

Potential for carfree development in the UK

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Carfree residential areas have been developed in a number of cities in Europe, with clear social and environmental benefits, but the concept has not been widely adopted in the UK. This paper aims to assess the potential consumer demand for housing in carfree developments in the UK and the circumstances under which it might be feasible. Two surveys of possible target groups were conducted: an online national survey aimed at members of environmental and cycling groups and a postal survey in Camden, London, followed by qualitative telephone interviews with a subset from both surveys. The findings revealed that potential demand for carfree housing is concentrated among 'carfree choosers' – people who currently live without cars by choice. These are mainly found in the inner areas of larger cities, where the greatest potential for carfree development exists. A substantial minority of carfree choosers would like to move to less urban locations; in these circumstances proximity to good rail services is a key requirement.

1. Introduction

Global concerns about climate change combined with policy and user pressures to create better urban environments for pedestrians and for children have led to a small but growing number of carfree developments in several European countries. These generally aim to provide urban housing free from traffic for people who wish to live without owning a car. Several studies have demonstrated the benefits of such developments including: considerably lower traffic generation (Scheurer, 2001), lower carbon dioxide emissions per resident and greater social interaction between residents (Ornetzeder *et al.*, 2008) and greater independence for young children (Nützel, 1993).

All of the European developments described as carfree have been built in existing cities, each involving some degree of compromise with vehicular access and ownership. Based on examples from around Western Europe (see Melia *et al.*, 2010) carfree development can be defined as residential or mixed-use developments which:

- provide a traffic-free or nearly traffic-free immediate environment
- are designed to facilitate movement by non-car means
- offer no parking for residents or limited parking separated from the dwellings.

National planning policy in the UK has been more favourable than in countries such as Germany where derogations are needed from minimum parking standards. PPG13 (DETR, 2001) states: 'new residential areas ... may be car free, where there is sufficient access by non car modes', although the term 'carfree' is generally used in the UK to denote any housing with no allocated parking. (Although the spelling of the terms is often inconsistent, UK documents tend to separate (car free) or hyphenate (car-free) the adjective. The spelling 'carfree' is used in this paper to differentiate the European style of development.) Despite these relatively favourable national policies, the concept has not been implemented on any significant scale in the UK. The planning policies of several local authorities, particularly in London (e.g. Camden, 2000),

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have promoted 'car free housing' in this limited sense in the inner areas of some existing cities. There have been some small developments with both limited parking and a traffic free environment, usually in city centres, which would satisfy the above definition. But the only British carfree development analysed in the literature is Slateford Green a 120-dwelling social housing development in Edinburgh (Eastwood, 2008).

This study set out to consider the potential for carfree development in the UK, focussing in particular on potential demand among home buyers and tenants. It did not attempt to look at the supply-side issues: scepticism among developers about potential demand was identified from interviews with some developers and policymakers as a barrier to potential supply. The study explored the demand question through two questionnaire surveys and qualitative interviews, informed by study visits to six continental European carfree developments. The next section briefly reviews the literature on European carfree developments and observations from the visits (described more fully in Melia, 2010). Section 3 reviews the literature on people who currently live without cars in the UK. The following three sections consider the question of potential demand, and describe and discuss the findings from the surveys. The final section suggests some conclusions of the study for planning and transport policy.

2. Carfree developments in Europe

There are three main types of carfree development found around Europe:

- (a) limited access model
- (b) Vauban (*stellplatzfrei*) model
- (c) pedestrianised centres with significant residential populations

The limited access model exists in a growing number of cities. Vehicles are physically excluded from the core of the residential area, which provides a child-friendly semi-private environment. In some cases, vehicle access is only possible to the edge of the development, while in others movable barriers or bollards allow vehicle access under exceptional circumstances, such as removals.

