



# Eco-Viikki

Aims, Implementation and Results

“A bit too child-oriented... but still quite OK.”

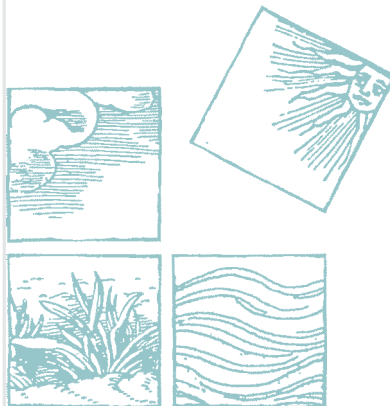
“This is really a wonderful home for someone such as me.”

“A nice place, badly built”



# Eco-Viikki

Aims, Implementation and Results



CITY OF HELSINKI  
MINISTRY OF THE ENVIRONMENT

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# Foreword



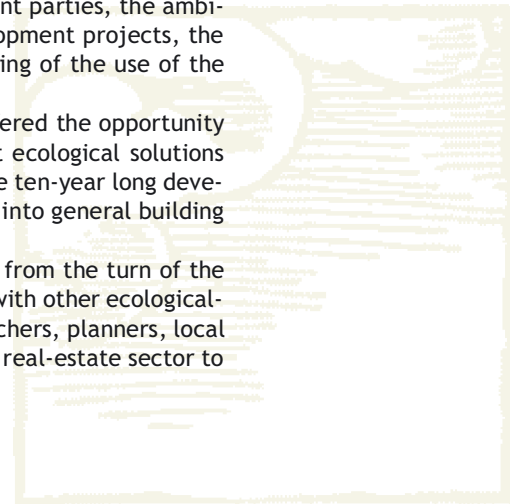
*Eco-Viikki - Aims, Implementation and Results* tells about the first ecological housing area to be built in Finland. Eco-Viikki is a housing area but also a noteworthy and internationally renowned experimental project.

More specifically, this book presents the aims, planning process, and practical implementation of Eco-Viikki, as well as the use of the buildings over a period of a few years. Also documented are the multi-faceted cooperation between the different parties, the ambitious goals, the unique eco-criteria, the numerous individual development projects, the tools of building project steering as well as the long-term monitoring of the use of the buildings.

As a residential area and forum for practical building, Viikki has offered the opportunity to implement applied research and development as well as to test ecological solutions immediately in the field. It is important to discuss and learn from the ten-year long development project and its results and to take up the best applications into general building practice.

Eco-Viikki is the internationally best-known Finnish housing project from the turn of the millennium. Eco-Viikki and the development work being carried out with other ecologically-sustainable building projects have also encouraged Finnish researchers, planners, local and state authorities as well as other actors within the building and real-estate sector to become active in international cooperation.

*The editors*



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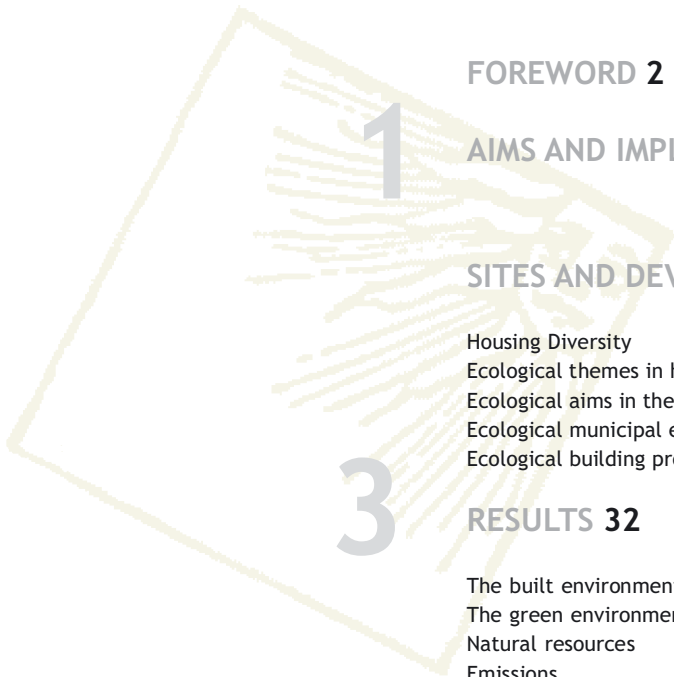
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# Aims and implementation

*"In an ecological society the material cycle is made as enclosed and nature-preserving as possible. Energy can be obtained, for instance, from solar or wind energy and other renewable sources. The need for vehicles is minimised and new forms of transport are developed. The optimal size for a functioning community is about 1500 inhabitants. Widely-placed buildings are located near cultivated land and nature corridors. People who work from their own home live in the area. Goods, food and services are produced locally and the need for commuting has been minimized. Modern technology is used in energy production as well as in moving information and materials."*

*Eero Paloheimo's criteria for an ecological society, presented at the Eco-Community Project meeting, 1.2.1994.*

## The environmental boom takes hold in the building and property sector

The general awareness of ecological problems increased in Finland at the beginning of the 1990s. In 1987 the Brundtland Commission defined the concept of “sustainable development” and ecological sustainability became an important goal also in land use planning and building. This became evident in the change in Finnish building legislation in 1990, where the aims of sustainable development were first included.

An enormous amount of interest and enthusiasm was then directed towards sustainable development. There was a strong belief that by using technology and by developing specific methods one could achieve more “environmentally friendly” buildings and living environments. The other Nordic countries and Germany served as models. Research programmes were initiated in order to ascertain what sustainable development in urban planning and building would actually entail. These included the Research Programme for Sustainable Development and the Research Programme for Ecological Buildings (both funded by the Finnish Academy).

### From theory to practice

Along with producing research data and development projects, there was a need to test ecological principles in practical design and buildings. Discussions between the Ministry of Environment and the Finnish Association of Architects (SAFA) about creating a project aimed at practical building resulted in the establishment of the Eco-Community Project at the end of 1993. The project was coordinated by a frequently convening SAFA working group as well as by a management group consisting of representatives of various interest groups.

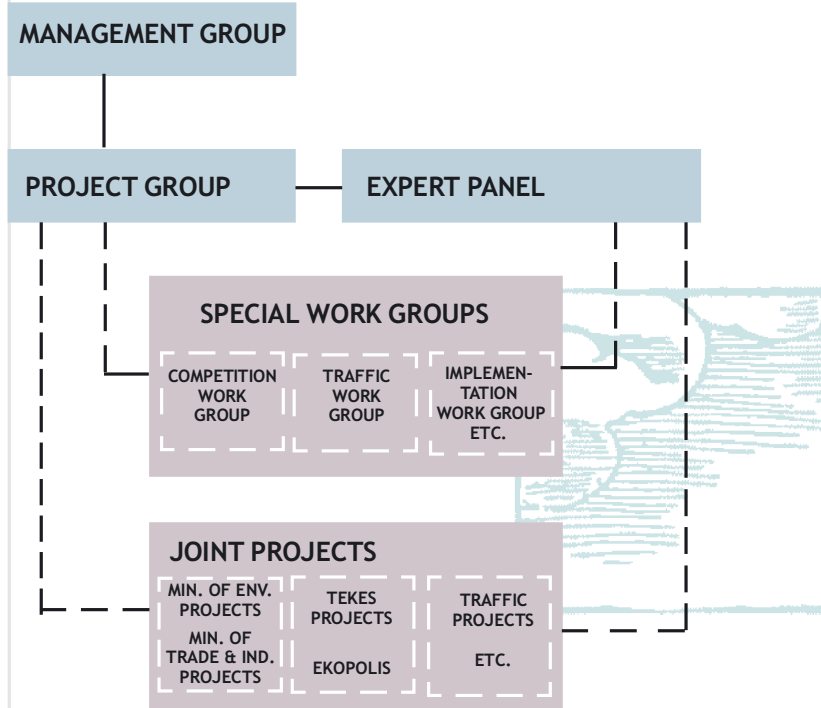
The project quickly got under way, and in January 1994 a letter was sent to several local authorities around Finland asking whether they would be interested in ecological experimental building. Proposals for new building projects for 16 areas in different parts of the country were received. Out of these, 4 were selected that best fulfilled the project criteria (accessibility, suitable size, implementation time-table, etc): Viikki in Helsinki, an area in Leppävaara in Espoo, Ainola in Järvenpää and Anttila in Tuusula. Further negotiations favoured Viikki because, from the point of view of the project, it was seen to be sufficiently ‘urban’. Furthermore, the area is connected to the existing communal structure and is easily accessible by public transport. At that time, the planning of Viikki was still at a relatively early stage, and the ecological starting points and other activities that had been planned for the area supported the aims of the project.

### An impressive setting and pioneering urban planning

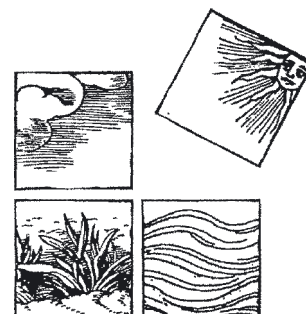
The preparation of the local plan (osayleiskaava) for Viikki had begun in 1989, when the area, eight kilometres from the centre of Helsinki, was virtually devoid of buildings, apart from the western edge of the area where the University of Helsinki has its Faculty of Agriculture and Forestry. The latter had been



Swedish “Eco villages”, such as Tuggelite near Karlstad, became in the 1990s models for Finnish eco-builders.



A diagram of the Eco-Community Project's organization and operations.



The logo for the Eco-Community Project.



The Viikki area before construction. In the foreground the University of Helsinki's Viikki research farm, in the background the location for the future eco-area.



The location of Viikki.

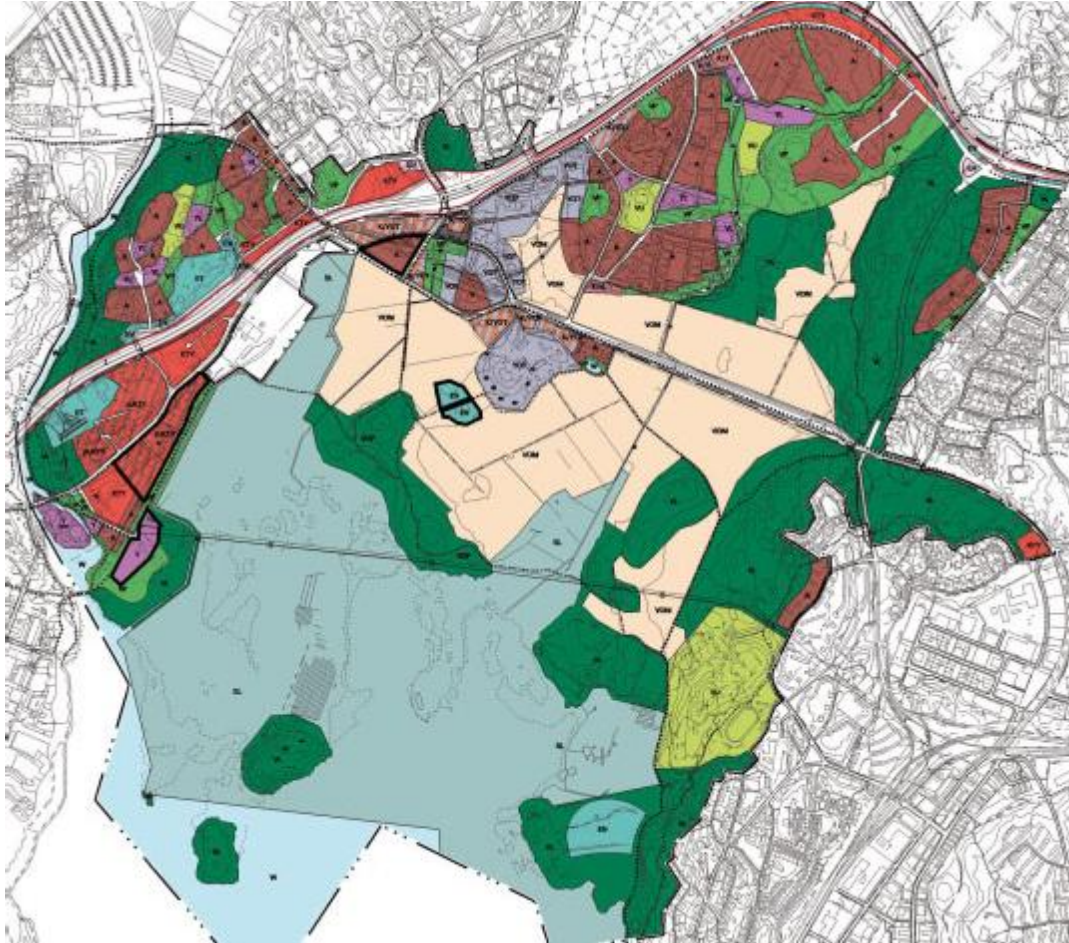


established after the war adjacent to the University's research farm established in the 1930s. The impressive landscape of Viikki comprises a cultural-historically valuable field landscape bounded by forested rocky outcrops as well as the extensive Viikki-Vanhankaupunginlahti nature conservation area bordering the coastline. The starting point of the local plan was to extend the University area, specialising in bio-sciences and bio-technology, and to construct an extensive new residential area connected to a science park, whilst preserving the natural and cultural values of the area. The plan allowed for 13,000 inhabitants and 6000 work-places. In preparing the local plan for Viikki, Finland's first extensive environmental impact assessment report was made, the recommendations of which led, for instance, to moving the proposed built areas further away from the nature conservation area.

During the preparation of the local plan, there was a lively public debate about the ecology of land use and building, and great potential was seen in Viikki for an experiment in environmentally-conscious building. Such a profile was supported by the presence of the University department for bio- and environmental sciences, as well as the proximity of the nature conservation area. Already in the draft version of the local plan, from 1992, there was a mention of Viikki as a possible experimental area for environmentally-conscious building. The ecological profile of the area came to maturity in the course of the planning and the draft for the local plan contained a work schedule for applying ecological principles in the planning and implementation of Viikki.

Despite the ecological starting points, doubts were also expressed in public about the planning and building of Viikki,





Local plan for Viikki.

particularly in reference to the proposed built-up areas being situated near a nature conservation area. According to opponents of the scheme, there was no way that the proposed number of inhabitants in Viikki would *not* influence the nature values of the area in a negative way. The local plan was, nevertheless, approved in spring 1995.

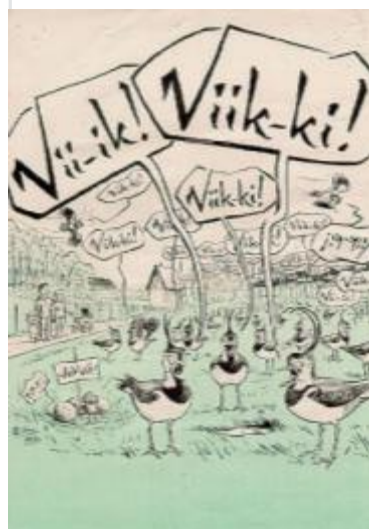
### Cooperation and programmes – a framework for development

In August 1994 it was decided that Viikki would become the pilot area for the Eco-Community Project. An extensive network of actors was established for the project, whose commitment would ensure that the project aims would be implemented. As a necessary development support, The National Technology Agency of Finland (Tekes) joined the project at the beginning of 1994. Later, the Eco-Community Project was linked to Tekes' Environmental Technological Programme of Building (RYM). Development projects implemented within this framework considerably shaped ecological principles towards more concrete implementations.

In 1998 the Finnish government initiated a programme for ecologically-sustainable building which offered an umbrella for those projects already in progress, as well as a framework for complementary projects. The programme consisted of 20 procedures distributed widely over the field of building ecology, several of which were linked to projects being carried out in Viikki. Many of the aims of the programme were also implemented through the extensive ProGresS Programme [ProGresS] coordinated by The Finnish Association of Building Owners and Construction Clients (RAKLI), which brought together the main



In the early stages of the Viikki project the decision-makers in Helsinki received protest mail from environmental conservationists.



property-owners and developers, and acted as a kind of forum for learning and development. Unfortunately the experimental area of Viikki didn't figure much in ProGresS because the emphasis in the latter was primarily on public and commercial building and not housing.

In the early days, promoting ecological sustainability in the building sector involved extensive cooperation. Everyone was a novice. The development programmes, which also received international attention, established the principle that ecologically-sustainable building is guided primarily through voluntary actions and development projects. It was felt that in such a situation as this, where there is comparatively little information about the environmental effects of such projects, it would be necessary to acquire a variety of experiences of different solutions. It was believed possible that building developers and property owners could develop, even quickly, their own ecological concepts. It was also believed that environmentally-conscious consumers would soon enter the market and ask for such concepts. On the other hand, there are already exemplary actors in the building sector, and their solutions have always had an influence on the establishment of new procedures.

