

BIOCLIMATISM

HELSINKI (Finland)

The setting-up of bioclimatism (use of natural energy provision without conversion into another form of energy, either electric, thermal or mechanical) is a renewable energy, in the sense that it is an inexhaustible and, moreover, a very cheap energy. Bioclimatism includes, first, analysis of the microclimate, aspect of the building, aspect of the windows and the roof, use of natural ventilation and air-conditioning, and optimization of natural light. Even if those different assets can sometimes get conflicting elements, because one cannot achieve all of them at the same time, bioclimatism has the great advantage of having no natural or seasonal boundaries. The case of Helsinki, given its project for the full creation of the environment-friendly district Viikki is interesting in many respects: implemented partnership, adopted methodology, scope of the project, issues. A project to follow.

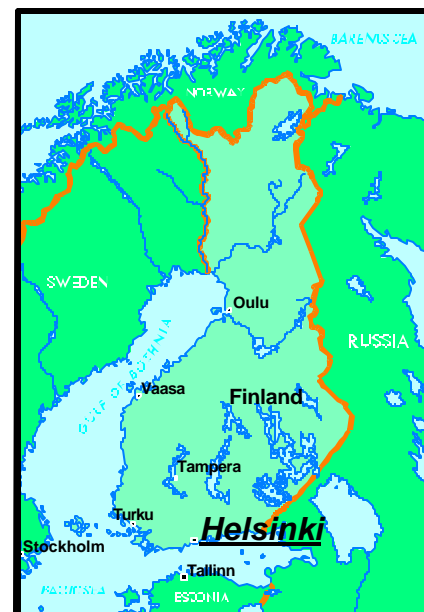
GENERAL ASPECTS

Helsinki, capital of Finland, is located at a latitude of 60° north. The city has 515.000 inhabitants, and belongs to a metropolitan area of 1.2 Million inhabitants.

The centre of the town is densely populated, contrary to its suburban areas, separated by major trunk roads arranged in networks from the town centre. Its sea and coastal landscapes are highly characteristic.

Climatic data :

Degree Days : 4,100
Annual Mean Temperature : 5.3 °C



CONTEXT

At a national level, a long-term programme for energy conservation, "The Council of State Programme on Energy Conservation" has been decided on September 1992, as part of the continuation of a sustainable development. Its goal is to reduce specific consumption of energy from 10 to 15% by the year 2005, and to reduce polluting emissions by promoting electric production through combined heat and power and use of renewable energy. In Finland, because of the harsh climatic conditions, numerous researches are carried out about energy economical buildings, and there are very strict thermal regulations. A unique development of experimental ecobuilding, Ekoviikki, will be erected in Viikki area in Helsinki. The idea is to demonstrate different environmental and energy solutions that follow the principles of sustainable development. The possibilities of utilizing solar energy in the energy management have been observed from the very beginning when preparing building and land use plans for Ekoviikki. In fact, Ekoviikki is a pilot project where guidelines for ecobuilding are drawn in a wider sense. The City of Helsinki is responsible for developing Ekoviikki area.



EXPERIENCE OF HELSINKI

Genesis of the project

- 1989 Preparation and adoption in 1994 of the town planning outlines of Viikki.
- 1994 The Municipality and the "Group for sustainable cities development" launched the competition for the planning of the ecological residential district of Viikki.
- 1995 Choice of the winning project. Beginning of the construction of the large projects of the scientific park.
- 1998 Beginning of the construction of one third of the ecological residential district of Viikki
- 2000 End of the first phase of accommodation for 2,000 inhabitants ; 2,000 jobs.
- 2010 Continuation of the residential area: 13,000 residents ; 6,000 jobs.



The site of Viikki is 7 km far from the centre of the town, along the main road giving access to the centre, and 20 minutes far from the airport by car. It appears to be an area that is not very much urbanised, where you can find a nature reserve and an experimental farm belonging to University. The district of Viikki will be an University suburb, where this latter and the scientific park, centres for biotechnology, will become the functional centre of Viikki. The project foresees the creation, within 20 years, of a new district of 13,000 new inhabitants, and 6,000 possibilities of jobs.

The outlines for the development of the main residential district, Latokartano, located at the south of Viikki, gives priority to ecological solutions, and recommends the use of wood as material for construction. A section of this district has been kept to develop there an ecological residential district of 1,700 inhabitants and of 70,000 m², fit for the Nordic climatic conditions, in a natural environment. Numerous services will be available in the district: supermarkets, clubs, bus stations, a kindergarten and a school. The kindergarten, which has to be built for the year 1999, will be subjected to a competition in order to include criteria for durability.

Players involved

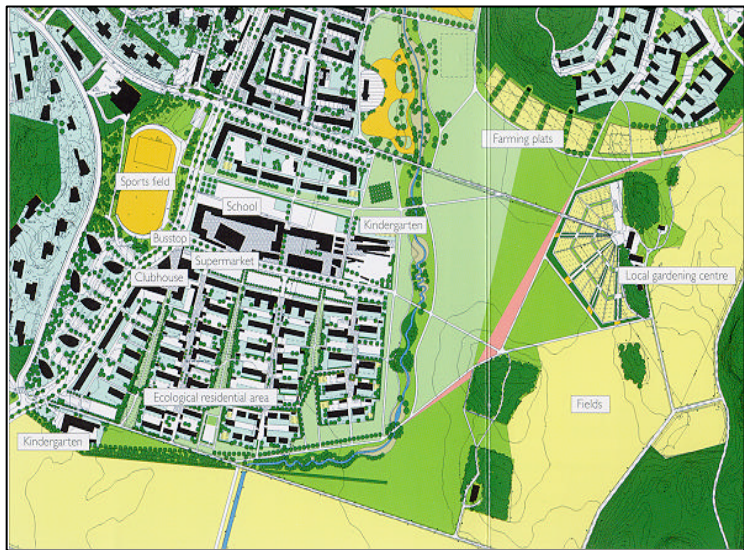
In the Viikki project, the municipality holds the key position. It had the initiative, and is the manager of the project. A close partnership has been established, since the launching of the project, with the group for development of sustainable cities (see above). Together, they launched a double competition for the design of the residential ecological district of Viikki: the first one, concerning the laying out of the district, and the second one, targeted on the building of experimental economical accommodation.

