

Barriers and opportunities for shared battery electric vehicles

A report for Transport and Environment

Final report

14th January 2021

elementenergy



Executive summary

Background and objectives

The UK government has committed to reducing carbon emissions to net zero by 2050. While it is critical that cars are rapidly transitioned to fully electric, no vehicle is ‘zero emission’ when considering the impact of vehicle production. The UK Science & Technology Committee lists reduced personal vehicle ownership as one of its 10 priorities to meet the 2050 net zero target. Transitioning to shared car models, such as electric car clubs, can reduce both car ownership and car travel demand alongside reduced in-use tailpipe emissions.

Despite the benefits of shared cars, uptake in the UK has lagged behind other European countries and operators have reported facing challenges when launching or expanding car clubs (the most mature form of car sharing). The objective of this research is to review the barriers to the adoption of shared battery electric vehicles in the UK, identify opportunities for increased uptake, and make recommendations for policies and strategies to mitigate these barriers. The research benefitted from a review of the existing literature and Element Energy’s on-going work with local authorities and was complemented by interviews with industry stakeholders.

Barriers to shared battery electric vehicle (BEV) adoption

Car club operator perspective

A number of recurring barriers to the growth of car clubs in the UK and the deployment of BEVs in their fleet were identified, the core ones are summarised in Table 1. For BEV deployment specifically, the key barrier is insufficient coverage of rapid charge points that could otherwise enable BEV business models to more closely match that of conventional petrol vehicles.

Table 1: Summary of core barriers to car clubs and their deployment of BEVs

Key barriers to the adoption of shared BEVs	Category
<p>Insufficient suitable charging infrastructure: Charging infrastructure needs differ from those of residents or traditional fleets, with widespread, charging infrastructure (on-street, at destinations and en-route) necessary to support a viable business case. To-date local and regional charging strategies have focused on resident or traditional fleet needs, leading to insufficient suitable infrastructure for car clubs.</p> <p>Key issues of lack of infrastructure include:</p> <ul style="list-style-type: none"> • Members cannot be relied upon to recharge which leads to high operational costs • Limited driving range of BEVs prevents participation in all business models <p>Inconvenience to users as a result of charging time requirements and range anxiety</p>	Barrier to BEV deployment in car clubs
<p>Lack of coherent national policy and messaging around car clubs:</p> <p>Local authorities across the UK have varying policy and attitudes towards car clubs which complicates and limits growth.</p>	Barrier to all car clubs
<p>Lengthy and complicated process in delivering car club parking bays:</p> <p>Car club operators have limited access to public parking bays, largely as a result of inconsistent policies and competing priorities within local authorities.</p>	Barrier to all car clubs

Local authority perspective

Local authorities are drivers of local transport policy. Decisions at local authority level are crucial for the expansion of car clubs, and the transition to net zero more generally. However, local authorities struggle to deliver their net zero ambitions due to gaps in key powers, funding barriers and a lack of capacity as a result of cuts in funding. There is a lack of national co-ordination, and local authorities have very limited guidance from national government on decisions to meet climate objectives, and how reported potential benefits of car clubs can be translated to a local context.

The lack of guidance and competing pressures around transport decarbonisation result in contradictory approaches between local authorities, including an unwillingness to consider car clubs in some cases despite their possible benefits and mismatches between local policy and intended policy outcomes.

Potential for deployment

Car clubs typically are most successful in large cities and areas with high local population densities. Based on population density data, it is estimated that there is **potential for deployment of up to 34,000 car club cars** across England and Wales (compared to <7,000 today; see Figure 1 for heatmap of areas with high potential for car club uptake). Of these, 14,000 could be deployed in Greater London. Across England and Wales, this fleet size is equivalent to 3.5m car club members (6% of the population) and could remove up to 300,000 cars from the road.

For this potential to be met with shared BEVs, there would need to be wide coverage of reliable rapid (50 kW) and ultra-rapid (100 kW and above) public charge points to enable users to charge vehicles and to confidently use BEVs in the same range of use cases as petrol vehicles. From the car club operator perspective, it would also require incorporation of vehicles into the fleet that are capable of ultra-rapid charging and development of suitable charging models and incentives to support a viable business case.

Compared to large user groups (private cars, taxis and private hire vehicles), the electric vehicle charging demand for car clubs will be relatively low even if the maximum deployment level is reached (estimated at 25 GWh/year in London, 1% of total forecast demand). This means that charging infrastructure will likely continue to be largely driven by other user groups. To ensure that the geographic distribution of the future network meets electric car club needs, detailed analysis of car club user travel patterns is needed so that potential synergies with other user groups and gaps in the network can be communicated to local and regional authorities.

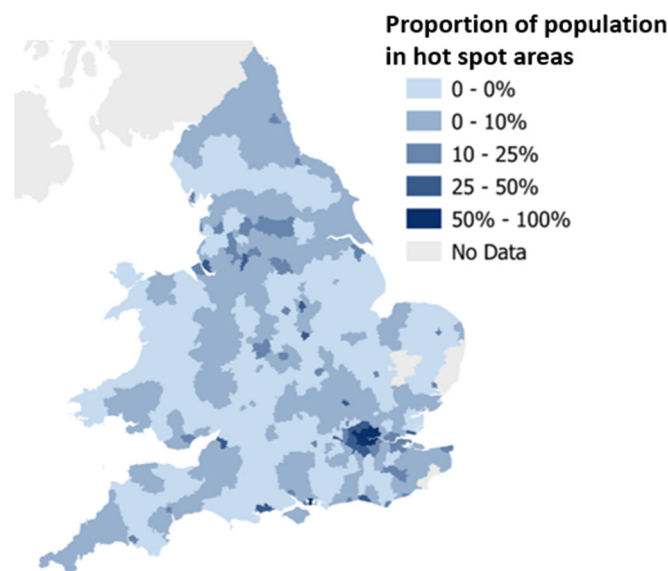


Figure 1 Share of population in areas of high population density in England and Wales (hot spot defined as >8,000 people per km²).

Recommendations to support the adoption of shared BEVs

Recommendations to support both the uptake of shared cars more broadly, and shared BEVs specifically, are summarised in Figure 2. Car club operators are already taking steps to overcome the barriers they face; however, they will need further support at both national and local authority level to fully address key barriers and enable consumers to shift away from privately owned vehicles towards shared BEVs.

Improved charging infrastructure will be crucial to enabling the uptake of shared electric cars, particularly the roll-out of a dense (ultra-)rapid charging network. Achieving a suitable network will require collaboration across the public and private sector. When developing charging infrastructure plans, both national and local authorities must consider the needs of car clubs. In turn, this requires car clubs to understand their likely charging needs and communicate them to authorities and charge point operators.

As shown by Figure 2, the majority of mitigating measures are the responsibility of local authorities (LAs). However, LAs need considerable support from the national government, including a coherent national framework supported by appropriate, car club-specific funding, to carry out these measures.

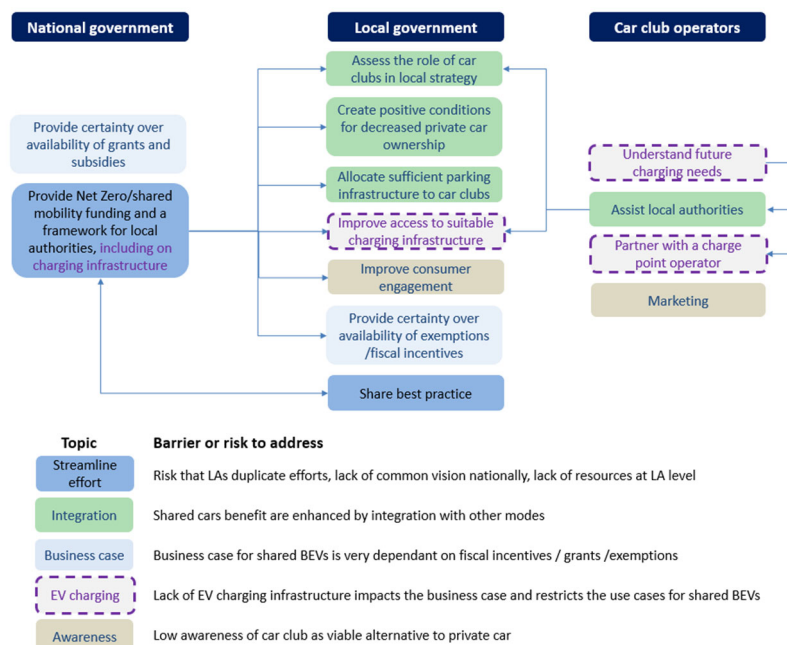


Figure 2: Summary of recommendations to mitigate barriers faced by car club operators.

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Authors

Daisy Tyrer, Consultant, daisy.tyrer@element-energy.co.uk

Katherine Orchard, Senior Consultant, katherine.orchard@element-energy.co.uk

Reviewers

Celine Cluzel, Director

Abigail Willis, Consultant

Acknowledgments

The authors would like to thank the stakeholders who gave their time to share their insider knowledge, namely: Kate Hinton (Zipcar UK), James Taylor (Zipcar UK and, formerly, DriveNow), François Denis (formerly Ubeeqo) and Frédéric Le Ballois (Blue Systems UK).

Acronyms

BEV	Battery Electric Vehicle
CCC	Climate Change Committee
EV	Electric Vehicle
ICE	Internal Combustion Engine
ICCT	International Council for Clean Transportation
KPI	Key Performance Indicator
LA	Local Authority
LSOA	Lower Super Output Area
PHV	Private Hire Vehicle
RFI	Request for Information
TCO	Total Cost of Ownership
ULEZ	Ultra-Low Emission Zone

1 Introduction

1.1 Context

The UK government has committed to reducing carbon emissions to net zero by 2050¹. Surface transport is currently the largest emitting sector in the UK; this sector was responsible for 24% of national CO₂e emissions in 2019 and decreased by only 3% between 2008 and 2018². Cars are the largest emitting vehicle group, responsible for 55% of domestic transport emissions in 2017³. Improvements in vehicle efficiency have largely been offset by population growth, with a 6% increase in the number of kms driven over the past decade⁴ and upsizing of the passenger vehicle fleet⁵.

While it is critical that cars are rapidly transitioned to fully electric, no vehicle is 'zero emission' when considering the impact of vehicle production. It is therefore recognised that reducing overall car ownership is also needed to meet carbon targets. In the UK, 76% of households had a least one car or van in 2019⁶ and the UK Science & Technology Committee lists reduced personal vehicle ownership as one of its 10 priorities to meet the 2050 net-zero target⁷.

Private car ownership is also inefficient, with private cars spending over 95% of time parked⁸. In contrast, shared cars allow users to access them only when needed and have the potential to improve the transport system efficiency by reducing congestion in addition to unnecessary private car ownership. Studies indicate that car club cars each displace between 5 and 15 private cars⁹. In England & Wales this displacement rate is estimated at 6.1 private cars per car club car¹⁰.

