GREEN URBANISM

Learning from European Cities

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Chapter 10

Building Ecologically: Designing Buildings and Neighborhoods with Nature in Mind

A Revolution in Ecological Building

It is a commonly cited statistic that some 40 percent of the world's energy consumption results from the construction and operation of buildings, and a high percentage of the resources that enter the global economy end up in the form of buildings or structures. The green-urban city views this continuous process of building, renovating, and managing of structures—homes, businesses, civic architecture—as important opportunities to reduce its ecological footprint. European cities (and countries) have made tremendous progress in this area, and they provide a wealth of project examples and program ideas from which to learn.

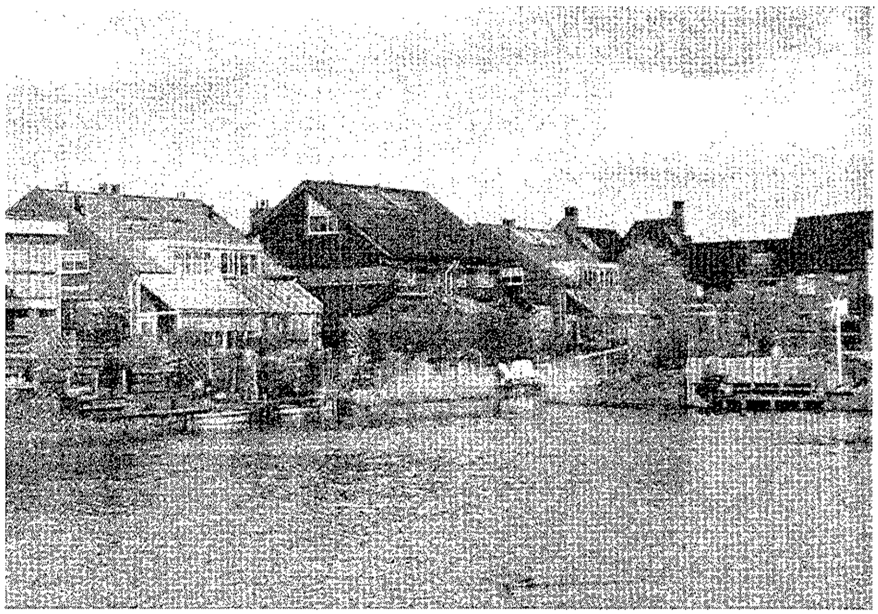
Especially in the Netherlands, Denmark, and Germany, there is now extensive experience with ecological or green neighborhoods and buildings. Indeed, this situation might be characterized as a revolution because there is so much activity in this area now, especially in countries such as the Netherlands, where ecological building features have become common practice. A number of these projects were visited, and together they represent a clear demonstration of the potential of significantly reducing resource demands through building and neighborhood design. These European countries have arrived much sooner at the conclusion that new development can and must be different if environmental consumption is to be reduced. The attributes and specific designs featured in these projects vary, but they tend to have in common an emphasis on minimizing the ecological footprint of their residents, and they tend to include high energy conservation standards, low water usage, the use of sustainable building materials, an emphasis on recycling and material reuse, and the incorporation of solar energy in the form of solar panels and photovoltaics, among other features, These projects also emphasize minimizing the role of, or doing without, the automobile. Most are sited in close proximity to public transit, emphasize walking and bicycling as mobility options, and typically restrict the number of spaces provided for automobiles.

Many Examples of Ecological Building Projects: The Dutch Leading the Way

Many specific examples can be cited that show the potential gain—environmental and social—from these building strategies. In the Netherlands, significant experimentation with sustainable development projects began in the early 1990s, partially funded by the Dutch government. Three projects are frequently cited as the important examples of the first wave of experimentation: Ecolonia (Alphen a/d Rijn), Morra Park (Drachten), and Ecodus (Delft). The author has visited and studied each of these early ecodevelopments, as well as more recent projects, and together they provide important inspiration and guidance.

One of the first ecological demonstration projects in the Netherlands was Ecolonia. Located in Alphen a/d Rijn, this residential neighborhood was an important testing ground for many ecological ideas and technologies that are now more commonly used throughout the country. Specifically, the neighborhood includes 101 residential units, clustered around a pedestrian common area and a lake. The overall masterplan for the neighborhood was the work of Belgian architect Lucien Kroll. Sponsored by the Dutch national government (NOVEM), the design of the actual structures was assigned to nine different architects (each designing for groups of ten to eighteen homes). The architects were in charge of creating their own unique design aesthetic and whatever combination of ecological design features they deemed appropriate. They were given broad environmental parameters that they had to design within, including an energy standard (200 megajoules/square meter) that buildings could not exceed.

