inner city locations, 34% suburban, 9% rural.

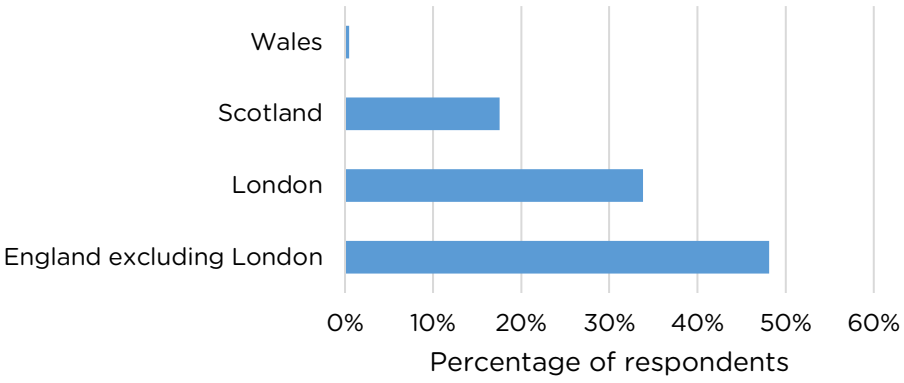


Figure 30: Location of respondents.

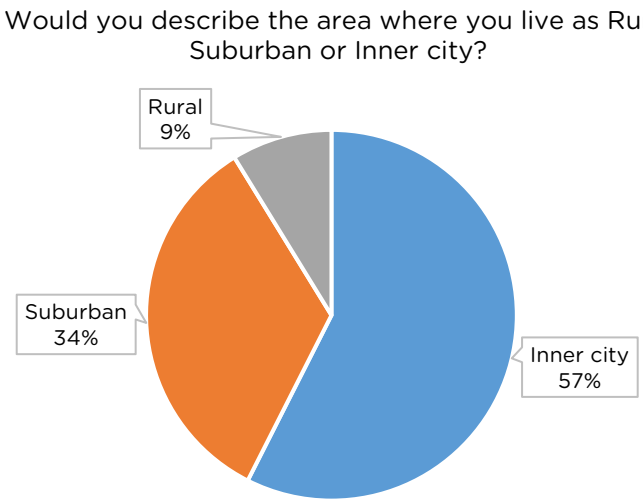


Figure 31: Urban-rural classification of respondents.

Two third of respondents were male (64%) and one third female, with a small proportion selecting 'prefer not to say/other'. With the overall membership statistics showing a higher proportion of male users, this indicates a representative split of the car club membership.

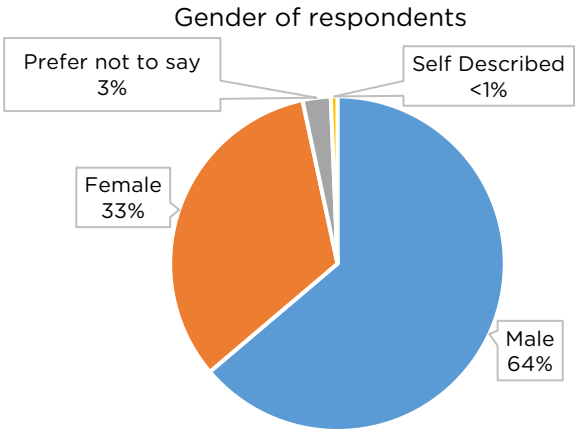


Figure 32: Gender of respondents.

43% live in two-person households. This fits with the majority of respondents travelling alone or with one other adult for most of their journeys.

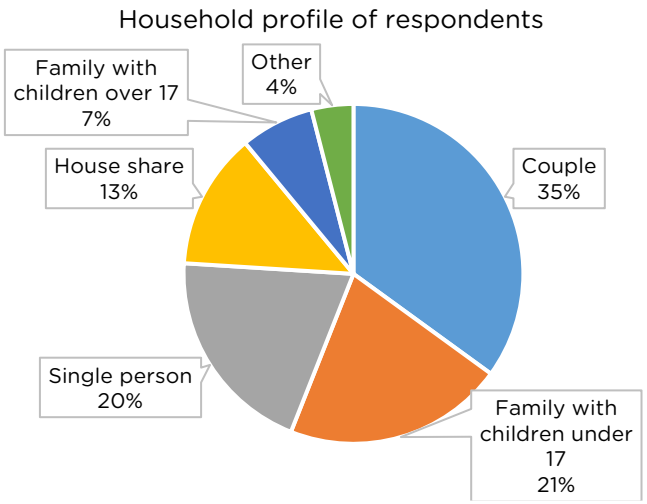


Figure 33: Household profile of respondents.

91% pay personally for their car club membership, 9% have this paid by their employers.

47% of respondents were in the 26-40 age bracket. Overall membership statistics suggest a higher proportion of members are in this age range, though in many regions that is a higher proportion compared to the number of responses.

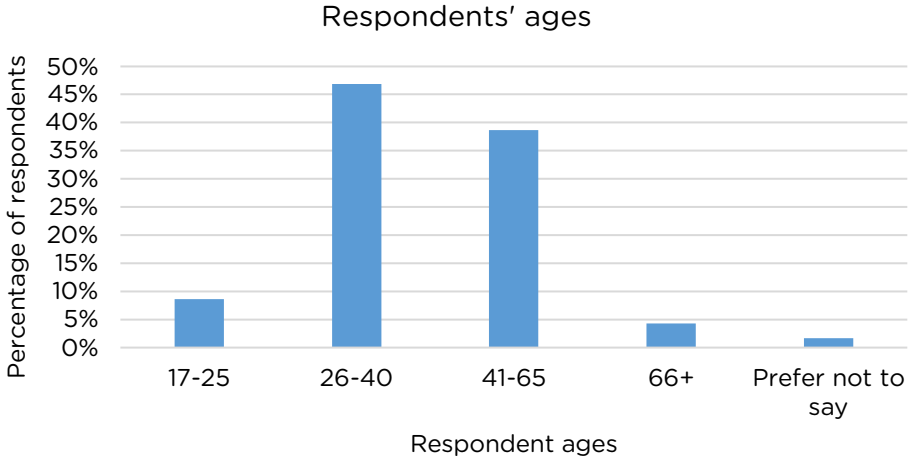


Figure 34: Age of respondents.

6.11 Case Studies

6.11.1 Case study: Rebecca, London

Rebecca had seen car club vehicles around and read about them. When her own car broke down, she made the decision not to replace it but to join a car club instead. This was mostly done to avoid the hassle and expense of owning a car in London. She did not use the car that much, traveling by public transport, walking and private hire taxis. But since the Covid-19 restrictions have been in place her use of the car club has increased as a replacement for the bus and tube.

6.11.2 Case study: Liam, Edinburgh

Liam had been thinking about disposing of his car for a while, since paying for it was expensive and parking was a problem. He had moved to the centre of Edinburgh and no longer needed the car to get to work, being able to use public transport or the bike share scheme for most of his travel. After talking to a colleague who had been a member of the car club for a long time, he realised he could manage all his travel without owning his car.

