



Shared mobility – where now, where next?

Second report of the Commission on Travel Demand

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About the Commission on Travel Demand Shared Mobility Inquiry

The Commission on Travel Demand is an expert group established as part of our work to explore how to reduce the energy and carbon emissions associated with transport.

The Commission's first report reviewed declining trends in per capita travel across the UK and the reasons for this. The future work programme will focus on other areas of policy which are critical to rapid decarbonisation.

This inquiry focuses on shared mobility and the potential to increase the occupancy of vehicles in-use, reduce individual ownership of assets and enhance multi-modal travel. We are using the term 'shared mobility' to mean:

- Shared ownership: where the use of the vehicle asset is shared across individuals incorporating various models of commercially or peer-to-peer operated 'car club's'/ car sharing schemes, fractional car ownership, bike sharing schemes.
- Shared at the point of use: Car/ride sharing (or trip sharing) – rides that are actually shared between different individuals or different parties, sometimes paid separately. In the future, this may include 'robot taxis' as shared mobility where the vehicle is shared across individuals.

Reference

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Executive summary

As the largest carbon emitting sector, and one which has yet to show any clear emissions reduction trajectory, transport is at the heart of the climate emergency and centre stage in the shift to a Net Zero economy. This inquiry into shared mobility takes, therefore, the position that more rapid and radical action is required to decarbonise the transport sector. More intensive use of fewer vehicles already offers a cost-effective, socially progressive and implementable set of options to cut carbon.

There is however no coherent national or consistent local policy framework for integrating shared car use within the wider set of mobility options. This runs from taxation, through management of the motorway network to the local allocation of parking space. Public bodies collect little data on sharing and have demonstrated only passing interest in the role of sharing cars and sharing lifts or rides. The failure to integrate the sharing of cars into transport policy is limiting and unhelpful, particularly for places where there is not a good set of public transport alternatives on offer.

Some of the evidence we received suggests that, when asked, many people struggle with the idea of giving up their cars or sharing vehicles. It seemed to follow then that sharing might be too difficult in policy terms. We believe that these answers come from asking the wrong sort of question. People already share their mobility today quite extensively. They used to share more, even in the recent past. And there are places where greater levels of sharing are normal. Some activities involve more shared transport than others. The exam question is not "Can you survive or not without a car?" but, rather "What needs to happen to enable greater levels of sharing to happen?" and "What sorts of innovations need to be in place so that not owning a car (or two cars) does not mean missing out on accessibility?" The data suggests that vehicles are utilised for only very small amounts of the week and that there is great potential to share assets and journeys more. But it will not happen in the absence of a set of policy commitments to bringing it about. We contrast the ambivalence to sharing and the perceived difficulties of it with the positivity and investment around automated vehicles, despite the manifestly more complex issues which arise from that transition.

The report sets out 20 recommendations which will support the evidence base around shared mobility, deliver more meaningful innovation trials and deliver a step change in the policy framework and incentives which sit around sharing mobility. Some policies are simple, such as making Highways England, whose networks carry around 32% of car miles each year, responsible for first monitoring vehicle occupancy and then facilitating a growth in it. There are significant network management as well as carbon benefits to be had. Others are more complex such as addressing the incentive system around multiple vehicles in a household or how to cross-subsidise greater provision of shared mobility in rural areas. There is no 'one-size fits all' approach but there are some actions which will have universal benefits such as redoubling efforts to reduce business miles driven in older private cars and to use the fleet assets of the public sector to reduce wastage and open up greater opportunities for shared access.

This report comes with two clear warnings which make the adoption of policies to support sharing yet more important. First, we see potential headwinds of lower motoring costs for many, due to electrification. This creates a real risk that transport will continue to become less shared. In the absence of any corrective policies, this will lead to substantial traffic growth according to the Department for Transport's (DfT) own forecasts. Second, such growth risks being compounded by the adoption of increasingly automated vehicles. Early estimates by the DfT suggest that in a shared model, such innovations could reduce future traffic growth to just 5% by 2050. In a more individualised model the growth could be as much as 55%. In essence, unless we deliver on sharing, our creative capacity for transport innovation could simply support the delivery of a more individualised transport system which creates higher demand futures.

There will be those who will find sharing a difficult policy sell. Of course, continuing the current weak commitment is an option. However, we would ask "If not sharing, then what? What policies will reduce the energy requirements of building the vehicle fleet, even when it is electric? Which policies will enable both short-term and long-term carbon pathway compliant transport policy? What makes other policy options more palatable than a major focus on increased sharing?" Doing nothing is no longer an option, we are in a climate emergency.

Whilst the Commission on Travel Demand holds no formal position in the policy system, its findings represent the considered synthesis of experts in the field. Its aims are to change the nature and pace of action on decarbonising transport. We hope that this report will create a globally leading environment in which innovations to accelerate sharing can flourish. Our report makes recommendations to the Department for Transport, the Committee on Climate Change, HM Treasury, Connected Places Catapult, Highways England, local government and companies involved in this space. We will host a summit a year on from publication of this report where we look forward to reviewing progress in the field.

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1. The case for change

The UK Government has committed to reducing carbon emissions to net zero by 2050.¹ The Committee on Climate Change assessment of the scale of the challenge is daunting. It states that:

- Net-zero is only credible if policies are introduced to match.
- Current policy is insufficient for even the existing targets.
- Challenges that have so far been out of scope must now be confronted.²

Nowhere is the challenge tougher than in the transport sector. Surface transport is the largest-emitting sector in the UK with emissions broadly the same as in 1990 and having increased over the period from 2013.³ Any progress to date brought by vehicle efficiency improvements has been offset by population growth, rising van traffic and upsizing of the passenger vehicle fleet to larger and less efficient models. There is a strong emphasis on decarbonising vehicles through electrification and other technologies⁴ but progress on this is, as yet, also off track.³

It will also be necessary to address the industrial energy and emissions embodied in producing cars and batteries or fuel cells of the future. No vehicle is zero emission. When the embodied emissions associated with material extraction, battery production, paint, tyres etc. are included in assessments of CO₂, battery electric vehicles are lower than internal combustion engine vehicles but only by around a third to a half in more recent studies.⁵ Even if the vehicle fleet were to remain the same size, this would still represent a major source of emissions in the economy. However, the DfT is currently working to an assumption that the car fleet will grow from the current 27 million vehicles to somewhere between 37 and 40.5 million by 2050.⁶ It is difficult to see how we can approach Net Zero with a growing vehicle fleet, even allowing for progress in emissions reduction in parts of the production process and in emissions from the power grid. **Reducing the need for, and extent of, individualised car ownership appears essential for decarbonisation. This is not yet accepted in transport policy.**

This inquiry into shared mobility starts, therefore, from the position that more rapid and radical action is required from the transport sector. More intensive use of fewer vehicles already offers a cost-effective, socially progressive and implementable set of options to cut carbon. It could play a much bigger role. Whether it does so or not will, to large degree, be defined by the creation of a truly supportive policy environment and real commitment.

Whilst the genesis of this report is the need to develop and deploy carbon reducing opportunities in the transport sector, there are many other reasons why greater shared mobility is a necessary part of any policy future for the sector:

- Sharing is an important part of a more inclusive and lower cost eco-system for getting around in urban, peri-urban and rural areas.⁷
- Sharing reduces local air pollution as well as climate change emissions.⁸
- Greater sharing is a necessary part of imagined autonomous vehicle futures to avoid very significant levels of traffic growth.⁹
- Sharing can lower costs to businesses and improve staff morale and retention.¹⁰

As we will set out through the course of this report, greater shared mobility meets all of the necessary conditions to be part of the low carbon transition. It delivers carbon reductions in a way which is cost effective and fairly distributed. Done well, it brings businesses and communities together through the innovations and develops social capital.

The arguments for creating the conditions for greater sharing to happen appear so strong that we are struck by the absence of any coherent policy framework to make it happen today.

2. What is shared mobility?

Shared transport is "part of a continuum between private and public transport".¹¹

Sharing can exist in different forms:

- Shared **vehicles** / 3rd party assets: vehicles available to multiple users, who may not know each other (car clubs; bike share)
- Shared **trips** / Filling empty capacity: seats in vehicles already making a journey used by passengers who may, or may not know each other (e.g. Liftshare, BlaBlaCar, Ridepooling);

The recent Foresight Future of Mobility review of shared mobility set out an assessment of the continuum of options by mode of transport as understood today (shown in Figure 1), whilst acknowledging that some of these categories may become less meaningful if there is a transition to shared autonomous vehicles.^a