Vauban, is the largest recently built carfree development, with over 5000 residents. Although sometimes described as carfree (*autofrei*) many Vauban residents resist the term: Freiburg City Council describes most of the district as *stellplatzfrei* literally 'free from parking spaces'. A 30 km/h access road allows vehicles to enter the district (Figure 1). Vehicles are allowed down the *stellplatzfrei* side streets at walking pace to pick up and deliver but not to park. Residents must sign an annual declaration of car ownership with car owners obliged to purchase a space in peripheral multi-storey car parks.



Figure 1. Vaubanallee, the main access road in Vauban, Freiburg

Pedestrianised city, town and neighbourhood centres are widespread across most of Europe. These are mainly commercial in nature; the definition above refers to the increasing number which contain significant residential populations.

The broadest study of European carfree developments was conducted by Scheurer (2001) who surveyed five in Freiburg, Hamburg, Vienna, Amsterdam and Edinburgh (all begun in the 1990s – the last three were complete at the time of his survey) and also discussed ongoing projects in Hamburg and Cologne. Apart from Slateford Green in Edinburgh, all allowed some peripheral parking, which enabled between 8% and 54% of the households to continue owning cars. Car use was lower, varying between 5% and 16% of trips (excluding one very small development with higher use). The residents were generally characterised by high levels of environmental awareness, high numbers of children and service sector professional employment. Five of the developments surveyed by Scheurer were visited during the course of this study, including Vauban.

The planned parking capacity was 0.5 per dwelling. Scheurer (2001) and Nobis (2003) found just over half of households owned a car, but today, many of the parking spaces are unused. Nobis (2003), found that 57% of the households without cars had given them up on moving there, although she did not explore the reasons for this. The cost of the parking spaces (€17 500 in 2006, plus a monthly fee) provides one explanation, but some residents retain ownership of spaces for visitors or re-sale reasons, although they do not own a car themselves. Like most of the larger carfree developments, parking spaces are provided for car club vehicles.

The other recent developments described as carfree elsewhere in Europe are smaller. Four others visited in: Hamburg, Cologne

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and Amsterdam varied from 64 to 600 dwellings. All were built at relatively high densities: all flats in Amsterdam and Hamburg, mainly flats with some terraced houses in Cologne. They all have less peripheral parking than Vauban – ratios varying from 0.15 to 0.23 – and varying arrangements to physically control the access of motor vehicles to the residential areas. In some of the smaller developments, (such as Kornweg, Figure 2), delivery vehicles are able to park close to the building entrances. In some of the others, such as Stellwerk 60 in Cologne, managing organisations control exceptional access to the site. This may be termed the ‘limited access’ model of carfree development.

All of the above analysis refers to new developments. A literature search failed to produce any examples of the removal of cars and vehicular access to a comparable extent from existing residential areas. The pedestrianised city centre with the largest residential population identified in the literature was Groningen in the Netherlands (Ligtermoet, 2006; Tsubohara, 2007) with 16551 residents (Gemeente Groningen, 2008), which was also visited. In 1977 the city centre (Figure 3) was closed to through traffic and the process has been progressively extended since then: roughly half the centre is entirely pedestrianised today. These streets are mainly commercial but do have some residents. In some streets, cars are allowed at limited times: bicycles form most of the traffic. Car ownership in the centre is 28.7 per 100 residents (Gemeente Groningen, 2008). There are just 2560 parking spaces for the residents.

There is some evidence from the few studies of European carfree developments of the benefits and problems they bring (discussed more fully in Melia *et al.*, 2010). All of the studies found low levels of car ownership and use and several found evidence that this represented a change for these households. Scheurer found proportions varying from 10% to 62% of



Figure 2. Kornweg, Hamburg



Figure 3. Groningen city centre

households had reduced their car ownership since moving to the carfree developments. Ornetzeder *et al.* (2008) found 50% of male and 30% of female residents – now non-car-owners – had previously owned a car, in Vienna’s Florisdorf development, where no parking is provided. They also found residents of the carfree project had more friends and acquaintances within the settlement than those of a reference settlement nearby. Nützel (1993) found that children were allowed to play out on the carfree streets of Nuremberg-Langwasser at a younger age than on conventional streets nearby.

