

Hammarby Sjöstad



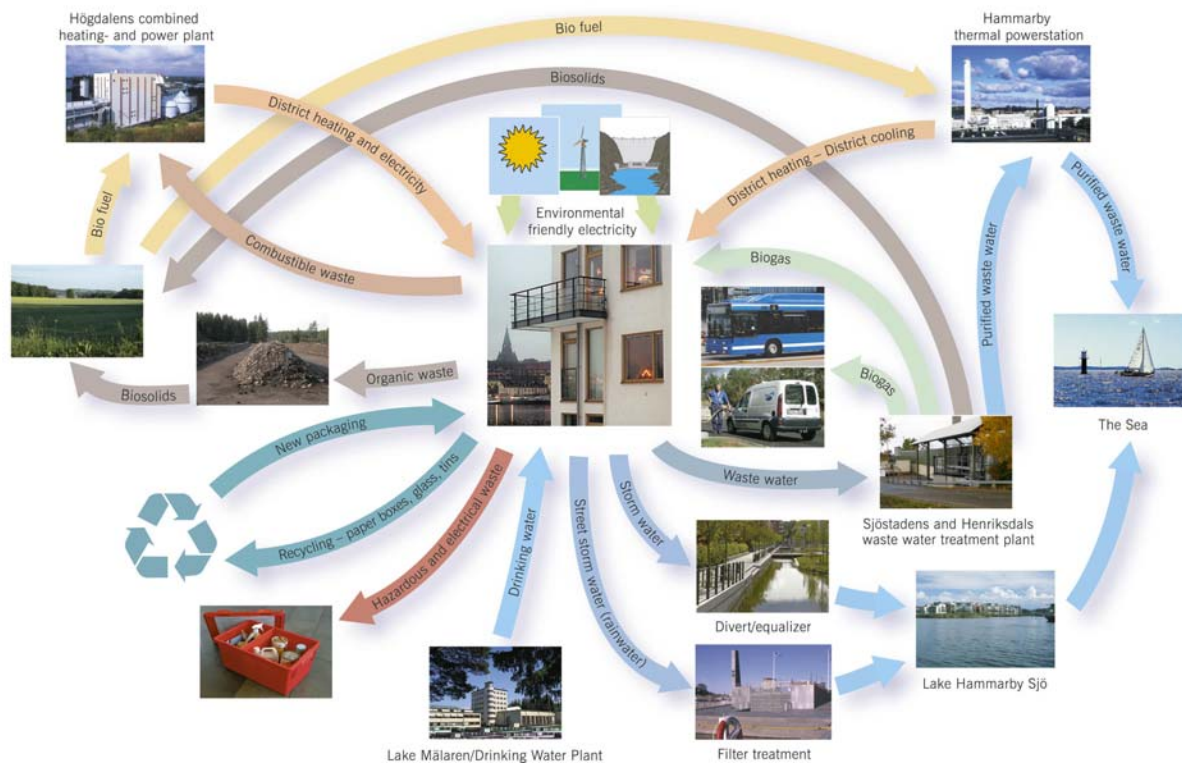
Location of Hammarby Sjöstad



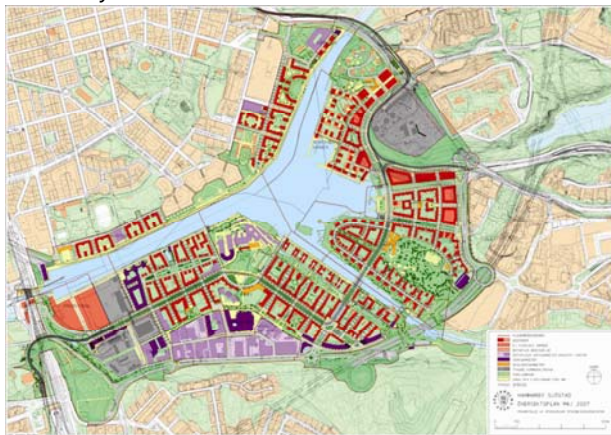
GlasshusEtt Information Centre

- location:** Stockholm, Sweden
- dates:** 1990 design beginning, 1992 beginning of construction; development ongoing, due to finish in 2016
- type:** New construction in brownfield / formerly industrial area
- use:** Residential, some commercial, services
- size:** 250 hectares
- people:** When finished 10000 dwellings for 25000 people and additional 5000 working in the area
- actors:** City of Stockholm, Stockholm Water Company, Fortum and the Stockholm Waste Management Administration (created the eco-cycle model -"The Hammarby Model"), different developers
- goals:**
 - The overall environmental goal is that the impact placed on the environment by emissions from Hammarby Sjöstad shall be a massive 50 % lower than the corresponding level for newly constructed housing areas dating from the early 1990s. Other goals were:
 - Land usage: sanitary redevelopment, reuse and transformation of old brownfield sites into attractive residential areas with parks and green public spaces.
 - Energy: renewable fuels, biogas products and reuse of waste heat coupled with efficient energy consumption in buildings.
 - Water & sewage: as clean and efficient as possible - both input and output – with the aid of new technology for water saving and sewage treatment.
 - Waste: thoroughly sorted in practical systems, with material and energy recycling maximised wherever possible.
 - Transportation: fast, attractive public transport, combined with car pools and cycle paths, in order to reduce private car usage.
 - Building materials: healthy, dry and environmentally sound.

energy use	KWh/m ²	construction	amenities
heating&electricity, initial goal (2000)	60	<ul style="list-style-type: none"> ▪ Sound, environment-friendly building materials 	<ul style="list-style-type: none"> ▪ proximity to public transport ▪ waterfront access ▪ preschools, schools, library ▪ healthcare ▪ commercial services ▪ recreation facilities (downhill skiing and cross country trails, kayaking, indoor recreation centres)
heating&electricity, updated goal (2005)	100 (20 for el)		
heating&electricity, achieved heating & electric, best 2006 regulations for new building (BBR), goal	110		
systems		site ecology	special features of the project
