

Strategies for sustainable building and urban development in Malmö; exemplified by Västra Hamnen and Augustenborg

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1. INTRODUCTION

This paper presents strategies for sustainable building and urban development, based on experiences from two projects in Malmö, the Bo01 area in Västra Hamnen and Ekostaden Augustenborg. It first presents a basic outlook on sustainable urban development in the city of Malmö, as a base for the strategies implemented in the projects. It argues that one has to look upon the projects as a whole, consisting of a package of measures. The measures are undertaken in different focus areas such as energy, ecocycle, traffic and biodiversity, resulting in a sum greater than the parts. The paper gives a strategic background, describes the two different projects and finally concludes with strategies for further development in the city, based on the experiences from the projects and new models for cooperation and implementation.

2. BASIC OUTLOOK

The city of Malmö has developed a strategy for sustainable development based on general documents such as the Local Agenda 21 Plan and the Environmental Strategy. The LA 21 plan taken in 1997, documents the state of the environment in the city and describes the visions for sustainable development. The Environmental Programme laid down in 1998 sets up concrete goals to reduce climate impact and the use of resources, both in buildings and everyday city activities. Simultaneously the Swedish government initiated a major funding programme for sustainable investments in the municipalities, which made it possible to develop a tool to reach these goals, Malmö's Local Investment Programme for Sustainable Development.

Malmö has through its density, geographical situation, good infrastructure, and other favourable conditions, possibilities to become a very resource efficient and sustainable city. There are, for example, unique possibilities for large-scale systems for locally renewable energy from the sun, wind, water and bedrock to be combined with effective systems for district heating and cooling. Strategies where measures for ecological, social and economic sustainability can be combined are necessary to create a sustainable development of the community as a whole.

3. EXPERIENCES FROM MALMÖ

Sustainable building and urban development have been the focus in two different projects in Malmö. One is an existing housing area where the focus has been sustainable revitalisation and the other is a redevelopment of a former industrial area to a new city district with high environmental aims.

3.1 Ekostaden Augustenborg

Augustenborg was built in the post war period as a pioneer of the new Swedish housing policy. Construction started in 1948. The area gained international acclaim in Sweden and Europe as a model of future urban living, and consisted of high quality accommodation, schools, shops, local employment, social facilities and a pleasant environment. During subsequent decades industrial decline and associated social and economic problems have hit the area hard.

A number of different departments within the City of Malmö, Fosie SDF, the local city borough, and the municipal housing company MKB initiated the Ekostaden Augustenborg project and have been working together with local residents to revitalise the area, to make it a more socially, economically and ecologically sustainable neighbourhood. The project is partially financed through Malmö's Local Investment Programme for 1998-2002. Ekostaden Augustenborg is one of Sweden's largest urban sustainability projects, covering the residential area, the school and an industrial area. The aim is to create a higher degree of resident's participation and jobs locally, and to make the area a model for similar revitalisation projects in Malmö and Sweden.

3.1.2 Sustainable building: the original character of the buildings had been damaged in the '70s by covering the facades with external insulation and steel sheeting. this also has had a negative effect on the internal environment in certain houses with problems with damp, ventilation and temperature control. this covering of the walls has been removed and a new insulation layer has been covered with skimmed painted render in five buildings, the remaining to be done in a rolling programme over a longer period.

Thirteen resource houses have been erected with sound materials and green roofs, one of them with straw and clay walls. The school has a new demountable ecological pavilion, with solar panels and a urine-separating compost-toilet. A communal house for the elderly has been built with sound materials and a green roof, as an extension to an older building now adapted for people with mobility problems, and a new house with flats for the elderly has erected on the unsightly concrete roof of a large underground garage.

9000 m² of green roof has been created on Kommunteknik's industrial area. The roofs form a unique botanical roof garden, where Europe's most comprehensive multidisciplinary research and development programme on different aspects of green roofs is carried out.

