

CARFREE AND LOW CAR DEVELOPMENT

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Introduction

The terms 'carfree' or 'car-free'¹ have been used in several different ways to describe quite different forms of housing or new developments. In UK planning policies (e.g. DETR, 2001) and discourse the term 'car-free housing' usually refers solely to the absence of parking, whereas several carfree developments in continental Europe were conceived with a range of broader aims. Nearly all of them involve some degree of compromise with vehicular access and storage, including some limited peripheral parking, so the term 'carfree' is something of a misnomer. 'Traffic free' might be a more accurate term, but as these initiatives spawned an international carfree movement, the term has been widely used in the literature.

Based on examples from around Western Europe Melia, Parkhurst and Barton (2010) define carfree development 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, and:
- Offer no parking for residents or limited parking separated from the dwellings.

The second point also typically encompasses provision of car club vehicles for occasional needs.

The sole defining criterion for the UK car-free housing developments is that they offer no parking for residents. They may be designed to facilitate movement by non-car means or may simply be located in places which are already reasonably adapted to living without car. A third category, 'low car development' may be defined as residential or mixed use developments which offer limited parking and are designed to reduce car use by residents. Thus it can be seen that all three categories have implications for parking policy and rely on different forms of parking management.

There are several reasons why carfree developments were proposed in different European countries. In some cases, the proposals were initiated by local authorities seeking to redevelop in areas where road capacity was limited. In other cases, the impetus came from groups of citizens. A carfree movement began in the 1990s in Germany and Austria, led by people with idealistic aims, seeking a better urban environment for people willing to make a positive decision to live without owning a vehicle. Apart from the environmental problems caused by motor traffic, two key claims made by proponents of carfree development relate to social equity and freedom of choice (see for example: Crawford, 2000). People without cars, who typically include poorer people and residents of dense inner urban areas suffer some of the worst consequences of pollution and severance caused by others driving through their areas. The progress made in several European countries encouraged the more disparate World Carfree Network to adopt the spread of carfree development as one of its aims. This network did not achieve the impact it had hoped for and by the second decade of this century, it had become dormant (World Carfree Network, 2013). Some of the carfree developments described below have been internationally influential, however, and as this chapter argues, the concept remains relevant as a means of addressing a range of urban planning and transport problems, including some related to parking.

In some of the cases described below, there was evidence of tension between the different actors over the purpose and objectives of European carfree developments. For the UK, car-free and low-car housing, the purposes have been generally clearer. They have been initiated by local authorities with the aim of reducing traffic generation and/or addressing parking problems in urban areas where these are perceived to be problems.

As there is no agreed set of objectives against which to assess the benefits of carfree developments, the analysis in this chapter will start from their observable characteristics. Underlying the various definitions of carfree development and car-free housing are the two principles of the exclusion of traffic and the non-ownership of vehicles

¹ Although the spelling of the terms is often inconsistent, UK documents tend to separate (car free) or hyphenate (car-free) the adjective. The word carfree is more frequently used to describe the broader concept promoted by the international carfree movement, and the developments described as *autofrei* in German speaking countries. This convention is used in this chapter.

The British concept of car-free housing follows only the second of those principles; European carfree development follows both, though a small minority of residents may still own cars. Low-car development also follows the second principle and may or may not follow the first. It may be considered self-evident that a policy which reduces car ownership and use would help to alleviate the problems caused by car use in urban areas. The relationship is far from direct, however, as illustrated in Figure 1.