The main problems of carfree developments identified by several of the studies, and interviews with stakeholders during this research related to parking and the control of vehicular access: control of parking in surrounding areas was generally found to be necessary, to avoid problems of overspill parking.

3. Carfree living in the UK

Although there is little evidence relating to carfree development in the UK, there is a significant body of evidence on carfree living. Car ownership remains strongly correlated with income, despite recent rises among lower income groups (from DfT, 2007). Single people, pensioners, tenants, students and lone parents are all disproportionately represented among households without cars. Car ownership is strongly associated with life stages, typically increasing with children and reducing after retirement (Chatterjee *et al.*, 2001). It tends to be lower in inner urban areas, particularly in London, where public transport is better and parking more difficult.

In a study of attitudes towards driving in Scotland, Dudleston *et al.* (2005) segmented car drivers into four, and non-drivers into three clusters. ‘Car sceptics’ (10% of the sample) are positive non-drivers who cycle more, but interestingly use buses less, than average. They tend to be younger, with high environmental

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awareness and their income levels were higher than the ‘reluctant riders’ (7%) who are carfree for reasons not of their own choosing. ‘Aspiring environmentalists’ (16%) are drivers who tend to find driving stressful and are most open to modal shift, cycling and using buses more than the average. They tend to be from higher social classes, younger than the average, with more women.

From Reutter (1996) it seems the profile of non-car owners in Germany is similar to the UK, with high proportions of older people, single people and households without children, particularly in the inner areas of larger cities. The residents of the European carfree areas are clearly very different. They appear to share some characteristics with Dudleston’s ‘car sceptics’ and ‘aspiring environmentalists’: younger with high environmental awareness, cycling and walking frequently but making surprisingly little use of public transport.

This analysis suggested three factors relevant to the discussion below about potential demand for carfree housing in the UK: environmental attitudes, inner city locations and the relationship between income and car ownership.

Could the concept of carfree development be expanded in the UK? This study focused on one aspect of this question, potential demand: who are the people who might be attracted to live in carfree developments and under what circumstances?

4. Methodology

A defining feature of carfree developments is that a substantial majority of residents do not – and would be unable to – own cars. Most of the residents have consciously chosen to move to a development regarded as a departure from normal practice: some of them have given up car ownership to do so. Although none of the European studies posed this question directly, the profile of the residents suggests that most lived without a car by choice rather than necessity. This suggests two principal groups among whom potential demand may be found: carfree choosers and carfree possibles, as defined in Table 1. In seeking to distinguish these groups from the rest of the population, three

characteristics are relevant: car ownership, attitudes towards it and (for the car owners) ability to give up car ownership. From these three characteristics, four possible groups, encompassing the entire adult population, may be defined.

The definition of the ‘carfree possibles’ raised a question about seriousness of intent, particularly where this might involve overcoming constraints. This was addressed by the addition of a further criterion: that the individuals had already given up car ownership in the past and subsequently reacquired a car.

Following the European evidence it was decided to test the hypothesis that carfree choosers and carfree possibles would be more likely than the others to choose living in a carfree development. To address the challenges associated with hypothetical questions, the questionnaires were structured to enable cross-referencing of questions concerning actual behaviour and future intentions – both hypothetical and more concrete. The questionnaires asked about socio-demographic characteristics, housing, vehicle ownership, modal choice and attitudes towards ‘European style’ carfree developments. They were followed by semi-structured qualitative telephone interviews of a sub-sample from each of the surveys, aiming to explore the respondents’ interpretations of the questions and to probe the hypothetical responses. The responses were analysed thematically using qualitative data analysis software.

