Green Affordable Housing Development
Case Eco-Viikki, Finland

Heikki Rinne
Project Manager

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Information on Helsinki

Population

- Total 576,600
- Men 47%
- Women 53%

Household types

- Average size
- 1-member households 49.7%
- 2-member households 30.2%
- 5-member households 3.1%

Dwellings, by form of possession

- Detached houses 13%
- Dwellings owned 45%
- Rented dwellings by occupier 45%

Dwellings, sizes

- 1 room 23.7%
- 2 rooms 36.4%
- 3 rooms 21.6%
- 4 rooms 11.7%
- 5 or more rooms 5.9%

Helsinki, Viikki Project 2009
Features of housing production in Helsinki

- Yearly production varies from 3,000 to 5,000 dwellings
- 70 % of production is on land owned by the city
- Land is generally leased with yearly 4 % rent of the site value
- The city controls the price and quality of the dwellings, competitions are used
- The city itself is the biggest developer, about 30 % of yearly production, mainly for social housing
Social Mix Principles in Viikki

SOCIAL MIX OF HOUSING IN VIIKKI

- 31% Social rental housing
- 11% Rental housing for students
- 16% Right-of-occupancy housing
- 42% Private housing
- Service
- K Kindergarten

Helsinki, Viikki Project 2009
Viikki is situated close to the City Centre – distance is only 8 km
Total project area is 1,130 ha - blocks and traffic 290 ha,
recreation and nature conservation 840 ha
The planning of the new housing areas and Science Park started in 1989.

Environmental impact assessment was completed in 1990.

Densely built sections are situated along the main motorway.

The large recreational areas joint to the north-eastern central park of Helsinki.

Fields and nature conservation areas retain the present boundaries.

By 2015:
17 000 inhabitants
6 000 jobs
6 000 students
Eco-Viikki

- "green fingers" with gardening plots are between the quarters
- ecological surface water management
- most of the houses face to the south to exploit solar energy
Ecological Building Themes in Eco-Viikki

- saving energy and water
- utilization of solar energy passively and actively
- healthy indoor climate
- building flexibility
- healthy materials – timber
- quality of immediate surroundings
## Ecological Building Criteria

<table>
<thead>
<tr>
<th>Weight</th>
<th><strong>Min</strong></th>
<th>( - conv.)</th>
<th>1 p</th>
<th>2 p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10 Pollution</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO$_2$</td>
<td>kg / brm$^2$</td>
<td>3 200</td>
<td>(-20 %)</td>
<td>2 700</td>
</tr>
<tr>
<td>Clean water consumption</td>
<td>l / resident / day</td>
<td>125</td>
<td>(-22 %)</td>
<td>105</td>
</tr>
<tr>
<td>Construction site waste</td>
<td>kg / brm$^2$</td>
<td>18</td>
<td>(-10 %)</td>
<td>15</td>
</tr>
<tr>
<td>Household waste</td>
<td>kg / person / year</td>
<td>160</td>
<td>(-20 %)</td>
<td>140</td>
</tr>
<tr>
<td>Eco labels</td>
<td>products</td>
<td>none</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td><strong>8 Natural resources</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating energy</td>
<td>kWh / brm$^2$</td>
<td>105</td>
<td>(-34 %)</td>
<td>85</td>
</tr>
<tr>
<td>Electrical energy</td>
<td>kWh / brm$^2$</td>
<td>45</td>
<td>(-0 %)</td>
<td>40</td>
</tr>
<tr>
<td>Primary energy</td>
<td>GJ / brm$^2$</td>
<td>30</td>
<td>(-19 %)</td>
<td>25</td>
</tr>
<tr>
<td>Flexibility, multi-use of space</td>
<td></td>
<td>normal</td>
<td></td>
<td>15%</td>
</tr>
<tr>
<td><strong>6 Health</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indoor climate</td>
<td></td>
<td>good</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moisture risks</td>
<td></td>
<td>norm</td>
<td></td>
<td>better</td>
</tr>
<tr>
<td>Noise</td>
<td></td>
<td>norm</td>
<td></td>
<td>new norm</td>
</tr>
<tr>
<td>Wind protection, solar impact</td>
<td></td>
<td>plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative floor plans</td>
<td></td>
<td>normal</td>
<td></td>
<td>15%</td>
</tr>
<tr>
<td><strong>4 Biodiversity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant selection</td>
<td></td>
<td>plan</td>
<td></td>
<td>better</td>
</tr>
<tr>
<td>Storm-water management</td>
<td></td>
<td>plan</td>
<td></td>
<td>better</td>
</tr>
<tr>
<td><strong>2 Food production</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultivation of useful plants</td>
<td></td>
<td>normal</td>
<td></td>
<td>1/3 useful</td>
</tr>
<tr>
<td>Topsoil reuse</td>
<td></td>
<td>normal</td>
<td></td>
<td>on site</td>
</tr>
</tbody>
</table>