His intention when joining was that he would use the car club about once a month/fortnight for large shopping trips and to visit his family who live 40 miles away outside of Edinburgh. He would be able to do this journey with public transport, but it would take a long time and they would need to pick him up from the station. He has a number of cars within five minutes' walk of where he lives, the longest he has had to walk for a vehicle was 20 minutes. Normally Liam books the car for a full day as this provides better value for money and he can complete a number of journeys.

6.11.3 Case study: Clive, London

After returning from living abroad for two years, Clive decided to not purchase a car and to try living in zone one of London using public transport, walking, cycling, and the car club. The car club provided an option in addition to the great public transport links that were available to them. Clive uses the car club for one or two days when travelling out of London where it is not convenient to travel by train.

The cost (compared to owning a car) and convenience is very important to Clive when using the car club. He finds booking the cars very easy and flexible; having around seven cars within walking distance it is easy to book a trip at any time. Clive has two young adult children both of whom are keen to start using the car club.

Clive is very happy using the car club and other transport options to travel around. Occasionally the family considers purchasing their own vehicle, but they are put off by the expected cost and hassle.

7 Operators' survey results

This section presents the results of the survey of car club operators in England and Wales. Note that the data presented here will not necessarily match the data reported in the previous section, as that comes from a survey of a sample of members, while the statistics here are the analysis of operators' full data sets.

7.1 Membership levels

Prior to the disruption to travel patterns as a result of the pandemic, membership of car clubs in Great Britain was growing. Total membership has grown by over 100% to more than 600,000 since the last surveys were carried out in October 2018. The number of active members (those who have used a car club vehicle in the last year) stand at 229,464 are active members.

7.2 Member ages

The membership data[5] shows that 57% of members were in the 25-39 age range, rising to 69% when the range is extended to 25-44. The proportion within this group has grown this year though it has consistently been the primary segment in previous reports.

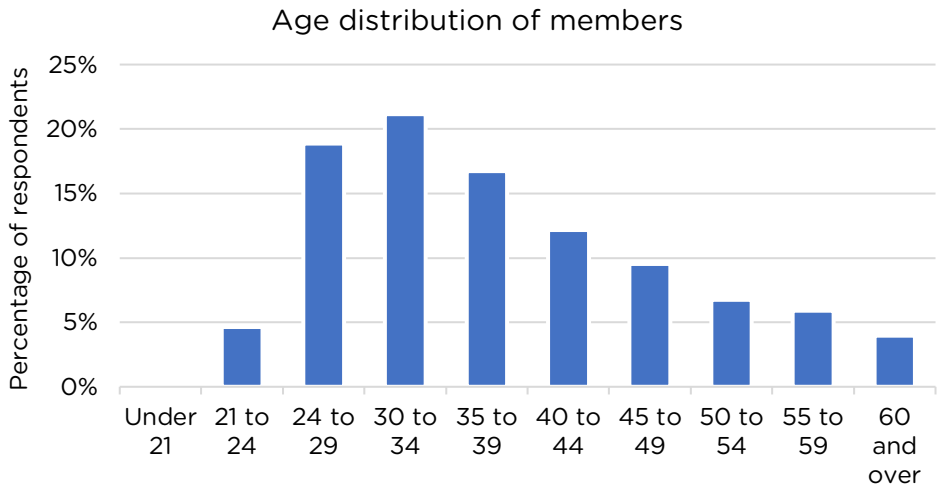


Figure 35: Age distribution of members.

7.3 Average annual journeys per member

The mean average number of journeys per member per year is between 6-8 (in 2019/20) depending on the region. Using median average brings this back into the 1-5 hires. This suggests that most users are using the vehicles for a specific journey requirement or limited need rather than a consistent usage on a weekly or monthly basis.

[5] Note that demographic data provided in this section provides information about those responding to the survey. This is different to the demographic data provided later in the Operators Survey section, which covers the whole membership base.

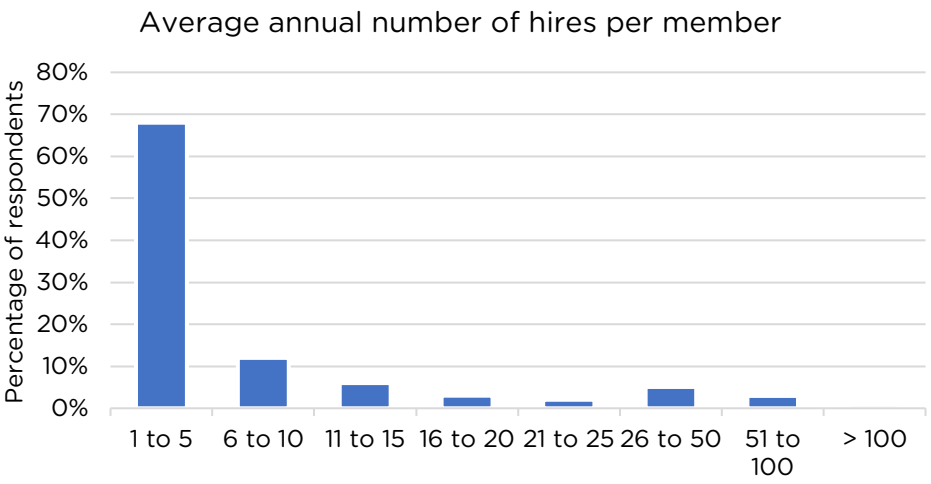


Figure 36: Average annual number of hires per member.

7.4 Changing journey patterns

Overall distance per journey analysis shows the 1-5 mile range is still the most prevalent use case, except in London where is 6-10 miles, though the longer journey distances (26 miles plus) are now exceeding the 1-10 mile range.

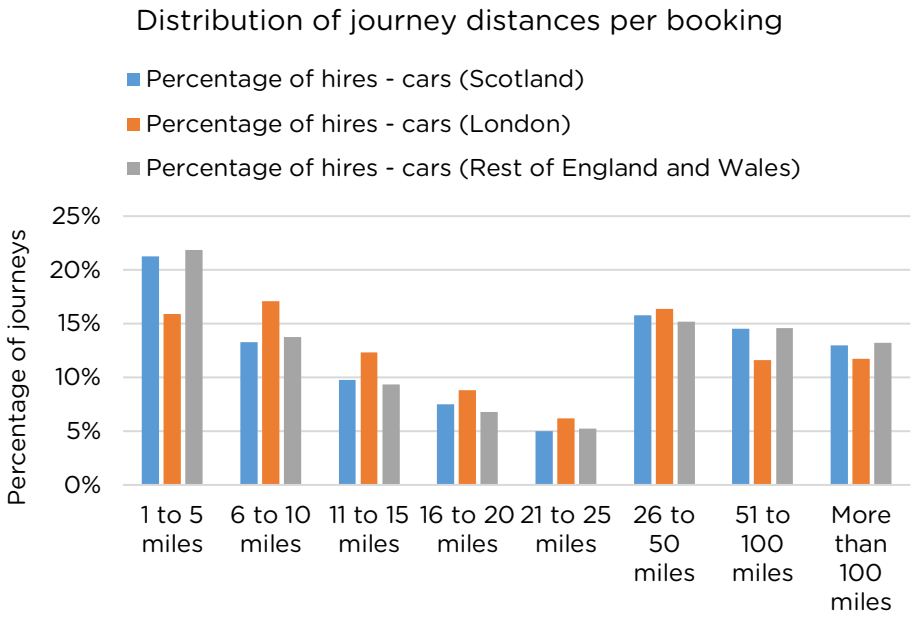


Figure 37: Distribution of journey distances per booking.

