

InclusivEV: Social & Environmental Benefits

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1 Introduction

This document aims to provide information on the range of potential social and environmental benefits that can result from the implementation of a car share scheme in a low-income neighbourhood.

In addition, the potential factors that can adversely affect the impact of such benefits have been outlined to ensure that the lessons learnt through the InclusivEV project can be taken forward by other interested parties.

2 Social Benefits

Car sharing can provide a wide range of social benefits to members by offering improved mobility at affordable rates. These benefits range from the ability to access additional services and amenities through to greater social cohesion, health benefits and financial savings.

2.1 Improved Access to Services

Many residents in low-income neighbourhoods cannot afford their own car; in the selected project research locations the use of public transport, walking or cycling were not always attractive to residents either because of poor service provision, high prices or high journey times. Therefore, on many occasions, the only option available was to drive or get a taxi.

In neighbourhoods where residents cannot afford to own a car or use a taxi, they may be unable to easily access key services such as healthcare, education and leisure facilities.

In addition, these residents may be excluded from attending job interviews or training opportunities due to a lack of mobility. This can trap them into a cycle of poverty from which they and their families are unable to escape. Car share schemes can tackle such marginalisation from employment and subsequent income by providing access to a vehicle without the expense of full ownership.

Studies have found that car share vehicles are used for a range of purposes, particularly journeys that are made less frequently. Research in the USA has found that car share schemes in low-income neighbourhoods are most likely to be used to access healthcare and childcare, and for buying groceries^[1]. In Scotland, personal business, shopping, leisure, and visiting friends and family have been found to be the most popular purposes for journeys using car share schemes^[2].

Such schemes can also make it easier for parents to access childcare. This helps to improve equality for families by making it possible and affordable for parents without cars to attend training and job interviews.

In areas where public transport is limited, these services tend to concentrate on enabling residents to commute to the city centre during the rush hour. In the context of the InclusivEV project, car sharing can play a valuable role in enabling people to access less central services (e.g. out-of-town retail parks). In addition, the flexibility to travel at other times of the day is key for people to be able to attend medical appointments and social gatherings.

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2.2 Stronger Social Networks

Car sharing encourages higher levels of walking, cycling and public transport use, as well as achieving higher levels of car occupancy. Studies have shown that these activities are more sociable than driving alone in private cars, and can therefore lead to greater social cohesion.

In addition, the use of public transport, walking and cycling all increases the presence of residents on local streets, thus making neighbourhoods both more sociable and safer.

The greater mobility offered by car share vehicles makes it easier for people to visit their friends and family and attend social gatherings, thus strengthening social networks. This is of particular importance where parents have split up, to enable both to get regular access to their children.

2.3 Health Benefits

One of the main uses of car share vehicles in low-income areas is to access healthcare. In addition to this, car share membership is also shown to increase healthy and active travel such as walking and cycling.

In Scotland, an extra 5% of members started walking at least once a week after joining a car share scheme, with 2% starting to cycle at least weekly^[2]. This shift could offer disproportionately high levels of health benefits as low-income areas suffer from health deprivation more than wealthier neighbourhoods^[3].

2.4 Financial Savings

Car sharing can be an effective way of addressing transport poverty where a lack of local public transport at evenings and weekends compels residents to operate a car even though they may be on a low income. Unlike fuel poverty, there is no definition of transport poverty but for many families one of the largest household expenses can be the cost of owning and operating a car^[4].

Explaining the benefits of car sharing to potential users is important and requires skill in engagement and marketing; people generally do not consider the full cost of car use. Per-journey car share costs can appear to be high compared to the apparent cost of private car use for the same journey.

The greatest financial savings result when car share scheme membership enables people to sell their car, or offer them for private car sharing or rental. However, residents who do not own a car can also save money. The Buffalo CarShare scheme in the USA is based in a low-income neighbourhood where only 10% of the households own more than one car. Their car share members reported being able to replace \$30/hr taxi rides with \$8/hr car share journeys. On average, the scheme estimates that it has saved its 504 members over \$377,000 on transport costs as of 2013, after four years of operation^[5].

However, it is important to consider all the possible implications of transferring public transport journeys to car share schemes. For example, in Castlemilk, near Glasgow in Scotland, some residents do their weekly shop by taxi. Using a car share scheme would be cheaper than getting the bus to the supermarket and the taxi back. However, the business that this could take away from the bus service has the potential to lead to a reduction in such services, further isolating those residents who cannot drive.^[6]

2.5 Integration with Public Transport

Car share scheme members are more likely to consider every journey individually and are therefore more likely to use public transport, walk and cycle. Whilst car sharing schemes traditionally operate in areas with good public transport, it is nonetheless possible for them to increase the use of public transport in areas that are poorly served.