Ecolonia demonstrated a wide range of ecological building ideas and techniques, including greenroofs on some units, many energy-conserving features (e.g., added insulation), the use of recycled building materials, solar hot water heating units, rainwater collection and its use in toilet flushing, car washing, and garden watering. Ecolonia provided a wealth of practical insights about what ideas and techniques worked and which ones



Ecolonia, one of the first ecological housing projects in the Netherlands, helped to demonstrate and test a host of ecological-design and building measures.

were less successful. On balance, and despite certain problems, the project was successful at achieving its goals. As Edwards (1996, p. 195) notes:

> Ecolonia does demonstrate that significant savings in energy use and environmental impact can be achieved by optimizing building materials and methods. By paying particular regard to orientation (south, east and west facing housing—not north), to differential window areas according to aspect, to increased levels of insulation and efficient boiler systems, Ecolonia has met the target in the NMP [National Environmental Policy Plan] of a 25 percent reduction in household energy use.

Ecolonia has played a significant role in the promotion and advancement of ecological buildings in the Netherlands—indeed, its mainstreaming. NOVEM, the Dutch national energy agency, has undertaken a series of detailed evaluation studies, with a number of important conclusions and ecological building insights. These studies concluded, for example, that sunboilers and solar heating units were successful and ready to incorporate into mainstream construction (NOVEM, undated).[1] For many months, a visitors center existed on site (which has itself been recycled and is now the visitors center at Nieuwland, the ecological housing project in Amersfoort), and hundreds of architects, builders, and community officials have toured the project. Ecolonia, aside from its benefits from a technical learning point of view, has had an important catalytic effect in the country.

Morra Park is a 125-unit development in the southern part of the city of Drachten, in the Friesland region of the Netherlands (see Figure 10.1). It incorporates a number of sustainability features, including a southern orientation, solar glass rooms attached to each unit, and the inclusion of solar panels on each unit (VROM, undated). The glass sunrooms (called *serres*) collect warm air at the top that is then blown into the wall space between the attached homes. Water is a key feature, and the development incorporates a closed-loop canal system, which collects stormwater runoff