However, comparing round-trip distances before and after the first lockdown shows a greater proportion of longer journeys taken and reduction in the shorter journeys.

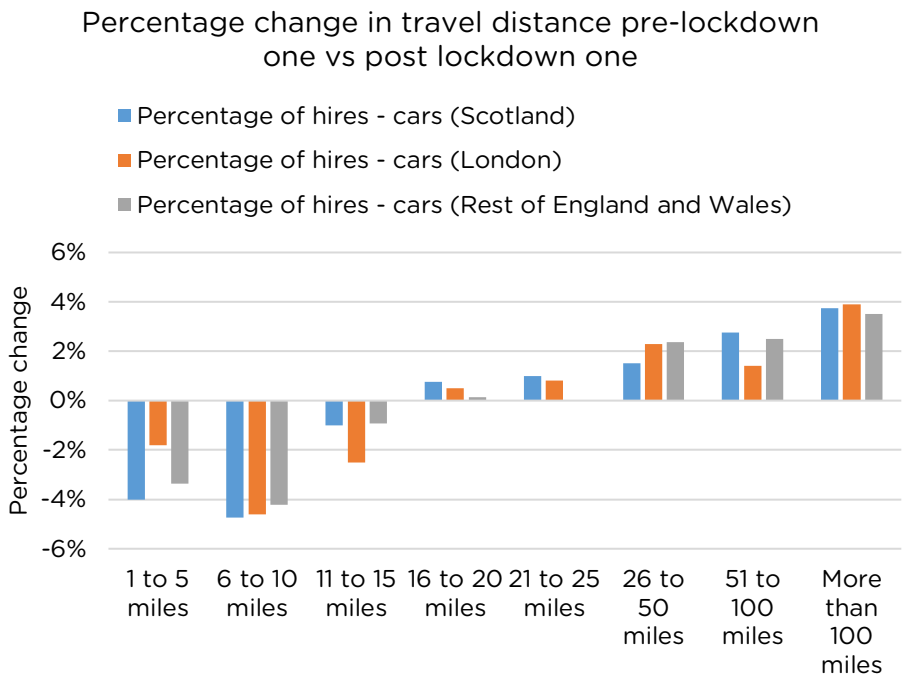


Figure 38: Percentage change in travel distance pre- and post-lockdown.

The shift in distribution has pushed the mean average distances above 50 miles across all regions, though the median average shows a more representative value between 17 miles in London[6] and 28 miles in Scotland.

7.5 Booking durations and timings

The shift in booking patterns is also noticeable as an increase in average booking duration. The mean average ranges from 10-12.5 hours across the different regions. However, the mean averages are highly impacted by some longer bookings impacting the overall figure. The median range offers a more informed view, which ranges from 3.3 hours in London to 5.2 hours in Scotland. This range would appear to fit in line with the booking distance profiles.

Regional changes in booking start times have been identified compared to previous years. In England and Wales (excluding London), there has been a 30% increase in the proportion of journeys at peak time weekdays (7am-10am and 4pm-7pm) compared to the last available data from 2017/18. A similar drop has been seen in other weekday times. The London data shows a similar but smaller shift, with the transition into the evening peak rather than the morning.

[6] This is based on round trip and one-way combined data

8 Fleet data analysis

This section presents our analysis of fleet data supplied by the car club operators.

8.1 Number of car club vehicles

Operators reported that at the end of October 2020 there were 6,060 car club vehicles in GB: 575 in Scotland, 3,887 in London and 1,598 in the rest of England and Wales. 5,370 of these vehicles are cars and the remaining 690 vehicles are light commercial vehicles (vans).

The chart below shows the changes in numbers of car club cars across the different regions in the last two years. Historic data for the van fleet was not available for all regions so only the cars have been shown.

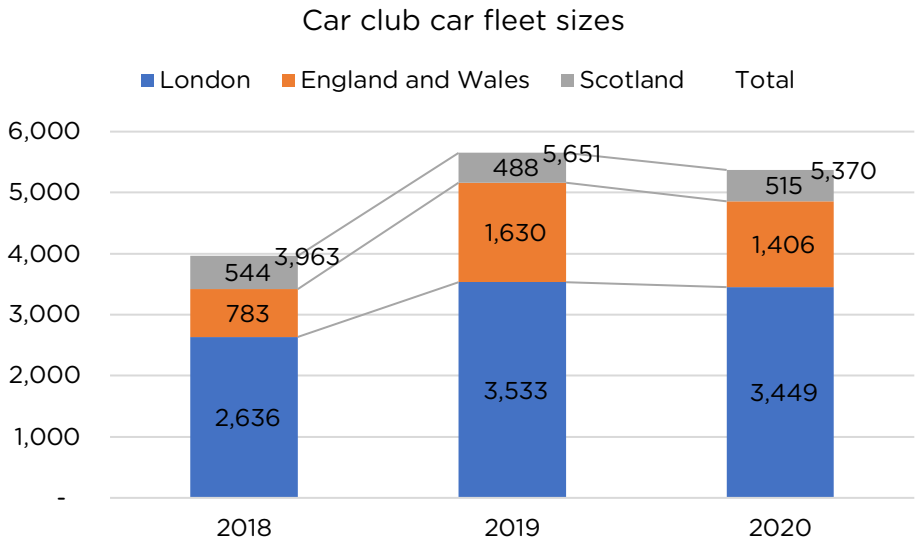


Figure 39: Car club fleet sizes between 2018 and 2020 (cars only).

The growth of the car fleet seen between 2018 and 2019 has stalled in 2020. The number of cars has fallen by 5% this year after growing by 43% between 2018 and 2019.

Even though the number of vehicles in the fleet in November 2020 was 6,060, the total number of individual vehicles used at some point during the period November 2019 – October 2020 was 8,321. The reason for the difference is because operators have acquired and disposed of vehicles during that period. This is unrelated to Covid-19; some operators have a policy of regularly turning over the vehicles on fleet.

The charts below show the number of vehicles on the fleet during the analysis period, the second one normalised taking November 2019 as a reference starting point. Car clubs reported the dates when vehicles joined and left their fleets, and this data was used to produce the graphs.