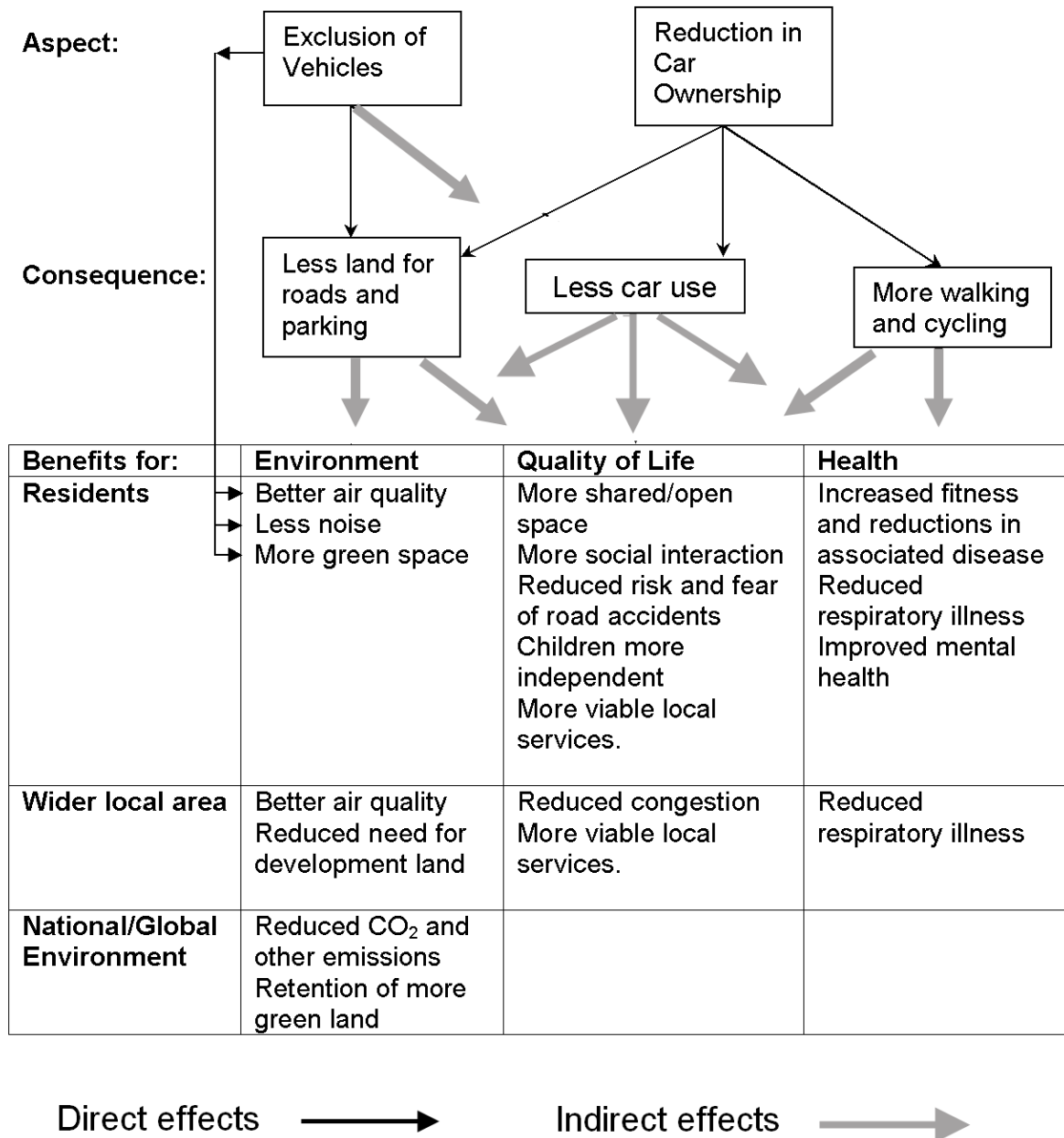


Figure 1 Benefits of Carfree Development

The indirect relationship shown between Exclusion of Vehicles and Less Car Use illustrates the effects of making parking less convenient and increasing the advantages of walking for short distances. Indirect effects on health may be imputed, though they have never been measured directly.

The next section will examine the European experience of carfree development and the UK experience of car-free housing and low-car development. Section 3 will examine the benefits and problems of each. The final section will draw conclusions for transport, planning and parking policy.

