

Car-Free Housing Developments: Towards Sustainable Smart Growth and Urban Regeneration Through Car-Free Zoning, Car-Free Redevelopment, Pedestrian Improvement Districts, and New Urbanism

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ABSTRACT

European car-free and car-reduced housing projects in Austria, Germany, the Netherlands, and Scotland that discourage, prohibit, or ignore automobile ownership by residents, have received limited and skeptical reception by some politicians, public sector planners, and academics. Based on a tour of these projects, they should instead be models for a policy to achieve sustainable urban life. The projects present an improved quality of life due to superior open and green spaces. In addition, the projects integrate the best elements of “green architecture,” seeking to use less electricity and water through the use of building materials, insulation, and special elements such as green roofs, solar generation of power, and the reuse of surface water. Three characteristics of these projects merit further study and support their replication as models for urban housing development: (1) residents of car-free housing projects strive together in search of an ecological community, reinforcing community goals and practices, with residents relying primarily on walking and bicycling rather than driving or even public transit; (2) the model ecological community educates and reinforces a lifestyle of environmental sensitivity and protection; and (3) the projects accommodate the demand for living in attractive, accessible, ecological communities and serve as the best antidote to the destructive increase in the automobile dominance of cities. In both developed and developing communities, car-free living can be extended as a residential choice through a number of urban revital-

ization mechanisms such as car-free zoning, new urbanism, car-free redevelopment, and pedestrian improvement districts.

CAR-FREE HOUSING

One of the most interesting innovations in European housing design at the turn of the millennium is car-free housing. The concept of car-free housing involves the marketing of housing to a population that desires to live without an automobile and in a community whose residents share that ecological goal. Residents of these communities often share broader ecological values, and typically the design of these projects includes various physical planning elements, architectural design, and building materials and components that reduce water, heating, and electrical consumption. For example, the projects are usually designed to convert surface water runoff to water for irrigation and other uses such as flushing toilets.¹ Most dramatically, these projects convert parking lots to open space for recreation and garden allotments, providing urban high-density housing with a more rural, green appearance. In addition, these projects typically provide community spaces for activities and services that advance the community identity, such as cafes, bicycle repair shops, health food stores, and educational and recreation programs, including day care and kindergartens.

Projects employ restrictions in varying ways. Some, such as *GWL-Terrein* in Amsterdam, *Beginenhof* in Bremen, *Gartensiedlung Weißenburg* in Münster, and *Floridsdorf* in Vienna, restrict residency to persons who contractually agree not to own an automobile. A small portion of the Amsterdam residents may compete by lottery for a limited number of parking spaces that the city required be included in the project. Others, such as the *Vauban* in Freiburg, place no restrictions on automobile ownership, but require that automobiles be parked in a parking garage in which the car owner must purchase an expensive parking space. In others, such as the Reim airport in Munich, or *Saarlandstrasse* in Hamburg, residents may have their maintenance payments increased if they obtain a car. In Hamburg's *Saarlandstrasse*, if a number of residents obtain cars, the development may be liable for previously waived fees. Some projects, such as

1. See TIMOTHY BEATLEY, GREEN URBANISM: LEARNING FROM EUROPEAN CITIES 290-324 (2000). See generally J. H. CRAWFORD, CARFREE CITIES (2000) available at <http://www.carfree.com> (last visited Aug. 20, 2004) (proposing feasible designs for cities without automobiles).

the Reim airport in Munich or Donau (Danube) City in Vienna, which provide underground parking infrastructure, or Freiburg's *Vauban*, which requires parking at large peripheral parking garages, seek to remove automobiles from residential areas. Finally, the approach of Portland, Oregon, and Tübingen, Germany, establishing urban residential and mixed-use densities invite a pedestrian and transit-based urban lifestyle. Parking is not required and is kept restricted, expensive, and unattractive.

Based on my site visits to Europe's realized car-free housing projects and my experience assisting in various planning initiatives, including Berkeley and Portland, I have identified a number of ordinances that can be enacted to expand car-free living opportunities. Car-free or car-reduced housing and mixed-use communities can result in a regeneration of neighborhoods through both rehabilitation and adaptive reuse, in addition to establishing attractive new urban settlements.

GWL-TERREIN - AMSTERDAM

The *GWL-Terrein* project in the Westerpark District of Amsterdam provides an example of how an exciting new housing project has revitalized a depressed census tract and redefined the district into an area that is attractive to both residents and investors. The project provides only 135 parking spaces for the 600 dwelling units.² Permits are allotted by lottery, with more than half the applicants unable to park their automobiles.³ Four of the spaces are allotted for car-sharing vehicles provided to the residents by a local operating company at an attractive rent.⁴ The *bestemmingsplan* (or project plan) took about nine months of administration and deliberation at the city level. The biggest challenge was to assure that cars could not come into the project.⁵ Construction of physical barriers and very high curbs resolved the problem.

The project is marketed as a car-free ecological community, and management actively promotes educational programs on liv-

2. BEATLEY, *supra* note 1, at 145. See also Jan Scheurer, *Urban Ecology, Innovations in Housing Policy and the Future of the Cities: Towards Sustainability in Neighborhood Communities* 276 (2001) (unpublished Ph.D. thesis, Murdoch University, Australia 2001), available at <http://www.wistp.murdoch.edu.au/publications/projects/jan/> (last visited Aug. 20 2004).

3. Scheurer, *supra* note 2, at 279, 286.

4. BEATLEY, *supra* note 1, at 145.

5. Interview with Joze van Stigt, Project Organizer, *GWL-Terrein*, in Amsterdam, Neth. (May 30, 2002).

ing an ecological lifestyle.⁶ The project includes environmental elements in addition to car-free or car-discouraging rules, such as collecting rainwater for use in toilet flushing. Much of the surface is redirected from automobile use to open space use, allowing 120 residents a private garden allotment and allowing natural drainage with no runoff, flood control, or drainage infrastructure.⁷ The residential buildings have green roofs, or eco-roofs, that are planted and become habitat, controlling surface water, offering insulation as well as long roof life, and providing carbon dioxide sequestration.⁸ Apartments have recycling bins, environmental bathroom fixtures, and southern-oriented passive solar heating, and hot water is generated from a central co-generation plant.⁹

The project is located on the site of an abandoned waterworks¹⁰ and incorporates the beautiful old brick plant as a restaurant, a café, an internet café, shops, a car-sharing service, and a television studio.¹¹ More than 6,000 households have applied or indicated interest in applying for the apartments.¹² With a tram stop at the entrance, *GWL-Terrein* residents enjoy easy access to central Amsterdam by public transport or bicycle. The Amsterdam project demonstrates the need to perform effective market analysis that will demonstrate the demand and market for ecological housing settlement and car-free housing. In Cologne, a market survey was conducted by the government, reporting 2,500 households desired to live in a car-free project.¹³

REIM AIRPORT - MUNICH

Munich's former airport provides another example of community regeneration through car-free development. On the site of the former airport, which is still served by the subway, the city redeveloped the former Reim Airport into a convention center and residential district, which includes the 28-unit *Wogano* auto-

6. BEATLEY, *supra* note 1,2 at 145-46.

7. *Id.* at 147.