3.1.3 Green structures: the large green roof project is a part of both rainwater management and the green structures. the area had problems with flooding of the cellars in heavy rains. as the roofs of the industrial area were a large rainwater-collecting surface, applying the green roofs minimises runoff and the new rainwater management system starts here. elsewhere in the area the rainwater is led in into a series of open channels collecting the run-off from most of the hard surfaces, taking it into holding and flooding ponds before the water leaves the area. the actions taken will ultimately result in a 70 % decrease in the run-off water that leaves

the area. the courtyards and augustenborg's park have been redeveloped together with the residents. the ponds and new planting also contributes to biodiversity.

3.1.4 Eco-cycle, waste management: the residents recycle nine fractions and compost organic waste in huge compost machines in the new resource houses placed within a short distance from the flats. this action means that ultimately 80 % of the waste from augustenborg will be collected and recycled or reused. an ecological management plan for the area has been developed that contains waste handling, composting of garden waste and a fossil-fuel free machine park for maintenance of the common green areas.

3.1.5 Traffic: the world's first electric road train is operating in the area providing a link between outlying areas and a central bus depot and local services such as health centres, chemists and banks. traffic in the area has been a problem and speed limits of 30 km/h have been introduced. a car pool with electric and ethanol powered vehicles has been started by a group of residents.

3.2 Västra Hamnen, the Bo01 Area

The City of Malmö has started redevelopment of Västra Hamnen, an old industrial area in the harbour, to a new city district with apartments, offices, shops and other services. Västra Hamnen used to be the centre of industrial activity for over 100 years for amongst others Kockums, the local shipyard, where huge boats and later submarines were built. In the late '80s SAAB built a new modern car factory on the landfill area, but the area has been left empty after changes in industrial activity.

Bo01, City of Tomorrow, the European Housing Expo in 2001, is the first step in redeveloping the area. The theme for the expo was "The future city in the ecological sustainable information and welfare society". A number of pioneer projects and special solutions work together to reach environmental sustainability for the area as a whole. The aim for the district is to be an internationally leading example of environmental adaptation of a densely built urban area.

The project was possible to realise to the full through grants from the government through the Local Investment Programme for Malmö for the period 2000-2003. In the project a Quality Programme agreed upon between the city, the expo and the developers, set standards for materials, energy efficiency, and biodiversity. System solutions for waste, sewage, traffic, energy and biodiversity were accomplished by the application of existing technology combined in innovative ways.

3.2.1 Soil decontamination: as the area has been the centre for industrial activity and consists of landfill from construction work and building in the city, the ground has been examined and comprehensive ground works have been carried out to ensure there is no risk for health and the environment. a small portion has been removed and deposited awaiting treatment.

3.2.2 Sustainable building: all houses have been built based on standards set in the quality programme. the city of malmö, the expo and the contractors have agreed upon standards for the buildings performance concerning material use, energy and green issues. environmentally dangerous substances are avoided. the standard for energy use in the buildings is set to 105 kwh/m² annually. there have been high ambitions to combine ecological sustainability with human sustainability in the shape of good architecture, beauty, social interaction and

functionality. the large number of contractors and different types of buildings makes it possible for the area to show a great variety of architectural designs and solutions on sustainable building.

3.2.3 100% local renewable energy: The area is provided exclusively with energy from renewable resources. Sun, wind and water are the basis for energy production together with biogas from refuse and sewage from the district. Electricity is generated mainly by wind power with a minor part generated by photovoltaics. A new wind turbine provides electricity for 2000 flats.

A large percentage of the heating is extracted through heat pumps from aquifers (natural water reservoirs in the bedrock) and seawater and also generated from solar collectors. The area's energy system is connected to the city's energy grid as a storage and reserve supply. This means that the local system exports energy when it is producing a surplus, and imports when the opposite is the case. On an annual basis the system is producing the amount of energy needed in the area. The system consists of existing technology combined in an innovative way. The concept has been rewarded with EU-Commission's energy prize "The Campaign for Take-off Award."