Car club membership has the additional benefit of supporting other sustainable modes of transport, with users reporting more walking and cycling trips after joining a car club and reduced car use. CoMo UK found that the average number of walking/cycling trips taken per week by each member increased after joining a car club, while car or taxi use fell by 9%¹⁰.

In addition to reduced car ownership and car travel demand, transitioning to shared BEV ownership brings additional benefits of faster uptake of BEVs in the fleet compared to private vehicles¹¹ and widening access to BEVs beyond those who can afford to purchase them for private ownership. However, although electric car clubs can contribute to future net zero transport systems care must be taken to ensure shared BEV adoption does not come at the expense of even lower carbon transport modes, such as active travel and zero-emission mass transit.

Despite the benefits of shared cars, uptake in the UK has lagged behind other European countries and operators have reported facing a number of challenges when launching or expanding car club schemes. This report explores some of the barriers faced by car clubs in the UK and opportunities to mitigate them.

¹ The Climate Change Act 2008 (2050 Target Amendment) Order 2019

² [Reducing UK emissions: 2020 Progress Report to Parliament](#), Climate Change Committee (2020)

³ Greenhouse gas emissions by transport mode (Table ENV0201), DfT (2017)

⁴ Provisional road traffic estimates, Great Britain: April 2019 to March 2020, DfT (2020)

⁵ Shared mobility: where now? where next? The second report of the Commission on Travel Demand, Centre for Research into Energy Demand Solutions (2019)

⁶ National Travel Survey (Table NTS9902), DfT (2019)

⁷ UK Science and Technology Committee (2019), [Clean Growth: Technologies for meeting the UK's emissions reduction targets](#)

⁸ Spaced Out: Perspectives on parking policy, RAC Foundation (2012)

⁹ Does sharing cars really reduce car use?; Transport & Environment (2017)

¹⁰ CoMo UK found that as of 2018, 4747 private cars had been disposed of by the 25,773 car club members in England & Wales (excl. London) after joining a car club. CoMo UK (2019), [England & Wales Car Club Annual Survey 2017/18](#)

¹¹ Due to faster replacement rates (typically 2 years for car club vehicles compared to 15 years for the wider fleet)

1.2 Objectives and scope

The objective of this research is to review the barriers to the adoption of shared battery electric vehicles (BEVs), identify opportunities for increased uptake, and make recommendations for policies and strategies to mitigate these barriers.

The focus is shared BEV adoption in the UK, but this involves also understanding the barriers to non-electric car club vehicles. Learnings from Europe and wider markets have been considered.

The research benefitted from a review of the existing literature and Element Energy's on-going work with Local Authorities and was complemented by interviews with industry stakeholders.

1.3 Structure of the report

Following this section, the report is structured as follows:

Section 2 explores the current UK car club market and how it compares to other regions.

Section 3 discusses the barriers to shared electric cars, identified in literature and in interviews with stakeholders.

Section 4 considers the potential for deployment of shared BEVs and the key enablers to support this deployment.

Finally, section 5 provides recommendations for both national and local governments to support shared BEV uptake.

2 Market overview

2.1 Car sharing business models

Car sharing is a broad term and generally involves accessing a car owned by another person or entity. The term car sharing may be used interchangeably with 'car club' in the UK, however, in some cases other modes of transport such as ride-hailing are considered car sharing. This report focuses on car clubs.

Car clubs allow individuals and businesses to have access to a personal vehicle without being tied to ownership. Users typically pay a membership fee and then pay according to trip length to use the car club vehicles, which are parked in various locations and can be collected and returned as and when required. A number of car club business models are in operation across the UK, each of which leads to different customer experiences and use cases, often at varying price points. Round-trip is currently the leading model in the UK, with free-floating only currently offered by one operator (Zipcar, London only) and innovative services such as peer-to-peer only emerging relatively recently (see section 2.3, Table 2).

Roundtrip – the most widespread model

Roundtrip schemes allow customers to pick up a car from a dedicated parking station and return the vehicle to the same place. Stations may be found at transport hubs or locally at on- or off-street parking. Roundtrip schemes have the advantage of a guaranteed parking spot at the end of the trip, however, there is limited flexibility as journeys must end at the same location as they started. Booking is generally carried out over 30 minutes in advance, and schemes charge users by the hour or day.

Free-floating – a model seen in London only at the moment

Free-floating schemes allow customers to pick up a car from one location and leave it at another. Cars are not picked up and dropped off at dedicated parking stations allowing complete journey flexibility. However, there are often geo-fenced restrictions for where cars can be dropped off, due to agreements with local authorities. Free-floating trips tend to be more spontaneous and shorter duration than use of other car sharing services.

Point-to-point – a model tried in London but no longer in operation

Point-to-point schemes allow customers to pick up a car from a dedicated parking station and return the vehicle to a different dedicated parking station. Like roundtrip models, point-to-point has the advantage of a pre-booked parking spot at the end of the trip, but also has the flexibility of not having to return to the start point of the journey.

Emerging car club business models

In addition to traditional car club business models, alternative car-sharing schemes are growing in popularity in the UK. For example, peer-to-peer car sharing allows private vehicle owners to hire out their car when they are not using it. Peer-to-peer sharing is generally facilitated through an online platform or smartphone app, where car owners set the price of hiring their vehicle. Peer-to-peer services are beneficial to both hirers and owners, as hirers have access to nearby cars at a lower cost than traditional car hire and owners make income on their vehicle when they would otherwise not be used.

Large peer-to-peer car sharing schemes include the US-based company Turo, which has gained over 50,000 members in the UK since launching in 2018¹².

¹² [Turo.com](https://www.turo.com)

Shared ride-hailing

Companies that offer ride-hailing services (e.g. Uber) are often classified as car sharing companies. Although ride-hailing does allow access to a car owned by another person or entity, the services differ from traditional car clubs in that the user does not drive the vehicle themselves. Additionally, ride-hailing drivers will carry out a number of ‘empty miles’ – miles driven waiting to be connected to a passenger. As a result, they are more similar to taxi services than car clubs. A number of ride-hailing services offer shared rides or ‘pooling’, where two or more groups occupy the vehicle simultaneously for a reduced fee. However, analysis found that most Uber and Lyft rides in the USA serve a single passenger, with an average passenger occupancy of 1.3 passengers per trip (excluding driver)¹³.

2.2 Current market size

Global car club membership has increased significantly over the past 10 – 15 years (Figure 3). Asia has seen the largest growth in car club membership, with number of users increasing by a factor of over 1000 between 2008 and 2018, with significant acceleration in growth rate from 2014 driven by the launch of a number of car sharing schemes, including China’s government-backed EVCARD programme¹⁴.

Growth in Europe has been slower, with a factor of ca. 20 increase in car club users between 2008 and 2018, with the majority of membership growth occurring after 2012.

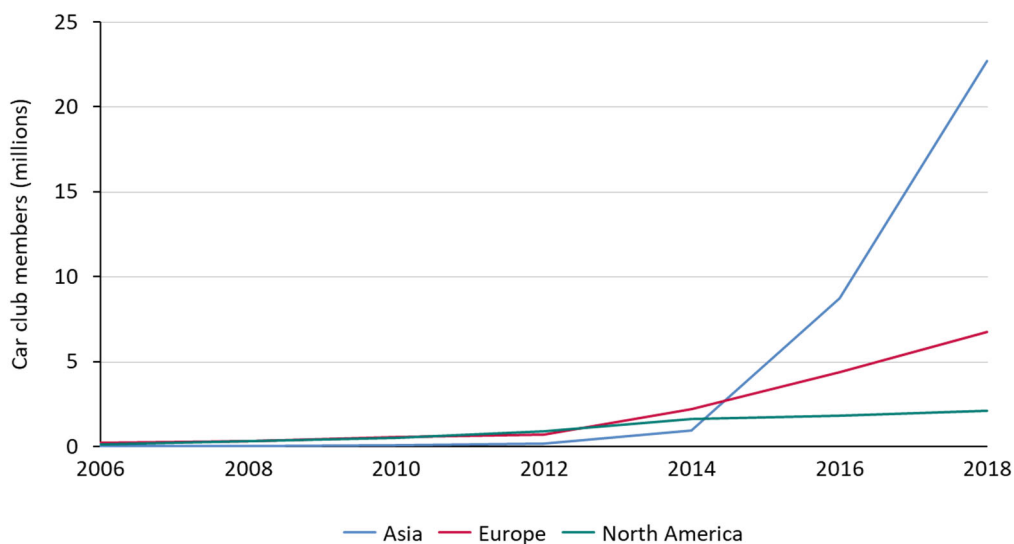


Figure 3: Membership of car clubs by region¹⁵

Although car club membership has increased across Europe, observed growth is not equal across all countries, (Figure 4). Although the UK’s car club membership has increased by a factor of 10 over the last 10 years, it is dwarfed by the large increase in membership seen in Germany, the market leader in

¹³ Factors influencing willingness to pool in ride-hailing trips, Hou et al. (2020)

¹⁴ The EVCARD programme is a membership-based self-service electric vehicle car sharing scheme supported by the Chinese government. The programme has expanded to over 30 cities in China and is reportedly one of the largest car sharing companies in the world. Source: Enabling ULEV uptake – international leading practice, Climate Xchange (2019)

¹⁵ Innovative Mobility: Carsharing Outlook; Carsharing Market Overview, Analysis, and Trends; Shaheen et al., 2020

car clubs for Europe¹⁶. As of 2019, approximately 3% of the German population are members of car clubs¹⁷, in contrast to the UK's 0.5%¹⁸.

The success of car sharing in Asia, largely encompassing growth in China, has been attributed to both supportive policy by local and national government, and additional factors such as strict measures to reduce private car ownership combined with poor public transport and taxi offerings to fulfil the shortfall in journey needs.¹⁹ For example, in Shanghai the local government set ambitious targets for car sharing and electric vehicle charge point provision which was enhanced by offering free parking spaces to shared vehicle operators and subsidies for introducing low emissions vehicles. Alongside this, a cap has been set on the number of new licence plates that can be issued every year to limit the number of vehicles entering the city. Electric vehicles are offered free licence plates while internal combustion engine vehicles must bid at auction (of which, ca 5% are successful). While public transport is insufficient to meet user needs, car sharing remains an attractive option.

The large uptake of car sharing in Germany has also been attributed in part to supportive local policy, with many cities open to granting space and parking permits to shared vehicle operators. Other contributing factors have been suggested to include the large number of big cities and densely populated medium-sized cities that are suitable for supporting free-floating and round-trip services.¹⁶ Germany was also an early mover in car sharing (starting in the 1980s) and in particular was innovative in 'smart' systems to support car sharing (such as automatic unlocking).²⁰ A number of major car sharing schemes were launched in Germany at the end of 2011, including the roll out of car2go and DriveNow services (backed by car manufacturers) in Hamburg and Berlin²¹ and the market has since expanded to over 200 operators.