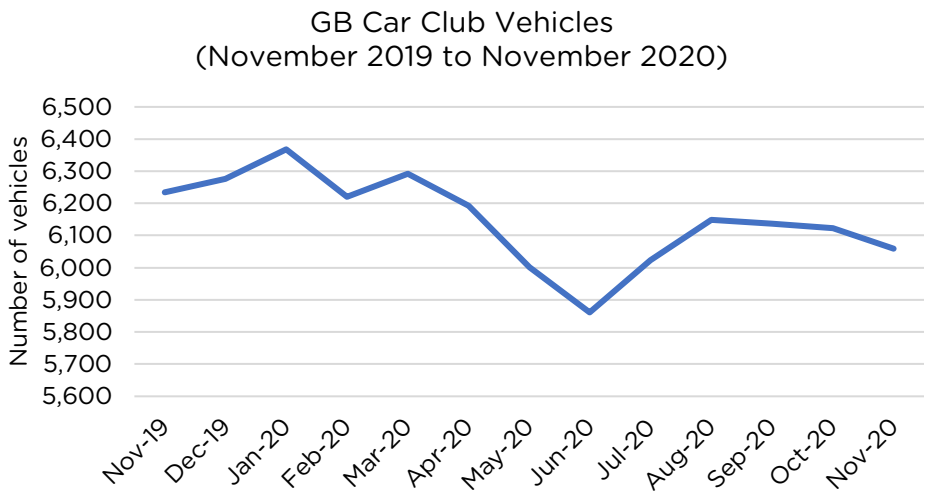


Figure 40: Number of car club vehicles available between November 2019 and November 2020.

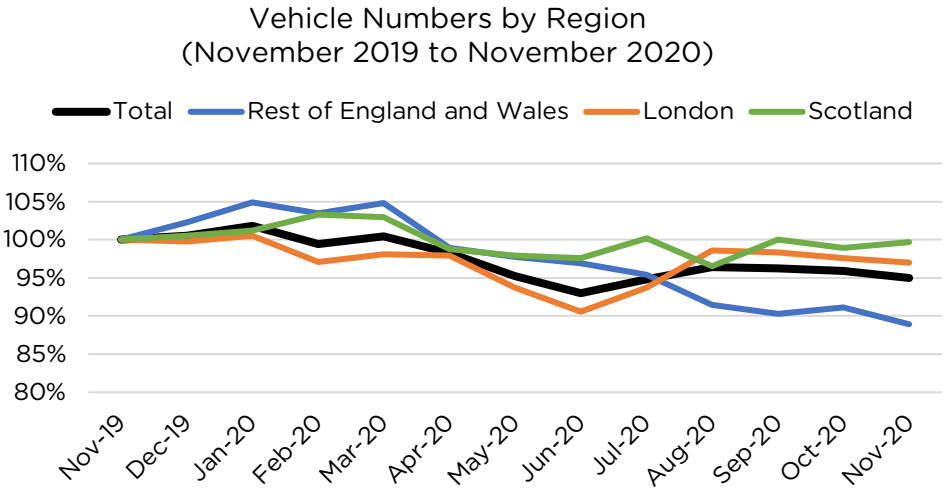


Figure 41: Number of car club vehicles available between November 2019 and November 2020 split by region.

The number of car club vehicles was reduced in the months after March 2020 due to the Covid-19 pandemic. This was mainly a reduction in numbers of cars rather than light commercial vehicles (vans) and, by June 2020, the GB fleet had shrunk by 8%. There was a significant recovery from June onwards in Scotland and London, which was partially offset by an 11% decrease in the number of vehicles in the rest of England and Wales. Overall, this produced a 5% decrease in the GB fleet size over the 12-month analysis period.

8.2 Vehicle class and segment

The charts below show the distribution of car clubs per vehicle class and car club cars per vehicle segment. The second chart also shows all GB vehicles for context. 89% of the car club vehicles are cars and 11% of the vehicles are vans.

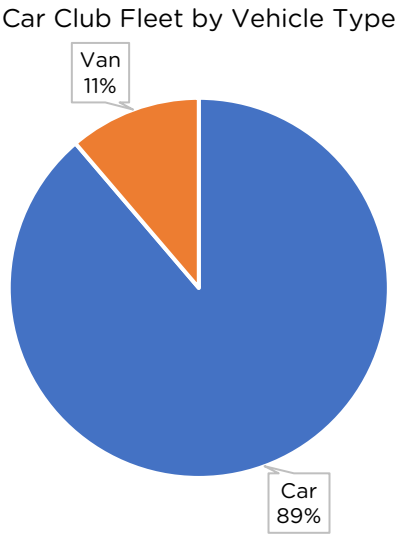


Figure 42: Car club fleet by vehicle type.

Segmentation of the car fleet showed that 54% are small cars (e.g., Ford Fiesta, Volkswagen Polo) and 45% are medium cars (e.g. Volkswagen Golf). This compares to the UK average[7] of only 70% of cars being in these two segments. The full breakdown is shown in the chart below.

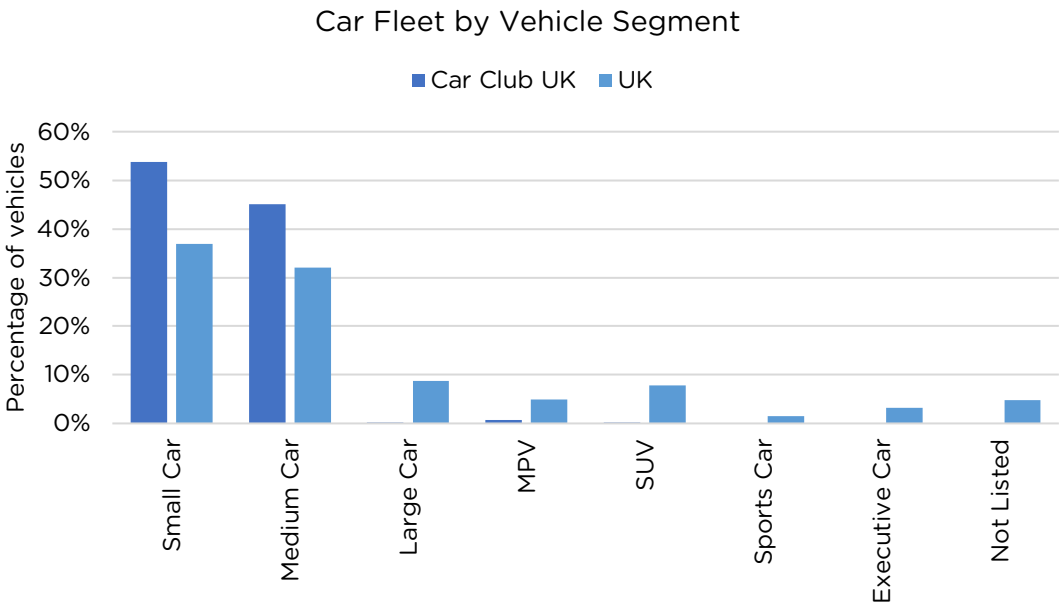


Figure 43: Car club vehicles by vehicle segment.

Segmentation of the van fleet showed that 92% of the vans are medium vans (e.g., Volkswagen Transporter, Vauxhall Vivaro). By comparison, the UK van fleet is evenly split between small, medium, and large vans.