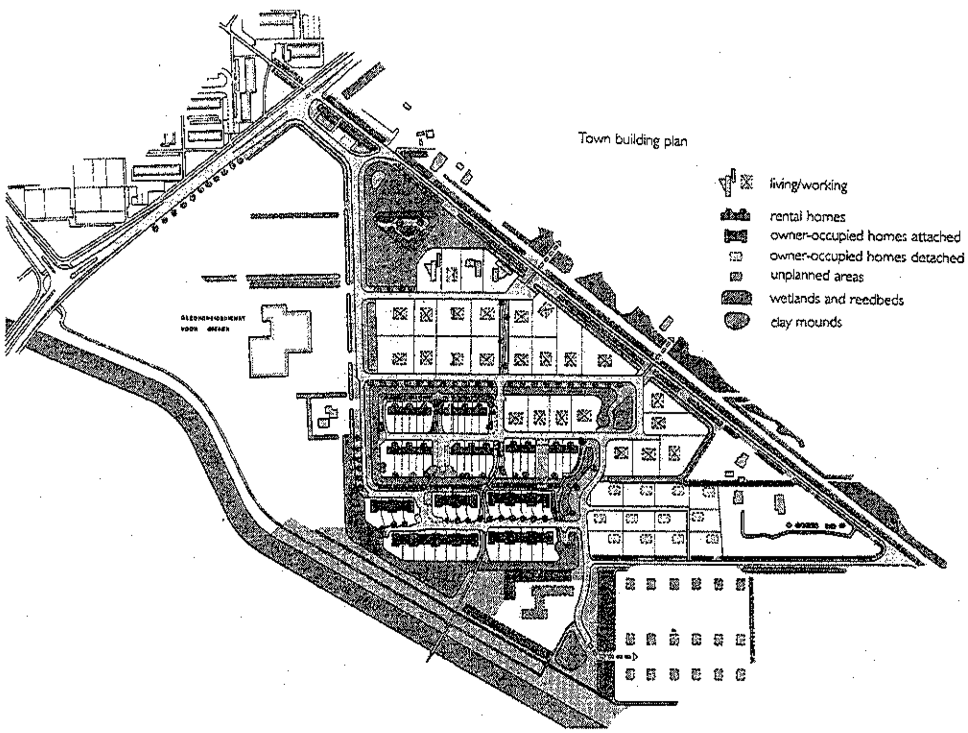


Figure 10.1. Morra Park: diagram of closed-loop canal circulation

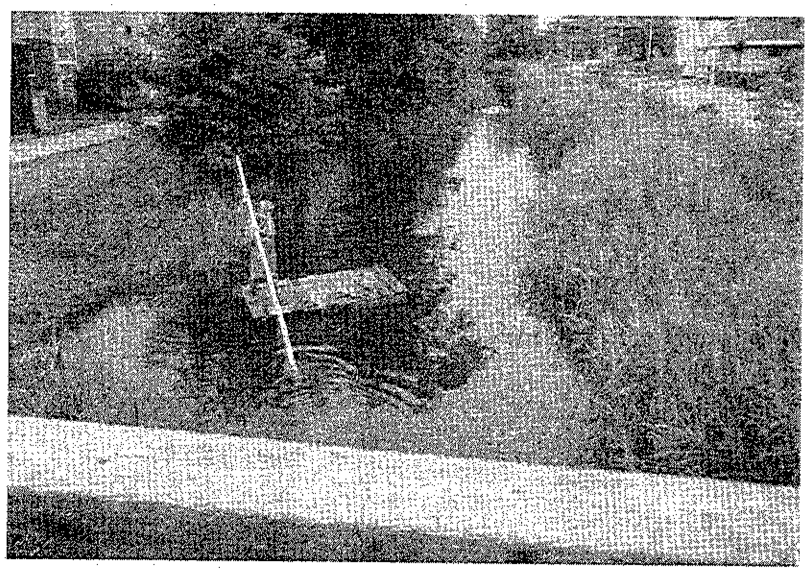
In Morra Park, an ecological housing project in Drachten, the Netherlands. A key design feature is a closed-loop canal system for collecting and naturally treating stormwater runoff. The water in the canals is dramatically cleaner than in neighborhood farming regions and is clean enough for residents to swim in.

Source: Municipality of Smallingerland, Drachten, the Netherlands.

and circulates and filters water through a constructed wetlands. Water is circulated through the canal by way of a windmill-powered pump. Parking is restricted to certain areas, which utilize permeable tiles to allow water percolation. Indeed, the project does not use asphalt and has very few hard surfaces. An interesting feature of the project is that one area of houses is devoted to combined home/work arrangements. In these structures, 30 percent of the floor area must be devoted to the occupants' primary economic livelihood. Home businesses that have located here include an architect, an accountant, and a photographer.

The project includes a mixture of housing types and income levels (as with most Dutch housing). One result of the Morra Park design has been the creation of impressive greenness. Efforts were made to preserve existing natural site features (e.g., including older trees along the canals). Several wooden footbridges, footpaths, and bike trails are included in the design. Common vegetable gardens and composting areas have also been provided. An effort was also made to build with more sustainable materials. For example, no tropical woods, no zinc, and no PVCs are used. The homes are designed to facilitate separation of wastes and recycling.

The project is almost entirely built out and is generally considered a success. As one planner and project resident explained, it is considered a very desirable place to live. The home designs have resulted in a substantial



Morra Park, an ecological housing project in Drachten, the Netherlands, utilizes a closed-loop canal system that collects, circulates, and cleanses stormwater.

reduction in energy usage, using an estimated 40 to 50 percent less energy than conventional homes in Drachten.[2] The project has not been a complete success, however, because certain elements of the design have not worked as well.[3] In particular, the glass sunrooms have been too hot in the summer, and during the winter they have been wastefully heated by some residents.