### The low-profile economy

Already from the beginning the view prevailed that ecological factors must also be economically viable - but economical also for the inhabitants and users. At that time, after the economic recession, people didn't yet believe that ecology could add extra value to the property, or that it was something that people would be willing to pay extra for. The common denominator was a desire for a reasonable price level. The image that 'ecological' would somehow be more expensive than 'unecological' was not desirable.

Funding for experimental building was sought from both the Ministry of the Environment and Tekes. Instead of an experimental building subsidies system, as initially planned, it was agreed to channel economic support through research and product-development funding. This was then developed by the Ministry of the Environment and Tekes and implemented between 1998 and 2000. The subsidies were meant to encourage property owners to use ecologically-friendly solutions. The subsidies were modest compared to the financial support available in many other countries at that time.

The difficulties in achieving even a temporary subsidy system were due to the general suspicion towards financial support linked with investments. It was presumed that such support would distort competition and affect prices. On the other hand, managing small subsidies was perceived, for instance in Tekes, as laborious and expensive.

However, the players in the field were active. Almost all building companies developed their own life-span calculation models and building steering methods. At the same time, there were on-going development projects – for instance, for building methods, environmental management and organising the building site waste – in the building and property sector,

and these were developed and tested on, amongst other places, the Viikki building sites.

### The detailed plan competition – a forum for ecological debate

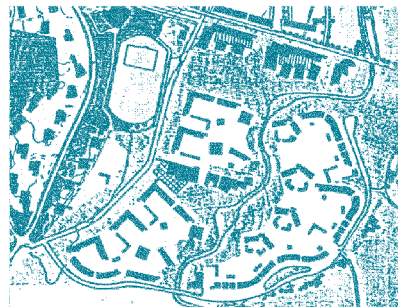
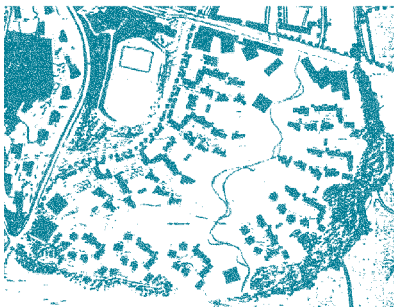
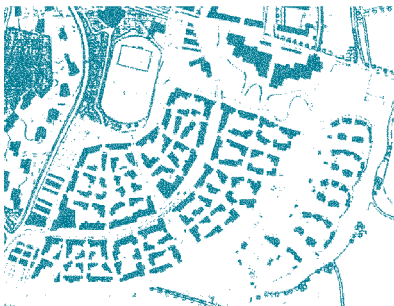
The first important public output in the Eco-Community Project was the organisation of a large open ideas competition for the detailed plan (asemakaava) of Viikki. The competition began in autumn 1994 with a large seminar that gathered together a group of experts to discuss the ecological opportunities and model solutions for cities. Apart from disseminating information, the event was also a kind of "synergy machine", a contact point promoting the formation of multidisciplinary expert groups that the competition programme called for.

In the planning competition, organised by the City of Helsinki and the Eco-Community Project, ecological visions and model solutions were sought for at the level of the neighbourhood block. The competition area was defined as roughly the area of the present Eco-Viikki – i.e. the southern-most area of the city district of Latokartano, situated closest to the Science Park. The 23-hectare area was to become a residential area for 1700 inhabitants (60,000m<sup>2</sup> - 70,000m<sup>2</sup> of housing) with services (2 daycare centres, a school and local shop). For the competition, ecological principles were formulated on a general level for the surrounding landscape, building construction, traffic, energy, and water and refuse management. In order to implement the ecological aims, the competition organisers stated that they wished potential competitors to form working groups consisting of experts in different fields.

There was a great interest in the planning competition, and 91 proposals were received. In evaluating the proposals, the competition jury had the support of a wide multi-disciplinary expert group. The competition proposals showed that the idea of an ecological city varied greatly; among the competition entries, one could find almost all types of plan, from the end of the 19th century to the present day. The competition jury indeed stated that it is not possible to define one correct model for an ecological area. However, the competition produced a large number of carefully thought out proposals that highlighted the relationship between nature and building as well as ecological aspects of residential building. Thus the competition fulfilled the project aim of being of educational significance.

*'Towards a Sustainable City' seminar, October 1994.*





*Models for an ecological city: some of the "Upper Class" entries in the 1995 Viikki detailed plan competition. On the top, the winning entry by architect Petri Laaksonen.*





Proposals for the 1996 housing block competition.  
 Below-right: the winning entry, 'Eko Teko', by Hunga-Hunga Architects  
 and developers VVO-Rakennuttaja Oy.

### 'Green fingers' an asset of the winning entry

The winning detailed plan competition entry, titled "60° 15" Pohjoista Leveyttä" [60° 15" northern latitude], by architect Petri Laaksonen, stood out from the other entries due particularly to its unique urban structure and implementation of ecological principles. In his plan, based on a finger-like structure, the buildings are grouped around residential precincts ('home zones' where pedestrians have the right of way), with 'green fingers' penetrating between the built areas, so that every plot is directly linked to the green areas. The major part of the buildings is directed optimally towards the south. The compact structure, lower at the edges and rising towards the centre, was seen as a favourable one from the point of view of wind abatement. The proposal also presented a wind shelter zone, formed by vegetation, between the open field and the built-up area.

The draft for the detailed plan was to a large extent drawn up on the basis of Laaksonen's winning entry and the input of Helsinki City Planning Department, and it was approved at the end of 1995.

### A design competition for a residential block as a promoter of inclusive planning

While the detailed plan for the area was being prepared, a competition at the neighbourhood and building level was organised. The ambitious aim of the second competition was to find ecologically efficient solutions as the basis for the first neighbourhood blocks in the area. With the experimental building implemented on the basis of the competition results, there was, according to the competition report, "a striving for an important developmental step in ecological building, both nationally and internationally."

The competition was arranged in order to find ecological innovations, but also to make sure that such innovations would actually be implemented. A new aspect for the competition system was to include building developers. There was a debate whether the different professionals would manage to find each other and whether such a procedure would exclude young designers. It was decided to organise a new type of registration-invitational competition, where there was to be a stage before registering for the competition, where the different parties could find each other. The intention was to promote the formation of workgroups wanting to participate jointly in the competition. The workgroups had to represent a variety of professional skills, and have the necessary expertise to be able to carry through the development projects and experimental building that they proposed.

Each workgroup had to include an architect, a structural engineer, a HVAC and electrical engineer and an expert in ecology, as well as a building developer. When registering, the workgroups were required to give a description of their central ideas, as well as a design and implementation concept. The groups had to present a specific ecological product, the experimental site for which would be Viikki.

Twenty-nine groups registered for the competition, including the major housing developers and building companies. Thus, the interest in the development and available plots was intense. Six groups were selected for the second stage of the competition. A few otherwise potentially eligible groups were excluded because their ability to implement the project was not convincing. The project ideas of those groups selected showed a wide variety of different approaches in the field of building ecology.

## High standards

The competition area, located along Tilanhoitajankaari, the local distributor road, consisted of reservations for two large residential blocks, one for predominantly high-rise blocks and the other for low-rise blocks. The lesson learned from the detailed plan competition was that in order to gain the desired results the requirements had to be precisely defined. However, proposing precise requirements was problematic, because at that time there were no ecological criteria available for such projects. The competitors were required to show the design principles and to justify at least the following factors: the main building materials and their environmental and health effects, the energy economy, water management, waste-disposal management, as well as the cost effects on investment and usage costs for solutions that diverged from conventional building practice. Because energy costs were felt to be particularly important, a relevant expert was consulted when drawing up the competition programme. Due to the novelty and problematics of this issue, three experts were eventually hired. They drew up energy guidelines and calculation programmes, which were attached as an appendix to the competition programme.

The invitational competition took place in March-June 1996. A broad group of experts was again appointed to assist the competition jury, and they provided statements about the competition proposals.

All the competition proposals were potentially realisable, yet rather traditional with regards to architectural design, building construction techniques, and floor-plan solutions. A common feature in all the proposals was a conservatory, often projecting into the body of the building frame. Comparing the environmental effects of different building materials and providing a detailed explanation of the choices had clearly been difficult for the competitors. With regards to the energy solutions for the housing, the ecological methods proposed included low temperature technology, geo-thermal heating and renewable energy resources. Particularly solar energy had been utilised in a varied way. Energy saving was strived for by using, for instance, wind- and solar-energy-boosted natural ventilation, wood-heated communal saunas and novel cold-storage solutions. As regards water management, some of the proposals had solutions for the local-based purification and recycling of grey water (non-toilet water).



*The townscape vision of the winning entry, 'Eco Teko', in the 1996 housing block competition.*





Ari P ennanen  
Raimo I nkinen  
Joel M ajurinen  
Kai W arttainen  
Tero A altonen  
Juha G abrielsson

## Residential block competition proposals – the basis for the implementation of Eco-Viikki

After the announcement of the results of the competition in October 1996, the group responsible for the winning entry “EKO Teko”, Hunga-Hunga Architects with the developers VVO-Rakennuttaja Oy, got to implement a residential precinct in the competition area. Due to the high quality of the other competition proposals, these groups were also given blocks and plots to develop in the eco-area. The aim was to test the innovative technical solutions of the competition proposals.

However, many of the innovations among the residential block competition proposals were eventually not implemented as, unfortunately, is often the case. For instance, the proposals for using clay and re-cycled building waste for the floor structures, recycling grey water and cooling cold storage spaces by using geo-thermal energy finally fell on technical-economic considerations. Also, the most important building material innovation, thermal concrete developed for wall structures, later during the construction stage turned out to be problematic, and was thus abandoned.

The utilisation of solar energy, on the other hand, was implemented in many projects, as were experiments involving natural ventilation. There was also an above average preparedness for an information network and building automation in the buildings and whole area generally. However, the area did not receive its own information network as the broadband connections of external operators become more common.

## Eco-criteria setting high standards

The residential block competition ensured that the area would receive buildings with ecological potential. Apart from individual ecological innovations, there was also a desire to ensure that a basic level of ecology for certain important factors would be applied in all buildings in the area.

Already at an early stage, there was an awareness that in order to maintain the area’s high ecological profile some sort of ecological criteria were required. Both competitions had also shown that evaluating the degree of “ecologicalness” of the proposals could not succeed without some measurable properties. There was no such criteria in use in Finland at that time, yet it was felt that various criteria in use elsewhere (BREEM, GBC) could not be directly applied to Finnish conditions. It was thus decided to create a set of ecological criteria specifically for Viikki. Due to the limited know-how in the field at that time, it was difficult to find suitable consultants for this task. Offers were asked from three groups, and of these the group led by professor of architecture Kai Warttainen was selected because it seemed the most innovative.

The so-called PIMWAG criteria (the name was derived from the initials of the members of the workgroup) were drawn up quite quickly in spring 1997. They consist of 5 factors to be taken into account in assessing the level of ecology of a scheme: pollution, the availability of natural resources, health, the biodiversity of nature, and nutrition. These factors contain a total of 16 criteria to be assessed in a project,

## PIMWAG CRITERIA

POLLUTION	minimum level	1 point	2 points
Carbon dioxide emissions	3200 kg/gross m <sup>2</sup>	2700 kg/gross m <sup>2</sup>	2200 kg/gross m <sup>2</sup>
Clean water consumption	125 l/person/day	105 l/person/day	85 l/person/day
Building material waste	18 kg/gross m <sup>2</sup>	15 kg/gross m <sup>2</sup>	10 kg/gross m <sup>2</sup>
Household waste	160 kg/person/year	140 kg/person/year	120 kg/person/year
Environmental labelling	No additional requirements	Environmental labelling for min. 2 products used to a substantial degree	Environmental labelling for several products used to a substantial degree
NATURAL RESOURCES			
Primary energy	30 GJ/gross m <sup>2</sup> /50years	25 GJ/gross m <sup>2</sup> /50years	20 GJ/gross m <sup>2</sup> /50years
Heating energy	105 kWh/gross m <sup>2</sup> /year	85 kWh/gross m <sup>2</sup> /year	65 kWh/gross m <sup>2</sup> /year
Electrical energy	45 kWh/gross m <sup>2</sup> /year	40 kWh/gross m <sup>2</sup> /year	35 kWh/gross m <sup>2</sup> /year
Adaptability and multi-use of space	Standard solution	15% adaptability in flats OR housing functions concentrated in communal spaces	15% adaptability in flats OR housing functions concentrated in communal spaces + versatile spaces in the building
HEALTH			
Internal climate	S = Class 2* P = Class 1 M = Class 2	S = Class 2* P = Class 1 M = Class 1 Min. 2 important prod. groups	S = Class 1* P = Class 1 M = Class 1
Moisture risks	Standard good solution	Better than build. standard RakMK C2 (1997) minimum level	Innovation used
Noise	Standard solution	RakMK C1 level (1997)	Noise insulation better than RakMK C1 level
Wind and sun	Standard good solution	Excellent solution	—
Alternative house plans	Standard solution	15% of flats differ in plan	30% of flats differ in plan
BIODIVERSITY			
Plant selection and habitat types	Plant selection based on defined habitat types	Vegetation characterized by varied flora and through layeredness	Yard design promoting biodiversity of plant habitats. Plant communities containing different species
Storm-water management	Solution in accordance with building standard RakMk D1	Rain water utilized for creating varied eco-systems and for watering gardens	Innovative solutions
NUTRITION			
Cultivation of useful plants	Standard solution	A third of bushes and trees yield produce	Residents given opportunity to cultivate their own yards



\*Indoor climate classification system: S= Target values for indoor climate; P= Guidance for design and construction; M= Requirements for building products

and are given 0-2 points, depending on the degree of “ecologicalness”. To begin with, each factor in each project has to reach the minimum level (= 0 points). The minimum level itself represents a clearly better level than the conventional level of building. For instance, the minimum level of the heating-energy consumption to be purchased was 105 kWh/m<sup>2</sup>/year, which is 34% less than in conventional building. In order to gain 2 points, the solution has to be as much as 59% more energy efficient.

The PIMWAG criteria thus defined the levels of ecology, but not the means of how to achieve them. Thus it was thought that there should be a larger range of different solutions. The maximum amount of points achievable is 30, but already to gain 10 points was, according to the PIMWAG workgroup, repre-

sentative of an ecologically excellent scheme. The criteria factors were also given a weighting. The most important factors were those which could be most influenced in Viikki, such as pollution. There were also plans for a system in which the projects could get additional financial support (e.g. from Tekes) in relation to their attained PIMWAG scores, but such a system turned out to be impossible to implement in practice.

### Tools for achieving ecological goals

To make the consumption figures comparable, other calculation programmes were also linked to the criteria for the consumption of heating energy (MotiWatti) and carbon dioxide emissions, as well as the energy tied to building materials and the use of the building (BEE programme).

Start of construction		Developer	
<span style="color: red;">■</span>	1999	YIT	
<span style="color: green;">■</span>	2000	VVO	
<span style="color: purple;">■</span>	2001	SKANSKA	
<span style="color: blue;">■</span>	2002	HELAS	
<span style="color: yellow;">■</span>	2003	ESY	
		ATT	
Type of occupancy		OO	owner-occupied
		AAO	right-of-occupancy
		AV	ÄRAYA rental
1750	floor area		

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Eco-Viikki plots: building developers, implementation time-table and forms of ownership.

According to the PIMWAG workgroup, ecological building in Viikki should be promoted on four levels: a minimum level of eco-criteria, experimental building projects, buildings with radical images, and monitoring schemes. Of these, only the idea of buildings with radical images was not used. A clubhouse, to be built in connection with the Eco-Viikki square, was for a long time intended to be a building that would give the area a radical image and function as some kind of “ecological window” for the inhabitants of the area, as well as for the general public. Projects and innovations as well as the energy, water and other consumption figures for the area were to be displayed in the building. Unfortunately, obtaining funding for such a project turned out to be impossible and the clubhouse was eventually built in a more traditional form.

The creation of the PIMWAG criteria in 1997 was a pioneering work. Due to its complexity, however, it was partly left incomplete. For example, as work progressed the listing of forbidden and recommended building materials was studied, as was the use of natural resources for each building part, but these aspects had to be left outside the criteria. The PIMWAG criteria generated a lot of interest abroad. Based on the PIMWAG experiences, the Ministry of Environment initiated the Building Environmental Classification Scheme (PromisE) in which an even more efficient method was developed for the evaluation of the environmental qualities of buildings. Despite its shortcomings, the PIMWAG criteria proved central in directing building in a more ecological direction in Viikki.

### The central role of the conditions for the hand-over of sites

It was decided that all the participants in the invited competition would be given the opportunity to build a residential

block in Eco-Viikki. According to the land exchange agreement, however, about one-third of the plot area belonged to the Finnish state, for the purpose of building owner-occupier housing. So before the plots were handed over an agreement had to be made between the City of Helsinki and the State on the plot subdivision. Following negotiations, a joint reservation plan and a competition bid query, the State Real Property Institute sold its plots to the building developers. The City then reserved plots for the developers, so that the totality was in accordance with the overall aims. Furthermore, the City reserved two plots for ecological development projects that were not based on the invited competition.