[7] We have used UK average figures for comparisons where London-specific equivalents are not available. All vehicles (VEH01) - GOV.UK (www.gov.uk)

8.3 Total mileage

The total distance covered by all car club vehicles between November 2019 and November 2020 was 33.7 million miles. The distribution per region is shown in the graph below.

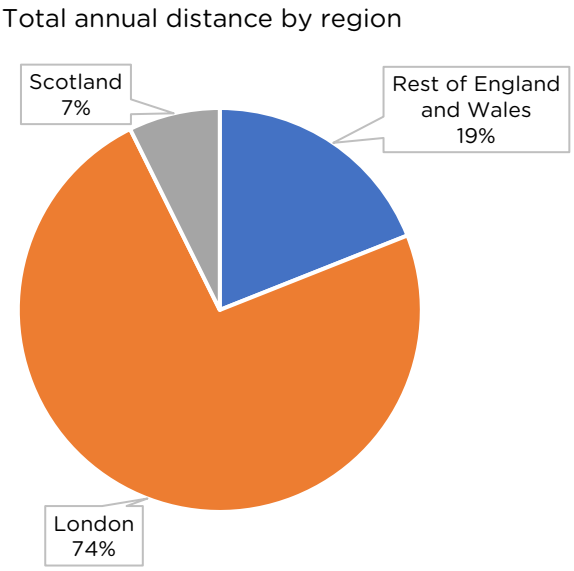


Figure 44: Total annual distance driven by region.

Compared with the figures reported in 2017/18, the data shows a reduction from 37.2 million miles as reported in the 2017/18 survey, a decline of 9.4%. This equates to a reduction of around 35% per member since 2017/18. However, the 2017/18 data is taken at face value suggest that vehicle numbers in England and Wales have significantly increased since the 2017/18 survey (80% increase in cars), even including the drop in vehicle numbers in 2020. We therefore do not wish to draw any interpretations from this data. The vehicle numbers chart, in figure 41, gives a more useful indication of trends in the market over the past year.

8.4 Fuel type

The breakdown of the fleet by fuel type is shown in the charts below. The key points to note are:

- 89% of the car fleet is petrol powered. 22% of these petrol cars have some level of hybridisation.
- 10% of the car club fleet are electric vehicles. By comparison, less than 1% of cars in the UK are electric vehicles[8].
- The diesel cars only represent 1.5% of the car club cars, they are in closed or corporate schemes and as such are not available to the general public.
- 68% of the GB car club vans are diesel fuelled, which significantly differs from the total GB vehicles, of which 96% of vans are diesel[9].
- Only 1% of the vans are pure EVs due to the lack of availability of pure electric medium vans on the market.

[8] Department for Transport, VEH0105 and VEH0132b.
[9] Department for Transport, VEH0403

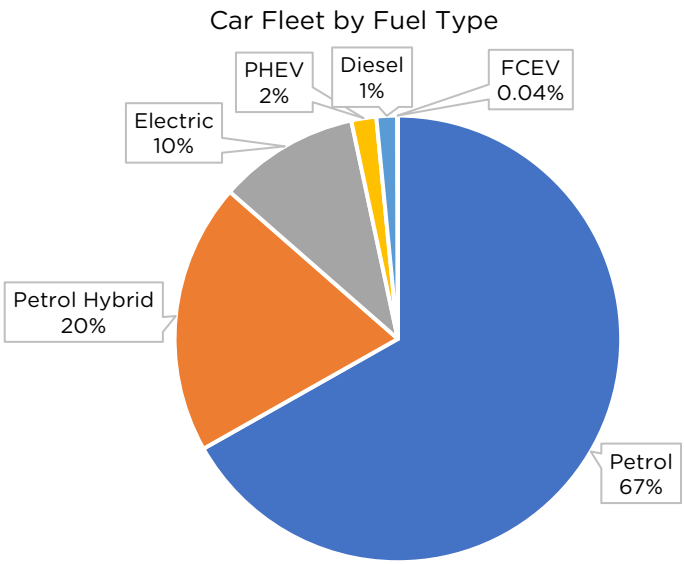


Figure 45: Car fleet by fuel type.

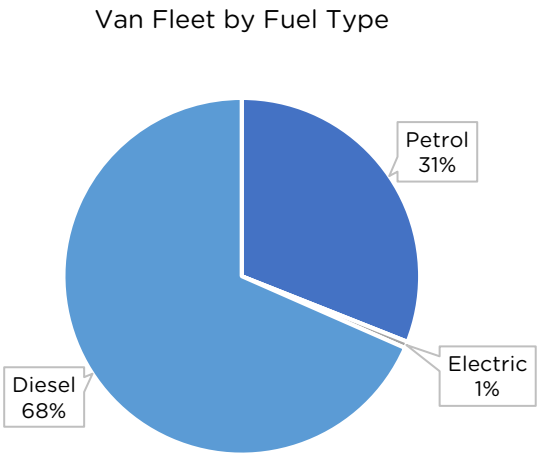


Figure 46: Van fleet by fuel type.

8.5 Vehicle age

The breakdown of the fleet by vehicle age is shown in the chart below. The key points to note are:

- 69% of cars and 91% of vans are two years old or younger.
- Less than 1% of the total fleet is aged five years or older.
- Car club cars have an average age of 1.6 years. Vans have an average age of 1.1 years. Vehicles are significantly newer than average UK cars and vans, both of which have an average age of 8.3 years[10,11].

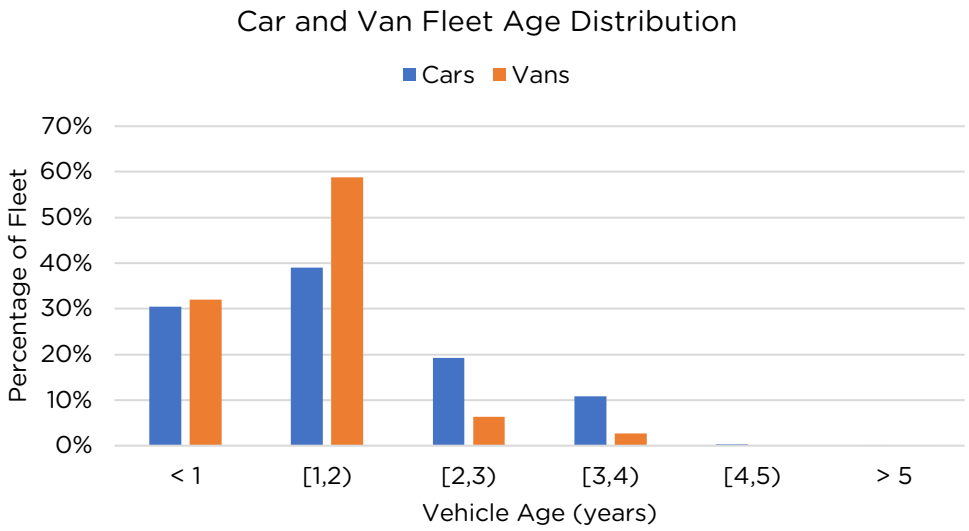


Figure 47: Car and van fleet age distribution.