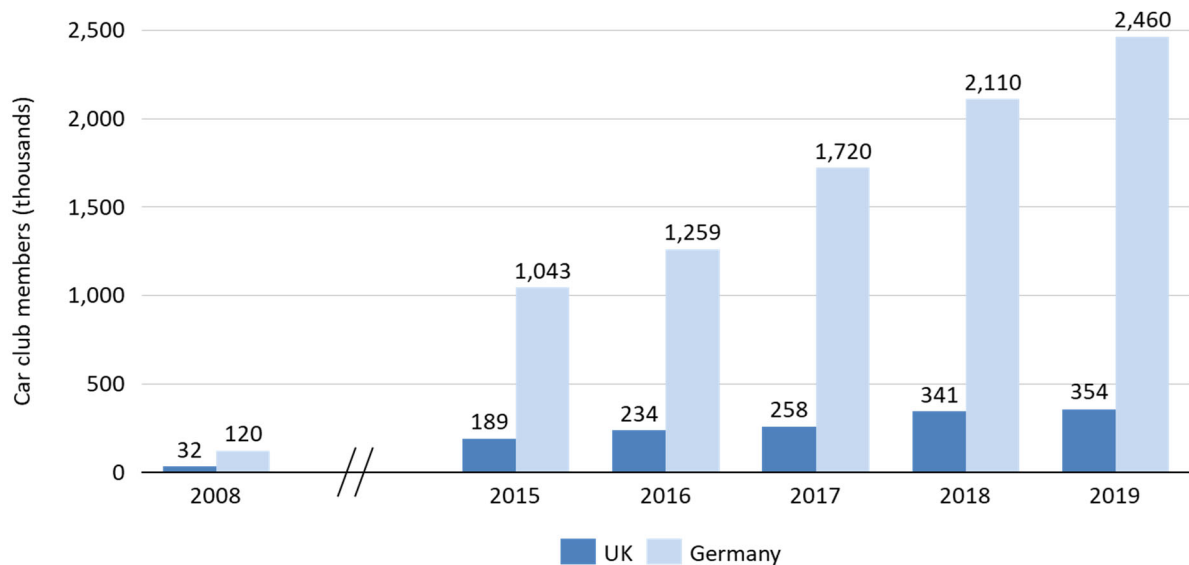


Figure 4: Membership of car clubs in the UK²² and Germany²³

¹⁶ Car Sharing in Europe: Business Models, National Variations and Upcoming Disruptions, Monitor Deloitte (2017)
¹⁷ 2019 Germany population taken from [Statistisches Bundesamt](#) (Federal Statistical Office of Germany)
¹⁸ 2019 UK population taken from the [Office for National Statistics](#)
¹⁹ Enabling ULEV uptake – international leading practice (2019) ClimateXchange
²⁰ [Journal of World Transport Policy and Practice](#)
²¹ The Demystification of Car Sharing, AT Kearney (2018)
²² CoMo UK, 2020
²³ [Bundesverband CarSharing](#), 2020

Car sharing in Germany²³

There are currently 226 car sharing providers in Germany, offering a mixture of roundtrip, point-to-point and free-floating services. ShareNow (formerly DriveNow/car2go) is the biggest free-floating car club provider, while Stadtmobil has the largest roundtrip fleet.

Car sharing is offered in 840 cities and municipalities in Germany. In major cities (>1m inhabitants), free-floating services are more common than roundtrip or point-to-point car sharing. In Hamburg, 87% of shared cars are free-floating, while only 11% of Berlin’s shared fleet are used for roundtrip or point-to-point services. In contrast, Karlsruhe has the highest density of shared cars to inhabitants (ca. 800 shared cars for its 300,000 inhabitants) and 92% of its shared cars are used for roundtrip or point-to-point services.

In 2017, Germany introduced a ‘Car Sharing Law’ which enabled local authorities to create public parking spaces that are available for use only by cars that are part of a car sharing scheme. For roundtrip or point-to-point car sharing, spaces can be designated for use by a specific provider, while spaces for free-floating cars can be by any registered scheme. Prior to the introduction of this law, over 90% of shared cars were parked in private parking spaces due to the lack of availability of public parking spaces, particularly in inner cities.

It is unclear what impact the popularity of car sharing in Germany has on private car ownership. A 2018 study found that the introduction of car sharing in Berlin and Hamburg had no impact on the share of new vehicle registrations in these cities²¹.

2.3 UK market players

A number of car club operators provide car sharing services across the UK. Major providers are summarised in Table 2.

Table 2: Summary of major car club operators in the UK

Company	Operating region	Business model	Electric car offering	Fleet size
Zipcar	London, Bristol, Cambridge and Oxford	Roundtrip in all operating regions, free-floating in London (Zipcar Flex)	BEVs offered under free-floating business model in London (Zipcar Flex)	Total UK fleet >3000. Current BEV fleet of 325.
Enterprise car club	Over 100 locations across the UK	Roundtrip	BEVs offered as an option	>1400
Co-wheels²⁴	Over 60 locations across the UK	Roundtrip	BEVs offered as an option	Unknown
E-Car Club	Across the UK	Roundtrip	All-electric fleet	Unknown
Hertz 24/7	London	Roundtrip	None	Unknown
Ubeeqo	London	Roundtrip (geofenced)	Trial in London	Ca. 500
Getaround	London	Peer-to-peer	Can filter to see BEV availability	N/A

²⁴ Co-Wheels encourages local ownership of its operations which are sometimes run as community car clubs or as a social franchise. Co-wheels.org.uk

Hiyacar	London, Bristol	Peer-to-peer	Can filter to see BEV availability	N/A
Karshare	Bristol	Peer-to-peer	Can filter to see BEV availability	N/A
Turo	Across the UK	Peer-to-peer	Can filter to see BEV availability	N/A

The majority of large UK car club operators are centred around London or other major UK cities, generally in the south of England. However, a number of community car clubs also operate in more rural areas, with lower population densities.

Roundtrip is the most common business model for car clubs in the UK. Zipcar has deployed almost 2000 roundtrip vehicles across London, Cambridge, Oxford and Bristol, and observe an average trip length of ca. 8 hours.

Car clubs in London

In 2018, approximately 70% of all car club members in the UK were based in London²². Most major UK car club operators provide services in London, including Zipcar (roundtrip and free-floating services), Enterprise, Co-wheels and Ubeeqo (all roundtrip). However, over the past year, two major car clubs have withdrawn from the London market.

Bluecity

Bluecity was a London-based **electric car sharing** company launched in April 2017 offering a point-to-point service. It was shut down in February 2020 after only being able to come to agreements with **3 of the 33 London boroughs**.

As a Bolloré Group company, it was able to take advantage of Bolloré’s charge point network in London. Its main challenge was the **lengthy and complex negotiations** with London’s fragmented local authorities.

DriveNow

DriveNow provided **free-floating** car sharing services in London. They offered petrol, diesel and electric vehicles across **9 boroughs** and key transport hubs such as Stratford International and London City Airport.

DriveNow was launched in London in 2014 and shut down in **February 2020**, citing **low uptake** and the **high costs and complexity** of operation across different boroughs in London as key reasons for their closure.

In 2015, TfL created a car club strategy for London in partnership with the Car Club Coalition (car club operators, London Councils, Greater London Authority and key stakeholders). The strategy highlighted that the development of car clubs would be successful in areas of outer London, where private car ownership is high, in addition to more densely populated inner London. A number of measures were outlined to assist the development of car clubs in London, including data collection, working with stakeholders to support car clubs and TfL encouraging boroughs to support the uptake of car clubs.²⁵

²⁵ Car club strategy for London, Car Club Coalition (2015)

3 Barriers to shared electric vehicle adoption

3.1 Barriers to car clubs

A number of recurring barriers to the growth of car clubs in the UK (not specific to electric car clubs) were identified in literature and in interviews with car club operators. These are summarised in Table 3 and Table 4.

Car club operator perspective

From the car club operator perspective, a key barrier to the growth of car clubs stems from the lack of coherent policy and messaging around car clubs from national and local authorities. Local authorities across the country and within cities have differing policies and attitudes towards car clubs, which greatly complicates the operational requirements of launching or expanding a car club scheme. For example, some local authorities may see car clubs as encouraging car use and therefore as not aligned with their objectives, discounting the emissions reductions and modal shift that can be achieved. Additionally, shared cars are not clearly distinguished from private cars in policy decisions or infrastructure planning which results in additional operational costs (for example, in the case of access charging). The lack of clear national policy around car clubs also affects the awareness and engagement of consumers, as they are not presented as a core mobility option.

Differing policies across governing bodies leads to complicated and limited access to parking infrastructure, another major barrier to car club expansion. Local authorities have different policies around the allocation of parking bays and permits for car club operators which may lead to lengthy negotiations, adding operational complexity and cost to car club operators. Local authorities also generate revenue from existing parking infrastructure, which can lead to a misalignment of needs between car club operators and the local authorities.

Table 3: Barriers to car clubs in the UK - car club operators' perspective

No.	Barrier description	Models affected
Operational		
1	Difficulty reaching profitability: high costs of operation lead to slim margins, particularly in areas with low population density where utilisation of vehicles is low.	All
2	Car clubs not distinguished from private car ownership in policy decisions, disadvantaging car clubs: policies aimed at discouraging private car use (e.g. congestion charge in London) also apply to car clubs despite their advantages to personal car ownership.	All
3	Difficulty reaching scale of operations (large fleet and wide operating area) necessary for consumer engagement and high utilisation: Members value convenience when using car clubs, including short distances to nearest shared cars which requires high density of vehicles. Wide operating area with large fleet also necessary for free-floating schemes to ensure balancing of car journeys across the operating region. It is difficult for car clubs to reach scale due to parking bay allocation and agreements with local authorities.	Free-floating, point-to-point

4	Competition with other forms of transport: car club services may compete with other forms of transportation such as ride-hailing or taxis. Car clubs are generally seen as complementary to public transport; however, free-floating schemes in particular may act as competition as they both serve shorter length, spontaneous journeys. Particularly an issue when public transportation is subsidised by government.	Free-floating, point-to-point
5	Car clubs poorly integrated with public transportation: with the occasional exception of free-floating schemes, car clubs are generally complementary to public transport but current services are not designed to encourage use of both. Lack of integration also means that the public does not see car clubs as a core mobility option and are unwilling or unable to give up private car ownership.	Point-to-point, roundtrip
6	Costs from damage generally absorbed by car club operator: when cars are damaged, it is difficult to correctly assess and fine those responsible. Additionally, car club cars are a possible target for vandalism. The scale of the problem varies between cities, with high levels of vandalism seen in Paris.	All
7	Free-floating schemes result in labour-intensive additional operation requirements: Operator team may have to redistribute vehicles away from popular destination areas to popular pick-up areas. Labour intensive solution and represents an additional operation cost.	Free-floating
8	Car club parking spaces sometimes used by unauthorised vehicles. May be conflict with authorities removing vehicles from private parking spaces. User must find alternative parking and operator team may have to return vehicle to correct space at later time. Labour intensive solution and represents an additional operation cost.	Roundtrip, point-to-point
Infrastructure		
9	Lengthy and complicated process in delivering new car club bays: local authorities may have different policies towards car clubs and face competing pressures and priorities around parking infrastructure.	Roundtrip, point-to-point

Local authority perspective

Local authorities (LAs) are drivers of local transport policy, and decisions at local authority level are particularly crucial for expansion of car clubs. Although there is some evidence that car sharing decreases private car use, there are few independent studies and a lack of clear guidance around how this can be applied in a local context.