The plot reservation conditions turned out to be perhaps the most important tool for promoting the quality of the environment in Viikki. Their central advantage was that the buildings had to fulfil the minimum requirements of the stipulated ecological criteria. Furthermore, each project had to include ecological experimental building and follow the good building practice recommendations established for the area. The design of the buildings had to be based on the plans and ecological innovations presented in the competition proposals. The developers were also obliged to participate in the monitoring, presentation and reporting of the results of eco-building. Despite the strict demands, the developers’ interest in the area turned out to be high.

At the plot reservation stage, the form of occupancy was also defined. About half of the housing was reserved for owner-occupancy and a quarter each for rented and ‘right-of-occupancy’ dwellings. [The ‘right of occupancy’ system is a form of housing possession falling somewhere between owner occupancy and renting. Residents buy into the scheme by paying 15 percent of the value of their home; this payment is re-





Detailed plan for the ecological residential area.

deemable at any time. Residents also pay a monthly residence charge]. The larger than usual percentage of owner-occupier dwellings is explained by the agreement made with the State and by the housing production policies of the property developers. It was also estimated that it would be easier to implement the additional investments required for fulfilling the eco-criteria and experimental building with owner-occupied housing rather than state-subsidised housing.

### The environmental impact assessment report enables the go-ahead

After the residential block competition, the draft for the detailed plan was revised, making it applicable for implementing the competition proposals, in accordance with the plot reservations. Also, in drawing up the detailed plan, an environmental impact assessment report was carried out for the eco-area. The report stated that even though, as a result of building, the area of rural fields will decrease and the landscape image of the area will change, the transformation of the Viikinoja ditch into a natural-looking stream will bring new biotopes to the area. Also changing the intensively-cultivated fields into meadows or allotment gardens would improve the birdlife habitat in the area. It was estimated that the 'green fingers' would, if implemented correctly, evolve into urban ambiances supporting a rich variety of species.

### Parking and surface water run-off as the eco-focal points of the detailed plan

No particular ecological requirements for building were contained in the detailed plan because it did not seem natural to do so. "Good building practice" guidelines and the conditions for handing over the plots were seen as more flexible steering

tools. Also, in the detailed plan, car-parking norms and the treatment of surface water run-off were used as tools to promote ecological land use for the yard areas.

With regards to car-parking spaces, the detailed plan only requires half of the usual car-parking spaces for the plots (e.g. in the 1-2-storey houses the norm is a minimum of 1 car-parking space for every 160m<sup>2</sup> of gross floor area, a maximum of 1 car-parking space for every 80m<sup>2</sup> of gross floor area). The aim was for car-parking spaces to be sold separately from the dwellings and thus to target their building and maintenance costs to those who need them. The building permit documents were, however, to contain an expansion reservation for extra parking, if necessary.

With regards to surface water run-off, there was also a stipulation in the detailed plan that *"through structural and other measures, the water coming from rain, melting snow and roofs should be slowed down to as large an extent as possible, and soaked into the ground."* The aim was to keep the surface water run-off that flows towards the nature conservation area as clean as possible and to improve the habitat for the vegetation.

The detailed plan for the eco-area was approved by the Helsinki City Planning Board in autumn 1997. The complementary "good building practice recommendations" and a general plan for the public spaces were approved the following summer. The regulations also included the eco-criteria for the area, which in turn guided the construction of the plots handed over by the State. A part of the "good building practice recommendations", based on the then operative Helsinki Building Ordinance, was binding, while other parts were recommendations for the planning of plots and public areas. Compliance with the binding stipulations was to be shown in



*Group self-build schemes during construction.*

the building permission documents. Many of the binding stipulations concretely influenced the housing projects. Among such requirements were, for instance, the use of conservatories or glazed balconies, the planning principles of the yards and 'green fingers', as well as technical stipulations regarding waste management, foundation construction and water drainage management.

### Group self-build projects complement the building developer spectrum

On the basis of a bidding competition for plots in autumn 1999, six plots in the south-east corner of Eco-Viikki, at the end of Versokuja lane, were reserved for self-build projects, consisting of resident groups of 3-5 families. The applicant groups had to present draft plans for the construction and their aims for ecological building. The 16 applications received were assessed on the basis of the qualities of the plans and their ecological ideas, and were then streamed into similar groups from which the order of selection of the plots was finally allotted. All the groups that were selected for the area included at least one building professional.

The group self-build projects contained many interesting development ideas, which in a natural way complemented the industrialised building methods of the rest of Eco-Viikki. These ideas include, for instance, ecological low-energy construction, preheated natural ventilation, wood-pellet heating, geothermal heating, combining living and work, as well as a log-frame terraced house.

## The rapid launch of the building design and implementation stages

The construction of the municipal engineering in Eco-Viikki began in autumn 1998, soon after the detailed plan was ratified. The design of the housing projects began on a wide front, with almost all the largest housing developers involved. The building of the first residential block (ATT/SUNH) began in spring 1999. By the end of that same year, already half of the dwellings were under construction. In the beginning, the dwellings of the non-state-subsidized housing were sold quickly, because there had been a lot of media attention about Eco-Viikki, and people were clearly looking forward to the dwellings coming on to the market. After the initial rush, however, the demand evened out. The last low-rise block of flats/terraced house was completed in early autumn 2004.

Different forms of contracts were used in constructing the projects: a part was realised as speculative development and a part based on contract bids. Also negotiation contracts were used if the project included a development input from a building company.

## Foundation conditions create additional costs

The building conditions in the area were difficult. Apart from the slope on the western edge of the area, the houses had to be built on 15-25 metre piles and the water table was near the ground surface. On some plots the ground also had to be stabilised or aerated with light gravel in order to avoid depressions. In order to be cost efficient in the levelling of the yards, landfill and the removal of soil was avoided, which then also followed the eco-criteria.

The effects of the ground conditions had to be included in the price of the dwellings, which reduced the possibilities of investing in ecological experimental building. The City of Helsinki assisted by lowering the plot rents, which to some extent reduces living costs.

## Forms of funding developed for financing experimental building

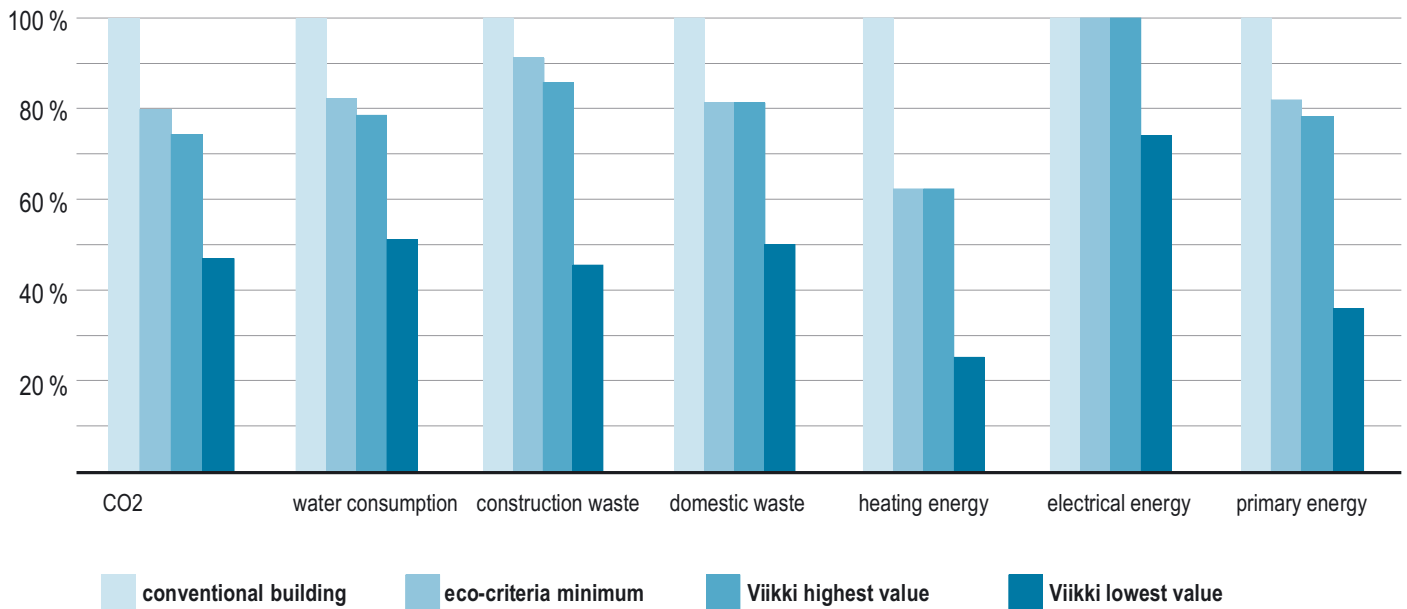
Building practices deviating from conventional ones, the binding demands of the eco-criteria (for instance, on energy saving), and the share of EU capital contributed by individual parties inevitably raised investment costs and the price of the dwellings. The starting point was, however, that the already established means of funding the work would be used in the experimental building projects.

The research and product development subsidies created by the Ministry of the Environment and Tekes for experimental building following the aims of sustainable development were a great help. Out of the total of 4 million Euros granted for the programme, the major part went to building project in Eco-Viikki.

Taking additional costs into account in the state-subsidized housing production was problematic because the price-limit per square-metre set by the Housing Fund of Finland (ARA) was not to be exceeded. After negotiations, however, ARA agreed



*Pile foundations.*



The PIMWAG criteria scoring that the schemes were measured against during the planning stage raised the expectation of results that were considerably more ecological than conventional building.

to accept reasonable additional costs, presented with justified calculations, in the Eco-Viikki projects. The argument was that additional investments would be reclaimed as savings during the use of the buildings. Encouraged by the experiences of Viikki, a similar practice was taken into use in other projects elsewhere in Finland financed by government loans.

### Project steering focused on ecology

In the steering of the Eco-Viikki projects, the same local group-work methods were used as in so-called Hitas areas (City of Helsinki-owned land with controlled cost and quality steering). The city project manager, the town planner and the architect responsible for granting building permission, as well as the building developer and the chief architect of the scheme worked together already from the initial stages of the planning. In Viikki a central part of the work entailed taking into account the eco-criteria and good building practice guidelines included in the conditions for the plot hand-over. In the development projects, the structural-, HVAC- and yard planning played an important role, and hence both the planners and the city representatives participated in the meetings.

The project plans were usually discussed over two or three meetings. In the initial stages of the planning, the preliminary experimental building project was reviewed, as were the PIMWAG criteria goals, the room programme, and the preliminary draft designs. Before handing over the building permit application, the local group would approve the draft for the official building approval drawings, which included, in addition to the normal practices, amongst other things, a yard plan, rainwater and subsoil water drainage plans, a waste-management plan for each plot as well as a car-parking report (if less than the maximum amount of car-parking places was being built). Furthermore, the project's experimental building programme was reviewed and the PIMWAG notification, with its calculations and explanations, was to be included in the building permit documents. In the notification, signed by the

developer, it was shown that the project fulfils the obligatory demands of the criteria as well as other specific requirements of the area.

The PIMWAG review also looked at the developer's proposal for additional points awarded on the basis of ecological quality exceeding the minimum quality, which was approved as such or revised. The projects received additional points, between 9.5 and 17.3, which (according to the criteria) correspond to an ecologically-excellent quality. In the monitoring, some points turned out to be rather optimistic.

### The PIMWAG criteria create work

After granting building permission, the City's building supervision office arranged a coordination meeting with all the parties participating in the building project in order to promote the distribution of information and to review the special requirements set for the implementation of Eco-Viikki. After the completion of the project, the developer would still have to deliver a report to the regional group about possible changes that occurred at the building stage and information on the amount of building waste material.

Regional group work was perceived as a natural way of providing feedback for the planners at a sufficiently early stage, and keeping the building permit stage in mind. Reviewing special designs and calculations took up a large part of the process, something which, according to the planner feedback, the competitors had not always anticipated. It also materialised that the programmes developed for calculating energy consumption and emissions at the competition stage were badly suited to the draft-planning stage. Indeed, the requirement of calculations for energy consumption and emissions linked with the production of building materials was soon abandoned, because at the draft stage there was not enough information available on the quantities of materials. The appropriate tools for such calculations need to be developed.

Using the PIMWAG criteria in the planning steering was

challenging and difficult for the builders and designers, but also for the City representatives. The criteria are suitable for a special project such as Eco-Viikki, but are too labour intensive for more widespread use. The principles and aims of the steering of the Eco-Viikki projects have been retained in the later building stages, but a more limited set of criteria is in use.

The property developers in Eco-Viikki were left with the responsibility for distributing information about the goals and the special properties of the buildings to the building contractors, building managers and residents. But, according to the feedback received in the monitoring, that did not always succeed in the desired way.

### International contacts bring different perspectives

The ecological building projects carried out in Finland before Viikki mainly consisted of individual buildings or sparsely-built eco-villages far from work-places and services. Already from the beginning of the Viikki project, there was a desire to find models for the planning and building of a dense urban-like area. Because in the early stages of Eco-Viikki the rest of Europe was ahead of Finland in realising such ideas, the project actively sought to establish contacts with corresponding projects abroad.

Foreign contacts also led to joint projects, through which additional funding was acquired for the Viikki development projects, supplementing the meagre domestic support. Funding was received, for instance, for three solar-energy projects, for the nature conservation area (from the EU LIFE fund) as well as for a Nordic cooperation project (which compared the aims and eco-criteria in Viikki, Hammarby Sjöstad in Stockholm and Örestad in Copenhagen).

### Monitoring creates a data base for future development

Already in the early stages of Eco-Viikki it was clear that every morsel of experience had to be utilised for what was a unique project in the Finnish context. Thus one of the project's basic starting points was the idea that it had to include monitoring that was as precise as possible. The central task of the monitoring was to study the attainment of set goals, particularly the realisation of the eco-criteria. The feedback has a central role in developing the steering tools for ecological sustainability in the future.

The monitoring research, which began in 2001, was an extensive process, coordinated by the City of Helsinki together with the Ministry of the Environment. Motiva Oy was the main consultant in the project, and was responsible for collecting the consumption data. Furthermore, there were separate reports carried out for plot ecology and surface water run-off, as well as an extensive resident survey.

The consumption data for the years 2002 and 2003 was collected from the 17 housing companies that had been built in the area before 2002. The information was mainly obtained from the house managers' annual accounts. The consumption data for heating, electricity and water was complemented



*The housing blocks that participated in the consumption monitoring project are marked in black.*

with data from the Helsinki plants distributing these services. The project information was collected from all the buildings in Eco-Viikki, including service buildings. Also, the developers, planners and house managers were interviewed in order to collect experiences and feedback. The final monitoring report was completed in summer 2004.

The monitoring process showed that collecting information about the building construction and the use of the buildings is presently rather time-consuming. It was also discovered that presently there are no measurements yet available for the eco-criteria that are simple enough or dependable enough. This concerns such factors as the amount of building waste and rubbish, the quality of the internal climate, the adaptability of the dwellings or even bio-diversity. There is indeed a lot to improve in the development of the monitoring of the building.

# Sites and Development Projects

## Housing Diversity

Common themes in the housing production in Eco-Viikki include: separate metering of water consumption for each dwelling, conservatories/glazed balconies, water-saving plumbing fittings (e.g. toilets), and making use of rainwater in the communal yards.

1 <

**SUNH** (Tilanhoitajankaari 20, 44 dwellings) was the first housing project to be completed in Eco-Viikki. It comprises a four-storey block of flats, with two two-storey flats placed one above the other, and two two-storey terraced houses. On the south side of the block of flats is an access balcony zone, which also leads to the upper flats. Each flat is separated from the access balcony by a conservatory. The scheme was part of the Solar Urban New Housing project (SUNH), under the EU Thermie Programme, which enabled the inclusion of a solar-heating system. Other experimental aspects of the scheme included improved heating technology, the timber elements of the external walls and the wood-based laminated external façade boarding. Each apartment has a separate ventilation system, the mechanical air intake-extract is supplied with heat-recovery, and there is an under-floor heating system using circulating heating water.

*Developer: City of Helsinki Housing Production Department (ATT)  
Architects: ARRAK Architects, Hannu Kiiskilä*



2 >

**HELAS Nuppukuja** (Nuppukuja 6, 26 dwellings), is a “right of occupancy” scheme built by the HELAS housing association. It consists of three timber-construction terraced houses, with the three-storey west gables demarcating the street line. The central innovation of the project was the timber floor solution that would enable the future conversion of the interior of each flat. Wood has been used abundantly in the interiors, including, for instance, the traditional type of wooden floor planks. The abundant communal spaces, including a club room and laundry, reduce the need for appliances in the flats. One of the two communal saunas is wood-heated. The site is part of the Viikki district solar-heating system. Each individual flat has a mechanical supply-extract ventilation system together with heat recovery. The ‘resident-centredness’ of the design was taken further in this project than any other in Eco-Viikki, which has contributed to its popularity among the residents. Within the residential block there is lush vegetation and several allotment gardens.