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For example, local residents working 9am-5pm in the city centre could commute to work by public transport and use the car share vehicles for non-work related activities such as shopping or visiting friends. This combination could make it possible for them to dispose of their car, if they owned one. However, this impact is likely to be less in low-income areas where a higher proportion of residents work antisocial hours^[7].

Similarly, while residents may be able to commute to and from their work locations using public transport, they find that this is not convenient if they need to undertake work journeys during the day. Therefore, they may resort to driving to work in order to have access to their car for business journeys. The availability of car shares vehicles, by their employer, for work use could enable them to commute by public transport.

This could also help to lock in the benefits of other schemes, such as subsidised bus routes and company public transport season tickets, by removing the need for employees to drive to work.

3 Environmental Benefits

Car sharing schemes using electric vehicles have the potential to bring about significant environmental benefits, primarily through carbon reduction and improvements in local air quality.

3.1 Carbon Savings

Road transport is responsible for about 25% of the EU's carbon emissions^[8]. Electric car share schemes can help to reduce emissions from car journeys through:

- Lower emissions from vehicles.
- User travel behaviour change resulting in:
 - Higher vehicle occupancy (in car share vehicles compared to private ones).
 - Reduced car mileage.
 - Increased use of public transport, walking & cycling.

Electric vehicles have zero tailpipe emissions. Where renewable energy is used to charge the vehicles, their journeys will be classed as zero total emissions, i.e. on a well-to-wheel basis. This represents a significant carbon saving when compared to the tailpipe emissions from the average UK car, of 157g CO₂/km.^[2] It is estimated that the use of electric car share vehicles could result in a reduction of greenhouse gas emissions by at least 35% compared to private car transport.^a

The carbon savings at socially deprived locations are likely to be greater than this, as residents are unlikely to be able to afford a new, more efficient, car but are more likely to own an older, more polluting vehicle.

It is unlikely that local taxis will be electric, so using car sharing instead of taxis will also result in significant carbon savings.

^a Cenex real world duty cycle analysis (Nissan Leaf Acenta as opposed to new Ford Focus 1.6 TDCi 95PS diesel) 35% well to wheel carbon savings based on 2013 UK carbon intensity of the electricity used.

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3.2 Air Quality

In addition to carbon savings, the reduction in travel made by existing petrol and diesel vehicles will also result in a reduction in nitrogen oxides and particulate matter emissions, both of which are key concerns in relation to air quality and public health. Improvements in air quality can help to reduce the incidence of respiratory illnesses such as asthma.

Even where renewable energy is not used to charge the vehicles, the emissions from the energy generation will be produced in less populated areas than where the vehicles are likely to be used - therefore the emissions will have less of an impact on human health.

3.3 Higher Vehicle Occupancy

Research has found that car share vehicles tend to have a higher occupancy than private vehicles.

In Scotland, the average trip in a car share car in 2014/15 included 2.2 people, compared to 1.5 people for the average car journey in Scotland.^[2]

3.4 Behaviour Change

Feedback from existing car share scheme members suggests that they are more aware of the cost of private car use and are therefore more likely to consider all travel options for completing a journey.^[9] Car share members are more likely to walk, cycle and use public transport where these options are appropriate, and resort to car sharing for journeys that can only reasonably be made by car.

Therefore, car sharing can result in a reduction in private car miles driven. This pattern of travel activity reduces traffic volumes, associated congestion and travel times. This results in an increased demand for and viability of alternative transport networks – to the benefit of all transport users.

3.5 Lower Car Ownership

Joining a car share scheme often offers members the flexibility to dispose of their own car. Those journeys that can only be made by car can still be made, whilst other journeys can be undertaken using other modes of transport, such as walking, cycling or public transport. In Scotland, 26% of car share members have disposed of their car since joining a car sharing scheme.^[2]

Research in the UK and overseas has found significant changes in travel behaviour once the link between car use and car ownership is broken. This further locks people into an increasingly sustainable and integrated transport system, which lends itself to the continued adoption of progressive low-emission technologies.

4 Site-Specific Factors

The on-site research undertaken through the InclusivEV project, using on-site surveys, has identified a number of site-specific factors that have the potential to impact of the social and environmental benefits of car share schemes.

4.1 Wroclaw, Poland

4.1.1 Social Factors

There are a significant number of amenities and services located within walking distance of the selected neighbourhood. In addition, some key facilities located further away (e.g. secondary school, university, municipal offices) are likely to be places that are commuted to, and therefore would not be suitable to be reached using car share vehicles.

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However, the introduction of car share scheme could increase residents' ability to visit friends and family and attend job interviews. Such car share vehicles could also be used to help residents access a wider variety of facilities not available locally, and in cases of emergency.

4.1.2 Environmental Factors

It is likely that the majority of car share journeys from this site would replace taxi use. This would lead to carbon and air pollution emission reductions through the use of electric vehicles.