8. *Id.* at 205-07.

9. *Id.* at 147.

10. Another attractive housing project that, while not car-free, enjoys a low automobile ownership is the 2600-unit former Waterworks Housing in Rotterdam.

11. Scheurer, *supra* note 2, at 277-78.

12. BEATLEY, *supra* note 1, at 147.

13. Ralph Hertz, Market Studies in Carfree Areas: The Example of Cologne, Address at Towards Carfree Cities IV, Conference of World Carfree Network (July 19, 2004).

free housing project and the adjacent 14-unit *Wohnen Auto Frei* car-free project. In addition to these projects, hundreds of flats are also available without restrictions on automobile ownership, but all parking and traffic circulation is underground, resulting in a traffic and car-free residential environment. In the *Wogano* and the *Wohnen* projects, only two units have cars.

In anticipation of greater automobile usage, the city required the developer to pay _ 18,000 per space for six spaces underground despite the lack of need. The city's basis for the requirement was the possibility that residents could have cars in the future. Indeed, in Hamburg's first car-free project, *Stadthaus Schlump*, and in Halle's *Johannesplatz* project, virtually each household now owns an automobile.¹⁴ These experiences, however, may be unique: the Hamburg project is small, the occupants tend to be from the entertainment industry and require transport at hours and to destinations not conveniently served by transit, and Hamburg is a sprawling, suburban, car-oriented city. The Halle project, near Leipzig in the former East Germany, reflects an East German car culture, and there has been little official effort to restrict automobile use. The federal German policy and local Munich city practice is to require one parking space for every housing unit. In approving the *Wogano* project, the city reduced the standard to 0.4 spaces per unit. *Wogano* officials who believed that the standard was a good guess of the need for visitor and resident parking have been surprised at a lower-than-estimated demand. The *Wogano* association has leased two spaces to a car sharing program.¹⁵

The *Wogano* project also utilizes many environmental components such as landscaping designed to capture surface water. The residents voted to use half the roof garden and patio for solar panels to generate electricity. The panels generate more electricity than is consumed by the residents, and the housing association profits from the sale of the excess to the power company. Digital displays in the basement indicate annual electric production, consumption, and profits, reinforcing efforts and encouraging children to conserve. *Wogano* was not permitted to use solar energy for heating or hot water because the development was designed to use a community power plant. Additionally, *Wogano*

14. Oscar Reutter, Address at Towards Carfree Cities IV, Conference of World Carfree Network (July 21, 2004).

15. Interview with Heike Skok, Staff Member, *Wogano*, Munich, F.R.G. (June 3, 2002).

wanted to use rain water to flush toilets but lacked sufficient funds to construct the system. *Reim* is connected to Munich by subway, but at a distance that makes bicycling a realistic, albeit a seriously energetic, alternative. The *Reim* project demonstrates how an attractive urban housing settlement can revitalize communities.

Car-free housing is an essential ingredient of sustainable urban development because it offers an ecological lifestyle and establishes a sense of community based on mutually-reinforced ideological principles integrating living and ecology. While the sustainability implications of car-free housing are obvious, car-free housing also offers consumers housing alternatives to allow them to rationally compare housing choices. If cities cease imposing an obligation to finance the automobile infrastructure on housing developers, developers could market both car-based and car-free housing, and consumers would be able to understand the true costs of automobile ownership, the improved site environment, the lower housing costs, and the benefits of adopting a pedestrian lifestyle. With a proliferation of car-free developments, cities should experience increased support for policies designed to extend public transit and expand opportunities for people to live well without driving. Car-free housing projects may also spur civic optimism and pride and generate other car-free initiatives, such as the comprehensive transit re-planning of Halle and Leipzig, Germany, which was ostensibly inspired by the *Johannesplatz* car-reduced project in Halle.¹⁶

SLATEFORD GREEN - EDINBURGH

Slateford Green in Edinburgh, Scotland, is another interesting example of former polluted lands or "brownfields" redevelopment around a car-reduced ecological housing settlement.¹⁷ The project, which contains 120 units on a 1.6 hectare (4 acre)¹⁸ site was built on a former railway goods yard 3.5 km west of the city center in the suburb of Gorgie and was completed in 2000. It was supported by local government as a demonstration project and developed by Canmore Housing Association, an experienced de-

16. ENVIRONMENTALLY FRIENDLY SHOPPING AND LEISURE TRANSPORT IN HALLE AND LEIPZIG (Fed. Envtl. Agency Circular, No. 4, Mar. 2001).

17. Interview with Graeme Russell, Director of Housing, Canmore Housing Association, Edinburgh, Scot. (July 7, 2004).

18. According to the developer's website, the project is on a 1.4 ha site, 3 km from the city centre. See <http://www.piarc.org/pub/1010i/02-e.htm>.

veloper and manager of approximately 2000 social housing units. About 45 percent of Edinburgh lives car-free. Bus service is a very short walk and tram service will exist if the city ever realizes its plans for tram service from the airport to the city center. The site for the project was chosen because limited automobile access existed on the available street network. Twenty-six units are owner-occupied, twenty-five in shared ownership and fifty-five are rental social housing subsidized by the government. Shared ownership is a form of leasing that allows the accumulation of equity and provides the occupant an option to purchase. Shared ownership tenure proved more popular than ownership and the remaining unsold units were converted.