Carfree Development in Europe and the UK

There are many areas of the world where people have always lived without cars because no road access is possible, or none has been provided. In developed countries these include islands and some historic neighbourhoods or settlements, the largest example being Venice with a population of around 70,000. The term carfree development implies a physical change, however, either new building or changes to an existing built area. The literature on carfree development refers almost exclusively to European examples, even in articles written in the context of developing countries (e.g. Wright, 2005). There is as yet no comprehensive list of carfree developments worldwide. An online list was begun a few years ago by Joel Crawford, author of *Carfree Cities* (Crawford, 2000). This list was subsequently transferred to Wikipedia, where it has grown with few verifiable sources.

Within Germany and Austria a number of groups started more or less spontaneously in different cities during the 1990s. Representatives of these groups were interviewed during study visits made by the author to several European carfree developments during 2006 and 2008 reported in Melia (2009). *Autofreies Wohnen* in Hamburg was one of the first of these groups, started in the early 1990s by activists who described their aim as 'purist': seeking to provide a carfree living environment for people who choose not to own a car. Their campaign eventually persuaded the municipality to provide land for two of the carfree developments described below.

Scheurer (2001) provides the broadest study of European carfree developments and refers to seven carfree developments (as well as some others which would not be considered carfree, as defined here) of which the first five were sufficiently advanced to survey. Some of these developments were studied more recently by Nobis (2003), Bouvier (2005) and Ornetzeder, Hertwich, Hubacek, Korytarova and Haas (2008). This section draws on those studies and observational visits made by the author between 2006 and 2008 as reported in Melia (2009). Based on these observations, Melia et al. (2010) classified carfree developments found around Europe into three categories: the Vauban (*stellplatzfrei*) model, the 'Limited Access' model and pedestrianised centres with significant residential populations

The Vauban Model

Vauban, in Freiburg, Germany has a population of just over 5,000. Unlike the other examples discussed here, it has no physical barriers to the penetration of motor vehicles into the residential areas. The catalyst for its creation was the acquisition of a former military base by the municipality and the formation of Forum Vauban by a group of local activists. The Forum persuaded the municipality to create a neighbourhood for non-car owners, with opportunities for groups of individuals (*Baugruppen*) to collectively build their own homes. Car owners would not be excluded but parking and traffic would be separated from the residential area.

Although the term *autofrei* (carfree) is sometimes used in connection with Vauban, this is not how most residents would describe it. The City Council prefers the term *stellplatzfrei* – literally 'free from parking spaces' – to describe the majority of streets where this rule applies. Vehicles are allowed down these streets at walking pace to pick up and deliver but not to park, although there are frequent infringements. Residents of the *stellplatzfrei* areas must sign an annual declaration stating whether they own a car or not. Car owners must purchase a place in one of the multi-storey car parks on the periphery, run by a council-owned company. The cost of these spaces – € 17,500 in 2006, plus a monthly fee – acts as a disincentive to car ownership.

The planned parking capacity – 0.5 per dwelling – was higher than other examples described below. At early stages of its construction, Scheurer (2001) and Nobis (2003) found just over half of households owned a car, but many of the parking spaces were unused. There have been no more recent surveys but parking levels suggest a substantial majority of households do not own cars there.

Some metered parking is available on the main Vaubanallee access road. Like most of the larger carfree developments, some parking spaces are allocated for car club vehicles, which provide an important service for occasional use, although their contribution to overall modal share is relatively

small. Nobis (2003) found 39% of households surveyed in Vauban belonged to Freiburg's car club. Ten vehicles were stationed there in 2006, the largest concentration of car club vehicles in the city.

Although vehicles are physically able to drive down the residential streets, and the no-parking rules are not effectively enforced, in practice, vehicles are rarely seen moving on the *stellplatzfrei* streets. Signs emphasise that children are allowed to play everywhere, and in the absence of moving traffic, children are more evident (Figure 2) than in the more conventional home zones and traffic-calmed streets common elsewhere in Freiburg.