Local authorities also face a number of competing pressures that impact transport decarbonisation, including resistance from businesses and residents to reduce or reallocate parking, and risk of lost revenue from parking spaces if reallocated. The risk of lost revenue is a particular concern for LAs as they have consistently faced budget cuts and limited resourcing for local programmes. Decisions on transport policy also often rely on several internal teams that may have inconsistent priorities (e.g. revenue vs. decarbonisation or congestion).

Parking revenues currently represent 3-10% of operational revenues for Councils (2-6% of total income),²⁶ suggesting that the overall impact of loss of revenue is relatively low for car club vehicles alone (with shared cars currently estimated to occupy less than 0.5% of parking spaces in London²⁷).

²⁶ Element Energy analysis of London Borough financial statements and UK local authority revenue and expenditure outturn statistics

²⁷ Based on known fleet size of current operators in London (upper limit of 4,900 if all fleet sizes given in Table 2 are in London) and over 1 million paid resident and short-stay spaces in London, from Reclaim the Kerb (2020) Centre for London

Other demands such as dedicated electric vehicle charging bays, parklets, and cycle parking also compete for parking spaces and contribute to overall reallocation concerns. However, a recent Centre for London report found that London Boroughs typically undercharge for resident parking compared to public parking, which suggests that increasing private car parking charges can compensate for any loss in revenue through reallocation.²⁸

The lack of guidance and competing pressures result in incoherent approaches between LAs including:

- **Unwillingness to consider car clubs** even in areas where it may be beneficial, for example seeing it as bringing additional cars to an area
- **Mismatch of local conditions with needs of a car club** for example, by favouring car clubs in areas that are not suitable, such as those with poor public transport and/or low population density that would not lead to a profitable business case for the operator
- **Mismatch of local policy with the intended outcome** for example, charging high rates for parking to compensate for lost revenue that reduces profitability and potential commercial success for the operator even where car clubs are encouraged as part of positive measures (e.g. to address emissions or congestion)

Consumers’ perspective

Table 4: Barriers to car clubs in the UK - consumers’ perspective

No.	Barrier description	Models affected
Awareness		
1	Low awareness of availability of nearby car clubs	All
Engagement		
2	Unwilling to give up personal car ownership: public tends to consider rare journeys rather than regular transport needs and lack understanding of the true cost of owning a car. Car users also tend to value the freedom and privacy of owning their own vehicle ⁵ .	All
3	Fear of lack of availability, particularly in areas with poor transport links.	All
4	Practical barriers: the needs of some groups may not be met by car club services, such as families with young children requiring car seats, those that require customisations for disabilities, or groups that are not digitally active.	All

3.2 Specific barriers to adoption of BEVs in shared cars

Several key barriers specifically preventing the deployment of BEVs in car clubs in the UK were identified in literature and in interviews with car club operators. They are summarised in Table 5 and Table 6.

Car club operator perspective

Shared BEVs are currently more expensive to operate than shared petrol cars due to higher purchase costs (even with plug-in grant support), smaller difference in fuel costs compared to private car users (leading to less benefit of BEVs in total cost of ownership than estimated for private cars), and higher staff costs to manage charging. In London, BEVs are currently exempt from the congestion charge but this advantage will be removed from December 2025. Of these costs, managing charging represents the largest barrier to a shift to shared BEVs.

Challenges in managing charging is primarily due to the **lack of suitable charging infrastructure**. As shared BEV deployment increases, electric car club operators must choose a suitable vehicle charging

²⁸ Reclaim the Kerb (2020) Centre for London

strategy. Operators ideally would rely on members to charge the car club cars in the same way that users currently refuel shared petrol cars. However, to enable this to happen, a widespread, dense network of rapid (50 kW) and ultra-rapid charge points (100 kW and above) is required. This is necessary so that users can be confident that they can reliably charge either at destination or en-route (primarily for round-trip journeys), or within a city close to their drop-off point (round-trip and free-floating). To-date local and regional charging strategies have primarily focused on resident or traditional fleet needs, leading to the majority of charge point deployment being on-street (often slow charging, 22 kW or under) or rapid charge points at key locations such as taxi ranks that are not open to other vehicles.

There are also insufficient car club bays with charge points to ensure that users can plug in the vehicle at the end of a trip, which is a common model in France and Germany. Retrofitting existing car club bays with charge points classifies as state aid, but if operators install their own charge point this adds a high additional cost. It is also potentially difficult to incentivise users to plug in vehicles – it is viewed as an inconvenience or is done incorrectly due to lack of familiarity with BEVs. Additionally, there are considerable uncertainties around the payment structures of charge points operated by different networks.

Without users recharging the vehicles, operator teams must charge the car club BEV fleet. This reduces the problems of relying on members and car clubs having to add their own charging infrastructure but is a labour-intensive solution and adds a high additional operation cost. This charging strategy is unlikely to be sustainable in the long term and at scale.

Suitable charging infrastructure is also crucial for enabling BEVs to replace petrol cars over all use cases. Round-trip journeys are typically longer than free-floating and are more likely to require charging in-trip and/or cause range anxiety for users if they are not confident of being able to charge in-trip.

However, even with widespread charging infrastructure, the longer charging time of BEVs compared to refuelling of conventional vehicles presents a challenge. Car club vehicles are generally used for convenience and the longer time taken to charge (e.g. 40-60 min at a rapid charge point) would reduce the customer experience, unless either users are able to limit this to a top-up charge only (feasible only for free-floating models) or if it fits with their usage (e.g. leaving the vehicle charging at destination). Charging a vehicle in the car club bay will also reduce flexibility of the service by, for example, preventing back-to-back vehicle bookings (to allow time for the vehicle to charge). As both the shared BEV market and charging infrastructure grow, operators will need to consider mechanisms to incentivise in-trip charging or develop other suitable charging strategies and business models.

Table 5: Barriers to the adoption of shared BEVs - car club operators' perspective

No.	Barrier description	Models affected
Infrastructure		
1	Limited rapid charging infrastructure: difficult and inconvenient for drivers to charge during the journey, so cannot guarantee range for long journeys. Operators also cannot use the same refuelling model as for petrol or diesel car club cars as would be highly inconvenient for drivers to charge during journey.	All
2	Retrofitting existing car club bays with charge points is classified as state aid: as a result, there are limited car club bays with charge points. Car club operators therefore cannot use a model of incentivising its users to plug in the vehicle at the end of the trip.	Roundtrip, point-to-point
3	Limited destination or on-street charge points (not at car club bays): lack of available charge points at destination, so free-floating consumer cannot plug in vehicle for next user.	Free-floating

Operational		
4	High purchase cost of BEVs: car clubs face pressure to ensure their fleet is up to date and pleasant to use, resulting in vehicle replacements roughly every 2 years.	All
5	Lower utilisation as a result of charging time requirements (buffer between bookings): the vehicle cannot be used when charging or at low battery.	All
6	Difficult to incentivise users to charge vehicles: if car clubs do not have a designated bay with a charge point, users may have to charge before ending the journey, which is viewed as inconvenient and may be difficult to encourage (see Table 6). If a car club bay does have a charge point, users may still not reliably plug in the vehicle at the end of their journey unless incentivised; however, this barrier was not rated highly by all operators. Where operators are unable to rely on users, they must use an operator team to charge vehicles, which is a labour-intensive solution and represents an additional cost.	All
7	Users may incorrectly plug in vehicles: may have to send operator team to correctly plug in vehicles. This is a labour-intensive solution and represents an additional cost.	All
8	Passing electricity costs onto users challenging: difficult and expensive to assess electricity consumption per trip and charge users accordingly. Doing so may be more costly than the value of the electricity consumed.	All
9	Time-based charging tariffs: Charging sometimes charged per minute (p/min instead of p/kWh), so expensive to leave vehicle plugged in between trips.	All

Consumer perspective

Table 6: Barriers to the adoption of shared BEVs - consumers' perspective

No.	Barrier description	Models affected
Experience		
1	Charging during journey viewed as inconvenient: charging time requirement is longer than refuelling a petrol or diesel vehicle, taking significant time out of the journey. For shorter, free-floating journeys, very few journeys may need charging to be carried out in-trip (particularly if charge points are available in bays) however, for longer round-trip journeys, between 50-100% of journeys are likely to require charging in order to maintain user experience. Car club operators would have to compensate users for time taken out of booking to charge. Members also highly value convenience when using car club cars ²⁹ , so lengthy charging time in the middle of journey likely to discourage use.	All
2	Lack of interoperability of charge points limits and/or complicated charging for user: different charge points may have different payment methods and platforms, requiring different payment cards or mobile applications which is inconvenient and potentially confusing for the user. Car clubs likely to make agreements with single charge point operator, reducing the complication but limiting the charge points that can be used.	All
Engagement		
3	Range anxiety deters users: drivers concerned that range of BEV may be insufficient for journey, particularly as limited rapid charging infrastructure.	All

²⁹ [England & Wales Car Club Annual Survey 2017/18](#)

4	<p>Lack of knowledge about electric vehicle and charge point use deters users: drivers may be unfamiliar with BEVs. They may be concerned that they do not know how to drive a BEV or use a charge point. As a result, members more likely to choose petrol option.</p>	All
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4 Potential for deployment of shared BEVs

4.1 Key success factors

Car clubs are not suitable in all locations. They are most commercially successful in areas of high local population density. This ensures a large pool of potential users and allows operators to profitably offer a high density of cars, making the service more attractive to users. Members want car club cars to be economically favourable, but also convenient: one study found that a key criterion for considering car sharing as a mobility option is finding a car within a walking distance of less than 1 km²¹.

Car clubs typically are most successful in large cities as these tend to have high overall population and a high number of connected, high population density districts. One study suggests that cities of over 500,000 people are optimal²¹; however, car clubs also currently operate in smaller cities and smaller schemes, such as community car clubs, have been suggested to need a local population of over 20,000.