*Developer: HELAS  
Architects: Abto Ollikainen, Architects*

3 >

**Versokuja 3** (31 dwellings) is a 'right-of-occupancy' development consisting of a block of flats and two rows of terraced houses. The house is joined to the Viikki district solar heating system. The dwellings have a pressurised ventilation system, with the replacement air directed through a supply air window. Other environmental features of the housing block include the adaptability of the flats, the layeredness and wide variety of plant species and the construction of cold-storage spaces in a traditional earth cellar.

**Kevätkatu** (Versokuja 2, 12 dwellings) is situated next to the above residential block and consists of two terraced houses. The set of ecological tools used in the scheme to a large extent follow the above project, but ventilation is based on mechanical extraction and replacement air is brought in through a supply air window.

*Developer: Etelä-Suomen YH-rakennuttaja*

*Architect: CASE Consult LTD, Kimmo Kuismanen*



5 >

**Auringonkukka** (Nuppukuja 3, 31 dwellings) and **Valkoapila** (Nuppukuja 4, 31 dwellings) are two four-storey owner-occupied blocks of flats characterised by a glazed balcony zone on their south side and the integration of solar collectors on the roof. Unusual for owner-occupied housing, the saunas and laundry facilities are communal, with one of each placed on each access stairs. The ventilation is based on a centralised mechanical supply and extraction system with heat recovery. Furthermore, raised access floors have been used in order to improve the future conversion of the flats.

*Developer: Skanska Kodit Oy*

*Architect: Kirsti Sivén, Architects*



4 <

**KTA Eko-Viikki** (Tilanhoitajankaari 28, 87 dwellings), consisting of two four-storey blocks of flats and two terraced houses, is the largest residential block in Viikki. The block is part of the district solar heating system. The dwellings have a mechanical supply and exhaust ventilation system with supply air windows, some of which (on the street side) were changed to normal windows due to the need for sound-proofing. Other ecological tools employed in the scheme follow the general outlines of the Viikki area.

**ASO Eko-Viikki** (Tilanhoitajankaari 30, 38 dwellings) is a continuation of the above scheme, and consists of a four-storey 'right-of-occupancy' block of flats and two terraced houses. The scheme's ventilation system differs from the former, having a pressurised ventilation system, with replacement air directed through supply air windows on the yard side. Fixed to the roof of the yard building is the largest individual solar collector unit in Eco-Viikki.

*Developer: City of Helsinki Housing Production Department (ATT)*

*Architect: Jukka Turtiainen, Architects*



6 <

**Keltavuokko** (Tilanhoitajankaari 22, 63 dwellings) comprises two 5-6-storey blocks of flats that form a gateway to a large green internal courtyard. The blocks are part of the district solar-heating system. Ventilation is based on a mechanical supply-extraction system with additional heat recovery. Special ecological features of the scheme include adaptable balconies and biodiversity of the planted vegetation.

*Developer: Skanska Kodit Oy*

*Architect: Bruno Erat, Architects*



7 <

**Norkkokuja 3** and **Norkkokuja 4** are two blocks of rental flats, comprising a total of 61 flats. The latter block is part of the district solar-heating system. Both have mechanical supply-extraction ventilation systems together with heat recovery. The ecological tools used in the scheme follow Eco-Viikki standards.

*Developer: VVO Group*  
*Architect: Hunga Hunga, Architects*



8 >

**Rosmariini**, **Minttu** and **Basilika** (Tilanhoitajankaari 17,19 and 21; 105 dwellings) are four point blocks located freely on the western slope of the distributor road of the area. The characteristic feature of all the blocks is the uniform zone of glazed balconies on the south façade. The ecological tools used in the owner-occupied flats follow Eco-Viikki standards and, for instance, are supplied with individual supply-extraction ventilation systems, together with heat recovery.

*Developer: YIT Construction Ltd.*  
*Architect: Reijo Jallinoja Architects*



9 <

**Norkkokuja 6** and **Norkkokuja 7** both comprise of three 'right-of-occupancy' blocks combining multi-storey and terraced-house units, containing a total of 68 dwellings. The schemes differ from one another with regards to the ventilation systems, all having centralised supply and extraction ventilation systems, but only seven flats have heat recovery. The crawl spaces in the buildings are ventilated mechanically. The ecological tools used in the scheme follow Eco-Viikki standards.

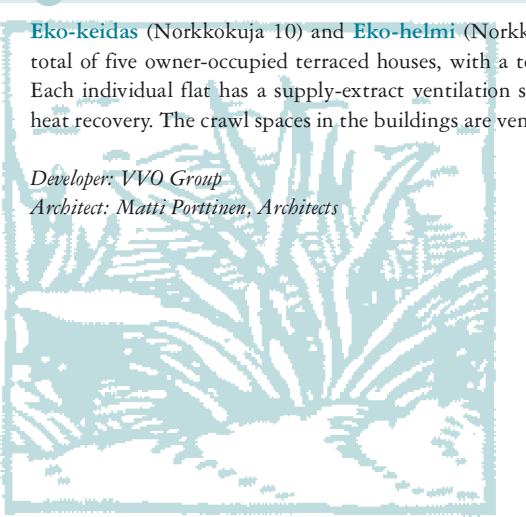
*Developer: VVO Group*  
*Architect: Hunga Hunga, Architects*



10 >

**Eko-keidas** (Norkkokuja 10) and **Eko-helmi** (Norkkokuja 9) comprise a total of five owner-occupied terraced houses, with a total of 31 dwellings. Each individual flat has a supply-extract ventilation system together with heat recovery. The crawl spaces in the buildings are ventilated mechanically.

*Developer: VVO Group*  
*Architect: Matti Porttinen, Architects*





11 >

**Korianteri** (Tilanhoitajankaari 18, 55 dwellings) consists of a 4-storey block of flats and 2 terraced houses. Each individual flat in the buildings has a supply-extraction ventilation system together with heat recovery, which a digital data channel system regulates through a local operating network. Each of the terraced houses has a conservatory.

*Developer: YIT Construction Ltd.*

*Architect: Jukka Turtiainen, Architects*



12 <

The owner-occupier point block **Salvia** (Tilanhoitajankaari 23, 39 dwellings) is a massive gate-like building to the Viikki area. Solar panels (with a total area of 200m<sup>2</sup>) are integrated into the balcony construction of the block. The electricity generated from the solar panels is utilized throughout the building. Each individual flat in the building has a mechanical supply-extraction ventilation system together with heat recovery.

*Developer: YIT Construction Ltd.*

*Architect: Reijo Jallinoja, Architects*



13 >

**Niityleinikki** (Nuppukuja 9, 21 dwellings) is an owner-occupancy scheme consisting of ten semi-detached houses and a separate maintenance building. Each individual dwelling has its own supply-extraction ventilation system together with heat recovery. The dwellings utilise passive solar energy through two-storey-high conservatories. One of the dwellings has its own solar-energy system.

*Developer: Skanska Oy*

*Architect: Kirsti Sivén, Architects*



14 <

**Ahomansikka** (Nuppukuja 5-7) consists of four combined multistorey-blocks/terraced houses with a total of 44 dwellings. The scheme was completed in autumn 2004. Each individual dwelling has its own supply-extraction ventilation system together with heat recovery. The communal saunas and laundries are situated in a service building in the yard.

*Developer: Skanska Oy*

*Architect: Kirsti Sivén, Architects*

## Ecological themes in housing

According to the plot reservation stipulations, all Eco-Viikki schemes were to include experimental ecological building. In order to fulfil the requirements of the ecological criteria, the buildings had to have, for instance, thicker insulation than in conventional building, a higher standard of insulation in the windows, and heat recovery from the extracted air (either individually adjustable for each flat or centralised). The utilisation of solar energy is the most visible ecological theme in the residential buildings, though many other ecological features were also implemented.

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### UTILISING SOLAR ENERGY

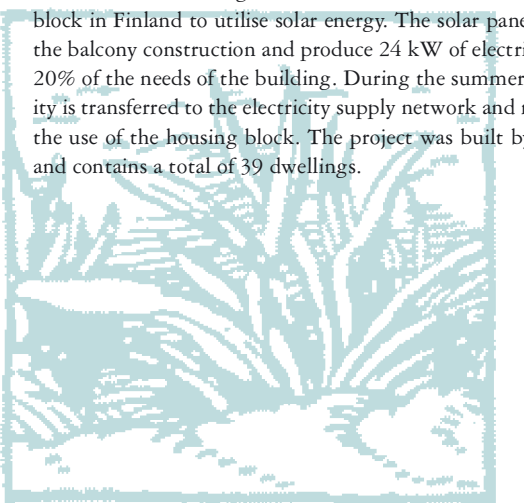
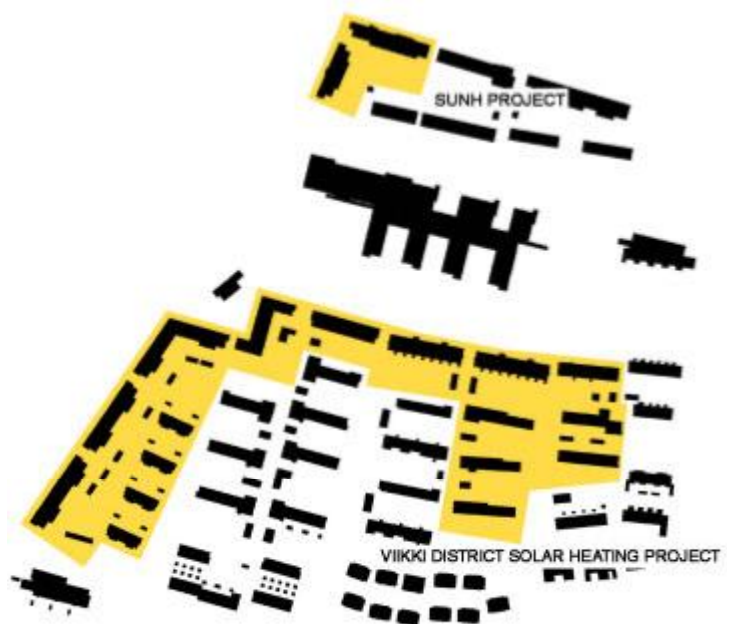
Solar energy is one of the central developmental themes and means of saving energy in Eco-Viikki. One of the principles when drawing up the local detailed plan was that as many houses as possible would face southwards, so that the flats, especially the living rooms, would receive direct sunlight. Viikki also managed to establish, what was for Finland, ground-breaking development projects that actively utilised solar energy. The Finnish companies in the project were accompanied by foreign partners. Financial support was received from the EU, Tekes and the Ministry of the Environment.

>

**Viikki's district solar heating project** was completed in autumn 2001, with participation from five developers. The project is to date the largest of its kind in Finland. Eight separate neighbourhood blocks serving a total of 368 dwellings come within the sphere of the solar heating project. The systems are separate for each block and the main heating is received from the standard district heating network. The solar energy is used to heat the domestic hot water, and also partly to heat bathrooms. The solar collectors (total area 1248 m<sup>2</sup>) delivered by the project's Austrian partners have been installed on the roofs of the houses, and they supply over one-third of the annual energy needs for the domestic hot water.

The **SUNH project** (Solar Urban New Housing) is a low-energy building that has solar heating as well as other developments in energy saving and timber construction. The project was commissioned by Helsinki City Housing Production Office (ATT) and was completed in summer 2001. The housing block consists of a four-storey block of flats and two terraced houses, with a total of 44 dwellings.

The **Salvia solar-energy house** was completed in spring 2003 and is located on the southern edge of Eco-Viikki. It was the first high-rise residential block in Finland to utilise solar energy. The solar panels are laminated into the balcony construction and produce 24 kW of electricity, which fulfils 15-20% of the needs of the building. During the summer, excess solar electricity is transferred to the electricity supply network and returned in winter for the use of the housing block. The project was built by the developers YIT and contains a total of 39 dwellings.



## THE ADAPTABLE WOODEN MULTI-STOREY HOUSE

In Eco-Viikki wood has been used for the structural frame and façades in low-rise housing, and as a supplementary building material in the multi-storey buildings and local service buildings in the area. In the wooden multi-storey house project at Nuppukuja 6, the HELAS housing association developed a timber floor construction for a low-rise apartment building, which would allow the free placement of the dividing walls in the flats and an adaptable spatial design. The structure is based on a combination of an open braced wooden pillar frame and a separately supported intermediate floor structure.



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## NATURAL VENTILATION

A system of natural ventilation with supply air windows was developed in both the blocks of flats and terraced houses. Over 200 rotating wind cowls were attached to the extract flues on the roofs. In some of the houses there is an additional 10 watt electric fan placed in the extract duct. Regulating the ventilation turned out to be a rather difficult feat in such a windy location, and the system requires further development.

## SHARED SAUNAS

The experiment in the SKANSKA housing schemes of placing communal saunas and laundry rooms around a single stairwell was very successful. This meant that there was no need for each individual owner-occupier flat to have its own sauna. Shared saunas, including a traditional wood-heated sauna, were also placed in the yard building. The photograph shows the wood-heated sauna in the HELAS scheme.

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## RESIDENT PARTICIPATION

Resident participation in the planning process was taken further than is the usual practice in the 'right-of-occupancy' neighbourhood block at Nuppukuja 6, built by the HELAS housing association. The residents were selected for the project already as the planning began. Because the building's timber frame structure enables the comparatively free placement of partitions, the wishes of the inhabitants could easily be taken into account.



15 <

### NATURAL LOW-ENERGY HOUSE

There are several interesting ecological themes in the group self-build schemes in Eco-Vikki, such as log constructions, wood pellet heating, and the use of geothermal energy. The most innovative of the projects combines natural materials with low-energy building. Versokuja 10 is a terraced house consisting of three dwellings, in which the structural frame and facades are in timber, the walls have been insulated with straw bales and the ground and intermediate floors have been insulated with peat. The ventilation system takes the replacement air as preheated through the crawl space and the fireplace. The scheme is due for completion in 2005.

### GLAZED BALCONIES AND CONSERVATORIES >

All the dwellings in Viikki have a glazed balcony, conservatory or terrace, as required by the good building practice guidelines. When used correctly, this saves on heating energy but is also a factor increasing the comfort of the home.



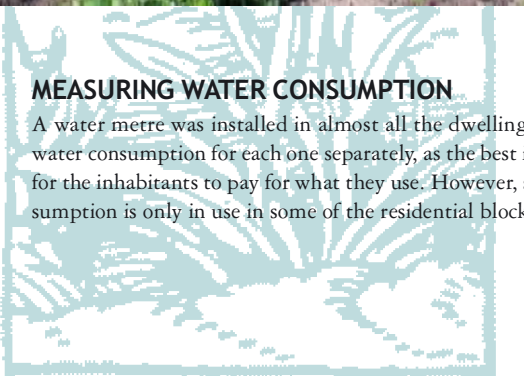
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### ALLOTMENT GARDENS

The abundance of allotment gardens on the plots, and the fact that a large part of the planting consists of fruit trees and berry bushes, can be considered another ecological theme in Eco-Viikki. A few of the plots also have traditional earth cellars.

### MEASURING WATER CONSUMPTION

A water metre was installed in almost all the dwellings, in order to bill the water consumption for each one separately, as the best incentive for saving is for the inhabitants to pay for what they use. However, so far billing per consumption is only in use in some of the residential blocks.



## Ecological aims in Viikki public services

There are also several public service buildings in Eco-Viikki where ecological criteria were implemented, and where also ecological innovations have been tested.

16 >

The **Auringonkukka daycare centre**, situated on the eastern edge of Eco-Viikki, was planned in autumn 1996 on the basis of an open architectural competition titled "A sustainable development daycare centre for Viikki in Helsinki". The competition was won by Quad Architects. Several of the development ideas of the competition entry had to be discarded due to cost factors, and the completion of the building was delayed until summer 2002. A local operating network is in use in the building, which automatically regulates the heating and ventilation according to the number of persons in the building and the use. The building is spatially organised into zones: the northern part is sheltered by a thicker wall structure, while the south side of the building is dominated by glass.



17 <

The **Kamomilla daycare centre**, designed by architect Jaakko Haapanen, is a pilot scheme in the City of Helsinki Public Works Department "Ecological daycare centre production" project. The goals of the project included: reducing energy consumption by 30% from the normal level, a healthy interior climate, adaptability, energy-saving building services, taking into account maintenance aspects, the minimisation of emissions during the lifespan of the building, informing the daycare users, and developing cooperation. Kamomilla was completed in 2001.

18 >

The **Viikki Teacher Training School of the University of Helsinki** (including primary, comprehensive and sixth-form levels) was built in the eco-area on the basis of the winning proposal in an architectural competition by ARK-House Architects. There are almost 1000 pupils in the school as well as about 250 trainee teachers. The school moved from Etelä-Haaga to the new school building in the summer of 2003. Sustainable development has been adopted as a part of all activities in the school. The school is also part of a Ministry of Education pilot project.