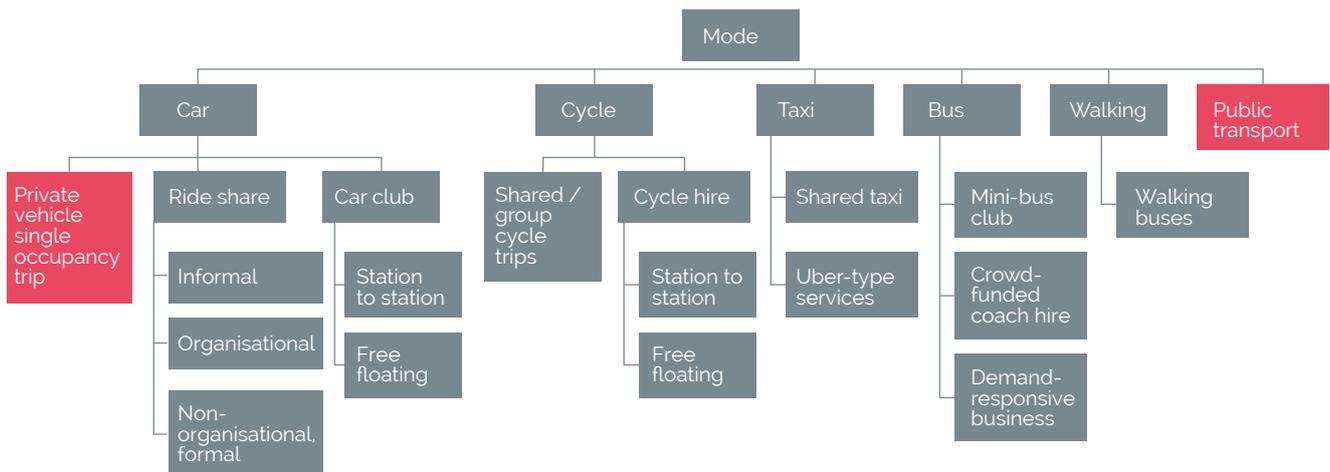


Figure 1: Shared Mobility Continuum (Golightly et al., 2019).¹²

a For a more detailed breakdown of some of the sharing services see Shaheen and Cohen (2019).

The review also further identified different characteristics of sharing which are important in defining the conditions under which they work:

- **Pure sharing vs collaborative access vs pseudo-sharing** – which ranges from activities such as lift giving (pure sharing) to buying access to a service being offered such as a private hire vehicle (pseudo-sharing).
- **Personal vs third-party ownership** – whether this is something shared between individuals (e.g. peer-to-peer car share) or whether there is a company (e.g. car clubs).
- **Discrete vs ongoing use** – one off trips (e.g. a taxi on a night out) compared with an on-going sharing relationship such as car sharing to work.
- **Synchronous vs asynchronous** – where sharing a vehicle in motion requires synchronous behaviour and sharing access to an asset such as a car requires asynchronous behaviour (two people cannot access the same asset at the same time for different trips).¹³

The Commission took evidence across the continuum of shared mobility with the exception of walking. However, the focus of the inquiry means the bulk of the evidence has been around how shared mobility can reduce household car ownership and reduce the proportion of lone-driver trips which are made in cars. As will be set out in the next section, for users to reduce car ownership or car driving requires the new shared mobility options to sit alongside and be integrated with a mix of different mobility options. Given the scale of the decarbonisation challenge and the timescales required to deliver the necessary upgrades to much of our public transport system they must fit together. This is not a case of either / or, but both.

The discussion about what shared mobility is and where different options sit within the transport system has real practical implications. Our evidence shows that local transport targets are set for 'sustainable modes' (bus, rail, bike and walk) and 'private car' (other).^{14,15} This does not provide a clear space for shared mobility in cars to be part of the mix despite efforts of the operators to create more integrated offers.¹⁶ The adoption of integrated 'Mobility Hubs' where bike share, car clubs and public transport can interchange begins to capitalise on the benefits of integration.¹⁷ At the same time, slow progress on allocating space for car club vehicles or levying charges for a car club parking permit at several times greater than that charged to a private resident suggests an on-going tension about the role of shared cars in mobility.¹⁸

Recommendation 1: We recommend that shared mobility options are placed within a road user hierarchy which is directly linked to the public policy outcomes they can deliver.

In setting out such a hierarchy, our challenge to providers of new mobility services is to share transparent evidence on the impacts of the services on mobility choices. Public authorities have to take decisions on space allocation and pricing with all users in mind. It seems much more likely that regulatory and policy change which supports better outcomes will be achieved where there is greater transparency on impacts.

3. Where are we now?

The car is used for 61% of trips and represented 78% of all vehicle mileage travelled in England in 2017.¹⁹ In 2018 cars and taxis drove 218 billion vehicle miles in England.²⁰ 17 million of England's nearly 23 million households own a car, totalling nearly 27 million cars owned as well as a further nearly 3.5 million vans.²¹ England remains a very car oriented society, with 88% of car owners responding to a recent DfT survey strongly agreeing or agreeing that their current lifestyle means they need to own a car or van.²²

Owning a car is currently the default means of having a car for personal use for the overwhelming majority of people, with only 1% accessing vehicles through car clubs.²³ Households in England spend a staggering £55 billion on just owning, insuring and maintaining their vehicles. That is four times the budget for Policing. For a household with a car the average cost burden of just owning a car is almost £3200 per year. A further £27.5 billion is spent on fuel and other running costs (£1600 per household per car per year).²⁴ At 14% of weekly household expenditure, transport is the highest part of household outgoings. Even when just considering expenditure on owning and running a car we spend more on this than we do on mortgages and council tax or on food and non-alcoholic drinks.²⁵

Given the scale of expenditure and the number of vehicles and vehicle miles driven, the very limited actual use of cars and of the potential mobility capacity of cars which are on the move is startling:

- The average car is only in-use for 3–4% of the time.²⁶
- Even in the morning peak, the largest proportion of the car fleet in use at any one time is just 15% (see Figure 2).²⁷
- One-third of cars do not move at all in a given day and 8% do not move during a whole week.²⁷
- 62% of car trips are done with a lone driver and the average car occupancy is just 1.55.²⁸
- For commuting trips average car occupancy is only 1.2 which means an estimated 36 million empty car seats every morning on the commute.¹⁰

- In total, over 2017, 621 billion empty vehicle seats moved around the UK.
- Given the average weight of a car today and the average occupancy levels we estimate that 910 kg of car are used to move every human (the average adult weighing just 76.5 kg).^{b,29} In pure weight terms, that is more than pulling a giraffe along behind a bicycle and, therefore, this requires substantial energy.

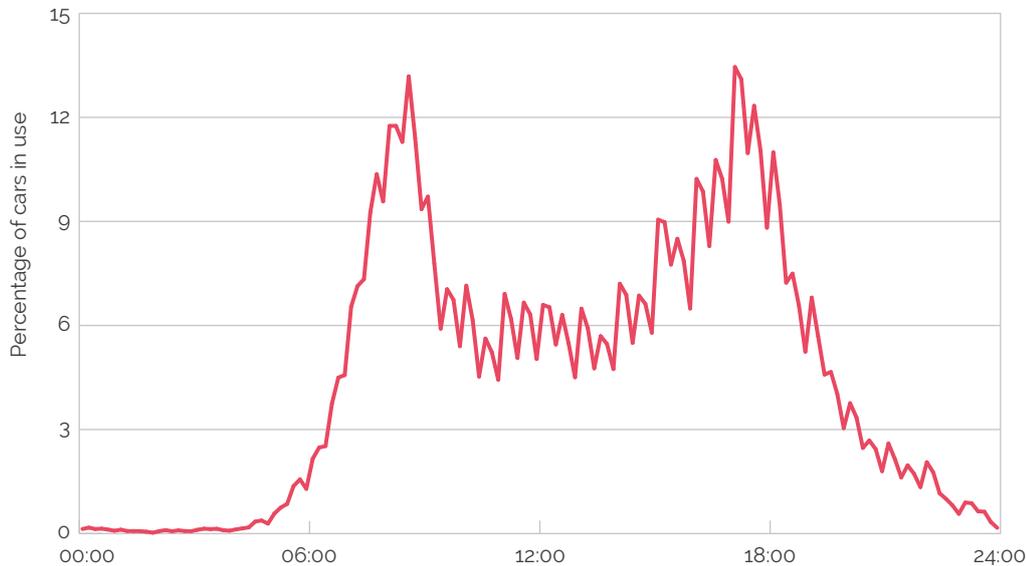


Figure 2: Even at peak time only a small proportion of the passenger vehicle fleet is on the move.²⁷

Analysis of the different patterns of car utilisation in the UK suggests only around 30% of use profiles in a given day are structured around the commute.²⁷ There is much more diversity in use patterns than is assumed and, therefore, opportunities to better match supply with demand.

It is absolutely clear that there is the potential to make major reductions in carbon consumption through:

- Reducing the size of the car fleet; and
- Using the vehicle miles that are driven more intensively.

Indeed, there are countries of comparable or higher real GDP per capita which have higher vehicle occupancy than the UK such as Sweden (14% higher)³⁰ and lower per capita car ownership such as Denmark (7%) and Ireland (6%).³¹

Recommendation 2: We recommend that the Department for Transport and Committee on Climate Change study the potential for saving carbon through greater shared mobility in time for the 2020 Progress Report to Parliament.

b Average new car weight of 1388 kg taken from ICCT European Vehicle Market Pocket Book Statistics 2017/18, with allowances for fuel and additional baggage totalling 23 kg.

4. Evidence on shared mobility innovations

This section reports on some of the latest evidence on shared mobility innovations as submitted to the inquiry and identified through academic and other grey literature. This is a rapidly evolving area and so the summary here is light touch.