Population demographics have also been suggested to contribute to commercial success. This includes local income level since disposable income impacts willingness and ability of residents to pay for a shared car. Residents in low-income areas are also likely to be less familiar with both car sharing and electric vehicles, and these areas typically face higher parking pressures.

4.2 Potential for deployment

Few projections for future growth of the UK car club market are reported, particularly outside London. The Mayor's Electric Vehicle Infrastructure Taskforce projected fewer than 10,000 car club cars in London by 2025, of which 60-90% could be electric vehicles³⁰. Previously, Transport for London set a target of 1 million car club users in London by 2025²⁵.

To assess the potential for shared cars, we have carried out a high-level estimate adapted from a previous study focused on the German market²¹. This assumes that commercial car club models require a minimum number of local 'hot-spot' areas of high population density (8,000 people per km²) to operate profitably.

Car sharing in Germany – see section 2.2 for more detail

Germany currently is the largest car sharing market in Europe, with 226 operators and car sharing offered in 840 cities and municipalities. Key success factors include:

- **Supportive local policy** – many cities open to granting space and parking permits to shared vehicle operators
- **Population density** – large number of big cities and densely populated medium-sized cities
- **Long history of car sharing** – beginning in the 1980s

Based on population statistics, there are 9m people in England and Wales living in 'hot-spot' areas (15% of the population), of which, 7.5m are in cities (see Figure 5)³¹. Considering all cities and large metropolitan areas,³² **there is potential for deployment of 34,000 car club cars** based on the following assumptions:

- at least 10% of a city or borough's population needs to reside in areas of high population density for car clubs to operate commercially (excluding community car clubs, see below)

³⁰ London electric vehicle infrastructure delivery plan (2019)

³¹ Based on analysis of Office of National Statistics Table SAPE22DT11: Mid-2019 Population Density estimates

³² Large metropolitan areas included: Greater London, Greater Manchester, West Midlands, Merseyside, West Yorkshire, Tyne and Wear

- the number of car club cars deployed in each area is in line with typical German cities (as outlined in Table 7).

Of these shared cars, 14,000 could be deployed in Greater London. Reaching this fleet size in London requires growth of approximately 12% year-on-year over the period 2020-2030³³ and around 1% of parking spaces to be occupied by car club cars.³⁴ This fleet size is comparable to the current taxi fleet (ca. 19,000 taxis) but far below the number of private hire vehicles (PHVs; ca. 95,000 PHVs registered in London at the start of 2020)³⁵. We have also assumed deployment of over 400 community car club cars in cities with lower population density and overall population over 20,000³⁶.

Assuming 150 members per car in large cities and London Boroughs,³⁷ and 33 members per car elsewhere, the total potential is equivalent to 3.5m car club members (6% of the population).

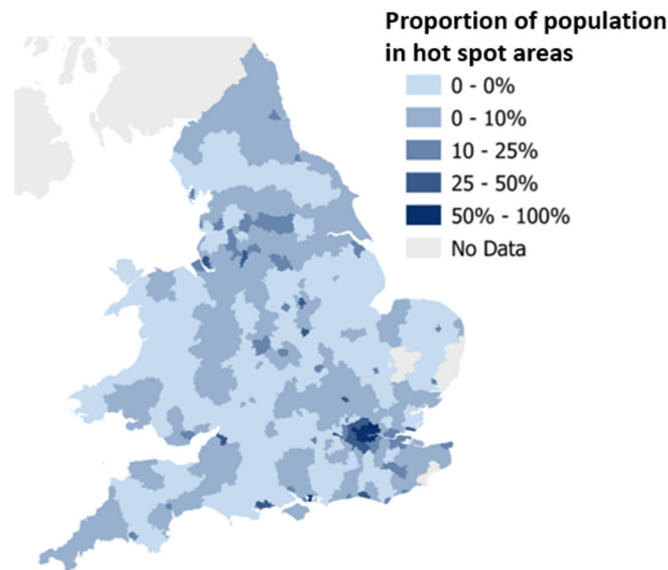


Figure 5 Share of population in areas of high population density in England and Wales (hot spot defined as >8,000 people per km²).

Table 7 Car club cars per capita assumptions³⁸

City size (population)	Assumed car club model	Cars per 1000 residents
>500,000 and London Boroughs	Commercial (free-floating + roundtrip)	1.6
>100,000	Commercial - roundtrip only	1
>20,000	Community	0.5

³³ Based on current market size estimate (4,500 cars) as given in the London EV Infrastructure Taskforce report
³⁴ Based on 1 million paid resident and short-stay spaces in London, from Reclaim the Kerb (2020) Centre for London
³⁵ TfL licencing data (<https://tfl.gov.uk/info-for/taxis-and-private-hire/licensing/licensing-information>)
³⁶ Making the business case for a sustainable local car club: indicative costs for community groups (2018) CarPlus
³⁷ Based on stakeholder interviews and CoMo UK data for England and Wales
³⁸ Based on typical deployment in German cities, taken from <https://carsharing.de/alles-ueber-carsharing/carsharing-zahlen/carsharing-staedteranking-2019>

However, 64% of hot-spots are in low income areas³⁹ and therefore are likely to need local support to drive uptake. This disproportionately impacts cities outside of London; for example, 80% of hot-spots in the West Midlands fall into the 50% most deprived areas compared to 47% in Greater London. Overall, without support in these areas, the potential is close to two-thirds lower (11,000 vehicles).

Support to drive uptake in low income areas is likely to primarily be in the form of **public engagement to raise awareness and develop sense of ownership of the scheme**^{40,41}. For example, in Nottingham, identification of and engagement with community champions and leaders helped to build support for and interest in a BEV car sharing scheme⁴⁰. **Financial support** could also be considered, at least initially, to help offer a service that is affordable while a customer base is built up. Support on the order of £5,000 per year⁴² to £5,000 per car⁴³ have been provided to support pilot car club schemes.

Assuming that each car club car replaces 9 private cars (based on mid-point of range reported in literature of 5-15 cars)⁴⁴, this could remove 100,000-300,000 cars from the road (lower value excludes low income areas, high value is full potential). In addition to decreasing car ownership, car club members have reported decreasing their average household mileage by 793 miles per year (1,270 km/year)²²; if all projected car club members were to reduce their annual mileage by this amount, it would result in an overall reduction in car use of over 4 billion km per year (2% of all car and taxi vehicle km in 2019).

The conditions for success of car clubs are more complex than solely population density and this analysis does not include factors such as local public transport availability, car ownership or use characteristics in each area, or demographics. Local authorities would need to assess the local conditions to determine the potential in their area, as well as the local mobility needs to determine the best solutions for their residents.

4.3 Reaching the potential with shared BEVs

For this potential to be met with shared BEVs, there would need to be **wide coverage of reliable public rapid and ultra-rapid charge points** (as discussed in Section 3.2) to enable users to charge vehicles and to confidently use BEVs in the same range of use cases as petrol vehicles. This would need to be supported by business models and incentives from the car club operator side **to incentivise charging by users** appropriately. From the car club perspective, it would also require incorporation of **vehicles into the fleet that are capable of ultra-rapid charging (100-150 kW and above) and that have long ranges to support longer journeys**. While costs and supply of suitable vehicles are currently limiting, the high replacement rate of car club cars means that this can be achieved relatively quickly as vehicle costs decrease in the 2020s.

Current coverage of rapid charge points varies greatly across local authorities, both across the UK and within large metropolitan areas such as Greater London (Figure 6). Determining the locations with the most need for car club charging and the likely number of charge points required in these locations would require detailed analysis of car club travel statistics that is outside the scope of this study; however, the density of rapid charge points within areas that car clubs are likely to be based (largely cities) as well as along major travel routes and at travel destinations will need to improve to support shared BEV

³⁹ In this analysis, defined as areas falling within the 50% most deprived in relation to income; based on data from English Indices of Deprivation 2019

⁴⁰ [Nottingham City Council EV Car Club Community Engagement Case Study](#)

⁴¹ [InclusivEV Policy Recommendations](#) (2020) Cenex

⁴² As detailed in Royal Borough of Greenwich third [Local implementation Plan](#); costs cover traffic management orders as well as engagement activities to promote car clubs

⁴³ Costs paid by developers (not the local authority) to support car clubs in new developments; Source: https://como.org.uk/wp-content/uploads/2018/06/Car-Clubs-in-Developments_combined-case-studies-14042016.pdf

⁴⁴ See introduction for sources of values

deployment. Barriers and policy recommendations for expanding the UK charging network are considered in a separate report published alongside this one.⁴⁵

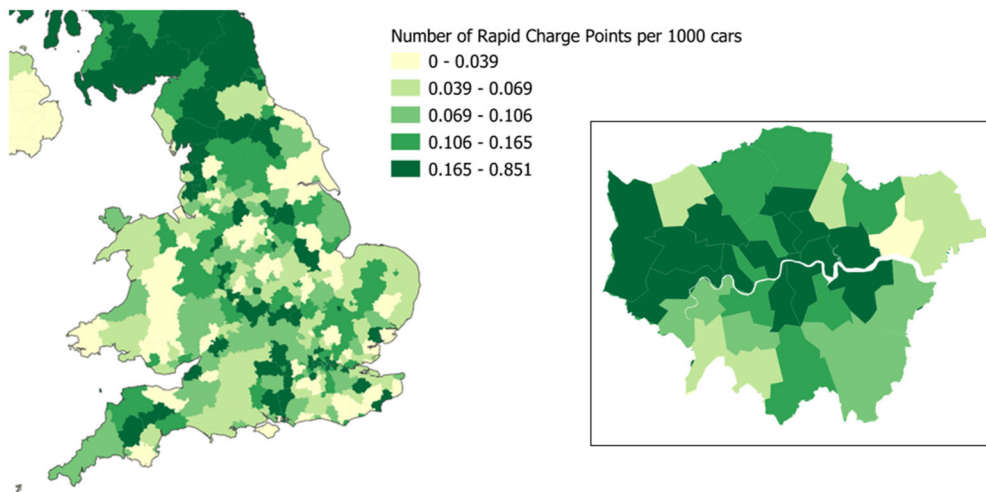


Figure 6 Distribution of rapid charge points, with focus on England and Wales, and (inset) London.⁴⁶

In large cities, the rollout of public charging infrastructure is largely driven by taxis and PHVs, particularly in the near-term since they have high daily mileages and are expected to electrify more rapidly than private vehicles. In London, the Mayor’s Transport strategy sets a target for all taxis and PHVs to be zero emission capable by 2033, which will be delivered through the existing licensing conditions on age limit and powertrain emissions. The ICCT estimates that the total annual charging demand for these user groups will reach ca. 481 GWh and 54 GWh, respectively, by 2025 and grow to ca. 979 GWh and 79 GWh by 2030⁴⁷. It is expected that ca. 50% of this demand will be met at public charge points, with the remainder being met through home charging. In comparison, even if the London car club fleet reaches the maximum size of 14,000 vehicles (estimated above) by 2030 and all are BEVs, the total annual charging demand is estimated to be ca. 25 GWh (1% of total demand, and 5% of combined demand from car clubs, taxis and PHVs at public charge points; Figure 7)⁴⁸.