Figure 2 *Stellplatzfrei* street, Vauban, Freiburg, Germany

Limited access model

Unlike Vauban, most of the other carfree developments described in the literature physically restrict the access of motor vehicles to the residential areas in different ways. These arrangements have been described as the Limited Access Model (Melia et al., 2010).

Saarlandstrasse and Kornweg in Hamburg are relatively small, with 111 and 64 dwellings respectively. In these cases, a few parking spaces (ratios 0.15 and 0.2) intended for visitors and deliveries are close to the housing, surrounded by semi-private space where vehicles cannot penetrate. These small developments are able to provide a traffic-free environment because of their particular situations – the Saarlandstrasse site is partly surrounded by water and Kornweg is effectively a traffic-free cul-de-sac.

GWL Terrein in Amsterdam and Stellwerk 60 in Cologne are both larger: around 600 and 400 dwellings respectively. Stellwerk 60 includes some houses as well as apartment blocks, with pedestrianised streets between them. Removable bollards restrict access to the core of the site. A residents' organisation controls these bollards which are removed for a limited range of vehicles such

as removal vans and emergency vehicles, but not for general deliveries which are done by hand, sometimes using trolleys or cycle trailers (Figure 3).



Figure 3 Access to Stellwerk 60, Cologne

In GWL Terrain, blocks of up to 8 storeys high have been built around semi-private space where vehicles cannot penetrate (Figure 4). Entrances to the blocks are all fairly close to the perimeter, where some time-limited parking is available. Peripheral parking, mainly in multi-storey blocks is provided at a ratio of around 0.2 on both sites, allocated by ballot in GWL Terrain, and separately sold in Stellwerk 60.



Figure 4 GWL Terrein, Amsterdam

Pedestrianised centres with significant residential populations

Pedestrianised city, town and neighbourhood centres are widespread across most of Europe, most of which are mainly commercial in nature although some also include residential accommodation. There is long-standing evidence on the traffic impacts of pedestrianisation (e.g. Hass-Klau, 1993; Parkhurst, 2003) although relatively few studies have been published in recent years. Whereas the carfree developments in the previous section were newly-built, most pedestrianised city, town and district centres have been retro-fitted. Pedestrianised centres may be considered carfree developments where they include a significant number of car-free residents, due to new residential development within the centres or because these centres already included dwellings when they were pedestrianised.

Groningen, a city in the North of the Netherlands is an example of a city with an unusually large residential population within a mainly traffic-free centre (16,551: Gemeente Groningen, 2008). The total population of the city is 181,000, including about 46,000 students (City of Groningen 2007, cited in: Pucher & Buelher, 2007). The original decision to restrict through traffic was implemented in 1977 (Tsubohara, 2007). Since then, the process has continued incrementally, with its city centre, an area of roughly a square kilometre having nearly half of its streets now pedestrianised and entirely closed to through traffic (although some of them allowing bicycles) with several car parks accessible on an 'in and out' basis.

Parking for non-residents has been progressively restricted to car parks towards the edge of the centre. In 2008 a total of 2,340 parking spaces (900 on-road) are reserved for the residents, amongst whom car ownership (28.7 per 100 households) was roughly half the city average and a third of the national average (Gemeente Groningen, 2008). The strategy of road closures and pedestrianisation contributed to a progressive fall in motor traffic within the city. The modal share for the car was just 33% of trips by city residents in 2003 (Gemeente Groningen, 2008).

Car-free housing

Some London boroughs with extensive Controlled Parking Zones, define car-free housing by a planning condition precluding occupants from applying for a residents' parking permit. Unlike European carfree developments, the main aim of these boroughs relates to area-wide traffic restraint through lower car ownership rather than quality of life for the residents of the car-free housing, who gain no direct benefit. The London Borough of Camden, which pioneered the approach, granted "car-free or car capped" planning permissions covering 2,416 dwellings between 2000/1 and 2010/11 (Camden LB, 2012 p.62). Nearly all the Borough is covered by a Controlled Parking Zone and, as the cost of metered or off-street parking in Central London is prohibitively expensive, this planning condition effectively prevents most affected residents from owning a vehicle.