The project Ecodus (short for Ecological building plan on the vander DUSsenweg) is another of the first-generation sustainable developments. Located in Delft, the project consists of about 250 dwelling units, built through a collaboration between the local housing society, the municipality, and a private developer. The development is a combination of privately owned and rental houses. Sustainable design features include a south and southeast orientation, solar panels (all units have them for hot water), the protection and incorporation of existing natural features of the site (including waterways and poplar trees), and high energy efficiency (high-value insulation, in combination with high-insulating glass). As well, Ecodus includes other features: the design of the block of flats on the west end to serve as a noise barrier (with bathrooms and kitchens facing the street and living quarters and bedrooms located on the quiet side); a concentration of parking in certain areas (and a fairly low parking ratio of 1:1); ready access to Delft's extensive bicycle network; narrow roads and keeping to a minimum the paved surface; rainwater collection in the canals and a natural wetlands purification system (like Morra Park's); extensive gardens for residents and a neighborhood orchard; the use of sustainable materials (e.g., glazed stoneware sewage pipe, avoidance of PVC pipe, limits on use of tropical hardwoods, use of water-based acrylic paint, vegetable-based sheet piling, recycled brick and oil); the use of 20 percent recycled concrete; house-to-house waste collection (including organic wastes and household chemicals); free composting bins; no chemicals permitted in gardens and green areas; and water-saving devices on toilets and showers (Delft, 1996).[4]

With construction completed in 1992, the goal of this project was somewhat different from other demonstration projects in the sense that the city specifically wanted to apply ecological principles to a typical or "normal" development (as one city environment department staff says, a "normal project for normal people"), and within typical financial limitations. There is little architectural experimentation, and in most respects Ecodus looks like a conventional development. The municipality has viewed Ecodus as a model for how all future development in the city should be constructed.

Several evaluations of the project have been completed, and some features have been found to work quite well and others not as well. One problem area includes the interior separation of kitchen and living quarters, a feature important for energy efficiency. Many Dutch families are opting for open kitchens and are taking out the separation wall (the Dutch in general tend to place importance on improving and modifying their homes). Parking and car usage are additional problems, as more residents have cars than originally expected and hoped (resulting in residents parking in places they should not). The idea of creating a car-free area was scrapped because of a need for access for waste collection trucks.

The solar and energy-efficiency features have generally worked well. There have, however, been conflicts over the desires of some residents to add an additional floor to their homes. These proposals have not been approved by the city because they would interfere with solar access for other units. To some, this represents the thorny issue of how to design affordable housing that residents can live in throughout the different stages of their lives. Forcing those who wish larger units to move out is seen by some as contrary to the goals of sustainability.

In the most recent city evaluation, an effort was made to determine how residents actually enjoy or value living there. The study concludes that indeed residents are happy living there and are especially pleased with the greenery and gardens, and the small homes and walkways throughout the project.

Since these initial demostration projects, there have been a host of more recent innovative ecological developments throughout the country. Oikos, near Enschede, is one of the more impressive of the latest generation of ecological building projects in the Netherlands. Located within a larger VINEX development site, the project incorporates a number of significant ecological features. These include the extensive use of *wadis*, or natural drainage areas (described in more detail in Chapter 7), the minimization of hard surfaces and the use of permeable bricks for parking spaces, extensive solar orientation (some 75 percent of the units are oriented to the south), and the extensive incorporation of natural areas and public gardens between the buildings (see Figure 10.2).

In the southern portion of the site (called the "outer Oikos"), new development will occur in development clusters, with extensive natural spaces—referred to as *eco-tuinen,* or natural gardens, between and around them. In addition, areas will be specifically identified in advance for community flower and vegetable gardens. Everywhere there is an emphasis on promoting natural drainage.

Other sustainable building features include high-speed bus service (to the center of Enschede), provided through a bus-only lane penetrating to the center of the community; good bicycle connections (there is a very high rate of bicycling in Enschede); restrictions on the building of wooden fences (only natural green fences will be permitted); and the building of a network of green hedges through the community. The buildings will not use tropi-