Car clubs – back to base

Station-based car clubs where vehicles are hired for a specific amount of time and returned to their point of hire have been in operation for over two decades, although the models continue to evolve with electrification and returns to specific areas rather than particular parking bays. The evidence base on car clubs is strong, partly as a result of around a decade of regular data collection brokered by CoMoUK (formerly Car Plus Bike Plus). The findings in the UK mimic that of other countries in that these options suit people who want access to a car, often for leisure activities, and who have good access to a mix of other transport services. They can do without their car or without a second car and estimates suggest that each round trip car club vehicle put on the street replaces 10.5 privately owned vehicles.¹¹ These findings have been robust across the recent decade of growth to over 4000 car club vehicles and 245,000 members. However, patterns of use are evolving with greater corporate scheme involvement with different usage profiles, extra incentives to use car club vehicles as they are low emission zone compliant and growing knowledge about regular versus infrequent users. There is a need to continually refresh what is understood about the profile of new and continuing car club users relative to the earlier adopters. One observation of car clubs is that they tend to operate in central urban areas where there is a sufficiently good complement of other transport options as well as density of user demand for the vehicles. We explore developments to broaden the coverage in Section 6.

Car clubs – one way

More recently there have been innovations in car clubs such that they do not have to be returned to their point of hire. One way car clubs can be returned to other stations (how docked bike hire schemes work) or floating (e.g. DriveNow). CoMoUK found that these schemes also reduce vehicle ownership, potentially by more than back to base schemes.¹¹

However, a comparison of back to base and one way car share schemes operating in Basel found that 35% of people using the back to base scheme had reduced their vehicle ownership compared with 12% using the one-way scheme. Importantly, whilst the back to base members also used bus, train and bike more, the one-way club members used these modes less, suggesting some substitution of these trips by car as a result of the opportunity of one-way hire.³²

Peer-to-peer car sharing

Peer-to-peer (P2P) car sharing (through apps such as Drivy and Turo) is a relatively recent phenomenon in the UK. Although people have always shared access to cars through insurance policy arrangements, the P2P model is more of a mirror of the B2C car club but with the assets owned by individuals and mediated through an app which takes care of booking. The evidence base in the UK is absent. A recent study in the Netherlands showed how rapidly this innovation was scaling up there. Whilst B2C car club vehicles have grown to around 3000 over more than a decade, the growth in P2P means more than 34,000 cars are on the platforms.³³ The study finds that B2C systems are concentrated, largely in urban centres whereas P2P vehicles are much more distributed. An associative analysis finds that the presence of P2P sharing vehicles has a weaker impact on overall vehicle ownership than B2C schemes. This though is a trade-off. It appears that it is challenging for the B2C model to operate everywhere, yet there is scope for more efficient sharing of vehicle assets in most locations. B2C providers also point out that there are differences in environmental quality of vehicles in B2C systems with an average age of less than a year compared with P2P and there were some concerns raised over clarity on insurance arrangements and the ability of public bodies to support such schemes as they had no safety oversight. We know very little about the P2P car sharing market in the UK and this needs to be addressed.

Lift sharing

Lift sharing is the co-ordinated matching up of rides between travellers. The driver offers a ride and is only recompensed the equivalent expenditure for the journey and does not make a profit. Liftshare is an established pioneer in the field in the UK and has over 650,000 members offering or looking for a range of one-off or regular lifts.¹¹ Whilst the application is used for a wide range of activities such as festivals, concerts and sports matches, it is in more intensive partnership with major employers that the successes have been seen. Liftshare estimate that with the right programme of engagement and incentives over 20% of employees of a large organisation can lift share with their greatest levels being 40% at Centrica and Wolesley.¹⁰ Other players are coming to the market such as BlaBlaCar which has been particularly successful in Europe. Studies show that in France students in particular seek lifts through BlaBlaCar and these are provided by a fairly wealthy demographic, suggesting a strong altruistic motivation for sharing, although there is not a strong coach service in France and there are road tolls which give a different set of choices and economics of choice to this form of travel relative to the UK.³⁴

Ridepooling

Ridepooling describes services where users book a ride which they are prepared to share with an unknown third party. This may involve some deviation off the existing route. This refers to services such as UberPool or LyftLine rather than straight ridesourcing services where there is no sharing of fare or route. In practice, the distinction is difficult however as a passenger can use the same vehicle in individual mode or be prepared to share.^{c.35} When being prepared to share, it is down to chance as to whether another rider will join part of the journey. To work as a commercial model requires a density of sharing so it is mainly operating in central London.

The scale and impact of ridesourcing is not well understood. The impacts of ridepooling are even less so. The largest data set on ridesourcing comes from California and so has limited transferability to the UK. There, the 2018 results of on-going panel survey of close to 4000 people found that "ridehailing trips are primarily replacing car or taxi trips while shared ridehailing more often substitute for the use of public transportation. Shorter trips made with these services tend to substitute for trips that would have been otherwise made by walking or bicycling".³⁶ Earlier work has shown that these services are predominantly used for leisure or social trips.³⁷ The recent California study also finds that 40% are at the weekend, 43% during weekdays and 17% at night.⁴⁰ In terms of vehicle occupancy (excluding the driver), Figure 3 below shows the findings from questions about the last ride which users had taken, again from California. On weekdays the average occupancy is 1.7 whilst at weekend evenings the average occupancy rises to 2.2.

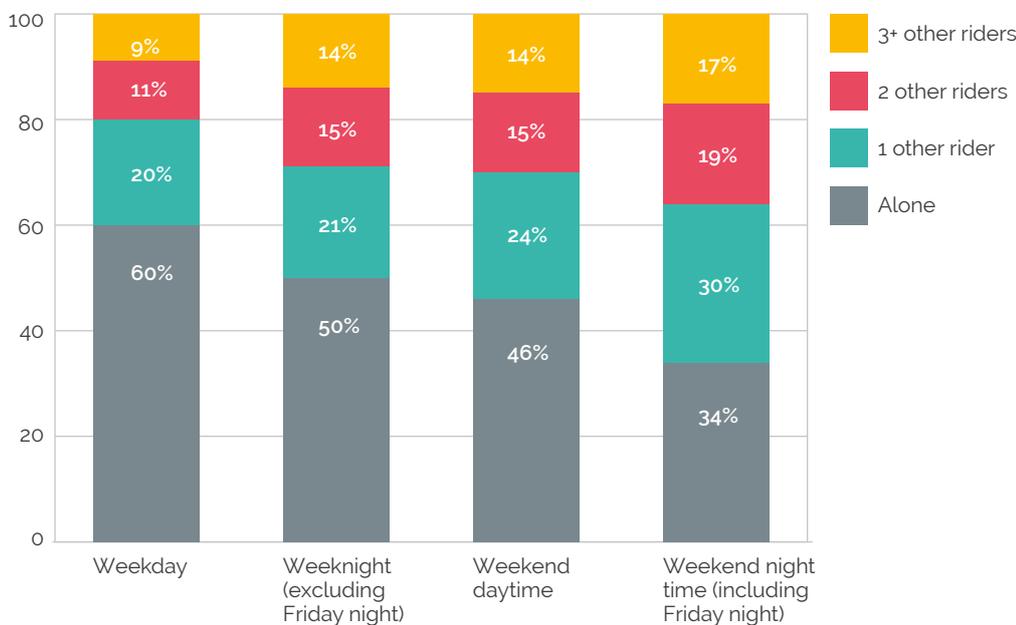


Figure 3: Vehicle occupancy for ridehailing and ridepooling trips in California (N=1,278).⁴¹

c A recent synopsis of different systems can be found at Shaheen, S. and Cohen, A. (2019).

The DfT’s Public Attitudes Tracker survey explored the awareness and usage of ridehail services and under what circumstances people would be willing to pool journeys. This varies significantly across age groups (44% of 25-34 year olds have used a service compared to 15% of 65-74 year olds). It also varies substantially across the country (See Figure 4), with much greater use in London than elsewhere. The tracker also explored the willingness to ridepool with unknown travellers. It found that the average fare which travellers would expect in order to switch from a £20 Uber to Uber Pool was £11.43.³⁸ This both implies a very high degree of sharing along the journey to make this commercially viable but also raises questions about the extent to which this is feasible in large parts of the country where £20 would represent only a small proportion of the most expensive taxi journeys. Some user groups, notably women, over 65s, those living outside London and those of white ethnicity reported being less likely to switch than men, under 65s, London dwellers and BME groups. However, there is a willingness to share amongst all of the groups with the maximum non-switcher rate reported as 22% for over 65s.⁴²