8.6 Euro standard

European Union emission regulations for new light duty vehicles, commonly known as Euro Standards, regulate tailpipe emissions including those associated with poor air quality (nitrogen oxides (NOx) and particulate matter). At the time of writing Euro 6 is the most stringent standard.

The breakdown of the fleet by Euro Standard is shown in the chart below. The key points to note are:

- 10% of the cars emit no tailpipe emissions as they are pure EVs.
- With the exception of 6 cars in closed pool car schemes, all the remaining cars are Euro 6 compliant, as required by CoMoUK accreditation.
- All the vans are Euro 6 compliant or pure EVs.

[10] Department for Transport, VEH0211
[11] Department for Transport, VEH0411

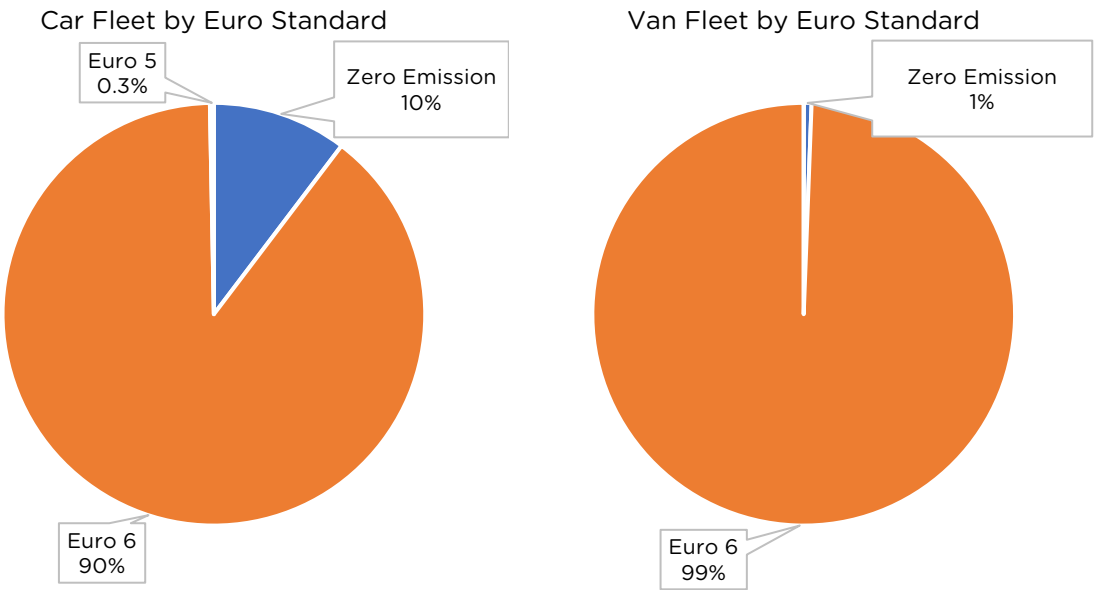


Figure 48: Car and van fleets by Euro standard.

As a result, 100% of publicly available cars and vans are ULEZ compliant.

8.7 Euro NCAP rating

Euro NCAP is a five-star safety rating system, against which all new vehicles must be tested.

The breakdown of the fleet by Euro NCAP rating is shown in the chart below. The key point to note is that 98% of the cars achieve either a 5 star or 4 star rating.

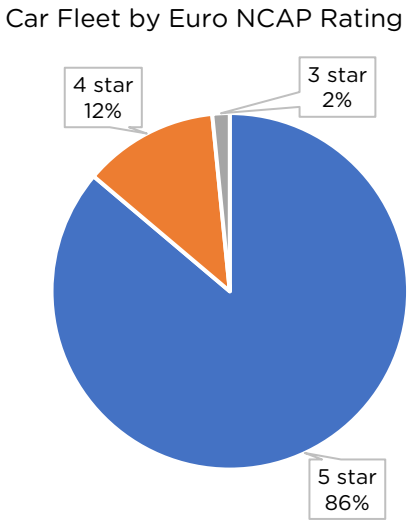


Figure 49: Car fleet by Euro NCAP rating.

8.8 Greenhouse gas emissions

8.8.1 Tailpipe emissions

The table compares the tailpipe emissions of car club vehicles in GB against the average UK vehicle. It shows that car club vehicles have lower emissions than average GB vehicles.

- The average car club car has emissions which are 26.6% lower than the average car on the UK's roads[12].
- The average car club van has emissions which are 7.1% lower than the average van on the UK's roads. This relatively small saving is because of the high share of petrol vans in the fleet[13].

Table 4: Difference in TTW CO_2 emissions between car club vehicles and the UK average.

TTW gCO_2e/km	Average GB Car Club	Average UK vehicle	Car Club difference to average UKB vehicle
Car	125.8	171.4	26.6%
Van	228.7	246.2	7.1%
Weighted average	137.5	-	-

Vehicle Excise Duty (VED) first year rates vary according to the CO_2 emissions of the car. The distribution of vehicles across these bands is therefore a useful proxy for the emissions of a fleet.

The breakdown of car club cars[14] and a comparison to all cars in the UK in 2019[15] are shown in the chart below. The key points to note are:

- Car clubs have significantly fewer highly emitting vehicles (>130 g/km CO_2). Over half the vehicles in the UK are in a VED band above 130 g/km CO_2.
- 13% of car club cars are ultra-low emissions vehicles (ULEVs), which are defined as emitting less than 75 g CO_2/km, as opposed to just 1% in the UK vehicle total fleet in the UK.

[12] This is the percentage difference between the average emissions of a car club vehicle and the emissions of an average UK car or van. Individual car club vehicle emissions were reported by the car club operators and the average calculated using the methodology detailed in the Appendix to this report. Average UK car/van emissions taken from UK Government greenhouse gas reporting conversion factors 2020, available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020.

[13] This is the percentage difference between the average emissions of a car club vehicle and the emissions of an average UK car or van. Individual car club vehicle emissions were reported by the car club operators and the average calculated using the methodology detailed in the Appendix to this report. Average UK car/van emissions taken from UK Government greenhouse gas reporting conversion factors 2020, available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020.

[14] VED for vans is not based on CO_2 emissions.

[15] Department for Transport, VEH0206.