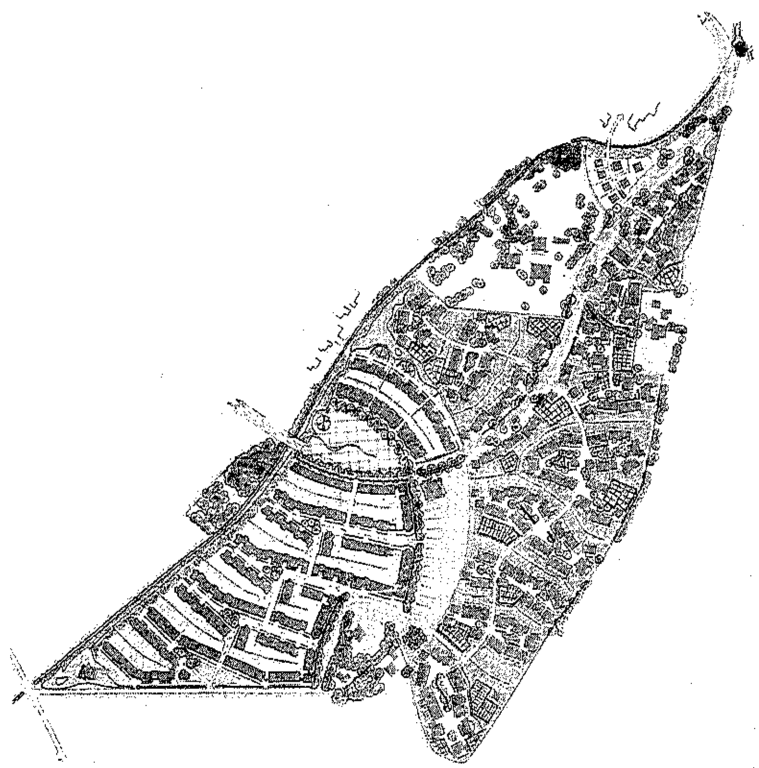


Figure 10.2. Plan diagram for Oikos ecological development

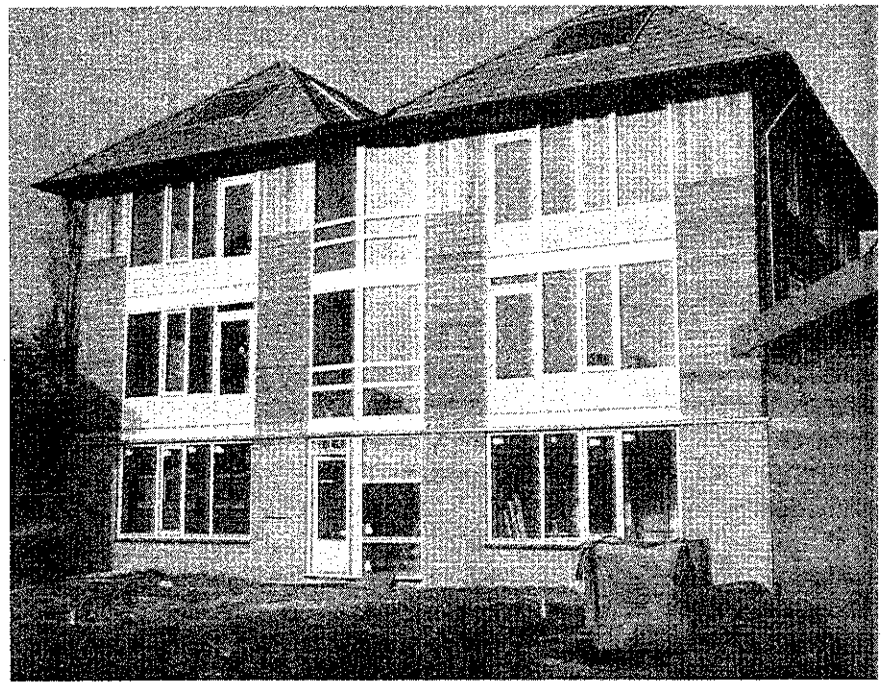
Oikos is a new ecological community in Enschede, the Netherlands. As the building plan shows, the design includes extensive green areas intermixed with housing. These green areas take many forms, including *wadis*, or natural drainage ditches, and community gardens (small cross-hatched areas on the map).

Source: BMD Enschede and Bureau Zandvoort.

cal woods; instead, they will use more sustainable woods and water-based paint (the lumber for the much of the buildings is western red cedar, which requires no treatment. It does come from Canada, though, raising questions about the environmental and energy costs of transportation).

Oikos will include a community center, where commercial and retail establishments will be located on the ground level with apartments above. At the very center will be a small public park with an interesting wishbone-shaped fountain. The fountain's pump will be powered by PV panels and will create the effect of a constant rainbow.

The physical design of Oikos is intended to facilitate interaction between residents. There are a series of crosswalks, each with a small public space,



Passive solar energy is an important design feature in many of the buildings in Oikos, an ecological development in Enschede, the Netherlands. About 75 percent of the homes are oriented to the south to take advantage of passive solar.

that eventually leads residents to the center of the community. As with many Dutch projects, the designers intended to de-emphasize the automobile. The direct route of the bus-only corridor has been described as the "front door" of the community, while the entrance for cars is considered to be the "back door." Nevertheless, there will be a considerable number of cars there and a considerable amount of commuting (although only 1.3 auto spaces per unit are to built).