Resource constraints precluded a representative national survey, so it was decided to focus on populations expected to contain high concentrations of the target groups. The following surveys were conducted during 2007:

- (a) an online national survey of members of environmental and utility cycling organisations
- (b) a random postal survey of Bloomsbury and Kings Cross wards in Camden, London

Following the analysis above about environmental attitudes, and the importance of cycling in the European carfree areas, high

Possible groups	Car owner	Desire and ability to change
Carfree choosers*	No	Do not own a car by choice
Carfree possibles*	Yes	Would like to give up car ownership under foreseeable and feasible circumstances
Other non-owners	No	Are temporarily or permanently unable to own a car
Other owners	Yes	Have no desire, or are unable, to give up car ownership

*Target groups

Table 1. Possible groups related to car ownership, desire and ability to change

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proportions of the target groups were expected among members of the above organisations in the UK. To reflect the influences of location on car ownership, it was decided to supplement this with a geographically defined sample. Bloomsbury and Kings Cross wards were chosen as they have some of the lowest car ownership in the country (32% and 34% of adults – 2001 census) coupled with median household incomes above the national average and high proportions of home owners without cars (56% and 52%). It was expected therefore, that these areas would contain high proportions of the Carfree Choosers in particular. Most of the Camden questions were identical to those of the online survey; a few were amended to reflect the context of inner London. Melia (2010) contains a more detailed discussion of the methodology, including copies of the questionnaires.

5. Survey findings

A total of 932 people responded to the online survey. Two thirds of these came from cycling organisations, particularly the CTC (the UK cycle touring organisation), producing a sample weighted towards males (67%) and the 40–59 age group (52%). Median household income was above average: nearly £40 000 – from banded responses – compared with a national median of £27 000 (DMAG, 2006). Some 78% were home owners – slightly above the national proportion. Three quarters lived in towns or cities. Single person households (16%) were under-represented. Car ownership was slightly lower than the national level (79% of respondents had a car in the household): the proportion with more than one car (32%) was significantly lower.

Although the categories relating to travel behaviour were not directly comparable with national statistics, the respondents clearly drove less than average (only 25% drove most days) and cycled considerably more (56% on most days) – this was true of the ‘environmentalists’ as well as the cycling members.

Of the 2200 Camden questionnaires 199 (9%) were returned – a low return rate typical of postal surveys in Inner London. Single person households, social tenants and the under 29s were all somewhat under-represented. In terms of gender, income (median around £30,000) and car ownership (67% without) the sample was close to the census and Greater London Authority (DMAG, 2006) figures for the two wards. The pattern of low car use (6% drove most days) and high

public transport use (34% used buses most days) was as expected for Inner London.

Non-car-owners who ticked ‘I live without a car by choice’ in the surveys were classified as carfree choosers. Drivers who ticked ‘I would live without a car if circumstances changed’ and who had also lived without a car in the past, were classified as carfree possibles. This classification does not necessarily imply that these individuals would give up their cars in practice – these issues were probed later, through the telephone interviews. The proportions of the different groups are detailed in Table 2.

In Camden, car ownership was low, public transport and accessibility were relatively good, so the small proportion of carfree possibles was expected. Comparing the two target groups with the rest of the sample was most illuminating within the online survey, where the large sample revealed more statistically significant associations (differences referred to here are significant at the 95% level unless stated otherwise). To some extent they reflected more general differences between car owners and non-car owners, although this was not always the case, particularly when considering preferences.

A total of 20 of the online respondents and nine of the Camden respondents, including 18 carfree choosers and nine carfree possibles, were selected for follow-up telephone interviews.

5.1 Carfree choosers

Compared with the rest of the online sample, the carfree choosers were younger (51% under 40) with a higher proportion living in single person households (27%). Their self-reported incomes were slightly lower than the rest of the sample, but significantly higher than the other non-owners and (although comparisons of this nature are problematic) seemed similar to the general population. Fewer had children (20%); more of them were renting (38%) although most (56%) were home owners.