Construction materials were chosen with environmental concerns in mind, such as using passive solar energy for heating and insulation, recycled newspapers as insulation, district heating, on-site grey water treatment, and collecting rainwater for garden watering. Photovoltaic panels were considered too expensive and inefficient given the available technology. Parking was set at .5 spaces per unit. Bicycling is not popular in Edinburgh and only half the residents have a bicycle. While initially only about half of the project residents lived almost car-free,¹⁹ by 2004, 90 percent of households were car-free.

The project has included a number of residents with disabilities, including seventeen deaf residents. The units comply with the disability-accessible rules applicable to social housing in Scotland, and the units for the deaf include computers with cameras that allow communication by sign language. A number of hearing residents of the project have taken advantage of sign language education offered at the project by a non-profit organization so as to allow communication with the deaf residents. The residents' association has established a very successful cooperative childcare center in the community room, filled with toys and small children, indicating the familial and youthful composition of most of the residents. The project mixes the various occupants in a manner that integrates the project residents with owned flats and social housing with those in shared housing.

After four years, only twelve unit residents own or have access to an automobile that they are permitted to keep outside the project. There are three parking spaces allocated to a car sharing club that some residents have joined. One car sharing vehicle is

19. Scheurer, *supra* note 2, at 294.

parked in the lot. Members can reserve a car online or simply use an entry card to the vehicle. Car sharing, however, is quite expensive for social housing tenants.

The central interior, which would have been a car park in a traditional car-oriented project, has been made into a very inviting park and play area with attractive landscaping, water features, and several small waterfalls. There are walks, individual sitting areas, a play area, and a fountain for small children who are safely guarded by a single gate that allows entry only by coded key pad. Residents may garden in a large garden allotment, and plans for a children's garden are included.

The project included numerous green architectural elements as described above, but it also sought to eliminate materials that contained harmful substances. It utilizes a lifetime aluminum roof, passive ventilation, and materials that provide the highest rating for insulation. The heating is from a central facility adjacent to the garden. Some conflict exists because there are no individual electric meters. Some residents who work outside the project use much less electricity compared to residents who remain at home, yet each pays the same, albeit rather small, utility cost.

The Association is considering installation of roof solar panels. Negotiations are underway with a nearby distillery to pipe hot water into the project for heating, which would eliminate its current practice of dumping into the sewer system. An exterior rim road with controlled access allows vehicles to pick up and drop off disabled tenants, and permits delivery of goods and services to residents. Only two or three residents are accused of occasionally taking advantage and temporarily parking within the project. The small but vacant car park exists for visitors and includes four handicapped parking spaces. The rim road is a public thoroughfare, and people walk across the road to and from the grocery and residential blocks adjacent the project, often littering. Residents have hired young people to police the litter and take trash to a recycling center at the grocery, and staff often pick up bottles and other matter left around the road. The project's grounds and area are immaculate.

Good bus service exists a very short walk from the project. A stop has been constructed for a potential commuter rail service that skirts the project, and service may one day be extended. On the other side of the project approximately 200 meters away is a large grocery store where a tram stop is proposed for the long-

stalled airport to city tram. Each day, the residents can enjoy a social coffee time in the community room and, although there are no additional spaces for shops or other amenities, a commercial district is adjacent to the grocery.

Adjacent to Slateford Green is another social housing project constructed by Canmore Housing Association. The adjacent project is unique in offering both flats and buildings for work spaces that allow small business start-ups. The work units are available for leasing to residents of Slateford Green. Two of the organizers of the childcare cooperative are working to convert the operation to one that would provide salaries to workers.

By any measure, Slateford Green has been a great success. It is fully occupied and appears to be in its original shape and appearance. The grounds reflect excellent maintenance and evidence the residents' pride in residing in an ecological project—one that does not suffer any stigma due to the presence of social housing residents. There is a long wait list for both the social housing units and the shared housing units, as well as a brisk market in the owner-occupied units. When units come on the market, they sell immediately, and a strong secondary market has been demonstrated, with units selling at 50 to 100 percent over original purchase price. The lack of any stigma associated with social housing is demonstrated by the near £ 250,000 (\$500,000) resale price of larger units. Single bedroom units, originally selling at £ 60,000 are now selling for more than £ 90,000. Although housing is in great demand in Edinburgh, particularly social housing, the unit prices at the project are outpacing other projects in the community.

Canmore Housing Association is including most of Slateford Green's green architecture elements in its newer projects and anticipates developing more car-free projects. Land is scarce, however, and the Association believes that a car-free project must be no further than 3.5 kilometers from the city center.

The project has been very successful for the housing association. It was encouraged by the city, and the approval process was extended a bit due to the novelty of the project and the time required to review the many innovative systems and materials.

Most cities throughout Europe, including those where car-free developments have demonstrated success, are skeptical of such developments. City development laws typically impose generous parking requirements. Thus, car-free or car-reduced developers must pursue time-consuming administrative proceedings to ob-

tain variances. Similar difficulty in obtaining variances from automobile access, public safety access, and parking requirements would also make approval of such developments difficult in most American cities.

In Europe, most projects have been funded through private housing associations, although a few have been in partnership with public social housing agencies. Although obtaining both short-term construction loans and long-term purchase loans has been difficult for some groups, others have found willing lenders. As with public and private housing developers, lenders want confidence in the existence of both a strong first market demand for such developments, and the existence of a secondary market for resale of units by those seeking to leave the community.²⁰

In addition to the problems of public approval and financing, the principal constraints on the development of car-free housing are the suitability of the site and the expectations of consumers. Consumers in the United States, and increasingly in Europe are, for a variety of reasons dependent on an automobile. For those who feel dependent on a car for work, church, family, and leisure, car-free housing would not be attractive. In America, even the car-less frequently desire to join the car-community. Thus, those buying an apartment or house may want the possibility of acquiring and parking a car in the future. Even car-less people may desire visits from the automobile crowd. Low-income renters and the elderly have the greatest need for pedestrianization and car-free housing.