This planning strategy appears to have contributed to the achievement of its goal to restrain traffic through lower car ownership. Between the 2001 and 2011 Censuses, the population of Camden grew substantially but the number of households owning cars fell in absolute and relative terms. Commuting by car, already very low, fell further over the decade. Several other policies, including the introduction of the Congestion Charge in London in 2003 would also have influenced these trends.

	2001	2011	Change
Population	220,338	198,022	11.3%
Households	97,534	91,603	6.5%
Households with a car	40,657	37,939	-6.7%
Households with a car (%)	44.4%	38.9%	-12.4%
Driving to work as usual mode	14.9%	10.0%	-32.9%

Table 1 London Borough of Camden: Trends in Car Ownership and Commuting (ONS, 2013)

Melia Barton and Parkhurst (2013) surveyed residents in two wards within Camden with particularly low car ownership. When asked why they did not own a car, cost was not the main reason: most respondents could have afforded a car if necessary. The most common reason, cited by just under half, was 'I have no need for a car'. Lack of parking was rarely the main reason but a secondary reason for just over a third of respondents.

Some other British Cities such as Brighton and Glasgow have planning policies which specifically allow for car-free housing (Brighton & Hove CC, 2005; Glasgow City Council, 2009). In other cities, including Bristol and Exeter, car-free housing has been built without specific policy support in pedestrianised locations which do not allow direct vehicular access. Princesshay in Exeter was built as an extension and redevelopment of the pedestrianised shopping area and was completed in 2007. 122 flats were included in the redevelopment for which a total of 23 car parking spaces were provided. The absence of parking did not appear to hinder the sale of flats in what was considered a desirable city centre location. Buyers queued in the street overnight before the release of the first phase of the development which had no allocated parking (BBC News Online, 2007).

Low car developments

As with carfree development there is no agreed definition of low car developments. Melia et al. (2010) define them as residential or mixed use developments which offer limited parking, and are designed to reduce car use by residents. The term 'limited' requires a judgement which varies according to context. The principle is that parking and controls and limited provision constrain the level of car ownership: if more parking were available, higher levels of car ownership, more typical of the surrounding area would result.

Six developments which may be considered 'low car' were reviewed in a study for the UK's Department for Transport (DfT, 2005). The parking ratios were considerably higher than the carfree developments described above – varying from 0.7 to 1.5 spaces per dwelling. 1.5 was the national maximum parking standard in the UK at that time (DETR, 2000), although the national standards were

not uniformly applied and were subsequently abandoned (CLG, 2006). The developments in the DfT study combined these parking standards with residential travel plans, designed to encourage modal shift amongst the residents. Most of the case studies had yet to begin construction at that time. Melia (2009) surveyed one of these – Poole Quarter in Dorset, England – during 2007. The findings support the view that low car developments that were well sited in respect to public transport and local services can reduce car use and increase active travel compared to conventional developments. However, there was little evidence of the beneficial changes to the local environment observed in the European carfree developments.

Poole Quarter was a new development of low-rise flats and town houses near the centre of a town with a population of 139,000. The dwellings completed at the time of the survey each had one parking space. The travel plan aimed to promote sustainable movement through information and incentives such as discounts on public transport. 81% of surveyed residents had a car in their household but only 15% had more than one car which was considerably lower car ownership rates than the surrounding area. Just over a quarter of residents had reduced their car ownership on moving there, mainly from two cars to one, and a third of residents reported lower car use. These changes were partly explained by proximity to the town centre, bus and rail stations but the parking limitations also contributed. The site had been developed at higher than usual densities for that area (108 dwellings/hectare) which meant that, even with the lower than usual parking ratios, the area between the housing was largely filled with parked cars. An area designated as a home zone (Figure 5) was rarely used, as intended, for children's play. The most frequently cited problem, by over half of the respondents, was lack of parking and conflict between neighbours over limited parking spaces was mentioned by several interviewees. When residents were asked why they moved to Poole Quarter, most mentioned the accessibility of the site but none mentioned anything relating to the low car concept or the travel plan – this was a notable difference from the European carfree developments.



