

Car Clubs

Introduction

This record of evidence forms part of the work undertaken by UKERC's Technology and Policy Assessment team relating to its project on policy strategy for carbon emissions reduction in the passenger transport sector. The material was produced alongside the project's main report and since it supports that report, it was judged appropriate to make this material available to a wider audience. The main report itself '*What Policies are Effective at Reducing Carbon Emissions from Surface Passenger Transport?*', and the supporting evidence can be found at:

<http://www.ukerc.ac.uk/ResearchProgrammes/TechnologyandPolicyAssessment/TPAProjects.aspx>

Explanation of Content

Evidence on this policy measure has been collected by the TPA team on the basis that it has, or may have, the potential to result in carbon dioxide emissions reductions in the passenger transport sector. This evidence document begins with a summarised description of the policy measure. The evidence itself follows the summary and is presented in table form.

Each piece of evidence has been assigned a separate row and tabulated using four columns:

- Year of publication, arranged chronologically, beginning with the most recent year
- Name of author, including where applicable additional cited authors (and year); and a Reference ID number.
- Type of evidence:
 - Evidence containing quantitative information is denoted by the letter 'Q'
 - Qualitative evidence is denoted by the letter 'C' for 'comment'
- The evidence itself

The evidence was originally gathered and assessed using several sub-headings. The purpose of this was primarily internal i.e. to facilitate the handling of evidence and the production of the main report. These sub-headings have been retained here as follows:

- Policy Measures and Carbon Savings
- Other potential CO₂ Impacts i.e. outside of the immediate policy influence
- Other Benefits e.g. air quality improvement or traffic congestion reduction
- Policy Costs and/or Revenues i.e. to local or national government
- Business and Consumer Costs
- Unintended Consequences e.g. rebound effect
- Reasons/Arguments for Carbon Savings Achievement or Failure
- Policy Suitability for the UK

A list of references follows the evidence tables. Note that the Reference ID numbers are allocated by Reference Manager, the referencing software used by the TPA team.

Any charts, figures and tables referenced in the evidence are not reproduced here but can be found in the original publication or evidence material.

Where no relevant evidence was found for a particular sub-heading, this has been noted.

Policy Description

The evidence recorded here covers car clubs - commercial or not-for-profit schemes that are essentially short-term car hire schemes. Car clubs offer mobility options for people who do not want to own a car, but need it from time to time. Members generally pay an annual membership fee which enables them to hire cars for short periods of time, at short notice. Other features may include:

- Distribution of cars around cities
- Online or electronic booking system
- Inclusive pay-as-you go charges (e.g. fuel)
- Access to vehicles using member “smart card”.

Evidence Tables

Carbon Savings and Policy Measures

Year	Author	Type	Evidence
2008	Carplus (ref 11490)	Q	<p>A survey of UK car club members revealed that when people join a club, the changes they make re mileage drive and the number of cars their household own results in a saving of 0.7t CO₂ per year. This is based on sample data that:</p> <ul style="list-style-type: none"> ▪ Members reduce their mileage by 53% from joining ▪ 44.7% of member households get rid of a car of defer purchase ▪ car club cars emit only 63% as much CO₂ as the cars that they replace ▪ Average mileage is 3660m according to the National Travel Survey. ▪ One car club car takes at least 5 -11 private cars off the road. <p>The Carplus survey revealed that members:</p> <ul style="list-style-type: none"> ▪ use cars for a third of the no. of trips of non-members (22.8% journeys vs 65.4%) ▪ walk and cycle almost twice as much as non-members (45.4% journeys vs 25.8%) ▪ use public transport (especially rail) three times more than non-members (31.8% journeys vs 8.7%) ▪ save 0.7 tonnes CO₂ per year due to reduced car usage of more efficient vehicles.
2008	Carplus (ref 11490)	Q	<p>The results from the Carplus survey show that:</p> <ul style="list-style-type: none"> ▪ People who join car clubs already travel 31.6% car miles compared to the national average <i>before joining</i>, i.e. their behaviour is already different ▪ The average car mileage of a car club member, <i>after joining</i>, is 10.5% of that of the average mileage of non-members (or car club members travelled 89% fewer miles in a car than non-members). Compared to the national average of