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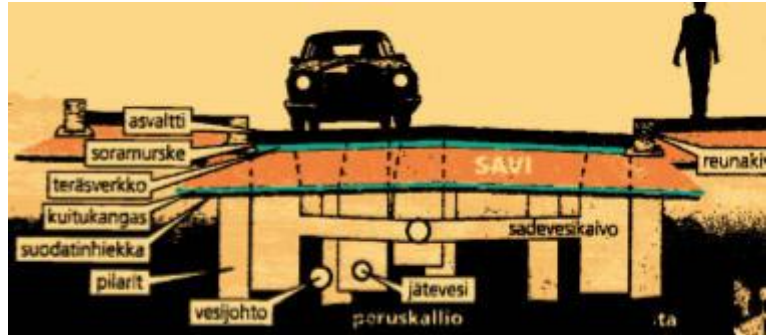
The **Kiila neighbourhood clubhouse**, designed by Case Consult Architects, was built next to the Kevätorri public square at the end of 2002. Half of the residents' clubhouse facilities in Viikki are housed in neighbourhood clubhouses, which offer better and more varied facilities for hobbies, fitness, family festivities, meetings and other common activities. The building and maintenance costs of these buildings are included in a monthly maintenance charge or the rents for the flats. The intention is to build a total of five neighbourhood clubhouses in the Latokartano area, each of which will specialise in a different activity; for instance, in Kiila the emphasis is on hand-crafts, with facilities and tools for small-scale wood-, metal- and textile work.

## Ecological municipal engineering and park construction

In Viikki high goals were set not only for house building but also for municipal engineering and landscaping. Several ecological innovations linked with these themes were realised in Eco-Viikki and the surroundings.

### CLAY STREET >

An experimental 120-metre-long street section was built in 1997 on Tilanhoitajankaari. Lime and cement and other reinforcement materials were mixed in with clay that had been dug up from the fields of Viikki. The stabilised clay was thus packed down on the lower part of the bearing layer of the street, replacing gravel and crushed aggregate. This was an attempt to find a use for the excess clay excavated during the building works, and at the same time to spare unrenewable gravel sources. The project was part of a Tekes research programme for environmental geo-technology. The experimental building showed that excess clay can be utilized in road construction. Design guidelines were also drawn up for the new road construction, but the method has not yet been taken into wider use.



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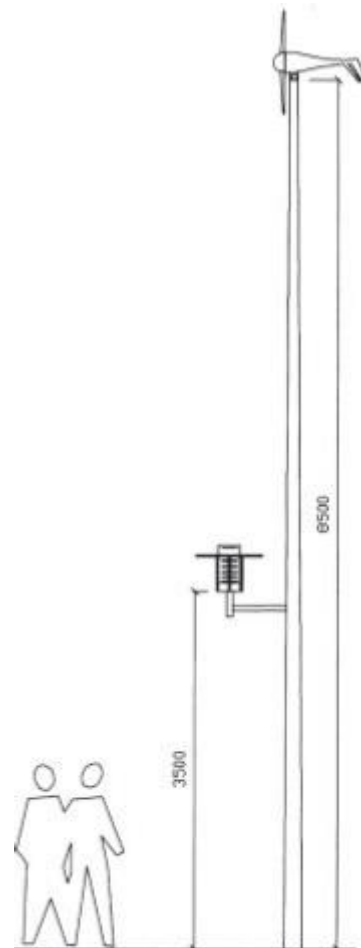
### THE BEARING SUBSTRATE FOR TREES LINING STREETS

Experimental street segments have been built in Viikki, where (for the first time in Finland) different soil substrates intended for trees lining streets, including their effects on the durability of the trees, have been studied. In 2002 columnar alder trees were planted on Norkkokuja and Versokuja and lime trees on Pasteurinkatu. Electronic measuring devices were then placed in the soil substrate and the trees, which sent data about the conditions as well as the growth and health of the trees through a wire-free GPS network to researchers at the University of Helsinki Department of Forest Ecology. Based on the research results, design and building guidelines were drawn up for the bearing substrate of trees lining streets. The Street and Park Division of the City of Helsinki City Public Works Department, together with the University of Helsinki, have been responsible for the development project and it has received funding from Tekes.



### WIND-POWERED STREET LAMP >

In 2002, in cooperation between Helsinki Energy and the Street and Park Division of the City of Helsinki City Public Works Department, an experimental lamp post was erected in the Viikinoja Park. The tip of the lamp post had a small wind turbine attached to it. The electricity produced by the generator was led directly into the 12-volt park lamp, the brightness of which varied according to the wind-speed. When there was no wind, the lamp remained unlit. The purpose of the experiment was, apart from saving energy, to demonstrate the essence and usability of wind energy, but at the same time for the lamp post to function as an environmental art work. The plan was to erect a few more lamp posts in the area, but the wind generator was located rather low down on the lamp post and was too sensitive to vandalism, and thus the project was abandoned.





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### VIIKINOJA DITCH BECOMES A STREAM

The Viikinoja ditch that directly traversed the Viikki field area was moved from its original location to the park area at the edge of the residential blocks. The channel was rebuilt following natural principles: it was made to meander and consist of a low overflow weir, pools and flood water terraces. According to the results of the measuring barrage, the discharge from Viikinoja ditch varies between 5 and 500 litres per second. At the height of the summer the ditch can be almost completely dry, but a heavy thunderstorm can cause flooding. The intention behind the design of the channel and vegetation is to slow down the water flow and at the same time improve the water quality before it reaches the nature conservation area and the sea bay. A variety of species of Finnish wetland plants have been planted in the stream bed and along its edges. The City of Helsinki Environment Centre monitors the water quality and discharge of the Viikinoja ditch. In a monitoring project, the City of Helsinki Public Works Department has studied how the vegetation planted in the bed and along the edges of the water way have thrived, as have the number of insects. Already after a couple of growing seasons the vegetation is lush and offers protection for birds, small animals and insects.



### SURFACE WATER RUN OFF NETWORK

>

One of the central aims in Viikki is to establish an environmentally-friendly management of surface water run off. According to the local detailed plan stipulations, "In the area one must, through structural and other means, and to as large an extent as possible, slow down the flow of rain water, melting snow waters and roof waters and absorb them into the ground." The clay soil of Viikki doesn't allow for surface water run off to be absorbed into the ground, but the Viikinoja ditch, rebuilt to act like a natural stream, as well as the 'green fingers' between the residential blocks, function well in slowing down the surface waters. The surface water run off from the plots is led through gutters and depressions to the 'green fingers', and from there to the Viikinoja ditch. The system also includes a large number of rainwater wells with hand-pumps, from which the residents obtain water for their allotment gardens. A separate monitoring report was made on the management of the surface water run off.

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### VIKKARI PARK FOR CHILDREN AND YOUNG PEOPLE

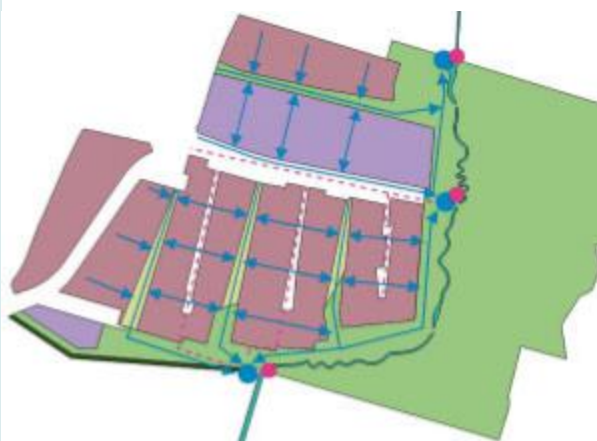
The aim behind the Viikkari Park for children and young people, situated next to the Viikinoja Park, was to apply ecological principles in the creation of a meeting place for Viikki residents. The design is based on the winning entry in an invited competition by the Molino design office. One of the central ideas of the scheme was that not everything would be built at once, but rather that just one part of the park would be 'pre-built', with further adaptations to be carried out by future users. The park also includes a building offering spaces for inside activities. The park activities are partly supervised. Viikkari Park is a joint project of the City of Helsinki Department of Social Services, the Youth Department and the Public Works Department, and was taken into use in autumn 2003.



22 <

### VIKKI GARDEN CULTIVATION CENTRE

A garden cultivation centre has been established adjacent to a copse in the centre of the Viikki Park. Here the residents from the nearby areas can rent an allotment garden between 500-1000m<sup>2</sup>. In the first stage, completed in 2003, 140 allotments were created. The plan also includes domestic animals, a cowshed, and a common social space for those cultivating plots, though the schedule for implementing these is still open. The City of Helsinki built the gardening centre and rents out the area to the Viikki Society, which in turn rents out the allotments to the residents. The Society also holds parties during the summer in the nearby Vadelmakallio barn.



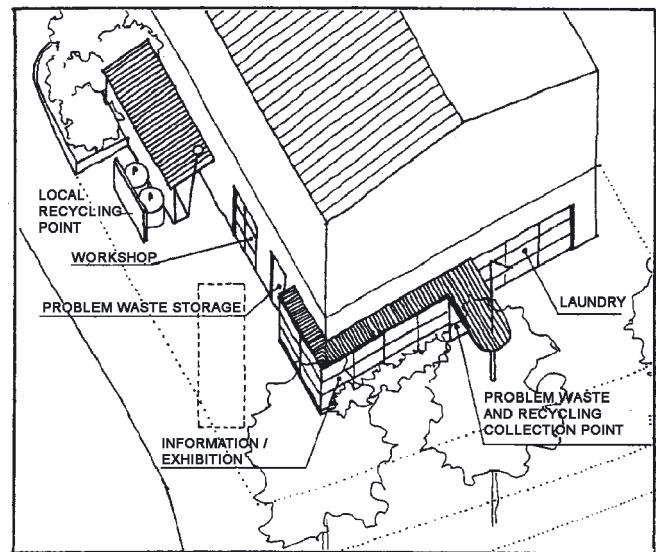
## A GRANITE NOISE BARRIER TO PROTECT A PARK

In 1998 an approximately 170-metre-long noise barrier, built from granite blocks, was erected to protect the Simo Klemetinpoika neighbourhood park from the noise coming from the nearby Lahdenväylä motorway. The design was based on results from a competition open to students from Helsinki University of Technology and the University of Art and Design Helsinki, in which ideas were sort for a noise barrier built from recycled material. The original intension was that the necessary 1m<sup>3</sup> granite blocks would be acquired from the nearby road works. The quality of the rock, however, tuned out to be too poor and so the stones chosen for the barrier are secondary quality stones brought from a quarry elsewhere.



## WASTE MANAGEMENT DEVELOPMENT PROJECTS >

In the early planning stages, a general plan for the waste management was drawn up for the Latokartano area. The plan presented the dimensions for the neighbourhood block refuse collection points, such that there would be space for the different bins for waste fractions and compost, separated at each residential block. In 2001 the Helsinki Metropolitan Area Council (YTV) waste management plant abandoned the plan because, following a change in the waste-management legislation, the packaging industry and retail outlets had been made responsible for the collection and reuse of packaging waste. These, however, were not interested in constructing and maintaining recycle points in the individual residential blocks, so other uses were found for the already built facilities in the pilot area. The guidelines for the dimensions of refuse points, however, have been included in the good building practice guidelines in the local detailed plans for Latokartano. The building of a composting plant for bio-waste in connection with the University of Helsinki Viikki research farm was also studied as a joint project between the University, the City of Helsinki and a private enterprise group. The intension was to build a pilot facility where the bio-waste of Eco-Viikki and the university area would be processed together with cattle manure to produce compost soil. The system also included the development of both a vehicle for collecting the waste and collection bins made from recycled materials. The aim of the enterprise group was to create an exportable product, with the Viikki pilot system acting as a model scheme. A preliminary project report was produced in 2001, but the company was not able to arrange financing and the project thus fell through.



## BUILDING SERVICES AND BROAD-BAND CONNECTIONS

In order to develop a decentralized information network (local operating network), independent of the building service agencies, a design guideline was drawn up in 1997 for Viikki, as a part of the Tekes technology programme. The programme was directed by the City of Helsinki Public Works Department's Building Services Office, and other participants included the Finnish Association of Building Owners and Construction Clients (RAKLI). The design guidelines were distributed to the developers and were applied as pilot projects in the Viikki daycare centres and housing schemes. The open and decentralized information technology enables the extensive control of lighting, heating, ventilation, security, etc., through information technology and automation, thus helping to improve living comfort and safety and reduce unnecessary energy and water consumption. When Eco-Viikki was still under construction, broad-band information technology connections were becoming established in residential areas in Finland. In 1998 the City of Helsinki Economic and Planning Centre, together with the Helsinki Telephone Company, conducted a poll in about 150 households, which showed that the Viikki residents were extremely interested in utilizing new information technology services. The cable networks of two IT operators were built into the Viikki road system, and additionally the City's Street and Park Division built a pipeline reservation for the City's district information technology network.





## Ecological building projects elsewhere in Viikki

Other actors in Viikki – in particular, the University of Helsinki – add their own character to the ecology of the area. The environmental goals for residential buildings and services are also high in the residential areas of Latokartano (north of Eco-Viikki), presently under construction.



- 24 > The University of Helsinki has strongly profiled itself in its building projects as a promoter of ecological sustainability, and its bio-sciences campus in Viikki is a good example of this. The **Korona Infocentre**, completed in 1999, is the main building on the campus, and houses the University's Science Library, the campus' central lecture and congress facilities, and administrative and service facilities as well as the City of Helsinki Viikki Library. Both the circular shape of the building and the double-skin façade have, in addition to any architectural aspect, an eco-technical function. The glass envelope decreases heat-loss in winter and reduces the need for cooling in summer. The space between the glass and the solid wall behind it is used for preheating the fresh air in winter and for cooling it down in summer. The curved shape of the façade allows fresh air to be taken from different sides of the building, depending on the season. The heating energy consumption of the building is about half that of a normal university building. This is partly influenced by the contract form developed for the HVAC technology, where the building contractor is responsible for the maintenance of the building for the first five years. In 2000 the building was awarded the Helsinki Rose of Building Award and in 2002 the building's designers, ARK House Architects, received the Finnish State Prize in Architecture.



As a renewable natural material, wood is well suited for the ecological goals of Viikki. In addition to the above multi-storey housing scheme, there are also other developments in wooden building being carried out in the area.

- 27 The **Leskenlehti community building** in the centre of the Latokartano district, housing a daycare centre and primary school, was built on the basis of the winning entry in an invited architectural competition by A-konsultit Architects. The timber-framed building clad with boarding and partly with tarred shingles was taken into use in autumn 2003. The **Viikki wooden** > **church**, designed by JKMM Architects, is being constructed in the neighbourhood service centre and is due to be inaugurated in autumn 2005. The facades of the church are clad with untreated aspen shingles.

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**Gardenia-Helsinki** is a tropical garden centre, which also provides information on the environment as well as opportunities for improving the quality of the home environment. The centre is jointly owned by the City of Helsinki and the University of Helsinki. The building was built on the basis of the winning entry in an architectural competition in 1997 by Artto, Palo, Rossi, Tikka Architects. Gardenia, completed in 2001, comprises a main building and two separate commercial buildings. The main building houses the tropical garden, a green-environmental information centre, a nature school, and café and terrace. The ground floor of the commercial building has premises intended for gardening enterprises, and on the first floor are office spaces, though there has been a delay in starting the commercial activities. The aim is to develop a varied courtyard-garden area, which would contain examples of 'model residential yards', kitchen gardens, and a Japanese garden.



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The **Viikki wooden multi-storey project** created the basis for the construction of new multi-storey wooden houses in Finland. The project, which began in 1994 as a part of the Tekes development programme for wooden building, culminated in 1995 in a competition for the design, product development and implementation of the houses. A total of 43 proposals were received, prepared jointly by building companies, architects and wood-sector enterprises. The winning proposal by Mauri Mäki-Marttunen Architects and the building company S. Horttanainen was built on the eastern edge of the University of Helsinki's teaching and research farm, by the shore of a ground water basin, and was completed in 1997. The 2-4-storey blocks comprise a total of 65 flats for University employees. The frame construction system of the buildings is based on load-bearing walls and mainly non-planed timber-frame elements. The facades are covered with cassette-like wooden elements that have been fastened with screws and can, when necessary, be unfastened for maintenance or replacement. All the flats and stairs in the multi-storey buildings are fitted with sprinklers, and in addition the flats also have fire alarms linked to the mains circuit.