⁴⁵ Cenex for T&E (2021)

⁴⁶ <https://www.gov.uk/government/statistics/electric-vehicle-charging-device-statistics-october-2020>

⁴⁷ Based on a stock growth projection that assumes all London PHVs are electric (BEV or PHEV) in 2030 and all taxis are electric in 2033; Source: Fulfilling electric vehicle charging infrastructure needs in Greater London and its boroughs (2020), ICCT

⁴⁸ Calculation assumes annual mileage of 10,000km and electricity consumption of 0.18kWh/km

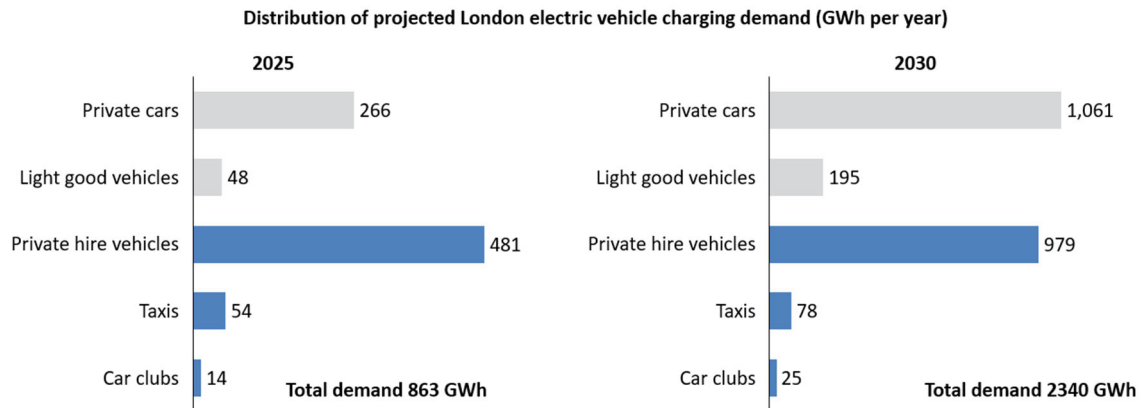


Figure 7: Comparison of maximum car club vehicle charging demand with estimated total charging demand in London (GWh per year) – blue segments will mostly use public charging.⁴⁹

The low fraction of demand that car clubs represent means that, even when the London electric car club fleet reaches its maximum size, it is likely that the rate of charging infrastructure rollout and its geographic spread will still be dictated mainly by the largest user groups such as PHVs, private passenger cars and light goods vehicles. Based on demand alone, we estimate that the equivalent of 100-150 rapid charge points would be needed to meet the demand of the car club fleet⁵⁰, which is small compared to current deployment (465 public rapid charge points in London)⁴⁶ and the future need forecast across all user groups (3,600 public rapid chargers by 2030)⁵¹. However, in practice, these 100-150 charge point “equivalents” will be spread over a much larger number of charge points as each car club user charges according to their specific journey needs and location. Therefore, although the size of charging infrastructure provision based on larger user groups may be sufficient to meet car club needs, in practice the geographic distribution may not be sufficient due to differences in the usage patterns of car clubs compared to other user groups.

Future electric car club charge point usage patterns are currently uncertain with regards to the share of charging carried out by users, the main locations that will be important for charging (e.g. on-street, en-route or at destination etc) and the type of chargers that will be used (e.g. the proportion of slow and fast-charging, if any). Whereas taxi and PHV driver travel patterns are well-understood, the travel patterns of car club users have not been studied in sufficient detail to allow authorities to incorporate car club needs when choosing sites for future infrastructure. Detailed telematics data would be needed, along with destination information and time spent parked during each hire period, to determine the most appropriate infrastructure and how best to align the needs of larger users with those of car clubs. While data sharing can cause concerns over confidentiality, by understanding their own future usage needs, car club operators can help local and regional authorities to provide appropriate infrastructure.

⁴⁹ Demand from private cars, light goods vehicles, taxis and PHVs based on 2020 ICCT London EV charging infrastructure report. Demand from car clubs based on 7,900 BEVs in 2025 and 14,000 in 2030.

⁵⁰ 140 based on usage and average kW assumptions used in aforementioned ICCT report (5.6h, 49kW in 2025), 114 based on future higher rates (8h, 75kW)

⁵¹ Fulfilling electric vehicle charging infrastructure needs in Greater London and its boroughs (2020), ICCT

5 Recommendations to support the adoption of shared BEVs

For widespread adoption of shared BEVs in the UK, a number of core barriers need to be mitigated. Many of the actions recommended here are required to mitigate general barriers to car sharing, including:

- Lack of consistent policy towards car clubs from national and local government
- Insufficient or complex access to parking infrastructure
- Unwillingness of consumers to use car club cars due to a reluctance to give up private cars and lack of awareness/knowledge

The key barrier to adoption of electric vehicles in shared fleets is the lack of suitable charging infrastructure to support a viable business case. In particular, car clubs need a widespread network of reliable rapid and ultrafast charge points, including en-route, at destinations, and within cities (e.g. hubs and on-street).

Car clubs are already taking steps to overcome some of these barriers (section 5.1), however they will need further support at both national and local authority level to fully address key barriers and enable consumers to shift away from privately owned vehicles towards shared BEVs. As shown by Figure 8, the majority of mitigating measures are the responsibility of local authorities (LAs). However, LAs need support from the national government to carry out these measures.

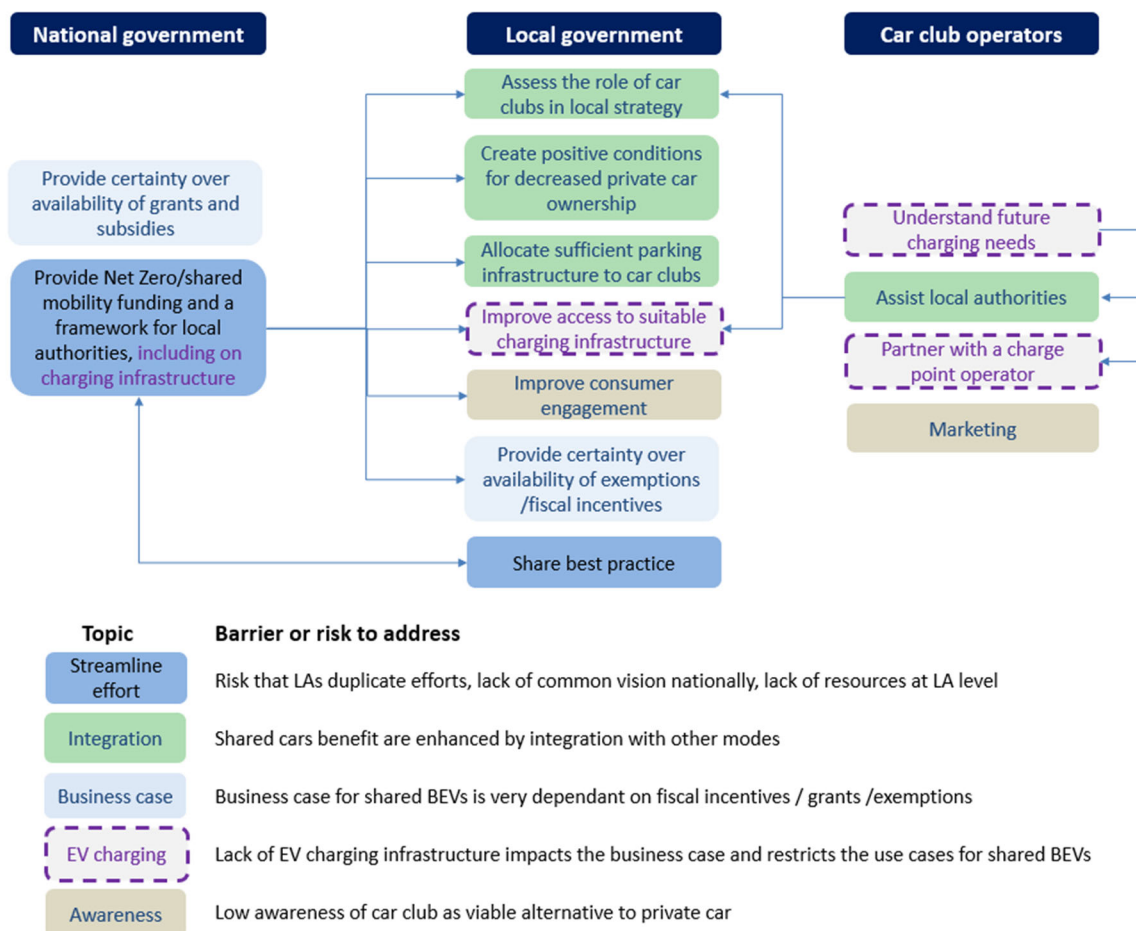


Figure 8: Summary of recommendations to mitigate barriers faced by car club operators

5.1 Enabling actions by car clubs

5.1.1 Understand future charging needs

Large-scale deployment of shared BEVs relies on sufficient charging infrastructure to support the needs of electric car club fleets. Car clubs can help to drive the development of appropriate infrastructure by understanding their own fleet needs. This will include analysis of telematics and user behaviour as well as consideration of appropriate future charging models (see section 4.3).

Key aspects of uncertainty in future charging models are the extent to which users can be relied upon to charge the vehicles and the extent to which charging can be carried out in car club bays compared to public charging. In an ideal case, users would carry out the majority of charging in order to avoid unfeasible costs of using operator teams to charge as the fleet grows. Achieving this may require car club operators to encourage drivers to charge through community guidelines, positive incentives or penalties⁵². However, in the absence of widespread public charging, if drivers are penalised for not plugging in the car, car club operators will face more pressure to provide a guaranteed parking spot with a charge point. Relying on charging in-bay at the end of a trip will require potential changes to car club hire models (e.g. building in charging time between bookings, preventing back-to-back hires).

Once future charging needs are understood, car clubs can use this information to identify synergies with the needs of taxi and PHV fleets, and to identify gaps in the planned network. Where gaps are identified, this can be communicated to both LAs and charge point operators to help shape future infrastructure plans. For example, in London, this information can be fed back to the GLA and the EV Infrastructure Taskforce.

5.1.2 Assist local authorities

Beyond the contractual phases, car club operators can assist local authorities in their understanding of the car club market conditions and requirements for operation, such as parking and charging needs. Car club operators' expertise can be shared through the formal request for information (RFI) that LAs might issue or through informal conversations with a local authority. Discussions between operators and LAs not only builds a relationship but also ensures that the local authority has a clear understanding of the needs of a car club and how these may align with their priorities and targets.