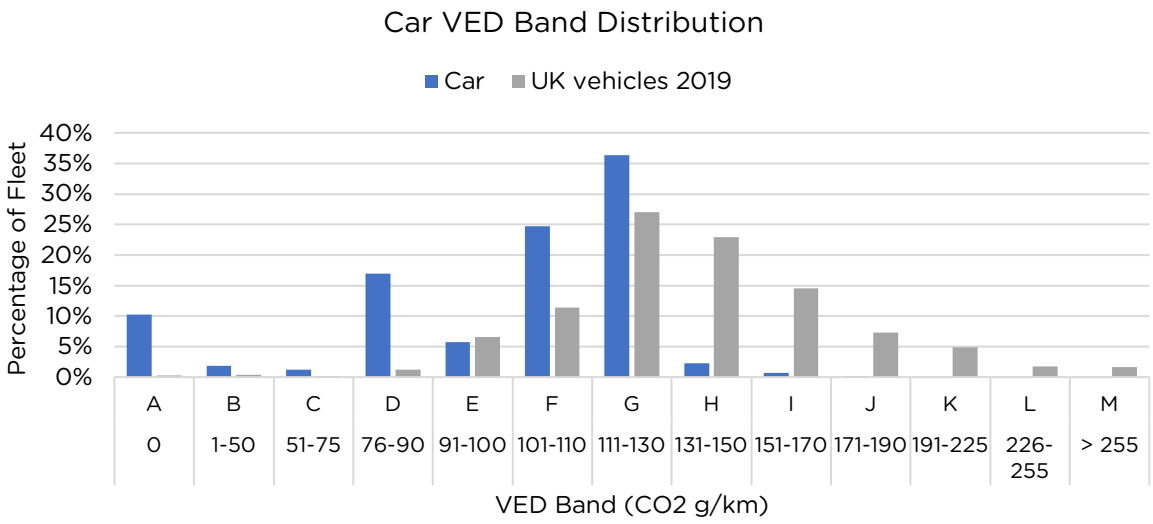


Figure 50: Car VED band distribution.

8.8.2 Total emissions

We have estimated well-to-wheel (WTW) carbon dioxide equivalent (CO_2e) emissions, which is the standard that should be used for reporting purposes. WTW emissions include the emissions from producing, transporting, and combusting fuel and electricity.

- The WTW CO_2e emitted by the fleet is estimated to be 9,670 tonnes.
- Over the same distance, the average UK car and van would have emitted 12,179 tonnes WTW CO_2e.
- This represents a reduction of 21% or 2,509 tonnes CO_2e, assuming all car club journeys would otherwise have been undertaken by another vehicle.
- This saving is approximately the equivalent of removing 979 cars from the road for a year[16], or the lifetime CO_2e absorption of 5,500 trees.

8.9 Air pollutant emissions

According to Public Health England "poor air quality is the largest environmental risk to public health in the UK"[17]. The two largest components of urban air pollution are oxides of Nitrogen (NOx) and Particulate Matter (PM). Real-world emissions of these pollutants from vehicles have been estimated using COPERT 5[18]. COPERT outputs are not directly comparable with Euro Standard regulations, though the standards are incorporated into its assessment.

The breakdown of the fleet by estimated real-world pollutant emissions are shown in the charts below. The key points to note are:

- Car club vehicles have average NOx emissions of 0.03 g/km and 0.38 g/km for cars and vans respectively. This is an 89% and 67% lower than the UK car and van average (0.32 and 1.16 g/km)[19] respectively from the UK average (0.32 and 1.16 g/km)[20].
- PM2.5 emissions are also significantly lower than the UK average car and van, with car clubs achieving 72% and 90% reductions, respectively.

[16] Numbers of cars removed from road calculated using average annual mileage for UK cars (7,400 miles/year from National Travel Survey 2019), reduction in emissions from driving more efficient car club vehicles, and average UK vehicle emissions from BEIS.
[17] PHE https://www.gov.UK/government/publications/health-matters-air-pollution/health-matters-air-pollution
[18] https://copert.emisia.com/
[19] NAEI, Emission factors for transport - NAEI, uk (beis.gov.UK)
[20] NAEI, Emission factors for transport - NAEI, uk (beis.gov.UK)

Car club vehicles have much lower air quality pollutant emissions than average UK vehicles for two reasons; there are far fewer diesel vehicles on the fleet and the vehicles are all much newer and so comply with the latest Euro standards.

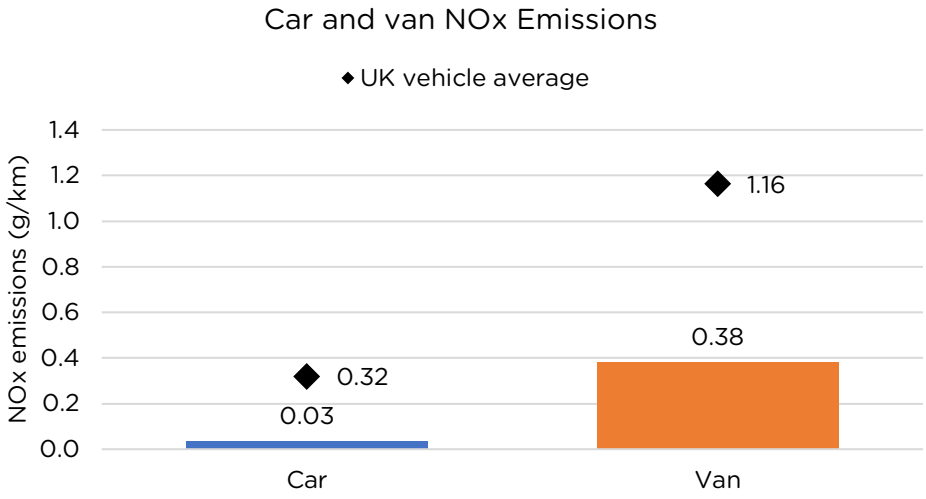


Figure 51: Car and van NOx emissions.