district heating	x	<ul style="list-style-type: none"> ▪ industrial land reclamation ▪ 'ecoducts' for biodiversity ▪ soil decontamination ▪ preservation of the hill of oak trees ▪ noise reduction devices <p><i>*some buildings, not all</i></p>	<ul style="list-style-type: none"> ▪ GlasshusEtt, information centre ▪ Integrated planning ▪ Innovative eco-solutions ▪ Innovative technologies ▪ Strong environmental demands ▪ Waste water treatment plant ▪ Waste separation and central handling ▪ Grey and black water treatment ▪ Biogas production recovery nutrients for farmlands ▪ Green roofs
combined heat & power	x*		
solar panels	x*		
solar cells	x*		
biomass and refuse	x		
wind power			
natural ventilation			
forced vent.w/heat recovery	x*		
non-renewable energy	x		
individual metering	x*		



Hammarby model



Plan of Hammarby Sjöstad 200, from Stockholm City Development Administration web page

Sea bank (picture by Milos Stankovic July 2007)

process and history

In 1917 the City of Stockholm bought the land south of Hammarby lake with the aim to develop an industrial area. In the major part of the Hammarby harbour area small and large-scale industries were mixed with office buildings and harbour activities. The industrial and harbour activities have led to high pollution of the area.

At the beginning of the 1990s, with a rise in housing need, plans started to be worked out for a new residential development. At the time most of the businesses of Hammarby were still prospering, but the City of Stockholm decided to turn this area into a new residential area. Several plans were made after the negotiations with the settled companies. The initial plans from the beginning of 1990s were changed in the 1996 and 1997, when new plans were developed as a support for the bid for the Olympic Games in 2004. An ambitious goal was set: 'twice (double) as good'. Even though Stockholm lost the bid, the environmental objectives were kept and further developed.

The idea was to create a new residential district, where people would live in comfortable housing with a good view of the lake, plenty of light, a beautiful natural area (green spaces, parks, and water), good transport connections and a location close to the Stockholm city centre.

description of special project features

In order to obtain the set goals an eco-cycle model 'Hammarby model' was developed for the area. It shows how sewage processing and energy provision interact, how refuse is handled and the added-values society gains from modern sewage and waste processing systems. The model was developed as a joint effort by Stockholm Water

Company, Fortum and the Stockholm Waste Management Administration.