# Results

# 3

*The construction of Eco-Viikki was almost complete by the summer of 2004, as the last plots west of Nuppukuja were being completed.*

*When now assessing the final results of Eco-Viikki, one must keep in mind that it will take some time before the residential areas develop a character of their own. Building mistakes are being corrected, systems are being adjusted and people are learning to use them. Municipal technology and services are being added to, and the social environment is gelling. In Viikki the finishing touch is provided by vegetation and the trees which gradually become more mature; they soften the environment and help root the buildings more firmly into the landscape.*

*Nevertheless, much can already now be said about the achievement of the environmental goals and the characteristics of the urban structure. Whether Eco-Viikki was successful or not is for each person to decide. In any case, the step taken by Eco-Viikki was a necessary one, before the next great step in development.*





Norkkokuja (left) and Versokuja (right)

### Built environment fulfils expectations

When comparing the almost completed Eco-Viikki with the results of the original planning competition, one can see that the area has been built in large part according to architect Petri Laaksonen's winning entry. The overall impression of the central block of Eco-Viikki, demarcated by 3-5 storey blocks of flats, is of a rather enclosed entity. In the interior of the area the buildings are 2-3 storeys high and the milieu is varied and relaxed. Already before the completion of the buildings, the vegetation in the area was fairly lush. The central ideas of the winning competition proposal, namely "the paved residential precincts into which the buildings feed, and particularly the 'green fingers' linking the plots and their allotment gardens", are the best features of the area. The residents have taken over the allotments, and as a result there is a contrast between the "tidiness" of the yards and the "controlled unroomed nature" of the "green fingers", as well as the abundance of cultivated plants and flowers.

The most public space in the area is the Kevätöri public square, where the local services, such as the social and health centre, local shop, clubhouse and school, are located. The residential precincts as well as the allotment gardens situated on the residential plots are common semi-public spaces for the residents, whereas the yards clearly belong to each individual neighbourhood plot. As regards the residential precincts, a stronger yet more relaxed architectural approach than there is at present, one emphasising the street sections, would have better supported the overall structure of the area. Also, the demarcation of the residential precincts according to the good building practice guidelines was not implemented logically. Building the maximum number of car-parking spaces, and not utilising the opportunity provided in the plan to use part of the parking areas for other purposes, has had an effect on the townscape.

In a spatially open urban structure like Eco-Viikki, there's a danger of confusion if the architecture isn't strong enough to create a totality. This confusion is indeed evident in the area, particularly when looking from Viikintie road and from

*An area of planting that can, if necessary, be transformed into a car-parking area.*





The roof forms contribute to the 'eco-architecture' image in Eco-Viikki.



*“A storage space on your own landing is an excellent solution. There’s a large balcony for a small flat; it’s better than a conservatory.”*

Residents’ survey comment

*“It’s fantastic that there are no individual saunas, but one for the whole house! A sauna of one’s own takes up unnecessary space and is a ‘moisture problem’. It eats up a lot of electricity, too.”*

Residents’ survey comment

the fields in the east. However, the situation will improve as the vegetation marking the southern and eastern boundaries of the area matures. Feedback from the residents’ survey indicated that some of the inhabitants also felt that the density of building is problematic.

### Conservatories and solar panels create an ecological image

The eco-area has been built in a rather traditional way. The building types are mainly conventional ones: normal blocks of flats and terraced houses. The exception among the blocks of flats is Tilanhoitajankaari 20, with its novel access balcony solution.

The large number of glazed balconies and conservatories facing southwards is the most evident feature differing from convention. The different kinds of ecological “supplementary features”, such as the solar collectors, ventilation cowls on the roofs of the residential blocks, earth cellars, etc., also help to create an ecological image for the area, as do even the forms of the roofs.

The dwellings generally received positive feedback in the residents’ survey due to the abundance of natural light. Large south-facing windows, conservatories and efficient floor-plan layouts do indeed create a good setting for comfortable living.

### The difficulty of measuring adaptability and positive experiences from shared facilities

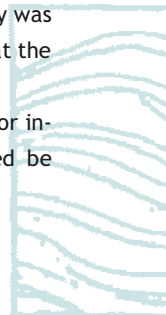
One of the central factors influencing the building ecology in the spatial design of the flats has been adaptability. Reducing building needs saves on natural resources; for instance, many of the flats can later be adapted in response to the number of residents and their needs. Also, versatile and well-designed shared facilities can replace the need for auxiliary spaces in the individual flats.

These goals have been realised in Eco-Viikki, particularly in regards to shared facilities. There has been great success in some of the residential blocks with shared saunas and laundries placed in each access stairs, which means that each flat does not require a separate sauna or washing machine. Shared saunas have also been built in the neighbourhood yard buildings, some heated with traditional wood-heated stoves. The number of other shared facilities is also larger in Eco-Viikki compared to conventional housing areas.

### A varied green ambience, but lacking in layers

The original situation in the Eco-Viikki area, an almost treeless field, has placed its own challenges on the landscaping, which had to be developed from scratch. On the other hand, the open starting point has provided endless opportunities. The initial stage, when the plants are still rather small, is inevitably thin-looking. In the monitoring stage a separate study was made of the plot ecology in Eco-Viikki, looking in detail at the success of the landscaping goals.

The aim was to offer the residents the opportunity for independent cultivation. An allotment garden can indeed be



found on every plot, or in the communal yards. The garden plots have been well received by the residents and are diligently tended. Cultivation in the yards is rather small scale. However, if the residents want to, they can get more garden space from the Viikki Garden Cultivation Centre. The opportunities for cultivation give character to the area and apart from producing food it has also a social importance.

Of all the goals set for the diversity of vegetation in the area, the abundance of species is the one that has been best achieved. However, a shortcoming in the selection of species is evident, for instance, with evergreens, such as fir trees. Furthermore, the goal of multi-layeredness has not been realised in the best possible way; with a few exceptions, the areas of vegetation consist mainly of only one or two layers.

In the development of the plant communities, consisting of different plant species, there has been a certain degree of conservativeness. The majority of the plant communities are very static and, for instance, the competition between species that occurs in nature, as well as the development of species, is not really to be expected here. With a new type of grouping of the plants, a variation in the planting density and the mixing of plant species, it would have been possible to develop new kinds of rich plant communities for the urban yards.

### Room for improvement in the maintenance of the vegetation

Apart from the allotment gardens, the abundance of edible plants separates Eco-Viikki from a typical residential area. There are fruit trees and berry bushes as well as other edible plants in all the communal yards. As regards the actual planting and thriving of the plants, problems, however, have often occurred: for instance, a larger proportion of fruit trees compared to other trees have died due to a lack of maintenance. In some instances, the residents themselves have actively begun to tend the vegetation in the yards, which has improved their general condition.

The influence of the ecological criteria in the selection of the yard vegetation is thus clearly visible. In order for the ecological goals to be realised in practice, the ecological guidelines and programmes should also take into account the complete lifecycle of the vegetation and its development as well as the need for maintenance at different stages.

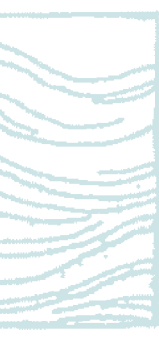
*“An allotment garden in the yard is a great thing! The yard isn’t too sterile, it’s sheltered and I like its plants and details. I like to walk around and study what other allotment holders in the neighbouring houses have planted. The plot boundaries aren’t too specific, I like that too.”*

Residents’ survey comment



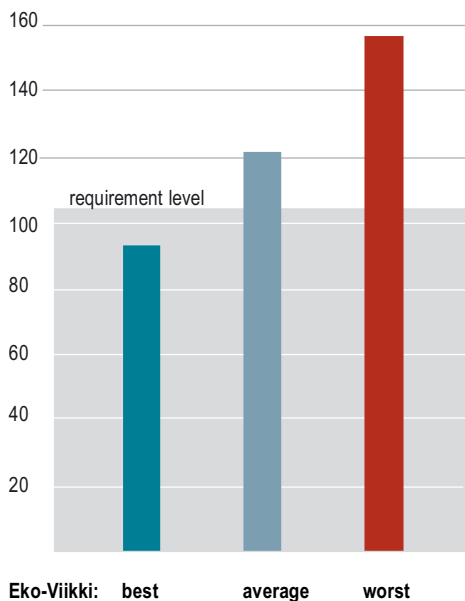
Allotment gardens in the eco-area.

A hand-pump utilising surface water run off.



## DISTRICT HEATING

weather adjusted specific fuel consumption  
kWh/gross m<sup>2</sup>, 2002



## Less heat is consumed

Reducing the consumption of natural resources in both building and maintenance has been a central goal in Viikki. Important tools in achieving this include favouring renewable natural resources, promoting recycling, and reducing heating, electricity and water consumption.

The district heating - standard in cities throughout Finland - is the main source of heating in the area. Over half of the dwellings are, however, also part of the solar heating system of individual residential blocks. For the monitoring study, heat consumption data from the years 2002 and 2003 were acquired from Helsinki Energy and the property managers of each residential block.

With regards to heating energy, the goal in Eco-Viikki was that district heating bought from the outside would be needed for a maximum of 105 kWh/m<sup>2</sup> of heated apartment, which is 33% less than what a conventional Helsinki residential building consumes. The goals for saving, as reported by the developer, have often been considerably more demanding than this.

The actual heat consumption in the Eco-Viikki properties varies considerably, as it does elsewhere. The average actual consumption was 120 kWh/m<sup>2</sup>; so the goal was not quite achieved during the first years of operation. However, the heating energy savings amount to about 25% compared to conventional building.

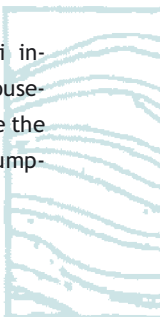
Central factors that influence the heat consumption include: solutions for ventilation and heat recovery from the building; the house type (both high rise and low rise); utilising solar heating; the type of residency (rental and owner-occupier); inhabitant density; and the consumption of household hot water. One can also presume that there is still room for fine tuning of the heating and ventilation systems in the houses. In the monitoring study, it has not been possible, however, to ascertain specific cause-and-effect relationships.

The insulation level given in connection with the criteria does not seem to correlate with the consumption data. There is, however, no specific information about the final insulation levels and U-values of the building envelopes.

## The impact of ventilation

In some of the mechanical ventilation systems, the influence of the energy saving of heat recovery is clearly evident. The fact that the centralised ventilation systems of the residential blocks have produced slightly better results than those for individual flats can probably be explained by the fact that individual systems have been used more diligently. There have been adjustment problems with the natural ventilation systems, particularly with the supply air windows. Also, the rotating wind cowls, which enhance the natural ventilation system, have turned out to be too effective in the windy conditions of Viikki.

The comparatively high inhabitant density in Viikki increases heat consumption through the consumption of household hot water. If the inhabitant density in Viikki would be the same as that of the average for Helsinki, the Viikki consump-



tion figures would be reduced by an estimated 5%.

The Viikki solar-heating systems have generally given good results. The energy production of the solar heating systems was in 2002 an average 285 kWh per square-metre of panel per year. The top figure was 395 (As Oy Auringonkukka, Nuppukuja 3) which is a Finnish record in its class. The solar collectors and their technology have functioned without fault in Viikki, but the systems' heat discharge circuits and their adjustments still required fine-tuning after the first year of operation. The property maintenance management staff also had to be schooled in the use of the equipment.

### Large differences in energy consumption

The data received regarding the electricity consumed in each housing complex is based on information from annual accounts, and in each individual dwelling based on anonymous information received from Helsinki Energy and the property developer VVO. With regards to electricity consumption for each residential block, the aim was that a maximum 45kWh/m<sup>2</sup> per year of electricity would be bought by the residential block and individual flats. Furthermore, it was required that there should be at least a preparedness in construction for a flexible regulation and guidance of building management, for instance, with local operating network (LON) technology.

The actual electricity consumption varies even more than the heat consumption, which is probably partly due to the fact that the type of household appliances and the individual user habits have a greater influence on electricity consumption. The average, however, is in accordance with the goals.

The factors that have significantly influenced the electricity consumption in residential blocks and apartments are: the form of ownership (rental and owner-occupied); ventilation technology; individual saunas in the flats; building type; the amount of shared spaces; and lifts. Surprisingly, resident density does not seem to correlate with electricity consumption. However, conclusions stemming from electricity consumption can only be approximate.

### The difficulty of estimating the environmental effects of materials

The most difficult environmental criteria to estimate in Viikki are the energy inherent to each building material (the so-called primary energy) and the energy consumed by a building during its lifespan. In practice, this refers particularly to energy used in the production, building and final placement of the material. Assessment of the primary energy had to be left out of the monitoring study due to the lack of initial information. Over 90% of the total energy used by a building and the emissions it creates occur, however, during the period when it is in use.

In general terms, apart from saving energy, the central means to lessen the consumption of primary energy in Viikki has been the comparatively abundant use of wood. One of the buildings in Viikki has been constructed completely from natural materials, including the insulation.



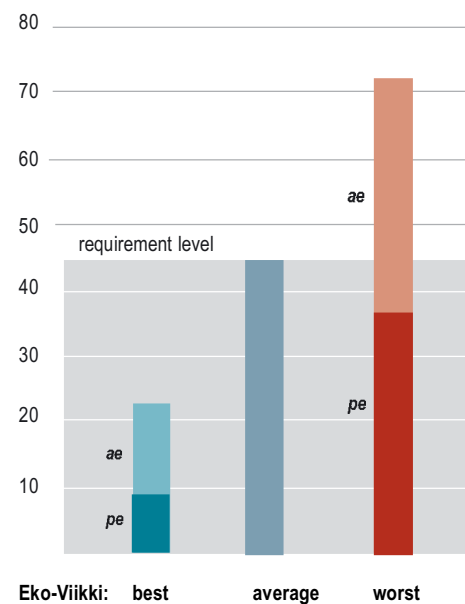
The house laundry ['pesula'] at Norkkokuja 7 (above).

A well-equipped laundry at Nuppukuja 4 provides an incentive for the residents to use it (below).

### ELECTRICAL CONSUMPTION

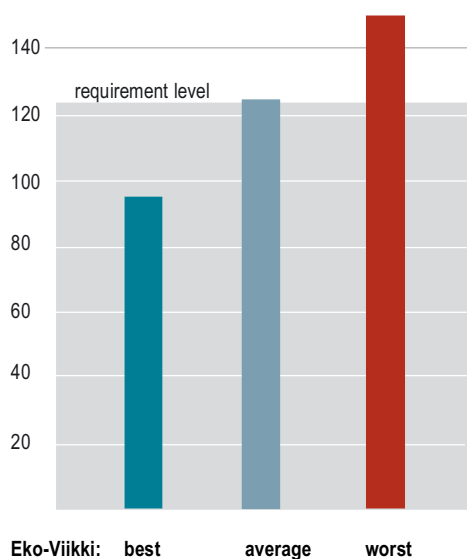
kWh/gross m<sup>2</sup>, 2002

ae = apartment electricity, pe = property electricity



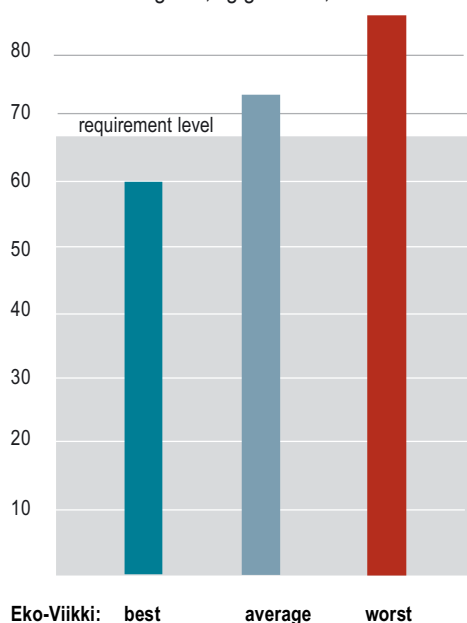
## WATER

consumption, l/person/day, 2002



## CO<sub>2</sub>

emissions during use, kg/gross m<sup>2</sup>, 2002



## Water savings

Water is a renewable natural resource, yet one that is rather scarce in many parts of the world. But in Finland people are used to saving mainly only for economic reasons. In Viikki the aim was for each Viikki resident to consume a maximum of 125 litres per day, which is about 22% less than normal. Also, the target consumption figures issued by the developers were often clearly smaller than this.

The data on the consumption and number of residents per residential block were acquired from the property maintenance managers. The actual water consumption varies a lot, but the average daily consumption is 126 litres per inhabitant, which is within the target limits. The house-type, form of ownership, and the presence of a sauna have been studied as factors influencing consumption. The collection and use of rain-water for watering gardens will probably save on tap water.

The families in Viikki have comparatively many small children, which increases water consumption. With time, however, the consumption is likely to decrease. Moving to a water billing system based on consumption will probably lead to a reduction in consumption. A water metre for the individual flats was installed in almost all residential blocks in Eco-Viikki, but during the year that the monitoring study was carried out, they were not yet in their intended use.

## Avoiding soil removal

One of the goals of the eco-criteria was to utilise the soil dug from the plots. The top soil layer was usually used on the plots or elsewhere in Viikki. Utilizing the other soil was difficult because it was mostly clay. A part of the excavated soil was used for the building of the park, such that first the original field top soil was dug aside and then the flat area was given shaped with the help of the clay brought from Eco-Viikki and finally the fertile top soil was pushed back on top.