What if the car-free community design is a fad and residents subsequently want or need to have automobiles? In such a case, some politicians and planners argue, streets and parking may be inadequate. Although experiments and the market will validate or invalidate these concerns, the greater constraints arise from the problems of site and community. Car-free housing should be conveniently served by public transit. Where residents might be expected to walk or ride bicycles as primary modes of transport, the site should be within walking distance from shopping, and bicyclists must have convenient storage and safe access to major community destinations. Thus, the site should not be more than a ten minute ride from the town center. In predominantly automobile-based communities, car-free projects in isolated suburban

20. Mark Fenster, *Community by Covenant, Process, and Design: Cohousing and the Contemporary Common Interest Community*, 15 J. LAND USE & ENVTL. L. 3, 25-27 (1999) (describing resistance to co-housing in favor of condominiums).

locations may not work well, but they could be very successful in New Urbanist mixed-use downtown centers—both in the central city and in the suburban town center. Those on fixed or limited income, those who prefer not to drive, and seniors who can live at a reduced rent if projects are located near shopping and urban amenities comprise an escalating demand. The projects fit best in transit-oriented settlements.

CAR-SHARING SERVICES

European communities have experimented with car-sharing for a number of years.²¹ The operations are a variation on the American car rental business. Instead of operating as a store and leasing cars to customers on a short-term basis, car-sharing clubs, associations, or businesses enter into agreements with residents of a neighborhood or housing development. For a monthly fee, the member has the right to lease a vehicle maintained at the project or at transit nodes for short periods of time at a greatly reduced rental fee as compared to commercial car leasing and rentals. Many Europeans forgo the expense of ownership by joining a car-sharing group.²² Although the concept appears anathema to American culture, car-sharing activity has increased in the U.S.²³ The inclusion of car-sharing typically allows the re-

21. See BEATLEY, *supra* note 1, at 150-56.

22. Annemarie Mannion, *In It For the Short Haul; Car-Sharing for Urban Errands Brings it to Battle Against Price, Parking and Pollution to Chicago*, CHI. TRIB., Sept. 12, 2002, at N1 (car-sharing began with Mobility Switzerland with 33,000 members and 1,400 vehicles).

23. See, e.g., Laurie Blake, *Car Sharing's Coming Soon*, STAR TRIB., Jun. 1, 2003, at 3B (discussing Neighborhood Energy Consortium of St. Paul, Minnesota which introduced the idea of car sharing as part of an ongoing effort to promote energy conservation); Christopher Heredia, *Sharing Car Use Winning Converts; Fans Rave About Cost and Convenience*, S. F. CHRON., Mar. 4, 2002, at B1 (describing City CarShare, a non-profit program that operates in San Francisco, Oakland, and Berkeley); Lyndsey Layton, *Metro Calls Car-Sharing a Win-Win*, WASH. POST, Jun. 6, 2003, at B02 (describing how Washington, D.C. provides parking for shared cars at various subway stops); Joey Ledford, *Car Sharing Pays Dividends*, ATLANTA J.-CONST., Jun. 13, 2003, at 2D (reporting more than 1,700 CarShare Atlanta alternate transportation users); Jason Mandell, *Learning to Share; Flexcar Tries to Convince Angelenos that they Don't Need to Own a Car*, L.A. DOWNTOWN NEWS, Jan. 31, 2003, available at Flexcar.com (news) (<http://www.downtownnews.com/archives/index.inn?loc=detail&doc=/2003/January/31-1097-news5.txt> — THIS LINK IS NO LONGER ACTIVE); note Annemarie Mannion, *In It For the Short Haul; Car-Sharing for Urban Errands Brings it to Battle Against Price, Parking and Pollution to Chicago*, CHI. TRIB., Sept. 12, 2002, at N1 (reporting on car-sharing groups starting in U.S. cities, including City CarShare in San Francisco with 1,700 members and 70 cars); Julie Sloane, *The Next Big Thing is Neil Peterson, Flexcar: Can a Car-Sharing Company Change the Way America Drives?*, FORTUNE SMALL BUS., June 2, 2003,

duction of parking ratios, allowing more open space, more profit, and lower rents. For example, Portland has lowered parking ratios from 1 to 1.5 parking spaces per unit down to 0.4 to 1 per unit in car-share-served rental projects.²⁴ In the downtown district, Portland has eliminated all parking requirements except to impose a cap on the amount of parking a developer may provide.

The car-free housing projects have entered into arrangements with car-sharing groups to provide several cars for the projects that residents can borrow when needed. Many contemplating living in a car-free housing project who have never lived car-free may take a measure of confidence about moving in by having the car-sharing option available.

In those cities with efficient public transit, car-sharing has not been successful from a business standpoint. Although new residents in the car-free development anticipate using a car for a number of trips, residents less and less find the need for an automobile as they become acquainted with their neighborhood and find alternative sources for their needs. In most car-free projects, the car-sharing vehicles sit idle, almost a symbol of their irrelevance. However, some car-sharing services have been extraordinarily successful. They have enabled individuals to make a commitment to car-free living. In Europe though, their success has been their undoing. It is very much like the community that runs a bus from the central city to suburban employment centers. Employment seekers take the bus and find employment only to elect to buy an automobile with their first pay check. The bus was the means to employment and economic independence, but its success results in the loss of a bus rider and a reduction in the fare box. In the United States, with dysfunctional public transport that typically and efficiently serves but a fraction of destinations, car sharing may prove financially successful.

I would urge that cities enter into the car-sharing enterprise and treat it as a municipal service. This could be taken on as a strictly public venture or perhaps more preferably as a public-private partnership. Experience will allow for discovery of the best model under which to operate the program. Car-sharing, for

available at <http://www.fortune.com/fortune/print/0,15935,456086,00.html> (describing Flexcar, a car-sharing company with 12,000 members in five states and D.C.); Jeffrey Tumlin & Adam Millard-Ball, *How to Make Transit-Oriented Development Work*, 69 PLANNING 14, 16 (2003) (noting how each car share vehicle takes 5 to 6 privately owned cars off the road) available at <http://www.planning.org/planning/member/2003may/tod.htm>.

24. William P. Macht, *The Rise of Car Sharing*, URBAN LAND, Jan. 2003, at 27.

some, may simply act as a methadone program for the automobile-dependent to allow them to become or remain car-free. For most, according to Oscar Reutter, car-sharing is like an insurance policy for people embarking on a car-free lifestyle.²⁵ Car-sharing constitutes an insurance policy should the car-less discover a need for an occasional personal automobile or truck. It may be particularly beneficial throughout the community in helping people to remain a one car family rather than to pursue multiple car ownership.