Further benefits could be gained if car share vehicles were used to replace the use of private cars – particularly if this enabled residents to dispose of their cars. However, further information on current levels of car ownership and travel patterns is needed to fully determine the potential for this.

Seventy-two of those surveyed said that they considered the air in their area to be polluted by transport emissions; 4% said that they had considered changing their travel behaviour to help address this. This shows a significant level of concern about local air quality; using electric vehicles would help to address this issue. These responses indicate that promoting the air quality benefits of an electric car share scheme could be an effective way to attract members.

However, a high proportion of those interested in using an electric car share vehicle would want to travel over 100km, thus requiring the vehicle to be charged during the journey. This may make using electric vehicles potentially less attractive to scheme members.

4.2 Modena, Italy

4.2.1 Social Factors

The selected neighbourhood appears to be well-served by public transport. Therefore the social benefits of a car share scheme are likely to be limited, as residents already have good access to local facilities. However, a car share scheme could help residents access the more distant hospitals.

Twenty-one per cent of those surveyed who have driving licences do not have cars. A car share scheme could enable them to access services and amenities that are not otherwise accessible.

The university is too far to walk to, although it is within easy cycling distance. It is unlikely that trips to the university would be made using a car share vehicle. Car share journeys are only cost-effective for short-duration trips and it is assumed that students would spend at least two hours per trip at the university.

4.2.2 Environmental Factors

The current levels of car ownership suggest that local residents drive to get around, with most of those driving daily. However, frequent public transport services and considerable amenities and facilities within walking distance suggests that people do not necessarily need to drive very often.

This suggests that there is the potential to reduce the levels of car ownership through a car share scheme. This could reduce the number of car journeys by breaking the link between car use and car ownership. For this to happen residents would need to be willing to commute by other modes, thus encouraging a reduction in car ownership beyond that which has already occurred.

However, the high levels of dissatisfaction with public transport shown by residents suggests that they might replace public transport journeys with trips using car share vehicles. From a social and environmental perspective, setting aside the emission reduction from using electric vehicles, this would

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not be a desirable outcome, as it could lead to a reduction in the public transport services provided. It is recognised that travel by bus leads to a lower environmental footprint than that of private car use.

However, for local journeys this is unlikely to happen on any significant scale given the cost difference between using public transport and car share journeys.

Seventy-three per cent of those residents surveyed said that they considered the air in their area to be polluted by transport emissions; 39% said that they had considered changing their travel behaviour to help address this. This shows significant levels of concern about air quality and using electric vehicles would help to address this issue. These responses indicate that promoting the air quality benefits of an electric car share scheme could be an effective way to attract members.

4.3 La Coma, Spain

4.3.1 Social Factors

With taxis widely used to access healthcare, one of the main benefits of a car sharing scheme in this neighbourhood would be to enable residents to attend medical appointments more affordably. However, with the survey results indicating that 24% of residents need to transport children using car seats and 20% of residents have special transport needs, with an overlap between these residents and those needing frequent access to healthcare, it would be important to assess what these needs are and the impact this could have on any car share scheme. For example, can these residents drive themselves, or would they have to be driven? Is it feasible for the car share scheme to provide wheelchair-accessible vehicles? The answers to these questions could affect whether or not these residents would be able to make use of the car share vehicles. It is therefore possible that community/ volunteer drivers would be needed to drive these residents in order for them to use the car share scheme.

Public transport to the neighbourhood is limited in the evenings and at weekends in particular; in addition residents consider the use of public transport to be expensive. Residents who are unable to afford public transport or access a car or taxi are therefore restricted at these times.

Access to car share vehicles could enable them to attend social gatherings and visit friends and family more easily, thereby strengthening their social network. In addition, car share vehicles could enable residents to travel to places that are only accessible by car, which they cannot currently afford to access by taxi. However, residents who cannot afford to use public transport will not be able to afford to use a car share scheme.

Car sharing could also help provide access to education, job interviews and training. With high levels of unemployment in the area, this could help to get people back into work.

However, the extent of these benefits could be restricted by the relatively low levels of residents with driving licences. The mobility of such residents would only be improved if they were able to get a lift.

4.3.2 Environmental Factors

The average age of a privately owned car in La Coma is 15 years. As older cars are more polluting, replacing journeys made by these cars with electric car share journeys will help to improve local air quality and reduce greenhouse gas emissions. However, this will only happen if the presence of a car share scheme enables residents to sell their cars. Therefore, the scale of the environmental benefits will depend on the number of vehicles sold and the number not bought in the first place because of the existence of a car share scheme.

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The survey results showed a lack of consensus on whether there were air quality issues in this neighbourhood, with the responses showing a 50:50 split. An electric car share scheme could help to address any possible air quality issues, as there would be zero tailpipe emissions.