Year	Author	Type	Evidence
			<p>licence holders, car club members do 19.5% of the average mileage (or 80% fewer).</p> <ul style="list-style-type: none"> Car club members reduce their mileage by 53.6% <i>in response to joining</i> a car club i.e. their overall mileage after joining is 46.4% of that before joining.
2008	Carplus (ref 11490)	Q	Extrapolating the survey data, Tables in Carplus (2008) show the resulting impact last year and the potential for scaling up for car clubs in total each year.
2008	Carplus (ref 11490)	Q	Car club cars tend to be new and well maintained. In comparison, cars disposed of by club members tended to be either around 5 years old or more than 10 years old. The median of disposed car age is just over 6 years. Average CO2/km of cars produced in 2003 was c. 173 g/km. Taking 110g/km as typical of club car emissions, this means CO2 emissions of the club cars are only 63% of the private cars that they replace.
2008	Carplus (ref 11490)	Q	Pricing structures encourage members to 'save up' and join trips together. It takes 2 miles for engines to reach optimum temperature during which emissions are at 20% more per mile. The average journey for a private car trip is 6.8 miles so 10% of the distance is under cold start conditions, whereas club drivers average journeys are 30-50 miles, because members tend to combine many reasons for travel within one trip to make the hire more efficient. So only 2% of distances are under cold start conditions.
2008	Carplus (ref 11490)	Q	The MOSES report 2005 showed car mileage reductions of 28% (Belgium) and 45% (Bremen) after joining car clubs.
2007	Anable and Bristow (ref 12297) citing Haefeli et al, 2006 and Millard et al, 2005	Q	The commercial car club sector in the UK is expanding at a rate of 200%+ per year. Approx. 200,000 members are expected by 2012. Carbon savings per member are significant (citing Haefeli et al, 2006 and Millard et al, 2005).
2007	Anable and Bristow (ref 12297) citing UKERC, 2007	Q	Commercial operators are concentrating resources on mainly city based, middle class UK areas. A recent assessment calculated annual carbon savings of 0.03 MtC p.a. by 2010 from publicly supported wider rolling of car clubs and a high benefit: cost ratio (citing UKERC, 2007).
2007	Shaheen (ref 11192)	Q	A Canadian car club organisation, Communauto, announced a 13,000 ton reduction in CO2 emissions as a result of their 11,000 car club users in Quebec. They calculate that on average each club member reduces car distance travelled by 2,900 kilometers per year. With a potential market of 139,000 households in the province the annual CO2 reductions could be 168,000 tons per year.
2007	Ledbury (ref 11645)	Q	By scaling up car club membership to 118 000 (from the 28 000 members in 2007) and assuming car club

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			members drove the national average before membership and reduced their car use by 50% afterwards, making assumptions about average mileage, a UKERC report estimated that 0.02 MtC (0.07 MtCO ₂) could be saved each year as a result of scaling up car clubs to this level. If car clubs were to reach participation of 15% of the population (9m people), this could produce annual savings of almost 8MtC (29 MtCO ₂) per annum.
2005	Wolfram et al. (ref 11380); and citing Kollamthodi and Watkiss	C	Car club schemes are a policy with potentially high impact argues Wolfram et al (2005). But Wolfram et al (2005) cites Kollamthodi & Watkiss (2005) who suggest that such schemes seem more effective in leading to a less dependent automobile lifestyle than in an effective reduction of emissions.
2005	Wolfram et al. (ref 11380)	C	Wolfram et al (2005) note the following case studies: <ul style="list-style-type: none"> ▪ Italy has its national framework of “Iniziativa CarSharing“ and started Car-Sharing [i.e. car clubs] in Turin and Palermo as part of the MOSES project. ▪ The MOSES project has shown that Car-Club schemes can reduce car use and change mobility patterns towards a larger use of environmentally friendly modes of transport. In Bremen, about 700 private cars have been replaced by the service of Car-Club and the authors see a big potential for European cities, where at least 500,000 private vehicles could be replaced by Car-Club services. ▪ Stockholm focused on the role of municipal fleets and alternatively fuelled vehicles for car clubs. ▪ Bucharest was the first accession country to develop car clubs.
2005	Wolfram et al. (ref 11380) citing Kollamthodi and Watkiss, 2005 citing Cairns et al. 2004	Q	The total reduction in emissions due to an increase in the number of car clubs has been estimated based on the assumption that each person that joins a car club reduces their annual vehicle mileage by 4,500 miles per year, and that an average of 20 people use each car club car (Other studies differ, indicating that one car club vehicle replaces 4-10 private cars e.g. Cairns et al. 2004 34 TOSCA (FP5, IST programme) (Wolfram et al, 2005 citing Kollamthodi and Watkiss, 2005).
2005	Kollamthodi and Watkiss (ref 11467)	Q	Reductions in NO _x , PM ₁₀ , and CO ₂ emissions are due to a reduction in the number of vehicle kilometres travelled each year. Assuming the number of cars used by car club organisations in the UK will rise from 250 in 2004 to 1000 by 2010, estimates show that CO ₂ emissions would be reduced by 115.50 kilotonnes. See Table 3.139 in Kollamthodi and Watkiss (2005).
2005	Ryden & Morin (ref 11611)	Q	The European funded Mobility Services for Urban Sustainability (MOSES) project assessed car clubs in a number of European cities and concluded that Car-Club schemes can reduce car use and change mobility