In Oikos, there has also been a great emphasis on educating the new residents about living ecologically. Municipal officials have convened a series of informal meetings with new residents to educate them about the ecological features of the project, giving them ideas about how they might maintain their homes in a consistent fashion. For example, new residents are given a list of native species of plants, trees, and vegetation, along with advice about how to maintain their gardens and outdoor areas in more ecologically sensitive ways.

In Amsterdam, the largest new development site, the Ijburg project, incorporates many sustainable features. Although controversial because it involves creating islands in the Ijmeer (with a resulting loss of shallow-water aquatic habitat), the development incorporates a number of both basic and innovative features to minimize its ecological footprint. Supporters of the project (the project was just endorsed by a citywide referendum and is moving forward) argue that its close-in location, dense and compact design, and ability to provide good public transit serve to make it, from the beginning, a relatively low-impact alternative for addressing the city's housing needs. Its density will average about 60 dwelling units/hectare, but will be as high as 110 dwelling units/hectare in certain areas. It will be served first by a high-speed tram and later by an extension of the city's underground metro system. In addition, several sections of the first island to be developed will be designed as car-free zones, and the number of allowable parking spaces for the entire project will be kept lower than is typical. The city, in collaboration with the national auto club (ANWB), is working on developing a set of mobility packages or options that will be offered to prospective homeowners (e.g., combinations of discounted public transit, membership in a car-sharing service, and so on). Other sustainable design and building ideas will be used in Ijburg, including utilizing district heating, high standards for insulation, restrictions on the use of certain building materials, and the use of active and passive forms of solar energy. Consideration is also being given to using a dual-line system for provision of water, in which a separate line brings less-than-potable water (e.g., from sewage treatment) to be used for toilet flushing, garden watering, and so forth. Ijburg will also take advantage of the Netherlands' special green investment funds, which will allow homeowners, once the project is certified as a green project, to obtain below-market mortgage rates.

Other environmental aspects of the project include the restoration of a former chemical dump to the south of the site (the plan includes building a containment barrier and a soil cover) and conversion to a park. A compensation package has also been negotiated with environmental groups and will include an expenditure of 40 million guilders (about US $20 million) to create and/or restore shallow habitat along shorelines north of Amsterdam and to create a bird island immediately to the east of Ijburg.

Other ecological innovations can be found in many other Dutch projects. One interesting design idea in Nieuwland, in Amersfoort, is the concept of *school houses*. There are fourteen of these structures planned. They are small school structures designed so that later, as the community matures and the numbers of school-age children decline, they can each be divided and converted into two single-family attached residential units. (These units will also accommodate PV panels on their rooftops.) These examples represent forward-looking architecture and community design, which recognize the fundamental need for flexibility and modification in interior spaces and even the uses of buildings over time.

Another variation on this theme are buildings designed from the beginning for dismantling and reuse. One such recent example is a new (so-called) *dismountable* police station in the Dutch town of Boxmeer. This is the result of a study (commissioned by the Dutch National Building Agency) of the concept of the *fast-office*, or a "lightweight, easily dismountable building which can be completely reused." As the National Building Agency explains, such a design provides badly needed flexibility: "Changes are always taking place in the police force and the situation twenty years from now is likely to be completely different to today's situation. The two-level building can be reassembled elsewhere, possibly with a different appearance" (National Buildings Agency, 1997, p. 38). Other important environmental features of this police station are an emphasis on natural ventilation ("electronically-controlled ventilation grilles"), daylight-controlled lighting, and double sliding windows (as an alternative to potentially leaking double-glazed windows).

Newer generation ecological or sustainable building projects are numerous, with creative examples in virtually all of the case study cities. Other impressive Dutch ecological projects under way in study cities, include the CiBoGa project and Piccardthofplas in Groningen; DeWijk in Tilburg; Nieuwland in Amersfoort; and Polderdrift in Arnhem, among many others.

Scandinavian Exemplars

Many exemplary Scandinavian projects and designs can also be cited. Indeed, for the major Scandinavian cities studied—Copenhagen, Stockholm, and Helsinki—the major new development areas in each are being planned and designed according to sustainability principles (and in fact the three cities are beginning to work together, to share information, and to collaborate on proposals for funding certain aspects of the projects). These projects are Viikki in Helsinki, Ørebro in Copenhagen, and Hammarby Sjöstad in Stockholm.