In Bremen, Germany, at the *Beginenhof* development, the car-sharing venture anticipated doing a brisk business at the car-free project occupied by woman heads of household. Shortly after occupancy, the occupants found they enjoyed their pedestrian and transit-based lifestyle and seldom used the vehicles. The project management decided to acquire transit passes so that residents would not have to pay transit fares, but instead could simply borrow one of the passes. The same phenomenon occurred. Residents found that they made fewer and fewer transit trips, opting for walking and cycling instead. Among the car-free housing developments, except for Edinburgh, there appears to be virtually universal bicycle usage. With residents often averaging two bicycles each, car-free developments require extensive secure bicycle storage. In Munich, at *Reim*, the developments offer easy-access outdoor storage for good months and underground basement parking or storage for the winter. Car-sharing should be publicly subsidized for it can be highly effective in weaning drivers from automobile ownership and dependency.

CAR-FREE ZONING

Car-free or car-reduced development calls for enactment of ordinances that permit car-free housing to be built without the need for variances and for ordinances that streamline rather than delay the application and planning process. In the case of each car-free project, variances have been essential to reduce the size of parking facilities. The parking variance at *Beginenhof* in Bremen, Germany, lowered parking requirements to 0.3 car spaces per unit. The precedent for the variance had been established in the *Hollarland* and *Gruenstrasse* car-free projects in that

25. Interview with Dr. Oscar Reutter, Wuppertal Institute for Climate, Environment and Energy, Münster, F.R.G. (July 27, 2004).

city, yet the variance took nearly a year to obtain.²⁶ In addition to its car-free character, the project is notable in being limited to female-headed households. The project is one-third owner-occupied, one-third social housing for women with children, and one-third market rate rental. Women with children occupy each of the types of units. Two seldom used car-sharing vehicles are available to residents. When residents ceased using all cars, the managers bought transit passes. As residents shifted to bicycles, the rents were simply lowered rather than providing transit passes. Preference for bicycling is health and lifestyle-based and not because transit is inconvenient. In fact a tram from the train station and center of town stops at the project.

The roof of the project is flat and has been planted with turf for insulation. It was only possible to do either the sod planting or the collection of rainwater for flushing toilets. The organizers elected to do the former. Because of excellent insulation, by June, tenants had not yet turned on the heat since moving in March. The windows are wood rather than plastic and are about the same price as other windows. There are no surface water treatment elements in the project, and there was insufficient financing available for solar panels.²⁷

Saarlandstraße in Hamburg, on the site of a former metal company, includes 220 residential units: one-third are owner-occupied; one-third are rented by the state housing society; and one-third are for the disabled.²⁸ The city waived parking impact fees, but the residents will have to pay the heavy fees if car ownership ever reaches 0.4 cars per unit. Individual fees will be assessed if vehicles ever reach 0.2 per unit.²⁹ The standard parking ratio in Hamburg is 0.8 spaces in rental projects and 1.0 in owner-occupied. The *Saarlandstraße* project was approved at 0.15.³⁰ The automobile-free restriction took the form of a deed covenant. By comparison, at the *Vauban* car-reduced housing project in Freiburg, Germany, residents who own a car are required to purchase a parking space in a peripheral structure for approximately \$22,500 originally [not correct here!!!, \$22,500 was only data we

26. Interview with Diana Lemmen, Project Planner, Bremen, F.R.G. (Jun. 6, 2002).

27. Interview with Dr. Erika Riemer-Noltenius, Initiator, Founder and Manager of project, Bremen, F.R.G. (Jun. 6, 2002).

28. Scheurer, *supra* note 2, at 296.

29. *Id.* at 296.

30. Interview with Almut Blume-Gleim, Architect and Urban Planner, City of Hamburg, Hamburg, F.R.G. (Jun. 7, 2002).

found as price and no mention of 14,500] ,³¹ now at nearly _ 17,500 or in excess of \$20,000.³² The *Saarlandstraße* project runs along an old canal, is surrounded by greenery, and is lushly landscaped. On the street side, the project awaits construction of office buildings that will buffer the existing homes. The site is an excellent one, a block from a tram stop.

Autofreie Mustersiedlung Floridsdorf in Vienna is a seven-story development consisting of 240 units or 80 units per acre (200 per hectare).³³ Although the density is high by non-Manhattan American standards, the open space and landscaping, traded for parking and driveways, renders the density acceptable and aesthetically pleasing. The parking facilities were slashed from 250 to 25 bays and are used exclusively by visitors and car-sharing vehicles, with parking for 400 bicycles.³⁴ The density is consistent with the adjacent developments. The Vienna project offers solar access to each dwelling and low-energy insulation. Rooftop panels supply hot water for a good part of the year, with hot water during the remainder of the year supplied by geothermal power. The geothermal power also cools in summer. Photovoltaic roof cells supply energy to recharge electric car-sharing vehicles.³⁵ The project site is across a small park from a tram stop, includes a shopping cooperative, an internet café, a public laundry, a bike workshop, playgrounds, a youth club, and a party room.³⁶ The projects in Bremen, Hamburg, and Vienna demonstrate the existence of a growing unmet market for car-free living and suggest that communities can offer car-free zoning districts or over-lay zones that reduce or eliminate parking and automobile infrastructure conditions without sacrificing community planning objectives.

Communities should enact amendments to their zoning ordinances and should establish standards for car-free or car-reduced land development, typically providing for the reduction of mandatory parking requirements and the promotion of transit-oriented development without the need for variances or special exceptions or exemptions. The author has been working with

31. Scheurer, *supra* note 2, at 334.

32. Claudia Nobis, *Less Car Traffic Through New Town Planning Concepts: The Model District Freiburg-Vauban*, Address at Towards Carfree Cities IV, Conference of World Carfree Network (July 21, 2004).

33. Scheurer, *supra* note 2, at 61.

34. *Id.* at 312.

35. *Id.* at 61.

36. *Id.* at 310-311.

planners in Berkeley, California, to design an ordinance that would make car-free housing a permitted use on any undeveloped parcel in the flats of the city below the hills. The ordinance would exclude residents of the projects from obtaining community parking permits, would exempt the project from parking requirements, and would exempt the developer from any exactions or fees relating to parking and circulation. Residents would be subject to covenants that would increase their rent, and owners might be subject to retroactive payment of fees if residents violate restrictions.