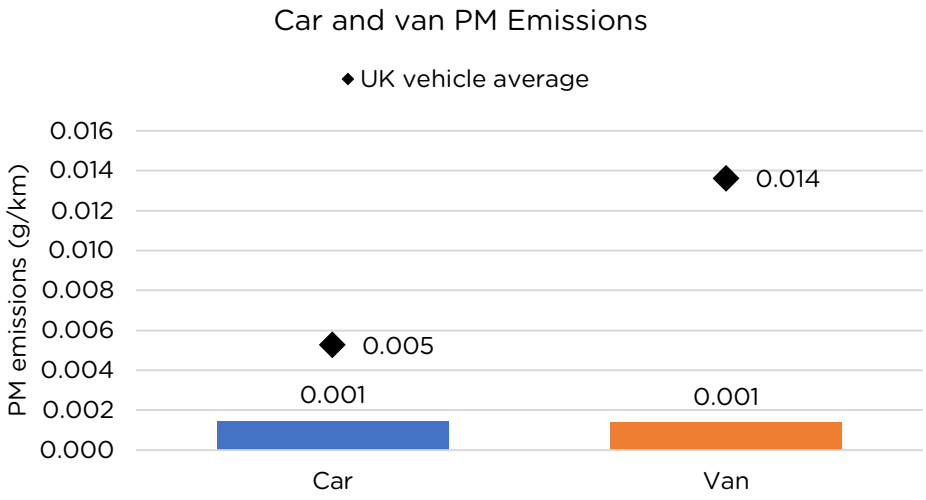
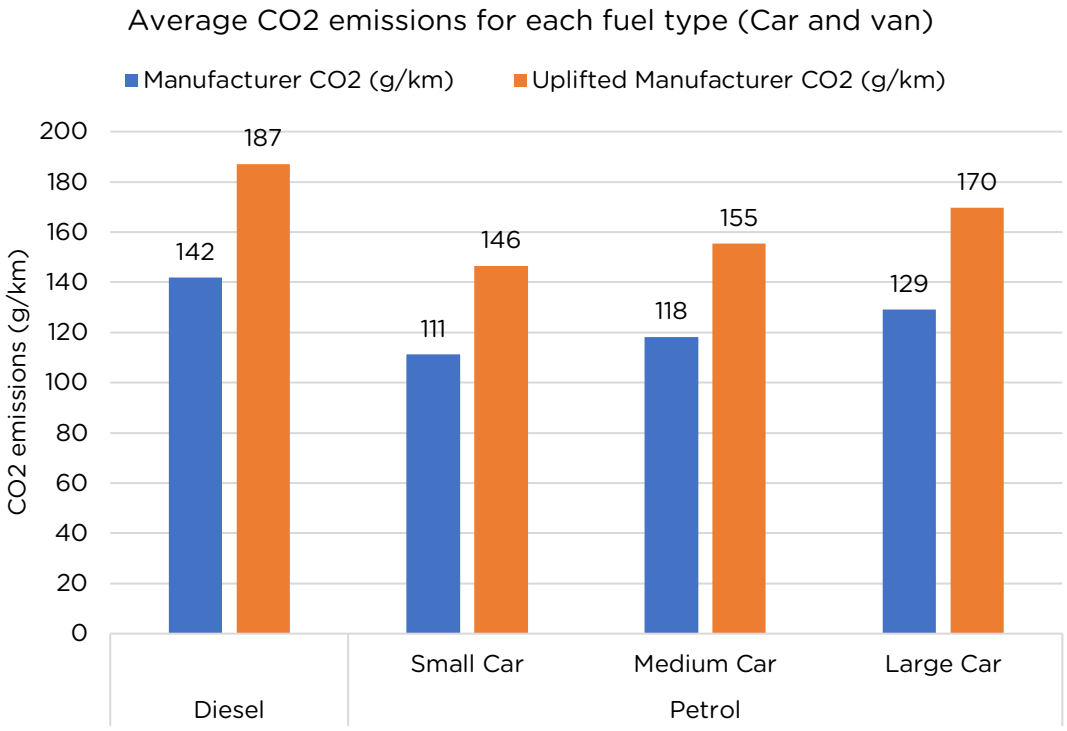


Figure 52: Car and van PM emissions.

9 Appendix

9.1 Carbon emissions

The measured carbon dioxide equivalent[21] (CO_2e) emissions provided by vehicle manufacturers were uplifted to account for the difference between the measured emissions and the real-world emissions. The uplift factor is based on the year of registration and is provided by the Department for Business, Energy and Industrial Strategy (BEIS)[22]. These uplifted emissions were compared against Cenex's own independently measured emissions factors[23] and good agreement was found. The uplifted emissions were used as they are provided for each specific make and model, hence providing more granularity than generic vehicle type measurements, e.g., small car). The different uplift factors are shown in the chart below.

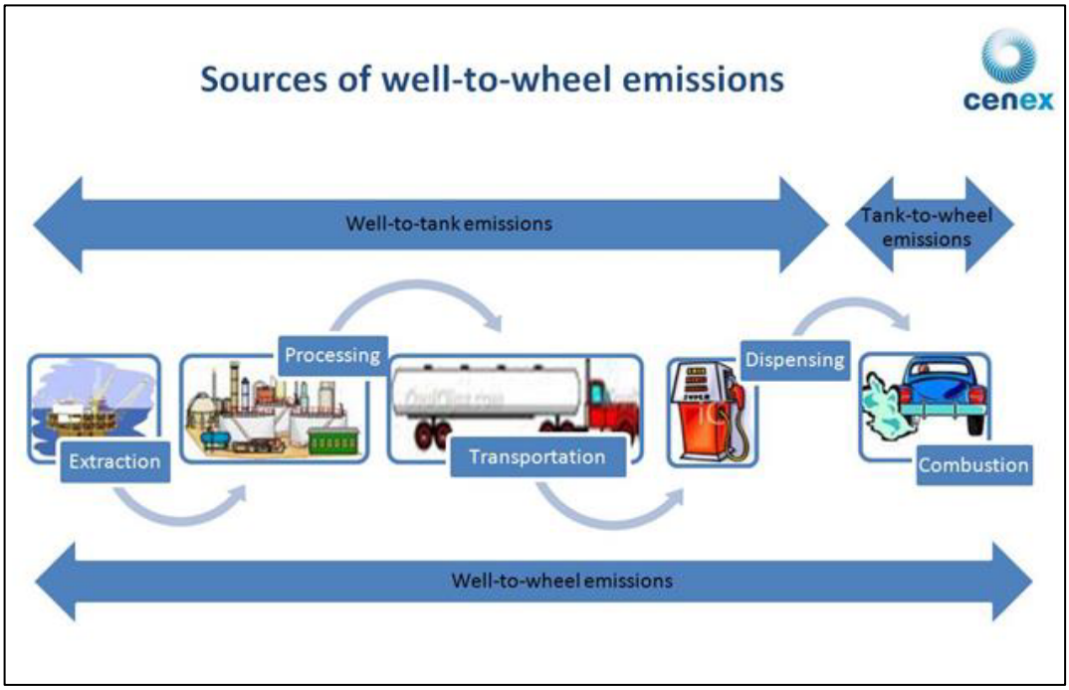


Both tailpipe and well-to-wheel (WTW) emissions are reported. Tailpipe emissions only consider the products from the combustion in the engine, while WTW emissions also account for, on top of the combustion, the extraction and processing of the fuel (or generation of electricity for electric vehicles) and its transportation/dispensing to the petrol station or chargepoint.

[21] CO_2e emissions is the equivalent amount of CO_2 in kg that accounts for all greenhouse gases emitted by vehicles: CO_2, methane and N_2O.

[22] BEIS, 2020 Government greenhouse gas conversion factors for company reporting: Methodology Paper for Conversion factors. Greenhouse gas reporting: conversion factors 2020 - GOV.UK (www.gov.uk)

[23] Cenex's real world emissions are based on actual measurements and capture fuel type and vehicle segment but do not have the granularity of the manufacturer measured emissions that additionally account for different models and manufacture years



9.2 Air quality emissions

Air quality emissions were calculated using the COPERT 5 tool[24], which estimates the real-world air quality emissions of vehicles based on their size, fuel type and engine Euro Standard. The emissions given by the tool come from a database of test data held through the Joint Research Centre's programme "European Research group for Mobile Emission Sources". The emissions test data is typically derived from laboratory studies where vehicles are tested on a chassis dynamometer over different real-world drive cycles, but increasingly often from testing vehicles on the road using portable emission measurement systems (PEMS).

9.3 Low emission zone compliance

Vehicles were deemed Low Emission Zone compliant if they met the following minimum emission standards:

- Euro 4 (or better) petrol or petrol hybrid engine.
- Euro 6 diesel engine.
- Zero tailpipe emission vehicle.

Many active and proposed zones in the UK require with these standards, for example the London Ultra Low Emission Zone, the forthcoming Scottish Low Emission Zones, and the Birmingham Clean Air Zone.

[24] https://copert.emisia.com/

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