**PIMWAG-points total**

| 0 | **MAX 30** |

The cost effect of the basic requirements of the eco-criteria is 5%
The additional investments will be compensated over the life span.

Helsinki, Viikki Project 2009
SOLAR HEATING
- Largest solar heating project in Finland
- Supported by EU
- 9 solar heating systems for 412 dwellings
- Total area of the collectors is 1400 m²
- About 30% of the energy needed for heating the domestic hot water
- About 10% of the annual heating requirements
- The solar collectors are integrated within the roof structure

SOLAR ELECTRICITY
- Solar PV-panels are integrated into the balcony constructions
- 24 kW, 280 m²
Timber Framed Multi-Storey Houses

- completed in 1997
- the first modern timber framed multi-storey apartment houses in Finland
- 65 flats rented to the University staff

Mauri Mäki-Marttunen Architects
Viikki Church

- no chemical coatings
- façades untreated aspen shingles
- interior untreated wood
- Award 2006, Chicago Athenaeum

JKMM Architects

Helsinki, Viikki Project 2009
Glazed Balconies or Terraces

- “buffer zone” saves heating energy
- increases living comfort
“Green Fingers”

- for gardening
- to collect rainwater
- to compost gardening waste
- for outdoor activities

Helsinki, Viikki Project 2009
Monitoring Project

- Pilot projects
- Consumption (CO₂, water, heating, electricity)
- Fulfilling of the Ecological Building Criteria
- Interviews (developers, architects, deputy landlords, inhabitants)
- The technical descriptions of the projects

**DISTRICT HEATING CONSUMPTION**
weather adjusted specific fuel consumption kWh/m²

**WATER CONSUMPTION**
Litres/person/day

**ELECTRICAL CONSUMPTION**
kWh/m², ae = apartment, pe = property

Helsinki, Viikki Project 2009
Inhabitant Survey

Ownership of apartments

- 24% Owner occupied flats
- 21% Right of occupancy flats
- 55% Rental flats

Inhabitants / flat

- Eco-Viikki
- Helsinki

Age distribution

- Eco-Viikki
- Helsinki

Helsinki, Viikki Project 2009
Inhabitant Survey

Influence of ecological targets of construction on the choice of dwelling place

Effect of the area’s ecology on environmental consciousness and behavior

Amount of information about ecological solutions of own flat

Estimate of the degree of personal ecological knowledge

Helsinki, Viikki Project 2009
Eco-Viiikki
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”

City of Helsinki
Ministry of the Environment

Helsinki, Viikki Project 2009
The sustainability of a residential area depends first of all on the lifestyle of its inhabitants.
Viikki has offered an opportunity to implement, research and development as well as to test ecological solutions.

Eco-Viikki is well known in Finland and abroad. Visiting groups come from around the world.

Awards:
Paris, Eco-building Grand Prix
Malmö, Sustainable City Award
Thank you!

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