It is essential that municipalities and developers establish confidence and acceptance with the financial capital industry so that banks and other lenders will willingly loan on car-free condominiums, co-housing, or rental housing. This problem, like the establishment of strong market demand and project profitability, presents a "chicken and the egg" problem: which comes first, a demonstrated market or a project to prove the existence of the market? These innovative projects require both risk-taking developers and political leaders who believe in sustainable development and are willing to encourage and support such settlements. Freiburg, Germany, has demonstrated that where all architects and builders are required to integrate the latest energy-saving technologies of green architecture, that inclusion carries no additional cost over traditional construction. The higher densities and inflating resale prices of flats in such projects should demonstrate the strength of the market. In addition, the development of an innovative ecological housing quarter can create great civic pride and optimism and can serve as a magnet to attract employers as well as tourists. Every European car-free housing settlement has a stream of urban planners from Asia and other cities in Europe, as well as visitors from North America.

NEW URBANISM

Larger projects that can include mixed use to establish lively communities are required to demonstrate the market for transit-oriented and car-free developments. The early car-free projects have been quite small and thus have not included the full urban fabric and structure. The development of larger projects carries the potential that communities can include the shops, offices, and institutions that can support the community. Accomplishing the development of such an urban structure requires the backing of political leadership and capital sources that can support the full

array of entertainment, shopping, institutions, and offices and job locations. These features can make the community sustainable, reducing the need for trips outside local destinations.

The key to the wide-spread development of car-free housing projects is market acceptance. Where a housing design sells or rents easily, preferably with a waiting line, banks, builders, and municipalities tend to join in and encourage replication. The difficult challenge is to establish such market acceptance in the absence of a supply. Communities dedicated to sustainability should establish ordinances that encourage the developments. Subsidies can be offered, such as exclusion from impact or development fees for roads and circulation, exemption from traditional parking requirements and design requirements aimed at accommodating automobiles, and density bonuses for including a car-free element and including green architectural elements.

The car-free zone or overlay zone would operate like a new urbanist development: a developer could apply to have the development reviewed under the new urbanist code rather than the traditional town zoning standards.³⁷ The best approach would be to establish car-free housing developments as a use of right within urban districts that possess access to the transit and bicycle infrastructure necessary to make the projects successful.

Communities that are serious about reducing automobile use in favor of alternative modes of transport such as transit, bicycling, or walking should consider Tübingen's and Portland's policy of imposing no parking requirements on downtown development and reuse projects, applying a cap only on the amount of parking allowed, and leaving parking planning to the developer. The potential success of New Urbanism's higher density urban structures can be seen in three German examples of the reuse of former military bases.

MILITARY BASE REUSE

One of the earliest true car-free projects, *Gartensiedlung Weißenburg*, is located in Münster, Germany, in the district of

37. Andres Duany & Emily Talen, *Making the Good Easy: The Smart Code Alternative*, 29 *FORDHAM URB. L.J.* 1445 (2002); James A. Kushner, *Smart Growth, New Urbanism and Diversity: Progressive Planning Movements in America and their Impact on Poor and Minority Ethnic Populations*, 21 *UCLA J. ENVTL. L. & POL'Y* 45, 63-64 (2002-2003); Robert J. Sitkowski & Brian W. Ohm, *Enabling the New Urbanism*, 34 *URB. LAW.* 935, 940-42 (2002).

Geist.³⁸ Using a former German military base, the project sits on a site of 3.8 hectares with 3.2 available for new development. The site is 2.5 km from the old city center. The project is not yet completed. Of the three phases, the two now completed provide 156 social housing flats and 40 row houses available for rent. The third phase will be composed of flats for purchase. The site is in a beautiful district with lovely homes, flats, and supporting commercial facilities. Transportation is available by bus directly from the site, running every 20 minutes. Within a short walk, buses are available every 10 minutes. Bicycling is even more popular, with nearly 30 percent of all trips made by that mode.

The project has two car-sharing cars and one large car-sharing truck parked at the project. Car-sharing is popular both in the project and within the city. Each occupant signs a contract as part of his or her lease agreeing to not own an automobile. Precise planning for the sale and control of flats has not been resolved, but restrictive covenants are planned. While a tenant may be evicted for car or motorized vehicle ownership, a conflict resolution process exists that may grant an exception in cases where it would be unreasonable to live without a car.³⁹ There is one disabled resident that has been granted a parking permit. Others, such as a young man with a job requiring a motor scooter, were granted a three month exception. All exceptions will only be granted for one year, after which time another application is required. The only case of a resident improperly owning a car was taken to the board and during the proceedings, the resident voluntarily moved away.

The project was approved with 0.2 parking spaces per dwelling for car-sharing and visitors. The housing association that built and manages the project has retained a larger parking lot adjacent to the project and within the former military base in the event that the market loses interest in the car-free character of the project. Within the project is a training center for the *Johanniter-Unfall-Hilfe* (JUH). In Germany, young men may serve in the military or within the alternative civil service of JUH. The

38. Interview with Dr. Oscar Reutter, Wuppertal Institute for Climate, Environment and Energy, Münster, F.R.G. (July 27, 2004); Interview with Henrik Freudenaus, Urban Planner, ILS (state planning agency of North Rhein-Westfalia), Münster, F.R.G. (July 27, 2004).

39. Interview with Vera Schlüppmann, Member, Resident Conflict Management Board, Münster, F.R.G. (July 27, 2004).

training facility provides emergency medical services (EMS) training to ambulance drivers within the civil service.

The project is without any vacancies. Construction of the first phase commenced in October of 2000. Approximately 50 percent of the project's residents are small children, and there are ample play areas. In addition, the children use the walkways throughout the project as a bicycle and roller skating venue. The tenants association has an apartment that is used for meetings, events and a twice-a-week coffee for residents. A number of residents have formed a babysitting cooperative, and several times a week parents take turns watching the children.

As with most car-free projects, there are insufficient storage places for residents' bicycles, which average about two per person. In addition, a large part of the storage is in the basements of the units, and the stairs are of too great a grade for easy bicycle access, particularly for children. The street level storage buildings appear filled to capacity. In one basement, a bicycle repair shop has been established, and twice a month an experienced repair expert comes and assists residents in learning how to make their own repairs.