In Helsinki, the municipal government's new development area (called Viikki), which will accommodate a new science park, will also include an interesting ecological housing district that will eventually be home to some 1,700 residents (City of Helsinki, undated). The preliminary design involves, among other things, an "ecological day care center and school," a wood industry activity center (to demonstrate how Finnish woods can be used in building), and a horticultural and gardening center that will provide residents with information about the environment and advice about gardening. A large conservation area lies to the south and east of the new community, with a large portion in protected wetlands. Other lands will be available for allotment gardens and walking trails, and some areas will remain in farm use. Interestingly, the intention behind the horticulture center is to in part, "rent out allotments to residents, give information, lend and hire gardening tools and maintain model plots" (City of Helsinki, undated, p. 4).

The area designed for ecological housing, although not built yet, has been designed. The design was generated through a competition and resulted in a basic layout of south-facing homes with dwellings "grouped along 'courtyard' streets, with green strips penetrating the gaps between the blocks. These green strips promote the utilization of rainwater, composting and allotment gardens" (City of Helsinki, undated, p. 2).

Interest in promoting sustainable building in the district has already resulted in the construction of an apartment complex made of Finnish timber. Ironically, wood construction has been rare in this land of abundant forests, largely a response to the perceived fire potential of such construction. New interest in utilizing Finnish wood resources led to this important demonstration project.

In the Copenhagen region, there are many examples of ecological building. One of the more notable is Skotteparken, a low-energy housing project in the community of Ballerup. This project consists of 100 residential units, partly funded through the EU's THERMIE program, which are intended to demonstrate and support new energy technologies. The project consists of six blocks, organized in a horseshoe pattern, with a small lake and a recreational area at the center. Heating for the project is provided through a combination of a small CHP (located in an adjacent school and fueled with natural gas) and solar collectors incorporated in the rooftops of the structures (100 square meters of solar collectors in each building). The CHP will operate on a pulse basis, providing energy to each of the building's boilers when solar heating is insufficient and boiler temperatures fall below a certain level. It is expected that the solar collectors will provide sufficient room heating except during the winter months, as well as 65 percent of the hot water needs over the entire year (Building and Social Housing Foundation, 1996).

Other energy features of this project include extra insulation, low-emissivity window glass (U-value 0.95), heat recovery of forced ventilation air (80 percent recovery), and low-energy lighting and appliances. Water-saving measures include low-use kitchen and bathroom taps and the collection of rainwater in the small lake. The projected energy and waste savings are substantial (predicted reductions are 60 percent in gas use, 30 percent in water, and 20 percent in electricity (Building and Social Housing Foundation, 1996). The project won a World Habitat Award in 1993.

Ecological Buildings and Institutional Structures

Examples of a number of larger institutional structures designed and built according to sustainability principles also exist in the case study communities. These include the Queens Building (in Leicester), the ING-headquarters building (in Amsterdam), and the SAS-headquarters building (in Stockholm), among others. Examples of mixed residential/office buildings designed around green principles can also be cited, including the "green building" in Temple Bar (Dublin).

Even major new city-center development projects, including major office and institutional uses, are being designed and conceived of as sustainable building projects. One of the clearest examples of this is in Berlin, with the massive new development occurring at Potsdamer Platz, as well as the new federal government complex. The buildings will be heated by a central heating and power plant and cooled by a central plant. Mobility will be heavily public transit oriented, with the target modal split set at 80 percent public/20 percent private. This is possible because the area will be served by the metro system, and there are plans to construct a new main train terminal at which major transit modes will intersect.

Especially unusual is the extensive planning and care that has gone into organizing the actual construction in ways that minimize impact on the natural environment. To minimize disruptive truck traffic, construction logistics are largely occurring by rail. Great attention is being paid to impacts of the project on groundwater, with special concern about the impacts of a lowering of the groundwater table on the adjacent Grosser Tiergarten. As a result, an extensive groundwater monitoring and management system has been developed. Among other measures, groundwater extracted during excavation will be returned to the aquifer. Other environmental measures include the designing and configuration of the buildings to reduce winds and the implementation of an environmental mitigation package (including the creation of a new 20-hectare park).

The ING-bank headquarters building (formerly the NMB bank) in Amsterdam is one European ecological design that has actually received considerable attention in the United States. It is a large building—some 50,000 square meters, housing 2,400 employees—designed in a distinctive S-shape, accentuated by a series of ten slanting towers. Designed by Dutch architect Ton Alberts, the building has a strong organic look with natural colors and shapes—a building that seems to grow from the very ground itself. In contrast to a skyscraper, it is often called a "groundhugger." The entire building is designed around a main corridor—or "mainstreet"—along which major functions and activities, including canteens, theaters, and meeting rooms, are located.