Special attention is paid to following aspects:

- Decontamination and clearance - The City of Stockholm's Environment and Health Administration has cleared and decontaminated the area to meet the requirements for not posing a health and environmental threat.
- Construction materials – all materials and products used should be sustainable, tried and tested, and eco-friendly.
- Storm water from streets – collected, purified and released into the Hammarby Sjö
- Solar panels – installed on some of the roofs, they meet half of the building's need for hot water
- Vegetation – preserved oak forest, vegetation ensures clean air, collects rainwater locally, and provides counterbalance to the dense urban landscape
- Vacuum system for solid waste and refuse sorting
- Green roofs – good local environment, rain water handling
- Ecoducts – ensuring biodiversity of local vegetation and animal species
- Communications – good public transport options, car pools, ferry traffic and foot and cycle paths
- Waste water treatment plant – it tests new technology, four different and new processes for purifying waste water. One of the products is biogas currently used as fuel in eco-friendly cars and busses

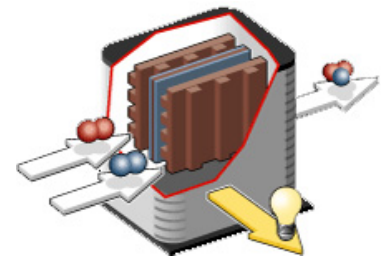
In Hammarby Sjöstad, an environmental information centre was built, Glashuset. It provides lectures on sustainable city planning and encourages inhabitants to live more sustainably. Interested citizens as well as visitors to the area can inquire about the features of the area.

The centre also serves as a testing ground for new technology with the aim to achieve good indoor climate with low energy consumption. Double-glazed facades, linked to an advanced control system cuts the energy consumption to 50 % of that of an equivalent building with glass facades. The double-glazed facades reduce the need for artificial light and the energy requirement for heating, cooling and ventilation. Heating is primarily provided by a heat pump that takes energy from the pumping station's moist heat and the waste heat generated by the mains power installation.

A fuel cell – an advanced energy converter – has been installed for the first time ever in a commercial building in Sweden. The fuel cell runs on hydrogen gas.

The fuel cell (on picture to the right)

1. Hydrogen and oxygen are fed to the fuel cell.
2. Electrons are released in the fuel cell, generating electricity and heat.
3. The waste product is water.



A solar panel plant has been installed on the roof to supply the fuel cell with energy by breaking water down into hydrogen in an electrolyser. Surplus power produced during summer will boost the building's power supply.

A biogas boiler, to meet peaks in heating requirements, and a biogas stove in the kitchenette has been installed. The biogas is produced in the area's own sewage plant and is part of the eco-cycle solution.

results

Since different actors were involved in the project with different developers the results are various. The high energy targets that were set have in most cases not been reached. Some measurements are performed but the data is not available to the public. The environmental goals were revised two times so far. The first Environmental programme was issued in 2000, revised in 2002/2003 and in 2005. Some goals were specified in more detail, with higher demands, while others, as energy were changed to lower, more achievable goals.

Regarding water consumption, the goal was set to 100 l/person/day, and the average consumption during the period from July 2006 to July 2007 was 141,9 l/pers/day (Stockholm average consumption is 200 l/pers/day – according to the official site of Hammarby Sjöstad area - <http://www.hammarbysjostad.se/>).

Energy goals were initially set to 60 kWh/m² and updated in 2005 to the goal of 100 kWh/m². Good performances were reached at two multi family building blocks, Holmen and Grynnan, which were constructed by NCC. Total building size is 212 flats and 1600 m² of non-residential area. On both buildings PV cells were installed in facades, balconies and windows with the total peak power 46 kW and PV production 32MWh. In total there are 212 PV modules installed on the south-west facing facades. The amount of produced energy is planned to correspond to the need of 70% of the energy needed for energy efficient refrigerator/freezer. The total budget for the project was app 35 mil Euro. The project was financed by NCC with a 30% subsidy for the innovative parts related to the environmental efforts, by the LIP programme. The project is carried out by NCC and the architect is White Architects. The PV supplier has not yet been selected, as this will be subject of an open tender.



Walkway by the sea (picture by Milos Stankovic)



Hammarby Sjöstad at night (picture by Victoria Herniksson)

funding

LIP (Local Investment Programme) Stockholm has supported the development of the Hammarby Sjöstad area by 300 mil SEK (33 mil Euro)

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sources:

- More on Hammarby Sjöstad on the Stockholm City Development Administration Office web page <http://www.stockholm.se/Extern/Templates/InfoPage.aspx?id=45432>
- More on the NCC project Hølem and Grynne can be found on: http://www.pvnord.org/buildings/ncc_hammarby_sjostad/Brief_Building_Report_HolmenGrynne.pdf
- Cas Poldermans (Feb 2006). Sustainable Urban Development, The Case of Hammarby Sjöstad, Paper for Kulturgeografiska Institutionen, Advanced Course in Human Geography Fall Semester 2005, Supervised by Lennart Tonell

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