Although the project was built using a low-energy design, particularly with regard to insulation and passive materials, no special green architectural elements exist. The residents are planning to install solar roof panels but have yet to realize that plan.

Two former French garrisons in southwest Germany have been redeveloped to establish a dense urban structure. Tübingen and Freiburg have both elected to clean up the brownfields of the former bases, adhering to classic New Urbanist practices, and redevelop the sites around car-reduced dense urban settlements.

Tübingen offers a beautifully restored historic center and fabulous new mixed-use urban neighborhoods. The historic community is a beautiful hillside town on the Neckar River. The parks are wonderful, and the forest fingers come down to the town as the development fingers reach out. The castles, forts, churches, and colorful houses along the river are picture postcard beautiful. The former French *Vauban* fort was given to the city and dedicated to a housing development for 6,500 residents.⁴⁰ The concept of the development is extremely close to the New

40. Interview with Cord Soelke, Project Director, Tübingen, F.R.G. (July 14, 2004).

Urbanist vision, albeit at decidedly urban densities of 250 persons per hectare or about 100 units per acre. The mostly five-story, modern, eclectic facades are integrated into the rehabilitated former military barracks and other reused buildings, such as a tank garage now used as a dancing school. The design is typically first-floor shops and other institutional uses with four floors of housing above. There did not appear to be a thriving collection of restaurants, cafes, or shops, which was blamed on the flat economy. The American government just recently informed the city that more than 500 U.S. bombs had been dropped on the military base during World War II. Had this been known, the project might not have been built. At a minimum, most of the sites were probably polluted with petrol and related products. Although no rental or social housing subsidies exist, the policy of the state of Baden-Wurtenburg in southwest Germany is to encourage home ownership. Buyers are given — 20,000 towards a down-payment, and the State offers a below-market low-interest mortgage. There are some seventy caravan wagons in which people live as an alternative lifestyle, sort of like Dutch houseboats. The sites are leased from the city as part of a decision to have an eclectic urban fabric. Initially, the French Quarter section of newer housing encouraged artists to locate there, offering avant garde architecture and living and work spaces for artists.

The many attempts to include automatic parking lot machines have gained slow acceptance because of service problems that can occur at any time. The policy does not restrict car ownership, but owners have to use expensive parking or arrange for private parking. The urban densities and available bus service has caused many to abandon their cars. A car-sharing service is also available. About 40 percent of the households are car-less as compared to 80 percent car ownership in the city and surrounding districts.

Tübingen, like the experience in the Pearl District of Portland, or the western district of Vancouver, British Columbia, demonstrate that the development of a high density urban structure will encourage many residents to adopt an urban lifestyle without car ownership.

Freiburg, Germany, has long been the example of sustainable urban planning. With its commitment to discouraging automobile use and encouraging walking, bicycling, and its tram system, Freiburg has been successful in expanding bicycle and transit

trips and in reducing the frequency and distance of automobile trips.⁴¹ The *Vauban* is a former French military base, currently housing 3,600, and ultimately designed to house 5,000, while creating 600 permanent jobs.⁴² In phases, student housing, co-housing, front garage and parking-free houses, and later, 210 plus-energy houses that produce more electricity than they consume have been developed. Diversity of architecture results from individual groups having separate housing associations and designs. The original design of 25 percent social housing was scaled back due to reduced subsidies from the state.

Freiburg has established low-energy building standards. Most units in the newest section have solar cell panels and solar-supported heating systems. Many units reuse water for toilets and garden irrigation. Some projects will have converters for organic waste and sewage. Vehicle owners must acquire expensive spaces in area parking garages. Approximately 55 percent have automobiles. Shopping is within walking distance. Tram stations and a 2-mile link to the city are expected to be completed in 2006; bus connections are convenient. Consumer preference for tram service may further reduce car ownership and use. Along with car-sharing membership, residents receive an annual transit bus pass covering the region and a *BahnCard* allowing half-price rail fares for one year. Of all trips, 64 percent are non-motorized. There have been some problems in allowing deliveries and pickups as some residents take advantage of it, using car-free streets for short-term parking.⁴³ A better solution would have been to establish narrower streets that would discourage parking.

Students reside in several old barracks that have been rehabilitated for dormitories and co-housing communal quarters. There are some elderly residents, but there are no special use buildings for the disabled. One building, with several elevators and walkways at the second and third floors, is completely accessible by the disabled.

There are no restrictions on car ownership beyond a limited number of places to park cars, including two car parks and an area that will in the future be developed as a carpark. One is quite large and has an air circulation problem. The other is the

41. Interview with Torsten Perner, Transportation Planner, City of Freiburg, F.R.G. (July 14, 2004).

42. Interview with Roland Veith, Project Director of the *Vauban* development on the city planning staff (July 14, 2004).

43. Scheurer, *supra* note 2, at 340-41.

solar car park and leases solar roof space to a company that generates electricity, which under the law must be bought at twice the cost of purchase to the consumer. The first floor is a standard quality large grocery store.

The very modern wood houses on the north side of the sun project buffering the major connecting four-lane road are known as "solar houses." Solar roof panels, vacuum toilets without water (like airplane toilets), and passive ecological systems are utilized there. Generated methane gas is used for cooking. The entire project has a surface water recovery system. All roofs of less than 7 percent grade must be earthen roofs. Rain water is collected and used for irrigation after it drains into the surface collection system. There is also a system that pumps and treats polluted groundwater.

Risenfeld, another similar development in Freiburg, has tram service and is a bit denser (five rather than four stories). The *Vauban* has a 13-meter maximum height, or four floors. Despite its ecological design, the higher density development at *Risenfeld* appears to have a similar presence of car-free households. An incinerator/power/heating plant serves some 600 units and is sustainable, burning wood chips and using the carbon dioxide that would normally be generated, providing all the heat and electricity for those units. In Freiburg, the average residential district contains only about 14 percent children, while *Vauban* contains 29 percent. Some concern was voiced that it may be too safe for children, who may not know how to act when they reach the teenage years in other neighborhoods that are more dangerous. The calmed streets are safe play areas, and there are pedestrian-only paths and many play areas and parks, such as the fingers of green that come into the project every three buildings.

While the boulevard running into the city has a 50 km speed limit, the large streets in the project are rigidly enforced at 30 km, and the calmed streets are much slower than that at 5 km.