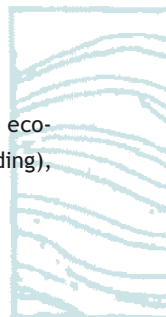
## Emissions correlate with energy consumption

Substances that pollute the atmosphere, such as carbon dioxide, sulphur dioxide and nitrogen oxide, are mainly emitted as a result of the consumption of energy. The emissions correlate with energy use, so in the Viikki eco-criteria carbon-dioxide emissions were selected to describe all gas-like emissions. The maximum CO<sub>2</sub> emission set for the buildings was 3200 kg/m<sup>2</sup>, which is 20% less than in conventional building.

The CO<sub>2</sub> emissions in the Viikki monitoring study are mainly based on the heat and electricity consumption of the buildings and not the rather small emissions from the building process. The consumption figures acquired in the monitoring study exceeded the goal by 9%, which correlates with the energy consumption figures acquired in the natural resources section. Also the factors influencing the emissions are the same.

## Room for development in building site waste monitoring

The maximum amount of building waste allowed in the eco-criteria was set at 18 kg/m<sup>2</sup> (based on gross m<sup>2</sup> per building),





which is about 10% less than normal. Each building developer sent the Eco-Viikki area group a report about the amount of site waste when the building was completed.

The actual amounts of weighed building waste varied between 5-15 kg/m<sup>2</sup>. During the construction of Eco-Viikki, a statute came into effect which required the sorting of building site waste. This clearly reduces the amount that is counted as waste. The maintenance level of each building site varied. The organisation and sorting of building waste at source mostly worked well, but it was not possible to get reliable information from all the sites regarding the amount of waste.

### Household waste monitoring problems

The maximum amount of general waste produced by each residential block was set at 160 kg per inhabitant per year, which is about 20% less than normal. Furthermore, it was required that the size of the residential block's bin store must be in accordance with the Viikki waste management plan and that there must be a cupboard in each household for the sorting of waste. Many of the flats in the residential blocks also have a lockable hazardous waste cupboard. There is also a waste recycle point in the courtyard of the local shop.

The monitoring study was unable to make a reliable assessment of the amount of household waste produced. The drivers of the garbage trucks gave a very rough estimation of the amounts of waste over a two-week period, based on their estimations and the dimensions of the rubbish bins. Based on these estimations, the waste corresponded in size to the average amount for a Helsinki residential area. On the other hand, the results of the residents' survey indicated that the residents in Eco-Viikki are rather conscientious in sorting their waste.

### The monitoring of the interior climate relies on resident feedback

In Viikki the requirement levels for the internal climate, construction work and surface materials were set on the basis of the newly established internal climate classification system. In order to ascertain whether the goals had been achieved or not, it would have been necessary, for instance, to examine the properties of the surface materials used, but as this was not possible the monitoring study of the internal climate had to rely mainly on residents' feedback. One can assume, nevertheless, that attention had been paid to the cleanliness of the ventilation construction and the emissions from surface materials, particularly as internal climate issues have been strongly emphasised in building in general.

The residents' survey also showed how satisfied the residents were with the internal climate and lighting in their home. Seven out of every ten households were reasonably satisfied with the ventilation in their home. There was dissatisfaction, however, with the mechanical ventilation, as well problems with adjusting the natural ventilation.

Some of the Viikki schemes also participated in the Finnish section of the international Project HOPE, which made an ex-

### A DIY-enthusiast's dream

*Eco-Viikki was a real paradise for the DIY enthusiast, particularly at the building stage. Mika's hobby is skip-hunting. On the building sites you can find all kinds of useful timber for your woodworking hobbies. Mika often goes skip hunting alone, but on weekends the whole 4-person family might join him. Kati thinks that her husband's hobby is a practical one and eagerly tells what good timber can be found in the skips. She has told her work colleagues about her husband's woodworking hobby but not about the family's joint skip-hunting trips!*



The refuse bin store at Versokuja 4 helps to demarcate the street line.

### *A portrait of a green consumer*

*There's no one particular way of being environmentally conscious: one person consumes little, another buys organic and ecological products; one person doesn't own a car, another buys a car with a catalysator. People have strong images of what a real 'green' person is like. Even though Satu, who lives in Eco-Viikki, sorts her refuse conscientiously, she doesn't consider herself particularly green, because her husband is greener. In their house Satu turns on the lights and her husband turns them off again. The same applies to many other families. In some families the energy-saver is the wife, sometimes the husband, and in one family it is the environmentally-conscious son. According to Satu, her friends don't consider her particularly green, because she likes bright colours and a true green supposedly can't wear a bright yellow quilted jacket.*

*"Incredible sound-proofing! I never hear sounds from next-door! Great!"*

*Residents' survey comment*

tensive survey of the health aspects of living in a block of flats. Significant differences in the internal climate conditions were ascertained in the four Viikki housing schemes studied in the research, even though the average for the schemes did not differ greatly from other sites in the study. The major part of the internal climate problems is linked with the above-mentioned shortcomings in the ventilation systems, and they are repairable.

### No major moisture problems

Structural moisture management, and mould and other health hazards linked with it, has become a serious problem in Finland. Repairing faulty structures afterwards is very difficult and expensive. The Viikki eco-criteria did indeed include the management of moisture risks as a separate section, and the solutions were to be indicated in the planning documents. Structural moisture management is more difficult than usual in Eco-Viikki because the terrain is low-lying and the surface water is not directed into storm-water drains but, through depressions in the terrain, into the Viikinoja ditch.

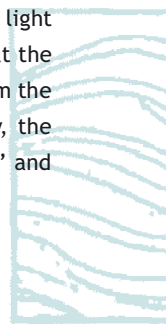
Part C2 (dealing with insulation) of the renewed Finnish building regulations (which came into effect at the beginning of 1999) required immediate compliance without any transfer period (which was permitted for the other sections of the regulations). Furthermore, in the Viikki projects voluntary solutions were followed which aimed at decreasing risks. Examples of these include: floor heating in the bathrooms, extract-ventilation of the crawl space onto the roof, over-dimensioned ground-water drains, raising the medium height of the plinth, moisture sensor reservations in the structures, and investing in surface-water planning. In the monitoring study taking into account moisture risks was not separately assessed, but was included as a question in the residents' survey.

### Noise under control

The eco-criteria's minimum requirements for sound insulation did not differ from the regulated level. When drawing up the criteria, however, it had been recommended that the new noise regulations (RakMkC1) should be followed. A few schemes in Eco-Viikki strived to achieve this voluntarily, before the new C1 came into effect at the beginning of 2000. There was a particular emphasis on developing an intermediate floor structure that would insulate against impact sounds. According to the feedback from the residents' survey and the Project HOPE research, people are reasonably satisfied with the level of sound-proofing in their home. However, the natural ventilation's replacement air solution in particular received negative feedback.

### Sheltered and sunny gardens and yards

The aim in the plan of the communal yards was to allow light and sun into the yards and children's play areas, while at the same time protecting them from the wind blowing in from the open fields. Indeed, according to the residents' survey, the yards and their surroundings are best described as 'light' and



'sunny', but there were also complaints about wind. The lush vegetation planted in the yards and the vegetation wind-breaks on the southern edge of the area will provide good wind shelter, when they have matured in a few years time.

### Child-centred and densely populated

The ecological sustainability of a residential area ultimately depends on the lifestyle of its inhabitants. Ecological behaviour is influenced by a knowledge-based preparedness regarding the function of the buildings and their technical systems, as well as the everyday life and personal choices based on these. The activity and collaboration of the residents can justifiably be seen as a gauge of the sustainability of any residential area.

In the monitoring study of Eco-Viikki, the residents' survey highlights the different aspects of the social environment of the area. As much as 67% of the households responded to the survey, carried out at the end of the summer of 2003; so it gives a fairly reliable picture of the Viikki residents' profile. The research presently being carried out by Sanna Ahonen at University of Helsinki Department of Social Policy represents a more in-depth study of a sample of Viikki inhabitants and ecological behaviour as a lifestyle issue. In other words, people are interested in the social aspect of sustainability.

The age distribution of Viikki residents is similar as that in other new residential areas in Helsinki, and differs from the average for the whole city. Of the area's 1900 inhabitants, there are more children and "young parents" (30-44) than average. The presence of the high number of children is also reflected in the familiar dichotomy of residents' views: for instance, parents are appalled by the dangers of car parking traffic, whereas childless people are horrified by the noise and wear of the plants caused by children. The residents' survey showed that despite the variety of ownership forms residents in Eco-Viikki seem to be more educated than average, with 45% of the respondents having a university degree. The average size of the just over 750 households is 2.4 persons, which in relation to apartment sizes leads to a larger inhabitant density than the average for Helsinki. This is typical for new areas and will even out with time.

### Ecological knowledge and motivation vary

Although environmental features have been used in marketing Viikki, ecology hasn't usually been the most important reason for moving into the area. For instance, its location close to nature was seen as a much more important asset. Initially it was expected that particularly ecologically-inclined people would gravitate to the area. A part of the inhabitants do indeed belong to this group, but a clear majority of the residents consider themselves as having only an adequate knowledge of ecological living. Moving to Viikki did also not change the ecological behaviour of the people to the expected degree, even though a part of the residents say that the influence is seen in the sorting of rubbish, the decrease in water consumption, favouring organic food and gardening for household needs.



A zone of trees and bushes provides a wind-shelter on the southern edge of the eco-area.

*"Personally, I have a great regard for the principle of town planning, according to which the house next door, with which we share a communal yard, contains an abundance of children and play equipment and there are nice conversations over the row of raspberry bushes that separates the small allotments. And, by the way, they look after their allotments better than we do!"*

Residents' survey comment

*"One had to be eco in everything. That's not what I wished for when I applied for a rented flat in Eco-Viikki. It's not the fault of the house, but the inhabitants."*

Residents' survey comment

*"A relaxed crowd lives in Viikki - no blokes in suits."*

Residents' survey comment





### **Sauna conversations**

*In the “lad’s sauna” there was a discussion about how each of them had ended up living in Eco-Viikki. In each family it had been the wife who had suggested moving to the eco-area. The men regarded this idea with a degree of suspicion because they were apprehensive about what living in an eco-area requires. To their relief, life in an eco-area turned out to be a rather ordinary suburban life, and didn’t contain anything stranger than sorting refuse and solar panels. You didn’t stand out even if you owned a car.*

*“I rarely use my own car to go to work. I’ve become more careful with how I use water. I’ve stopped soaking myself unnecessarily in the shower.”*

Residents’ survey comment

*“There is much to be desired in selecting the inhabitants: a large part of those who have moved here don’t even know that they are moving to an eco-area! This is evident, for instance, in the hazardous waste, which ends up in the rubbish bins.”*

Residents’ survey comment

The resident selection process, and the accompanying publicity aimed at the residents, does not seem to have promoted the goals of ecological housing. In the sales brochures for the dwellings, the nature in Viikki and the values linked to it are clearly evident, but the developers marketed the properties and distributed information to the new residents mainly by means of their normal methods. Of those renting a flat in the area, a certain number is selected from a queuing system on the basis of their social situation. For others, simply finding a flat in Helsinki over-rides any environmental goals. It’s obvious that the lack of knowledge and motivation have been contributing reasons why the original environmental goals were not always achieved, particularly as the technology in the houses partly differs from conventional building. In some of the schemes, however, the residents received a large amount of information concerning ecological living, and even the opportunity to influence the design of their own dwelling.

The residents’ survey shows that people’s views on what is “ecological” vary greatly. Even those who have an environmentally-friendly outlook often see the protection of the surrounding nature and its variety as the main issue, and don’t notice the slower and usually more considerable influences that come through the consumption of natural resources with building construction and emissions. For example, some of the residents tell in the survey that they were disappointed with the density of the area, and expected a closer contact with nature, even though it is building densely that enables the preservation of nature areas. Ecology is thus still often seen as a closeness to nature. It also became evident that environ-

*“Ecological behaviour has been made easier than in many other areas. Allotment gardening and garden work are natural activities here. We spend much more time outdoors than before, which results in a higher regard for nature.”*

Residents’ survey comment





mentally-friendly thinking doesn't always correlate with an environmentally-friendly lifestyle.

### Disadvantages contribute towards social bonding

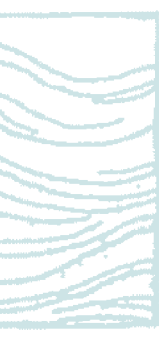
Eco-Viikki residents' opinions about the positive and negative sides of the area don't substantially differ from the opinions of other housing areas. The lack of services in the still uncompleted Viikki, the poor quality of the building construction and the lack of maintenance of both the buildings and common yards are seen as the biggest drawbacks. The ecological solutions that have received positive feedback are the solar heating systems, the allotment gardens and the shared saunas in some of the housing schemes. Criticisms are levelled at the gravel surface of the yards (because the gravel travels into the houses), the density of the building, and shortcomings in the functioning of the ventilation systems. The evident disadvantages, combined with the residents' social background (with an academic emphasis) and partly also their ideological background, have, nevertheless, contributed to the creation of a strong community spirit in the area. The Eco-Viikki residents' level of activity has indeed turned out to be high. Also, by Helsinki standards, the residents' have actively participated in the decision-making process of their neighbourhood block.

All in all, Eco-Viikki differs surprisingly little from other new residential areas in terms of residents' profile. This is, on the other hand, how it should be; ecology should indeed be embedded as a part of a "normal" lifestyle, not an alternative or exceptional one.



*"I would consider it a cultural scandal if Helsinki University would close down their research farm. The city must also bear its own responsibility in this issue. I have become radicalised!"*

Residents' survey comment





*Pedestrian- and cycle bridge over the Viikinoja ditch, by architect Juhani Pallasmaa.*

## The Future?

# 4

*Viikki is proof of the lack of prejudice and bold mindset of the City of Helsinki in initiating a project that requires a larger than usual long-term investment. The building of Viikki also shows that a large city can find the resources, and its civil servants have the vision, know-how, ambition and energy, to develop existing practices.*

## Learning forum

As a residential area and forum of practical building, Viikki has offered the opportunity to implement applied research and development as well as to test ecological solutions in the field. It has also created the framework for practical cooperation between the Ministry of the Environment, the City of Helsinki and other parties. Even though building is a slow route to achieving new solutions for a wider application, it is obvious that without development projects and experimental building new ideas and solutions would never even be born. Research, development and practical testing are of decisive importance for the steering of building. More extensive changes in the regulations should indeed always be tested through experimental building before their more widespread application.

## Slow change

The building sector is normally perceived as conservative, due to its deeply ingrained practices and attitudes. Large leaps in development are avoided, as are the financial risks involved. Furthermore, a striving for uniformity, the so-called 'bulk product', has been typical for the Finnish house-building industry. Still in the 1990s, the building companies and developers did not see the opportunity to stand out or profile themselves through ecology. The reason for this could be, apart from an unwillingness for development, a lack of real demand.

The tight schedules for building projects do not usually allow for experimentation with solutions, calculations and comparisons. The decades-long tradition within the building sector to strive for low investment costs and low prices still continues. Regarding Viikki, one could conclude that only by investing in design is it possible to achieve living environments that are both adaptable and comfortable in the long term.

Viikki has, in other words, offered a good test base: but the question is, has it been utilised more generally? Many good solutions were tested in Viikki but, apart from individual exceptions, they do not seem to have been taken up in the developers' other schemes, not to mention becoming common in the building sector. A lack of tenacity and ambition in development still ail the building sector. Nevertheless, the know-how attained in the Viikki development projects has probably become a part, at least to some extent, of the spiritual assets of individuals and thus can be utilised also in the future.

When considering how the whole building and real estate sector could be guided along the path taken by the pioneers of ecological design, one has to consider how the results of the development projects could be brought into general building practices, and not just environmentally-conscious building.

## Ecological thinking emerges but is poorly implemented

The planning of Viikki led to the wide-scale development of ecologically-sustainable solutions in Finland. In the early stages there was no clear idea of which factors would be important with regards to environmental effects, and which ones would be less influential. The Viikki criteria and the practical

building projects thereafter forced the dismantling of the existing complex array of environmental features. During the Viikki project, the environmental effects of the building and property sector have indeed become clearer. The next stage would include, among other things, the development of billing practices so that the fair targeting of costs would serve energy- and water-saving goals.

Two easily implemented and tried-and-tested ecological solutions can be picked out from the residents' survey. The abundance of natural light in the dwellings and the planting in the shared yards received unreserved praise from the residents. Through such simple means, it is possible to create a notable additional value from ecology, as well as an improvement in the quality of living " something which should not go unexploited.

The development of the building steering process, engaging the property developers and improving the dissemination of information, all entail specific tasks. The experiences from Eco-Viikki show that ambitious goals and ecological criteria do not automatically create the desired end result, unless there is a sufficiently concrete monitoring and feedback system or if the knowledge, goals and responsibilities don't permeate the whole production chain. The development work entails a long-term commitment to goals, and in the building sector the central committing factor seems to be money.

## Monitoring still in its infancy

The extent of the monitoring of Viikki has been exceptional in Finnish building. It has enabled the assessment of design and building processes as well as the success of technical solutions based on results and consumer data. The calculation programmes used in Viikki proved too cumbersome and complex. In the future there is a need for considerably more simple procedures that can be of use already in the planning stages.