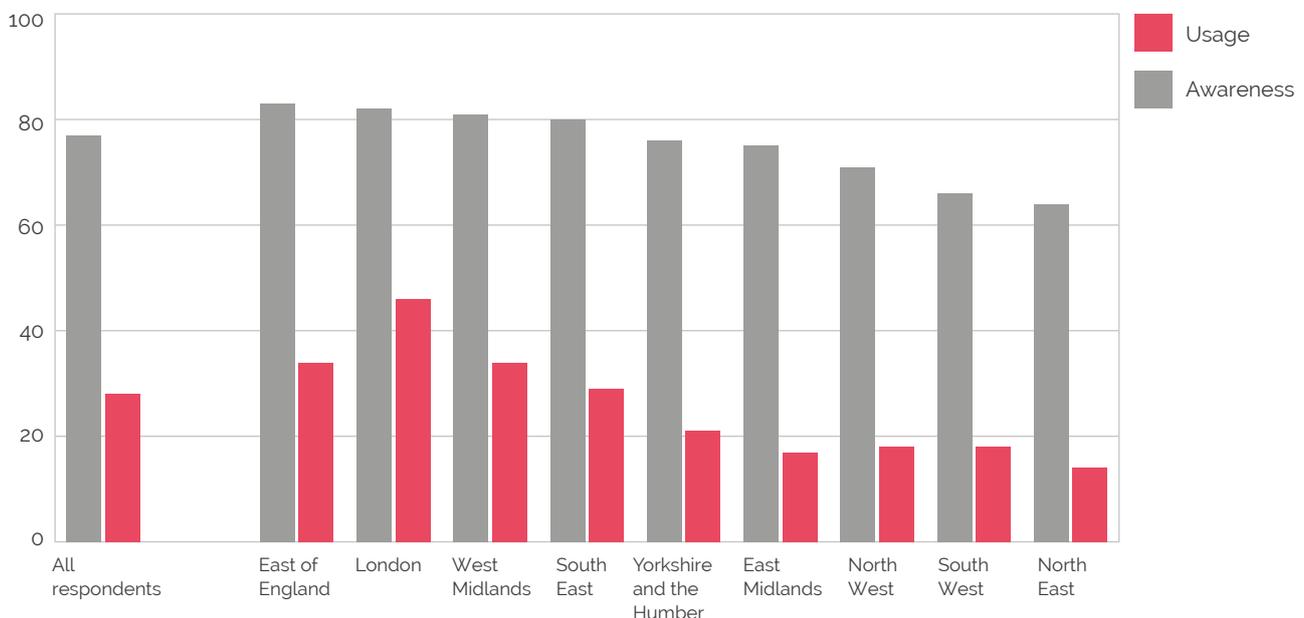


Figure 4: Awareness and usage of ridehailing services across England.³⁹

Given the mix of journey purposes reported for ridehailing and ridepooling is predominantly social and that ridepooling seems to have some substitution effects for public transport there is no evidence, as yet, to suggest that these services will be beneficial to traffic levels. Indeed, recent research suggests that in central areas these services are adding to congestion.⁴⁰

Bike share

The bike share market is very dynamic. It offers, in a range of ways, access to bikes for additional 'last-mile' connectivity within cities and leisure use. E-bikes are now becoming part of the mix which might broaden the coverage of bike share trips. CoMoUK define three categories of system.¹¹

- **Docked bike share:** also known as station-based bike-share, this system makes use of on-street infrastructure for parking and accessing the bikes. Users need to retrieve and park the bikes at these stations across city-wide network (e.g. Santander bikes in London and Hirebike in Lincoln).
- **Dockless bike share** (also known as free-floating; this station-less system relies on internal locks on the rear wheel to secure the bike). Users must use a smart phone to access and secure the bikes at the start and end of their trip. Bikes can be parked anywhere across the locale, although some schemes have preferred bays (e.g. Beryl Bikes in Bournemouth).
- **Hybrid schemes:** these systems have docking stations but users can also park out-of-hub using a rear wheel lock (e.g. City of London).

CoMoUK estimate that in 2018 there were 24,871 bikes with just over 650,000 signed up members making over 19 million trips a year. Bike share appears to have wider benefits, exhibiting a more even gender split than cycling generally (42% female) with 43% of users restarting cycling having not ridden for a year or more. Whilst these schemes tend to operate in more central areas of cities, there is a diversity of practice with some offering quite large spatial reach. They also allow people coming from further out from the city to make connections within the city which might otherwise be difficult. A quarter of riders have used bike share in conjunction with the bus and 40% with rail.⁴¹

Success factors for bike hire schemes can be difficult to establish given the changing technologies. For example, around 50% of the bike sharing schemes opening in Spain have been closed although this varies very significantly across the country as does utilisation between the schemes still in operation.⁴² Beate Kubitz described the process of re-establishing a successful bike-share scheme in Cardiff, noting the benefits of integration between key use sites in the city (e.g. the Council and University) and the integration with good cycle infrastructure, information and care for the system.⁷ A wider study of bike share schemes globally has established a link between increased ridership and high quality cycling infrastructure provision.⁴³

Demand responsive transport

Demand-responsive transport is not new. There have been numerous developments, largely driven by initiatives around provision for community transport. More recently services such as Arriva Click, Slide, Chariot and Buzz have been trialled, with some withdrawn. Demand-Responsive services have the potential to extend the reach of the core public transport network and to provide a level of service to more peri-urban and rural areas which traditional bus services no longer can. However, we would suggest that the limited success of trials to date points to the challenges of:

- a. building up a user base that is willing to rely on the service given their potentially short-run nature; and
- b. such services stacking up in purely commercial terms and therefore being able to provide a return to technology investors.

The expert discussion pointed to a real need to find a way for these services to contribute to the wider transport solution and, for this to happen, for good collaboration between the public sector, existing community transport providers and new technology firms.¹⁵

Summary

We have summarised in Table 1, for each of the innovations, their contribution to:

- Reducing car ownership.
- Increasing car occupancy.

We have also examined:

- Complementarity/Competition with public transport.
- Scale (urban/peri-urban/rural).
- The quality of evidence base (maturity and robustness).

Innovation	Car ownership	Vehicle occupancy	Complementarity / Competition	Scale	Quality
Car clubs back to base	✓✓✓	✓	✓✓✓	Largely urban centre	Strong
Car clubs one way	✓	?	✓X	Largely urban centre	moderate
Peer to peer	?	?	?	Typically clustered in some cities in UK	Weak
Liftsharing	?	✓✓✓	✓✓	Workplace, activity based and general	Strong
Ridepooling	?	✓	✓X	Central urban areas in UK context	Weak
Bike share	?	N/a	✓✓	Mostly central urban areas	Moderate
Demand responsive bus	?	✓✓✓	✓✓✓	Generally deployed away from high demand p.t. routes	Moderate
✓ Weak positive effects ✓✓ Moderate positive effects ✓✓✓ Strong positive effects ? Effects not clear ✓X Effects both positive and negative (balance unclear)					

The evidence base for these innovations is generated through a range of sources, some of which relies on commercial companies providing data and this is not always forthcoming or consistent. The quality of the UK evidence to date owes much to the work of CarPlus BikePlus, now CoMoUK. DfT are aware of only limited evaluation evidence on interventions to support shared transport and do not have any specific plans to undertake evaluations in this area with that being a matter for Local Authorities. The DfT has indicated that it will commission qualitative research into current sharers' experiences of sharing, key motivators for adopting shared transport modes as part of the Future of Mobility Research and Analysis Programme.

This is such an important part of the transition pathway to Net Zero that we feel there are risks that a poorly funded, fragmented and partly proprietary evaluation evidence base will not be sufficient to address what is a major knowledge gap in a rapidly changing field.

Recommendation 3: We recommend that the Department for Transport work with CoMoUK and other relevant bodies to develop a data collection and repository process to ensure it understands the case for and impacts of interventions in this space.

The data shows that not only are many of these services concentrated in denser urban areas where there is scale of potential user markets, but also that the user base is also not representative of the population as a whole. Whilst not true for all innovations (e.g. bike share), the population group with the strongest use profile is the Under 35, skewed towards males with higher than average incomes and from white backgrounds. This needs to be better understood for the following reasons:

- It is important to know if the adoption of these innovations amongst groups using them today feeds through into lower levels of car use later in life.
- To what extent is it an unwillingness to engage in the shared mobility systems and to what extent is it a lack of availability of such systems which skews use patterns? The former matters for how the systems are designed and the latter for their potential to expand.

We also note that the vast majority of sharing occurs outside of these managed systems so practitioners should be careful not to extrapolate about “willingness to share” only from the formal innovations being deployed.

5. Sharing behaviours

Through the course of the inquiry several participants pointed to the lack of willingness of people to share. This is manifested in the relatively low car occupancy levels and in survey data. For example, the DfT's Public Attitudes Tracker Survey in 2017 found that 94% of car owning / using respondents enjoyed the freedom and independence of their car and 88% reported needing to own their car or van for their current lifestyle (Figure 5).