There were fewer statistically significant associations in the Camden survey owing to its smaller sample size and greater homogeneity. Some associations (age, income, household structure) exhibited the same signs but the magnitudes were smaller and the differences were not statistically significant.

	Online survey		Camden survey	
Carfree choosers	221	(25%)	104	(52%)
Carfree possibles	212	(24%)	10	(5%)

Table 2. Proportions of target groups in the two surveys

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Some 61% of the carfree choosers cited environmental factors as a principal reason for not owning a car. When asked about this in interview, some explained how these reasons had evolved over time. Their accounts appear consistent with Jain's (1998) hypothesis that 'going carfree' may contribute to environmental awareness.

The carfree choosers from the online survey rarely drove (76% never), travelled less as car passengers (72% occasionally), cycled more (64% most days) and used all forms of public transport more than the rest of the sample (see Figure 4). Both trains and buses appeared important for the carfree choosers, in different ways. From the online survey, whereas more used buses (39%) than trains (35%) regularly (most weeks or most days) the proportion who never used a bus (7%) was higher than the proportion who never used a train (3%). Compared to the other non-owners, they cycled more and used buses less, suggesting a degree of substitution between these two.

A total of 11 of the 19 carfree choosers interviewed mentioned proximity to a station as a factor in choosing where to live. Proximity to bus services was mentioned by several respondents but there was only one suggestion that this might have been a factor in deciding where to live. As most of the carfree choosers lived in larger urban areas, proximity to regular bus services may have been regarded as a 'given'. Travel behaviour, with high levels of public transport use, was generally more homogenous in the Camden sample, so many of the differences were not statistically significant.

Of the online carfree choosers, 91% lived in towns or cities. Their attitudes to their existing neighbourhoods and towards

future house moves both reflected urban preferences. They preferred to live in areas well served by public transport (60%), close to shops and services (44%) and town or city centres (36%). They were also more likely to favour living in flats or terraced houses: 95% would prefer or consider one or both. Several of those interviewed expressed broader lifestyle preferences for urban living.

One of the issues probed in the interviews was the extent to which transport factors influenced or constrained location and employment choices. Unlike the other groups, the carfree choosers were more likely to choose their location based on transport factors. Some of those interviewed, not wishing to move, deliberately sought employment opportunities constrained by the ability to get to work by non-car means. For others, the potential conflict between work and residential location was not one they considered likely to arise as long as they continued living in their current location in a large city. This suggested some less conscious constraints on job searching – where the individual would feel no need to look for opportunities elsewhere.

Some 40% of the carfree choosers stated that they would like to live 'near the countryside'. When followed up in the interviews, a move to a smaller town was suggested by several as one way of achieving this. Several of the carfree choosers recognised a conflict between this preference and the proximity and transport connections which were important to them. Some believed that they might be obliged to acquire a car later in life, for example: '...if I decided to get married and have kids and move out to the suburbs – then you need a car to ferry them around...'