Figure 5 Poole Quarter

Melia et al. (2013) researched the potential UK demand for housing in European-style carfree developments. They found the strongest demand amongst 'carfree choosers' or people who live without cars by choice. 91% of these people were already living in urban areas, particularly in larger cities. They differ from the low-income groups who are constrained to live without a car and tend to cycle and using rail more, but using buses less. Most of the 'carfree choosers' displayed pro-urban attitudes, favouring higher density living in flats and terraced houses. Their views on access to public transport and services suggest the potential demand for carfree living can be most easily satisfied in the inner areas of larger cities.

Benefits and Problems of Carfree Development

Although the literature on European carfree developments is limited, there is evidence that these developments reduce car use and increase walking and cycling. The literature also suggests some other potential benefits, which this section reviews.

Scheurer's (2001) surveys found levels of car ownership varying between 8% of households in Vienna Florisdorf to 54% of households in Vauban, which was then at an early stage in its development. Scheurer's method of measuring modal share was rather unusual, asking respondents to fill in the frequency of trips per month under seven specific categories with no 'other' category, so comparisons with all-purpose modal share statistics may not be precise. Nevertheless, a clear pattern of very low car use (5% - 16% of journeys) and high levels of walking and cycling (38% - 73%) emerges from these surveys.

Nobis (2003), surveying Vauban two years later, found a similar proportion of carfree households ("over 40 %") and using different questions from Scheurer confirmed the low level of car use: cycling was the most frequent mode for commuting, shopping and leisure. Both of these studies were conducted before the extension of the tram system to Vauban in 2006, which may have further influenced both car ownership levels and travel patterns.

The studies of European carfree development have mainly concentrated on mobility aspects although containing some evidence of other benefits. Ornetzeder et al. (2008) explored questions of social cohesion and social contacts in Vienna's Florisdorf carfree development. 85% - 87% of respondents agreed that there were "good neighbourly relationships", "solidarity within the settlement" and that people helped each other. They found that residents of the carfree project had more friends within the settlement than those of the slightly larger reference settlement. They also knew more people by sight. The authors ascribe these differences to the carfree nature of Florisdorf, although there were also differences in the extent of resident involvement in the planning of the two developments which could explain differences.

Scheurer also comments on the favourable environment for children in Vauban where household sizes were particularly high. Nützel (1993) found that children were allowed to play out on the carfree streets of Nuremberg-Langwasser at a younger age (average 3.8) than on conventional streets nearby (average 5.6). The observations made during the study visits by the author support these findings. There was considerable evidence of young children playing and cycling without direct supervision in several of the developments visited.

No specific research has been found on the health or economic impacts of carfree development, although some benefits could be deduced from the observations about travel patterns and traffic generation. The health benefits of walking and cycling have generated a substantial literature. Both are associated with improved fitness, bone and muscle strength and flexibility of joints (BUPA, 2007) and improvements in mental health (Glenister, 1996). Although the issues are not fully understood, air pollution caused by motor traffic is associated with a range of respiratory illnesses (RCEP, 2007) and so a reduction is likely to provide health benefits.

The European studies provide fairly strong evidence for the three intermediate consequences illustrated on Figure 1 (relating to land, car use and active travel). Ornetzeder et al. (2008) found evidence to support two of the ultimate benefits: sociability, as discussed above, and reductions in CO₂ emissions: residents of the carfree area had a lower carbon footprint than a more conventional reference development nearby, and considerably lower than the national average.