An emphasis in the building is given to energy conservation, which is accomplished in several significant ways. The building is angled toward the sun and emphasizes daylighting throughout. No workspace is more than 23 feet away from a window, and windows are fully operable. The interior spaces are mostly painted in light colors, and the atrium towers contain extensive "sun paintings"—metal sculptures that help to further bounce sunlight into the interior of the building. There is considerable vegetation along the mainstreet, including hanging plants that drape luxuriously from the upper floors of the atria. Water flow forms are used extensively, with some handrails transformed into gurgling brooks. Water for these flow forms comes from a rainwater collection system. Other energy features include double-glazed windows, a high-efficiently electric generator, an energy retrieval wheel, and other heat recovery systems. Again, there is a heavy emphasis on daylighting and a heavy reliance on task lighting.

Nature is visually close, and the building has a series of impressive gardens and green courtyards surrounding it. The effort to create these greenspaces included the unusual step of helicoptering in several large trees to be planted in one of the courtyards (ING Bank, undated). Perhaps the only negative about these gardens and courtyards is that they provide largely visual (but not physical) access, and the interior building spaces seem little connected to this marvelous green exterior. The location of this bank headquarters expresses its sustainability impulses as well. It is located on a main pedestrian square and shopping area, a few feet away from a bicycle-only path and just a few blocks away from a major metro and train stop. The front of the building is also accentuated by a group of some fourteen older trees that were transplanted from another location where they were going to be cut down.

The results of this early design are spectacular. Energy consumption has been dramatically reduced (estimated to be only 10 percent of what it was in the previous building). The estimated payback period was extremely short.[5] Employee absenteeism has been reduced considerably as well, and employees clearly enjoy working in this structure. Increases in productivity have surely occurred because the office is both a delightful, humane space to work in and one of which the bank (and its employees) can actually be proud.

The new Queens Building at De Montfort University in Leicester represents another significant example of large-scale European ecological building. Designed by Short Ford Architects, the most significant design feature of the building is its emphasis on natural ventilation. More specifically, this feature is achieved through its orientation, a narrow profile facilitating cross-ventilation, and the use of "ventilation chimneys" that cool the building through a stack effect. This is no small accomplishment given the heat loads generated by computers and the more than 1,000 students and faculty members that occupy the structure at any given time. Other environmental features include the incorporation of a combined heat and power plant, the use of CFC-free insulation for piping, and the creation of more flexible, adaptable spaces within the building (De Montfort University, 1993). The building also makes extensive use of daylighting through "rooflights and glazed gables," which bring light deep into laboratory spaces that in a conventional building would not experience much natural lighting (Steele, 1997). Steele describes the building as "the largest naturally ventilated building in Europe," and one that sets "a significant precedent" for future building (p. 68). The use of natural stack effect as a main design feature is impressive:

> The cooling action works by a wholly passive natural stack effect unaided by fans or other mechanical means, a kind of thermosyphon operable in still air conditions, enhanced further by a moving air stream across the roof. The building is compartmented to keep air flow routes relatively intelligible and more locally controllable. The fire regulations are satisfied simultaneously and acoustic privacy is maintained. (De Montfort University, 1993, p. 11)

In this way, the Queens Building utilizes natural principles to cool the building, which reduces energy consumption substantially and fosters a pleasant working and learning environment.

Ecological Urban Renewal

Another important trend evident in several of the study cities is the incorporation of ecological or environmental design features when buildings and neighborhoods are restored or renovated. Numerous examples of ecological renovations in Denmark, the Netherlands, Germany, and elsewhere can be cited (see Danish Town Planning Institute, 1996). A number of such ecological renovations have taken place in Berlin, including pilot projects at Unionplatz (see Mega, 1996) and the now well-known Block 103 project (Berlin-Kreuzberg; see European Academy of the Urban Environment, 1997). These projects typically involve greening initiatives (greenwalls, roof gardens, tree planting, and the replacement of pavement with green), rainwater collection systems with rainwater treated through a vertical biological filter and used for toilet flushing (in the case of Block 103), the use of environmental building materials, and solar energy systems (180 square meters of photovoltaics in Block 103), among other improvements. Block 103 also involved a social dimension, incorporating a community kitchen that served residents organic meals on a weekly basis (see