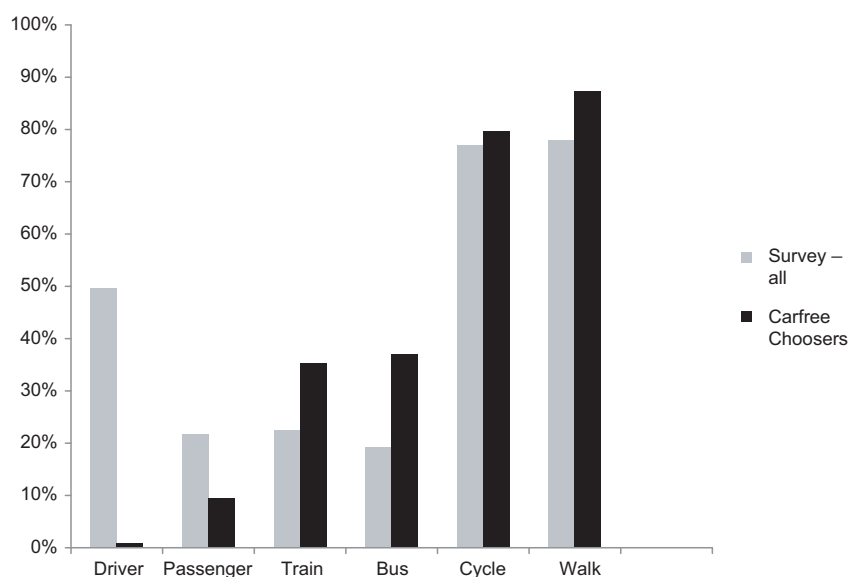


Figure 4. Regular (most weeks) travel by mode – carfree choosers (online survey)

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Closer questioning around the transport constraints of the carfree choosers suggested that in many cases the expressed desire to move to more rural locations without acquiring a car might not be feasible in practice.

5.2 Carfree possibles

Compared to the carfree choosers, the online carfree possibles were: older (66% over 40), had higher incomes (66% over £30 000), were more likely to be living in a family (52%), with children (42%) and working full-time (67%). Some 23% of them lived in rural areas in detached (26%) or semi-detached (35%) houses, mainly (84%) as home owners.

They drove more (57% most weeks) than the carfree choosers but less than the other owners (and less than the general population).

They cycled more than the other owners and almost as much as the carfree choosers (62% on most days, 85% most weeks (see Figure 5)). They used trains more (24% on most weeks) than the others but less than the carfree choosers. Their attitudes towards public transport were not as positive as the carfree choosers. Infrequent, unreliable and uncoordinated bus services, indirect routes requiring changing, and living some distance from the nearest railway station were all mentioned as reasons for continuing to own a car.

The questionnaires asked the carfree possibles: 'what changes would be necessary for you to live without a car'. The top reasons identified in the online survey were: improved public transport

where I live (47%), changing circumstances of my family or spouse/partner (37%) or moving to a different place (25%). The interview explanations were generally consistent with their questionnaire responses, but none of the carfree possibles gave the impression that those circumstances were likely to change in the foreseeable future. Long periods of car ownership would seem to make such a decision more difficult or less attractive.

5.3 Attitudes to carfree neighbourhoods

The questionnaires asked about future moving intentions. Those who indicated that they might move in the future were asked whether they would consider moving to a 'European style' carfree neighbourhood, if one were built in this country. The responses are outlined in Table 3.

In the online survey, the attitudes of both the carfree choosers and carfree possibles were, as expected, more positive than the other groups. None of the differences were statistically significant in the Camden survey.

The interviews probed the reliability of the responses to these questions. Some of the interviewees had experience of carfree areas from overseas; some had read magazine articles about them but in most cases the concept needed to be explained.

When pressed, most of the 'keen' group revealed factors particularly related to work or family which would constrain their ability to move to other places. Travel concerns did not appear likely to prompt a move. After describing the specific constraints, the following response was typical:

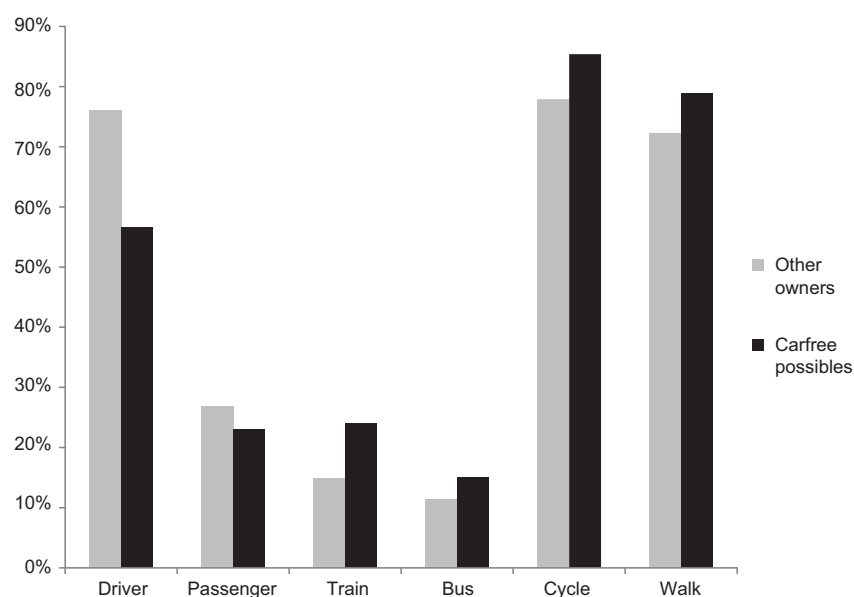


Figure 5. Regular (most weeks) travel by mode – car owners (online survey)

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Survey – groups	Keen – would even move some distance	Would consider if convenient
Online – carfree choosers	24%	65%
Online – carfree possibles	14%	70%
Online – others	5%	54%
Camden – carfree choosers/possibles	6%	48%
Camden – others	2%	39%

Table 3. Target group attitudes to carfree neighbourhoods

‘there are so many different, other factors that come into it...if I were going for a job in a particular area of the country and there was a carfree place that was close to it, that would be a first choice to look at...it would be in that order...’

The people who had ticked ‘consider moving there if it were somewhere convenient’ displayed a similar range of attitudes towards carfree neighbourhoods. Some were enthused by the idea. Further questioning revealed constraints mainly related to work, family and public transport connections, and a range of preferences concerning locations.

Access to rail was mentioned by several interviewees, either in terms of proximity to a station or a convenient rail link to their places of work. For the Camden respondents this typically meant good rail links into central London.

Among the attractions of carfree areas, phrases such as ‘cleaner and greener’ were used several times. Some mentioned a better environment for children to play in. Another theme related to a sense of community, sometimes related to ‘like-minded people’, who were expected to move to such places.

Several of the interviewees said that a carfree area within an existing city – usually the one in which they were living – would be of more interest than a smaller settlement, or a new development of any kind. The strength of these preferences varied, however. Architecture and design, as well as public transport connections, were mentioned as factors which would influence decisions on whether to move to a newly built area.

The carfree choosers who expressed an interest in moving to a carfree development were particularly concentrated in larger settlements. Among the 128 who gave their addresses, 96% lived in cities and towns of the sizes shown in Figure 6.

6. Discussion

The surveys demonstrate that the greatest potential demand for housing in carfree areas, at least in the short-term, is found among carfree choosers living in, and preferring to remain living in, larger urban areas. The reasons for this are mainly practical. Although carfree choosers walk and cycle more frequently, access to public transport is clearly a key locational requirement for them. Their needs are varied and multiple: locations in which they live tend to permit travel in different directions with rail generally available for longer journeys. The absence of one or more of these factors was often cited by the

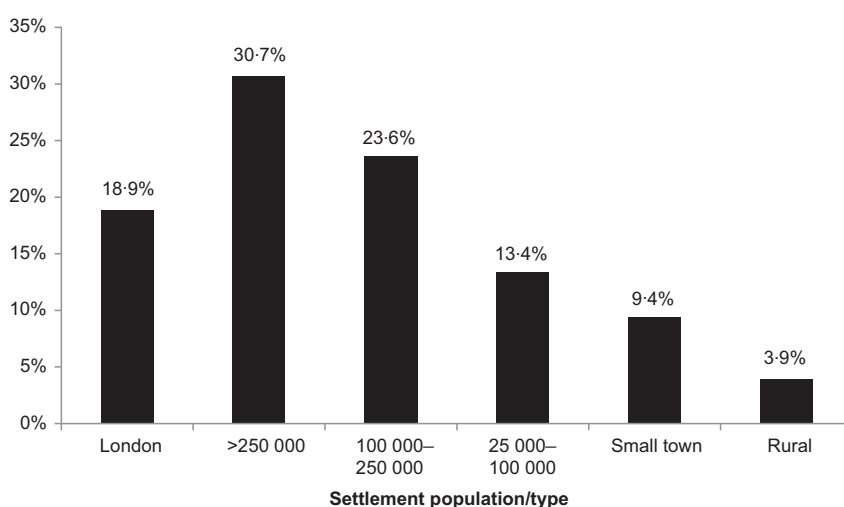


Figure 6. Home locations of carfree choosers interested in carfree neighbourhoods (online survey)