3.2.4 Eco-cycle, Waste treatment: Collecting stations for 6 fractions are located in the properties. These fractions go to recycling plants. The organic and the other waste fraction go into vacuum waste chutes. The organic waste is taken from there to the biogas plant, where it meets slurry from food waste disposers in 70 apartments, and sewage. The biogas can be used as alternative car fuel, for electricity and heat production, or be pumped back into the area's natural gas grid after further cleaning. The next step in the process will be a KREPRO plant where phosphorus is extracted from the sludge from the biogas process. The remaining waste is taken to Malmö's waste incineration plant where heat is extracted. The area is attached to Malmö's existing sewage system, except for the food waste disposers that have separate pipes to the collector tank.

3.2.5 Biodiversity: The district is built with the aim of containing a diverse range of natural life. A number of habitats are created in the parks, and green space factors and green points are used to stimulate biodiversity in the housing area, resulting in green roofs and a variety of gardens.

Rainwater is treated locally without any connection to the public sewage system and will be cleaned and treated through a surface run-off system. The system consists of green roofs, channels and dams that hold back the rainwater before reaching a recipient, either the canal or the Öresund. The system also contributes to an increased biological diversity in the area.

The green space factor system is used to integrate the design of the houses with the gardens. The system is applied to ensure compensation for land use and biodiversity in the area. 14 different factors have been set up, and the project has to reach a factor of at least 0,5 to get building permission. The building contractors have also selected at least 10 "Green Points" that benefit biodiversity.

3.2.6 Traffic: the area is planned and built to give priority to pedestrians, bicycles and public transport and to minimise effect on the environment from traffic. a mobility management office is set up to give residents and companies in the area advice and support. a transport-

pool with alternative vehicles has been set up, and a station for electric charging and gas filling is placed in the area.

3.2.7 Environmental communication and IT: through information, advice and different experiments with it-solutions one aims to motivate and facilitate environmental sound behaviour and actions. the inhabitants shall be able to read and control their own energy consumption and book a car in the carpool.

4 STRATEGIES FOR FURTHER DEVELOPMENT

The City of Malmö is working towards creating a collected operative strategy for sustainable building and urban development. The purpose is to develop a toolbox with different tools and strategies.

One strategy is to develop methods and work procedures to work locally within defined areas. Success factors to succeed with this type of local work is amongst others the ability to:

- Create commitment and local co-operation between individuals, organisations and companies.
- Find resources for investments and development work
- Combine local ideas and wishes with knowledge and experiences from different professional participants
- Work methodically with long term aims and determination, which requires experience and patience.

Another strategy is to develop governing programs and criteria, for example:

- A Programme for ecological building
- Local environmental and quality programmes
- Green space factors and similar criteria

A third strategy is to develop a new type of environmental management system that could be used in new development or ecological redevelopment of residential areas. The experiences from Bo01 and Augustenborg should be the basis for this.

A forth strategy is to create a local centre for sustainable urban development. This centre could be a platform for partnerships between different actors on the scene and for research and development of future sustainable solutions.

5. CONCLUSION

The work towards sustainable development has been carried out together by a large number of participants in both the Bo01 and Augustenborg projects. A number of research projects are following up the different measures taken. The experience from the projects make a common ground to build on for continued work towards a sustainable building practice and development in Malmö. They reflect two urban settings that are both important to deal with, the construction of new urban areas and the revitalisation of existing housing areas. Experience from the pioneer projects in new construction can be implemented in the existing building mass, and the Augustenborg project shows an approach that can be developed further in other existing areas.

The experiences from these projects will be a model for further sustainable development projects. The high environmental standards set in the Bo01 area will be followed up in the further development of Västra Hamnen, through a revised Quality Programme and similar

infrastructure projects. A project to introduce solar energy in Augustenborg has been developed, based on the experiences from Bo01. Lastly, a Programme for Sustainable Building in Malmö is underway, to be applied in new residential projects.

6. REFERENCES

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