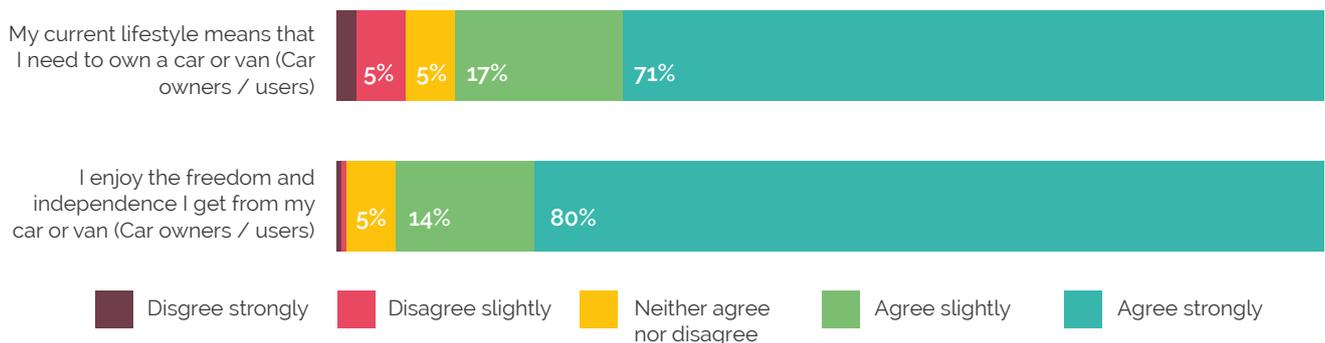
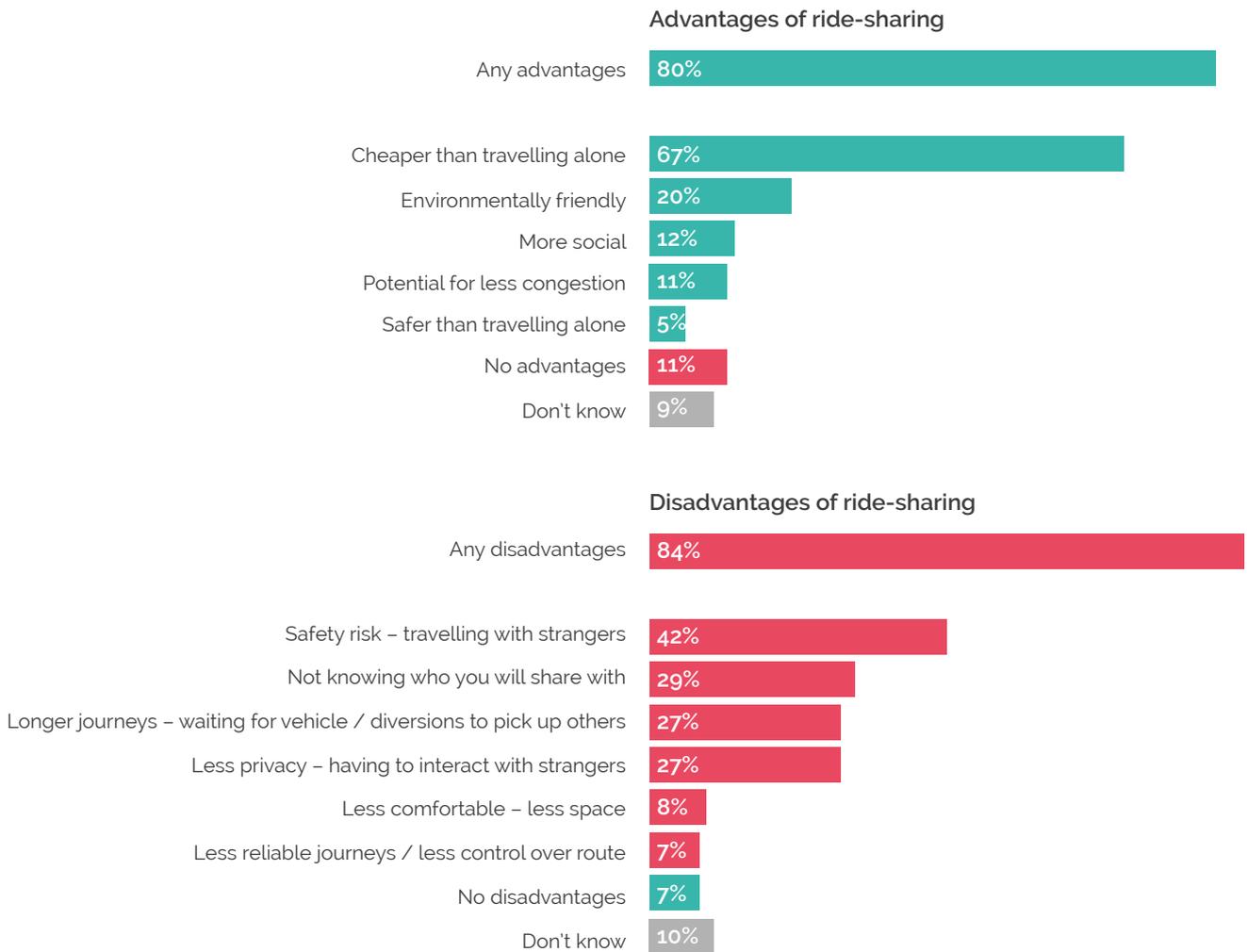


Figure 5: Department for Transport Public Attitudes Tracker Survey views on ownership.²²

The Foresight Future of Mobility study also addressed the behavioural factors which need to be considered in understanding sharing. The study identified sharing to be conditioned by feelings and attitudes and to be based on the extent to which sharing is integrated into other daily activities (e.g. highly complex trip-chains are often more difficult to share with someone else).⁴⁴ Previous work has shown that there is a group within the population (around 12%) who enjoy driving for its own sake and who think there should be no restrictions on it.⁴⁵

More recent work has also begun to explore the conditions under which people would consider sharing vehicles either as part of pooled ridehailing or more autonomous fleets of the future. The DfT found that 84% of people reported some form of disadvantage with ridesharing (Figure 6). The largest category was safety risk, with 42% identifying that as a disadvantage with women reporting 49% and men 36%. There are some important barriers to increasing shared mobility.



Source:

Q71b. What do you think are the advantages, if any, of ride-sharing compared with travelling alone or with people you know in a taxi?

Q72. What do you think the disadvantages, if any, are of ride-sharing compared with travelling alone or with people you know in a taxi?

Figure 6: Department for Transport Public Attitudes Tracker Survey views on ride-sharing.

So, should we put shared mobility in the too difficult box? We think not. Everyone shares their mobility. Some more than others for sure, but everyone shares sometimes:

- Almost 40% of car journeys are already shared.²⁵
- In 2018 the average distance travelled as a car passenger in England was 1783 miles.⁴⁶
- A further 1030 miles are travelled on bus, rail, underground and coach services. All shared.³²
- 240,000 people are members of car clubs across England, Wales and Scotland.¹¹
- 650,000 people are members of bike share schemes across England, Wales and Scotland.⁵⁶
- Liftshare links 50,000 workers in major employers for their commute.¹⁰

Sharing is normal, not new, and energy would best be addressed into thinking about how to make it more normal and easier for a wider range of purposes. Specific attention needs to be paid to the use cases in which people are willing to share. Whilst some people give up their cars and move to shared access to cars there are others who have never wanted to own and drive a car or cannot on affordability or health grounds. This represents 24% of households. These households rely on a shared mobility system for all journeys. For the remainder, asking whether or not they can give up the car is too loaded a question. Being prepared to share some more journeys is quite different to living entirely car free. Similarly, willingness to share will be highly dependent on the social context in which it happens, which is difficult to glean from surveys. The Foresight Future of Mobility study identified a range of interacting factors which would influence adoption of sharing including the social capital invested in building a community of users where trust in the provider and user community is built over time. Where these factors work, it is often the case the arrangements move off the platforms and become more peer to peer led.⁴⁴ The success of workplace based schemes shown in the previous section is one example of trust building but there are many forms of communities around places⁴⁷ or activities (festivals, sporting events or shopping) where sharing is undertaken and this could all potentially be broadened.

Recommendation 4: We recommend that future research programmes on sharing focus on understanding when and how sharing works and what is required to grow and sustain shared mobility and through this understand how to overcome barriers for different users.

We contrast the scepticism about the potential for greater sharing of vehicles to the optimism, funding and policy effort devoted to the deployment of autonomous vehicles. In the 2018 DfT Tracker survey 80% of respondents identified potential disadvantages of autonomous vehicles yet this is still seen as a critical opportunity.¹⁹ As identified in a wide range of studies on the deployment of autonomous vehicles, if they are not to create more traffic, as a result of empty running, then they need to be intensively shared.⁴⁸ The DfT's 2018 Road Traffic Forecasts found that the difference between greater shared mobility in an automated future and more individualised mobility could be as much as 50% of current levels of traffic (Table 2).

Tests	Traffic growth from 2015 to 2050
Private travel	55%
Ride-sharing	5%

Whilst these are, as yet, sensitivity tests rather than forecasts, the difference comes down to vehicle occupancy. In the low traffic growth outcome average occupancy changes from 1.5 to 1.7 and in the high growth from 1.5 to 1.3. Put in those terms, the physical scale of the task of increasing car occupancy does not seem Herculean or unattainable if there was to be commitment to it.

It is still early stages in the development of increasingly connected and autonomous vehicles. The Commission was told that the current vehicle designs and pilots make it difficult to really understand whether people will shift to autonomous vehicles and share them. In particular Professor Merat told us that people's actual experiences will determine their acceptance of the system.⁵⁰ This could be quite different to their reported perceived acceptability of some potential system. So, whilst work is underway to understand potential user perceptions (e.g. work commissioned by the DfT) this can only take understanding so far. Trust building again seems critical and not enough is yet known about the extent to which design can overcome the reluctance of some people to share small spaces without human supervision.⁵¹ The evidence we have collected from a whole range of sharing applications suggests that greater sharing will need to be cultivated over time and cannot simply be switched on just by deploying a new technology. Such a shift needs to start now both for policy needs today but also because of the scale of the potential benefits / disbenefits of a more / less shared autonomous future. In the absence of evidence that a shift to more shared mobility is achievable, we suggest that a future strategy based on greater autonomous vehicles is flawed.