Car club operators can offer services that complement existing local policies for mutual benefit. For example, to support TfL's ULEZ scrappage scheme, Zipcar offers a Diesel Scrappage Scheme membership option. Drivers that join after scrapping their business vehicle through the TfL scheme are offered free membership to a Zipcar UK business account. Zipcar additionally matches TfL scrappage funding up to £3500 used for driving credit⁵³.

Operators can additionally assist local authorities by providing flexibility in their services, matching their level of involvement according to the preference of the local authority (see box below).

⁵² For example, Bluecity only allowed timed sessions to end when the vehicle was plugged into a charge point

⁵³ [Zipcar.com](https://www.zipcar.com)

⁵⁴ [Nottingham City Council Car Club](https://www.nottinghamcitycouncil.co.uk), CoMo UK

⁵⁵ [TransportNottingham.com](https://www.transportnottingham.com)

Nottingham City Council (NCC) works in collaboration with Enterprise Car Club on the Nottingham City Car Club, with the aim of expanding its sites and the number of vehicles in its fleet⁵⁴. The NCC offers funding which gives residents a discounted membership fee and driving credit⁵⁵. Although the car club is operated by Enterprise, it is branded as the Nottingham City Car Club and the NCC carries out extensive marketing and promotion. The NCC is also highly involved in the integration of car club with other council mobility schemes such as City Card Cycles (shared bike service)⁵⁵ and plans to expand the service across the city.

5.1.3 Partnership with a charge point operator

Partnership with a charge point operator (car club BEVs use network at an agreed tariff) with an existing network of charge points combats the logistical and economic issues associated with installing new charge points for the car clubs in addition to the uncertainties around pricing structures of public charge points.

Bluecity, the London-based electric car sharing service operational between 2017 and 2020, had the advantage of being able to use the charge point network of its parent company, Bolloré. As a result, charge points that the car club BEVs could use were already available and the cost of charging was clear. However, the charge point network found that the use of the charge points by car club vehicles could prevent other BEV drivers from making use of the charge points, due to the relatively low utilisation of the car club car (2 to 3 hours per day).

Operators could also explore innovative charging solutions by partnering in trials of new charging technology. This would allow car clubs to be at the forefront of new technology, trial different solutions and give members access to charge points.

5.2 Recommendations for national policy

5.2.1 Provide a framework for local authorities

National government and local authorities in the UK share the ambition to deliver net zero emissions by 2050. Local authorities are key drivers of climate change actions across the country. Local authorities have influence over approximately one third of emissions in their local areas⁵⁶ and have considerable leverage over local choices, for example through planning powers over building and transport (see box, next page). However, current levers are insufficient to deliver local net zero ambitions due to gaps in key powers, policy and funding barriers, and a lack of capacity and skills as a result of cuts in funding⁵⁶.

Additionally, there is currently a lack of national co-ordination, with no national plan in England and Northern Ireland on the role of local authorities in delivering net zero emissions. Local authorities have very limited guidance on decisions to meet climate objectives and time and expertise is required to deal with contradictory information to develop local plans – see box on the next page for a summary of local authorities' powers with regards to transport. This strains already understaffed and underfunded authorities.

The Climate Change Committee (CCC) has called for a **national framework**, incorporating local and national climate action, to be created for the delivery of net zero emissions by 2050⁵⁶. **The aim of the framework would be to provide clear direction to reduce uncertainty, provide additional powers to local authorities where necessary and clarify delivery roles.** As local areas have different conditions, a one-size fits all approach to the delivery of net zero is unlikely to work beyond setting strong standards. As a result, the framework must allow for local flexibility to maximise efficacy. As set

⁵⁶ Local Authorities and the Sixth Carbon Budget, Climate Change Committee (2020)

out by the CCC, the framework must **be accompanied by appropriate long-term financing to support local authorities** in increasing skills, capacity, and resourcing to enable the delivery of net zero ambitions.

Local Authorities have considerable influence over transport choices and infrastructure in their local areas, but the degree of influence varies across the different levels of authority and transport type. Relevant powers at local and regional level are summarised below:

Transport service type	Level of influence:		Joint/Combined Authority
	High	Medium	
	District Councils	County Councils	
Access and charging (e.g. clean air zones, zero emissions zones congestion charging etc)	Influence through Local Plan	Direct control over local roads	Influence through regional strategy and funding ^a
Parking	Direct control over residential and public off-street parking	Direct control over parking on public roads	
Charging infrastructure	Direct control over deployment on own land	Direct control over deployment on own land and local roads	
Walking and cycling	Influence through Local Plan	Direct control of local routes	
Bus services	Influence through Local Plan	Direct control over subsidised services	Potential for direct control through franchising ^b
Rail	Influence through engagement with operators		Influence through regional strategy ^c

^a Some direct control where regional authorities control some local roads – for example, delivery of measures on the TfL Road Network in London; note also that the London Congestion Zone and ULEZ are administered by GLA and TfL

^b Requires authorities to take up this option, currently only in place in Greater London and under consideration in Greater Manchester

^c Some Combined Authorities have rail franchising powers so may have more control; Rail services within London are under the control of TfL

Local Authority activities are primarily funded through revenue (e.g. Council Tax, business rates, parking revenue etc.) and Government grants. Key sources of funding for transport infrastructure schemes specifically include the Community Infrastructure Levy and Section 106 charges, alongside targeted regional and national funding streams (for example, Local Implementation Plan funding in London, Combined Authority funding established through devolution agreements, and schemes such as Low Emission Neighbourhoods, OLEV funding etc.).

Alongside direct delivery and planning powers, local authorities can also influence wider net zero outcomes through softer measures such as leading by example (for example, decarbonising their own fleet), coordination of public and private sector stakeholders, and community engagement to raise awareness and encourage behaviour change.

However, despite the range of powers available, action by local authority teams can be limited due to gaps in governance (requiring coordination or reliance on national action), lack of expertise in all aspects of transport and limited resources to research options, and competing internal priorities.

A national framework should provide local authorities with guidance to more easily determine and effectively deliver climate actions best suited to their local region, of which electric car clubs are one option. Within the transport sector, key criteria that need to be covered by such a framework include:

- **Guidance for assessing the suitability of transport measures** for a particular local area, including cost-benefit assessment criteria for new transport schemes that reflect decarbonisation benefits. For car clubs in particular, guidance for assessing local suitability would need to consider the different business models, the overall likely impact and value for money. If a local authority has determined that a car club aligns with their net zero strategy, the

framework could then offer guidance on measures that make car club schemes commercially viable, sustainable and have maximum impact on net emissions in that area.

- **Guidance on developing electric vehicle charging infrastructure deployment plans.** This guidance should enable and encourage local authorities to develop a holistic solution for the charging needs of their area, considering all charge point users including car clubs (if considered beneficial to their net zero goals) and visiting drivers, in addition to residents and more traditional fleets (e.g. taxis).
- **Measures to monitor the impact of actions taken.** In the case of car clubs, the collection of data on journey needs, number of car club users, shift of journeys from private to shared cars, and increase in public and active travel journeys from residents (members and non-members) and car club operators would allow local authorities to monitor overall local emissions impact of shared cars. A common reporting framework for key performance indicators would assist local authorities to collect data and ensure that impacts are being assessed consistently and effectively. CoMo UK, a shared mobility research body, carries out annual surveys of car club use at national and London level.⁵⁷ This could be extended to local authority level, to improve understanding of use and impact. Recently, research by RAC Foundation, London Councils and Imperial College London has proposed a data sharing framework for car club operators and local authorities in the UK (see box, next page)⁵⁸. Adoption of this framework in the future has the potential to improve understanding of the impact of car clubs at local authority level and to improve the efficiency of such analysis.

In December 2020, London Councils, RAC Foundation and Imperial College London published the Car Club Local Authority Data Standard (CLADS). London Councils identified that inconsistencies and gaps in data collected by local authorities around car club use and operation led to problems in evidence-based policy development. Inconsistent data requests and collection is inconvenient for car club operators and hinders the ability of local authorities to understand the impact of car clubs on their areas.

The CLADS project was launched with the aim of standardising data exchanges between car clubs and UK local authorities, to increase the efficiency of data collection and to engage stakeholders on both the local authority and car club operator side in simplifying the data sharing solution.

The data framework consists of a summary statistics file and four data files, all shared on a quarterly basis. The four data files collect information on:

- 1) **User information:** includes operator's name, location at lower super output area (LSOA) level, anonymised user ID, age and user type
- 2) **Parking location:** required only for round trip services, collected at street level
- 3) **Vehicle distribution:** required only for free-floating services, and gives number of available vehicles within the local authority
- 4) **Trip information:** for roundtrip, the trip information is collected at street level. For free-floating, information includes the trip start/end location, journey time and total mileage

Further work must be carried out before the framework can be adopted to determine issues around ownership of the data, data sharing across local authorities/car club operators and the clauses that need to be added to protect data privacy and commercially sensitive information⁵⁹.

⁵⁷ <https://como.org.uk/shared-mobility/shared-cars/why/>

⁵⁸ Better data for smarter decision-making: The proposed car club-local authority data standard, Imperial College London, London Councils, RAC Foundation (2020)

In addition to the guidance provided by a national framework, a platform that enables local authorities to share best practice around measures taken to achieve their net zero targets could be established. This would enable local authorities to share skills and expertise and would prevent duplication of efforts. It could also be used to allow neighbouring local authorities to work collaboratively, ensuring that actions are delivered effectively across a larger area.

5.2.2 Provide certainty over availability of grants and subsidies

Industry experts have identified the need for continued subsidies, such as the Plug-In Grant, to support car club operators as they shift towards electric fleets. Although government cannot continue to subsidise positive climate actions such as adoption of electric vehicles and car clubs indefinitely, clearer roadmaps outlining the long-term availability of grants and subsidies would provide operators with better certainty when planning future expansions or deployment of electric fleets.

Some fiscal incentives offered to BEVs are determined at local level, such as the exemption from congestion charge in London. Guidance for the deployment and timescale of such schemes should be provided in the national framework (section 5.2.1). This should enable local authorities to provide more certainty over the availability of these incentives.

5.3 Recommendations for local authorities

5.3.1 Assess the role of car clubs in local transport strategies

Electric car clubs have the potential to bring benefits of decreased car ownership and reduced demand for car travel, alongside widening access to electric vehicles. However, car clubs will not be suitable in all locations or may require further support (for example in low income areas).

LAs will need to assess the suitability of car clubs within the context of their own local area characteristics and local climate goals. Close to 300 local and regional authorities in the UK have declared a climate emergency and many have set local targets sooner than the UK national 2050 target. While meeting these targets will be challenging, measures that reduce car use – including car sharing, where local characteristics support it – are particularly relevant for these local authorities in supporting their local ambitions⁵⁹.