Year	Author	Type	Evidence
			patterns towards a larger use of environmentally friendly modes of transport. The MOSES report 2005 showed car mileage reductions of 28% (Belgium) and 45% (Bremen) after joining car clubs.
1999	Mulheiuin & Reinhardt (ref 11612)	Q	Research in Switzerland suggested that those who gave up their car as a result of joining a car club reduced their amount of car travel by around 6700km (approximately 72%) a year.
1996	Steininger (ref 75)	Q	In a survey of Austrian car club members, a strong impact on total mileage travelled was observable (see Table 5 in Steininger, 1996). Individuals within household car access group ('car-households') reduced their car mileage by 62%, individuals of 'no-car-households' increased their car mileage by 118%. In absolute per person terms the increase of the latter group is only one sixth of the reduction of the former group. The aggregated net effect depends on the relative group size of the no-car-households - in this experiment it was a reduction of 53%. On the basis of the observed behaviour and the structure of current Austrian-wide CSO membership (of which 52.5% did not own a car prior to membership) a net effect of a reduction of car mileage by at least 46.8% can be derived.
1996	Steininger (ref 75)	Q	Car club vehicle use results in an average of 1.9 passengers per trip, which is 36% above the national average.

Other CO2 Impacts

Year	Author	Type	Evidence
			No specific evidence found

Other Benefits

Year	Author	Type	Evidence
2005	Wolfram et al. (ref 11380)	Q	Assuming the number of cars used by car clubs in the UK will rise from 250 in 2004 to 1000 by 2010, estimates show this would have a only a marginal impact on NOx and PM10 emissions from total road transport – a below 0.01% reduction from 2005 to 2010. CO2 emissions would be reduced by 115.50 kilotonnes.
2002	Shaheen (ref 11413)	C	Car clubs appear to provide large social benefits. Car travel and ownership diminish greatly - far more than with virtually any other demand management strategy known. Particularly appealing is that car clubs represent an enhancement in mobility and accessibility for many people, especially those less affluent.
2002	Shaheen (ref 11413)	C	Car club companies may be the prototype of an entirely new business activity: innovative mobility service. As car ownership proliferates and cars become more modular and specialized, entrepreneurial companies

Year	Author	Type	Evidence
			may see an opportunity to assume the full care and servicing of a household's or an individual's mobility needs. These companies might handle insurance, registration, and maintenance, and parking management and could substitute vehicles as a household's situation changes.

Policy Costs and/or Revenues

Year	Author	Type	Evidence
			No specific evidence found.

Business and Consumer Costs

Year	Author	Type	Evidence
2005	Kollamthodi and Watkiss (ref 11467)	Q	<p>The average value of a car club car is £15,000 assumes Kollamthodi and Watkiss (2005); purchase costs have been annualised over a life time of twelve years. The unit and annualised costs of car purchase and security costs are presented in Table 3.133. The NPV of capital costs between 2005 and 2010 associated with increasing the number of car club cars to 1000 is presented in Table 3.134.</p> <p>Operating costs include costs of insuring and taxing vehicles, along with the costs of staff to run the clubs. It has been assumed that one full time member of staff is required for every ten car club cars, and that the staff and overhead costs associated with administering and maintaining ten cars comes to £60,000 per year, or £6,000 per car per year. Other costs include the cost of insurance and Vehicle Excise Duty. Details of the estimated unit operating costs per additional car club car are given below in Table 3.135. The net present value of additional operating costs between 2005 and 2010 for all of the additional car club cars is presented in Table 3.136.</p>
1996	Steininger (ref 75)	C	The motivation for the development of organizations that grant their members access to cars upon telephone booking and charge them on a time and kilometer basis of actual use has been two-fold. First, individuals driving low yearly mileages can reduce their fixed costs by sharing them with other users. Second, individuals are served incentives which better reflect the external costs of the choice of their modal split.

Unintended Consequences

Year	Author	Type	Evidence
			No specific evidence found.