Recommendation 5: Shared AV projects and pilots should be prioritised in all publicly funded research and innovation related to the AV agenda.

6. Policy options

The consensus amongst participants in our inquiry is that there has not been a policy focus on shared mobility, in particular on sharing vehicles. The successes that have been achieved through innovations in car clubs and lift sharing have been hard fought. However, the sixth principle of the Future of Mobility Urban Strategy states:

“ Mobility innovation must help to reduce congestion through more efficient use of limited road space, for example through sharing rides, increasing occupancy or consolidating freight.”⁵²

The arguments for increasing shared mobility such as tackling the embodied carbon in vehicles, increasing fairness and improving health set out in Section 2 of the report go well beyond congestion. Nonetheless, we see this as a call for ideas to stimulate sharing. Expecting change to be delivered through private innovation alone will undershoot on what could be achieved by changing the policy environment to make sharing more likely.

The inquiry drew on several propositions from the evidence and from elsewhere in the world to debate what could work in the UK and these are discussed below. There is not a universal prescription for everywhere and some of the options require serious piloting and assessment before widespread deployment. They all sit within our broader framing set out in Section 2 of a need to promote effective use of urban space and to deploy a hierarchy of road use which favours walking, cycling and then public transport. As identified in Section 3, many of the innovations and policies are likely to work best when they are part of a rich mobility mix.

6.1. Reducing vehicle ownership

Recommendation 6: The Department for Transport and HM Treasury need to set out a vision for the transition to a smaller vehicle fleet.

As we set out in Section 1, this is a necessary part of a shift to a vehicle fleet which is consistent with the Net Zero target. Whilst some will see such an approach as the continuation of the (phony) war on the motorist, this is actually consistent with the anticipations of the mobility industry in a wider shift to providing mobility as a service. As set out in Section 3, a large proportion of the fleet is sat idle most, or even all, of the day and lower vehicle ownership does not imply lower access to mobility.

Policies which will support such a shift include:

- Expansion of car clubs.^{16,11}
- Creation of mobility hubs with access to shared mobility options, particularly in new developments.¹⁵
- A taxation and incentive system which is linked to the number of vehicles per household as well as their environmental standards.⁵³
- Innovative business models for shared ownership of vehicles (fractional car ownership).⁵⁴

The evidence on car clubs is strong and mature, at least in the context of urban centres. There is however, an inconsistent level of commitment to starting or growing car clubs and, indeed, some areas where charges for car club space are being levied well above that for residents parking despite the positive externalities that replacing personal car ownership brings to communities. There are real commercial limits to how far such schemes can spread and more innovative means of developing partnerships between the private sector, public and third sectors will be necessary to scale up (see Section 6.3).

Recommendation 7: We recommend that regional or local transport bodies establish a shared mobility strategy with a goal of reducing individual vehicle ownership and promoting access to a cleaner fleet.

More work is required to understand how to make the mobility hub model work well, as it is seen to in other countries (Bremen for example being a pioneer in this space) and this could be part of the Future Mobility Zone bids which are being developed. There are opportunities around existing public transport hubs but also to develop this approach in major new housing developments and to think about how these will tie in with accelerating electrification of the fleet. Discussions were clear however, that this cannot be tokenistic siting of car club vehicles in housing areas with limited supporting bus services or cycle lanes.

Recommendation 8: We recommend the piloting of mobility hubs in new developments to deliver good practice guidance and workable standards.

At a national level, there are no incentives or penalties around how many vehicles a household owns. If, for example, the government wanted to try and incentivise the reduction of second or third cars in households it has few levers to pull.

At a local level, there is a diversity of practice. For those areas where parking is managed, differential parking permit charges are sometimes applied by the number of permits per household. This impacts on some groups in areas where parking is already difficult but leaves out areas where there is more supply.

Recommendation 9: The Department for Transport and HM Treasury should commission an options review to develop a more coherent, consistent and fairer system of incentivising lower vehicle holding per household.

There are also more speculative means of reducing the size of the vehicle fleet. One such model which has been piloted is fractional car ownership where groups of individuals purchase shared access to the same vehicle which is managed through an app and smart keys. These models are yet to deploy at commercial scale.⁵⁵ However, given the data in Section 3 on the extent to which vehicles do not move in a day, these options could yet play a significant role. They may be particularly effective ways of sharing access in communities where a car club would not be viable but where there are opportunities to share. However, the extent to which they widen access to cars and solo car driving rather than adding real sustainability benefits needs to be understood.

The DfT’s National Transport Model currently has a model of car ownership which generates linear increases in vehicle stock (Figure 7). This is inconsistent with the policy requirements of a Net Zero carbon future, its own direction in the Future of Mobility Urban Strategy and the rhetoric of most of the transport industry and innovators. As the projections of future vehicle use draw on the projections of household car ownership, it is apparent that the shifting ownership model will impact on expected future travel demand.

Recommendation 10: We recommend that a range of different vehicle ownership futures form part of any future road traffic forecasting exercise.

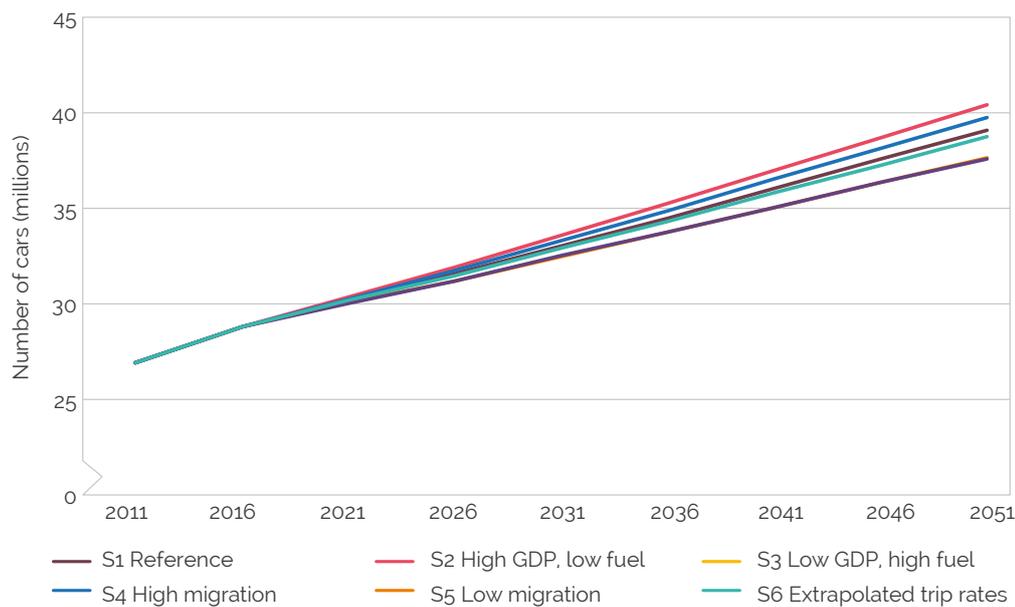
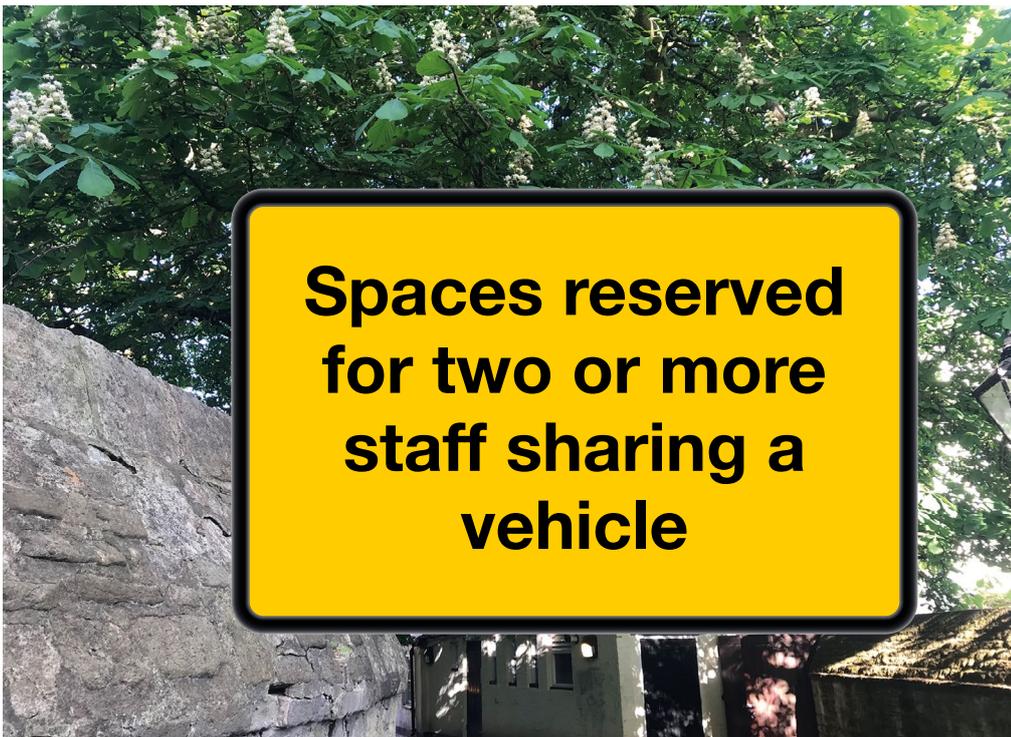


Figure 7: The only way is up? Department for Transport Car Ownership Forecasts.⁵⁶

6.2. Adapting infrastructure

Infrastructure can be adapted to encourage the use of shared mobility. Measures include the allocation of space for interchange, prioritising parking availability for shared vehicles and allocating dedicated space on the road network for high occupancy vehicles. In Section 6.1 we advocate the allocation of space for mobility hubs to promote greater shared mobility. Liftshare identified positive reinforcement of the message on sharing journeys to work by the provision of priority parking for car sharers. This is simple and low cost to implement in a managed environment such as staff parking.