4.4 Redditch, UK

4.4.1 Social Factors

In this location, a car share scheme could offer a number of social benefits. With poor public transport and a limited range of local amenities, residents who do not own cars are likely to find their access to facilities is restricted by the extent to which they can afford taxis.

A car share scheme could offer residents greater mobility, thereby increasing their ability to: visit friends and family; go shopping; access healthcare; and attend job interviews and training. With high levels of unemployment in the area, this could help to get people back into work.

Cost savings resulting from using a car share rather than taxis could also help to free up money for other purposes (or reduce debt), thereby further improving the quality of life of local residents.

4.4.2 Environmental Factors

Given the high cost of owning and running a new car and the relatively low income of residents, it is likely that the cars owned at this site are older, more polluting vehicles. The greatest environmental benefit would come from enabling residents to sell their cars. However, given the high level of car dependence in the area, this would be very difficult to achieve.

If residents can only commute by car, using a car share scheme would not be cost effective. However, if the reason that residents are heavily reliant on cars is through choice rather than necessity, a car share scheme could help some of them to sell their cars.

The potential to reduce emissions by encouraging residents to reduce their car reliance could be significant, but this would be very difficult to achieve, especially in the short term.

Sixty per cent of those residents surveyed said that they considered the air in their area to be polluted by transport emissions; electric vehicles would help to address this issue. However, only 24% of survey respondents said that they had considered changing their travel behaviour to help address this, indicating either an unwillingness or an inability to change their travel behaviour away from private car usage.

5 Factors Affecting Social & Environmental Benefits

The long term social and environmental benefits of car share schemes within lower-income neighbourhoods depend upon a number of factors:

Car ownership levels.

While this may be necessary in more car-dependent communities, greater social benefits will be achieved where residents either do not have access to a private car or are served by infrequent or unreliable local transport services.

Given the high cost of owning and running a new car and the relatively low income of residents, it is likely that the cars owned at such sites are older, more polluting vehicles. The greatest environmental benefit would come from enabling these residents to sell their cars. However, the scale of the benefit will depend on the number of vehicles sold and the number not bought in the first place because of the existence of a car share scheme.

Membership structure.

Subsidised priority access for low-income residents will enable such individuals to access medical appointments or job interviews. The cost savings of such a membership structure could also help to free up residents' money for other purposes, thereby further improving the quality of life of local residents.

The availability and viability of walking, cycling and public transport for local journeys.

While car ownership may be necessary in some communities where fewer journeys can be made by other modes of transport due to unreliable services, the introduction of car sharing can result in a reduction in private car miles driven. This change in mode choice has the potential to reduce traffic volumes and increase the demand for, and thus viability of, alternative transport networks. This not only benefits the local environment, through reduced pollution, but also benefits all local transport users through increased demand for services.

However, it is important to consider all the possible implications of transferring public transport journeys to car share schemes. If for example using a car share scheme was cheaper than getting the bus to the supermarket and the taxi back this could lead to a reduction in taxi and bus services, further isolating those residents who cannot drive.

6 References

- [1] Connecting Low-Income People to Opportunity with Shared Mobility https://www.itdp.org/wp-content/uploads/2014/10/Shared-Mobility_Full-Report.pdf
- [2] The Carplus Annual Survey of Car Clubs 2014/15 (Scotland) http://www.carplus.org.uk/wp-content/uploads/2015/03/Carplus-Annual-Survey-of-Car-Clubs-2014-Scotland_Final1.pdf
- [3] Health Inequalities and the Social Determinants of Health, Royal College of Nursing, Policy Briefing #01/12 January 2012:
http://www.rcn.org.uk/__data/assets/pdf_file/0007/438838/01.12_Health_inequalities_and_the_social_determinants_of_health.pdf
- [4] Learn How Car Clubs Can Improve Your Organisational Efficiency, Energy Saving Trust, November 2012: <http://www.carplus.org.uk/wp-content/uploads/2013/06/EST-Car-Club-Guide-2013-Printer-friendly.pdf>
- [5] Case Studies: Connecting Low-Income People to Opportunity with Shared Mobility <https://www.livingcities.org/resources/285-case-studies-can-shared-mobility-help-low-income-people-access-opportunity>
- [6] Castlemilk Car Club Feasibility Study, Steer Davis Gleave, 2016
- [7] (King, 2014), as referenced in Connecting Low-Income People to Opportunity with Shared Mobility https://www.itdp.org/wp-content/uploads/2014/10/Shared-Mobility_Full-Report.pdf
- [8] European Commission, http://ec.europa.eu/clima/policies/transport/index_en.htm
- [9] DCCS Programme Review 2010-12 http://www.carplus.org.uk/wp-content/uploads/2015/03/Carplus-Annual-Survey-of-Car-Clubs-2014-Scotland_Final1.pdf

Climate-KIC European Headquarters
21 Great Winchester Street
London
EC2N 2JA
United Kingdom