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carfree possibilities as a reason for acquiring or continuing to own a car. The linear pattern of public transport networks in British cities means that their central and inner districts of cities tend to benefit from both more frequent and multi-directional services.

The interviews cast doubt on the survey responses of some of the carfree possibilities. Although several of them were positive about the prospect of living in a carfree development none of them appeared likely to give up their car ownership in the foreseeable future. Whether the carfree possibilities are likely to provide a substantial proportion of the demand would depend therefore on the availability of some peripheral parking. The European evidence suggests that if car owners are able to move to a carfree development many will choose to give up their car ownership later. The cost of parking spaces, and the ability to re-sell them provides an ongoing incentive for this in some of the examples.

It should also be noted that the target groups are not static. At different points in the lives of most of the interviewees decisions were made to acquire or give up a car. Nearly half of the carfree choosers had owned a car at some point in their lives, and subsequently decided to give them up. At these points, car owners might become more receptive to the prospect of living in a carfree development. This implies that potential demand for carfree development may be larger in the longer term.

This analysis also implies, paradoxically, that carfree developments which provide some limited peripheral parking (for residents' as well as car club vehicles) with charges as a disincentive may have a greater potential to change behaviour, and reduce overall car use, than developments where no parking is possible, which may only attract the most committed carfree choosers.

The importance of proximity to services for the carfree choosers would imply that successful carfree developments would need to be built at relatively high densities, as were all the European developments visited. This would be consistent with the housing and location preferences of most of the carfree choosers.

The local services required by carfree choosers may be provided in smaller settlements and suburban centres. Some other needs, particularly employment, would create a greater challenge. Some interviewees mentioned that future moves for employment reasons, or starting a family, might necessitate the purchase of a car. Some of the carfree possibilities had reacquired a car for these reasons. The ability of carfree choosers to remain carfree would depend therefore on the range of needs accessible within the immediate area and their ability to satisfy

other, potentially changing, needs elsewhere by public transport. The prevalence of carfree families with young children in European carfree developments suggests their design and location has helped these families to avoid the usual pressures to acquire a car at that stage in their lives.

7. Conclusions

This study began with an aim to explore the potential for 'European style' carfree development in the UK, focussing mainly on the question of potential demand among home buyers and tenants. The findings are outlined below.

- (a) Potential demand does exist, concentrated mainly in the inner areas of larger cities.
- (b) There were no other reasons why the different types of carfree development found across Europe could not be implemented in the UK, although further research would be needed to establish other aspects of feasibility, such as effects on property prices and more specific locational opportunities and constraints.
- (c) The availability of sites large enough to provide a traffic-free environment would be a constraint within the inner cities. Elsewhere, accessibility to services and public transport serving a sufficient diversity of needs would be key criteria.
- (d) Where feasible, carfree developments can reduce traffic generation and the concentration of traffic in dense urban areas. They promote modal shift, active travel and greater independence among children.
- (e) The European examples all involved the public sector – particularly local authorities – in the initial development of an unfamiliar concept to private developers; but unlike most other sustainable transport interventions it requires no more public funding than a 'business as usual' scenario.

In a context where pressure for housing growth is coupled with constraints on public expenditure, carfree development is a concept which merits greater attention from planners, transport planners and policymakers. More research into the supply-side issues could help to address the apparent reluctance of the house building industry to satisfy this niche market.

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