There are very few examples of High Occupancy Vehicle lanes in the UK. One, connecting the M606 to the M62 near Bradford has been removed and one of the two lanes in Leeds is scheduled to be converted to a bus lane. Enforcement has been a difficult issue given other policing priorities. Overall, there was a strong feeling that there is not enough space on UK road networks to allocate it to 2+ vehicles. Where there is a case for road space reallocation it should be targeted at much higher occupancy vehicles through bus lanes or to vulnerable road users through high quality cycling infrastructure. This will maximise the throughput of people.

One major area of potential opportunity does exist around our inter-urban network which, in England, is managed by Highways England. None of the performance indicators which are set for Highways England relate to encouraging greater car occupancy on the network⁵⁷ and there are currently no policies and programmes in place to try to support this. Indeed, we were told that Highways England does not monitor or report on car occupancy.

By contrast, significant investment is going in to widening the number of running lanes on much of the motorway network. The 'Smart Motorway' initiatives cost something of the order of £9 million per lane mile to deliver. An evaluation of the initial smart motorway systems suggested that this could achieve a 7% increase in throughput.⁵⁸ This would be the equivalent of increasing car occupancy from 1.55 to 1.66 (below the levels of car occupancy found in Sweden).^d It is inconsistent with the joint goals of carbon reduction and congestion improvement to pursue a road expansion route when alternative vehicle utilisation options are left unexplored and underexploited.

Rather than encouraging sharing practices, it also appears that the system currently encourages Highways England to close off car sharing opportunities. Discussions revealed practices such as closing off informal parking areas near motorway junctions where it appeared car sharing was being practiced. This was done for safety reasons. Whilst we understand the safety concerns, we see these patterns of use as indicative of a potential latent demand for car sharing for some longer-distance trips. Designed well, such sites might also act as effective interchanges for access to local public transport and onwards journeys to city centres.

Recommendation 11: We recommend that the Department for Transport amend the performance metrics for Highways England to require them to monitor car occupancy levels and to have a responsibility to increase them.

Recommendation 12: We further recommend that Highways England, in partnership with local transport authorities and car sharing companies, develop a series of pilot schemes with high quality interchange designs to encourage safe car sharing across their network. This should be part of Highways England's core spend from the Department for Transport. It should be accompanied by a major programme to build communities of users around the system.

6.3. Building communities of users

All of the experience of the Community Transport Association, Liftshare and CoMoUK and the research underpinning the Future of Mobility study points to the need to invest in the development of communities of practice around shared mobility. It requires skills, positive reinforcing experiences and the development of trust over time. We are yet to see evidence in the UK of new innovations appearing in the transport market through which individuals simply sign up and begin to share at scale, although peer to peer ride share has grown rapidly in parts of Europe.³³ Whilst this is the model for innovations such as UberPool and LyftLine there is as yet limited evidence as to the range of people willing to share and the conditions under which this would be acceptable (e.g. without a supervising driver).

^d Note that this is an estimate of the change in car traffic, the Smart Motorway system also benefits freight.

Rather, therefore, than relying solely on individual-led adoption of such innovations we suggest there is an opportunity to explore building on what is already known about sharing through communities of practice. Sharing is most effective where demand can be relatively easily pooled and long diversions avoided. This is one reason why workplace schemes work with larger employers and why liftsharing for festivals and large sporting events is more widespread. Communities of practice could be built around a range of different practices, such as theatre and cinema or dining out in a city. Offering shared ride services could, for example, be part of the booking offer and process.

Recommendation 13: We recommend that the Department for Transport provides seedcorn funding for a range of trials to encouraging building shared mobility practices.

It is also clear that there is an on-going need for the services provided by Community Transport. These provide a vital lifeline for many who live without cars and with a poor or non-existent public transport service. No commercially viable service was seen through the inquiry. Whilst there is scope for greater adoption of technical innovation in the Community Transport sector, there is much to be learnt from it in terms of building community and delivering a wide social value. There is an on-going need for revenue support for less well served areas which is becoming more and more difficult to secure.

As well as making a broader case for investment in more community based transport to tackle issues such as isolation, there are opportunities to be more creative in the use of a whole range of vehicle assets which are procured and used by the public sector in particular. The recent evaluation of the DfT's Total Transport initiative found that around £2bn per year of public funding for transport services is provided by a number of agencies, largely local authorities including:

- £150 million per annum for non-emergency patient transport.
- £250 million p/a BSOG.
- £278 million p/a for socially necessary bus services.
- £1 billion p/a for home to school transport.⁵⁹

Whilst the challenges to unlocking greater cooperation amongst the public sector are reported by the studies as being significant and context specific, they form a critical part of the opportunity space for better shared transport, particularly as they are largely funded by the public sector.

Recommendation 14: The Future of Mobility White Paper on rural mobility should specifically address how to maximise the potential for shared use of public sector fleets and procured services to enhance shared mobility.

We also took evidence on the potential to increase shared mobility options through greater partnership between the public sector and private car club providers.⁶⁰

If a car is required in the course of work, however infrequently, then it can be a reason to drive to work. The mileage reclaim expenses ensure that the driver does not lose out. However, evidence from the BVRLA showed that the average age of the 'grey fleet'^e is 8.1 years with an average CO₂/km of 138 g/km compared with a car club fleet of 0.6 years and 108 g/km.¹⁴ Enterprise Car Club told us that some public authorities were taking up car club fleets and then making the vehicles available to the general public outside of core hours.¹⁴ This can expand car club provision in more rural settings and could apply well beyond the public sector if it were to be incentivised.

Recommendation 15: We recommend a rapid evidence review be commissioned of the benefits of public sector and private sector car pooling arrangements to identify the scale of potential operational and emissions benefits as well as the wider community benefits.

Recommendation 16: We recommend that an ambitious target for public sector car sharing and reductions in grey fleet mileage be set by 2021 and monitored by the Committee on Climate Change.

6.4. Changing incentives and regulations

As the data on vehicle occupancy shows, vehicles have become less shared on average over time. This has happened at a time where the overall cost of motoring, when adjusted for inflation, has fallen by around 8% over the decade to 2017/18.⁶¹ Evidence from previous oil price spikes and the introduction of the London Congestion Charge showed that car occupancy increases slightly, although the longer term trend remains a slow decline.^{10,62} It also appears to be the case that greater peer to peer ride sharing is in operation in places where there are toll lanes such as California or motorway tolls such as France.³⁴

The anticipated shift to lower emission vehicles and electrification of the fleet will, in the absence of any other policy change, make the per mile costs of motoring cheaper. The DfT's 2018 Road Traffic Forecasts suggest that by 2050, the cheaper costs of motoring will increase car traffic by an additional 43.9 billion vehicle miles per year (11%) compared with a reference case where the transition does not go beyond committed policies.⁶ As noted earlier, we see few opportunities for high³⁵ occupancy vehicle or specific tolling infrastructure. Without a shift in how vehicles are charged for moving around the network, there will be a strong headwind against which efforts to encourage greater sharing will be fighting.

The inquiry heard of new proposals for the development of 'mobility credits' for users who give up a vehicle and sign up to a 'Mobility as a Service' type offer.¹⁶ The aims of an initial trial would be to provide the credits instead of cash as part of a vehicle scrappage scheme for older vehicles linked to Low Emission Zones. Mobility credits could also be part of planning conditions placed on new housing developments. It is too early to say what the impacts of such a scheme would be.

^e Personal vehicles used for business mileage and reimbursed through expenses.

However, we note that the success of such schemes will depend on the existence of a high quality mix of public transport, bike and car sharing facilities. This option could be beneficial in providing a new entry point for users, a better experience of multi-modality and some options for experimenting with sharing. However, of itself it will not alter the long-term economics of travel and just relying on incentives will be limited in scope.

The inquiry heard on several occasions that the current model of car clubs is operating either at a loss or more or less break even.^{7,15} The ability to scale up beyond denser urban areas in the absence of greater public sector involvement or public policy intervention is limited. This should come as no surprise, as the economics of public transport provision also see concentration of services on busy corridors and around the working day. Evening and weekend services require subsidy. More taxis operate in central areas than in the periphery. There is currently no simple mechanism for capturing some of the commercial value of operating in denser and more congested markets and recycling that revenue to cover more peripheral areas.

Recommendation 17: We recommend that the Future of Mobility Regulatory Review explores mechanisms which could generate cross-subsidy between more and less profitable areas and which allow for easier models of public-private funding to be used to broaden the areas covered by new mobility services.