Reasons/Arguments for Carbon Saving Achievement or Failure

Year	Author	Type	Evidence
			<i>The 2007 Carplus survey</i>
2008	Carplus (ref 11490)	Q	<p>It is usually assumed that the difference between the travel choices of club members and non-members is due to the club facilitating a voluntary change in travel behaviour. But it could be that the people that join clubs are the types that already have non-standard travel behaviours. This leads to the question of whether the club has played a part in promoting a shift in travel behaviour, or whether it simply allows users to continue with their pre-existing suite of travel choices, modified by inclusion of a club.</p> <p>The survey data suggests that the reduction in overall car use happens as a response to joining the club (rather than their behaviour being like this anyway); and that members walk and cycle more after joining the car club.</p> <p>The public transport results are less consistent but although there is a short term decrease in public transport use from non-car owners, in the long term access to the car club may have averted a dependency upon a private car.</p> <p>In summary, a small sub-sample of car club joiners suggest that:</p> <ul style="list-style-type: none"> ▪ Number of trips by car reduced as a result of joining the club is between 3.1% -15.8% ▪ People make 13.2% - 15.2% more journeys by walking and cycling after joining ▪ Change in public transport use is ambiguous as it isn't possible to separate out previous car owners from non-car owners.
2008	Carplus (ref 11490)	Q	Figure 1 in Carplus (2008) shows the modal split between car club members and National Travel Survey (NTS) non-members.
2007	Synovate (ref 11613)	Q	Transport for London commissioned research on car clubs found, on average, car club members reported that they had reduced the number of days per year that they drove a car from 64 to 41, implying a potential reduction in car use in the order of 36%. Before joining, 55% of the sample owned or had access to a car in their household, compared with 26% afterwards, and the average number of cars per car club member fell from 0.77 to 0.35. 19% of the sample explicitly reported selling a car as a result of joining the club, with longer-term members more likely to have done so.
2002	Bonsall (ref 11608)	C	Bonsall (2002), cited by (Cairns et al 2004), reviewed the literature for the Department of Transport, Local Government and the Regions, and the Motorists Forum and concluded at the time that there was relatively little that was useful. Nevertheless, the review's overall

Year	Author	Type	Evidence
			conclusion was that car sharing could make a useful contribution towards reduction in traffic levels and that the potential existed for an increase in the number of car sharing schemes.
2002	Shaheen (ref 11413)	C	<p>In the late-1980s and early-1990s, many cars club efforts were initiated in Europe and initially supported by government grants. Most found it difficult to make the transition from grassroots, neighborhood-based programs into viable business ventures. They miscalculated the number of vehicles needed, placed too great an emphasis on advanced technology, or were ineffective in their marketing. Many failed organizations merged or were acquired by larger organizations. Those that thrived were more professional and integrated advanced electronic and wireless technologies. But even today, clubs account for only a tiny amount of travel in all but a handful of locations.</p> <p>The largest organization, Mobility CarSharing, has 2,000 cars and 50,000 customers in 900 locations throughout Switzerland. In Germany, about 75 organizations serve approximately 40,000 customers with about 1,500 vehicles. Car club activity continues to increase. Italy's Ministry of the Environment recently invested five million dollars (U.S.) for a national program. Operations were planned in four cities for 2001, leading to a total of 15 deployments. In June 2001, Germany's railway announced that they would launch "dbRent" - a car club and bike service throughout the nation. In Europe, there are over 200 CSOs operating nearly 4,000 vehicles.</p>
2002	Shaheen (ref 11413)	C	<p>Car club programs are more likely to succeed when they provide a dense network and variety of vehicles, serve a diverse mix of users, create joint-marketing partnerships, design a flexible yet simple rate system, and provide for easy emergency access to taxis and long-term car rentals. They are more likely to thrive when environmental consciousness is high; driving disincentives such as high parking costs and traffic congestion are pervasive; car ownership costs are high; and alternative modes of transportation are easily accessible.</p> <p>An important lesson is the need for partnerships and mobility providers to offer enhanced products and services.</p>
1996	Steininger (ref 75)	C	The mileage effects in Steininger (1996)'s experiment are not due to changed frequency of use, but arise out of distance effects. In 'car-households', the share of trips done by car for trips of more than 20 kilometers declined significantly as distance increased. Cost transparency reveals the advantage of public transport (where overall transport use shifted) for longer distance

Year	Author	Type	Evidence
			trips.

Policy suitability for UK

Year	Author	Type	Evidence
			No specific evidence found.

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