The local suitability assessment will need to consider the local characteristics (e.g. population density) and consumer base (income, demographics etc), the different car club business models, the overall likely impact of car sharing, and value for money. LAs can be supported in this assessment by engagement with car club operators and, if implemented, by guidance through a national framework. Engagement with car club operators will be particularly important to determine whether either financial support or support in consumer engagement is likely to be needed while a customer base is established; for example, in new developments or in low income areas (see sections 4.2 and 5.3.5).

5.3.2 Create positive conditions for decreased private car ownership

A key barrier to the uptake of car clubs is the reluctance of residents to relinquish private car ownership, particularly in areas of poor transport links. In addition to national measures disincentivising private car ownership (such as high taxation), local authorities can create positive conditions to give residents affordable and sustainable alternatives to private car use that are aligned with residents' needs and local conditions. Car clubs are beneficial but, to maximise climate impact, they should be included in transport strategies with the aim of reducing overall driven mileage and complementing other forms of zero-emission transport.

⁵⁹ Due to slow turnover of the private car fleet and limited supply of electric vehicles, the earlier the net zero ambition, the lower the possible contribution of shifting to zero emissions vehicles is to reducing emissions

Local authorities can carry out a number of actions to create positive conditions for decreasing private car use, including:

- **Improving public transport offering** by expanding bus services, either through Enterprise Partnerships with operators or franchising (in Mayoral Combined Authorities), and exploring innovative on-demand services to complement traditional services where subsidised bus services are uneconomical. In addition, improvements in infrastructure to ensure priority access (such as bus lanes) reduces journey times and ensures a service that is more attractive to users.
- **Improving cycling and walking infrastructure** including secure cycle parking and ensuring a cohesive network of high-quality cycle lanes⁶⁰.
- **Improving efficiency of multi-modal trips** through initiatives such as integrated ticketing and multi-modal mobility services, as well as ensuring good links between public, active and shared transport (such as good connections between cycle lanes and transport hubs).
- **Designing new developments to encourage sustainable travel** such as the '15 minute city' concept, in which housing, workplaces and services are co-located. Incorporating public transport links, active travel infrastructure, and shared mobility into the design plans alongside incentives for residents can decrease reliance on private cars (see information box, below).
- **Implementing access and charging measures** to disincentivise private car use, such as reallocating on-street parking, increasing parking charges, workplace parking levies, and low or zero emissions zones.

Positive conditions that encourage residents to give up their private cars will improve operating conditions for car clubs and encourage membership.

Bath Riverside is a housing and office development, located 1 km away from Bath city centre. The development was designed to have good walking and cycling routes to the centre of Bath, alongside 14 different bus routes. Additionally, households benefit from a range of sustainable transport schemes, including free car club membership and a £100 cycle voucher. As of 2019, 70% of new residents use walking, cycling or public transport as their primary travel mode⁶¹.

5.3.3 Allocate sufficient parking infrastructure to car clubs

A key barrier identified in literature and in interviews with stakeholders is the availability of parking infrastructure for car clubs. This is largely a result of misaligned motivations and priorities between local authorities and car club operators. Local authorities may be unwilling to give up residential parking spaces or may not have a system in place to negotiate parking permits for free-floating shared cars.

If car clubs align with local climate targets and are deemed appropriate for a particular region, local authorities must recognise that car club operators need to be provided with access to sufficient parking infrastructure. A national framework (see section 5.1) will help local authorities establish appropriate systems.

Parking strategies are recognised as a strong lever in encouraging sustainable transport choices, and it has been recommended that local authorities set targets for reallocation of on-street parking based on best practice from European cities⁶². An association of car clubs in France (L'Association des

⁶⁰ Revised guidance and active travel ambitions in England were announced in July 2020. See <https://www.gov.uk/government/publications/cycling-and-walking-plan-for-england>

⁶¹ You've Declared a Climate Emergency, ARUP (2020)

⁶² Reclaim the Kerb, Centre for London (2020)

Acteurs de l'Autopartage) has campaigned for local authorities to ensure that at least 1% of parking spaces are reserved for car sharing⁶³. Local authorities may tender out car club bays to be used by a single operator or could choose to create designated 'car club bays' that can be used by cars belonging to any car club scheme. The German Car Sharing law, introduced in 2017, enabled local authorities to designate parking bays to car clubs. The law allows parking spaces used for roundtrip or point-to-point schemes to be reserved for a single car club operator. Spaces used for free-floating schemes will be available to any car club provider²³.

In order to support car club deployment, bays reallocated to car clubs must be done so at a fair price.

Additionally, local authorities could work directly with car club operators in the development of a local scheme, ensuring that positive market conditions are created and priorities aligned. The Mayor of Paris successfully supported car club deployment in the city by designating a large number of parking spaces to an appointed operator⁶⁴.

Autolib' was an electric car sharing service launched in Paris in 2011, in partnership with the mayor of Paris. Autolib' had a fleet of ca. 4000 BEVs and over 100,000 subscribers. Autolib's partnership with the mayor allowed the city authority to designate a large number of parking spaces across the city for use by Autolib' cars, alongside charge points operated by Autolib' themselves. The scheme successfully operated across Paris for 7 years, before shutting down due to vandalism and marketing problems. The car club bays and charge points previously used by Autolib' were passed onto other car club providers by the City of Paris.

Sufficient parking infrastructure will not only allow car clubs to expand and thus improve profitability, but also improve their visibility to consumers.

5.3.4 Improve access to suitable charging infrastructure

Before car clubs can deploy BEVs, operators must identify a strategy for charging their fleet that is sustainable and minimises operational cost. The current lack of suitable charging infrastructure for BEVs is a key barrier to deployment.

By continuing to deploy local charging infrastructure, local authorities can help to alleviate barriers surrounding charging infrastructure. In developing charging infrastructure plans, local authorities should plan for the needs of all users, including car clubs (requiring a mix of rapid hubs, en-route and destination charging, as well as on-street), residents and taxis (rapid points and hubs, focused at taxi ranks). This would help local authorities in areas where car clubs would be suitable to create a charging infrastructure plan, factoring in the requirements of shared BEVs.

A range of funding opportunities have been made available or recently announced to support LAs in deploying charging infrastructure, including:

- On-street Residential Chargepoint Scheme (ORCS)
- ChargePlace Scotland, Switched on Towns & Cities Fund (*Scotland only*)
- Defra Air Quality Early Measures Fund
- Regional funding and frameworks (e.g. Rapid Chargepoint Concession Framework in London)
- Targeted national funding streams (e.g. ULEV Taxi Infrastructure scheme, Innovate UK schemes)
- Rapid Charging Fund (*announced March 2020, not yet open, not necessary targeting LAs*)

⁶³ [Les entreprises de l'autopartage créent leur association professionnelle](#), Le Figaro (2020)

⁶⁴ [Enabling ULEV uptake – international leading practice](#), Climate Xchange (2019)

However, although funding streams are available to LAs, they are focused either on residential on-street charging or rapid hubs for either en-route driving or specific fleets (e.g. taxis). As such, no funding scheme or guidance currently exists to support LAs in addressing the needs of car clubs. Additional funding schemes are available for private charge point operators. However, it is unlikely that a charge point operator would install charge points specifically for car clubs unless through a partnership, despite the increased reliability of demand from a BEV car club compared to private car owners.

Besides wider infrastructure that enables potential in-trip charging, an important enabler for allowing car club users to recharge vehicles is the provision of charge points in car club bays. Retrofitting car club bays with charge points by local authorities is currently restricted by state aid laws⁶⁵. However, local authorities have the option of installing a charge point for a bay before tendering out the bay to a car club (successfully employed in Paris, see box above). This requires confidence that car club operators would be interested in deploying an EV in that location so engagement with the market is key.

5.3.5 Improve consumer engagement with car clubs

Local authorities have a longstanding role in local engagement and communication, including consultation with local groups, directly working with communities to understand their needs and even co-designing solutions at a local level⁶⁶. If a local authority determines that uptake of car sharing is appropriate for a particular area, community engagement prior to launch may be valuable to increase membership and to reduce concerns around vandalism. Car clubs and BEVs may be new concepts for residents, particularly in low-income areas (see box below), and provision of information is important to support uptake. Engagement with community representatives during site selection assists in determining site suitability. Communications and marketing materials can also be tailored to the local area and present the scheme as a solution to local problems, to develop a sense of ownership^{66,67}.

Nottingham City Council and Enterprise Car Club worked with Cenex to expand car club services to locations in lower income neighbourhoods. Cenex found that by working with influential representatives in the local community, interest in and support for the car club was increased. After launch, the car club saw high usage and continued to expand .

5.3.6 Share best practice

Where local authorities have successfully supported car clubs to operate commercially and observed local benefits, sharing their experience with other local authorities would help to address the lack of independent evidence and improve expertise in decision-making. In line with the recommended KPIs under a national reporting framework (see section 5.2.1), useful information to share includes:

- **Local characteristics and suitability assessment** procedure
- **Tendering process** including whether charge points were included in the tender
- **Wider charging infrastructure installed**, such as density and type of slow, fast and (ultra)rapid charge points
- **Supporting measures implemented** such as integrated ticketing and/or journey planning
- **Impact and value for money** including number of private car journeys avoided, increases in public and active transport etc

In London, London Councils is a potential platform for sharing information. Outside of London, this may require a platform to be set up under a national framework for the role of local authorities in achieving

⁶⁵ Car club operators can install charge points themselves but this adds an additional operation cost; note that it is still currently unclear how state aid will be regulated in the UK after leaving the EU

⁶⁶ InclusivEV Policy Recommendations: Electric Car Clubs in Low Income Neighbourhoods, Cenex (2020)

⁶⁷ Nottingham City Council EV Car Club Community Engagement, Cenex (2020)

net zero (see section 5.2.1). Alternatively, local authorities could come together to create a group similar to the UK100⁶⁸ to share expertise and experience across different authorities.

Shared best practice would particularly help local authorities that may have limited resources and funding and would be unable to carry out analyses of multiple options and measures. This is likely to not only improve understanding of local authority measures to assist car clubs but also ensure that schemes can be launched in areas where they are likely to have the highest impact.

The UK100 is a network for locally elected leaders in the UK that have committed to switching their community to 100% clean energy by 2050⁶⁸. The network works collaboratively to share knowledge and to develop solutions to challenges faced by local leaders.

5.3.7 Provide certainty over availability of grants and subsidies

Where fiscal incentives offered to BEVs are determined at local level, such as the exemption from congestion charge in London or local scrappage schemes as part of local climate action plans, local authorities should consider car clubs in planning these incentives. Local authorities should also continue to communicate with car clubs to provide more certainty over the availability of these incentives.

⁶⁸ [UK100.org](https://www.uk100.org)