The monitoring has also mercilessly shown the thinness of the documentation of facts and the monitoring culture generally in Finnish building. Much technical data on the Eco-Viikki schemes was hard to find, only in the possession of individual persons or simply unavailable. It is clear that developing building in the future requires more intensive investment also in monitoring.

The monitoring was also hampered by the fact that there was very little comparison material. Far too much of the consumer data that is referred to in relation to average person numbers or square/cubic metres is based on statistics and numerical formulas and not on real consumption data. The reliability of the Viikki consumer data is undermined as there are no real comparable consumer figures available for the new residential areas of Helsinki or for older schemes.

## Finland at the forefront of ecological building?

One of the goals in the planning of Viikki was to create a display window of Finnish know-how, with the help of which the building sector could market its skills outside Finland. Viikki is undeniably the building project in Finland that has re-



ceived most foreign attention over the last decade. It has been presented in numerous international conferences, seminars, expert meetings and publications. During and since its construction, many expert groups from Finland and abroad have visited Viikki. The main part of the public-relations and information distribution work has been carried out by the heads of the Helsinki Viikki Project. Building companies and building sector organisations, on the other hand, have marketed Viikki with a lower profile. Even today there is a lot of untapped PR value in Viikki.

On the other hand, the interest in Viikki is to a large extent due to its land use planning, building steerage and other issues linked with organization, and not so much the individual building schemes and the technology employed in them. The progressiveness of Viikki is indeed based on an integrated steerage system of land ownership: the plan solutions, plan regulations and the method of handing over plots, the PIMWAG criteria and their use as a prerequisite for handing over the plots and receiving building permission, as well as the supervision and monitoring procedures linked with these. Of course, the residential and service buildings have also received the attention they deserve, due to their architecture and ecological solutions.

As landowners, the municipalities thus have the means by which to steer building in a more ecologically sustainable direction. On the other hand, the starting point in Finland so far has been that ecologically-sustainable building is prompted

primarily through voluntary actions not sanctions. It remains to be seen whether the experiences of Viikki will persuade the building sector to invest in new solutions that promote ecological sustainability in future residential building.

### Ecology in all building

Still a couple of years ago ecological building was perceived as a marginal phenomenon, with the occasional individual eco-house. In Viikki it was shown how the goals of ecological sustainability can create not only ecologically-friendly but also urban and socially-mixed living environments, and with various options concerning its financing and forms of ownership. The solutions created by an ecological viewpoint give the area a positive identity, increase residents' initiative and communality, add life to the shared yards, and increase the opportunities for inhabitants of all ages to spend time outdoors. As the green environment develops, the planned lushness and variety of nature will be consolidated, and the ecological identity of the whole area will grow stronger. Ecology is becoming one criterion amongst others for good building criteria, such as safety, health and comfort.

### Sustainable development - slowly but surely

From the very beginning of the planning of Viikki, the ecological viewpoint of sustainability has been emphasised, whereas social-, cultural- and economic-sustainability have been left in the background. Viikki is a reflection of its time: in the mid-





*A view of Viikki from the south-east.*

1990s ecology was almost a synonym for sustainable development. Only in recent years have also other elements of sustainable development emerged in the research and development. Viikki, however, shows that the subfactors of sustainability go hand in hand; their ecological goals have fed particularly social and economic sustainability.

In order for sustainable development to become authentically established in the building sector and the building of residential areas, more new “Viikkis” are needed: extensive joint efforts and experimental building by city authorities and the building sector. The positive results in Eco-Viikki came about to a large extent due to the keenness and perseverance of individuals. Development should, however, be a substantial part of the everyday activities of the building and property sector, not something exceptional and unique. New practices are established slowly, after much testing. In building, we are probably just in the early stages of embracing the principles of sustainable development.



*Visitors at the Viikki wooden multi-storey project.*

# Appendix: Actors, events and facts

## Eco-Viikki Project seminars (Finnish):

- 'Towards a Sustainable City - Expert Seminar', Cable Factory, Helsinki, 20.10.1994.
- 'Wooden Multi-Storey Residential Block Seminar', Helsinki City Planning Department, 2.12.1994.
- 'Tools for Sustainable Building in Viikki', 28.2.1997.
- 'The Viikki Eco-Housing Blocks - A New Direction for Building', Helsinki City Planning Department, 31.5.1999.
- Experiences and viewpoints on the eco-building in Viikki, Info-Centre Korona, 13.6.2000
- 'Experiences and Views of Eco-Building in Viikki', Info-Centre Korona, 13.6.2000.
- 'Viikki Solar-Energy Electricity System Pilot Project', Info-Centre Korona, 4.6.2003.

## Congresses:

Viikki has been presented at, among others, the following international congresses dealing with ecological building:

- 'Nordic Sustainable Building 98-Congress', Copenhagen, Denmark, 1998.
- 'International Conference on Sustainable Building', Maastricht, Germany, 2000.
- 'Urban Ecology, Focus Europe - Workshop and Congress', Oslo and Drammen, Norway, 2002.
- 'World Sustainable Energy Day', Linz, Austria, 2002.
- 'Expert Meeting on Sustainable Construction Planning', Brussels, Belgium, 2004.

Viikki has also been presented in numerous congresses and educational events in Finland.

## Exhibitions (Finnish):

- 'Experiences and Viewpoints on Eco-Building in Viikki', Info-Centre Korona, 13.6.2000.
- 'Viikki Experimental Building', Wanha Satama (Doctoberfest), Helsinki, 26.10.1999.
- 'Viikki Eco-Blocks'. Invited-competition exhibition, Helsinki City Planning Department, 31.5.-12.8.1999.
- 'An Ecological Housing Area for Viikki in Helsinki', Planning competition exhibition, Helsinki City Planning Department. 1.6.-26.6.1995.

## Publications:

- *Towards a Sustainable City. The Viikki Eco Neighbourhood Blocks 2000*, Pirjo Pekkarinen-Kanerva, and Harri Hakaste (eds.), Helsinki, SAFA, 2000, ISBN 951-9307-06-0 (English).
- Viikki Ecological Housing Area (4-poster series), Helsinki, SAFA, 1999 (English).
- *Planning Competition for an Ecological Housing Area in Viikki, Helsinki*. Pirjo Pekkarinen-Kanerva (ed.). Helsinki, SAFA, 1995. ISBN 951-95550-8-0 (English)
- *Ecological Neighbourhood in Viikki, Design Competitions and Experimental Building*. 1997. Pirjo Pekkarinen-Kanerva (ed.). Helsinki, SAFA, 1997. ISBN 951-97574-5-7 (English) ISBN 951-95550-6-4 (Finnish), and ISBN 951-95550-7-2 (Swedish).
- *Kohti kestäväää kaupunkia seminar report*, Pirjo Pekkarinen-Kanerva, Leena Siikanen, Tiina Heloma (eds.), Helsinki, SAFA, 1994, ISBN 951-95550-4-8 (Finnish)



Eco-Viikki activists (from left to right):  
Heikki Rinne, Aila Korpivaara and Riitta Jalkanen

## Visiting groups:

During its construction and to the present time, Viikki has been presented each year to approximately 25 international groups, and about the same number of Finnish groups.

EKO-VIIKKI 1994-2004

### PROJECT PARTIES AND ORGANISATION

#### EXECUTIVE GROUP 1994-1998

Pekka Korpinen, City of Helsinki (Chairman)  
Tuomas Rajajärvi, City of Helsinki  
Olavi Louko, City of Helsinki  
Heikki Rinne, City of Helsinki  
Jouni J. Särkijärvi, Ministry of the Environment (Vice-chairman)  
Ilppo Niemi, Ministry of the Environment  
Marjatta Erwe, The Finnish Association of Architects (SAFA) -1997  
Juhani Katainen, The Finnish Association of Architects (SAFA) 1997-  
Matti Vatiilo, The Finnish Association of Architects (SAFA) 1997-  
Veli-Pekka Saarnivaara, Tekes -1997  
Ari Ahonen, Tekes 1997-  
Osmo Koskisto, Tekes  
Heikki Kotila, Ministry of Trade and Industry  
Ilkka Laine, Confederation of Finnish Construction Industries (RTK)  
Arto Suikka, Confederation of Finnish Construction Industries (RTT)  
Pirjo Pekkarinen-Kanerva, The Finnish Association of Architects (SAFA) (Secretary)

#### PROJECT GROUP 1994-1998

Matti Vatiilo, The Finnish Association of Architects (SAFA) (Chairman)  
Pirjo Pekkarinen-Kanerva, The Finnish Association of Architects (SAFA) (Secretary)  
Markus Lindroos, The Finnish Association of Architects (SAFA)  
Aila Korpivaara, Ministry of the Environment  
Jussi Rautsi, Ministry of the Environment  
Riitta Jalkanen, City of Helsinki  
Heikki Rinne, City of Helsinki 1997-  
Harto Rätty, Tekes  
Osmo Koskisto, Tekes 1997-  
Bruno Erat, The Finnish Association of Architects (SAFA) -1997

#### EXECUTIVE GROUP 1998-2001 (MONITORING)

Matti Vatiilo, Ministry of the Environment (Chairman)  
Aila Korpivaara, Ministry of the Environment  
Riitta Jalkanen, City of Helsinki Planning Department  
Heikki Rinne, City of Helsinki Economic and Planning Centre  
Tuomo Sirkiä, The Finnish Association of Architects (SAFA)  
Tom Warras, Tekes  
Harto Rätty, Tekes  
Seppo Salastie, Helas  
Sisko Marjamaa, City of Helsinki Housing Production Department (ATT)  
Lasse Vanhanen, YIT Group  
Risto Mykkänen, YH-Suomi Oy  
Urpo Piilo, The VVO Group  
Raimo Poikela, Skanska Oy

#### PROJECT GROUP 1998-2001 (MONITORING)

Aila Korpivaara, Ministry of the Environment  
Harto Rätty, Tekes  
Riitta Jalkanen, City of Helsinki Planning Department  
Heikki Rinne, City of Helsinki Economic and Planning Centre  
Tuomo Sirkiä, The Finnish Association of Architects (SAFA) (Chairman)  
Markus Lindroos, The Finnish Association of Architects (SAFA)  
Jouko Kempainen, The VVO Group  
Maria Mannisto, City of Helsinki Housing Production Department (ATT)  
Erkki Heikkinen, Skanska Oy  
Jari Hovilehto, YIT Group

#### EXECUTIVE GROUP 2002-2004 (MONITORING)

Matti Vatiilo, Ministry of the Environment (Chairman)  
Aila Korpivaara, Ministry of the Environment  
Riitta Jalkanen, City of Helsinki Planning Department  
Markku Siiskonen, City of Helsinki Planning Department 2003-  
Heikki Rinne, City of Helsinki Economic and Planning Centre  
Kai Miller, City of Helsinki Building Regulation Department  
Tuomo Sirkiä, The Finnish Association of Architects (SAFA)  
Hannele Ugur, Viikki-Seura  
Jarmo Mylläri, City of Helsinki Housing Production Department (ATT)  
Seppo Sinervä, The VVO Group  
Pekka Sokka, Skanska Oy  
Lasse Vanhanen, YIT Group  
Martti Polvinen, YH-Suomi Oy  
Ilari Aho, Motiva Oy

#### PROJECT GROUP, 2002-2004 (MONITORING)

Aila Korpivaara, Ministry of the Environment  
Harri Hakaste, Ministry of the Environment  
Riitta Jalkanen, City of Helsinki Planning Department, 2002  
Markku Siiskonen, City of Helsinki Planning Department  
Heikki Rinne, City of Helsinki Economic and Planning Centre (Chairman)  
Kai Miller, City of Helsinki Building Regulation Department  
Ilari Aho, Motiva Oy  
Ana Rodriguez, Motiva Oy  
Kari Vikström, Motiva Oy

#### PICTURE SOURCES

##### **City of Helsinki, Real Estate Department, City Survey Division**

- Aerial photos on the inside cover, pages 6 and 32.

##### **Jussi Tiainen**

- Pages 20 (above), 30 (right), 31 (above right).

##### **Pirjo Pekkarinen**

- Page 8.

##### **Viikki Project/ Markku Siiskonen, Heikki Rinne**

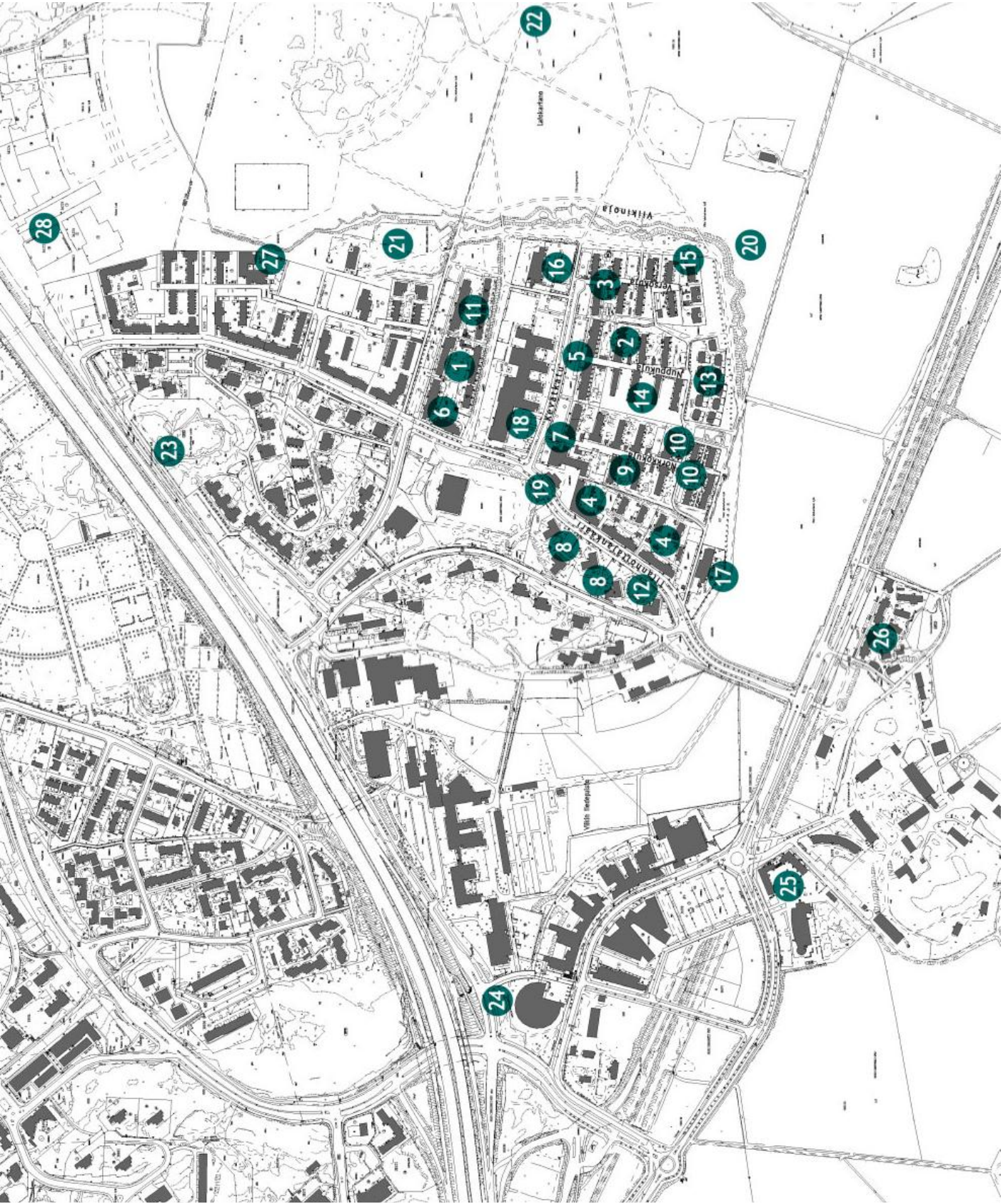
- 17, 21 (upper left), 25 (upper left), 27 (upper right/lower left), 28 (centre, left), 29 (upper left/lower right), 31 (lower left), 33 (centre), 35 (centre/lower), 41 (upper), 44, 47 (lower).

##### **Ahto Ollikainen**

- Page 25 (upper)

##### **Harri Hakaste**

- All other pictures.





“A really good love nest and home for a young couple”

“No cafes, no men’s keep-fit classes.”

“Give it time and let the trees grow!”

“All I have to say is, clay doesn’t really suit me.”

A residential area for approximately 1900 inhabitants was built at the turn of the millennium in Viikki, in the Helsinki district of Latokartano. High ecological goals, even by international standards, were set for the area. This publication tells how Eco-Viikki came about, how the ecological goals were achieved, and what was learnt from the experience. The authors are “activists” from the City of Helsinki and the Ministry of the Environment, who were involved in the Eco-Viikki process from the very beginning, and who have been following its progress closely.

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