Competition for the planning of the ecological residential district of Viikki

Among the referential terms of the competition for the planning of the ecological district, it has been advocated to :

- develop a project economically feasible, of an high architectural quality, well integrated in its environment, and where it is nice living,

- promote the mixing of economic functions, and of social origins of inhabitants,
- promote the use of renewable energy and of passive/active solar provision,
- promote water savings and restrict wastewater
- maintain the variety of the ecosystem,
- use non toxic materials with a long useful life,
- if possible, use raw materials,
- take advantage of modern technology of telecommunications in daily life,
- promote involvement of inhabitants in the protection of environment,
- integrate different services : school, secondary school, hostel, grocery,
- keep the playground and the stadium,
- find solutions without cars, giving priority to public transport.



The team that won the competition suggested a planning with little four or five-storey buildings, gathered around courtyards, and directed towards the south, to facilitate free heating provision. It is also planned that the buildings should be in close contact with the natural environment. Green strips between the buildings would outline playgrounds and would also be there to ensure composting, salvage of water from the rain, and gardening. The architecture of the buildings is of high quality, with a pertinent use of the ecological materials, and an estimated consumption still below the one required in criteria. Nevertheless, as the six projects in competition included interesting innovations, each team will have the possibility to carry out a part of its project.

Solar Heat Project

One of these projects is the biggest solar energy project ever in Finland. The project involves the construction of nine solar energy systems (between 80-250 m² each), the total collecting surface area being 1,246 m². Each system has been optimised for its integration to the building in question. As the building planning did not start before the solar project, the siting, placing and sizing (predesign) of the solar heating systems have been possible. Also, the building planning process could better account for the solar aspects and requirements. The solar heating system consists of the collectors, storage and required heating components. The storage will operate with high stratification accomplished through a low-flow scheme and veridical passively opening stratifiers. This fits well with the basic heating system which is district heating with low return temperatures. Thus, the solar heating system can operate at relatively low temperatures and consequently reach higher solar yields. Following, the collector gross yield is will be much higher than in standard systems. Here in average 400 kWh/(m²a) is expected. The Ekoviikki Solar Energy Projects is part of the EU Thermie demonstration programme. The total budget of the Project is 800,000 € Almost one-half of the energy needed for warm service water of the new buildings will be derived from solar energy. This concerns some fifty per cent of the buildings in Ekoviikki. The main share of the solar energy systems will be constructed in apartment houses. The project increases the housing prices by about 0.5 per cent only, but yields free hot water in return. One of the focal features of the Solar Energy Project is the integration of solar energy into the building project on different levels. This includes a roof-integrated collector solution, the combination of ordinary building plan and solar design, joint purchases etc. The project comprises several innovative solutions and new financing patters. The Ekoviikki solar heat project started in

summer 1998 and it will be completed in autumn 2001. The first solar heat system is already being constructed in one of the building projects of the City of Helsinki Housing Production Bureau. The total surface area of solar collectors to be constructed on the roof of this accommodation unit is 248 m², and they have been integrated as part of the roof structure. This solar heat system will be taken into use in early spring 2000. The rest of the systems will have been taken into use by summer 2001, and they will then produce some 15% of the annual heat demand of the Ekoviikki area.

The future inhabitants of the ecological residential district of Viikki

One third of the inhabited districts belongs to government, who sell them to private construction societies in charge of building dwellings with access to the property. The Municipality, owning what remains left, will have accommodation built, one part of which will be sold to private individuals, and the other part will be rent out. The marketing of the project towards the future purchasers and tenants is entirely directed towards the ecological goals of the district. Property developers try, as far as possible, to include the future inhabitants in the choices relative to the ecological developments of their accommodation. Advanced technology will be used to disseminate the information concerning social and cultural activities of the district through a network of data to which all the buildings will be able to connect.

EVALUATION AND PERSPECTIVES

The competitions have held an essential role in the development of the project, particularly at the level of the consciousness raising and of the training of the hired teams who, in order to deal with the actual problems, had to be initiated with a scheme including numerous professions and disciplines, by bringing together architects, ecologists, town planners, etc. In 1995, the group for the development of sustainable cities launched another competition, that time concerning ecological renovation of the district of Ristinummi in Vaasa. The competition for the planning of the ecological residential district of Viikki has been a Finland first. There did not, thus, exist any reference in this matter. In a country where there is a strong urbanisation, the issue of the competition was to prove that it is possible to include ecological criteria in urban development projects. The guide of the ecological criteria of Viikki was published on May 1998. It develops a methodology completely integrating both monitoring and assessment of the projects. It will then be important to follow them within the years to come.

FOR FURTHER INFORMATION

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