The city of Freiburg has instituted a comprehensive environmental program.⁴⁴ Freiburg's environmentalism stems from a coalition of greens and farmers, with many others who successfully fought a state initiative to develop nuclear energy. After the reactor failure at Chernobyl in the Ukraine, radioactive fallout fell on Freiburg, requiring the confiscation and destruction of farm

44. Interview with Dr. Dieter Wörner, Director, Environmental Protection Agency, and C.E.O., Municipal Waste Management Enterprise (July 15, 2004).

animals and produce over a two-year period. Although the automobile population has increased in the city, there is no rush hour traffic. Traffic is generally at a consistently busy—but not congested—level, and it is primarily concentrated on certain limited arteries with other streets calmed to discourage traffic. An expanded tram service accounting for nearly 25 percent of all trips and 40,000 daily bicycle trips into the old town have contributed to the light traffic. Freiburg has also been extremely active in energy and waste disposal. Because Freiburg is the sunniest city in Germany, and because of its environmental reputation, the city has become the European center for solar technology and development. In addition to national government incentives, the state and local government will pay 10 percent of solar installation costs and may invest more heavily in larger demonstration projects, such as a stadium or the solar garage at the *Vauban*.

The privatized and environmentally-intelligent municipal service provider of gas, electricity, and water has established a voluntary higher “environmental rate” for utilities. It has attracted 10 percent of ratepayers and is considered a wild success. The proceeds from the higher rates are used for programs and incentives to establish co-generation, solar, and other alternative energy endeavors.

The city has also aggressively sought to develop more co-generation plants, such as at the *Vauban*, to provide electricity and heating without emitting carbon dioxide. The city has also established a successful recycling program that recycles all but a very small amount of refuse that will be burned in environmental incinerators minimizing land fill materials.

The city has sought to advance the development of high density districts such as the *Vauban* and *Risenfeld* to counterbalance the impact of more rural outlying development. The city has successfully promoted green architecture to the point that all architects and builders are accustomed to environmental design, and the result is that green architecture presents no increase in costs over traditional building.

TAX-INCREMENT-BASED REDEVELOPMENT

Pursuant to tax-increment redevelopment legislation, redevelopment bonds can be sold to pedestrianize and revitalize neigh-

borhoods.⁴⁵ Under the program, property taxes of the landowners will increase as property values increase in the face of new development and redevelopment. At the outset, distribution of tax revenues to taxing authorities is frozen so that the incremental funding, i.e. the increased level of taxes, is available to pay off the bonds and to finance infrastructure or other improvements such as public art, affordable housing or other essential facilities or services. In the interim, taxing authorities continue to receive the prior level of revenues. Although redevelopment in the United States is limited to blighted districts and many current brownfield properties could easily qualify, it is recommended that redevelopment statutes be amended to permit the use of the revitalization strategy to accommodate transit-oriented development, ecological settlements, and urban infill.

PEDESTRIAN IMPROVEMENT DISTRICTS

Another strategy towards car-free housing would be the retrofitting of neighborhoods to become car-free. Modeled on the Business Improvement District,⁴⁶ where commercial districts have improved district appearance and the quality of municipal services, such as maintenance and security, neighborhoods might apply to be designated a pedestrian improvement district. The designation might allow the community to create a special assessment district to close and landscape streets, replacing them with landscaped and tree-lined bicycle and walking lanes with barriers to exclude automobile traffic. Owners may elect to live car-free or to contribute to parking garage construction on the outskirts of the district. To encourage community support for the districts,

45. *Sweetwater Valley Civic Ass'n v. City of National City*, 555 P.2d 1099 (Cal. 1976) (rejecting argument that profitable golf course was "blighted"); *Castel Properties, Ltd. v. City of Marion*, 631 N.E.2d 459 (Ill. App. Ct. 1994) (scrutinizing urban redevelopment blight findings). See generally TAX INCREMENT FINANCING AND ECONOMIC DEVELOPMENT (Craig L. Johnson & Joyce Y. Man eds., 2001); Jonathan M. Davidson, *Tax Increment Financing as a Tool for Community Redevelopment*, 56 U. DET. J. URB. L. 405 (1979); Susan Mead, *Incentives for Downtown Revitalization: Tax Increment Financing Districts, Chapter 380, and Other Tools*, 32 URB. LAW. 1013 (2000); Susan Mead & Ann Cole, *Eminent Domain in Tax Increment Financing Districts and Other Redevelopment Areas: A Developer's Perspective*, 30 URB. LAW. 619 (1998).

46. *Kessler v. Grand Cent. Dist. Mgmt. Ass'n*, 158 F.3d 92 (2d Cir. 1998); Richard Briffault, *A Government for Our Time? Business Improvement Districts and Urban Governance*, 99 COLUM. L. REV. 365 (1999). BIDs can generate gentrification, displacing less affluent residents and businesses. See David J. Kennedy, *Restraining the Power of Business Improvement Districts: The Case of the Grand Central Partnership*, 15 YALE L. & POL'Y REV. 283 (1996).

those residents desirous of automobile access can be assured of peripheral parking lot access. A board elected by property owners, tenants, and other residents could govern these pedestrian improvement districts.

A moderate alternative is to follow the approach of Portland, Oregon, and Tübingen, Germany, which have elected not to regulate parking but instead have left parking to landowners. Each has opted to establish high density urban design without city-provided or city-mandated parking and has left the matter to the marketplace. Public policy, then, is to provide a dearth of public parking and to design streets and alleys to be narrow, calmed, and virtually parking-free. Limited parking resources in both cities encourage residents to live car-free, further reducing the need for parking.

CONCLUSION

The replication of high-density urban and suburban transit-oriented development should be the centerpiece of urban development. The experience of European car-free projects informs us that residents of car-free housing projects come together in search of an ecological community, reinforcing community goals and practices, with residents relying primarily on walking and bicycling rather than driving or even public transit. The ecological community educates and reinforces a lifestyle of environmental sensitivity and protection in a manner unavailable in other urban forms. Accommodating the increasingly large demand for living in attractive, accessible, ecological communities is the best antidote to the current destructive automobile dominance of cities. In both developed and developing communities, car-free living can be extended as a residential choice through a number of urban revitalization mechanisms, such as car-free zoning, new urbanism, car-free redevelopment, and pedestrian improvement districts.