The benefits for residents from carfree developments in general may be inferred with a reasonable degree of confidence, although the extent depends upon the individual circumstances of each development. The benefits to the wider local area and the global environment are more problematic

to assess and whether they are achieved in practice depends upon a number of other factors, including supportive policy and design issues.

The land-related benefits depend on how the land saved from parking and roads is re-allocated. In Vauban, the developers were obliged to reserve an area of land as a form of insurance, in case car ownership exceeded the capacity of the car parks. This did not occur and the land has been used as informal public open space since then. In Slateford Green, Edinburgh, land set aside for parking has been used to provide more semi-private space including a children's play area (Eastwood, 2008). In other developments it is difficult to identify how the 'land saved' from parking was used, since developments were planned with the low or zero parking in the first place. The benefits may nonetheless be inferred from a notional counterfactual where additional land for parking would either reduce public space, gardens or reduce the number of dwellings built on the site, which in turn might increase building on undeveloped land elsewhere.

Reduced congestion depends upon wider policy and practice in the city and the immediate area surrounding the carfree development. Some of the benefits would also depend upon behavioural change by residents for which there is some evidence from the European studies. Carfree developments reduce driving and increase active travel because they attract residents predisposed towards non-car travel and they change the behaviour of residents (compared to conventional developments). If lower car use in carfree developments were solely due to the former, then national and global benefits would not be achieved and the benefits to the wider local area would be achieved at the expense of other areas. However this is not the experience identified in Europe.

The evidence from European studies suggests that carfree developments do indeed change the behaviour of their residents. Nobis found that 81% of the carfree households in Vauban had previously owned a car; 57% gave up their cars after moving there. Scheurer found proportions varying from 10% (in GWL Terrain) to 62% (in Florisdorf) of households had reduced their car ownership since moving to the carfree developments. In Florisdorf, Ornetzeder et al. (2008) found only one car owner (who was violating the rules of occupation) amongst the 50% of male and 30% of female residents had previously owned a car. 41% of respondents said they were "using the bicycle much more than before".

The existing examples in continental Europe and the study of demand in the UK both suggest considerable potential for carfree development, particularly in the inner areas of larger cities, where population densities are high and many households do not own a vehicle. These areas are also likely to benefit most from the reduced traffic generation. Many cities and countries have adopted policies of urban intensification, sometimes for transport reasons but mainly where development land is scarce or where there is a desire to protect undeveloped land. As Melia, Barton and Parkhurst (2011) argue, urban intensification tends to reduce car driving but the effect is less than proportional, so doubling the population density in an area will generally reduce but rarely halve the traffic generation and car ownership of each household. This produces the *paradox of intensification*: global benefits at the price of worsening local conditions. Carfree development is one means of attenuating the localised externalities of intensification. Where implemented over an area wider than an individual housing development, this benefit would depend upon effective control of parking.

The main problems of carfree developments relate to parking and the control of vehicular access. Scheurer found dissatisfaction amongst 39% of residents with the arrangements in Vauban. Carfree households were unhappy that some car owners were flouting the rules by parking on the *stellplatzfrei* streets. Some car owners were unhappy about the inconvenience of parking separated from the housing. Nevertheless, Nobis found carfree households were more satisfied overall with the arrangements than car owners. This finding is consistent with Borgers (2008) who found that car owners in the Netherlands preferred parking to be adjacent rather than separated from their housing (there was no mention of any carfree housing in the sample).

Overspill parking can also be a problem. The Vauban system of annual declarations and expensive parking spaces has given some residents an incentive to cheat, by registering cars in other names and parking them nearby. Freiburg City Council had taken legal action against two persistent offenders. The suburban location of Vauban made parking enforcement more difficult. There were no parking controls in the adjoining district of Merzhausen and statutory enforcement of parking rules within Vauban itself was rare. Vehicles were often parked on the *stellplatzfrei* streets in contravention of the rules, although this did not significantly detract from the traffic-free nature of these streets as there were very few vehicle movements.