A potential regulatory shift raised in our evidence sessions related to the ways in which companies account for their carbon emissions. Currently, the conventions (for Scope 2 emissions) require that companies report on and reduce emissions from their own vehicle fleets. They are not, however, responsible for reducing emissions related to the commute to work which are classified as Scope 3 emissions. Given the progress achieved by many large companies around active travel and lift sharing it appears that much more could be done if companies were required to pay attention to the emission consequences of how their staff access work.¹⁰

Recommendation 18: We recommend that the Committee on Climate Change reviews the evidence on workplace travel schemes and examines the potential for greater behavioural shifts if commute emissions were brought into Scope 2.

6.5. Stimulating innovation

Throughout the inquiry we learnt about a range of different innovations and approaches in different areas. Each deployment has its own lessons. Liftshare, for example, suggested that it had had to focus its strategy on B2B engagement without relying on public sector support as this had proven too difficult and time consuming to secure. Whilst larger urban areas have some people engaged in stimulating innovation, this is not the case everywhere. There has also sometimes been an antithesis towards car-related innovations as they struggle to fit within a "sustainable" versus "non-sustainable" mode-based dichotomy.

However, we also recognise that some innovations do not offer the same levels of assurance on standards of vehicles or operation which can make politicians wary of supporting schemes over which they have little or no influence.

Overall however, our reflections are that a good relationship between the private sector innovators and the public sector will improve the chance of successful deployment.^{60,63} Deployment may require space, regulatory adaptation or stimulation through partnership where, as we identify in Section 6.3, the public sector is a potentially substantial client. This is how the most effective car club deployments have been achieved.

We also heard of the challenges of deploying innovations through trials. Government support for trials in transport is often of a three year duration, with the anticipation that this will then move to more mainstream funding support or a commercial basis at that point. However, for mobility innovations this can be challenging as they need to launch as a sufficiently high quality product to avoid losing users at the early stage and then need to build their user base, particularly in the shared mobility space. We cannot be sure from the evidence received whether the three year cliff edge trial funding is a barrier to growing the mobility service market in the UK but it might be.

Recommendation 19: We recommend that the Connected Places Catapult explore, with both governmental and non-governmental parties, a range of models for transitioning from pilots to full applications.

In order to maximise the potential to share information on fleet resource availability or potential ridesharing needs and options, multiple services might need to be pooled. However, there remain important issues of data protection. For example, if multiple service providers were to be able to offer patient transport services then understanding what information is to be shared and stored and on what basis is a significant issue. Data is also not typically made available to local governments for planning purposes either at all, or in a consistent manner. There are cities and countries which explicitly set out aggregated data sharing protocols as part of licenses to offer services on public roads and this could be adopted within the UK. The inquiry did not have the scope to go into data governance issues. However, we note that they appear particularly important to unlocking some aspects of the shared mobility market.

Recommendation 20: We recommend that the Future of Mobility Regulatory Review pays particular attention to the different aspects of data governance that relate to shared mobility.

7. Concluding reflections

Our overall reflections from the inquiry are that increased shared use of the car, as part of a wider mix of integrated transport options, offers a range of benefits. Of particular importance is the potential to support rapid decarbonisation of transport but there are also significant potential congestion, financial inclusion and social integration benefits from greater sharing.

There is however no coherent national or consistent local policy framework for integrating shared car use within the wider set of mobility options. This runs from taxation, through management of the motorway network to the allocation of parking space. We see potential headwinds of lower motoring costs for many, due to electrification and the real risk that transport will continue to become less shared. If this is the case then it is anticipated that autonomous vehicles will make the situation yet worse. In essence, our creative capacity for transport innovation will support the delivery of a more individualised transport system and miss the opportunities that lower traffic futures could offer. Supporting a more shared mobility future is critical to attaining a more sustainable and inclusive transport future. Because the UK starts from a more fragmented mobility market position than many other European countries, the risks of more individualised outcomes seem higher without clear action to prevent this.

We have set out a range of research needs, policy questions and recommendations that would, we feel, contribute to the creation of an innovation and delivery ecosystem in the UK that put us at the forefront of shared mobility. There is not one solution but many, and they should be tailored to the needs of each area and integrated with existing provision. Solutions could include:

- Integrated offers of ride pooling options by major attractions such as cinemas and theatres as part of the ticket booking process;
- Pick up and drop off-zones to support longer-distance ridesharing along the trunk road network which allow quick connection into city centres, linked to major employers;
- Opening up access to pool vehicles by public sector organisations in rural areas outside of core hours or when under used; and

- Ensuring new housing has fully integrated mobility hubs combined with subsidised access to a MaaS offer.

Whilst we are under no illusion that creating a cultural shift to greater levels of sharing is difficult, it is not impossible. What it really means is looking to find ways to amplify the sharing that already exists across all walks of life. Looked at in this way, the difficulties pale into insignificance with those of delivering automated vehicles which seem firmly accepted in policy. What is required is a commitment and policy follow through to change the game on sharing. Of course, continuing the current weak commitment is an option. However, we would ask "If not sharing then what? Which policies will enable both short-term and long-term carbon pathway compliant transport policy? What makes other policy options more palatable than a major focus on increased sharing?" Doing nothing is no longer an option, we are in a climate emergency.

Final list of recommendations

Recommendation 1: We recommend that shared mobility options are placed within a road user hierarchy which is directly linked to the public policy outcomes they can deliver.

Recommendation 2: We recommend that the Department for Transport and Committee on Climate Change study the potential for saving carbon through greater shared mobility in time for the 2020 Progress Report to Parliament.

Recommendation 3: We recommend that the Department for Transport work with CoMoUK and other relevant bodies to develop a data collection and repository process to ensure it understands the case for and impacts of interventions in this space.

Recommendation 4: We recommend that future research programmes on sharing focus on understanding when and how sharing works and what is required to grow and sustain shared mobility and through this understand how to overcome barriers for different users.

Recommendation 5: Shared AV projects and pilots should be prioritised in all publically funded research and innovation related to the AV agenda.

Recommendation 6: The Department for Transport and HM Treasury need to set out a vision for the transition to a smaller vehicle fleet.

Recommendation 7: We recommend that regional or local transport bodies establish a shared mobility strategy with a goal of reducing individual vehicle ownership and promoting access to a cleaner fleet.

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Recommendation 20: We recommend that the Future of Mobility Regulatory Review pays particular attention to the different aspects of data governance that relate to shared mobility.

About the Commission inquiry

In total 28 organisations and 41 people submitted evidence either in writing, orally or both upon which this report is based:

Attendees

- Professor Greg Marsden, ITS, University of Leeds – Commission Co-Chair
- Professor Jillian Anable, ITS, University of Leeds – Commission Co-Chair
- Jonathan Bray, Urban Transport Group – Commissioner
- Elaine Seagriff, Jacobs – Commissioner
- Dr. Nicola Spurling, Lancaster University – Commissioner
- Eleanor Chappell, Department for Transport
- Jo Bacon, Department for Transport
- Will Walker, Department for Transport
- Juhi Verma, Department for Transport
- Demelza Birch, Department for Transport
- Helen Bullock, Department for Transport
- Mia Drake, Department for Transport
- Tracy Savill, Connecting Places Catapult
- Ewa Kmietowicz, Committee on Climate Change
- Ellie Davies, Committee on Climate Change
- Laurenz Gerger, Association of British Insurers
- Paulius Mackela, London Councils
- Steve Gooding – RAC Foundation
- Ivo Wengraf – RAC Foundation
- James Lancaster, Enterprise Holdings
- Malcolm Wilkinson, Highways England
- Eric Manners, Jacobs
- Richard Dilks, ComoUK
- Antonia Roberts, ComoUK
- Dr David Golightly, Newcastle University (virtual)
- Professor Natasha Merat, ITS Leeds
- Kate Gifford, West Yorkshire Combined Authority
- Christopher Allwinter, Transport for Greater Manchester
- Jay Parmar, BVRLA
- Catherine Bowen, BVRLA
- Beate Kubitz, Independent Consultant
- Antonia Roberts, ComoUK
- Kate Gifford, West Yorkshire Combined Authority
- Helen Davies, Transport for West Midlands
- Bill Freeman, Community Transport Association
- Suzanne Lau, Community Transport Association
- Dr. Kate Pangbourne, ITS, University of Leeds
- Robert Schopen, Co-wheels
- Matthew Clark, Chair, CoMoUK and Steer Davies Gleave
- Spyridoula Vitouladiti, Transport for London
- Ali Clabbourn, CEO Liftshare

Other organisations

- HM Treasury
- Exeter City Council
- Urban Mobility Partnership
- David McKenna, IBI Group

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This report

The Commission on Travel Demand is an expert group established as part of our work to explore how to reduce the energy and carbon emissions associated with transport. This inquiry focuses on shared mobility and the potential to increase the occupancy of vehicles in-use, reduce individual ownership of assets and enhance multi-modal travel.

www.creds.ac.uk/commission-on-travel-demand/

About CREDS

The Centre for Research into Energy Demand Solutions (CREDS) was established as part of the UK Research and Innovation's Energy Programme in April 2018, with funding of £19.5 million over 5 years. Its mission is to make the UK a leader in understanding the changes in energy demand needed for the transition to a secure and affordable, low carbon energy system. CREDS has a team of over 90 people based at 13 UK universities.

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