The Limited Access model avoids the latter problem, although overspill parking in the surrounding area was sometimes an issue. Most of the examples were in more urban locations than Vauban. In GWL Terrain, parking in the surrounding areas was already controlled, so the development did not significantly change the parking situation there. In Stellwerk 60 some complaints had been made about overspill parking which was then addressed by the extension of controls in the surrounding area.

The criteria for exceptional vehicular access to Stellwerk 60 had caused differences of opinion amongst the residents. One contested issue was whether older or disabled residents should be allowed to drive into the interior of the site. The rules adopted by the residents' association allowed minibuses for older and disabled residents inside the site but not private cars,.

The annual declarations of car ownership used in German carfree developments, are not believed to be enforceable under English or Scottish law (A. Chandler, Bristol Law School, personal communication, 11/03/09). There does not appear to be any legal means of preventing home owners from owning vehicles, although a tenancy agreement may allow a landlord to take action where a tenant infringes a clause preventing them from parking in a defined area. This method is sometimes used for car-free student accommodation. Scepticism over the likely effectiveness of such enforcement often contributes to opposition towards such developments (e.g. Kingston Federation of Residents, 2013; Scotsman.com, 2007).

Conclusions

The parking challenges around carfree and low car development epitomise several of the challenges of urban parking policy in general. Where road space is limited, parking controls can be used to ration that space, to reduce traffic within a particular area and to improve the urban environment. Carfree or low development can be used to pursue the same objectives. Parking controls in defined geographical areas will often create pressure on the surrounding areas. Carfree and low car development will likewise create pressures for surrounding parking controls, where these do not yet exist.

Where comprehensive parking controls already exist, in places like Inner London, it is relatively easy for planning authorities to impose no-permit conditions on residents of newly built housing. Although a few individuals may find private or uncontrolled spaces elsewhere, a no-permit rule prevents car ownership for the vast majority of residents. In car-free housing of this kind, the no-permit condition is the only factor reducing car ownership. In all other respects, these dwellings may be no different to any others in the area. By contrast, the European carfree developments create a degree of self-selection through design and conception or marketing. Many of the people who move to them are attracted by the concept but this self-selection can never be absolute. Where parking within the development is limited and particularly where its cost is significant, some residents will always be tempted to park in surrounding areas unless and until controls are extended there (which in practice occurs).

The low levels of trip generation by residents of European carfree developments (where a minority continue to own cars) are consistent with the aggregate data for the UK. Households without cars generate very few car movements. Although some households without cars occasionally borrow or hire cars, they generate on average less than 2% of the car trips per person of households with cars (DfT, 2013 Table NTS 0702). Thus any policy which reduces car ownership in a particular area will also reduce traffic generation as well as demand for parking spaces.

From a policy perspective, the advantages of carfree (or to a lesser extent low car) development are greatest in densely populated urban areas with limited road space. In some of the densest areas, unconstrained car ownership may be physically impossible. Melia et al (2013) suggest that the potential demand for carfree housing is greatest in the inner areas of larger cities, so there is a considerable overlap between areas of greatest benefit and areas of greatest potential. For cities undergoing urban intensification, carfree development offers a response to the paradox of intensification, enabling development at higher densities without the usual problems caused by traffic generation. This may be particularly useful for development sites where road capacity is a planning constraint.

One of the most common objections to car-free housing in the UK is the fear of overspill parking from residents of surrounding areas. However, the extension of controlled parking zones in several British

cities over recent years offers an opportunity to plan for new development with lower parking standards.

Unlike low car development and the UK-style low-car housing, the European carfree developments offer more tangible benefits to their residents. These benefits flow from the removal of traffic and the re-use of parking land to improve the immediate environment. The two different approaches of the UK and European cities illustrate a different policy emphasis: the European approach for a greater concern for the immediate environment of residents.

The European examples described in this chapter all involved the public sector – particularly local authorities – in the initial development of what was an unfamiliar concept to private developers. However, unlike most other sustainable transport interventions, carfree development 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.

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